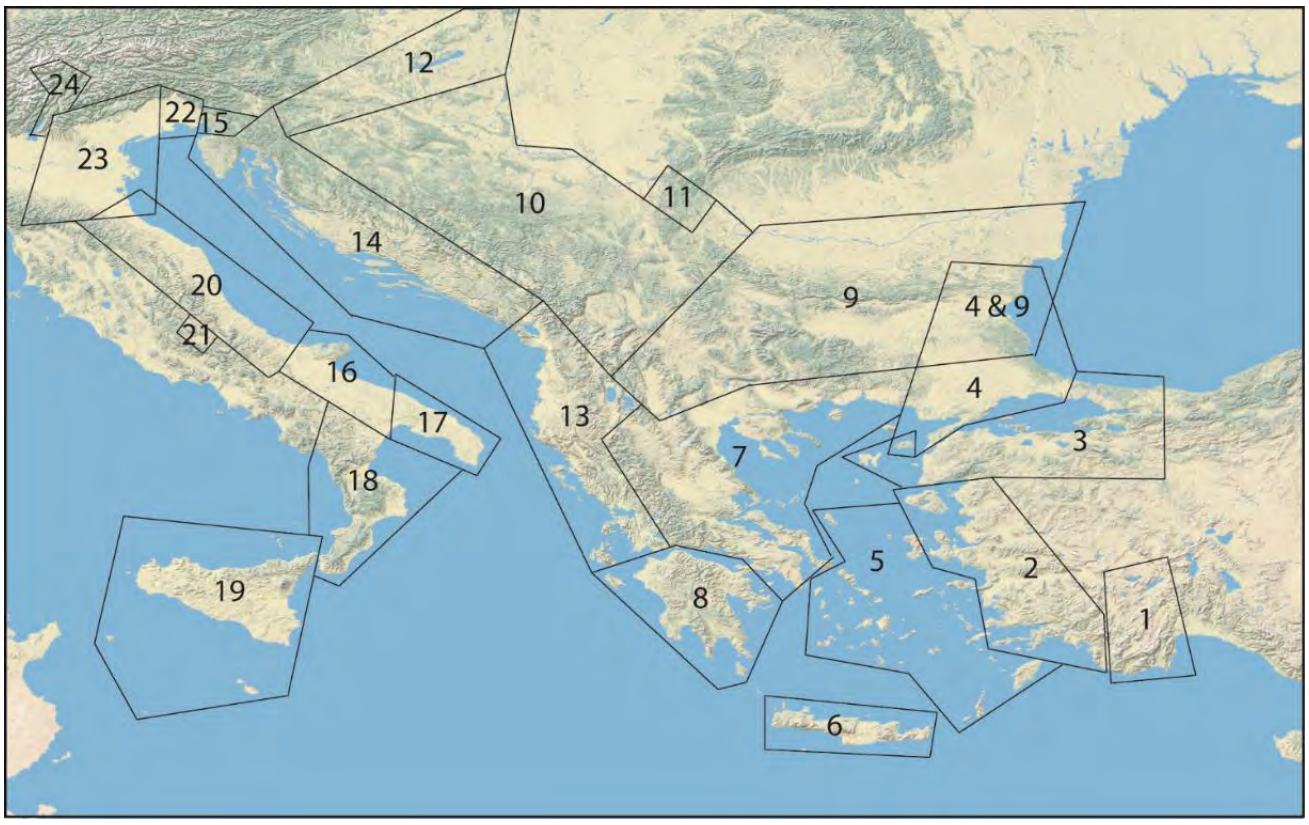
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What Happened to the Southern European Hunter-Gatherers at the Advent of Farming, between Western Anatolia and the Head of the Adriatic Sea (9000-4500 BC)?
A narrative description based on the archaeological record

Doctoral Thesis

Michael Templer



Study Area and Regions

Volume 1 – Text

Doctoral thesis under the direction of Prof. M. Honegger

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Neuchâtel, le 15 septembre 2016

Le doyen
Hédi Dridi

p.o

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Glossary of abbreviations

aka: 'also known as'.
ALBOT & ALBOT: 'A Little Bit of this and a Little Bit of That'. An abbreviated way of stating that multiple factors are involved and that one cannot be categorical or simplistic regarding provenance, causes or effects.
BC: Before Christ – calibrated date (sometimes referred to as BCE (Before Common Era) in the literature.
BP: Before Present – before 1950 BC in uncalibrated Radiocarbon years (^{14}C dates). In the literature 'BP cal.' is sometimes used to express calibrated dates prior to 1950 BC.
^{14}C: Method of dating using half-life of Carbon 14. See also 'OxCal'.
CEB AEB: Central European-Balkanic Agro-Ecological Barrier – Climatic and geological barrier running ENE from Lake Balaton which acted as a barrier to the northward progression of the Neolithic between *ca*. 6000-5500/5300 BC.
DFBW: Dark Faced Burnished Ware (Early Neolithic pottery style emanating out of the Near East).
FTN: First Temperate Neolithic – Term coined in 2007 by John Nantris, to define the coherent and integrated phenomenon of the initial penetration of the Neolithic into Europe without referencing the nationally based archaeological cultures of the Southern, Central and Northern Balkans.
IRSL: Infrared stimulated luminescence dating method.
kya: 1000 years ago (20 kya = 20.000 years ago).
LBK: *Linearbandkeramik* – Linear Pottery Culture in English.
LPC: Linear Pottery Culture – LBK in German.
LGM: Last Glacial Maximum – end of coldest period of last (Wurmian or Würmian) ice-age, also marking the beginning of global warming dated *ca*. 18.000 BC.
masl: metres above sea level.
mbsl: metres below sea level.
MNI: Minimum number of individuals – used in the analysis of faunal remains.
NOA: North Atlantic Oscillation – north-south seasonal movement of junction of westward moving warm air and polar air in the North Atlantic where weather systems (depressions) are born.
OxCal: Open-access Oxford University Radiocarbon Dating Laboratory permitting the calibration or recalibration of ^{14}C radiocarbon dates.
PHP: Primary Harvestable Productivity – total available wild vegetable biomass for human consumption in a given region.
PPN: Pre-Pottery Neolithic – Initial or Early Neolithic periods in the Near East when pottery was either non-existent or in its infancy (PPNA = *ca*. 10k- 8,5k BC; PPNB = *ca*. 8,5k-7k BC; PPNC = > *ca*. 7k BC).
RCC: Rapid Climate Change. Climatic events involving rapid cooling in the Eastern Mediterranean. The RCC event that concern us is that between *ca.* 6600-6000 BC, with its cold, strong winds and aridity which led to the "*drought-triggered cultural collapse in the Southern Levant*" (Weninger B., et al., 2009) and contributed to the initial migrational movement out of the Near East and Central Anatolia towards the south, south-west and west; its coupling to the '6200 BC event' resulted in the great Neolithic migration into Europe.
RSBW: Red-Slipped Burnished Ware.
TFR: Total Fertility Rate – Total number of children born over the child-bearing age, estimated as being between the ages of 18-40, for a given population.
THC: Thermohaline Circulation. Name for global deep sea and surface current which crosses the North Atlantic as a warm surface current from the Gulf of Mexico towards Western Europe. Western Europe's mild damp climate is dependent on this current, also known as the Gulf Stream.
TL: Thermoluminescence method of dating.
WPW: White-Painted Ware – Mostly associated with the Starčevo Culture in the Central Balkans.

VBQ: Vasi a Boca Quadrata (Square-mouthed Pottery Culture) Neolithic Culture of Northern Italy which flourished from *ca.* 4500 BC.
WRE: Water Reservoir Effect (aka Aquatic Reservoir Effect) – Generic abbreviation to designate the correction to ^{14}C dates when calibrating these, for the aging effect on dates due to the dated object emanating from an aquatic environment (freshwater or seawater), or due to dating human or faunal remains that have directly or indirectly consumed substantial quantities of aquatic resources. The correction to be applied is location and period specific.

Abstract

Other than the 'Objectives and Introduction' and 'Conclusions', this study is meant as a reference manual regarding the evidence for the contact period between the autochthonous Mesolithic hunter-gatherer population and the immigrant Neolithic farmers in the Study Area, which stretches from Western Anatolia to the Trentino-Alto Adige at the head of the Adriatic, and which is broken into 24 Regions, grouped into 6 Macro-Regions. Through the published archaeological record, site visits and meetings with regional experts, this study attempts to elucidate and summarise how the Terminal Mesolithic population in the 24 Regions interacted with the Initial Neolithic migrants. The study differentiates between Mesolithic sites in which 'Neolithic' attributes appear at a point in time and Neolithic sites established by migrant farmers which might have encompassed Mesolithic attributes, recognising that this last is in many cases more difficult to elucidate. The contact period, which can be short or last many centuries, has been termed 'Transition' to avoid the Mesolithic-Neolithic dichotomy, since hunter-gatherers can in many instances be seen to continue with their ancestral lifeways after acquiring some desirable Neolithic attributes, and where possible, their progress towards the full Neolithic or their disappearance from the archaeological record has been tracked over time. The Mesolithic way of life eventually disappears from the archaeological record, and the Transition is a watershed moment for humanity as mankind transitions from a life lived broadly in symbiosis with nature to one lived in which nature is altered to meet mankind's desires.

Key-words: Mesolithic, Neolithic, Transition, Region, 'game in the pen', ALBOT & ALBOT.

Résumé

A part les sections 'Objectives and Introduction' et 'Conclusions', cette étude prétend être un manuel de référence concernant la période de contact entre les populations de chasseur-cueilleurs mésolithiques autochtones et les fermiers immigrants néolithiques dans la zone d'étude, qui couvre une aire géographique entre l'Anatolie occidentale et le Trentino-Alto Adige au nord de la Mer Adriatique, et qui est divisée en 24 régions, groupées en 6 macro-régions. Par le biais des publications archéologiques, des visites de sites et des rencontres avec des experts régionaux, cette étude cherche à mettre en avant de manière succincte comment les populations du Mésolithique terminal des 24 régions ont interagi avec les premiers migrants néolithiques. L'étude fait une différence entre sites mésolithiques où des attributs 'néolithiques' font leur apparition à un moment donné, et sites néolithiques établis par des agriculteurs immigrants qui auraient pu inclure des éléments mésolithiques, tout en reconnaissant que percevoir ce dernier pose problème. La période de contact, qui pouvait être courte ou durer plusieurs siècles, a été nommée 'Transition' dans le but d'éviter la dichotomie Mésolithique-Néolithique, car dans plusieurs cas on constate que les derniers chasseurs-cueilleurs ont continué leur mode de vie ancestrale après avoir acquis certains attributs néolithiques, et là où possible nous avons suivi leur progrès dans le temps vers le Néolithique ou leur disparition d'un point de vue archéologique. Le mode de vie mésolithique disparait éventuellement des sites archéologiques, et la Transition est un moment clé pour l'humanité alors qu'il change d'un mode de vie en symbiose avec la nature à un autre dans lequel la nature est pliée pour palier à ses désirs.

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Objectives and Introduction

What can appear to us to be rapid change in the context of Prehistory is unlikely to have appeared so to the peoples involved, although there are some striking examples to the contrary, which most often involve the sudden arrival of new peoples with new technologies, value systems and cultural identities. Under normal circumstances, cultural evolution is a continuum and its historical manifestations involve the construction, re-negotiation and reproduction of a culturally created human identity involving many people and many things at different times and in different places. The advent of the Neolithic is the most important qualitative change in the human condition, which is marked by the Transition from a hunter-gatherer-collector-fisher life-way which of necessity implies living in symbiosis with nature, to a productive life-way involving agriculture and animal husbandry, in which the natural constraints of the carrying capacity of the land are overcome by bending nature to the needs of mankind. The Transition to the Neolithic in the Study Area, which covers the north shore of the Central Mediterranean between Western Anatolia, the Balkans and the head of the Adriatic (Map MR1), was a complex process involving demic diffusion with agricultural products, domesticated animals, new technologies and belief systems, whose origins are to be found in the Formative Zones in the Near East; the Neolithic migrants adapted their attributes to the new environments over time and their diffusion across the Study Area involved the piecemeal adoption and adaptation of their baggage by the autochthonous populations they encountered, who also transferred part of their knowledge and cultural baggage back to the Neolithic migrants, so that in time the two merged into new cultural groups.

The objects we find in the archaeological record can represent discarded objects, misplaced objects, the accidental deposition, disposal or loss, or the conscious placing and positioning of objects for long-term memory, out of respect or for ritual purposes. Other than manufactured objects, prehistoric man has left many other traces that witness his passage, regarding his habitation, diet, life ways, etc. The archaeologists' primary objectives are to discover, understand and interpret what he finds and hopefully communicate the information in such a manner that it is preserved for future generations.

Writing the history of prehistoric peoples is made up of the slow accumulation and interpretation of data, covering variable time-spans and geographical areas. People have moved and communicated over large area, sometimes on a continental scale, for tens of thousands of years, so that the history of a particular group or region can seldom be divorced from a wider picture, clearly transcending current national boundaries and cultural cleavages, which made no sense in prehistoric times, when geographic features were more likely to have marked boundaries. But even physical boundaries were not necessarily an impediment to contact, communication, movement and exchange; navigation has existed for over 100.000 years (Strasser T. F., *et al.*, 2010) and mountain ranges may have slowed the movement of people, objects and ideas, but not prevented them.

This study deals with one of those instances when the arrival of new human groups, bearers of a new mode of subsistence based on agriculture and animal husbandry and a different cultural baggage, commonly referred to as 'Neolithic', substantially altered the lifeways of indigenous populations. Contact with the migrants can have been direct and/or indirect, taking various forms, but what is certain is that it had – over time – a profound impact on the evolution of populations in the Study Area with which we are concerned. In many instances the contact brought about changes in a progressive manner, which varied in time and space. We will refer to this contact period as the 'Transition' when the hunter-gatherers (and on occasion fishermen and collectors), commonly referred to as 'Mesolithic', progressively adopted Neolithic attributes.

Furthermore, this study does not set out to formulate a grand theory regarding the dissemination of the Neolithic. The objective is to present a non-exhaustive compilation of sites across the extensive

Study Area through which the progress of the neolithisation process and the Transition can be seen as both demic diffusion and interaction with local communities in their multifarious and complex forms. Many questions continue to beg answers, since the archaeological record is parsimonious and much research is ongoing, so that this study cannot pretend to be exhaustive; its interest resides in the fact that we are not aware of any previous study which attempts to capture the volume of data presented here covering such an extensive geographical area. We therefore hope that this study will constitute a document from which researchers can extract information useful for their area of interest, whilst also presenting a substantial volume of data covering the extensive area west of the Formative Zones of the Neolithic way of life, during its initial expansion to Western Anatolia and into South-East Europe, until halted by ecological and physical barriers stretching from Hungarian Transdanubia to the Alps at the head of the Adriatic.

The Study Area was selected based on the following criteria:

- We wanted to provide an overview of the impact of the Neolithic expansion westward out of the core-areas where it originated and developed, on the autochthonous hunter-gatherers it encountered in Western Anatolia and Europe as it expanded in westward and north-westward directions;
- We wanted to cover a sufficiently large geographical area for the findings to be meaningful and to allow for the variability over time and space to be highlighted, as regards the mode and speed of expansion, the type of contact and the impact of the contact on the indigenous populations as well as on the migrating farmers and herders;
- I am not aware of anyone having covered the Transition of this Study Area in sufficient detail;
- The geographic limits of the Study Area were established based the regions covered by the first known westerly overland and maritime migration of Neolithic peoples out of the Formative Zones of the Neolithic (Konya Plain, South-Eastern and Central Anatolia, the Levant and Cyprus) into Western Anatolia and Europe. The European boundaries were established to the south and west of the lower and middle reaches of the Danube as far north as the CEB EAB in Hungary where the Neolithic advance marked a multi-centuries pause, and west along the southern edge of the Alpine Chain at the head of the Adriatic, which also formed a natural boundary to the northward expansion of the Neolithic. The southern and western limits have been set along the north shore of the Central Mediterranean as far west as the Ionian Sea and Adriatic Basin.

The Study Area (Map MR1) thus covers Western Anatolia, the Aegean Basin, the Balkans south and west of the Danube up to Hungarian Transdanubia, the heel and foot of Italy, Sicily, and the Adriatic Basin up to the Southern Alps between the Trentino-Alto Adige and North-Western Slovenia. The duration of the various Transitions in the Study Area extended over some 4500 years in a SE to NW cline, between approximately 9000-4500 BC, if we include precursor navigators from the 9th millennium BC in the Aegean Basin. In this introduction we will briefly review the several attributes of the Study Area, and the many aspects taken into consideration before reviewing the individual regions.

Some definitions

Dates: Radiocarbon dates (^{14}C), expressed as 'BP' (Before Present = 1950 AD) after the standard deviation, will be calibrated to 2σ (95.4% probability), using OxCal 4.2 and the IntCal 09 curve (Bronk Ramsey 2009a or later). When calibrating using OxCal 4.2, the date range within the highest probability factor at 2σ will be used and the percentage probability will always be indicated. The resulting calibrated date range will be expressed in calendar years BC, and the median of the calibrated date range will be indicated to give an idea of the possible approximate absolute date BC. The following example will hopefully clarify this point:

- R-1040A 6300±60BP = 5385-5203 BC (OxCal 4.2 at 91.2% probability), on charcoal level 8B – Median 5295 BC.

Because the Transition is a process rather than an event (Bronk Ramsey C., 2010: 265), and our data is almost invariably sparse or incomplete, no attempt has been made use Bayesian statistics or analyses to determine precise dates or precise sequence of events, although we have systematically calculated the median of the calibrated ^{14}C date ranges to give an idea of the approximate time at which events occurred as evidenced in the archaeological record.

For any given site, we have not necessarily included all the dates available, but only those that are relevant with regards to the Transition.

Map MR3 shows the calibrated dates for the first appearance of Neolithic attributes at a particular geographical point of the Study Area, without differentiating between Mesolithic and Neolithic sites. It is intended to illustrate not only the overall south-east to north-west cline regarding the dissemination of the Neolithic across the Study Area, but also some of its leapfrogging and halting progress. No attempt has been made to prepare date charts by Region or Macro-Region, since this study does not purport to be a statistical study, but rather the narrative of a process as seem through the archaeological record.

Palaeolithic: The Western European Palaeolithic is conventionally divided into the Lower Palaeolithic (prior to *ca.* 250k BP, after which *Homo neanderthalensis* takes centre-stage), the Middle Palaeolithic (250k-45/35k BP with *Homo neanderthalensis* until Homo sapiens migrates into the various European regions), and the Upper Palaeolithic (post 45/35k BP until the advent of the Holocene). The Upper Palaeolithic has been traditionally divided into numerous cultures (e.g. Aurignacian, Solutrean, Gravettian, Azilien, Magdalenian, Uluzzian, Epigravettian, Epipalaeolithic etc.), each determined by regional material cultures. In some regions of Southern Europe in particular, the Epigravettian continues until the advent of the Neolithic. We have tried to cut through the complexity and ambiguity of the regional nomenclatures by treating the Palaeolithic as ending at the end of the Younger Dryas stadial/Pleistocene epoch and the start of the Pre-Boreal interstadial / Holocene epoch, *ca.* 9700 BC/11700 BP, although, because of local traditions, it will not always be possible to avoid local nomenclatures.

This study is not strictly concerned with the Palaeolithic, other than the fact that the term is used to denominate pre-Mesolithic hunter-gatherer societies.

Mesolithic: Holocene hunter-gatherers. The Holocene is conventionally stated as commencing in 9700 BC at the transition from the Dryas 3 stadial (hereafter called Younger Dryas) to the Pre-Boreal. I will try to avoid terms such as Epipalaeolithic or Epigravettian for Holocene hunter-gatherers. Hunter gatherer communities with attributes normally associated with the Neolithic will be referred to as Transitional, in the absence of evidence for their complete integration into the Neolithic lifeways.

The Mesolithic can also be divided into regional cultures in time and space (e.g. Sauveterrian, Castelnovian, Blade and Trapeze Culture, or Romanellian, which last straddles the end of the Palaeolithic and Early Mesolithic, becoming the Epiromanellian, etc.).

Neolithic: Holocene communities primarily practicing animal husbandry and agriculture with most of the attributes associated with the Neolithic lifeways.

There are numerous cultures defined for the Early Neolithic (e.g. DFBW, Firkirtepe, Starćevo, etc.), most of which are regional or even national. Some of those based on national criteria can together broadly define a single culture (e.g. Sesklo, Karanovo and Anzegabegovo-Vršnik).

Transition or Transitional: Holocene communities of Mesolithic hunter-gatherers having acquired some Neolithic attributes and in the process of adaptation to the Neolithic lifeways. The designation can also include Early/Initial Neolithic communities in a given region which have acquired Mesolithic

attributes (e.g. lithic traditions and/or a high proportion of hunted fauna). This designation, which covers a wide spectrum and helps avoid the dichotomy Mesolithic-Neolithic, allows us to stress the period of contact, adaptation and transformation.

The Study Area

The Study Area comprises a complex geography, with the Aegean Sea, the Ionian and Adriatic Seas, and the straits of Messina cutting the Study Area into what appears to be separate areas following broadly north-south axes as you progress westward. This Study Area has been divided into 24 Regions based primarily on natural geographic boundaries (Map MR1), grouped into 6 Macro-Regions, which are also established based on broader natural boundaries (Map MR2) as follows:

- The Western Anatolia, Marmara and Southern Thrace Macro-Region includes 4 Regions:
    - Region 1 - Bay of Antalya and Lake District
    - Region 2 - Eastern Aegean
    - Region 3 - Sea of Marmara and Eskişehir
    - Region 4 - Thrace
- The Southern Balkans Macro-Region includes 4 Regions:
    - Region 5 - The Aegean Islands
    - Region 6 - Crete
    - Region 7 - Eastern Greece and the Sporades Islands
    - Region 8 - The Peloponnese and Megara
- The Eastern Central Balkans Macro-Region includes 4 Regions:
    - Region 9 - Bulgaria and Rep. of Macedonia
    - Region 10 - Serbia to Slovenia east of the Dinaric Alps
    - Region 11 - The Iron Gates
    - Region 12 - Hungarian Transdanubia and Eastern Slovenia
- The Eastern Adriatic Macro-Region includes 2 Regions:
    - Region 13 – North-Western Greece and Albania
    - Region 14 - Western Montenegro, Croatia and Bosnia & Herzegovina (split between south, central and north)
- The Southern Italy and Adriatic Seaboard Macro-Region includes 6 Regions:
    - Region 16 - Northern Apulia and Eastern Basilicata
    - Region 17 - The Salento Peninsula
    - Region 18 – Calabria and Western Basilicata
    - Region 19 - Sicily
    - Region 20 - Molise to Romagna
    - Region 21 - The Fucino Basin
- The Northern Adriatic Macro-Region includes 4 Regions:
    - Region 15 - Trieste and Slovene Karst
    - Region 22 - Friuli-Venezia Giulia
    - Region 23 - Eastern Emilia-Romagna and the Veneto (split between north and south of the River Po)
    - Region 24 - Trentino-Alto Adige

Methodology

The presentation of the material follows a standard format, so that in the introduction of each Macro-Region (Map MR2) we present the contents under the following headings:

- Regions and geography;
- Climate and environment;

- Early human presence;
- Funerary practices;
- Lithics;
- The state of research;
- Mesolithic;
- Neolithic;
- Transition.

In a similar manner, each region is presented in a consistent manner as listed below, with exceptions when a Region has been the subject of numerous surveys (Regions R08 and R13), when these are treated as a separate category, or in the case of Region R14 which has been subdivided into South, Central and North, and Region R23 which has been split between south and north of the River Po:

- General introduction;
- Mesolithic and Transition sites – Introduction;
- Mesolithic and Transition sites – Site details;
- Initial and Early Neolithic sites – Introduction;
- Initial and Early Neolithic sites – Site details;
- Conclusions, highlighting the salient points relating to each Region.

Insofar as possible, all the Mesolithic sites which have come to our attention have been considered, with the exception of Regions R22 and R23, where the hundreds of mostly Early Mesolithic sites in the Alps, tell us little about the Transition. By the same token all the Initial and Early Neolithic sites have been considered, with the exception of 'second wave' Neolithic settlements (e.g. Thessaly and Macedonia in Region R07; the Tavoliere in Region R16, the bulk of the Starčevo sites in Region R10, numerous Formative and Early LBK sites in Region R12, and Fiorano sites in Region R23). When examining the literature on the sites, all the data available for understanding the Transitional period has been exploited, many of the key sites have been visited, and numerous experts have been consulted.

We have prepared distribution maps of the sites for each Region, with 2 for Region 23 (one for sites north and another for sites south of the River Po), with additional distribution maps for surveys in Regions 8 and 17. The sites are numbered in most instances from top to bottom on the distribution maps and the reference number is quoted in the text.

The figures are numbered sequentially for the Introduction and for each Region; they are grouped with the sites distribution maps in the second volume. The selection of figures is admittedly eclectic; it is intended to be representative of selected stratigraphies, lithics, distribution maps, charts and pictures of sites in their environment. Understanding a site of necessity involves seeing and understanding it within its local context, which is why we have included a number of photographs, many taken by the author, who has made a point of visiting all the Regions and as many of the key sites as possible.

Geography of the Study Area

Western Anatolia with its Lake District, coastal plains and river valleys is separated from the most westerly Neolithic Formative zone in the Central Anatolian Konya Plain, by mountain ranges rising to over 2000 m, which mark the eastern limit of our Study Area. The mountain ranges in Western Anatolia are separated by river systems, such as those of the Menderes and Gediz which flow in a westerly direction to the Aegean or that of the Simay which flows west and then north into the Sea of Marmara. South of the River Menderes the coast is somewhat abrupt and forbidding until it reaches the head of the Bay of Antalya on the southern coast of Anatolia.

North-Western Anatolia is made up of the Marmara region, up to the Bosphorus, (which may or may not have been breached at the time of the Transition), and the southern coast of the Black Sea.

It includes the rolling country south of the Sea of Marmara, with its several lakes, with lands suitable for early agriculturalists. We have also included the Aegean islands of Lemnos and Gökçeada/Imbros, which would have formed a single large island, separated from the shore by a relatively narrow channel prior to the Holocene.

To the North and West of the Sea of Marmara, at the head of the Aegean, Southern Thrace is watered by the complex meandering Ergene river system, whose main arm circles round the eastern end of the Rhodope Mountains from Bulgaria where it is called the Maritsa. The River Maritsa rises gently in a westward direction up a wide plain or river valley between the Rhodope Mountains to the south and the Stara Planina Mountains to the north.

The northern littoral of the Aegean is made up of a fringe of alternating plains and coastal ranges hiding interior plains, such as the Plain of Drama in the centre and the Plain of Serres through which flows the River Strymon/Strimón to the west. This coastal fringe is bounded by the Rhodope Mountain, which runs parallel to the coast some 40 to 60 km inland, marking the boundary between Greece and Bulgaria as well as between two Regions. The Rhodope Mountains are cut at approximately mid-range by the River Néstos/Mesta, which connects to the headwaters of the River Maritsa.

In the north-west of the Aegean, the River Strymon/Struma gives access due north, connecting near its headwaters with the River Morava, which itself flows north into the River Danube, east of Belgrade. The Greek Macedonian plain in the north-west corner of the Aegean is cut by the River Axios / Vardar, which penetrates north into the Republic of Macedonia, which also connects near its headwaters with the River Morava. The River Aliakmon flows across the Greek Macedonian plain west of the River Axios, flowing east and south-east from its headwaters deep in the Pindus Mountains, providing a channel of communication to and from the Northern Ionian and Southern Adriatic Seas. Our Study Area will encompass all of these river systems. To the North, the River Danube will constitute the northern limit, which will extend east as far as the Iron Gates and north to Hungarian Transdanubia.

The western side of the Aegean is bounded at its northern extremity by Mount Olympus, which is cut off from the coastal ranges of Óssa and Pelion to the south by the gorge through which the River Pineios, which crosses the Plain of Thessaly, flows out to sea. Access to the Thessalian Plain, so prized by the Initial Neolithic migrants, is more easily gained via the Bay of Volos, north of the Island of Euboea, and which would not have been much smaller during the 7th millennium. The rest of the coast on the eastern seaboard of Greece is largely steep-to, except for the shores of the Saronic Gulf and the head of the Gulf of Argos which gives access to the Plain of Argos.

The Aegean Sea itself is dotted with a large number of island groups which acted as stepping stones for sea crossings from prior to the Holocene, with Crete, host to the earliest evidence for cultivation in Europe, as its largest island marking the southern limit of our Study Area.

The southern and western coast of the Peloponnese is mostly mountainous, excepting where rivers reach the sea at the heads of the Gulfs of Laconia and Messenia on its southern coast, and the coastal region to the south of the Gulf of Patras at the entrance of the Gulf of Corinth, as far as the estuary of the River Alfeios. The centre of the Peloponnese is mostly mountainous with plateaux.

North of the Gulf of Corinth, the Pindus Range stretches northward, parallel to the Ionian and Adriatic Seas, till it becomes the Dinaric Range. These mountains effectively create a continuous land barrier, breached by only a few passes, between the Aegean Sea to the east, the plains and hills south of the Lower Danube in the Central Balkans of ex-Yugoslavia as far north as Hungarian Transdanubia, and the Adriatic Basin to the west. The Central Balkans to the west of the Danube are mostly plains with large flooded areas in prehistory, but marked by important features such as the Iron Gates Region, where the Danube cuts through over 100 km of gorges between an easterly extension of the Dinaric Range and the Carpathians to the north and east of the Danube. The northern extremity of the Study Area in the Central Balkans is limited by a line running west from the Budapest though the Bakony Hills north of Lake Balaton into Slovenia. It is here that the northern extremity of the Dinaric Range

dips in Slovenia, connecting the head of the Adriatic via the Sava River system with the Transdanubian Region of Hungary, Eastern Slovenia and Eastern Croatia. In Northwestern Slovenia, the Alps rise again as the Julian Alps, which sweep west, becoming the Venetian Alps and the Dolomites, marking the northern limit of the Study Area, with the Italian regions of Friuli-Venezia Giulia, the Veneto and the Trentino-Alto Adige.

The eastern shore of the Ionian Sea north of the Gulf of Corinth, past the island of Corfu, which marks the juncture of the Ionian and Adriatic seas, as far as the beginning of the Dalmatian Coast north of Montenegro, is punctuated with estuaries and their associated river valleys, bays, coastal plains and wetlands. To the north of this region, the Dalmatian coast stretches as far as the Istrian Peninsula; it is mostly rugged, steep-to and inhospitable, except for a small plain around Split and the Ravni Kotari Plain in the region of Zadar, about half way up to the Dalmatian coast; this coast is lined with hundreds of islands as far as the Istrian Peninsula, many of which would have been connected to the Mainland during the 7th millennium BC. The south-western tip of the Istrian Peninsula was also suitable for agriculture, and this peninsula is then connected to the head of the Adriatic via the Slovene plain of Capodistria / Koper and the Trieste Karst.

To the west of the Ionian Sea, Sicily may or may not have been separated from the Boot of Italy by the Straights of Messina, with its strong current, at the LGM (Mussi M., 2001: 89). Southern Italy (Calabria, Basilicata and Puglia) fall within the Study Area. Calabria, with the steep dorsal spine of the Southern Apennines extending into the toe of Italy, has a coastal strip to the west and a wide plain to the south round the Bay of Otranto, and is bounded by Basilicata to the north. To the east of the Bay of Otranto, the Salento Peninsula or Heel of Italy, with its lack of water systems and dry central plateau, is the southern half of Apulia/Puglia. The Northern part of the Italian region of Puglia extends as far north as the Gargano Peninsula with the offshore stepping-stone islands (Palagruža and Susac) across the Southern Adriatic, and includes the fertile Tavoliere Plain to the west of the Gargano, which is cut by numerous water courses coming down from the Apennines as it rises gently in a westerly direction.

North of Puglia on the Western Adriatic, there are numerous rivers coming down from the Apennines which cross the coastal plain all the way up to River Po Plain. The Fucino Lake Basin deep in the Apennines, which looks both east and west, has been included in the Study Area because of its importance for understanding some of the dynamics of the Transition.

At the head of the Adriatic, the eastern watershed of the Northern Apennines as far west as the Italian province of Parma and the Po River Basin east of a line running up to Lake Garda are included in the Study Area, which is bounded to the north by the Trentino-Alto Adige with its deep glacial valley system which cuts deep into the Southern Alps. The north-east is limited by the Italian region of Friuli-Venezia Giulia, with its coastal plain rising gently to the Southern Julian Alps, and the north-western corner of Slovenia in the Julian Alps.

The geography of the Study Area has changed in several ways since the advent of the Neolithic between the 8th to the mid-5th millennia BC.

First, sea level rises subsequent to the LGM have been estimated to be between 120-140 m (Fig. Intro-1), with consequent major changes to the coastlines of the Study Area (Figs. Intro-2 & Intro-3). At the dawn of the 7th millennium BC, the sea level was still some 25-30 m lower than today, only attaining approximately current levels during the Neolithic after 4500 BC (Merkyte I., 2003; Van Andel T. & Schakleton J., 1982), so that once-extensive coastal plains are now below sea-level, and with them numerous coastal archaeological sites. Drowned archaeological sites have been discovered in many parts of the Mediterranean basin: The entrance to the Upper Palaeolithic Cosquer Cave, near Marseilles, is now 80 m below sea-level; the Early Mesolithic cave-site at Punta dell'Arco in Sicily is 25-30 m below sea level (F. Antonioli, 1997); possible underwater cave-sites in the Northern Sporades have been identified close to the semi-submerged Early Neolithic site of Agios Petros on Kyra Panagia (Efstratiou N., 1985), as well as on the close-by Island of Youra (Sampson A., 1998); the Mesolithic site of Maroulas on the island of Kythnos in the Aegean is now partly submerged (Kozlowski J., 2007;

Poulianos N., 2008; Sampson A., 2010), as is the Early Neolithic site of Torre Sabea on the west side of the Salento Peninsula. Further afield, a PPNC site and five Early Neolithic sites, several metres underwater off the Levantine coast in the region of Mount Carmel, have been under investigation (Galili E., *et al.*, 2002).

Secondly, Seismic and other geophysical activities (e.g. plate tectonics and isostatic subduction or uplift) have had an impact on the area, the sum of which is hard to quantify. Following the Younger Dryas, the Black Sea was connected to the Sea of Marmara (possibly via the Izmit-Sapanca basin, whose channel became silted up by the Sakarya Delta in the 5th millennium B.C.), and the first intrusion of saline water into the sea of Marmara is estimated to have taken place around 6500 BC. The Black Sea would have again been cut off between the 5th and 2nd millennia BC, after which the Bosphorus may have been breached subsequent to seismic activity, thus connecting the Black Sea to the Mediterranean as we know it today (Özdoğan M., 1998); a different hypothesis postulated by I. Merkyte (2003), states that the Bosphorus was breached as early as 8250 BC, and that water exchange with the Mediterranean began *ca*. 5500 BC. As a result of plate tectonic activity, early in the Christian era, the eastern end of Crete sank by an estimated 7 m, whilst the western end was uplifted by up to 13 m; the same plate tectonics have resulted in the uplifting of the Southern Peloponnese by *ca*. 4 m, whilst the Northern Aegean has risen by ca. 6 m during the Holocene. The Isostatic uplift subsequent to the melting of the Finoscandian ice-cap, which continues to this date, has had repercussions as far south as the Aegean, which has sunk between 9-11 m during the Holocene and which continues to sink to this day, as magma in the mantle below the earth's crust is slowly sucked north to fill the void caused by the uplift resulting from the loss of ice-cap weight on the earth's crust. The additional weight of the rising sea level has created downward pressure on the earth's crust which has repercussions on the surrounding dry land, so that the southern Peloponnese is estimated to have sunk by *ca*. 4 m, whilst the Northern Aegean has risen by an equal amount during the Holocene (Lambeck K., 1996).

Last, post-Mesolithic anthropic activities, such as land clearance for agriculture and deforestation for timber, have resulted in massive slope denudation and erosion, the colluviation of valley floors, plateaux and plains (in addition to the creation of new coastal plains as sediments have been carried out to sea) (Fig. Intro-4), so that open air sites have, as a consequence, either been eroded or buried. The creation of ever-growing conurbations as well as other building and civil engineering activities have also resulted in the deeper burial or destruction of numerous prehistoric sites, although their chance discovery, responsible reporting, and subsequent salvage excavation has increased the corpus of knowledge regarding prehistory.

Climate, flora and fauna

There is a certain amount of variability in the determination of the Holocene climatic phases in the Study Area (Fig. Intro-5), so that what follows is a sketched outline of the major recognized phases. The end of the Pleistocene co-terminates with that of the Younger Dryas stadial cold period, at approximately 9700-9500 BC, and the subsequent Pre-Boreal climatic period, with a rapid rise in temperatures of some 7°, marks the beginning of the Holocene Epoch, as well as the Mesolithic for the purposes of this study. The Younger Dryas was, if anything, dryer than the LGM, according to the pollen record of 3 deep-sea cores in the Adriatic, Ionian and Tyrrhenian Seas, with precipitations below 100 mm a year, creating desert conditions in the centre and south of the Italian and Balkan peninsulas (Rossignol-Strick M., 1998), which could in part explain an apparent reduction in human occupation of those regions. The Pre-Boreal climatic warming periods lasted from *ca.* 9700 BC to *ca*. 7300 BC, when the Boreal set in; The Boreal lasted till *ca*. 6000 BC, with the advent of the Atlantic 'climatic optimum', which lasted some 2000 years, with average temperatures some 2° Celsius higher than today at their warmest in Central and Western Europe, close to the beginning of the climatic period. The major weather trends associated with the climatic periods are punctuated by climatic oscillations of greater or lesser intensity, due to factors such as solar activity, air circulation, melting ice-cap waters

being released into the ocean and changes in the thermohaline circulation/Gulf Stream. The Younger Dryas stadial climatic period, which gradually ended *ca.* 9700 BC, was in all probability caused by the partial breaching of the ice-wall retaining the gigantic freshwater Agassiz Lake, formed by the North American Laurentide ice-cap melt-waters, resulting in a massive and prolonged outflow of ice-cold fresh water into the North Atlantic via the St. Laurence Seaway and Hudson Bay. This outflow disturbed the North Atlantic thermohaline circulation (Gulf Stream) for more than a millennium, with icebergs rafting debris to latitudes close to that of Cape Trafalgar, south of Portugal, resulting in a prolonged cold period with disturbed weather patterns. An RCC event occurred starting *ca.* 6600 BC in the Eastern Mediterranean and the Levant, which was compounded by a cold dry period known as the '6200 BC event', which lasted some 200 to 300 years, between *ca.* 6250-6000 BC, which was caused by the final major discharge of Lake Agassiz through the Hudson Bay, disturbing once again the thermohaline circulation in the North Atlantic (Weninger B., *et al.* 2006, 2009); it is evidenced by iceberg-rafted debris to latitudes close to the north of the Iberian Peninsula, and is an important climatic event in relation to the Transition we are studying.

The North Atlantic weather systems have migrated up and down the latitudes in response to the climatic periods. Simplistically, during the cold stadials, the rain-bearing Westerlies flow south of the Alps, supplying plenty of pluviosity to the Mediterranean basin, North Africa and the Near East, whereas during the warmer interstadial climatic periods most of the rain is carried north of the Alps, rendering the Near East and the Mediterranean basin more arid. During the '6200 BC event', when the temperatures dropped several degrees, and pluviosity increased, the rain band has been estimated to have moved south between the 50th and 42nd latitudes, thus straddling the Alps, and covering the northern half of the Adriatic Basin, and the regions north of the Aegean Basin (Berger J. P. & Guilaine J., 2008; Budja M., 2007; Burroughs W., 2005; Lambeck K., 1996). South of this line, in Anatolia and the Levant, pluviosity decreased, with cooler weather, resulting in failed crops and stressed communities, for many of whom migration probably became a necessity in order to survive (Weninger B., *et al.*, 2006, 2009). This event is probably one of the major contributory causes for the influx of Neolithic migrants into Eastern Greece and the Southern Adriatic, and the subsequent rapid northerly expansion of the Neolithic through the Balkans. This northward expansion of the Neolithic was halted for a period lasting several centuries at the northern limit of our Study Area in Hungarian Transdanubia by what has been termed the Central European-Balkanic Agro-Ecological Barrier (CEB AEB) in an area that has been termed the 'LBK Formative zone' (e.g. Bánffy E., 2004).

The eastern longitudes of Europe tend to have cold wet winds from the North during the winter, due to the North Atlantic Oscillation (NAO), whilst Western Europe benefits from warm wet weather off the Atlantic when the anticyclone is based over Greenland. When the anticyclone is based over Iceland or Scandinavia, as occasionally happens, it draws cold air from the North over Western Europe, at which time the Mediterranean basin benefits from warm wet winters. In both instances, most of the wet weather in the Eastern Mediterranean Basin comes between the autumn and spring. The Near East saw its pluviosity decline after *ca*. 7500 BC, with an RCC event of marked aridity commencing *ca*. 6600 BC (Fig. Intro-6), supplying one of the possible causes for the initial westward migrational movement of the Near Eastern Neolithic populations out of their Formative Zones. The demography of the Near East had increased substantially as a consequence of the increased sedentism coupled to the practice of agriculture and animal husbandry, and most likely became stressed both socially and from a nutritional standpoint by the increasing aridity. During the 7th millennium BC, a marked reduction in the number and size of the communities, particularly in the southern part of the Near East is discernible (Berger J. P. & Guilaine J., 2008: 13).

The geography, the prevailing summer and winter temperatures, and the prevailing winds coupled to the annual pluviosity, meant that the south-west coast of Italy and the eastern side of the Adriatic and Ionian Seas were the only reasonably forested parts of the Study Area at the time of the LGM, when these southern regions acted as refugia. During the Post-Glacial, commencing around 16000 BC, the forests expanded progressively northward and gained in altitude. With global warming,

sea temperatures increased, ice caps melted, evaporation increased, and as a consequence, so did pluviosity. The increased vegetable ground cover of the steppes was able to support a greater animal biomass, but this situation reversed when the ground vegetation found itself under the canopy of the expanding forests, so that the animal biomass shrank (Bottema S., 2003: 33-34). The large herbivore herds that favoured colder weather and steppe environments (reindeer, elk, horse, bison) migrated north ahead of the expanding forest cover, to be replaced with forest species (cervids, suids and bovines), whilst at higher altitudes, the caprines (ibex and chamoix) survived by migrating upwards above the tree-line. Steppe grasslands are capable of supporting up to 4 times the animal biomass, as compared to forest environments, but carry a poorer repertoire of useful or edible plant matter compared to forests. In the face of these events, part of the population migrated northward into previously inhospitable regions freed by deglaciation, whilst others remained *in situ*, and adapted to the slowly changing environment. This adaptation, with its economic intensification, is often referred to as the broad spectrum revolution.

Around 9000 BC, the primary vegetation cover of lowland Greece and Southern Italy, becomes progressively oak or mixed oak thermophile forest, which gradually moved to higher altitudes during the Boreal and Early Atlantic climatic periods, when the lower altitudes gradually converted to Mediterranean maquis with evergreen and scrub forests. By the early 7th millennium BC, this situation prevailed over most lowland and mid-altitudes of much of our Study Area. The current situation we associate with the Eastern Mediterranean, with its heat and aridity, is a recent development, the consequence Neolithic and post-Neolithic anthropic activity, since forest cover helps conserve humidity in the soil and restrain erosion. During the Early Holocene, the water table would have been higher, wetlands more extensive and watercourses more abundant, less seasonal, and less channelled, even if during the 7th millennium BC, the average temperatures were about 2° Celsius higher that at the end of the 20th century (Rossignol-Strick M., 1998).

The Mesolithic

The first point to be made is that the Post-Glacial Late Pleistocene (Terminal Palaeolithic, or Epilalaeolithic as it is sometimes called) and Early Holocene (Mesolithic) is not to be considered an impoverished period separating the Palaeolithic from the Neolithic, but a period of intensive change and adaptation.

The second point is that this is the first interglacial with *Homo sapiens* in Europe, or anywhere in the world for that matter, other than Africa, with the exception of a possibly brief incursion into the Levant *ca.* 100 kya.

The term Mesolithic, coined by H. Westropp in 1866, was based on technological post-Palaeolithic north-west European cultural markers, prior to the advent of the Neolithic. It progressively came to define a chronological period, synonymous to many with a period of cultural decline. From the mid-twentieth century, although the term has not received universal acceptance, particularly in Southern Europe, the perception of the post-glacial period as a period of decline has been substantially modified by the increasing volume of research, and that:

- The transition from Late Glacial to Post Glacial has been recognised as a prolonged period of climatic fluctuations spanning several millennia;
- The transition from the Palaeolithic (or Epipalaeolithic) to the Mesolithic was a gradual process, with the Mesolithic emanating from, and culturally anchored in the Palaeolithic;
- The Mesolithic represents an adaptation to new climatic and environmental conditions, and Mesolithic lifeways are not necessarily more brutish than those of the Palaeolithic, or of agro-pastoralists;
- The development of the Neolithic in the Formative Zones spanned many millennia (in an accelerating mode between 11.000 BC and 8000 BC) and was not a linear process or one in which human agency was the only driving force;

- The variability in the adaptive capabilities of humans has been recognised, and personal or group choice can be a major factor in change;
- The Mesolithic of northern latitudes bears a closer resemblance to the Palaeolithic than that of the more temperate southerly latitudes of Eurasia;
- Whilst certain technological manifestations of the Mesolithic can be mapped over extensive regions, they evolved over time and can be regionally specific;
- In a similar manner to the Late Palaeolithic, which has been subdivided into different temporal cultural periods (e.g. Aurignacian, Gravettian, Uluzzian, etc.) based on cultural markers in time and space, so with the Mesolithic (e.g. Sauveterrian, Castelnovian, etc.), so that the Mesolithic cultures cannot be considered uniform across the study area.
- The Transition to Neolithic lifeways was not necessarily rapid and could and did extend over many centuries;
- Mesolithic lifeways could and did incorporate attributes normally associated with the Neolithic;
- There has been a major on-going debate regarding the degree of social complexity during the Mesolithic, which has concomitantly generated debate about the meaning of social complexity, with answers tending to be author-specific;
- The concept and research regarding human agency in association with environmental determinism has grown apace;
- The search for explanatory models using ethnographic and sociological models has also expanded;
- The crossing of national boundaries in research projects has permitted more rational research;
- A whole new range of terminology has evolved in relation to the Mesolithic and the Transition to the Neolithic, such as core-periphery, interaction zones, exchange networks, frontier zones, wave of advance, indigenists, diffusionists, acculturation, complex hunter-gatherers, and M. Zvelebil's availability, substitution and consolidation model, as proposed in 1985. All and more are probably valid as partial explanations, so that we favour our acronym 'ALBOT & ALBOT'.

The LGM ends *ca*. 18000 BC, announcing the onset of the gradual warming, interspersed with colder climatic phases or stadials. The Post-Glacial Late Palaeolithic, until the end of the Pleistocene epoch and the onset of the Holocene, coinciding with the rapid warming of the Pre-Boreal climatic phase shortly after 9700 BC, has been variously termed Epipalaeolithic or Epigravettian, to cite the two most common in our Study Area, but rarely Mesolithic. M. Roksandic (2008: 55) reminds us however that the term 'Epipalaeolithic' has been used to define the Postglacial period, including into the Holocene, when no change of subsistence strategy or of lithic technology is discernible from that of the Upper Palaeolithic; she quotes A. Leroi-Gourhan (1965) and J. Kozlowski and S. Kozlowski (1986) to support the use of the term 'Mesolithic' to imply substantial changes in economy, ecology, and material culture with an implied tendency towards a productive economy as defined by A. Leroi-Gourhan (1965) and G. Clark (1980). For the purposes of this study, however, the Mesolithic commences with the Holocene and the Pre-Boreal, and it is in that context that the term will be used.

Many Post-Glacial cultural facies that have been defined across Europe (e.g. Epimagdalenian, Azilian, Epigravettian, Sauveterrian, Castelnovian, Romanellian, Lepenski Vir, Ağaçli, etc.), based on regional cultural attributes, can straddle the Pleistocene/Holocene divide, since all are modern cultural constructs attempting to recognise and define change, cultural frontiers and chronological boundaries.

M. Zvelebil (1986a, 1986b) recognised that "*The range of adaptations developed by hunter-gatherers of the temperate zone parallel those based on the cultigens and domesticates of the Near East. This means that the hunter-gatherer communities of the temperate zone were coping with problems similar to those encountered by the Near-Eastern populations and that domestication forms one among a number of pathways towards socio-economic intensification*". The temperate zone is defined as that encompassing broad leafed forests, which are rich in biomass, with a limited range of large mammals but a high diversity of mid-sized ones, highly productive coastal and riparian zones

and the presence of a large number of edible or useful plant species, many with storage organs (nuts, fruits, tubers, seeds), within marked seasonal weather fluctuations. The Palaeolithic groups who did not migrate north with the large herd herbivores that favoured the open steppe environment, ahead of the advancing forest, necessarily adapted to their new environment to survive by applying some, if not all of the following:

- Colonising and exploiting new territories, made available by climatic warming;
- Long-range mobility, contacts and exchange networks (partner exchange, diffusion of new technologies, exotic materials, etc.), with the trade and exchange of exotic materials covering distances of many 100s of km confirmed during the Mesolithic (Rigaud S., 2011);
- New forest hunting techniques based on encounter hunting (bow and arrow), and the exploitation of avifauna and smaller land animals, involving the probable development of new fowling and trapping techniques;
- New lithics technology, with microliths as the overriding hallmark;
- Adapting their diet from one dominated by animal protein in a steppe environment low in PHP, to one of increasing diet-breadth;
- Greater reliance on alternative r-selected food sources such as plant food, gastropods and marine shellfish, as against K-selected high protein animal biomass;
- Exploitation of marine resources, as well as greater use of lake and riverine resources using different techniques (boats, navigation, nets, fish hooks, fish traps, harpoons);
- Increased sedentism with the concomitant consequences (demographic growth and diseases);
- New methods for exploiting a given territory and its resources;
- Possibly developing and exploiting food preservation and storage techniques;
- Managing the environment through the creation of clearings by the use of fire, to create open spaces to favour the growth of hazel and/or browsing for herbivores;
- Changes in belief systems, social structure and practices (burials, personal adornments, perception of territory);
- Domestication of the dog;
- Selectivity in game kill profiles.

In regions of high PHP, the carrying capacity of the land is high, and demography will tend to grow. When the animal biomass is reduced, because of the high human population, the tendency will be to continue to hunt to possible extinction. The populations of such areas are more likely to be receptive to the adoption of domesticates (Boone J., 2002), which can be equated to 'game in the pen', to counter the stress and the brutal reductions in human populations resulting from famine, diseases and climatic catastrophes, which tend to keep populations stable when they occur in 30-year cycles.

As M. Zvelebil *et al*. (2010: 309) have stated, mobility patterns, settlement-generating behaviour and the taphonomic processes, which transform and obscure site-generating human activities, "*have shown time and again that remains of Mesolithic sites have significantly smaller chances of identification than Neolithic ones*". These biasing taphonomic factors which seriously impair the discovery of Mesolithic sites have fed into the interpretative literature, downplaying the possible role of Mesolithic communities in the transmission of the Neolithic. Where intensive and extensive surveys have been undertaken (e.g. the Crimea, the north-western side of the Black Sea coast, the Marmara region, Greece, Albania, Italy, parts of Croatia), numerous open-air sites with lithic scatters approximately datable on typological grounds to the Mesolithic have been discovered. Such open-air sites can rarely be precisely dated, and whilst most of them have no preserved faunal remains, a careful analysis of the lithic assemblage can tell us something about the provenance of the raw material and thus of the contact networks, an indication of the duration of occupation and whether the subject of a single or multiple occupations, the extent of the site, the activities undertaken at the site and the activity areas, thus supplying clues about the subsistence strategies. Such sites are often classified as base, transient or special purpose camps, where the first are thought to represent sites where the entire community settled for a period of time, whilst the latter can be a temporary hunting

halt, or a site where raw material has been extracted and worked. Ethnographic studies indicate that hunter-gatherer sites can simply vanish within a few years of abandonment, such as those of the Selk'nam of Tierra del Fuego (Mansur M., *et al*., 1997), so that we should be grateful for the sites discovered, possibly representing a tiny fraction of the potential number of Mesolithic open-air sites, even if the information derived is tenuous and rarely of use for this study, other than to confirm the existence of a Mesolithic population in the given region.

Because of the mobility of the Mesolithic hunter-gatherers, the often sparse archaeological remains are hard to flesh out. We are also strangers to their lifeways and value systems, so that we find it easier to relate to the Early Neolithic and their increased and increasing visibility in the archaeological record (Bailey G., 2008). J. Cauvin (1996), in his seminal work, stressed the radical difference in belief systems between hunter-gatherers and agriculturalists; the first have a more intimate relationship with nature, with their territory at the centre of the world, tied into their origin myths, so that the natural, the social and the supernatural constitute an integrated environment, in which the ideology encompasses humans, animals, plants and the environment (Fuglestvedt I., 2003; Jordan P., 2003; Lee B. & Daley R., 1999; Winkelman M., 2002). As R. Bradley (2001) points out, hunter-gatherers may not necessarily consider themselves in different terms from the animals and the environment on which they depend; there is a kind of reciprocity, which means that it is conceivable for people to turn into animals or for animals to be transformed into human beings; there appears to be a merging of human and animal identities, evidenced in shamanic activities and therianthropes. This disappears with animal husbandry when 'trust' is replaced by 'domination', and the mystic relationship that may have existed when humans lived in symbiosis with nature, no longer exists in an animal husbandry and production society. P. Boyer (2001) tracks the evolution of symbolic thought and religion, reaching similar conclusions, whilst D. Lewis-Williams (2002) explores more specifically the Shamanic world of hunter-gatherers, whilst stressing that any attempt to understand their world without considering their cosmological system risks being incomplete, since the social, existential and symbolic levels are inextricably comingled. Finally, D. Lieberman (1993) points out that whilst sedentism may be hard to identify in the archaeological record, it is important because of its association with increased cultural complexity. This increased cultural complexity can include a change in the social organisation, as well as in symbolic thought and its manifestations, which can mark an important step in facilitating the Transition from the Mesolithic to the Neolithic.

A. Testart (1982) has admirably treated of the reasons, causes and effects of the hunter-gatherer mode of existence and subsistence, compared to that of the societies based on production, with all the gradations possible between the two extremes. The degree to which hunter-gatherer groups have adopted characteristics normally associated with the Neolithic gives an indication of their preparedness to continue to adapt their lifeways and become more fully integrated into the new mode of subsistence. An enumeration of the critical factors will include the degree of storage practiced, the degree of sedentism, the production of surpluses, the degree of specialisation, the social organisation, the levels of technical competence, the degree of social differentiation and the ideology of the group:

- Storage is possibly the primary cause of sedentism and the neolithisation process, yet it is not unknown in hunter-gatherer societies. The storage of foodstuffs in hunter-gatherer societies can be the result of seasonal abundance, or necessitated by a subsequent lean period in the annual cycle. In hunter-gatherer societies it can be used as a buffer against lean times by the hunter-gatherer group, as well as for exchange, in which case it can lead to social differentiations (e.g. the Iron Gates Mesolithic and Transition);
- Sedentism is the corollary of storage, since the storage of surpluses cannot (or only exceptionally) occur without sedentism, and both are hallmarks of the Neolithic. Sedentism can also occur because there are sufficient resources close at hand either on a seasonal basis or year round, so that hunter-gatherers are not obliged to move around their territory on a cyclical basis, and thus become sedentary or partially so. Paradoxically, sedentism can also occur when there is penury of resources, resulting in regular periods of scarcity, so that hunter-gatherers

will settle near a sure, if less preferred, but secure food source, such as can be found along coastlines. Sedentism tends to favour demographic growth, since some birth spacing mechanisms which characterise mobile hunter-gatherer societies are in part deactivated;

- The production of surpluses of perishable goods which cannot be stored for any length of time will rot or be consumed by other animals or insects if not shared and consumed within a short space of time. This is only one of the reasons many hunter-gatherer societies have a sharing ethic when large game is successfully hunted, although this is less often the case with small game or the food collected on gathering expeditions. The storage of perishable food for long periods, which can occasionally exceed 12 months, requires special techniques (e.g. smoking, drying, salting, freezing, burying in layers of fat, storage pits, silos or other containers). The production of surpluses can be for group consumption during periods of penury, in which case the organisational structure of the group is not necessarily substantially changed. Alternatively, when surpluses are produced exceeding the needs of the group, substantial changes in the group social structure and ideology can occur, which are normally associated with the Neolithic or Metal Ages;
- Specialisation normally presupposes a large population and/or exchange networks, warranting the cost to the community of supplying the necessities to a specialist, so that he can practice his speciality without being concerned with acquiring them himself. This situation is more typical of a structured hierarchical sedentary population, which is rarely the case in the Mesolithic. A small mobile hunter-gatherer band of up to 30 persons will normally only comprise half that number of effective purveyors of food, so that whilst certain individuals are likely to be more skilled than others, the rule is for generalists rather than specialists. We will see that specialisation, or at least the development of special skills, as well as social differentiation can occur in Mesolithic groups where there is evidence for the exploitation of aquatic resources, although this can also be accentuated by contact and exchanges with Neolithic groups, and represent a stage in the neolithisation process;
- The social organisation of hunter-gatherer groups tends to be relatively egalitarian with a sharing ethic. Mobile hunter-gatherers who have to carry their worldly goods on their shoulders minimise their material possessions, and share the success of the hunt as explained above, which acts as an insurance against the day when today's successful hunter is less so than other hunters within the group. The successful hunter will undoubtedly gain prestige, but not necessarily power over the group. Tensions within such groups that cannot be resolved internally by discussion, the arbitration of elders/shamans or other simple techniques can result in scissions or the migration to neighbouring groups. With demographic growth and the territoriality which often accompanies sedentism, the surpluses accumulated tend to be controlled by a restricted group in a socially differentiated structure; the socio-political organisation tends to become more hierarchical and restrictive. This situation can be evidenced by burial practices, special structures and the existence of prestige goods indicative of status within a hierarchical organisation, in which the elite control the exchange network and ostentatiously parade their prestige, status and power with surpluses and rare goods obtained by the efforts of their group or through exchange;
- The technical competence of a hunter-gatherer group can go beyond the manufacture of weapons such as the bow and arrows, knapping and the manufacture of tools in hard animal matter. If fishing is involved it can include the manufacture of craft (e.g. reed boats, dugouts), fishing nets, fishing lines and hooks, traps, basketry etc. Some of these, such as craft and heavy and/or bulky fishing equipment, can be indicative of sedentism, whilst at the same time inform on the possible lines of communication up and down river systems, along the coast or across the open sea;
- The ideology of mobile hunter-gatherer groups tends to be closely aligned with nature and the spirits which inhabit the landscape on whose bounty they rely, sometimes with shamans who

can intercede and interpret, but who are otherwise normal contributors to the subsistence needs of the group. With sedentism and surpluses, and particularly with the Transition and neolithisation, there is a discernible shift from ever-present spirits who can help or hinder, to gods requiring a competent individual or restricted group to officiate and intercede.

The lifeways of hunter-gatherers can be simplistically defined as being based on sharing and immediate return, relying on the natural bounty of the environment, whilst those of Neolithic farmers and herders are based on personal acquisition and delayed return, as well as the exploitation and control of their environment. All gradations between the extremes can however be envisaged. The degree of discernible shift towards the Neolithic lifeway could have predisposed hunter-gatherer groups to progressively accept other Neolithic attributes. It is unfortunate that most Mesolithic sites where a stratigraphy exists are in caves or under rockshelters, undoubtedly distorting our understanding of the lifeways of hunter gatherers, for whom mobility was probably a necessity and the norm; in this respect, ethnographic studies show that the return on time invested for hunter-gatherers drops rapidly the longer they exploit a particular area (e.g. Lieberman D., (1993), quoting Vickers (1983), Lee (1972), Silberbauer (1981) and Saffiro & Scaglion (1982), noting that after prolonged occupation of a site, the Siona-Secoya spent 12% more time away, travel 18% further for a 46% reduction in hunt-weight; that under similar circumstance the Yanomoto need to go hunting three times as often on trips lasting 50% longer, and that the San tend to move camp when the time spent on the daily search for food exceeds three to six hours). D. Lieberman (1993) further points out that radiating mobility from a sedentary or semi-sedentary base is only documented among hunter-gatherers in rich environments with plentiful, storable resources; circulating mobility, avoiding resource depletion and gaining access to a variety of resources from different ecological zones (coastal and inland; lowland and upland), depending on the season and resource availability is more typical of foragers, although hybrid situations exist based on seasonality. That the population density of hunter-gathering groups is limited to the carrying capacity of the land is self-evident, and as R. Bettinger (1987) states, as overall resource abundance declines, and search-time increases, breadth of diet will tend to increase, whilst conversely, selectivity increases with resource abundance. Under climatic, demographic or resource pressure, the intensification of resource exploitation can sometimes be discerned in the archaeological record (sedentism, use of marginal resources), or as nutritional stresses visible in the funerary osteological remains. Since human behaviour is of course unpredictable, being partly culturally subjective, partly rational and partly guided by self-interest, interpretation of the archaeological data can be delicate and any determinism (environmental, demographic or cultural) needs to be treated with caution. Such stresses might however have contributed to make the Neolithic lifeway look attractive.

Several studies point to the low reproduction rate of mobile hunter-gatherer societies expressed as the Total Fertility Rate (TFR), due to factors such as:

- The inability to carry more than one child in arms at a time;
- With low body-fat, the women are less sensually disposed;
- The mean age of menarche is later, and the reliance on lactation for several years leads to lactational infecundity.

Birth spacing consequently produces 4 to 5 offsprings during the child-bearing age of 18-40 in such populations, whilst every 10% increase in dependence on agriculture will result in an increase of 0.4 births per woman, so that sedentary intensive cultivators and herders have up to 7 children (Boone J., 2002). There is general agreement that there was demographic growth in Europe after the LGM, when the hunter-gatherers, estimated at possibly no more than 20,000 people (Burroughs W., 2005), broke out of their refugia in the southern latitudes to colonise the lands being opened up by deglaciation and which were being invested by the herd herbivores of the open steppe or tundra environments; L. Groube (1996: 106), quoting Carneiro & Hilse (1966), estimated that on the eve of the Neolithic, the European population could have been as low as 50.000 to 100.000 people. In 1960, Deevey (quoted by Pennington R., 2001) estimated the world-wide population at 5.3 million in 8000 BC. This last would appear to be an unrealistically high number given our current knowledge about the evolution of

Homo sapiens, his emigration out of Africa some 60 kya, and genetics. In 1998 Harpenden *et al*., (quoted by Pennington R., 2001), suggested that the global population of *Homo sapiens* at only 20k humans some 50-100 kya based on the interpretation of genetic data. L. Cavalli-Sforza (1996) accepts a global demographic growth by a factor of five, between 70/80 kyr BC and 8000 BC, without supplying any quantified estimates, and that this demographic growth led to the overexploitation of resources by hunter-gatherers in several regions of the world, resulting in adaptive strategies, such as the exploitation of marine resources, agriculture and animal husbandry. For migration to occur there needs to be penury of resources and/or increased demography. Most of the quantifications that exist have been proposed for the Neolithic, particularly for the Near and Middle East, which do not concern us here, other than to make the point that the exponential population growth was only made possible by sedentism, dietary changes and the engendering of surpluses brought about by agriculture and animal husbandry.

Ethnography teaches us that hunter-gatherers maintain contacts over great distances, as a way of obtaining partners, maintaining friendly relations, and as a basis for reciprocity and insurance against periods of shortage (David N. & Kramer C., 2001), as well as for the exchange and procurement of desirable raw materials and objects. Such contacts are discernible in the Palaeolithic, Mesolithic and Neolithic archaeological record by similarities in artistic representations, cultural affinities in the material assemblages, as well as by objects whose original provenance can be shown to originate from distances in excess of 1000 km.

P. Rowley-Conwy and R. Layton (2011) have explained in some detail, using numerous ethnographic and historical examples, that hunter-gatherers tend to be fully aware of the potential of their territory and aim at stability in their niche area. If for any reason instability arises due to any number of factors (e.g. overexploitation, changing environment, etc.) they will adapt to create a new stable niche environment (e.g. diversified food sources, low-level food production or manipulation of the environment, etc.). Cultural change occurs when a new stable niche environment cannot be attained, but hunter-gatherers do not appear to have ventured beyond a low level of environmental control or food production (e.g. forest burning to favour the growth of hazel). The evolution of farming occurred stochastically over many millennia in the Near East, and as it evolved into a new type of niche environment, it brought about massive demographic and cultural change, which it transported into new territories as it expanded geographically out of its core area of development.

There is limited evidence for social stress in the Study Area during the Mesolithic. It is also true that there are few burials on which to base any conclusions other than in the Iron Gates, where there is evidence for a relatively high population density, with two instances supplying evidence for inter-group conflict during the Middle Mesolithic (Lepenski Vir *ca.* 7750 BC and Schela Cladovei *ca.* 7400 BC), and a single individual during the Late Mesolithic at Franchthi Cave in the Greek Argolid (Region 8), whose remains have been dated *ca.* 6800 BC (Estabrook V., 2014 Table 3.1).

The Neolithic

The first premises of the Neolithic in the Near East can be discerned *ca* 21000 BC, during the coldest period of the last 'Wurmian' glacial period, at the site of Ohalo II, which extended over 2000 m^2 in shallow waters below the current water-level of Lake Galilee, 212 mbsl, in the Levant. The site was excavated between 1989 and 1991 and again between 1999 and 2001, following a number of particularly dry years, which resulted in a reduced water-level of lake. This short occupancy site was saved by the joint effects of being submerged soon after the remains had been carbonised. The carbonised remains of six semi-dugout huts with vegetable bedding matter were found associated with storage pits, grinders and quern stones, and the carbonized remains of up to a hundred different species of edible wild plant seeds (Weiss E., 2009). The evidence increases during the Kebarian (*ca.* 18000/16000-12000 BC), at sites such as Ein Gev III with stone walled huts, and during the Geometric Kebarian (*ca*. 12000-10500 BC), at sites such as Haon III where stone receptacles were found. At Abu

Hureyra on the Euphrates in Northern Syria, occupied by a sedentary population since *ca.* 11500 BC, the probable cultivation of barley is attested from as early as 11000 BC (Hillman G., 2003; Bellwood P., 2005; Moore A., 2003, 2009), predating the conventional dates admitted for the earliest agriculture of 10000-9000 BC.

During the Natufian (*ca.* 10500-8500 BC) of the Near East, circular stone huts were equipped with paving stones and hearths, attesting the growing importance of private space, whilst site size increased up to fivefold, with more numerous sites, including that of Ain Mallaha occupied for about 1000 years without perceivable interruptions. Cemeteries in which grave goods regularly appear attest to possible changes in belief and/or value systems, funerary rites, lineages, social hierarchies, and territoriality. Figurines make their appearance, as do personal adornments. Sickles and sickle blades attest to agriculture, whilst obsidian attests to long distance contacts. At Hallam Cemi, in South-Eastern Anatolia, the controlled exploitation of suids may have begun prior to the Holocene (Bellwood P., 2005; Rosenberg M., 1999).

In South-East Anatolia, in the middle of the 10th millennium BC, following the Younger Dryas, remarkable centres of human occupation began to be constructed with special buildings, which took on impressive proportions from *ca.* 8500 BC, such as those at Göbekli Tepe and Nevali Çori. Such centres point to some form of centralised and hierarchical social structure with temporal and intercessionary spiritual powers vested in restricted groups able to assert substantial coercive power over a large number of individuals, where spirits have given place to gods and ancestor worship. After the RCC event lasting from 8300-8100 BC, a decline set in, so that late in the 8th millennium BC these sites are largely abandoned, for reasons which are not clear, but which could be related, *inter alia,* to population growth, social tensions, changing climatic conditions, environmental stress, and/or epidemics. It is at this juncture, in the second half of the 8th millennium BC, that the initial wave of colonisation appears to get under way in the Anatolian Lake District, Crete, and the eastern seaboard of the Aegean, with that of Thessaly a few centuries later, without our being able to specifically demonstrate the causes for this migrational movement (Hauptmann H., 2004). It has however been suggested that the Near-Eastern population increased 1600% in the 1500 years between the end of the Natufian / beginning of the PPN, and the end of the PPNB *ca*. 7000 BC (Hansen B., 1995); during this same period, one of the larger sites, Abu Hureyra, grew again five-fold, attaining 16 acres (Kuijt I., 2000). Violent deaths have been attested at Nemrik 9, in Northern Iraq, during the PPNA (*ca.* 10000-8500 BC), and sites such as Tell Magzaliyah began to be fortified during the PPNB (*ca.* 8500-7000 BC), supplying evidence for social stress.

The dislocation of Near-Eastern society, that can be seen to occur *ca.* 7000 BC, gave rise to the creation of a number of coastal sites (e.g. Tarsus, Mersin and Ras Shamra), many of which have produced Impressed Ware (Fig. Intro-8) and whilst numerous sites were abandoned and a hiatus in the occupation of other inland sites can be discerned (e.g. Jericho, Byblos, and Ain Ghazal), other sites became smaller with an increased accent on pastoralism (Berger J.-P. & Guilaine J., 2008). The dispersal of the Near-Eastern Neolithic at this juncture was not limited to a westward migration, but that is the only one which will concern us. The arrival of Neolithic populations on the eastern seaboard of the Aegean and Crete, then Thessaly a few centuries later, was not the first maritime migrational movement in the Mediterranean. Cyprus was visited in the 11th millennium BC and colonised by the 9th, demonstrating that the art of navigating across open waters with payloads approximating one tonne could be repeatedly undertaken in several waves (Vigne J.-D., 2009). During the Early Mesolithic, navigators colonised Aegean islands (Kythnos and Youra), bringing domesticated or semi-domesticated fauna (suids and caprines) with them. There is also evidence for the colonisation of Crete during the Middle Palaeolithic (Mortensen P., 2008), and obsidian sources on the Island of Melos were exploited at the end of the Palaeolithic.

The landward progression of the Neolithic from the Near East across Anatolia came to a halt for several millennia, until the 8th millennium BC, at the western edge of the Konya Plain in Central Anatolia, where marked differences in subsistence strategies between sites in relatively close proximity

to each other can be discerned, whilst contacts and exchanges are evidenced by obsidian and technological similarities (Özdoğan M., 2005). The Neolithic eventually reached the Pisidian Lake District *ca.* 7000 BC, with Neolithic migrants arriving in Thessaly, the Region of the Sea of Marmara and the western seaboard of Anatolia over the next few centuries. Without going into the causes for the long gestation period of the Neolithic in the core areas of neolithisation prior to westward expansion, several authors, such as C. Perlès (2001: 62; 2014) and M. Özdoğan (2009, 2013) have pointed out that the westward population movements out of the Near East occurred from multiple regions at different times, by various means and for different motives, and that whilst there are clues regarding motives, provenance and means, there is plenty of contradictory and unclear data.

The Neolithic that reached Western Anatolia and Europe was a complete package that included the following social and technological attributes:

- Sedentism;
- Agriculture and animal husbandry, whilst continuing to exploit the natural resources in a limited manner (hunting, fishing, collecting);
- Planning for the future with delayed return on agriculture and animal husbandry;
- Cult practices and new symbolism (special structures, symbolic and cult objects, burial in a contracted lateral position (also known as crouched, hocker or foetal position) in special places), with spirits giving way to gods and possibly ancestor worship;
- Social organisation (social differentiation, personal space in households);
- Expansion of exchange networks;
- Demographic expansion;
- Pathologies associated with sedentism, population expansion, lack of hygiene, vegetable food preparation, agricultural work and animal husbandry;
- Quadrangular habitation structures, special buildings, storage pits and structures which demand a special construction effort;
- Protected sites;
- Disposal areas;
- Animal husbandry with the four animal species domesticated in the Near East (suids, bovines, ovines and caprines);
- Domesticated founder crops whose provenance is to be found in the Near East (Colledge S., *et al*., 2004):
    - Emmer wheat (*Triticum dicoccum*)
    - Einkorn wheat (*Triticum monococcum*)
    - Hulled barley (*Hordeum vulgare* aka *Hordeum sativum*)
    - Flax (*Linum usitatissimum*)
    - Lentil (*Lens culinaris*)
    - Pea (*Pisum sativum*)
    - Bitter vetch (*Vicia ervilia*)
    - Chick pea (*Cicer arietinum*)
- Agriculture with sickles made of blades inserted in wood or bone handles;
- Pottery;
- New bone and antler tools and objects (e.g. spoons, hoes);
- Polished stone objects (e.g. Axes, adzes, chisels, bowls);
- Querns and grindstones for the preparation of food;
- Chipped stone pressure blade technology;
- Oven hearths;
- Particular funerary rites;
- Symbolic objects of Near-Eastern provenance (ear studs, figurines, pintaderas, cult tables);
- Personal adornments and prestige or status objects.

The Neolithic migrants sought out light, fertile and well-watered agricultural land in lowland plains or river valleys. The Neolithic populations that migrated to the Thessalian Plain, as from the first half of the 7th millennium BC, found a promised land that fulfilled their needs, where most of them stayed for several centuries, whilst the population expanded with the arrival of new waves of migrants and/or natural demographic growth, before moving beyond the confines of the broader region. The causes that drove the initial migration into Thessaly and Northern Greece would not necessarily have been the same as those driving the migrational movement northwards up the Central Balkans. According to S. Burmeister (2000), emigration needs to be looked at as a social process, stimulated by the interplay of climatic, economic, social and demographic developments, which does not involve the entire established society; it normally involves a minimum number of individuals for the move to be successful, essentially drawn from the young adult segment of the population looking for a means of subsistence. Pioneers will initiate the movement by selecting a destination that satisfies their needs best, with subsequent waves following the impulse of successful predecessors, leading to a concentration of migrants of the same origin who will tend to assimilate the norms established by the first effective settlers (site location, type of construction, material culture, etc.). At the archaeological level only social units are discernible, covering time spans involving several decades at best, with the number of migrants tending to reduce the further from the point of origin. The leap-frogging principle can sometimes be discernible, with macro-leaps along the coast, overseas, or over the hills, with migrational movements lasting several centuries.

Other reasons for travel and/or migration would be the discovery and exploitation of new resources, or trade / exchange with autochthonous populations and/or pre-established migrants, thus facilitating acculturation and the establishment of cultural homogeneity. Finally, it should be remembered that the Neolithic populations, whilst being markedly different in lifeways compared to the hunter-gatherers they encountered, yet continued to hunt, fish and collect the natural bounty of the land and sea, thus ensuring there was contact with the hunter-gatherers, which could have taken the form of exchange (goods, ideas or partners) and/or competition, although the evidence for confrontational contact is notably absent from the archaeological record during the Transition and Early Neolithic.

The Transition

There is a fundamental difference between the Neolithic way of life which tends to be carried by migrants and Neolithic attributes which can be transported or acquired (Özdoğan M., 2011a). There are also various ways of describing the Transition (e.g. Transformation; from foraging to farming; from a procuring to a producing economy; beginnings of a sedentary life and producing economy, etc.), which are all valid, but which we will not use.

There are fundamental changes which hunter-gatherers have to undergo to fully integrate into the Neolithic agro-pastoralist lifeway, such as delayed-return planning, sedentism, social organisation and belief system, although primitive agricultural societies are also known to practice shamanism, evidencing the slow pace a Transition can take. As A. Smith (1999: 389) states "*It is obviously possible for hunters to become food producers and to take on responsibility for plants and animals, but the difficulty of overcoming cultural tradition should not be underestimated, particularly if the hunters become locked into hierarchies which make it difficult to compete for status and to cross cultural divides… It requires a shift in both social organization and the meaning of product and property. What appears to define these groups of foragers is not purely their means of primary subsistence, but how they are organized socially, and their beliefs in how a product should be distributed*". To this enumeration needs to be added the shift required in world-view referred to above. It is improbable that such changes would have occurred at a moment in time, and dependant on the Mesolithic group and their degree of preparedness for adaptation, such changes may have taken variable time-span on a step-by-step basis for the entire group or for segments of the group. A good example of a slow Transition

outside our Territory is that of the Ertebölle and related cultures in Northern Europe and Southern Scandinavia, where the indigenous hunter gatherers, in contact with the LBK Neolithic, accepted certain Neolithic attributes whilst essentially maintaining their lifeways for over a millennium between 5400-4000 BC, before eventually fully integrating the Neolithic by 3500 BC (Jeunesse C., 2010).

The level of preparedness for the Transition would probably have been dependent on factors already in place, such as:

- The degree of sedentism;
- The degree of storage and planning taking place;
- The social structure existing prior to the Transition;
- The period of time contacts had existed with Neolithic groups and the geographical distance of the Neolithic groups;
- The type of products, ideas or knowledge exchanged;
- The level of population, territory nucleation, and resource stress;
- The relations with Neolithic groups;
- Whether partner exchange was taking place;
- Whether there was competition for resources.

The changes that can be indicative of Transition are:

- Sedentism;
- Changes in habitat structures;
- Evidence of new activities;
- Evidence of Mesolithic and Neolithic attributes in an archaeological horizon that corresponds to the contact period when Neolithic groups were in the Region;
- Domesticated animals in the faunal assemblage;
- Pottery;
- Polished stone objects;
- Cultivated plants in the macrorests or the pollenic spectra;
- Evidence for land clearance;
- Quernstones and grinders, sickle-blade inserts with sickle gloss;
- Appearance of new symbolic objects and personal adornments;
- Changes in lithic technology and procurement patterns;
- Changes in funerary rites and other evidence for changes in ideology;
- Evidence of dietary change and pathologies normally associated with the Neolithic (density dependant, caused by agricultural work or food preparation, sedentism, or related to animal husbandry) (Froment A., 2001; Harter-Lailheugue S., *et al*., 2005);
- The dates correspond with the probable contact and Transition period;
- The degree of attraction the Mesolithic site or territory may have had for Neolithic groups.

Not all the above will occur at any one site, nor necessarily be visible in the archaeological record, but each can be an indication of adaptation in sites where there is continuity of occupation between the Mesolithic and the Neolithic. As M. Zvelebil (2009) says "*The beginning and end of the Mesolithic, like all such phenomena, are ambiguous and fuzzy. The challenge is how best to analyse and interpret small-scale changes within a community, and elucidate real conditions of existence of Mesolithic communities*".

D. Mlekuž, *et al*. (2008: 414) have cautioned that "*any stratigraphic or radiocarbon sequence may be a complex palimpsest, created and recreated by a series of interlinked processes. On the one hand, "gaps" in the radiocarbon sequence do not necessarily represent periods of abandonment of a cave, but may reflect episodes of post-depositional disturbance and intensive modification and transformation of the cave sediments. They may also be created by having too few radiocarbon samples and by the selectivity of the sampling. Small-scale excavations (typical for cave sites), failure to appreciate the effects of post-depositional processes, direct translation of radiocarbon dates into cultural sequences, and interpretative models that see the Neolithic as radically different from the*

Mesolithic, have all contributed to the creation of such gaps. The gaps by some researchers in the radiocarbon sequences of caves in southeast Europe around the time of the Mesolithic-Neolithic transition are perhaps symptoms of our approach towards the transition rather than a reflection of radical cultural or demographic change associated with the displacement of Mesolithic foragers by immigrant farmers".

Many genetic studies have confirmed that there was been a substantial hunter-gatherer component in the post-Transition population, since L. Cavalli-Sforza and A. Ammerman's (1971, 1984) wave of advance model, which postulated that the Middle Eastern component of the population was largest in South-East Europe and reduced on a broadly north-westerly cline, due to population admixture (Lell J. & Wallace D., 2000; Mlekuž D., *et al*., 2008). Because of the greater likelihood for Neolithic males to be pioneers (*ca.* 80%), for them to take hunter-gatherer women as partners (*ca.* 20%), and for males to sire more than one female, the gradient of the male Chromosome Y marker is more pronounced across Europe than that of the female mtDNA (Lacan M., *et al.*, 2014; Sykes B., 2003).

Recent research has suggested that a Late Palaeolithic koine of seafaring folk evolved during the Younger Dryas as one response to the environmental stress, expanding and continuing into the Mesolithic and Initial Neolithic (Ammerman A., 2011; Conolly J., 2008; Kaczanowska M. & Kozlowski J. K., 2012 unpublished; Sampson A., 2008, 2010). This is evidenced by some half dozen Late Pleistocene / Initial Holocene sites around the coast of Cyprus; by the establishment of Late Pleistocene and Mesolithic island sites in the Aegean (Ghiali, Ikaria, Kithnos, Lemnos, Melos, Northern Sporades); by the presence of circular habitation structures at some of the sites; by the similarities in the lithic traditions, dominated by flakes, splintered pieces and denticulated notched pieces, between the Gulf of Antalya, the Cypriot and Aegean island sites, as well as the Greek coastal sites of Franchthi and Sidari, and by the trade and diffusion of obsidian from Melos and Ghiali. Whether these navigators helped transport the first farming communities to Cyprus from the Near East during the 10th and 9th millennia BC (and into and around the Aegean Basin as early as the end of the 10th millennium BC), or whether these migrants achieved the feat under their own initiative is not known, but the two groups would have come into contact, and might have given the clue to transporting wild boar and Anatolian goats to be let loose on the Aegean islands of Kithnos and Youra during the Early and Middle Mesolithic. Looking a little further ahead, there is also a strong similarity in the lithic tradition of these navigators with that of the earliest known European Initial Neolithic site at Knossos on the Island of Crete, which maintained different Neolithic cultural traditions to those of mainland Greece.

Finally, it should be noted that Neolithic migrants are unlikely to have selected locations where they were unable to practice agriculture. The corollary is that if an Initial Neolithic, Transition or Late Mesolithic site with Neolithic attributes is excavated in an area or region with no suitable agricultural land within a reasonable distance, there is a good probability that the site occupants were Mesolithic hunter-gatherers undergoing the Transition.

The different interpretative approaches

The ultimate objective of archaeology is to understand the past, if we make abstraction of the treasure-hunting aspect. If prehistoric archaeology got seriously underway as a science in the later 19th century, particularly in France under Boucher de Perthes, Piette and Peyrony, it can be said to have taken off in the first half of the 20th century with the development of scientific techniques such as developed by Pitt-Rivers, and most particularly in the second half with the increasing use of the hard and social sciences. Whilst much of mainland European prehistoric archaeology has tended to be anchored in typological and technical analyses during the 20th century, due to the prevalence of lithics and ceramics in the archaeological record (with an accent on an evolutionary bias), recent decades have witnessed a growing interest in placing and understanding prehistoric societies in their cultural,

social and environmental contexts, recognising the importance of human agency and reducing the element of environmental contingency. Archaeology is becoming more concerned with the people in question, their needs and their means of satisfying them (life-way, economies, technology and style, symbolism and culture, belief systems, and social organisation), and their relationship with their environment as well as with the wider world. It is also concerned with their cultural evolution over the long term, since detailed events are rarely visible in the material records. R. Bernbeck (2007: 207) clearly stated the ambiguity of archaeology in that "*the constitutive paradox of archaeology is the discovery of that which remains forever undiscoverable*", so that the salient point of the discipline is the lack of knowledge; he goes on ironically to say that "*one day, our narratives about the past will be disjointed and thus appropriate testimony for those whose fate must remain unknown*". The cultural strait-jackets we impose in our search for understanding prehistory, whilst necessary, can be counterproductive; this has been well stated by A. Radmilli (1987), in that "*Considerare il paleolitico, il neolitico como periodo non facilita la comprensione delle nostra antica storia... Non dobbiamo, infati, dimenticare che dietro al termine di cultura, esiste una concreta realtà storica, perché ogni cultura si deve a un grupo umano, ha une dinamica…*" (Pluciennik M., 2000).

A number of theoretic approaches to archaeology, whether as interpretative models (Evolutionist, Diffusionist, Structuralist, Functionalist, Processual, Marxist, Determinist, etc.) or new departures in archaeological science (Middle Range Theory, New or Processual Archaeology, Symbolic and Structural Archaeology, Interpretative or Postprocessual Archaeology, Social Archaeology, Theoretical Archaeology, Evolutionary Archaeology, Inductive Archaeology, Gender Archaeology, etc.) have been expounded. Taken as a whole, all these approaches have helped advance the discipline, and our way of viewing and interpreting the data, even if some have been wholly or partly discredited as culturally, economically, philosophically, politically or gender biased; or anchored in present-day cultural, material and social values; or as being unilateralist or simplistic. As R. Bettinger (1987) insisted, it is the logic applied to the interpretation that matters, and nothing prevents multiple interpretations of an archaeological assemblage. M. Jarman, *et al*. (1982: 4) noted, quoting Allen and Richardson (1971), that the interpretation of data generally fails "*to take account of the complexity and variability of human social behavior*"; they point out a little lower down that "*the tendency of humans, as of animal populations, to press upon their available resources is a powerful incentive in the long term for the development and maintenance of well-adapted productive economies*" (p. 6), and that man's "*adaptability, and his resourcefulness coupled to his technological inventiveness have ensured his evolutionary success… Selective advantage goes to communities who have more rather than less productive economies – the selective value of economic fitness is evident; even if on occasion particular populations and communities might have been protected from this force, for a time*" (p. 11). Thus the need to concern ourselves with an assessment of available resources, the technology whereby they were exploited and the demography – not an easy task for the Mesolithic.

A non-exhaustive list of the numerous sciences and disciplines that have been brought to bear on archaeology and its interpretation includes:

- Anthropology (social and cultural);
- Anthracology;
- Botany;
- Chemistry;
- Climate and environment;
- Comparisons with other sites, regions and periods;
- Computer applications (data bases, statistics, cartography, simulations, GIS, etc.) ;
- Dating methods include stratigraphic relative dating, typological, dendrochronology, ^{14}C, Optical Thermoluminescence, etc.;
- Discussion;
- Drawing;
- Environmental studies;

- Ethnology or ethnoarchaeology;
- Excavation techniques;
- Experimental archaeology;
- Faunal analysis;
- Flotation;
- Genetics;
- Geology, petrographic analyses, geography, and territory and site catchment analysis;
- Malacology;
- Macrorest analysis;
- Microwear analysis;
- Osteoarchaeology (analyses on human and faunal remains) and medical sciences;
- Palinology;
- Physics;
- Photography;
- Prospection and surveys (resistivity, electro-magnetic, area walking, aerial photography, cores, test digs, etc.);
- Sedimentology;
- Sociology;
- Traceology;
- Zoology.

The interpretation of the archaeological record is anchored in the site location, the artefacts and remains, within their context, as discovered in the archaeological record. Since the archaeological content is the material manifestation of existential, economic, social or symbolic activities, it is the contextual interpretation which will help tease out the lifeways of the people who created them. Stated differently, all man-made artefacts or remains, within their context, termed 'signifier' are imbued with 'signified' meaning, which will not only be different for any individual or group, but also carry different levels of meaning (e.g. utilitarian, technological, stylistic, social, historical, symbolic, etc.). The signified will also be different dependant of the individual viewpoint (e.g. the creator, the user, the exchange partners, the archaeologist, etc.). In archaeological research, it is the provenance, the primary and secondary functions, the know-how, the historic context, the skill, the symbolic content, etc., which will be particularly pertinent. R. Torrence (2001: 74), quoting from Lemonnier (1993), Dobres & Hoffman (1994) and Bleed (1997), defines know-how or technology, which uses physical actions to achieve material outcomes, as the actions of competent persons, working with selected raw material (lithics, hard animal matter, wood, clay etc.) to produce a predetermined object, constrained within a social, symbolic and historical context. Technology, which carries in its material expression the adaptive responses in an evolutionary context, is closely linked to prehistoric groups because it evolves slowly, so that rapid change can usually be attributed to the movement of populations, which either blend in with, or are superimposed on the autochthonous substrate; furthermore, transmitted through the generations as 'do as I do', technology carries a heavy social and ideological content, so that overlying its form and functionality are the non-material symbolic aspects within belief systems, which define the organisation and transform social relations and the structure of society, without being necessarily explicit (Hodder I., 1982a, 1982b).

Lithics are a privileged area of archaeological studies, with a history going back some three million years, and whilst they may have consumed as little as 5% to 10% of the attention of the knappers and users in stone-age societies, they can represent close to 50% of the archaeologists' attention, because of their ubiquitous presence and durability. Their typologies have been used to define cultural groups and cultural affinities; the tool-types and user wear analysis have given clues as to their purpose; their distribution in the archaeological record has been used to define site-extension and site-use; knapping technology has been used to determine cultural affiliations and areas of contact; the petrographic analyses have been used to determine the provenance of the raw materials and

exchange networks, and sudden changes in lithic typologies or debitage have helped establish culture changes and migrational movements or long-distance exchange networks.

C. Perlès (2003: 79-80), quoting from Pelegrin (1995) and herself (1992) has made the point that lithics are the only cultural remains in sufficient abundance at contemporaneous sites (prior to the Neolithic) to establish cultural continuities or cultural affinities. Many different techniques can be used to produce stone tools, and there are many different conceptions of what a tool should look like and how it ought to be used to fulfil a given task. Each group thus uses but a small array of the potential methods and techniques, in a specific combination related to their conception of the tools, which is passed down the generations, embedded in the larger cultural context of the group, allowing us to use lithic assemblages as an index for continuity or change. Interpreting changes through time or explaining the main features of a given assemblage requires the evaluation of a great many parameters before they can be related to economic, cultural or functional factors.

Typologies (*sensu stricto*) and classificatory systems are an important and useful, if subjective, cultural and reductionist 20th century construction of the (mostly) French and Italian archaeological tradition (e.g. F. Bordes, D. Sonneville Bordes, A. Gob, D. Binder and Laplace). The creation of typological cultural sub-groups or facies is a methodological transfer from the realm of naturalists, which can be particularly delicate, since they can be the quasi-artificial creation of particular archaeologists, and not correspond to an historical reality. The *fossiles directeurs* can help establish approximate dates in the absence of more precise dating methods, as well as sequences and cultural or ethnic affinities within a regional context of multiple sites. They are used on a European-wide basis, and create a *lingua franca* between archaeologists, but caution in their use is required to ensure due consideration is given to:

- The specificities of a particular site (site function, activities, duration of occupation, area excavated, whether the knapping was performed on or off-site, reasons for the loss or disposal of the assemblage, etc.);
- Lithics, cores and debitage waste that do not fit into the typology and classificatory system;
- Changes of morphology due to the repeated retouching, accidental breaking and reuse of fragments, or the deliberate retouching of tools for a different purpose;
- The difficulties of procuring suitable raw material;
- The quality of the raw materials used;
- The competence of the knappers and their personal choices;
- The intentions and the needs at the time of knapping;
- Traceology;
- Other artefacts in the cultural assemblage of the site in reaching conclusions;
- Changes over time in the face of environmental, biodiversity, demographic changes and cultural contacts.

Over the last few decades typologists have been confronted with the interpretative archaeologies coming essentially out of the Anglo-Saxon archaeological traditions, and attention has moved a step beyond the object to the agent, with a focus on placing the lithics and the relevant data within historical and sociological contexts.

Knapped lithic have been broadly divided into two categories:

- Impact tools to kill or maim, which are seldom retouched after their original manufacture, and which mostly conform to precise cultural standards (points, triangles, lunates, trapezes, etc.). It is mostly, but by no means exclusively, these objects which help define cultural traditions and affiliations;
- Tools used to work and convert other materials by actions such as cutting, scraping or rubbing (wood, skins, meat, plant matter etc.), which are less typologically straight jacketed, and which can often have been retouched several times prior to discard or loss.

So far as the Transition is concerned, there are several aspects of the lithic assemblages which are likely to indicate contact between the autochthonous hunter-gatherers with Neolithic groups and their Transition towards Neolithic lifeways:

- New knapping technique (pressure debitage, different cores types, new sources of raw material, increased size of debitage;
- Larger blades and increased tools size;
- Blades rather than flakes;
- Sickle gloss;
- Mesolithic typologies within a fully Neolithic context.

Tools and objects made of hard animal matter (bone, ivory, teeth, antler, horn) also evolve and change between the Mesolithic and the Neolithic, so that the presence of certain types in Mesolithic contexts can be indicative of contact with Neolithic groups and therefore of Transition.

In this study it will be assumed that the domestication of the four principal animal types (ovines, caprines, bovines and suids) occurred in the Near East, so that the presence of remains of such animals is indicative of either contact with Neolithic communities or animal husbandry activities. According to J.-D. Vigne *et al*. (2005) the criteria for determining domestication can be summarized as being:

- Osteomorphological changes (morphometric analyses);
- Changes in taxonomic spectrum;
- Kill pattern (age and sex);
- Taxon not endemic to region;
- Changes in bone size;
- Representation in art;
- Pathological findings;
- Decrease in DNA haplotype diversity;
- Shift in ratio of stable isotopes;
- Frequency of skeletal parts indicative of *chaîne opératoire* of carcass processing on or off site;
- Presence of new-born and/or shed milk teeth on site;
- The presence of coprolites or coprogenic deposits.

Incipient domestication of the wild boar is attested in the Middle East from prior to 8500 BC, and there has been controversy regarding its possible independent domestication in Europe. The DNA demarcation between the Middle-Eastern and European wild boar has been stable in the Holocene at approximately the level of the Crimea, and a DNA study, based on maternally inherited haplotypes, has demonstrated that the first evidence of interbreeding with the European wild boar is attested at the North German LBK site of Eilsleben, dated to ca. 5500 BC, after which European genes replace the Near-Eastern ones over as little as 500 years. The suggestion is therefore that the domestication of the European wild boar only occurred after the introduction of Near-Eastern domesticated pigs, during the Early Neolithic north of the Alps (Larson G., *et al*., 2007).

The domestication of the wolf (*Canis lupus*) is another matter, since its domestication (*Canis familiaris*) is attested during the Late Upper Palaeolithic and could have occurred at multiple locations at different times. W. Müller (2005) and I. Radovanović (1999a) have explained why the domestication of the wolf can be treated as a special case:

- The wolf was hunted for its fur. A killed she-wolf with a new-born litter would charm the hunter or dependants as emotional objects. It can be weaned as a pet (which is less true of caprines, ovines, suids, cervids and especially the auroch);
- The desire for flight in new-born puppies only develops after about 2 weeks. Some wolf-cubs have reduced flight behaviour and selection of this trait is possible, as is the selection of cubs with reduced aggressivity;
- The wolf is a social animal within its pack. It lives in a community where there is a pecking order and intergroup assistance. This trait can be developed towards humans;

- The wolf is more or less omnivorous and does not require special feeding in that if there is food for humans, there is food for the wolf/dog. There is therefore no need to plan for fodder or change of life style;
- A wolf is capable of fending for himself and returning;
- A wolf does not require special penning or particular care;
- The wolf can be of assistance to man whilst hunting, used as a guard-dog and as a companion, and is fur and food on the pad, when need makes itself felt;
- The wolf can be trained to defecate elsewhere;
- The wolf can be trained to breed with conspecifics in an anthropic environment.

The presence of *Canis familiaris* in Mesolithic or Transition contexts will therefore not in itself be indicative of neolithisation, although it needs to be recognised that its presence means that the population in question was not averse to having animals in its midst.

Trade, exchange, contact and migrational movements over considerable distances are clearly attested with the open sea not being an obstacle. Crete was colonised over 100 kya, probably from North Africa across some 300km of open water (Kopola K. & Matzanas C., 2009); Homo Sapiens emigrated from Africa between 100-60 kya and reached Australia prior to 40 kya after undergoing sea crossings; Obsidian from the island of Melos was obtained during the Late Palaeolithic (Perlès C., 1997a; Sampson A., *et al*., 2009); Cyprus was visited prior to 10 k BC and colonised in the 9th millennium BC (Vigne J.-D., 2009); The Aegean islands of Kythnos, Youra and Ikaria were colonised during the Mesolithic (Sampson A., 1998, 2008; Sampson A., *et al*., 2002, 2003), and the Southern Adriatic was probably crossed prior to the Mesolithic if the Romanellian lithic technology on opposite shores is a reasonable indication. Experimental archaeology using a papyrella reed craft was rowed to Melos from Cape Sounion under the direction of Harry Tzalas in 1988 (Fig. Intro-7), and based on the Mesolithic dug-out found at La Marmotta in Italy, the experimental archaeological transport of Monoxylon I in 1995 covered 300km between islands, whilst that of Monoxylon II in 1998 carried almost one tonne, and travelled some 800km along the coast, confirming the feasibility of seafaring and the transport of payloads approaching 1000 kg (Vigne J.-D., 2009). During the late Mesolithic, the diffusion of trapezoidal armatures technology overland across Europe in an east-west direction was completed in a few centuries at most. We should not therefore be surprised to find evidence of contact over distances reaching several hundred kilometres, materialised by raw materials, manufactured or prestige objects and cultural similarities during the Late Mesolithic and the Transition.

If ideology acts as a social bonding and unifying force, mortuary practices are its most dramatic manifestation in the archaeological record (David N. & Kramer C., 2001). Mortuary practices are cultural texts produced by the living for the dead as the living. Matters of social concern are communicated here, so in a changing world they will also be a locus of change (Burmeister S., 2000: 560). They are the product of active social and personal choices and strategies, made relative to beliefs (Carr C., 1995), used for social control (Stutz L., 2009) or expression, or more generally, to use I. Hodder's term, they are '*meaningfully constituted*'. C. Carr (1995, Table 1, p. 124-125) uses ethnoarchaeology as the basis for his study (37 ethnographic examples are listed: 9 from Africa, 6 from Asia, 8 from the insular Pacific, 7 from North America, 6 from South America and 1 from the Mediterranean Basin); he gives a comprehensive list of attributes and social aspects to look for in the archaeological record, which I have supplemented from other sources (e.g. Radovanović I., 1996; Verjux C., 2007), interpretable as regards lifeways, social structure, belief systems, trade and alliances, territoriality, conflicts and migrations:

- Burial types, such as individual, collective, superimposed, dismembered, scattered, cremated, cemetery or 'special' places, intra/extra *muros*, etc.;
- Funerary context, type of grave structure and effort to create this;
- Position of grave in relation to habitat, other graves, other structures and natural features;
- Changes and causes of any disturbance of graves since inhumation;
- Grave goods: type, quantity, quality, source and disposition;

- Rituals using fire, ochre, etc.;
- Handling and manipulation of body, before, during and after burial;
- Orientation and position;
- The 'norm' and variations within the norm and exceptions;
- Responsibility to the deceased;
- Vertical and horizontal social organization, social ranking and status;
- Personal identity and social classification at death;
- How the ritual contributed to the redefinition of the cadaver;
- How the mortuary practice was integrated into daily life or differentiated from it;
- Hiding or playing on the effects of decomposition;
- Cosmology and its symbols, beliefs about the soul, the afterlife and the nature of the soul's journey to the afterlife;
- Age at death;
- Gender;
- Genetic signature and provenance;
- Cause of death (aggression, trauma, illness, age, childbirth);
- Diet and health;
- Territoriality;
- Trade, exchange, alliances and contacts.

Ethnography indicates that most hunter-gatherers do not bury their dead in cemeteries, so it is not surprising that burials are often lacking in Mesolithic contexts, with less than 1000 known in our Study Area, with most of those in the Iron Gates Region (Meiklejohn C., *et al*., 2009; Verjux C., 2007). Where they do exist in Mesolithic contexts prior to and during the Transition, they are of great value as indicators of value systems, social organisation and change, bearing in mind that social factors grow in importance with social complexity. It must however be recognized that the interpretation of mortuary practices is a delicate matter, fraught with dangers, to be therefore treated with great caution.

Attempts have been made to categorise societies as simple or complex, based on specific criteria, but as R. Cvekić (2009) has pointed out, variability in social organisation is on a continuum, and opposing the two ends misses all the nuances, so that juxtaposing hunter-gatherers with farmers, as though they were in opposition, with the latter assumed to be of a higher order makes little sense. We therefore have many Transitions, which can be said to commence either with evidence of long-distance contact, or the presence of agriculturalists and/or pastoralists in a given region.

As evidence or markers of Transition are identified, so the causes need to be elucidated. Ethnographic examples abound of transitional stages between hunter-gathering and farming once contact between the two has been established:

- B. Voytek and R. Tringham (1989) see instances of Transition in the following four examples:
    - In the Philippines, the system of exchange between the Agda (agriculturalists) and the Palanan (hunter-gatherers) is rational. Cultivated products are exchanged for non-domesticated protein in an equitable system in which the social equilibrium is not upset, even if there are individuals with privileged contacts and delayed reciprocity;
    - In India, the Bihor hunter-gatherers maintain exchange networks with agriculturalists through the intermediary of 'chiefs';
    - In North America, the Cree Indians developed chiefdoms to control the exchange of animal pelts with white immigrants, so that their social organisation became less egalitarian;
    - The Okiek of South Africa produce honey at the household level for exchange and the proceeds are not shared within the community, although sharing exists at other levels.
- C. Fowler & N. Turner (1999) state that "*the management and promotion of certain culturally important plant and animal populations is much older than agriculture. Strategies for increasing productivity and enhancing the quality of particular 'wild' plant species include a*

wide spectrum of practices: burning, trimming or pruning, coppicing, thinning, bark-ringing, selective harvesting, water diversion, sparing, replanting of propagules, fertilizing, mulching, weeding and transplanting (Blackburn and Anderson 1993, Anderson 1993, Gottesfeld 1994). In the management and enhanced production of animals, strategies include culling, sparing, monitoring, selective fishing and hunting based on lifecycles and number of fish and animals, alternative resource use, transplanting of eggs and young (in the case of fish), 'clearing out' streams and shellfish beds, and habitat manipulation by clearing and burning to promote better forage and game (Anderson 1996, Inglis 1993)";

- In the 19th century, the Technelque of Patagonia exercised a control, between hunting and stock-breeding, on wild horses, without attempting to domesticate them; the Laps continue to control herds of wild reindeer to this day, and according to their myths, the Selk'nam of Tierra del Fuego exercised a control over the herds of wild guanacos.

The above hopefully sets the scene and context within which we will attempt to determine how the autochthonous hunter-gatherers of the Terminal Mesolithic responded to the appearance of the Neolithic in their midst.

This study cannot be comprehensive since research is a continuing process, the corpus of available information substantially greater than summarised here and growing exponentially as interest in this subject appears to attract a growing number of researchers. We have attempted to capture the salient aspects relating to the presence of Mesolithic populations prior to and during the Transition as well as the early presence of migrant farmers in the 24 Regions and to determine as best we can how they interacted before eventually merging.

Regions 1-4 – Western Anatolia, Marmara and Southern Thrace – Introduction

(Maps MR1 and MR2)

Western Anatolia, Marmara and Southern Thrace – Regions and geography

This Macro-Region encompasses 4 Regions in Western Anatolia and Thrace west of a line going directly north from the head of the Bay of Antalya as far as the Black Sea coast some 150 km east of the Bosphorus. The area has been split into the four Regions listed below, to take into consideration the geography, as well as the archaeological evidence for the uptake of the Neolithic way of life, and the particular characteristics of the Mesolithic folk they encountered and with whom they appear to have interacted:

- Region 1 to the south-east includes the head and the west side of Bay of Antalya, the coast as far as the Aegean, the western side of the Pisidian Lake District to the north with the sites around Lake Burdur.
- Region 2 covers the Aegean seaboard of Anatolia from west of the Bay of Antalya to the Troad.
- Region 3 covers the Troad, an area running 100 km south of the Sea of Marmara as far as 150 km east of the Bosphorus, incorporating the region of Eskişehir, and the area about 30 km west of Istanbul up to the Black Sea coast.
- Region 4 covers the north shore of the Sea of Marmara from 30 km west of Istanbul, the Gallipoli Peninsula and the north-east corner of the Aegean up to the Black Sea from where the region stretches north up the Black Sea coast beyond the Romanian border.

The mountains of Western Anatolia appear to have slowed the overland westerly progress of the Anatolian Neolithic of the Central Plateau, where Aşikli Höyük is the earliest known farming community with evidence for agriculture with domesticated glume wheats dated the end of the 9th millennium (Colledge & Conolly, 2007). The southern coast of Anatolia is inhospitable with scant space for agriculturalists beyond Cilicia, except for the head of the Bay of Antalya, with its Palaeolithic, Mesolithic and Neolithic presence. The head of the Bay of Antalya communicates inland to the Lake District via the plains and river valleys that flow down from the north, so that interaction between the Mesolithic and Neolithic lifeways can be discerned in this region. The Aegean seaboard has gone through substantial morphological change since the 8th millennium BC, when rias existed extending up to 70 km inland; the Region also has natural routes of communication inland via the river valleys that flow in a westerly direction, but the eustatic sea-rise, coupled to slope erosion and massive sedimentation of the river valleys due to anthropic activities since the Neolithic, has led to a situation where virtually no evidence for human occupation of the land prior to the Neolithic has been discovered.

Around the Sea of Marmara, the geography of this region has also changed substantially since the Late Mesolithic and Early Neolithic due to a combination of unquantifiable tectonic activity, anthropic activity resulting in deforestation, slope erosion and sedimentation, as well as the eustatic sea rise. The dates for the breaching of the Dardanelles / Hellespont and the Bosphorus continue to be the subject of research and debate. At the end of the 20th century, several archaeologists were of the opinion that the Aegean breached the Dardanelles ca. 6500 BC, and the Black Sea ca. 5600 BC (Budja M., 1999; Özdoğan M., 1998a; Ryan *et al.*, 1997, quoted by Cook G., *et al*., 2002: 79). According to some of the latest research (W. Nicolas, *et al*., 2011), prior to the Younger Dryas, there was probably some outflow from the Black Sea. With the Younger Dryas, a long period of desiccation led to a drop in the Black Sea level to *ca*. 107 m below its present level; at the same time, between the Younger Dryas and some point in time in the Early Holocene, the Bosphorus lip rose to its current level of approximate -35 metres. Beginning *ca*. 7600-7000 BC, the Hellespont was breached and the Aegean Sea began to enter the Sea of Marmara, and in the space of not more than 400 years the Black Sea

attained the then-prevailing sea level, flooding some 100.000 km^2 (Nicolas W., *et al*., 2011; Kiziltan Z. & Ali Polat M., 2013: 127). Thereafter, the Sea of Marmara and the Black Sea continued to rise in line with the eustatic sea rise in the Aegean, so that during the Transition commencing in the 7th millennium, the Aegean, the Sea of Marmara and the Black Sea were at essentially the same level, and it can be assumed that Mesolithic and Early Neolithic sites around their shores, where relatively few sites appear to have survived, will have been drowned (Bailey W., 2000; Kiziltan Z. & Ali Polat M., 2013); In this connection the site of Yenikapi in Central Istanbul, discovered during civil engineering work, is 9 mbsl.

The island of Gökçeada/Imbros, which is an extension of the Gallipoli Peninsula, is now separated from the mainland by a 50 m deep channel, and would have become disconnected before the Holocene. The Island of Limnos, further south and west of the Troad, is separated by a 40 m deep channel from the island of Gökçeada/Imbros and would have been in the process of becoming a separate island at the beginning of the Holocene.

To the North and West of the Sea of Marmara, at the head of the Aegean, Southern Thrace is a well-watered plain with the complex meandering Ergene/Maritsa river system, whose main arm circles round the eastern end of the Rhodope Mountains, before turning west in Bulgaria, up a wide plain/valley between the Rhodope and Stara Planina mountain ranges. Close to the Black Sea, east of the Ergene/Maritsa river system, the Istranka Mountains rise to over 1000 masl, stopping much of the rains from the north, resulting in a steppe environment to the south.

A coastal plain of varying width stretches along the western Black Sea coast, which was considerably wider when the Black Sea water level was over 100 m lower than at present, prior to the rapid rise in the sea-level once the Bosphorus was breached. During the Terminal Mesolithic and Transition/Initial Neolithic, this shrunken coastal plain was still wider than at present, with the Black Sea water level approximating that of the Aegean and the Sea of Marmara.

Western Anatolia, Marmara and Southern Thrace – Climate and environment

A probable RCC Event between 7400-7200, resulting in substantially reduced pluviosity in Eastern Anatolia and the Levant (Clare L., 2014, Fig 10 p. 11) may have played a part in the demise of the Göbekli Tepe Culture of Eastern Anatolia and the initial dispersal of the Near-Eastern PPNB and Early Pottery Neolithic populations. H. Parzinger (2014: 380) states that "*it is indeed noteworthy that hardly any of the important sites of the PPNA and PPNB were still occupied during the end phase, PPNV (7400.7000)*". Northern Anatolia was densely forested during the 8th millennium BC, with some large carnivores present (bear, wolves, leopards), when the PPN farmers, used to tilling more open land on the Central Plateau and areas to the south-east, began to move westward. They therefore appear to have chosen to move in southerly, south-westerly and westerly directions where reforestation, whilst in progress, was not so advanced (Roberts N., 2014: 84-85). This migrational pulse involved navigation, since a limited number of Neolithic migrants reached Crete and Thessaly. The subsequent RCC event which began *ca*. 6600 BC and culminated in the '6200 BC event', which lasted until the end of the millennium or a little beyond, witnessed a much stronger two-pronged westerly migrational pulse, the first of which followed a maritime westerly route into the Southern Balkans, and the second an overland route into the regions of the Sea of Marmara and Thrace, as far as the Lower Danube in Bulgaria (Parzinger H., 2014).

The Pisidian Lake District terrain is made up of adequately watered intermountain valleys with lakes separated from one from another by high mountains. The area was in the process of reforestation during the 8th-7th millennia; "*the pollen record indicates that with 6700 cal. BCE onwards mixed forests of oaks, pine and juniper and low herbs were predominating the vegetation in the area (Kuzucuoğlu 2002: 42)*" (Çilingiroğlu Ç., 2009: 261), although the inter-montane basins in the Pisidian Lake District would not have been heavily forested at the advent of the Neolithic settlements after 7500 BC (Roberts N., 2014: 84-85). Further south, the head of the Bay of Antalya has changed

somewhat due to sedimentation, so that possible open air sites are likely to be buried, otherwise the geography of the region is relatively unchanged, and many of the sites discovered in this region have survived near or on the surface thanks to the karstic nature of the terrain, which has preserved the paleosols.

The vegetation of the Anatolian shore of the Aegean is radically different today to that prevailing at the advent of the 7th millennium BC when the land was substantially more forested. Rias that extended up to 70 km inland are now filled with erosional material, as are all the river valleys; the forest cover has largely disappeared due to anthropic activity, so that slope erosion has been intense; bays that once existed are now coastal plains, and the eustatic sea rise has drowned much of the coastal plains that existed at the time. As a consequence, virtually no Mesolithic presence has been found in the Region, and the multi-layer Neolithic sites discovered have been either located on natural mounds, or discovered fortuitously during civil engineering work. At the north-eastern extremity of the Aegean and around the Sea of Marmara, anthropic activity has also eliminated the forest cover, so that surface sites there have also either been eroded or buried under sedimentation.

Thrace would also have been largely forested within a steppe environment during the 7th millennium, as a consequence of lower pluviosity than north of the Istranka, Rhodope and Stara Planina Mountain Ranges.

Western Anatolia, Marmara and Southern Thrace – Early human presence

There is evidence for a pre-Holocene presence in the Konya Plain east of this Macro-Region at the cave/rockshelter of Pinarbaşi, 32 km to the south-east de Çatal Höyük (Baird D., 2003, 2004, 2004), as well as at the head of the Bay of Antalya where Karain Cave has been occupied *ca.* 500k years, the Western Pisidian Lake District, the regions of the Sea of Marmara, Eskişehir and Thrace.

Western Anatolia, Marmara and Southern Thrace – Funerary practice

Pre-Mesolithic hominid remains have been found at Karain Cave north of Antalya, and a burial was found at Öküzini Cave nearby, which has been typologically dated to both the Transition and the Neolithic. Close to the Sea of Marmara, the Early Neolithic Fikirtepe Culture burials found are mostly in crouched/foetal position burials under the floors of the wattle and daub habitation structures north of the Sea of Marmara (e.g. Barçin, Fikirtepe and Yenikapi), with cremations also found in Early Neolithic contexts at Yenikapi, which are considered to be a probable Mesolithic tradition; to the south of the Sea of Marmara, whilst the Early Neolithic burials also tend to be in a crouched position, they are extramural (e.g. Barcin Höyük). The recent excavations at Girmeler also uncovered an inhumation in a crouched position in a Late Mesolithic context.

Western Anatolia, Marmara and Southern Thrace – Lithics

During the Early Holocene, conical and sub-conical cores, erroneously referred-to as ‘bullet cores’ or ‘pencil cores’ (Biagi P., 2016: pers. com.), emanated from the Prut-Seret Basin to the Crimea, from where they then spread round the west side of the circum-Pontic region into Thrace and east of the Bosphorus at hunter-gatherer Ağaçli Culture sites during the 8th-7th millennium BC (Fig. R03-1). The Early Mesolithic lithic tradition from the head of the Bay of Antalya and the valley north into the Pisidian Lake District originate from the Late Palaeolithic and find their respondents in the Mesolithic of the Aegean Basin, lending support to the hypothesis that the islands of the Aegean were colonised by navigators from Southern Anatolia.

Western Anatolia, Marmara and Southern Thrace – State of research

M. Özdoğan (1995: 29-30) has pointed out there have been three periods of serious erosional and sedimentation phases in Anatolia: the first in the Chalcolithic, the second in the Hellenistic period, with the current rate also being very high. Given the preference for Initial Neolithic sites to be located on alluvial plains, these are now buried or partially buried under several metres of sedimentation. On the Aegean seaboard, the deep valleys and rias existing during the Mesolithic and Neolithic have been filled by sedimentation. In inland Turkey only the karstic regions, plateaux, hill-slopes or volcanic regions contain visible Neolithic sites, and only civil engineering works tend to expose Neolithic sites in other areas, whether they are on the plains, plateaux or hill-slopes. It is telling that 90% of the Neolithic sites in Anatolia are on Karstic terrain not subject to alluvial deposits (Özdoğan M., 2008b).

In 1995 the number of excavated Neolithic sites in the Levant, excluding Anatolia, was in excess of 350; in South-Eastern Europe, 400; in the whole of Turkey, 32. There was therefore a strong bias against seeing the Initial Neolithic developing in Anatolia (Özdoğan M., 1995). During the second half of the 20th century, the discussions around Anatolia centred on whether it was a bridge or a barrier to the expansion of the Neolithic to the Balkans; in the early 21st century a very different picture is emerging regarding the complexity of the diffusion of the Neolithic (Özdoğan M., 2011a: S416-S417; Özdoğan M., *et al.*, (ed.), 2011, 2012, 2013, 2014).

The area has been the subject of growing archaeological research these past decades, greatly modifying our knowledge regarding the neolithisation process. The Bay of Antalya and the Lake District have been the subject of three major new excavations; the Regions of the Sea of Marmara and Eskişehir, and that of Thrace have been widely explored, primarily under the aegis of the University of Istanbul, with a continuous flow of new data these past 30 years; the Anatolian Aegean seaboard has also been the subject of intensive research these past two decades and although poor in evidence regarding the Mesolithic, recent excavations and research are modifying our understanding of how the region was colonised by Neolithic migrants.

The earliest evidence for the Neolithic expansion into Western Anatolia dates to *ca*. 7000 BC, but this movement, which does not appear to be driven by demographic, cultural or climatic pressures, was thin, episodic and appears to be undertaken by entrepreneurial migrants, who might have mixed with the indigenous populations. This initial movement out of Central Anatolia is probably to be seen in the context of the changes occurring in that region, where there is a shift from large agglutinated settlements to smaller dispersed settlements (Düring B., 2011: 122-123); and as that author has said, "*the Neolithic expansion in Asia Minor between 6500 and 5500 BC is marked above all by an extraordinary diversity of cultural traditions, in which different regions developed with their own distinct character*" (Düring B., 2011: 199).

Gordon Childe believed Anatolia to be uninhabited during the Initial Neolithic, thereby giving birth to the idea of a maritime connection to Europe (Özdoğan M., 1995: 27-28). He was not entirely wrong, in that navigation is well attested in the Late Pleistocene and all through the Holocene in the Eastern Mediterranean, with maritime migrational movements clearly occurring (e.g. Cyprus, Crete, Aegean islands and Thessaly), as well as offshore fishing and maritime trade and procurement; but Anatolia was inhabited, with a large body of evidence from Central Anatolia, the Bay of Antalya, the Lake District, the Marmara Region as well as Thrace and more recently the Aegean seaboard. The recent research raises interesting questions regarding the regions of origin for the Neolithic colonisation of Thessaly as well as trans-Aegean contacts. Central Anatolia, Cilicia and Cyprus are considered to be primary areas of neolithisation after Eastern Anatolia and the Levant, each evolving in their special way from at least the 9th millennium BC. B. Düring (2011: 123) explains that "*after an early uptake of the Neolithic way of life in South-central Anatolia around 8500 BC, it lasted until 7000 BC before it was taken up elsewhere in Asia Minor, and that it was only at around 6500 that this expansion gained the momentum to colonise comprehensively the landscapes of West Anatolia, Greece, and the southern Balkans. This expansion of cultivation practices*

out of the habitats resembling the natural habitat zone of early crops could be labelled the 'second Neolithic revolution', and it can be argued that its effects were more profound than the initial domestication of crops and animals". Intensive and mixed farming developed in the 7th millennium, and this change, coupled with social changes visible in the break-up of the larger agglomerations of Central Anatolia (e.g. Aşigli Höyük and Çatal Höyük) into smaller dispersed units could have facilitated the migrational movement. The RCC event known as the '6200 BC event' was not a prime mover of the initial migrational movement, but could have driven the acceleration seen towards the end of the 7th millennium (Düring B., 2011: 124-125).

What is clear from the research in Western Anatolia and Thrace is that "*it has also revealed that the Neolithisation of Europe was not a simple process that can be explained as a linear development. To the contrary, this Neolithisation involved a very complex series of events taking place simultaneously*" (Özdoğan M., 1999).

The recent data suggesting that an initial westward migrational movement got under way late in the 8th and early in the 7th millennia comes from the Pisidian Lake District, the Aegean seaboard, the Eskişehir region east of the Sea of Marmara, as well as Crete. Some of these migrants appear to have come overland, whether via the Pisidian Lake district to the Aegean shore, or following northern routes towards the Sea of Marmara whilst others probably came by sea, starting from different points, thus bearers of diverse cultures. Their points of departure will long remain the subject of research and discussion, since there appears to be little exact replication of cultural attributes from any single primary centre of neolithisation, whether one looks at the domesticated fauna, the pottery, the type of construction, the lithic assemblage, or other cultural factors. To take one example, bovines appear to have been domesticated in the Middle Euphrates Region sometime between 8500-7500 BC, and are found in Cilicia *ca*. 7000 BC, but in Central Anatolia only *ca*. 6000 BC, so that the provenance of migrants arriving in the Lake District or the Aegean Basin prior to 6000 BC with domesticated cattle becomes an interesting question (Düring B., 2011: 178-179). What is clear is that sea-borne travel, migration, contact and exchange over long distances was an established fact throughout the Holocene in the Eastern Mediterranean, with the same being true overland, all evidenced by the movement of raw materials (e.g. obsidian), migrations with a complete Neolithic package and the replication of cultural attributes over large areas. In any one Region it can be demonstrated that settlements were established at approximately the same time by people originating from different cultural backgrounds. To this kaleidoscope should be added the input from the autochthonous population, so that whilst it is possible to identify cultural horizons in time and space, there is scope for diversity as well. It is therefore not possible to be categorical about any single explanatory model, and we need to revert to ALBOT & ALBOT.

Western Anatolia, Marmara and Southern Thrace – Mesolithic

The term 'Epigravettian' is more often used than 'Mesolithic' in this Macro-Region to denote the period prior to the Neolithic during the Holocene. We will however maintain the term Mesolithic to denote Holocene hunter-gatherers, so as to maintain consistency.

The Mesolithic of the Western Pisidian Lake District is not well known other than through surface scatters. Further south towards the Bay of Antalya, the stratified Öküzini and Karain cave sites show continuity of use, albeit with hiatuses, from the Palaeolithic onwards. Further south still, on the west side of the Bay of Antalya, the caves of Beldibi and Belbaşi also contain Mesolithic stratigraphies continuing into the Transition. P. Biagi (2016: pers. com.) confirms that there are numerous other sites attributable to the Epipalaeolithic in the interior of the Gulf of Antalya, still unpublished (but no Mesolithic ones to date), with almost all the caves in the region having occupations attributable to this tradition – unpublished material from surveys in the region by Ankara University.

The Mesolithic is also attested in the Regions of the Sea of Marmara and Thrace, where there is evidence for contact with the incoming farmers. It can be assumed that sites have been lost to eustatic

sea rise, erosion and sedimentation, particularly along the Aegean seaboard. The Sea of Marmara was a landlocked lake with a water-level 15-30 metres lower than today (Algan A. *et al*., 2011; Kiziltan Z. & Ali Polat M., 2013; Özdoğan M., 2011e), and the Black Sea water-level was also much lower than today prior to the 7th millennium BC (Merkyte I., 2003), so that hunter-gatherer sites are likely to have been lost along the shores of both of those seas, particularly since the evidence points to coastal sites and an economic base in which aquatic resources played an important part.

On the eastern shore of the Aegean no Mesolithic sites were known ten years ago, but the situation is rapidly changing with the stratified site of Girmeler and a lithic scatter near Bodrum.

During the Early Holocene, sub-conical cores, or 'bullet cores' or 'pencil cores' as they are often erroneously termed (Biagi P., 2016: pers. com.), emanated from the Prut-Seret Basin to the Crimea, from where they then spread round the west side of the circum-Pontic region into Thrace and east of the Bosphorus at hunter-gatherer Ağaçli Culture sites during the 8th-7th millennium BC. The movement of people and ideas would have been facilitated at the time by the broad plains to the west of the Black Sea, before these were drowned when the Bosphorus was breached. These cores are unidirectional and the debitage is by pressure flaking or indirect percussion (Fig. R03-1). They continue to be found in the coastal Early Neolithic Fikirtepe Culture (e.g. Fikirtepe, Pendik, Ilipinar and Menteşe) (Fig. R03-1), suggesting that elements of autochthonous populations merged with the incoming migrant Neolithic communities or/and that the Neolithic migrants were partially acculturated by the Mesolithic inhabitants of the Region (Gatsov I., 2005; Gatsov I. & Nedelcheva P., 2007; Kozlowski J. K. & Kaczanova M., 2009: 365-366).

With the exception of the coastal Fikirtepe Culture, there appears to be a break in the lithic tradition between the poorly known Late Mesolithic and the Early Neolithic. The Mesolithic has a marked microlithic component, whilst the Earliest Neolithic lithic assemblages, which are poorer, do not. The Ağaçli Culture lithic assemblage, with its blades and backed bladelets, whilst bearing resemblances with the North Pontic tradition with its sub-conical cores, emanating from the Late Pleistocene, also contains a multidirectional debitage on plates with microliths (Bladelets, trapezes and lunates) (Gatsov I. & Özdoğan M., 1994: 99; Gatsov I., 2005).

Regarding Anatolia in general, B. Düring (2008: 18) states that "*given the widespread evidence for 'Microlithic' sites across Anatolia and their occurrence in early Aceramic Neolithic sites, it can be suggested that these Palaeolithic and Mesolithic 'Microlithic' people played an important role in the initial transition to a Neolithic economy, particularly in southeast and south central Anatolia. By contrast, in the Marmara region, there is a technological disjunction between local Epi-Palaeolithic / Mesolithic assemblages and those of the Neolithic, but it is difficult to establish at present whether this relates to changes in local traditions over time or new groups of people moving into the area*".

Western Anatolia, Marmara and Southern Thrace – Neolithic

The core areas of neolithisation are the Levant, Northern Syria, Iraq, and South-East Anatolia, with Central Anatolia, Cilicia and Cyprus being added a little later. The Neolithic package developed in different ways in each of these regions during some 3000 years before it was exported to Western Anatolia, Crete, the Peloponnese and the Balkans (Düring B., 2011; Özdoğan M., 2008b: 143), and as M. Özdoğan (2013: 192) states, "*the timing of the initial expansion of the Neolithic way of life from its core area is still not very clear*", but forerunners may have visited western Anatolia either side of 7000 BC. Whilst the domestication of animals is first attested in the Levant around the middle of the 9th millennium BC, pastoral nomadism as a way of life only began at the turn of the 8th and 7th millennia (Vigne J.-D., 2014: 127), and this could have been one of the drivers which facilitated the overland expansion of the Neolithic at that time in the direction of Western Anatolia. Whilst the domestication of cattle is believed to have commenced in the 9th millennium BC, the morphological evidence for domestication occurred in the Northern Levant shortly before the first occupation of Çatal Höyük (7400-6200 BC); the herding of cattle is not evidenced at Çatal Höyük prior to its abandonment, but it

had spread west across Anatolia to reach Aşikli Höyük to the north-west and Höyücek in the Pisidian Lake District prior to 6200 BC (Russell N., *et al.*, 2005). These dates suggest that domesticated bovines were probably transported round the coast from Cilicia or the Levant to Western Anatolia and Thrace.

The first evidence for the Neolithic of Central Anatolia, in Cappadocia and the Konya Plain, dates from the last quarter of the 9th millennium as exemplified by the site of Aşikli Höyük in Cappadocia, where agriculture was practised as early as 8300 BC (Colledge S. & Conolly J., 2007), and Boncuklu Höyük, 8 km south of Çatal Höyük in the Konya Plain, where the occupation began before the end of the 9th millennium, showing clear continuity from the Mesolithic (Baird D., 2006, 2007, 2008). These two sites are important in evidencing the step by step adoption of Neolithic lifeways by autochthonous populations, attesting a Transition lasting many centuries. Çatal Höyük, although better known, is only occupied from *ca*. 7300-6200 BC. The use of lime-plaster floors in the Konya Plain Early Neolithic (e.g. Boncuklu, Çatal Höyük and Musular) is an important cultural marker for the possible provenance of migrants into this Macro-Region, but the presence of this pyrotechnology at the site of Girmeler in the South-Eastern Aegean (Region 2) prior to 8000 BC in an otherwise Mesolithic context begs many questions.

Wattle and daub constructions are not known on the Konya Plain, whereas they are in Cilicia, where the evolutionary track is different to that of Central Anatolia, and closer to that of the Fertile Crescent; at Yumuktepe in Cilicia, dated *ca.* 7000 BC, the earliest constructions are wattle and daub and domesticated bovines have also been found about 1000 years earlier than in the Konya Plain, as well as DFBW pottery (Düring B., 2011: 157-160). These data are important cultural markers for the possible provenance of migrants into this Macro-Region.

Impressed Ware is known on the Levantine coast during the PPN, where this mode of decoration was possibly first applied, so that this again could be an important cultural marker for the possible provenance of migrants into this Macro-Region, although this decorative style could have been invented or copied after contact and/or exchange in different locations.

The westward migrational movement from Central Anatolia coincides with the collapse of the Pre-Pottery cultures in the East with a decline in population densities (Özdoğan M., 2008b). The region of Eskişehir, some 200-300 kilometres to the south-east of the Sea of Marmara, is, to date, the most westerly advance known for the PPN of the Konya Plain with sites such as Asarkaya, Keçiçayiri and Kalkanli. No dates are available at present, but it presumably predates the next identifiable wave of advance, estimated to have occurred starting *ca*. 6600 BC with DFBW pottery. M. Özdoğan (2010: 885) has suggested that a sparse initial migrational movement occurred starting at the end of the 8th millennium into North-Western Anatolia, possibly reaching European Thrace.

DFBW, first developed in the Near East and taken up in Central Anatolia and Cilicia, is the hallmark of the Archaic Fikirtepe Culture in the Sea of Marmara Region, and is found as far west as Çalca (whose initial occupation could date from an earlier date) in the Troad, south of the Dardanelles in the north-west corner of Anatolia, and as far west as Eastern Bulgaria in Europe. DFBW is also found in the Western Pisidian Lake District and on the Anatolian Aegean coast with different characteristics, in combination with Impressed Ware of Levantine tradition a little later. This was a more important migrational movement than that occurring early in the 7th millennium, and could be an expansion of this first migrational flux, which continued throughout 7th and into the 6th millennia, following different trajectories. It is characterised by multiple waves with different cultural attributes, and complex cultural affinities which change over time and which could include elements of the autochthonous substrate (Özdoğan M., 2010).

Red-Slipped Ware, which appears later than the DFBW in Eastern Anatolia, spread westward later than the DFBW as part of the later 7th millennium migrational movements, reaching the Pisidian Lake District, the Aegean coast, the Region of the Sea of Marmara and the Balkans, developing into red and black painted ware (Özdoğan M., 2008a). This wave of colonisation appears to have reached the Anatolian Aegean seaboard directly, and is found at several recently excavated sites (e.g. Ulucak, Yeşilova). This demic movement is seen in Greece as well as the littoral of Western Anatolia, where

Impressed Ware is also present at the end of the 7th millennium. Understanding the interaction zone and provenance of all these cultural markers continues to cause problems (Özdoğan M., 2009: 38).

The first signs of the Neolithic in the Pisidian Lake District, known as the Hacilar Culture, have recently been given credibility for an early 8th millennium date by the discovery of a lime plaster floor from the late 9th millennium at Girmeler Cave further west; A late 8th millennium or beginning of the early 7th millennia is assured subsequent to the re-examination of Hacilar and by three recent major excavations (Bademağaci, Höyücek and Kuruçay) with a spate of dates. The Initial Neolithic pottery tradition is DFBW, which continues through the end of the 7th millennium, when Painted Ware appears. DFBW is also found on the eastern seaboard of the Aegean and the Region of the Sea of Marmara and Thrace, where the sites excavated over the last half century point to an Early Neolithic which could be broadly concurrent with that of the Western Pisidian Lake District and earlier than that in Thessaly (Duru R., 2012; Lichter C., 2005: 67; Lichter C. & Meriç R., 2012). The suggestion is therefore that the migrational movement from the Central Anatolian Plateau, whilst westward, was multidirectional during the 7th millennium. R. Duru (2012) sees links in the Early Neolithic pottery traditions between the Western Pisidian Lake District, the Aegean seaboard and the Marmara Region, noting the following common pottery traits:

- Red-slipped Ware;
- Fine burnishing;
- 'S' profiles;
- Jars with narrow necks;
- Anti-splash rim pots;
- Tubular lugs and vertical string holes;
- Red painted motifs on a light coloured surface;
- White painted strip decorations on a red-slipped surface.

A mass migrational movement, visible across Western Turkey and most of the Balkans, possibly in part triggered by a combination of the '6200 BC event', social unrest and demographic pressures, which lasted several centuries, is evidenced by over 100 sites in Western Anatolia and hundreds more in the Balkans. This migrational movement, which may have originated from different parts of the core areas of neolithisation, is typified by painted ware (Özdoğan M., 2008b, 2011a).

The initial neolithisation of the Balkans most likely did not occur through the Sea of Marmara region, nor through South-Eastern Thrace (notwithstanding a limited early penetration up the Black Sea coast into Eastern Bulgaria), since there is a lack of cultural affinities (pottery shapes, firing techniques and decoration, lithic tradition and habitations). The Initial Neolithic of the Balkans north of the Aegean and in Bulgaria must therefore have been either a easterly return movement by the Thessalian and Macedonian Neolithic communities and/or a sea-borne penetration from the Northern Aegean, for which there is however a lack of evidence.

Western Anatolia, Marmara and Southern Thrace – Transition

Transition sites are evidenced in the Bay of Antalya, The Eastern Aegean, the Sea of Marmara and Thrace Regions.

In the bay of Antalya, Mesolithic lifeways and lithic technology continue with the addition of some Neolithic elements such as pottery and polished stone axes; in the Eastern Aegean the site of Girmeler has thrown new light on possible cultural affinities; in the Sea of Marmara and Thrace Regions, the Mesolithic traditions are visible in the Fikirtepe Culture (lithic technology, subsistence and possibly the circular habitation structures in wattle and daub), whilst being otherwise fully Neolithic (Lichter C., 2005). It is also to be noted that the microlithic tradition persists in this Macro-Region till about 6000 BC, when it had disappeared from Central Anatolia some 1500 years previously in the PPN sites. This differential in the timing for the loss of Mesolithic attributes points to poorly differentiated Mesolithic predecessor groups (Düring B., 2011: 45).

Region 1 – Western Anatolia, Marmara and Southern Thrace – Bay of Antalya and Lake District

(Map R01)

Western Anatolia, Marmara and Southern Thrace – Bay of Antalya and Lake District – General Introduction

Only the western part of both the Bay of Antalya and the Pisidian Lake District are included in this study. The demarcation line runs from the head of the Bay of Antalya in a line going north, so that the only lakes included are Lakes Burdur, Aci and Said.

The Lake District terrain is made up of adequately watered intermountain valleys with lakes separated from one from another by high mountains. The area was forested during the 8th-7th millennia; "*the pollen record indicates that with 6700 cal. BCE onwards mixed forests of oaks, pine and juniper and low herbs were predominating the vegetation in the area (Kuzucuoğlu 2002: 42)*" (Çilingiroğlu Ç., 2009: 261). The head of the Bay of Antalya has changed due to sedimentation, so that possible open air sites are likely to be buried, otherwise the geography of the region is relatively unchanged, and many of the sites discovered in this region have survived near or on the surface thanks to the karstic nature of the terrain, which has preserved the paleosols.

"*Archaeological evidence indicates that a gradual adaptation of agro-pastoral lifestyle by Mesolithic hunter-gatherers did not take place in the region*" (Çilingiroğlu Ç., 2009: 263). The excavated mound sites of the region appear to be fully Neolithic from inception, yet a Mesolithic presence is attested in the Region, but the indications are that this could have been sparse, and long contact with the Eastern Pisidian Lake District and the Central Plateau could have predisposed them to integrate the Neolithic lifeway once this became locally available.

Western Anatolia, Marmara and Southern Thrace – Bay of Antalya and Lake District – Mesolithic and Transition sites – Introduction

The Mesolithic of the Western Pisidian Lake District is poorly known other than through surface finds (Schoop U.-D., 2005). Further south, a number of cave sites north of the head of the Bay of Antalya, and on its west side, possibly occupied episodically and on a seasonal basis during the Epipalaeolithic and Mesolithic, were abandoned shortly after the hunter-gatherer occupants acquired some Neolithic attributes.

Western Anatolia, Marmara and Southern Thrace – Bay of Antalya and Lake District – Mesolithic and Transition sites – Site details

Baradız (1) – This is Dune site lithic scatter near the north-east corner of Lake Burdur.

"*Despite intensive research concentrating on the early sedentary villages, pre-Neolithic sites are documented at a very few find spots. Of these, Baradız is probably the most important as it is the only site which was subject to small-scale excavations by Şevket Aziz Kansu in 1944. Baradız is a small open-air site southwest of Isparta, located on one of the sand-dunes which belong to Lake Burdur. Kansu's excavations revealed existence of a microlithic industry characterized by microburins, geometric-tools and microlithic cores which are dated to the Mesolithic period (Harmankaya and Tanındı 1996)*" (Çilingiroğlu Ç., 2009: 261-262).

B. During (2011: 42) indicates that it is a site with a single microlith, that its attribution is therefore doubtful and that the material has been lost.

Given the nature of the site and the details of the lithics, the site clearly attests an Early Holocene presence in the Western Lake District.

Belbaşi Cave (8) – This coastal rockshelter 300 masl 20 km north of Beldibi, to the west of Antalya, dominates a narrow valley running down to the sea. The site was excavated in the 1960s by E. Bostanci, who indicated three levels, on top of which he found some material from the Neolithic and Classical periods (Yakar J., 2001: 122).

The material found at this coastal cave produced Upper Palaeolithic material which resembles the Natufian, similar to that of Beldibi Cave nearby (Fig. R01-1) (Otte M., *et al*., 1999; Perlès C., 1987b; Yakar J., 1991: 122). Above the three levels some coarse Neolithic pottery is associated with similar lithics, but the excavator believed these to be intrusive, so that no lithic material could be associated with the pottery. Some of the pottery is similar to that found at Belbidi (Yakar J., 1991: 122). Because the excavation has not been published in detail for the top Level 1, the supposed mixing cannot be verified (Düring B., 2011: 160).

It would seem that the Terminal Mesolithic occupants of this site acquired some pottery and were possibly in contact with the occupants of Beldibi Cave, where a similar Transition situation has been found.

Beldibi Cave (9) – This double cave, located 25km south-west of Antalya, is 25 masl and 100 m inland. The lower cave contained the archaeological strata first excavated by E. Bostanci in 1959-1960 and again between 1966-1967 (Yakar J., 1991: 122).

The lower strata F, E and D are Upper Palaeolithic, whilst C and B are Mesolithic and A, 70 cm thick is Neolithic. There is a hiatus between Levels C and B. Level B, split into B1 and B2 contained coarse DFBW of simple shapes in a Mesolithic context, which according to J. Mellaart resembled the earliest pottery from Çatal Höyük East. The lithic assemblage from the lower Level B2, notwithstanding the hiatus, is a continuation of the Mesolithic microlithic technology found in the underlying Level C (Fig. R01-2), characterized by microburins, lunates, tanged points, tranchets, ridge-backed sickle blades, trapezes and other arrowheads. In Level B1, the microliths become rare and badly shaped, and the lithic assemblage evolves with blades, some backed as sickle inserts (possibly to cut grasses), large scrapers and burins, suggesting growing contact with Neolithic groups, whether in the Lake District, the Konya Plain or along the coast to Cilicia. Unfortunately, the top levels which contain mixed Mesolithic and Neolithic attributes have been poorly published (Düring B., 2011: 160).

The small quantities of obsidian found suggest contacts with Central Anatolia, (Otte M., *et al*., 1999; Yakar J., 1991: 123), so that it is probable that the late Mesolithic hunter-gatherers acquired Neolithic material through exchange, eventually learning the techniques for manufacturing these, whilst possibly cutting wild grasses and essentially retaining their Mesolithic lifeways.

There are similarities between the Mesolithic lithic assemblage with those at Franchthi Cave (and the Cave of Cyclops) as well as with the Romanellian, which several authors have noted (Özdoğan M., 1995), supplying indirect evidence for Mesolithic maritime contacts between the southern Anatolian coast, and the Western Aegean. They were also in contact with the occupants of Belbaşi Cave, where a similar Transition situation has been found.

It would seem that the Terminal Mesolithic occupants of this site acquired some pottery, and were acquiring other Neolithic attributed prior to abandoning this site which has no suitable agricultural land nearby.

Çarkini Cave (7) – Cave near Karain B with some pottery.

Karain B Cave (7) – This cave site, about 400 masl, is some 200 m above the plain on the steep slopes on Mount Katrain about 30 km north-west of Antalya (Fig. R01-3). The site was discovered by I. K. Körten, who excavated it between 1946-1975 and the excavations, which are ongoing, have been under I. Yalçinkana since 1985. The site, with its 11 m of stratigraphy (Fig. R01-3) has been occupied about

500k years since the Early Palaeolithic, and is the oldest recorded site in Turkey. After the Epipalaeolithic occupation there appears to be a hiatus of several millennia before a Neolithic occupation (Özdoğan M., 2011; Erdoğu B., 2014 pers. com). The Neolithic occupation is dated to ca. 6400 BC with an assemblage similar to Bademağaci further north and Höyücek in the Lake District, and includes domesticated fauna (Thissen L., 2005).

We replicate this information under the 'Neolithic and Transition' section below, since it is hard to determine, based on the information, whether the Early Neolithic occupation was by immigrant Neolithic people or by autochthonous hunter-gatherers during the Transition. If as stated, the assemblage resembles that from Bademağaci and Höyücek, we are then dealing with immigrants, with shepherds possibly using the site, which is up a steep scarp.

Öküzini Cave (6) – This cave site (Fig. R01-4) lies between the head of the Bay of Antalya and the Lake District, at the foot of the Taurus Mountains, level with the plain. It was first excavated in the 1950s by K. Kétken, and again by J.-M. Léotard and M. Otte in the 1990s. The top Levels O and IB have not been published in detail, so that the interpretations suggesting mixing cannot be verified (Düring B., 2011: 160).

The first occupation dates from *ca*. 18200-17500 BC, and continues with interruptions until *ca*. 11800 BC. The site is then probably unoccupied until the Pottery Neolithic at the advent of the Neolithic and continues into the Chalcolithic with burial pits. The Neolithic and Chalcolithic levels have however not been adequately published (Martinoli D., 2009).

The microlithic component first appears *ca*. 15500 BC, with a long sequence of lunates like everywhere else in Southern Anatolia (Biagi P., 2016: pers. com.). The lithic assemblage finds parallels at Franchthi Cave, Klithi and Asprochaliko in the Southern Balkans towards the end of the Pleistocene (triangles, trapezes and segments of circle), at which time there are no obvious correlations with the Levant (Léotard J.-M. & Otte M., 1996). The microlithic element continues into the Holocene (Fig. R01-4a), as well as the final occupation at the top of the sequence, where a burial with a polished axe and sherds was found, which has been attributed to the Neolithic or Chalcolithic (Léotard J.-M., et al., 1996; Otte M., *et al*., 1999), but which U.-D. Schoop (2005: 48-49) dates to 7000-6500 BC, and attributes to acquisitions through contacts with the Konya Plain about one millennium after the Neolithic got under way in that Region.

M. Özdoğan has stated that the evidence from this site "*displays the first irrefutable evidence of a circum-Mediterranean interaction sphere during the Epi-Palaeolithic period. The microlithic assemblages from Öküzini and Beldibi caves, have elements of both Natufian on the East, and Franchthi and Romanelli in the West*" (Özdoğan M., 1998: 32), yet this site does not appear to have contacts with the Neolithic further east (Özdoğan M., 2011a: S419), and he believes there to have been a hiatus of over a millennium between the last Epipalaeolithic occupation and the occupation with pottery (Özdoğan M., 2011d: 30).

The lithics from the topmost levels (Fig. R01-4) with the pie-chart of the faunal composition, suggests that ovicaprines existed at the site prior to its abandonment, as well as other Neolithic attributes such as grave-goods, whilst the lithics are of Mesolithic tradition.

This site supplies additional confirmation of a hunter-gatherer presence from the Late Pleistocene and Early Holocene. It might also provide evidence for contact between these occupants and the Neolithic people further east, or more likely the Pisidian Lake District Hacilar Culture, given the recent dates close to 7000 BC, from whom they appear to have acquired domesticated fauna and Neolithic material attributes, but there are conflicting views regarding this.

Western Anatolia, Marmara and Southern Thrace – Bay of Antalya and Lake District – Initial and Early Neolithic sites – Introduction

The Pisidian Lake District Early Neolithic is known as the Hacilar Culture after the eponymous site. The Early Neolithic of the Region is well attested thanks to the re-examination of Hacilar and three recent major excavations (Bademağaci, Höyücek and Kuruçay) with a spate of dates, which have pushed the Initial Neolithic back to the late 8th or beginning of the early 7th millennia from the middle of the 7th millennium (Duru R., 2012; Düring B., 2011; Efe T., 2005; Schoop U.-D., 2005).

The Initial Neolithic sites in the Lake District appear to have been heavily dependent on agriculture, as well as the collection of nature's bounty. All the domesticated animals are present, but hunting was also important (Duru R., 2012; Düring B., 2011: 165), broadly reflecting a similar situation to that prevailing in the Konya Plain. The earliest phases at the three sites of Bademağaci, Höyücek and Kuruçay have no habitation features in the lowest level suggesting they were of light material (e.g. wattle and daub), which is not present at the contemporaneous sites excavated in Central Anatolia. The limestone floors above the lowest levels find their origin in Central Anatolia, thus linking the Western Pisidian Lake District to the Central Plateau (Duru R., 2012: 23) in the same way as pottery styles and pintaderas do in the later stages of the Neolithic (Efe T., 2005). There are enough differences between the Neolithic attributes of the Lake District and those of the Central Plateau that, whilst contact between the two regions is clear, the provenance of the Initial Neolithic migrants remains an open question, and will no doubt be the subject of research and debate for some time to come.

Obsidian in the Region attests to contacts with the Aegean with Melian material as well as with Central Anatolia (Schoop U.-D., 2005), although it should be noted that whilst the trade in obsidian is an important subject, too little is known about it (Biagi P., 2016: pers. com.).

Western Anatolia, Marmara and Southern Thrace – Bay of Antalya and Lake District – Initial and Early Neolithic sites – Site details

Bademağaci (5) – This Hacilar Culture site is located 2.5 km north-east of the town of Bademağaci in a small plain 780 masl, 75 km from Burdur and 50 km north of Antalya (Fig. R01-5). The site was excavated by Refik Duru in association with Gülsün Umurtak in the later years, over a surface of 3000 m^2, between 1993-2009. The mound has 7 m of stratigraphy above ground and 2 m below, for a total of 9 m. The deposits are complex, since different parts of the mound were used at different times (Fig. R01-5).

The earliest settlement, Early Neolithic I (EN I / Levels 5-9), lies below the Early Neolithic II settlement (EN II / Levels 1-4). The earliest occupation level was found at a depth of 8.4 m (EN I / Level 8) with part of a lime mortar floor of terrazzo-type (Fig. R01-5). No architectural features were found in the 60-70 cm below, but a small amount of pottery and bone tools were uncovered in Deep Trench 1 (Fig. R01-5). In Deep Trench 2, similar material was found at a similar depth, so that the 60-70 cm level was labelled EN I / Level 9 (Duru R., 2012). Given the 60-70 cm thickness of this undated Level 9, it could represent several centuries of occupation prior to the earliest median date available for Level 8 of 6865 BC.

The sherds from EN I / Level 9 are fired to medium hardness, monochrome and slipped to the same colour as the paste and poorly burnished. This type of pottery continues throughout the EN I although the shapes change. Overall it is described as "*rather developed but not sophisticated and rather homogenous with limited variety*" (Duru R., 2012: 18-19). A marble stone bowl was also found in this Level.

No details are given of the EN I lithic assemblage by R. Duru (2012). For the EN 2, his suggestion is that some of the tools were imported from the Konya Plain, and that the imported obsidian was generally worked on site. M. Özdoğan and I Gatsov (1998: 213) have noticed similarities between

the lithics from this site and those from Öküzini cave close by, and T. Efe (2005: 107), quoting R. Duru (1998, 1999, 2001, 2003) has also noted that the globular vases and pressure-flaked tools would indicate at least a partial contemporaneity with Çatal Hüyük in the Konya Plain, which was first established *ca*. 7400 BC.

The earliest dates for this site are (Duru R., 2012):

- Hd-22340 7949±31BP = 7031-6700 BC (OxCal 4.2 at 95.4%), on Charcoal EN I /Level 8 – Median 6865 BC.
- Hd-22279 7465±27BP = 6412-6251 BC (OxCal 4.2 at 95.4%), on Charcoal EN I /Level 4a – Median 6330 BC.
- Hd-21016 7424±37BP = 6390-6231 BC (OxCal 4.2 at 95.4%), on Charcoal EN I /Level 4 – Median 6310 BC.
- Hd-21015 7481±40BP = 6430-6250 BC (OxCal 4.2 at 95.4%), on Charcoal EN I /Level 4 – Median 6340 BC.
- Hd-22339 7553±31BP = 6463-6387 BC (OxCal 4.2 at 95.4%), on Charcoal EN I /Level 3a – Median 6425 BC.
- Hd-20910 7546±41BP = 6471-6353 BC (OxCal 4.2 at 92.2%), on Charcoal EN I /Level 3 – Median 6410 BC.
- Hd-21058 7459±51BP = 6425-6236 BC (OxCal 4.2 at 95.4%), on Charcoal EN I /Level 3 – Median 6330 BC.

The dates suggest that the earliest occupation of the site (EN I / Level 9) would have occurred in the late 8th millennium BC and that the EN I lasted approximately one millennium. B. Düring (2011: 125-126), quoting R. Duru (2004), has stated that "*a new radiocarbon date from Bademağaci, in the Lake District, suggests that this site was occupied from 7000 BC onwards. Unfortunately, apart from a limestone plaster floor that could not be associated with any walls and a few small shards, nothing has been published for the 'Early Neolithic I' at this site. In these circumstances, it is difficult to judge how reliable this single radiocarbon date is (we could potentially be dealing with old wood, for instance)*".

It is unfortunate that the EN I / Level 9 is undated, only excavated over a small surface in deep soundings and poorly published, since it might have shed light on the economic base and composition of the first settlers. It can comfortably be assume that the initial settlement at Bademağaci dates from *ca*. 7000 BC or a little earlier.

Hacilar (3) – This is the eponymous Early Neolithic open-air site of the Western Pisidian Lake District. The mound, 940 masl, is located 26 km southwest of Burdur, 8 km south of Lake Burdur and 1.5 km west of village named Hacilar on a gentle rise about 100 m above the lake the northern slopes of Taurus Mountains (Fig. R01-6). The location is extensive with occupations extending into the Metal Ages stretching over several kilometres. A stream, Koca Çay, flows on the west side of the site, which was first excavated by J. Mellaart between 1957-1960. During the final year of excavations, Mellaart found a second settlement on the western side of the mound which was earlier than the first settlement, which had 9 Levels. This earlier settlement, with 7 identified levels (I-VII), was dubbed 'Aceramic' over a depth of 1.5 m, with a Level VI produced elements of a lime plaster terrazzo floor (Fig. R01-6) (Duru R., 2012). R. Duru indicated that he found pottery in the basal level of the earlier settlement 25 years later, so that he relabelled the earlier settlement 'Early Neolithic'. There is however a problem with the pottery found by R. Duru in the earliest levels of the 'Aceramic' excavation of J. Mellaart, as Ç. Çilingiroğlu (2009: 263) has pointed out, in that "*in 1985-1986, small scale excavations have been carried out by R. Duru in the vicinity of Hacilar, who found in situ ceramics on a red painted floor in the vicinity of Hacilar, a trait of "Aceramic Hacilar", therefore he claimed that there are no Aceramic levels at Hacilar as J. Mellaart once proposed (Duru 1989). It is worth here emphasizing that the red colored hard surfaces found by Duru and his team were not located on the mound Hacilar but 80-90*

m away from it." No reference is made to the level below that in which lime plaster terrazzo floors were found, which could cover a considerable period of time.

The basal Levels IX-VI of the later settlement are dominated by unpainted monochrome pottery (Özdoğan M., 2011d). T. Efe (2005: 107-108), referring to R. Duru (1989, 2003), cannot confirm whether the neolithisation of the region occurred in the Aceramic Neolithic or the Early Neolithic, since R. Duru's deep soundings of the site confirmed the existence of pottery in the deepest levels.

R. Duru (2012), published the dates, the earliest of which are as follows:

- BM-127 8700±170BP = 8259-7490 BC (OxCal 4.2 at 95.4%), on charcoal, Level V of the 'Early Neolithic' settlement – Median 7875 BC.
- P-314 7340±94 = 6400-6031 BC (OxCal 4.2 at 95.4%), on charcoal, Level IX- Median 6215 BC.
- BM-125 7770±180BP = 7083-6247 BC (OxCal 4.2 at 95.1%), on charcoal, Level VII – Median 6665 BC.
- BM-48 7550±180BP = 6827-6023 BC (OxCal 4.2 at 95.1%), on charcoal, Level VI – Median 6425 BC.
- AA-41602 7468±51BP = 6429-6238 BC (OxCal 4.2 at 95.4%), on charcoal, Level VI – Median 6335 BC.

B. Düring (2011: 125), quoting R. Duru (1989), R. Duru (2012: 22) and L. Thissen (2002) indicates that the single date for an Aceramic / Early Neolithic horizon with a median date of 7875 BC is incorrect. Commenting on this single Early Neolithic settlement date, R. Duru (2012: 22-23) states that given the probable presence of pottery and the limestone floor, this last should be correlated with the similar limestone floors at Bademağaci EN I / Level 8 at *ca*. 6865 BC (7031-6698 BC). A date *ca*. 7000 BC for the establishment of the settlement is therefore plausible. This would agree with the dates for the later settlement, recognising that the date for Level IX has to be incorrect since the date for Level VII, two Levels more recent has a median date of 6666 BC, and Level VI three Levels more recent a median date ca. 6400 BC.

The dates for the lime plaster terrazzo floor level can be set against those for Girmeler Cave recently discovered further west (Region 2 – Eastern Aegean) with a median date of *ca.* 8080 BC in an otherwise Mesolithic context, so that the median date 7875 BC for Hacilar becomes credible, whether pottery was present from the earliest level or not. If it is assumed that the Mesolithic occupants of Girmeler learned the technique from somewhere to the east of their site, it is possible that the earliest occupation of Hacilar could be pushed back into the 9th millennium.

It is probable that the site was established by Neolithic migrants, since the site appears to be fully Neolithic from inception.

Höyücek (4) – This Hacilar Culture Neolithic mound site is located between the Pisidian Lake District and the head of the Bay of Antalya, 35 km south of Burdur, and. The site, with a total of 7.5 metres of stratigraphy, of which 3.5 m are above ground level and 4 m below, was excavated by R. Duru and Umurtak between 1989-1992.

After the Early Neolithic occupation, the nature of the site changed, becoming some sort of cult centre, the earliest phase of which was labelled 'Shrine Phase' (Sh.P). The stratigraphy of the Early Neolithic settlement, which sits on virgin soil, is 4 metres, thus over half of the mound height. It was labelled 'Early Settlement Phase' (ESP) and broken into 3 levels of occupation, of which the basal one, with 70 cm of stratigraphy, 'ESP 3'. The ESP was excavated over 35 m^2. No architectural features were found, but pieces of burned plaster floor. The assumption is that the constructions were wattle and daub, which has not survived. (Duru R., 2012: 8).

The pottery from the ESP is mostly grey, slipped and slightly burnished, whilst the lithics appear to be Neolithic in character with blades, similar to Hacilar and Kuruçay (Duru R., 2012). Hunting is attested by the presence of auroch, wild boar, equids, 3 types of deer, fox and bear (Düring B., 2011: 166).

The dates given by R. Duru (2012: 12) are:

- Utc-3793 7393±38BP = 6390-6211 BC (OxCal 4.2 at 93.3%), Level ESP2, on bone – Median 6300 BC.
- Hd-14007 7556±45BP = 6480-6352 BC (OxCal 4.2 at 91.8%), Level Sh.P, on charcoal from last architectural level – Median 6415 BC.
- Hd-14002 7551±46BP = 6478-6351 BC (OxCal 4.2 at 90.0), Level Sh.P on charcoal from last architectural level – Median 6415 BC.

As the authors point out, there is something wrong with the first date, which cannot be more recent than the Shrine Phase with a median date of 6415 BC. It can therefore be assumed that ESP 3 could date from as early as the end of the 8th millennium BC (Duru R., 2012: 13), or the early 7th millennium.

M. Özdoğan and I. Gatsov (1998) as well as L. Thissen (2005) have indicated that the site had been dated to *ca*. 6400 BC, and could possibly be as early as 6600 BC, but we think they may have been overcautious in their estimation, and that a date in the range proposed by R. Duru is plausible, particularly in the light of other sites of the Hacilar Culture and Girmeler Cave further west.

As with the other Early Neolithic sites, this one was probably established by Neolithic migrants, but the inclusion of autochthonous hunter-gatherers cannot be excluded.

Kuruçay / Kuruçey (2) – This Early Neolithic Hacilar Culture site, 960 masl, is located 3-4 km from the southern shore of Lake Burdur and 15 km from the town of Burdur. The mound is 9 m high and sits on a natural rise near a seasonal stream (Fig. R01-7). The site was excavated by R. Duru between 1978-1988.

The earliest stratum, defined as Level 13, on the virgin soil is Early Neolithic; it is 60-80 cm thick, and is followed by a hiatus before the Early Neolithic Level 12 was laid down. Level 13 is mixed pebbles with a few sherds and flint tools, leading to the supposition that it represents flood-water deposits from higher points on the southern side of Kuruçay Hill. About 150 burnished sherds were collected, most of which were plain dark grey paste, whilst a few were beige slipped with reddish paste and well burnished, and some carried painted decorations. The pottery appears to belong to several periods, the earliest of which appears to be similar to that found at Hacilar (Duru R., 2012).

The dates for the earliest three levels are (Duru R., 2012: 7):

- Hd-12915-12673 7310±70BP = 6273-6032 BC (OxCal 4.2 at 86.2%), Level 13, on bone – Median 6155 BC.
- Hd-12916-12674 7140±35BP = 6069-5980 BC (OxCal 4.2 at 91.1%), Level 12, on bone – Median 6025 BC.
- Hd-12917-12830 7045±95BP = 6076-5728 BC (OxCal 4.2 at 95.4%), Level 11, on bone – Median 5900 BC.

All three dates are on bone, and we have seen that the date derived from bone at Höyücek could have given a date several centuries too recent. If this situation is replicated at Kuruçay, it would place the earliest occupation of the site in the middle of the 7th millennium. Additionally, since the deposits of the basal Level 13 are mixed, the likely date for the establishment of the settlement cannot be determined.

The site was probably established by Neolithic migrants or a splinter group from Hacilar nearby.

Western Anatolia, Marmara and Southern Thrace – Bay of Antalya and Lake District – Conclusions

This Region, which in many respects has been well investigated, poses some interesting problems regarding the Transition. There was an established Mesolithic occupation for which evidence has been found in the coastal and near-coastal cave sites, which in most cases appear to have been used on an episodic basis. No Mesolithic open-air sites have been found, although lithic scatters have been

reported in the Western Lake District. Several of the cave sites occupied during the Late Mesolithic contain monochrome pottery in Mesolithic lithic contexts before being abandoned, clearly suggesting that the autochthonous population was in contact with Neolithic settlements before abandoning the caves. In the case of Karain B, it is unclear whether the cave was used by acculturated Mesolithic people or by shepherds from nearby Early Neolithic settlements.

The Initial Neolithic of the Region bears many similarities to the Early Neolithic of Central Anatolia, but also some important differences, so that the Western Pisidian Lake District Neolithic cannot be deemed a replication of the situation further east. It should also be borne in mind that the Neolithisation of the Konya Plain and Cappadocia was primarily undertaken by the autochthonous population, who adopted the full Neolithic package in different ways over long gestation periods, adapting it in their own particular manner, under the influence of the Levant and Eastern Anatolia, some time after it began evolving there. A similar situation could have occurred in the Western Lake District, although the evidence is lacking, without excluding the probability that a migrational movement also occurred from Central Anatolia or elsewhere, since the introduction of the Neolithic was relatively rapid in the early 8th millennium, but possibly earlier, close to a millennium after it began evolving in Central Anatolia.

Some of the similarities of the Western Pisidian Lake District with Central Anatolia are:

- Lime plastered terrazzo floors;
- Pottery shapes (globular vases) and some manufacturing techniques (DFBW and slip), and the earliest examples are not particularly primitive in the Neolithic settlements. There are however major differences in pottery traditions;
- About 40% of the lithics in the Lake District Early Neolithic sites are made of obsidian, which come mostly from sources 400 km distant in Cappadocia. This is a smaller percentage than is found at sites in the Konya Plain, but points nonetheless quite strongly at the provenance of the migrants and/or contacts. Otherwise, the lithics, dominated by irregular non-standardised blades from unipolar cores, bear little resemblance to those from the Konya Plain, or to the Mesolithic in the Bay of Antalya (Düring B. 2011: 166), although as R. Duru (2012: 28) points out, the armatures from Suberde in the Eastern Lake District appear to be similar to those found in the Western Lake District, even if this similarity appears to be of a trade and exchange nature, rather than a common cultural origin. The blades in the Konya Plain appear to have been imported to the sites as prepared artefacts manufactured by craftsmen, who did not migrate to the Lake District, so that the migrant knappers were much less skilled, whilst probably wanting to replicate the debitage of blades;
- The microlithic element is largely absent.

Some differences between the Lake District and Central Anatolia are:

- House construction is wattle and daub, occasionally with sunken floors;
- The cult of the bull and the ‘Mother Goddess’ are much less in evidence;
- Under-floor burial practices are less present;
- There are differences in the pottery traditions;
- There is some evidence for resemblances between the Initial Neolithic lithics at the most southerly Neolithic site of Bademağaci and the cave site of Öküzini. The lithic technology is different to that of the Central Plateau with limited evidence for pressure flaking.

The total Neolithic package appears to be present in the basal layers of the four settlements examined, with strong resemblances in the pottery between the sites, which is well developed from the earliest levels (Duru R., 2012: 23). Whilst animal husbandry and agriculture existed from the earliest levels, hunting and the collection of nature’s bounty continued to be important at the Neolithic sites. U.-D. Schoop (2005) is of the opinion that the Hacilar Culture came about when the autochthonous populations adopted the Neolithic, and R. Duru (2012: 29) also suggests that it is possible that the Initial Neolithic of the Western Lake Region was a local development (similar to the Central Plateau), with the coastal autochthonous population moving inland to more propitious agricultural land, and, as

in the Konya Plain, developing their own particular culture. B. Düring (2011: 173-174), goes into more detail stating that "*if one takes a comprehensive view of the Lake District Neolithic, the following issues stand out. On the one hand, there is at present surprisingly little evidence of links with earlier Epipalaeolithic/Mesolithic groups that have been investigated in the nearby Antalya Region. According to the publications, microliths do not appear to be part of the toolkit. The resources of the local environment appear to have been fully exploited, including the collection of a range of gathered tree foods, such as hack-berry, almond, apple, and pistachio, and the hunting of aurochs, equids, hare, and wild boar. This 'broad-spectrum' subsistence economy is reminiscent of that found in the Antalya cave sites. Further, the presence of seashells at Höyücek also fits with what we know from the Antalya Mesolithic, where these were prominent in sites. It is to be hoped that future research and publications at the promising site of Bademağaci will elucidate links between hunter-gatherer groups and farmers and clarify to what degree they shared cultural practices. On the other hand, even if local antecedents of the Lake District Neolithic are not clearly demonstrated at present, it is obvious that this cultural horizon cannot be regarded as an offshoot of that of Central Anatolia, from which it differs in almost every respect: Clustered neighbourhoods are absent; domestic buildings in the monochrome ceramic phase take on a form that is standardised but different from that of contemporary buildings in Central Anatolia; sub-floor burials are almost completely absent in the Lake District Neolithic; the ceramics traditions of the Lake District are distinct from those of Central Anatolia; and the chipped stone industries have little in common with those documented farther east*".

Given the number of attributes that appear together, and the possible relative contemporaneity of the earliest levels of Bademağaci EN I-8/9, Kuruçay 13, Höyücek ESP and Hacilar EN "Aceramic", we consider that an important element of immigrant Neolithic folk formed a nucleus which could have been joined by a limited presence of partially acculturated hunter-gatherers, so that there could have been an element of acculturation in both directions, even if there is limited evidence regarding a Mesolithic substrate in the basal levels of the Initial Neolithic sites.

The fact that the Initial Neolithic of the Anatolian Aegean seaboard and to a lesser extent that of the Sea of Marmara Region, which clearly involved migrants, have many similar attributed to the Early Neolithic of the Western Pisidian Lake District and Central Anatolia also points to a multi-directional migrational movement from Central Anatolia and points further east.

On balance the evidence appears to point to an Initial Neolithic in the Region based on an inflow of immigrants. It is not clear whether the Neolithic attributes acquired by the Mesolithic hunter-gatherers south of the Lake District were acquired from the Lake District immigrants and/or by direct exchange with the Central Plateau and/or maritime contact with Cilicia, Cyprus and/or the Levant. The Terminal Mesolithic population, which may not have been numerous, appears to have abandoned their cave sites at about the time the Neolithic settlements were established, and it is plausible that they joined forces, adopting the full Neolithic package, unless they died out.

Region 2 – Western Anatolia, Marmara and Southern Thrace – Eastern Aegean

(Map R02)

Western Anatolia, Marmara and Southern Thrace – Eastern Aegean – General Introduction

The geography and vegetation of the region is radically different today than it was during the 7th millennium BC. Rias that extended up to 70 km inland are filled with erosional material, as are all the river valleys; the forest cover has largely disappeared, so that slope erosion has been intense; bays that once existed are now coastal plains, and the eustatic sea rise has drowned much of the coastal plains that existed during the 7th millennium. As a consequence, virtually no Mesolithic presence has been found in the Region, and the multi-layer Neolithic sites discovered have been either located on natural mounds, or discovered fortuitously during civil engineering work.

Over the past two decades the research has accelerated in the region, with a number of Early Neolithic open-air sites being discovered (Figs. R02-2 & R02-2a), several of which are currently being excavated, and the information coming out is substantially changing the perception of how and when the Neolithic reached the region.

Western Anatolia, Marmara and Southern Thrace – Eastern Aegean – Mesolithic and Transition sites – Introduction

We have found no confirmation for Mesolithic or Transition sites in the central or northern parts of the Region. A single cave site in the south, on the mainland opposite the Island of Rhodes and a lithic scatter appear to be the only confirmed attestations for a Mesolithic presence.

Western Anatolia, Marmara and Southern Thrace – Eastern Aegean – Mesolithic and Transition sites – Site details

Bodrum (16) – The existence of a Mesolithic lithic scatter has been reported close to Bodrum (Erdoğu B., 2014: pers. com.).

Girmeler Cave (18) – The cave site (Fig. R02-1), with its esplanade, about 100 masl, would have been about 15 km from the shore during the Mesolithic, but is currently distant about 25 km due to post-Mesolithic sedimentation of the river valley and estuary. The site originally consisted of a tell 6 m high, evidencing a permanent occupation on the esplanade outside the cave mouths (Fig. R02-1), which was levelled to create a car park for the exploitation of the hot springs, so that only the earlier levels below ground-level subsist.

The site has been recently excavated by B. Erdoğu and T. Takaoğlu, who reported on the excavations at the 2014 EAA Conference in Istanbul, which information has been complemented shortly after by personal communication with Burçin Erdoğu at Trakya University, Edirne.

Four small trenches were excavated (Fig. R02-1). Trenches A and C produced Mesolithic Levels (referred to as Epipalaeolithic and Pre-Neolithic in Turkey) with two levels of lime-plastered floor using pyrotechnology, which is one of the earliest instances known for the technique, with postholes suggesting a wattle and daub superstructure, in the excavation pit between the two cave openings. The dates for this level are:

- Wk-37966 8906±37BP = 8232-7961 BC (OxCal 4.2 at 95.4%) – Median 8095 BC.
- Wk-37967 8876±33BP = 8226-7938 BC (OxCal 4.2 at 93.3%) – Median 8080 BC.

Trench C also produced a crouched inhumation (Fig. R02-1).

Trenches B and D produced Early Neolithic pottery similar to that from Bademağaci, two possible sickle blades and evidence for cultigens. There are about 1000 years between the lowest levels

reached Trenches in A and C, and those in Trenches B and D, but about one metre of archaeological deposits remain unexcavated.

The lithics of the Mesolithic and Pre-Neolithic are primarily based on flake technology with some blades and bladelets, but no microliths, with a similar lithic tradition continuing in all four trenches.

As matters stand, there is evidence for about 1000 years of occupation, but the flattened tell suggests it was considerably longer.

B. Erdoğu stated that this site, dating from the 9th millennium BC "*is characterised by sedentary communities engaged in intensive hunting*", without evidence for the acquisition of domesticated fauna in any of the trenches. The fauna includes a surprising quantity of caracal remains as well as fallow deer, red deer and wild boar.

The chipped stone assemblage of Girmeler cave is different from that of the Central Anatolian assemblages as well as that from the region of Antalya (Öküzini, Belbidi and Belbaşi Caves), with possible continuity between the Mesolithic and Neolithic (Özdoğan M., 2011a: 221, 2011b: S420). It would seem that this site will have more in common with the Mesolithic and Transition sites of the Bay of Antalya, than with the Aegean seaboard, although the excavations at Ulucak may modify that perception, but this can only be established once details of the excavations in progress are published.

This site has the potential of shaking established thought, given the Mesolithic/Pre-Neolithic evidence for lime-plastered floors, which originate further east. It seems probable that either through migration and/or contact, the original Mesolithic occupants of the site acquired the knowledge from Central or Eastern Anatolia, and that continuing contact brought about the Transition with the acquisition of agriculture, pottery and the traditional Neolithic mode of inhumation.

Peynirçiceği Cave – See **Girmeler Cave.**

Western Anatolia, Marmara and Southern Thrace – Eastern Aegean – Initial and Early Neolithic sites – Introduction

Most of the Neolithic sites discovered are in the central part of the Region (Fig. R02-2), which has only been under prehistoric archaeologists' eyes these last two to three decades, and the Initial Neolithic sites currently under investigation, appear to be first attested many centuries, if not a millennium, after their appearance in the Western Pisidian Lake District, given the possible dates for the initial establishment of the sites of Bademağaci and Hacilar (Region 1), notwithstanding the shorter interval suggested by M. Ozdogan *et al*. (2012) (Figs. R02-2 & R02-2a). The Aegean eastern seaboard sites show many similar characteristics, suggesting a common background, even if there are regional differences. It is probable that the initial migration was overland down the westward flowing river systems, but there is evidence pointing to a maritime provenance of Neolithic migrants as well towards the end of the 7th millennium.

Sites in the region of Izmir have DFBW at their base (Ulucak, Ege Gübre, Yeşilova), suggesting two migrational avenues from Central Anatolia (Özdoğan M., 2008a).

Western Anatolia, Marmara and Southern Thrace – Eastern Aegean – Initial and Early Neolithic sites – Site details

Çiliniroğlu (unknown location) – Early Neolithic site near the Anatolian Aegean coast mentioned by M. Özdoğan (2011b).

Çine-Tepecik (13) – This is an Early Neolithic mound-site near Ephesus, currently under excavation (Özdoğan M., 2011b).

No details are available regarding this site at present.

Çukuriçi Höyük (13) – Neolithic mound 0.7 km south-east on Ephesus (Fig. R02-3), which has been the subject of planned excavations since 2006, due to the risk of destruction by agricultural work. The tell has 5 m of stratigraphy above ground and 3.8 m below ground, which is expected to date back to the middle of the 7th millennium BC (Horejs B., 2012; Özdoğan M., 2011b).

The recent excavations have produced evidence for an Early Neolithic occupation and the following dates (Clare L. & Weninger B., 2014: 44, quoting Horejs & Weninger, in press):

- Erl-14514 7900±74BP = 7043-6630 BC (OxCal 4.2 at 94.7%), on bone – Median 6835 BC.
- UGAMS-6043 7690±30 BP = 6593-6468 BC (OxCal 4.2 at 95.4%), on charcoal, Core EPH 215 at 21.43 m – Median 6530 BC.
- UGAMS-6040 7590±30BP = 6479-6410 BC (OxCal 4.2 at 95.4%), on charcoal, Core EPH 204 at 23.09 m – Median 6445 BC.
- Erl-14521 7568±39BP = 6478-6378 BC (OxCal 4.2 at 94.5 %), on bone, Core EPH 214 at 21.91 m – Median 6430 BC.

No detailed reports or dates are available at present for this site.

Dedecik-Heybelitepe (12) – This is an Early Neolithic site 150 m from a spring, identified in the late 1990s. It is located some 40 km south-east of Izmir on the western fringe of the Torbali plain, close to the ancient city of Metropolis, where it has been under excavation by C. Lichter and R. Meriç since 2003 (Özdoğan M., 2011b).

Two other sites of about the same period have been identified in the vicinity in the Torbali Plain:

- Torbali-Tepeköy under the modern city of Torbali;
- Kuşçuburun.

Obsidian from Melos has been found in levels dated to the early 6th millennium BC, confirming the trade in this product throughout the Aegean, suggesting that the neolithisation of the Southern Balkans need not necessarily have been exclusively from the Eastern Mediterranean and the Levant (Lichter C. & Meriç R., 2012).

No detailed reports or dates are available for this site at present.

Ege Gübre (10) – The site is within the grounds of the Ege Gübre factory (Fig. R02-4) 1 km from the coast (possible more distant at 6000 BC) at the head of the Çandarli Gulf, north of Izmir, and south of Lesbos. The site has been under excavation since 2004.

The earliest level Ege Gübre IV has round buildings and the site expanded laterally over a period of some 500 years. Much of Level IV was destroyed when Level III was constructed, but the following dates were obtained (Sağlamtimur H., 2012):

- Beta-215599 7290±50BP = 6241-6051 BC (OxCal 4.2 at 95.4%), Layer IV – Median 6145 BC.
- Beta-215596 7250±50BP = 6222-6027 BC (OxCal 4.2 at 95.4%) Layer IV – Median 6125 BC.
- Beta-257640 7200±50BP = 6211-5993 BC (OxCal 4.2 at 95.4%) Layer IV – Median 6100 BC.

Impressed pottery, which is also alien to Central Anatolia, comprises some 1% of the total and obsidian is present although its provenance is not indicated. It is possible that this obsidian comes from the later levels, because B. Düring (2011:178), referring to the earliest levels, states that there is none.

As M. Özdoğan (2011a: 421) has stated, "*Ege Gübre in Izmir, located on the coastal plain adjacent to the Aegean, presents an interesting case. The earliest Neolithic occupation, with dates around 6250 cal BC, in addition to typical central Anatolian elements has round stone buildings and quantities of impresso pottery that are alien to inland Anatolian assemblages.*" (p. 421).

There is an assumption that there was contact with Cyprus because of the circular structures in the earliest phase, as at Hoca Çeşme Levels IV and III. (Özdoğan M., 2011a; Sağlamtimur H., 2012).

This site is not as early as some of the sites on or near the Aegean seaboard, and probably reflects one of the multiple migration routes around the Anatolian coast as well as overland. The lack

of Anatolian obsidian strengthens the argument for seaborne Neolithic immigrants originating from Cyprus, or possibly further east.

Ulucak Höyük (9) – This is an open air mound site 25 km east of Izmir on the road to Ankara, on the landward side of a pass, on the valley plain close to a stream, covering some three hectares (Fig. R02-5). The site has been under excavation since 1995 by A. Çilingiroğlu. Level V, 5 metres down, is dated 6230-6055 BC, with a further 4.5 metres to go. Excavations on Level VI began in 1998. "*The red-painted lime floors from Ulucak VIa, dated to 7040-6660 cal. BCE, make a stronger case for the origin of the early Ulucak society somewhere in Central Anatolia where such floors are well attested (Özbaşaran 2003). It is following the appearance of early farming communities in West and Northwest Anatolia in the mid 7th millennium BCE that ceramic traditions in Anatolia become very similar to each other. In my opinion, the homogeneous appearance of ceramics from this stage (referenced in the literature with such names as brown burnished ware, dark burnished ware and dark face burnished ware) implies a common origin rather than independent development in pottery production that was related to the initial dispersal of farming groups. The social dynamic behind this phenomenon deserves a detailed assessment and explanation which is, for obvious reasons, beyond the scope of this study.*" (Çilingiroğlu Ç., 2009: 489-490).

The lowest Level VIa and VIb has only been investigated in Grid L13, over 90 m^2 and produced red-plastered lime terrazzo floors (Fig. R02-5), wattle and daub rectangular structures, an open area with cobbled paved hearths, no pottery, small quantities of Melian obsidian (40% obsidian according to B. Düring (2011: 178)), mostly domesticated fauna, and fewer marine product than in the later phases. The information is provisional since Level VI was only excavated commencing in 2008. The earliest dates are indicated at in the range of 7050-6640 BC (Çilingiroğlu A., *et al.,* 2012; Clare L. & Weninger B., 2014: Table 17, p. 45), and the earliest dates they quote are:

- Beta-269727 7950±50BP = 7041-6691 BC (OxCal 4.2 at 95.4%), on charcoal Level VIa – Median 6865 BC.
- Beta-250265 7910±50BP = 7029-6649 BC (OxCal 4.2 at 95.4%), on charcoal Level VIa, Grid L13a – Median 6840 BC.
- Beta-317542 7870±40BP = 6834-6604 BC (OxCal 4.2 at 90.1%), on emmer on plastered surface, Grid L13d, Unit 183 – Median 6720 BC.
- Beta-269729 7850±50BP = 6840-6590 BC (OxCal 4.2 at 88.6%), on charcoal Level VIb – Median 6715 BC.
- Beta-317544 7850±40BP = 6826-6594 BC (OxCal 4.2 at 95.1%), on emmer Level VI, Unit 120 plastered surface – Median 6710 BC.

Level 5A (*ca*. 6100) produced small amounts of Impressed Ware, whereas Level 5B (*ca.* 6200 BC) had none.

Level IV, dated to the early 6th millennium BC, has 4-5% Impressed Ware.

M. Özdoğan (2011b: 24) indicates that the dates suggest an initial occupation of the site at the end of the 8th millennium, and states that "*Prior to the 2009 campaign, excavations at Ulucak had already reached the Early Pottery Neolithic horizon, revealing dates as early as 6500 BC and deeper in the horizon, pottery sherds were getting extremely scarce; in 2010, at the deepest layer yet reached, excavators reported that no sherds had been encountered and both the floors and the walls had red coating. Considering that the earliest dates are now revealing 7040 BC, and that excavations have not yet reached virgin soil, it seems evident that the establishment of the Neolithic settlements in the littoral areas of Izmir along the Aegean must date to the turn of the 8th to the 7th millennium BC. The recovery of red-coated floors and the absence of pottery sherds inevitably recalls the debate on aceramic Hacilar, claimed by Mellaart, where later a handful of sherds, all very crude, were recovered by Duru in associated fills. There are good reasons to surmise that both authors were correct, as it has become quite clear through a number of sites in central Anatolia that the introduction of pottery vessels to Neolithic life went through a rather slow process, pottery being a rather scarcely used commodity for*

several hundred years." B. Düring (2011: 126), quoting a personal communication from Ö. Çevik, also indicates that ^{14}C dates would indicate an occupation of this site in the early 7th millennium, in the PPN.

The early buildings at this site resemble those from the Pisidian Lake District, being rectangular and made of reed / wattle and daub, which evolve into mud-brick over time (Çilingiroğlu A. *et al.,* 2012; Derin Z., 2005, Abay E, 2005).

No mention is made of any indices that might suggest any influence or contact with an autochthonous Mesolithic population, except that at the 2014 20th annual EAA Conference in Istanbul, Özlem Çevik indicated that domesticated fauna in Level VI represented *ca*. 86% of the total, which could indicate an element of hunter-gatherer substrate in the site's population make-up, although this percentage decreases to 80% in earlier Level 5 and 70% in later Level 5 and Level 4, which is a contradictory trend.

With the habitation structures resembling those from Hacilar and Bademağaci with their terrazzo floors (also at the Mesolithic site of Girmeler) it seems probable that that original settlers arrived overland from the Pisidian Lake District with all four domesticated faunal species.

Yeşilova Höyük (11) – This mound site near a highway intersection on the eastern outskirts of Izmir was discovered in 2003 and excavated between 2005-2011 under Z. Derin (Fig. R02-6). The site is now 4 km from the coast, but when first occupied would have been near-coastal (Derin Z., 2012).

The Neolithic levels (III), beneath Chalcolithic (II) and Roman (I) levels, are 3 m thick, and have been split into Early Neolithic (III 6-8), Middle Neolithic (III 3-5) and Late Neolithic (III 1-2).

Pottery exists from the earliest levels, which is monochrome, plain, mat and well fired. It finds parallels in the Early Neolithic of the Western Pisidian Lake District (Derin Z., 2012).

The structures from the earliest levels were tent-shaped and hut-like (Derin Z., 2012).

The earliest date is from Level III 7, and the author estimates that the earlier Level III 8 might be 200 years earlier and be contemporaneous with Ulucak IV, 20 km further inland (Derin Z., 2012):

- Köln (no ref. n°) 7505±37BP = 6444-6335 BC (OxCal 4.2 at 75%) – Median 6390 BC.

There is no indication of any autochthonous influence at this site.

<u>Western Anatolia, Marmara and Southern Thrace – Eastern Aegean – Conclusions</u>

Girmeler is the only excavated Mesolithic site in this Region. Even if the cave was used, a permanent or semi-permanent settlement outside the cave was clearly influenced by the Formative Neolithic to the east, if not settled by migrants, and has produced clear evidence for the Transition. It is a shame that the evolutionary history of the site has been truncated by its destruction.

There are links between the Early Neolithic of the Western Pisidian Lake District and the Aegean seaboard and the Marmara Region, as seen through the pottery styles (Duru R., 2012):

- Red-slipped Ware;
- Fine Burnishing Ware (DFBW);
- 'S' profiles;
- Jars with narrow necks;
- Anti-splash rim pots;
- Tubular lugs and vertical string holes;
- Red painted motifs on a light coloured surface;
- White painted strip decorations on a red-slipped surface.

The indications are that the first Neolithic migrants probably reached the Region before 7000 BC, arriving via an overland route at Ulucak Höyük, thus well before the Neolithic is attested in Thessaly. New settlements were established over the following centuries, with at least one (Ege Gübre) possibly set up by migrants arriving by sea from Cyprus.

Melian obsidian, present from the end of the 7th and early 6th millennia at sites such as Dedecik-Heybelitepe, Coşkuntepe (Region 3) and probably Ege Gübre, attest to an Aegean interaction zone, confirmed by the almost simultaneous appearance of Impressed Ware in the Levant and around the Aegean Sea (Çilingiroğlu A. *et al.,* 2012).

None of the sites examined show any convincing evidence of being influenced by a Mesolithic population *in situ*. No evidence has been found on the eastern Aegean seaboard south of the Troad for such a population, which is surprising, since Mesolithic sites have been found on Ikaria, Kythnos, Limnos and other islands in the Aegean, as well as in cave sites on the south coast of Anatolia. As has been suggested for the Western Pisidian Lake District, the Mesolithic occupation may have been sparse, and given the amount of post-Mesolithic slope erosion and valley-floor sedimentation, as well as the eustatic sea-rise, almost all traces of any open-air sites may have been washed away, buried or drowned.

Region 3 – Western Anatolia, Marmara and Southern Thrace – Sea of Marmara and Eskişehir

(Map R03)

Western Anatolia, Marmara and Southern Thrace – Sea of Marmara and Eskişehir – General Introduction

This Region extends as far east as the region of Eskişehir to the south-east of the Sea of Marmara, and from there in a line going north to the Black Sea, and West to include the Troad and the Island of Limnos. The area roughly 30 km west of the Bosphorus has been included in this Region, since it was deemed important to include most of the Mesolithic Ağaçli Group and Early Neolithic Fikirtepe Culture sites in a single Region. Greater Istanbul has thus been included, as has the Black Sea coast to the north where most of the Ağaçli group sites have been discovered.

The geography and vegetation of this region has changed substantially since the Late Mesolithic and Early Neolithic due to a combination of unquantifiable tectonic activity, eustatic sea rise and anthropic activity. The dates for the breaching of the Dardanelles / Hellespont and the Bosphorus continue to be the subject of research and debate. At the end of the 20th century, several archaeologists were of the opinion that the Aegean breached the Dardanelles ca. 6500 BC, and the Black Sea ca. 5600 BC (Budja M., 1999; Özdoğan M., 1998a; Ryan *et al.*, 1997, quoted by Cook G., *et al*., 2002: 79). According to some of the latest research, prior to the Younger Dryas, there was probably some outflow from the Black Sea. With the Younger Dryas, a long period of desiccation led to a drop in the Black Sea level to *ca*. 107 m below its present level. At the same time, between the Younger Dryas and some point in time in the Early Holocene, the Bosphorus lip rose to its current level of approximate -35 metres. Beginning *ca*. 7600 BC, the Bosphorus was breached and in the space of not more than 400 years attained the then-prevailing sea level, flooding some 100.000 km^2 (Nicolas W., *et al*., 2011). Thereafter, from a date prior to 7000 BC, the Sea of Marmara and the Black Sea continued to rise in line with the eustatic sea rise in the Aegean, no doubt drowning numerous Mesolithic and Early Neolithic sites around their shores (the site of Yenikapi is *ca*. 8 mbsl), where relatively few sites appear to have survived, even if most of those known are near-coastal (Bailey W., 2000). This means that during the Transition commencing in the 7th millennium, the Aegean, the Sea of Marmara and the Black Sea were at essentially the same level.

The first evidence for the Neolithic in the Region could date from the end of the 8th or beginning of the 7th millennia, primarily in the Region of Eskişehir, but also near Lake Manyas and the Troad, where aceramic levels appear to have been found; "*Salvage excavations began at Keçiçayırı in 2007 promises to reveal more on the possible presence of PPN stratum in the region (Şahin 2008). Özdoğan also considers these as pre-pottery sites together with Çalca and Musluçeşme in the Marmara Region, having macro-blade industries without ceramics (Özdoğan 2000: 167). Such implications have to be tested with extensive excavations*" (Çilingiroğlu Ç., 2009: 346). The Archaic Fikirtepe culture, which dates from ca. 6600-6500 BC, has a DFBW monochrome pottery tradition, with the addition of some Impressed Ware, recalling the DFBW of Central Anatolia (Abay E., 2005; Kozlowski J. K., 2007: 41; Özdoğan M., 1999). In 1999 M. Özdoğan suggested a Central Anatolian origin for this culture with its bone spoons and polishers, even if cult objects in the form of steatopygous figurines, are conspicuous by their scarcity, but in 2014 he modified this to the Pisidian Lake District, with the migrants moving north through the intermountain valleys of the Sakaya River system (Özdoğan M., 2014: 87), which makes more sense, since the bone spoons were made out of the long bones of cattle, which were conspicuous by their absence in the Konya Plain, where domesticated bovines appear about one millennium later than in Cilicia.

Western Anatolia, Marmara and Southern Thrace – Sea of Marmara and Eskişehir – Mesolithic and Transition sites – Introduction

Lithics attesting Pleistocene hunter-gatherers have been found in several locations all over the Region. Evidence for the Late Pleistocene/Early Holocene hunter-gatherers has been found on the Island of Limnos and at possibly Yarimburgaz Cave near Istanbul. The Late Mesolithic of this region is known as the Ağaçli Culture after the sites on a fossil dune on the Black Sea coast, west of the Bosphorus. All the Ağaçli Culture sites are lithic scatters (Fig. R03-1), which are mostly near-coastal, and can only be dated typologically. M. Özdoğan, (1999) has indicated that the typology resembles that of Dikilitaş on the Black Sea coast of Bulgaria (which would imply a date extending into the 7th millennium), but not that found in Öküzini Cave in the Bay of Antalya. D. Bailey (2000: 127) has suggested that the Ağaçli sites date from the late 8th millennium.

Western Anatolia, Marmara and Southern Thrace – Sea of Marmara and Eskişehir – Mesolithic and Transition sites – Site details

Ağaçli Black Sea sites (1-7) – There are seven Ağaçli Mesolithic sites on the southern shore of the Black Sea, which from west to east are:

West of the Bosphorus:

- **Ağaçli (1) –** 82 lithic scatters spread over 1 km^2 on a palaeodune which has been destroyed by a lignite mine discovered by M. Korfmann in 1973. The site includes Palaeolithic scatters recognisable by their patina, as well as Mesolithic ones. The microlithic industry and sub-conical cores have clear affinities with the Pontic Epigravettian (Fig. R03-1), and is datable on typological grounds to the 7th millennium (Gatsov I. & Özdoğan M., 1994; Gatsov I., 2005; Kozlowski J. K., 2007; Özdoğan M., 1998, 1999, 2013). (Fig. R03-1).
- **Gümuşdere (2) –** Lithic scatters on fossil dune and on the slopes of the Domusdere gully 5 km to the east of Ağaçli, which includes Pleistocene as well as Holocene material. The site has been destroyed by a hotel complex (Gatsov I. & Özdoğan M., 1994; Özdoğan M., 1999).

East of the Bosphorus:

- **Doğançali (5) –** Lithic scatter on a fossil dune (Özdoğan M., 1999b: 210).
- **Mürsellibaba (6) –** Lithic scatter with some obsidian close to Domali, with affinities with that of Ağaçli.
- **Domali (4) –** Lithic scatter on fossil dune destroyed by a sand quarry (Gatsov I. & Özdoğan M., 1995).
- **Alaçali / Akçali (7) –** Open-air site on a fossil dune close to Domali, where a lithic assemblage including obsidian, resembling that from Ağacli has been found (Özdoğan M., 2005: 210).
- **Kefken (8) –** Ağaçli Group site.

These sites are important in attesting the coastal presence of Late Mesolithic groups, which is reinforced by the presence of other Late Mesolithic sites found near the Sea of Marmara.

Asarkaya / Porsuk Çay (30) – This site, in the high valley of the River Porsuk, near the village of Sabuncupinar in the Region of Eskişehir, some Pleistocene or Early Holocene lithics were found (Efe T., 2005).

Eksino (38) – Unpublished Mesolithic site on east side of Gökçeada / Imbros (Erdoğu B., 2014-09: pers. com.).

Göksu (9) – Ağaçli Group site on the east side of the Bosphorus, half way between the Sea of Marmara and the Black Sea.

Göstepe (17) – Ağaçli Group site on the south side of the Sea of Marmara, facing Istanbul, which has been destroyed by a motorway.

Haramidere / Harmidere (14) – Ağaçli Group site on the north shore of the Sea of Marmara, west of Istanbul, which has been destroyed by the construction of the motorway (Bailey D. W., 2000, quoting Gatsov I. & Özdoğan M. (1994)).

Ibo nun Rampasi (18) – Ağaçli group unexcavated Mesolithic lithic scatter site near the shore on the south side of the Sea of Marmara (Düring B., 2011: 33; Özdoğan M., 2013: 192).

Manastir (20) – Ağaçli Group site on an island (but possibly attached to the mainland during the Early Holocene) on the south side of the Sea of Marmara.

Musluçeşme (26) – Ağaçli group unexcavated Mesolithic lithic scatter site near the eastern shore of Lake Manyas, south of the Sea of Marmara (Özdoğan M., 2013: 192).

Ouriakos (39) – This open-air site under a 30 cm covering of sand, 20 m from the sea and 10 masl, on the south-east side of the Island of Limnos (Fig. R03-2). The site was discovered when the being bulldozed to create a car-park in 1997. The site has been typologically dated to the Late Pleistocene and/or Early Holocene, when the island would probably have been connected to Gökçeada / Imbros by what is now a 40 m deep channel, as well as possibly the mainland, presently separated by a 50 m deep channel, whilst being in the process of becoming an island. Several lithic scatters have now been discovered up and down the coast dating from approximately the same period between 12000-10000 BC. The site has been the subject of excavations under N. Efstratiou between 2010-2012, and a short report is in press for publication in Antiquity (Efstratiou N., *et al.*, 2013, in press), in which the authors state that "*the most characteristic implements are microlithic lunates and end-scrapers. Other tools consist of few oblique truncations, backed bladelets, burins and notched bladelets. The Ouriakos lunates are very characteristic tools of standardised dimension and thickness. They are obtained with bipolar, abrupt retouch without microburin technique, from microbladelets of scalene triangular cross-section detached from small cores with one or more prepared platforms by indirect percussion. The end-scrapers are represented by long and short specimens of different size and thickness, obtained from different types of blanks.*

The Ouriakos industry can be compared to those from layers Ia1-Ia2 of Öküzini Cave, north of Antalya (south-west Anatolia). These layers yielded lithic assemblages with bipolar lunates, and a great variety of end-scrapers (KARTAL, 2002), radiocarbon-dated to the Younger Dryas from charcoal (OxA-5213: 10150±90 and RT-1441: 10440±115 uncal BP) (LÓPEZ BAYÓN et al., 2002: Table 1)." (Fig. R03-2).

The authors give the following date for Ouriakos, which is synchronous with Öküzini Cave:

- GrA-53229 10390±45BP = 10474-10106 BC (OxCal 4.2 at 94.1%), on burned bone (from apatite).

The lithic raw material comes from an oucrop that was still exploited until the 1940s for the manufacture of threshing sledge inserts, located 7 km to the north-west in at the head of the Havouli Valley, and is being studied by P. Biagi and his team. A burned sample of the sparse and weathered faunal remains was sent for dating (Efstratiou N., 2012, 2013: pers. com.; Efstratiou N., 2014: 185-187; Biagi P., 2016: pers. com.).

The site on this island predates the Ağaçli Group sites, and confirms a Late Pleistocene Younger Dryas hunter-gatherer presence in the Region, which has proved elusive further south on the Anatolian Aegean seaboard. It also appears to confirm a late Pleistocene interaction zone encompassing the Bay of Antalya with both the eastern and western shores of the Aegean Sea. According to P. Biagi (2016: pers. com.), the material is very specialised although comparable with

that of Direkli Cave, near Gaziantep in Southern Anatolia, where the material dates to the same period, and the sites in the Bay of Antalya. This means that the traditional assemblages with lunates moved from the Levant along the coast of Anatolia up to the Aegean. We know little about this movement because of the absence of systematic surveys. P. Biagi would expect to find numerous sites with systematic surveys, in a similar manner to the discovery of other sites on Ouriakos recovered during very brief suverys.

Paşaalani (3) – Inland Ağaçli Group site west of the Bosphorus.

Yarimburgaz (10) – This cave site, 20 km west of the Bosphorus and now on the far outskirts of Istanbul, is located at Altınşehir in the district of Küçük Çekmece, and 1.5 km north of Lake Küçük Çekmece (Figs. R03-3 & R03a). The site was the subject of a test excavation by Kanzu in 1965 and excavated in 1986 by M. Özdoğan. "*The formation of the cave occurred during the Eocene era which has two connected chambers which are called "Lower" and "Upper" chambers. Neolithic remains have been excavated only in the Upper Chamber whereas the Lower Chamber revealed stratigraphy that reaches back to Lower Paleolithic (Arsebük et al. 1990)*" (Çilingiroğlu Ç., 2009: 358).

Layer 4 has a single date from the mid-6th millennium BC and contained pottery of Fikirtepe BFBW, suggesting the occupation was well after the Transition (Özdoğan M., 2013), and another which is either from this Layer 4 or Layer 7 (Özdoğan M., 2013; Clare L. & Weninger B., 2014 Table 24, p. 48):

- GrN-15529 7330±60BP = 6274-6063 BC (OxCal 4.2 at 83.2%), on charcoal – Median 6170 BC.

Layer 5, for which there appears to be no date, appears to be dated typologically to the middle of the 7th millennium, contained a few sherds of Red-Slipped Ware and a few Impresso decorated ones (Bailey D., 2000: 91; Özdoğan M., 1998, 2008: 153, 2013: pers. com.).

"*Layer 6 had no pottery but a few flakes, a ground stone pick; however none were clearly of Ağaçli type, but whether it has anything to do with the Ağaçli group, is not possible to say.*" (Özdoğan M., 2013). There is a single date from Level 6 with a large standard deviation (Özdoğan M., 2013: pers. com.; Clare L. & Weninger B., 2014: Table 24, p. 48):

- GrN-15532 8110±320BP = 7871-6379 BC (OxCal 4.2 at 95%), on organic material, Level 6 – Median 7125 BC.

Layer 7 has three contradictory dates (Clare L. & Weninger B., 2014: Table 24, p. 48):

- GrN-15529 7330±60BP = 6274-6063 BC (OxCal 4.2 at 83.2%), on charcoal – Median 6170 BC.
- GrN-15533 7640±90BP = 6655-6352 BC (OxCal 4.2 at 93.1%), on charcoal, Layer 7a – Median 6505 BC.
- GrN-15531 9190±100BP = 8642-8244 BC (OxCal 4.2 at 94.4%), on organic material, Layer 7b – Median 8445 BC.

This double cave site, which appears to have been occupied episodically since the Palaeolithic, attests a Mesolithic presence prior to or concurrent with the Late Mesolithic Ağaçli Group Culture. The occupation is renewed after a hiatus in occupation between Layers 6 (Mesolithic) and 5 (Neolithic or Transition) (Özdoğan M., 2013).

Yenice & Pazarköy (34) – Plains in Çanakkale Province with evidence for probable Palaeolithic occupations (Yakar J., 1999: 242).

Western Anatolia, Marmara and Southern Thrace – Sea of Marmara and Eskişehir – Initial and Early Neolithic sites – Introduction

M. Özdoğan (2011b) has noted that the wealth of information coming out of the excavations currently under way are necessitating constant reappraisals of the neolithisation process, with no single model applying, since the arrival of Neolithic migrants took place over more than a millennium, following different paths and adapting in different ways to their new environment, even if the Neolithic elements can always be traced back to the core areas of neolithisation in the Central Plateau and regions further south and east. He states that "*In our surveys in the southern parts of the Marmara region, we had encountered some sites, Çalca being the most prolific one, revealing lithic assemblages that were reminiscent of the late Pre Pottery Neolithic material of central Anatolia; thus we had surmised that the arrival of Neolithic elements could have taken place much earlier than previously assumed. Later, this assumption was backed up with the recovery of flint points retouched by pressure flaking at Keçiçayiri in the Eskişehir region. However, as neither of these sites had secure stratigraphic evidence and as the discussions were based solely on typology, no consensus was reached on their chronological position. In the 2009 campaign, ongoing work at Ulucak Hoyuk revealed the much-needed evidence to resolve this problem*" (Özdoğan M., 2011b: 35).

Several major demic movements into the Region can be identified: the first dating from the PPN at the end of the 8th millennium; the second commencing in the mid-7th millennium which gave rise to the Fikirtepe Culture, and a third commencing towards the end of the 7th millennium. A separate sea-borne migrational movement has been identified on the Anatolian Aegean seaboard and Thrace during the second half of the 7th millennium, possibly originating from Cyprus.

The earliest evidence for the Neolithic of the region is probably to be found in the Region of Eskişehir with the sites of Asarkaya, Keçiçayiri and Kalkanli, with ties back to the Konya Plain (Efe T., 2005). "*Salvage excavations began at Keçiçayırı in 2007 promises to reveal more on the possible presence of PPN stratum in the region (Şahin 2008). Özdoğan also considers these as pre-pottery sites together with Çalca and Musluçeşme in the Marmara Region, having macro-blade industries without ceramics (Özdoğan 2000: 167). Such implications have to be tested with extensive excavations*" (Çilingiroğlu Ç., 2009 346). These sites could date back to the PPN, at the end of the 8th or early 7th millennia. Further west the sites of Musluçeşme and possibly Çalca could also belong to this migrational movement, which M. Özdoğan (2012: 662) has described as being thin and sporadic. The route taken by the Neolithic migrants to this region from Central Anatolia to the north-west appears to have been via the Eskişehir basin, with the Neolithic sites of Demircihöyük and Findik Kayabaşi, and from thence via the Inegöl and Yenişehir basins to Lake Esnik and the Sea of Marmara.

The first large scale Neolithic penetration in the Region is known as the Fikirtepe Culture after the eponymous site in Istanbul. The basal level at the site of Mentese has been dated to *ca*. 6500 BC, and it is known not to represent the earliest phase of this culture, which M. Özdoğan (2012) has estimated at *ca*. 6600-6500 BC (Figs. R03-4 & R03-4a). The Fikirtepe Culture is an Early Neolithic pottery culture, and its earliest manifestation, Archaic Fikirtepe, is characterised by DFBW, with a growing element of Red Burnished Ware with incised decorations as it transforms into Classic Fikirtepe. Some early migrants may have penetrated into South-Eastern Bulgaria, where DFBW has been found at sites such as Koprivets and Krainitsi, close to the Danube (Özdoğan M., 2005). The sites close to the Sea of Marmara are strongly influenced by the Mesolithic Ağaçli Culture as noted by M. Özdoğan (2012: 662-665; Özdoğan M., 2013: 195), who states that *"assuming that the Fikirtepe culture represents the first wave of endemic movement of Neolithic communities into the contact zone between Anatolia and southeastern Europe, its interaction with local Mesolithic communities is of prime interest. In regions such as southern Marmara, where no Mesolithic sites are known, the earliest Fikirtepe habitation layers reveal the use of mudbrick architecture and buildings with rectangular plans, whereas in the region around Istanbul, where the most intensive sites of the Mesolithic Ağaçli group existed, Fikirtepe settlements are comprised entirely of round or ovoid huts made of wattle and*

daub. It is highly significant that while the pottery, bone, and lithic assemblages are identical in both regions, those having rectangular mudbrick architecture are strictly dependent on farming, with very little evidence for hunting, whereas those with round wattle and daub houses have a mixed subsistence pattern, with extensive indications of hunting, fishing, and mollusk collecting along with some domestic animals. Likewise, grinding stones, and other ground and polished stone artifacts, though present, are rather scarce in the latter region. Yet another significant difference is in the burial customs; the former, as recovered at Ilipinar and Aktopraklik, have extramural cemeteries (Alpaslan-Roodenberg 2008), whereas all the sites around Istanbul, including Fikirtepe and Pendik, have intramural burials below the floors of the huts. It seems possible to surmise that sites along the southern Marmara represent immigrant farmers, bringing with them a new way of life, with those around Istanbul involving the merging of local Mesolithic communities with the newcomers, either by living together or more possibly voluntarily adapting certain aspects of the Neolithic package, resulting in a mixed subsistence pattern but at the same time continuing their main mode of living. How far west into the Balkans the Fikirtepe culture expanded is not clear; the recovery of two sites with a Fikirtepe type of pottery in the Dardanelles indicates that there was at least a westerly expansion along the southern coast of Marmara. In Thrace, only a handful of typical early Fikirtepe sherds are known. Thus it is possible to assume that after encountering the local Mesolithic communities in the region of the Bosporus, the pace of expansion either stopped or slowed down".

The next movement, which brought with it painted pottery, figurines and pintaderas, coincides with the '6200 BC event', and could have been at least partly driven by climatic change and social unrest in the Near East and Central Anatolia. This wave appears to have avoided the previously colonised Fikirtepe areas of Eastern Marmara, bypassing them without signs of conflict or interaction, into Thrace.

Not all the Early Neolithic sites of the region are covered in this study, of which a partial list of those we have come across includes Akmakça, Çarkini, Erenköy, Findikkayabaşi, Gürpinar, Heybeli Dedecik, Keskaya, Marmaracik, Menekşe Çatağı, Yalova and Yenişehir II.

As a final note, sites around the Sea of Marmara, which became connected to the Aegean prior to the Holocene, will have been drowned, as evidenced by a Late Neolithic site below water off the island of Avşa, to the west of the site of Manastir (20), and the recently discovered site of Yenikapi, some 8 mbsl (Kayan I., 2014: 104).

Western Anatolia, Marmara and Southern Thrace – Sea of Marmara and Eskişehir – Initial and Early Neolithic sites – Site details

Aktopraklik (26) – This Neolithic site, comprising three mounds, lies 25 km west of Bursa and south of the Sea of Marmara. It is 3 km north-east of Lake Ulubat, which might have been closer at the time the settlement was established. Mound C represents the oldest occupation (Fig. R03-5), and is clearly of the Fikirtepe Culture, and appears to be one of its earlier manifestation. Excavations began in 2004 under Necmi Karul, who indicated that much more work needs to be done. Different pottery types have been found at the site, including cream and beige Monochrome Ware, as well as DFBW (Fig. R03-5), suggesting it is one of the earliest Neolithic Site of the Region (Karul N. & Avci M. B., 2011, 2013; Özdoğan M., 2005: 23).

Faunal remains, which include red deer and cattle, suggest that hunting was important during the Initial Neolithic.

The earliest settlement is made of circular semi-sunken wattle and daub structures dug down up to 40 cm, with semi-circular stone foundations. Such circular habitations are typical of sites close to the Sea of Marmara. Under-floor burials in the crouched position were found accompanied by grave-goods, suggesting that the living cohabited with the dead during the Fikirtepe Culture settlement, but that this tradition changed during the Chalcholithic, when Mound C was used as a cemetery (Karul N. & Avci M. B., 2011, 2013).

The two dates available (Clare L. & Weninger B., 2014: Table 20, p. 46; Karul N. & Avci M. B., 2011: 6):

- OxA-20596 7444±37BP = 6400-6235 BC (OxCal 4.2 at 95.4%), on human bone, burial 89D-4.4-06 – Median 6320 BC.
- OxA-20597 6800±36BP = 5736-5636 BC (OxCal 4.2 at 95.4%) on human bone, burial 88E-12.1.07 – Median 5685 BC. This is a Chalcholithic burial.

This important settlement, with close affinities with the Fikirtepe sites around the Sea of Marmara, appears to have been established some time after the appearance of the Neolithic in the Region, by a population arriving from the East. It can also be seen as a bridge between the sites around the Sea of Marmara and those inland, such as Pendik and Ilipinar, where similar incised and impressed decorative patterns were applied to the pottery. Whether elements of the autochthonous population were integrated into the settlement is possibly suggested by the faunal remains, but the study of the lithics will possibly shed more light on this subject.

Asarkaya (30) – Open air lithic scatter in the high valley of the Porsuk Çay, near the village of Sabuncupinar in the Eskişehir Region, discovered by T. Efe in 1990.

The lithics collected as surface scatters find their parallel in the Aceramic levels at Aşikli Höyük in the Konya Plain (large semi-circular flake scrapers with steep retouch, blades and end-scrapers on blades, as well as a single platform core). The suggestion is that this site represents the westerly extension of the Konya Aceramic Neolithic tradition (Efe T., 2005: 112), although J. Yakar (1991: 243) thought it might be a Mesolithic site.

Since the Konya Plain Early Neolithic grew out of the Mesolithic, both could be correct.

Barçin Höyük (23) – This is a small mound site 4 km west of Yenişehir and 200 masl (Fig. R03-6), which was probably located on a slightly elevated spur, lies in a basin that contained wetlands and vegetation made up of open forest with deciduous trees. It was initially set up at the inception of the Neolithic and was occupied throughout the Neolithic into later periods. The Neolithic Levels have been dated VIa to VIe and cover the date ranges (Gerritsen F., *et al.*, 2013):

- GrA-52848 7715±40BP = 6632-6470 BC (OxCal 4.2 at 95.4%) Level VIe basal Level – Median 6551 BC.
- GrA-45685 7115±40BP = 6063-5967 BC (OxCal 4.2 at 72.9%) Level VIa – Median 6015 BC. The site continued under excavation in 2013, but the dates are unlikely to change.

Level VIe produced modest amounts of pottery which is rather coarse, and remarkably, a four-legged square box-vessel with low sides and a handle (precursor to Fikirtepe boxes?) (Fig. R03-6). The repertoire in Level VId is richer and finer, being well burnished with wall 5-6 mm thick as against 7-10 mm in Level VIe.

The lithics include sub-conical cores, is blade based and includes trapezes and the bone industry is typical Fikirtepe with spoons and spatulas.

Burials, which are in the typical Neolithic crouched position are close to buildings but not within them.

The fauna is mostly domesticated (4 species), with only a low incidence of hunted fauna. Milking was practiced from inception (milk, cheese, butter, yoghurt) (Gerritsen F., *et al.*, 2013).

The occupation of the site therefore commenced sometime around or just after 6600 BC, which is no later than the earliest known site in Thessaly, and given the lithic technology, could have incorporated some autochthonous population, although the low incidence of hunting speaks against this.

Çalca / Çalca Mevkii (33) – Open air site or sites near the village of Karlidere on a ridge, close to a spring, overlooking the stream with the same name, inland, in the Troad south of the Dardanelles, at the south-western edge of the Region.

The site was thought to have been visited by hunter-gatherers between the 8th-6th millennia (Yakmar J., 1991: 242), with a lithic tradition other than that of the Ağaçli Group (Özdoğan M., 1999, 2012).

Pottery sherds resembling DFBW from the Central Anatolian or Near Eastern tradition, a preponderance of flakes as well as lithics knapped using the pressure technique and indirect percussion, indicate that it is also an Early Neolithic site. No microliths were found (Özdoğan M. & Gatsov I., 1998; Özdoğan M., 2005; Özdoğan M., 2011b), so that there appears to be no influence from the Ağaçli Group. The suggestion from B. Düring (2011: 126) is that whilst this site could be that of early 7th millennium migrants, it could equally be a later special purpose site, and only an excavation and ^{14}C dates can help resolve this issue. Ç. Çilingiroğlu (2009: 257) states that "*Özdoğan and Gatsov (1998: 214-219) propose that Aceramic permanent settlements might have existed in the area in the light of material collected from Çalca and Musluçeşme. Çalca Mevkii is located on a river terrace belonging to Karlıdere Stream in Çan district, covering an area 250 x 150 m. At the site, evidence of mound formation and presence of macro-blades, end scrapers, single-platform cores when considered with absence of pottery points out to the existence of a PPN site*".

The site may have enjoyed several periods of occupation, but does not appear to be a Transition site, even if it might be a PPN site that predates the Fikirtepe Culture.

Coşkuntepe (36) – This is a small mound site on the south side of the Troad, facing Lesbos. It lies at 230 masl on a hilly promontory roughly 1 km from the sea. The land around is rugged and unsuitable for agriculture and the site is unexcavated due to ownership of land issues (Fig. R03-7).

Surface collections have produced pottery sherds containing red-slipped ware, which could indicate and Early Neolithic date; the lithics contain bladelets of various types of flint as well as of Melian obsidian.

The site is undated and will hopefully be excavated (Takaoğlu T. & Özdemir A., 2013). There is however no suggestion of a Mesolithic substrate at this site.

Demircihöyük (27) – This site 25 km west of Eskişehir is an Archaic and Classic Fikirtepe site, occupied through the Calcholithic. The earliest levels predate the Fikirtepe site of Ilipinar Phase X. Unfortunately, the material dated to the Early Neolithic was not found *in situ*, and the pottery was separated into wares and forms by Jürgen Seeher, and the early ware was denominated A and B (Efe T., 2005). 44 sherds of Ware A "*Schieferware*" mostly belonged to dark globular vessels with a flat base and an interior ledge to support a lid, sherds of which were also found; This dark pottery was carelessly slipped in a pasty red, and is correlated to the thick-walled pottery from the lower Levels XII-IX of Çatal Hüyük. Ware B "*Glimmerware*", represented by 473 sherds is unslipped Grey Ware, has the same shapes linking it to Ware A, as well as other shapes linking it to Classic Fikirtepe Ware; Jürgen Seeher correlated Ware B to the upper levels of Çatal Hüyük, and believes it to be contemporary with the Hacilar-type painted pottery (Efe T., 2005).

Ç. Çilingiroğlu (2009) confirms that some of the pottery (e.g. hole-mouthed jars) is typologically similar to Çatal Höyük XII-IX according to the excavators, whilst The DFBW is associated with Fikirtepe Culture boxes.

Fikirtepe (13) – This is the eponymous site of the Early Neolithic Fikirtepe Culture of the Region, which has been split into Archaic and Classic phases. It is within a few km of the sister-site of Pendik. The site, in the suburbs of Istanbul, was discovered in 1908 during the construction of a railway line, and excavated between 1952-1954 by K. Bittel (Fig. R03-8); it was again the subject of a test-dig by Kanzu in 1965. The structures were circular or oval with sunken floors and wattle and daub walls, which is not a Central Anatolian tradition, and belong to a single cultural horizon (Özdoğan M., 2013).

The economy was based on domesticates, some hunting, fishing and collection of aquatic molluscs. 13 fish species were identified, half of which were fresh water varieties and the other half

marine, some of which could have weighed over 100 kg. "*A second important source of subsistence was provided by domestic animals such as cattle, sheep, goats, and pigs; cattle were most important for subsistence, and sheep may have been kept also for wool. By contrast to these domestic animals, wild hunted land animals, such as deer and wild boar, constitute a relatively insignificant proportion of the animal bones(less than 8 per cent).*

Thus, the faunal remains from Fikirtepe include a very interesting mix of fishing and animal husbandry. Unfortunately, nothing is known about the botanical evidence of these sites: whether cultivated crops were important to Fikirtepe people and to what degree the gathering of wild resources was practiced. The evidence is limited to a few possible sickle blades and grinding tools, which are open to multiple interpretations" (Düring B., 2011: 181).

The early pottery is DFBW, and the 6 inhumations found, of which 4 were beneath the habitation structures, are in a flexed lateral position with some grave-goods of bone spoons and rectangular vessels (Düring B., 2008: 181; Özdoğan M., 2013).

The lithics include sub-conical cores, erroneously referred-to as bullet cores (Biagi P., 2016: pers. com.), which "*spread out from the Prut-Seret basin to the Crimean Peninsula including during the Mesolithic period. The bullet cores in the area of the Black Sea shore during the Epipalaeolithic/Mesolithic transition have been registered. As far as Turkish Black sea shore is concerned these are the assemblages from Ağaçli group*" (Figs. R03-1, R03-8), suggesting that this occurred in the 8th-7th millennium BC and that this tradition, including microblades and scrapers, was carried into the Initial Neolithic tradition of the Sea of Marmara Region (Gatsov I., Nedelcheva P., 2007; Özdoğan M., 1999). Obsidian from the sites of Salaeli and Yağlar is also present, confirming contacts with Central Anatolia (Düring B., 2008; Özdoğan M., 2013).

The site has been typologically dated back to the Archaic Fikirtepe and cover the period 6400-5800 BC to the Classical phase (Özdoğan M., 2013), so that it is not the earliest manifestation of the Fikirtepe Culture, which M. Özdoğan (1999) has maintained contains several elements of the Mesolithic Ağaçli Group culture (circular huts, mixed economy in which fishing plays and important part and the lithic assemblage which includes an important microlithic element).

Gelibolu (36) – Initial Neolithic site on the island of Gökçeada (Imbros in Greek) off the tip of Gallipoli. The island was part of a larger island incorporating the Island of Limnos at the end of the Pleistocene, and was separated from the tip of the Gallipoli Peninsula by a narrow channel.

Fikirtepe material has been found at this site (Özdoğan M., 2011b: S424).

Ilipinar (19) – This Fikirtepe Culture Early Neolithic mound site 100 masl, 5 m high, is located on the south side of the Sea of Marmara, at the western extremity of Lake Iznik (Fig. R03-6). The basal Phases X-IX, devastated by fire, whilst predominantly of inland Fikirtepe Culture, contain some features of coastal Fikirtepe settlements. The site was excavated by T. Roodenberg in the 1990s.

The Early Neolithic habitation structures are rectangular with at least the lower part made of Pisé with post supports, suggesting wattle and daub may have been used for the upper part. This technique is later replaced by mud brick construction in Phase VI (Yakar J., 1994; Derin Z., 2005). According to B. Düring (2011: 189) in the basal level, the houses are wattle-and-daub according to the best preserved 'burned house'.

The lithics include obsidian from Sakaeli and Yağlar in Central Anatolia in the lowest Phases X and IX (Düring B., 2008: 21), or Hasa Dağ (Thissen L., 1999: 37), as well as some sub-conical cores recalling the Ağaçli Group Mesolithic (Gatsov I. & Nedelcheva P., 2007). "*The lithic assemblage, like that of other Anatolian Pottery Neolithic sites, is poor, lacking clear-cut tool types*" (Özdoğan M., 1999b: 215). "*The chipped stone assemblages from basal Menteşe and the earliest levels 10–9 at Ilipinar are considered to be very similar to those from Fikirtepe and Pendik. At all of these sites we see, on the one hand, irregular flakes struck from irregular cores and reworked mainly into rounded endscrapers with steep retouch, and, on the other hand, bullet cores used*

to produce narrow, regular blades that were often snapped and retouched into various microliths. Very typical are blades reworked into long perforators by means of steep retouch" (Düring B., 2011: 185).

The pottery in Phase X is Classic Fikirtepe. It is burnished monochrome with occasional incised or excised geometric motifs (Roodenberg T. & Alspaslan-Roodenberg S., 2008). Impressed Ware appears in Levels IX-VIII which is very similar to Ulucak IV east of Izmir, and could find its origin on the Mediterranean littoral of the Eastern Mediterranean. The Impressed Ware only represents 4-5% at each site (Çilingiroğlu Ç., 2009: 370).

The site contained 48 burials, mostly in a crouched position, with gift offerings (Fig. R03-9). The skeletons showed signs of stress related conditions (osteoarthritis from hard labour, iron deficiency anaemia, dental caries and dental wear) (Roodenberg T. & Alspaslan-Roodenberg S., 2008). Faunal remains are mostly of domesticated species, with sheep and goat the most important during the earliest period, shifting to cattle later on. (Düring B., 2011: 189). In Phase X, wild game represented 9% of the fauna, increasing to 14% in Phase IX, then dropping to 2% in Phase VIII. Aquatic resources are poorly represented in the basal levels (Thissen L., 1999: 33).

This site was established several centuries after the first appearance of the Fikirtepe culture in the region of the Sea of Marmara. The earliest levels X-VIII have been dated 6000-5700 BC (Roodenberg T. & Alspaslan-Roodenberg S., 2008), and the earliest dates from the 31 ^{14}C dates obtained for Phase X are as listed below (Clare L. & Weninger B., 2014: Table 23, p. 48):

- GrN-15083 7240-140BP = 6412-5872 BC (OxCal 4.2 at 94.7%), Phase X, on charcoal – Median 6142 BC.
- GrN-19351 7195±40BP = 6115-5991 BC (OxCal 4.2 at 84.9%), Phase X, on charcoal – Median 6055 BC.
- GrN-22046 7160±90BP = 6227-5873 BC (OxCal 4.2 at 94.5%), Phase X, on charcoal – Median 6050 BC.
- GrN-15079 7140±120BP = 6239-5749 BC (OxCal 4.2 at 95.4%), Phase X, on charcoal – Median 5995 BC.
- GrN-15085 7100±50BP = 6065-5886 BC (OxCal 4.2 at 95.4%), Phase X, on charcoal – Median 5975 BC.
- GrN-17046 7100±30BP = 6033-5905 BC (OxCal 4.2 at 95.4%), Phase X, on grain – Median 5970 BC.

It is possible that the site incorporated some autochthonous Mesolithic elements, or at least was influenced to a certain extent by the local Mesolithic traditions, although not to the same extent as the sites on the northern shores of the Sea of Marmara.

Istanbul Tarihönceci Arastirmari (ITA) project (12) - PPNB flint artefacts possibly dating to the first half of the 7th millennium BC were discovered west of Lake Küçükçekmece to the west of Istanbul. Mehmet Özdoğan reviewed the objects which he declared to be diagnostic of the later PPNB of Western and Central Anatolia, but made of local Eocene flint. These are the first such finds in Europe, and bear comparison with finds at the sites of Keçiçayiri and possibly Kalkanli in the region of Eskişehir about 300 km distant, as well as Çalca (Aydingün S., 2009).

Kabakli (28) – Possible PPNB unexcavated site in the Region of Eskişehir (Özdoğan M. & Gatsov I., 1998: 223).

Kalkanli (31) – Possible PPNB unexcavated site in the village of the same name in the region of Eskişehir some 25 km to the south-east, on the high plateau.

Blades and a point similar to those found at Keçiçayiri were found at this site, similar to the PPNB lithics of Central Anatolia, and which can be compared to the sites of Keçiçayiri and Asarkaya in the same region (Efe T., 2005: 111).

Keçiçayiri (32) – This is a multiple locations site on the high plateau to the east of the Phrygian hills, 5 km from the village of Bardakçi, 50 km south of Eskişehir, and some 200 km to the south-east of the Sea of Marmara (Fig. R03-10). The sites were named after the small plain in which the sites are located. They were discovered in 1977 subsequent to clandestine digging, and investigated in the early 1990s by T. Efe, who excavated the sites between 1996-1999 (EFE T., *et al*., 2012). The sites include a flint outcrop surrounded by knapping debris.

There are three separate prehistoric settlements:

- The Höyük and Terrace;
- The Northwestern Field;
- The Citadel / Cibirada.

Some of the lithics from the Höyük and Terrace can be dated to the Middle Palaeolithic (Fig. R03-10).

The lithics from the aceramic lower level of trench 88 in the Northwestern Fields could date from the PPN, since a naviform core, diagnostic of the PPN of the Levant and the Central Plateau, is a particularly telling find (Efe T., 2012). The lithic finds from the 1995 survey, which included large blades obtained using the pressure technique, were examined by Kozlowski, who identified them as being in the Late Near Eastern PPN tradition from Göbekli Tepe in South-Eastern Turkey, as well as sequences from the Central Turkey Konya Plain sites of Late Aşikli, Early Musular, Can Hassan III and the Early Neolithic of Çatal Hüyük (Efe T., 2005: 111; Özdoğan M., 2005: 21; 2011b: 24).

Early Neolithic DFBW with the rare addition of red-slip, which includes globular pots, is similar to the material from the Early Neolithic II levels at the Pisidian Lake District site of Bademağaci. This material was found in the Northwestern Fields, the Höyük and Terrace, and the top of the Cibirada. This pottery, originally thought to date from the Archaic Fikirtepe, and comparable to the site of Demircihöyük (Efe T., 2005: 110-111), with the Early Neolithic lithics, are now thought to predate the Fikirtepe Culture, which might have emanated out of this earlier migratory movement (Efe T., 2012: 230).

Marmaracik (21) – Early Neolithic Fikirtepe site to the south-west of Menteşe in the Yenişehir Basin to the south of Lake Iznik.

Menteşe (20) – Early Neolithic Archaic Fikirtepe Culture mound site in the Yenişehir Basin to the south of Lake Iznik, close to a palaeolake. The site was excavated by a Dutch team under J. Roodenberg in the 1990s.

Mudbrick and wattle and daub appear to have been used simultaneously in basal Mentese (Çilingiroğlu Ç., 2009: 373; Roodenberg J. & Alspaslan-Roodenberg S., 2008; 2013).

The lithics, studied by I Gatsov and P. Nedelcheva (2007), appear to form a techno-complex with the basal levels of Ilipinar, Fikirtepe and Pendik, and include elements of the Ağaçli Culture with single platform sub-conical ones, erroneously referred-to as bullet cores (Biagi P., 2016: pers. com.), from with blades were extracted using a punch or the pressure technique. "*The chipped stone assemblages from basal Menteşe and the earliest levels 10–9 at Ilipinar are considered to be very similar to those from Fikirtepe and Pendik. At all of these sites we see, on the one hand, irregular flakes struck from irregular cores and reworked mainly into rounded endscrapers with steep retouch, and, on the other hand, bullet cores used to produce narrow, regular blades that were often snapped and retouched into various microliths. Very typical are blades reworked into long perforators by means of steep retouch*" (Düring B., 2011: 185).

The pottery is plain and includes hole-mouthed jars with everted rims. DFBW appears later, as do the boxes. The pottery is Archaic Fikirtepe and assures the transition to Classic Fikirtepe (Çilingiroğlu Ç., 2009: 374).

"*In the older faunal evidence from Mentese, cattle play a prominent role. About 20% of the faunal remains in the oldest level are from wild animals, mostly deer and*

wild boar; thereafter, their frequency decreases sharply." (Düring B., 2011: 200). The population appears to have been essentially farmers and animal breeders, and the 20 inhumations show signs of stress associated with hard work and a diet rich in carbohydrates (osteoarthritis and spinal deformities associated with hard work, porotic hyperostosis due to iron deficiency, poor dental health). The earliest inhumations were buried in the classical Neolithic crouched lateral (foetal) position (Alspaslan-Roodenberg S., 2001).

The site has recently been dated to *ca*. 6500 BC, which could not represent the earliest occupation of the site, and thus predate Ilipinar by at least 400 years (Özdoğan M., 2012; Roodenberg J. & Alspaslan-Roodenberg S., 2008). Ç. Çilingiroğlu (2009: 373) quotes the following dates without lab. refs. from Roodenberg *et al*. (2003: Fig. 11):

- 7550±50BP = 6481-6340 BC (OxCal 4.2 at 87.1%) – Median 6410 BC.
- 7410±130BP = 6482-6017 BC (OxCal 4.2 at 95.4%) – Median 6250 BC.
- 7450±25BP = 6394-6247 BC (OxCal 4.2 at 95.4%) – Median 6320 BC.

The influence of the autochthonous Mesolithic population can probably be seen in the relatively high percentage of hunted fauna in the basal levels, the lithic technology, and possibly the use of wattle-and-daub in the earliest levels.

Musluçeşme/Muslu Çeşme (24) – Open-air site on the western shore of Lake Manyas south of the Sea of Marmara, located on the highest terrace near a spring.

Of the 142 lithics recovered, 15 (11%) are in obsidian of unknown provenance. The site also contains polished stone axes but no pottery (Özdoğan M. & Gatsov I., 1998). The lithic assemblage is notably different to that of the Ağaçli Group and the suggestion is that this site represents a PPN incursion prior to the introduction of pottery (Özdoğan M., 2012: 674). B. Düring (2011: 126) is of the opinion that whilst this site could be that of early 7th millennium migrants, it could equally be a later special purpose site, and only an excavation and ^{14}C dates can help resolve this issue. Ç. Çilingiroğlu (2009: 257) says that this is "*Yet another possible PPN site, Musluçeşme, identified through the high concentration of lithics and polished axes, has been documented in Manyas-Balıkesir, located on one of the high terraces of Lake Manyas (Özdoğan and Gatsov 1998: 214). Musluçeşme lithic assemblage contains mostly flint but also obsidian micro-cores, single-platform cores, end-scrapers, blades and notched tools. Özdoğan, drawing on the nature of the lithic material collected from these sites and absence of pottery, envisages a possible PPN horizon in Troas and Marmara Region in general, although he asserts that systematic excavations are needed in order to test the accuracy of this statement (Özdoğan and Gatsov 1998: 223)*".

The jury would appear to be still out on the interpretation of this site, which does not appear to include any Mesolithic elements.

Orman Fidanğili (29) – Mound site in the Upper Porsuk valley in the Eskişehir region almost totally buried by erosional and alluvial deposits, presumably unexcavated (Yakar J., 1994).

Pendik (15) – Open-air site south of Istanbul and close to Fikirtepe discovered in 1908 whilst building the railroad (Fig. R03-11). A sounding was made at this Fikirtepe site in 1961 by Ş. A. Kandu, on top of which a later Hoca Çeşme Culture cemetery was found. The site was finally the subject of excavations in 1981-1982 by S. Harmankaya and M. Özdoğan, and again in 1992 by Pasinli and Uzumoğlu, whose material has yet to be studied. This is a sister site to Fikirtepe, a few km distant, and contemporaneous with Yarimburgaz, Ilipinar and Hoca Çesme (Gatsov I. & Özdoğan M., 1994; Özdoğan M., 2013).

The earliest Archaic Fikirtepe structures are circular wattle and daub with sunken floors and pitched roofs (Derin Z., 2005; Özdoğan M., 1999). "*During the 1981 excavations two grids were excavated. These yielded in total five circular-oval shaped pit houses which were 50-70 cm deep and*

had 3-6 meter diameters. Between the pit structures were open areas (Özbaşaran, N. 1989: 5)" (Çilingiroğlu Ç., 2009: 357).

The lithics are a mixture of Neolithic and Ağaçli Culture attributes (Gatsov I. & Nedelcheva P., 2007; Özdoğan M., 1999, 2013), whist also including Central Anatolian obsidian from Sakaeli and Yağlar (Düring B., 2008:21).

Two burials in contracted positions were found under the floors of two habitations, without grave-goods (Özdoğan. M., 2013).

Mollusc collecting, fishing and hunting also continued to be important, notwithstanding the presence of domesticated animals (Özdoğan M., 1999: 215).

The earliest structures, the lithic industry and the early faunal assemblage suggest there is an autochthonous element in this Early Neolithic site. There are unfortunately no dates, and no details of the faunal assemblage.

Tuzla (15) – Neolithic site east of Istanbul and close to the site of Pendik, which was the subject of a test dig in 1965 by Kanzu.

Uğurlu-Zeytinlik Mevkii (36) – This is a mound site 300 x 100 m, currently under excavation on the western side of the Island of Gökçeada/Imbros (Fig. R03-12), currently 17 km from the Gallipoli peninsula, but which would have been closer when the settlement was established with sea levels lower.

The earliest phase V has two levels of occupation, the earliest of which has been dated (Erdoğu B., 2013; 2014 EAA presentation):

- Wk-29173 7618±36BP = 6530-6417 BC (OxCal 4.2 at 92.3%) – Median 6475 BC.

The earliest pottery is mostly Red Burnished Ware with some DFBW (Erdoğu B., 2013), and the lithic industry is on local flint with about 1% obsidian, mostly from Melos, with some from 700 km away in Central Turkey. M. Özdoğan (2011a) has identified this site as being a Fikirtepe Culture site, and with the 4 domesticated animals present, B. Erdoğu (2013; 2014 EAA presentation) sees these Neolithic settlers, who most probably arrived from Northwestern Anatolia as competent navigators.

Yenikapi settlement (11) – This Neolithic settlement was discovered in 2005 in the centre of Istanbul during the construction of the new urban transport and tunnel complex under the Bosphorus (Figs. R03-13 & R03-13a). The site which was originally located near the Lykos Stream on the coastal plain west of the Golden Horn is currently up to *ca*. 9 mbsl, but at the time the settlement was founded the Sea of Marmara was probably 15-30 m lower than today, with the coastline over 1 km distant (Algan A. *et al*., 2011; Kiziltan Z. & Ali Polat M., 2013; Özdoğan M., 2011e). Excavations began in 2008 under Ismael Karamut, the Director of Istanbul Archaeological Museum, with Yasir Analir as Chief Archaeologist at the dig. The excavations were continuing in 2012 (Özdoğan M., 2012: pers. com.).

The earliest pottery is diagnostic of Archaic Fikirtepe, possibly dating from 6600-6400 BC, with some sherds possibly earlier. The pottery typologies appear to span about a millennium, until the sea-level drowned the site. The earliest constructions are quadrangular, oval or circular, made of wattle and daub (R03-13a), reinforced with stones. Burials have been found mostly in the crouched position beneath the habitation structures with one infant burial in a pot (Fig. R03-14); cremations date from the later Yarimburgaz Culture (Algan A. *et al*., 2011; Kiziltan Z. & Ali Polat M., 2013). That inhumations and cremations should co-exist could indicate that communities with different belief systems were living together. The DNA analyses could help clarify whether Mesolithic and Neolithic communities merged (Algan A. *et al*., 2011).

Unusual finds include 2080 footprints in three separate horizons dating from the archaic and classical Fikirtepe, showing the use of footwear (Kiziltan Z. & Ali Polat M., 2013: 118-119).

This Fikirtepe Culture site appears to have been establishes 2-4 centuries before that of Fikirtepe and Pendik a few km to the east.

The economy was based on farming, animal husbandry, fishing and hunting. Cattle are the most important domesticated animal, with ovicaprines, suids and dog present; the young kill-date suggests that the animals were bred for consumption. Hunting was important with roe deer the most important large game. The remains of two bows were found as well as two paddles or shovels and a throwing maul.

M. Özdoğan (2013: 195) believes that this site, established in an area occupied by Ağaçli Culture hunter-gatherers, and which is the only coastal Fikirtepe culture to have quadrangular habitation structures and non-Neolithic burial customs "*strongly suggests that these two communities might have merged to live together*", and that the momentum to move west might have been halted by the presence of Mesolithic communities.

The lithics have not been studied, but no obsidian was found, whilst the nearby sites of Fikirtepe and Pendik, which probably date from a little later, had 5% of their lithics manufactured in this material; nothing can be deduced at present from the lithic traditions as to whether they incorporated possible Mesolithic traditions. The high level of hunting and fishing do however suggest Mesolithic elements.

Yenisesehir II (23) – Early Neolithic site some 10km east of Menteşe.

Western Anatolia, Marmara and Southern Thrace – Sea of Marmara and Eskişehir – Conclusions

There is plenty of evidence for a hunter-gather presence in the Region, particularly between the Sea of Marmara and the Black Sea, as well as in the region of Eskişehir, during the Late Pleistocene and Early Holocene, with numerous lithic scatter sites for the Mesolithic Ağaçli Culture. The Late Mesolithic Ağaçli Culture population appears to have merged with the Early Neolithic Fikirtepe Culture migrants near the Sea of Marmara, evidenced by circular or sub-circular structures made of wattle and daub, often with sunken floors, at Fikirtepe Culture sites, the high incidence of hunting and the different ways of disposing of the dead; to the north of the Sea of Marmara, there are also numerous instances of sub-conical cores, which are a hallmark of the Ağaçli Culture, at Fikirtepe Culture sites. The provenance of the Fikirtepe Neolithic migrants is not clearly established, since the bovines are unlikely to have originated from the Konya plain, although these could have been acquired *en route* or after arrival.

Yarimburgaz Cave, near Istanbul, is a special case in that it is a stratified Late Mesolithic and Later Neolithic site, which does not appear to belong to the Ağaçli Culture, and whose Final Mesolithic occupant might have acquired some pottery prior to the site's abandonment.

The region of Eskişehir may hold the key to the earlier overland diffusion of the Neolithic from the Konya Plain and possibly the High Euphrates towards the north-west during the PPN starting during the late 8th millennium BC. The excavations at Keçiçayiri and/or Kalkanli will hopefully supply answers to the dates of the earliest occupation of such sites and whether there is an element of Mesolithic substrate at these sites. This migrational movement appears to have reached Europe west of Istanbul in the first half of the 7th millennium BC if the reading of the evidence from the Istanbul Tarihönceci Arastirmari (ITA) project is correct, which would confirm an earlier overland migration into Europe via Thrace than the maritime one into Thessaly and Northern Greece.

The Fikirtepe Culture is the first Pottery Neolithic of NW Anatolia and extends into South-Eastern Bulgaria (Koprivets, Krainitsi, Kazanlik, etc.) during its initial archaic phase with DFBW, without incorporating any elements of a Mesolithic substrate at these sites. The Fikirtepe Culture, which is fully Neolithic, is dated *ca*. 6600/6500-5500 B.C. and shows marked differences between the coastal sites (Fikirtepe, Pendik, Yenikapi, etc.) and the inland sites south of the Sea of Marmara (Ilipinar, Mentese, etc.), particularly as regards habitations structures, lithic assemblage and subsistence strategies. It is probable that the newcomers to the region who settled as farmers close to the shores of the Sea of Marmara incorporated the Late Mesolithic hunter-gatherers of the Ağaçli

Culture, who appear to disappear from the archaeological record, whilst the newly arriving Neolithic Fikirtepe Culture migrants appear to have acquired some Ağaçli Culture attributes (lithic technology, subsistence strategy and possibly habitation structures). The alternative reading is that the Terminal Mesolithic population acquired the Neolithic package whilst retaining elements of their culture, but such a reading appears to be more problematic, given the rapidity with which the sites were set up with the full Neolithic package, all of whose Neolithic attributes can be traced back to the core areas of neolithisation to the east.

A second, substantially smaller wave of immigrants, appears to have arrived by sea, by-passing this Region and settled in Thrace at Hoca Çesme *ca*. 6500 BC, as well as on the Aegean seaboard near Izmir at Ege Gübre at about the same date.

Region 4 – Western Anatolia, Marmara and Southern Thrace – Thrace

(Map R04)

Western Anatolia, Marmara and Southern Thrace – Thrace – General Introduction

The area roughly 30 km west of the Bosphorus, between the Sea of Marmara and the Black Sea, has been excluded from this Region, since it was deemed important to include most of the Mesolithic Ağaçli Group and Early Neolithic Fikirtepe Culture sites in a single Region. Greater Istanbul has thus been excluded from this Region, as has the Black Sea coast where most of the Ağaçli group sites have been discovered.

The island of Gökçeada/Imbros is included in this Region, since it is an extension of the Gallipoli Peninsula, now separated by a 50 m deep channel, even if it had become disconnected prior to the Holocene. The Island of Limnos, further south and west of the Troad, separated by a 40 m deep channel and which would have been in the process of becoming disconnected from Gökçeada/Imbros at the beginning of the Holocene, with its Late Pleistocene/Early Holocene sites, has been included in both this Region and that of the Sea of Marmara and Eskişehir.

Turkish Thrace has the Istranka mountain range that runs east-west to the north, straddling the Bulgarian border, which stops much of the rains from the north, creating a steppe environment to the south. This range is cut by the Maritsa River in the west of the Region, north of the Greco-Bulgarian border, before it turns west in Bulgaria up a wide plain between the Rhodope Mountains to the south and the Stara Planina Mountains to the north; to the east of the Maritsa, its tributary, the Tunja also cuts through Istranka Hills and finds its source to the north in the Bulgarian Stara Planina Mountains. A coastal plain of varying width stretches along the Black Sea coast, which was considerably wider before the rise in water level of the Black Sea once the Bosphorus was breached, possibly *ca*. 7600 BC, when the Black Sea sea-level was over 100 m lower, but still wider than at present during the late 8th and early 7th millennia, when the Black Sea water level approximated that of the Aegean and the Sea of Marmara.

Western Anatolia, Marmara and Southern Thrace – Thrace – Mesolithic and Transition sites – Introduction

The hunter-gatherer presence is evidenced for the Pleistocene and beginning of the Holocene by a number of sites on or close to the Gallipoli Peninsula, the Island of Limnos and the Black Sea coast, whilst that for the Later Mesolithic by Ağaçli Group sites on the Gallipoli Peninsula and on the Bulgarian Black Sea coast where Mesolithic lithic scatters have been found over a wide area at Dekilitazh/Dikilitaş. The presence of only one Mesolithic site in Bulgarian Thrace is surprising given the existence of several Romanian sites south of the Danube Delta (Boroneanţ A. 2005), and the presence of the Middle Mesolithic site of Myrne north of the Danube Delta in the Ukraine close to the Black Sea border with Romania as well as numerous other Mesolithic sites in Southern Ukraine and the Crimean Peninsula (Biagi P. & Kiosak D., 2010).

Western Anatolia, Marmara and Southern Thrace – Thrace – Mesolithic and Transition sites – Site details

Değirmenlik Mevkii (25) – Mesolithic surface scatter on a dune or mound 8 km east of Eceabat on the Gallipoli Peninsula with microblades, scrapers and a few geometrics (Yakar J., 1991: 231), which have been attributed to the Ağacli Group, and estimated to date from *ca*. 7000 BC (Özdoğan M., 1999: 210).

Dekilitazh / Dikilitaş / Pobiti Kamani (8) – This Mesolithic open-air site close to the Bulgarian north-eastern Black Sea coast dates from the Early Holocene and is the same complex stretching over 50 km^2 in the region west of Varna also known as Pobiti Kamani/Pobiti Kamuni with some 11 sites from which 11,000 lithics have been collected. The collection includes many sub-conical cores and tools, including over 400 microliths (points, lunates, triangles, trapezes and truncations) (Gatsov I., 1989, 2005: 215).

I. Gatsov (1989, 2005, 2007) considered this lithic scatter to represent the most easterly extension of the Iron Gates 'Epi-Tardigravettien' (as found at Cuina Turcului and Vlasac), with material dating from the 9^{th}-7^{th} millennia BC. D. Bailey (2000), quoting I Gatsov (1995), points out that this was an area where people prepared blanks or tools, which were taken elsewhere, and that a small part of the of the lithics were pre-Holocene and some Late Neolithic.

M Özdoğan (1998) sees similarities with the Ağaçli Group lithic scatters on the southern shore of the Black Sea.

The fact that so much material appears to have been worked in this area during the Mesolithic is evidence for a population whose Early Holocene settlements have not been found and whose subsequent movements are currently not known, either because they were mobile and left little archaeological signature and/or because their settlements were close to the shore of the Black Sea and that these sites are now drowned. It should also be noted that there are several sites south of the Danube Delta in Romania (Boroneanţ A. 2005), that the Middle Mesolithic site of Myrne north of the Danube Delta in the Ukraine is close to the Black Sea border with Romania, and that there are several other Mesolithic sites in Southern Ukraine and the Crimean Peninsula (Biagi P. & Kiosak D., 2010).

It is strange that there is no other evidence for the presence of Mesolithic hunter-gatherers in the region, and an alternative or additional reason could be that at least part of the population migrated south to form what we know as the Late Mesolithic Ağaçli Group, possibly coinciding with the breaching of the Bosphorus barrier between the Black Sea and the Sea of Marmara, which might have occurred in the second half of the 8^{th} millennium.

Eksino (29) – Unpublished Mesolithic site on east side of Gökçeada/Imbros (Erdoğu B., 2014-09: pers. com.).

Kilisetepe (26) – Open air site on the Gallipoli Peninsula opposite Çanakkale, in the town of Eceabat with Early Neolithic material. In the open country nearby, some patinated more ancient lithics were also discovered (Yakar J., 1991: 233).

Ouriakos (31) – Open air flint knapping area under sand dunes near the beach on the east side of the Island of Limnos (Fig. R03-2), dating from the Late Pleistocene, when the island could have been connected to Gökçeada/Imbros (40-50 m deep channel) and possibly the mainland (>50 m deep channel to Gallipoli Peninsula). According to N. Efstratiou (2015), the joined-up islands probably began to separate from the mainland *ca*. 12k BC, and the two islands separate ca. 10k BC. The land mass would have been more extensive at the time, and the site, now next to the beach some 8 masl, would have been *ca*. 1.5-3 km from the shore at the time it was occupied. The open-air site, which probably covers many thousands of square metres, was discovered in 2006 by A. J. Ammerman when the sand dune covering the site was partially bulldozed to create a car park above the beach, and several lithic scatters have now been discovered up and down the coast. The site has been the subject of excavations under N. Efstratiou 2009-2013 (Efstratiou N., *et al.*, 2013, 2014, Efstratiou N., 2015, and 2013: pers. com), in which the authors state that "*the most characteristic implements are microlithic lunates and end-scrapers. Other tools consist of few oblique truncations, backed bladelets, burins and notched bladelets. The Ouriakos lunates are very characteristic tools of standardised dimension and thickness. They are obtained with bipolar, abrupt retouch without microburin technique, from microbladelets of scalene triangular cross-section detached from small cores with one or more*

prepared platforms by indirect percussion. The end-scrapers are represented by long and short specimens of different size and thickness, obtained from different types of blanks.

The Ouriakos industry can be compared to those from layers Ia1-Ia2 of Öküzini Cave, north of Antalya (south-west Anatolia). These layers yielded lithic assemblages with bipolar lunates, and a great variety of end-scrapers (KARTAL, 2002), radiocarbon-dated to the Younger Dryas from charcoal (OxA-5213: 10150±90 and RT-1441: 10440±115 uncal BP) (LÓPEZ BAYÓN et al., 2002: Table 1)." (Efstratiou N., *et al*., 2013) (Fig. R03-2).

The authors give the following date for Ouriakos, which is synchronous with Öküzini Cave quoted above:

- GrA-53229 10390±45BP = 10474-10106 BC (OxCal 4.2 at 94.1%), on burned bone (from apatite).

The lithic raw material comes from an oucrop that was still exploited until the 1940s for the manufacture of threshing sledge inserts, located 7 km to the north-west in at the head of the Havouli Valley, and is being studied by P. Biagi and his team. A burned sample of the sparse and weathered faunal remains was sent for dating (Efstratiou N., 2012: pers. com., 2013, 2014: 185-187; Biagi P., 2016: pers. com.).

The site on this island predates the Ağaçli Group sites, and confirms a Late Pleistocene Younger Dryas hunter-gatherer presence in the Region, which has proved elusive further south on the Anatolian Aegean seaboard. It also appears to confirm a late Pleistocene interaction zone encompassing the Bay of Antalya with both the eastern and western shores of the Aegean Sea. According to P. Biagi (2016: pers. com.), the material is very specialised although comparable with that of Direkli Cave, near Gaziantep in Southern Anatolia, where the material dates to the same period, and the sites in the Bay of Antalya. This means that the traditional assemblages with lunates moved from the Levant along the coast of Anatolia up to the Aegean. We know little about this movement because of the absence of systematic surveys. P. Biagi would expect to find numerous sites with systematic surveys, in a similar manner to the discovery of other sites on Ouriakos recovered during very brief suverys.

Pobiti Kamani/Pobiti Kamuni – See Dekilitazh/Dikilitaş above.

Tepecik (26) – Ağaçli group Mesolithic site on the Gallipoli peninsula facing the Dardanelles destroyed by a hotel site.

Western Anatolia, Marmara and Southern Thrace – Thrace – Initial and Early Neolithic sites – Introduction

M. Özdoğan (2012: 675) noted that "*the primary introduction of Neolithic elements into Thrace could have taken place as early as the final stages of the Pre-Pottery Neolithic Period. It also seems possible that this primary expansion of the Neolithic model continued up to the early stages of the Pottery Neolithic, though this expansion appears to have been very random. However, following this initial stage, there is a clear distinction between the events that took place in the southern and eastern Marmara regions and those occurring in Thrace, indicating a virtual borderline somewhere between sixty and eighty kilometers west of Istanbul. In Thrace, the earliest secure evidence of Neolithic habitation is in the so-called monochrome phase, as recovered at Hoca Çeşme Phase IV dating to 6400 cal b.c.e. and Aşağı Pınar Layer 8. The pottery of this stage is extremely fine, jet black or red colored, lustrously burnished, and is reminiscent of the so-called Dark Faced Monochrome Wares of central Anatolia. The composition of the cultural assemblage is notably different from that of the Fikirtepe and Yarimburgaz cultures. The difference is evident in the types of pottery vessels but more significantly in the lithic assemblage. Sites in Thrace totally lack micro-blades, bullet cores, and the pressure flaking technique. In fact, lithic material is rather scarce, with the only detectable artifacts*

being large blades. Pottery decoration is also rare and confined to shallow fluting, light incision, and applied motifs. Some of the applied designs are conspicuously similar to those of Köşk Höyük and Tepecik Çift like further east in the core area of Neolithisation (see Özbaşaran, chapter 5 in this volume). The settlements are rather small, consisting mainly of round buildings with wooden post structures. At least at Hoca Çeşme, the settlement is encircled by a massive stone wall, reinforced with a palisade.

At present, it is not possible to define the trajectory of the monochrome culture before reaching Thrace, though it clearly signifies an endemic movement. The location of Hoca Çeşme on the Aegean littoral, and the recovery of similar assemblages in the region of Izmir, strongly suggest a maritime route following the Aegean coast. Further to the west, in Bulgaria, there are at least four sites, Koprivets, Kraïnitsii, the Polyanitsa plateau, and Yablokovo, where a pre–Karanovo I monochrome phase has been noted (Todorova 2003), implying that this wave of migration extended up to the Danube around 6200 cal b.c.e. if not earlier. However, it is also evident that it was not a dense movement".

Western Anatolia, Marmara and Southern Thrace – Thrace – Initial and Early Neolithic sites – Site details

Aşaği Pinar (16) – Initial Neolithic site in Central Turkish Thrace near Kirklaredi. The excavations, begun in 1993, were ongoing in 2008 on a surface exceeding 4000 m^2 (Figs. R04-1 & R04-1a).

The basal Levels 8-9 contained Archaic Fikirtepe DFBW as well as some Red-Slipped Fikirtepe Ware in well stratified contexts.

Level 7 contained Karanovo I Red-Slipped Ware of western tradition, some of which was painted white. The assemblage showed affinities with Hoca Çeşme to the south, which is later than the Fikirtepe Culture (Özdoğan M., 2005, 2008, 2011b, 2011c). It is the most easterly site attesting the Karanovo pottery and can be seen as a bridge between Anatolia and the interior of the Balkans (Özdoğan M., 2008).

According to Ç. Çilingiroğlu, (2009: 400-401), quoting M. Özdoğan and Schwartzberg (2008: 20-21), Level 8 contained DFBW, possibly dating from 6400-6300, whereas Level 7 contained RSBW and White-on-Red Ware.

The earliest dates found, indicated as below Level 6 is (Reingruber A. & Thissen L., 2005: 312):

- Bln-4996 6900±48BP = 5895-5705 BC (OxCal 4.2 at 94.4%), below Level 6, on cereal – Median 5800 BC.
- MAMS-15895 6908±27BP = 5846-5725 BC (OxCal 4.2 at 95.4%) from ditch – Median 5775 BC.

M. Özdoğan (2013: 190) states that Level 7 has been dated 5950-5750, and that whilst the lowermost Level has not been dated, it is estimated to date from 6200-6000 BC.

There is no indication of any Mesolithic substrate at this site, although the Fikirtepe Culture folk who first settled this site could have incorporated acculturated hunter-gatherers or their descendants.

Azmak/Tell Azmak (9) – This Later Early Neolithic Karanovo Culture site is located 25 km north-west of Karanovo in the Maritsa Valley.

The structures with floors made of mud, clay and plant material packed on to wooden substructures, were excavated in the lower levels (Bailey D., 2000).

The earliest dates are (Horváth F. & Hertelendi E., 1994; Nikolova L., 1998):

- Bln-293 7303±150BP = 6452-5901 BC (OxCal 4.2 at 95.4%), on oak – Median 6175 BC.
- Bln-291 7158±150BP = 6273-5739 BC (OxCal 4.2 at 91.3%) – Median 6005 BC.

Because the dates for this site are on oak, and considered to be influenced by 'old wood' to the tune of several centuries, the date for the establishment of this site is estimated to be *ca*. 5700 BC (Reingruber A. & Thissen L., 2005: 312). Even if the site was established *ca.* 6200-6000 BC, there is no indication of any influence from a Mesolithic substrate.

Bulgar Kaynağı (15) – Archaic Fikirtepe Culture flat site in Turkish Thrace destroyed by a sand pit.

No details could be found to determine whether there were any indices of a Mesolithic substrate at this site, although Fikirtepe Culture sites mostly show evidence of Mesolithic traits in the lithic technology and the economic base.

Buruneren (22) – Classic Fikirtepe Culture site in Turkish Thrace on the Sea of Marmara at the head of the Gallipoli Peninsula.

Drama (14) –This is an Early to Middle Neolithic site on the middle reaches of the River Maritsa.

This site, established by Early Neolithic migrants has been listed amongst those containing DFBW, presumably in the late 7th millennium BC.

The Middle Neolithic level contained 26 geometric microliths (15 trapezes and 11 lunates) out of a total assemblage of 888 lithics, which included other microliths. The geometric microliths were analysed and *ca*. 80% were considered to have been used as armatures. Given the time gap of close to a millennium between the end of the Mesolithic and the appearance of these microliths, it is difficult to postulate any Mesolithic influence (Lichardus J., *et al*., 2000).

Dzhuljunitsa/Dzuljunitsa/Dzhulyunitsa-Smardesh (6) – This is an Early Neolithic DFBW site in the Veliko Tarnovo region of North-Central Bulgaria, near the village of the same name, which was established between 6200-6000 BC (Gurova M., 2012b: 8). The earliest Level has affinities with the earliest phase at Koprivets, whilst the second Level is White-Painted Ware of Koprivets II type and has affinities with Kovačevo in the Struma River basin (Çilingiroğlu Ç., 2009: 417; Gurova M., 2011, 2012b).

The site is also noteworthy for being the earliest site known to date for the working of Balkan Flint, and M. Gurova, who is studying the lithics, has stated (2012a: 41-42) that in relation to the "*demic diffusion from north-west Anatolia (Marmara region) the site of Dzhuljunitsa is at the epicentre of the process, being closely affiliated to the context of Anatolian influences (mainly in pottery style) (Еленски 2008; Elenski 2004). This site is also the most serious candidate for the 'nuclear area' of procurement and subsequent distribution of BF 'Balkan Flint' and blade production. The location of the site at an almost equal distance from the Pleven-Nikopol Moesian flint and Ludogorie deposits (between 60 and 100 km) is quite advantageous for acquisition and transportation of raw material. We have to keep in mind that expeditions over much greater distances are presumed for acquiring high quality raw material in Neolithic times – about 400-500 km (Binder, Perlès 1990, 260).*

According to the available archaeological evidence, among the Dzuljunitsa flint repertoire there are virtually no formal tools of BF in spite of the fact that there are many blanks for their manufacture. The site's inhabitants were probably only producers and consumers of blades of BF. On the other hand, once they knew the advantages of the Ludogorie BF (my assumption), they could take advantage of this acquisition and reach a local and independent perfection of their technological skills. Becoming thus the 'new flint knappers' they might incorporate BF products into the network of intra- and inter-regional exchange of goods, exotica and social messages".

There is no indication of any Mesolithic substrate at this site.

Hamaylitara (23) – Early Neolithic site at the head of the Gallipoli Peninsula on the Sea of Marmara.

The pottery is 90% Red-Slipped and Burnished Ware, which began to appear in the Classic Fikirtepe phase according to M. Özdoğan. This type of pottery is common in Western Anatolia,

although not present at Menteşe and Ilipinar. There are also vertical tubular lugs, which are common in the Lake District, whilst only one example is known from the Fikirtepe culture. There are similarities with the earliest phase at Hoca Çeşme (Phase IV), with its 5-6 m oval structures cut into the rock and wattle and daub walls (Erdoğu B., 2000: 160).

Hoca Çeşme (20) – This open-air site 7 km from the Greek border near Enez (ancient Ainos) in Turkish Thrace, is now 5 km from the sea on a small rocky outcrop (Figs. R04-2 & R04-2a). It would have been close to the mouth of a gulf stretching 50 km inland at the time of first occupation. The site was excavated between 1990-1993 by M. Özdoğan.

The lithic tradition is different to the local Late Mesolithic and the Fikirtepe Culture, with many flakes, few of which are retouched, no sub-conical cores, and few blades (Gatsov I., 2005).

The pottery of the initial occupation, Phase IV, is fine-walled DFBW with Red-Slipped Ware added a little later, without Coarse Ware. There are some sherds with applied zoomorphic motifs, and some with incised decorations (Karul N. & Bertram J.-K., 2005, Özdoğan M., 1998b: 440, 1999, 2008). A human figurine with crossed legs is similar to those found in Central Anatolia as well as at Hacilar and Höyücek in the Lake District (Hansen S., 2005: 202).

The fauna is essentially domesticated, with ovicaprines dominating, as well as large quantities of molluscs (Özdoğan M., 1999, 2013).

The habitations were circular with walls made of stone or wattle and daub in the early Phase IV and the site was protected by a massive stone wall (Fig. R04-2) (Erdoğu B., 2000; Karul N. & Bertram J.-K., 2005; Nikolov V., 2007).

The dates for the basal Phase IV suggest that the site was first settled sometime close to 6500 BC, with *ca*. 6400 BC being indicated by most authors (Karul N. & Bertram J.-K, 2005; Nikolova L., 1998; Özdoğan M., 2013):

- Bln-4609 7637±43BP = 6574-6429 BC (OxCal 4.2 at 92.8%), level IV – Median 6500 BC.
- Hd-16725/19145 7496±69BP = 6461-6233 BC (OxCal 4.2 at 95.4%), level IV – Median 6345 BC.
- GrN-19779 7360±35BP = 6273-6092 BC (OxCal 4.2 at 76%), level IV – Median 6185 BC.
- GrN-19355 7200±180BP = 6419-5742 BC (OxCal 4.2 at 95.4%), level IV – Median 6080 BC.

This site has affinities with the Lake District (lithics, pottery, bone implements, figurine), or as M. Özdoğan (2008) states, possibly the Aegean coast of Anatolia. It is the only site with such cultural affinities found in Thrace for the Initial Neolithic. With its protective wall which was used into Phase II, no influence from any local Mesolithic tradition can be discerned. In Phase II it merged into the Karanovo / Sesklo cultures (Nikolov V., 2007; Özdoğan M., 1998b, 1999).

It is probable that these colonizers arrived by sea (Özdoğan M., 2008), since circular structures are known in Cyprus as well as protective walls (e.g. Khirokitia at a later period of the Neolithic), so some influence or cultural affinities with the island are possible, as is the case with Ege Gübre on the Anatolian Aegean coast north of Izmir, although it should be noted that pottery is not known on the Island of Cyprus at the time.

There are no indications of contact with an autochthonous hunter-gatherer substrate at this site.

Kachitza (5) – This Early Neolithic site is in North-Central Bulgaria, and according to I Gatsov (1989:474), the lithics bear a resemblance to those found at Dekilitazh, although according to M. Gurova (2014: pers. com.) he revised his descriptions of the lithics from Dekilitazh on three separate occasions.

Karaağaçtepe (28) – Early Neolithic site located at the tip of the Gallipoli peninsula, which was originally excavated by the French occupation forces in 1926, and published by Demangel (1926).

M. Özdoğan re-examined this site in 1981 and confirmed the presence of a Neolithic level.

Karanovo (10) – Later Early Neolithic site in Central Bulgaria treated at greater length in Region 9 (Bulgaria and Republic of Macedonia).

There is no indication of Transition at this site.

Kaynarka Mevkii (24) – Fikirtepe Culture site on the Gallipoli peninsula, 8km to the south of Gelibolu, located on a terrace above the Münipbey Stream.

The pottery appears to be Classic Fikirtepe (Özdoğan M., 1999: 204, 2011b: S424), and the lithics include some obsidian, some bladelets and some geometrics (Yakar J., 1991: 231), suggesting the influence of the Mesolithic Ağaçli Group.

Kazanlak/Kazanluk (11) – Early Neolithic site in the valley of the River Tundsa, with pottery, presumably DFBW, which M. Özdoğan (1999: 214) considers to be reminiscent of Archaic Fikirtepe, whilst also within the Bulgarian 'Monochrome Phase'. The dates from the lowest archaeological level are however mid-6th millennium (Stamboliyska E. & Uzonov Z., 2009).

Kilisetepe/Maydos Kale (27) – Open air site on the Gallipoli Peninsula opposite Çanakkale, in the town of Eceabat with Early Neolithic material. In the open country nearby, some patinated more ancient lithics were also discovered (Yakar J., 1991: 233).

Koprivets (2) – Initial Neolithic site in Eastern Bulgarian Thrace.

The basal levels of this site contained DFBW similar to that of Archaic Fikirtepe, suggesting there was an Initial Neolithic which arrived overland via the region of the Sea of Marmara, which penetrated up the Black Sea coast, before being taken over by the Sesklo/Karanovo Painted Ware Culture which rapidly extended up the Balkans.

Kraïnitsi/Kraïnitsa (to the west of map) – Initial Neolithic site in Western Bulgaria up the River Struma. 4 small trenches were excavated by St. Tchohadjiev and A. Bakanska in the 1980s.

The site appears to have been first established in the mid-7th millennium BC (Bailey D., 2000).

The lowest level I on virgin soil in trench 3 yielded monochrome fine, semi-fine and coarse pottery. The inclusions in the fine ware include mica, fine sand and fine organic material, plus some crushed baked clay. The coarse ware contained sand, some pebbles and a great quantity of larger organic inclusions of straw and grain. The decoration is plastic or impresso. There are also Many vertically pierced lugs, some of which are slightly oblique (Stefanova T., 1996). The monochrome pottery found at this site is only replicated at Koprivets, and gave rise to the theory that there was a monochrome phase (Kozlowski J.K., 2003). M. Özdoğan (1999, 2005, 2008, 2012) considers the DFBW to be similar to that of Archaic Fikirtepe, which culture may have got as far west and north in Bulgarian Thrace.

There is however no indication of any Mesolithic substrate.

Krovili (17) – Later Early Neolithic site from *ca* .6000 BC, 12 km inland in Greek Thrace, 72 masl.

Lafrouda (18) – Later Neolithic site near the coast, east of the Island of Thasos, which is partly eroded by sea action. The base of the mound is currently 2m below sea level proving that sites on the coastal plain are quite likely to have disappeared (Ammerman A. J., 2008).

Limenaria (21) – Neolithic Site on the Island of Thasos.

Makri (19) – This Early Neolithic site close to the shore in Greek Thrace has a post-Palaeolithic horizon beneath 3 m of sediments. The Neolithic horizons are divided into Makri I and Makri II. The lowest level excavated has impressed and incised ware with rare white-on-red pottery (Andreou S., *et*

al., 2001: 314), and is important for the Early Neolithic of the region (Karkanas P. & Efstratiou N., 2009). The lowest levels have however not been excavated to date (Efstratiou N., 2016, Pers.com.).

It would seem that there is a long hiatus between the two periods of occupation at this site, excluding any possible continuity.

Orlovets/Orlovec (3) – This Early Neolithic DFBW monochrome pottery site is located close to the village of Orlovets on the second terrace of the River Baninski Lom, which is a tributary of the River Rusenski Lom in Northern Bulgaria (Stamboliyska E. & Uzonov Z., 2009: 46-47). The site was probably established by migrants from North-West Anatolia after the middle of the 7th millennium BC.

The lithics are on blades of imported raw material, and there are no indications of a Mesolithic substrate.

Pločite/Plochite (4) – This Early Neolithic DFBW Monochrome pottery site is located on the Yantra River in the Veliko Tarnovo District of Bulgaria (Stamboliyska E. & Uzonov Z., 2009).

There are no indications of a Mesolithic substrate at this site.

Poljanitsa Plateau/Poljanica-Platoto/Polyanitsa-Platoto/Polianica-Platodo (7) – This Early Neolithic DFBW Monochrome pottery site, on the Goliama Kamchia River, near Tardovishte in North-East Bulgaria, was excavated by H. Todorova in 1976, when a single small trench was opened.

Ç. Çilingiroğlu (2009: 416-417) states that "*the lithic industry shows microlithic elements such as trapezes and perforators (Todorova 1990: 72)*", and the pottery, which is red-slipped and mat, includes DFBW hole-mouthed jars tempered with large quantities of chaff, with vertical lugs, some plastic decorations, finger impressions and impresso, which suggests that the Neolithic migrants who established the site originated from North-West Anatolia. The structures are rectangular wattle and daub.

Monochrome pottery and Impressed Ware in the lowest Level at this Early Neolithic site are associated with trapezes and has been dated to the second half of the 7th millennium (Budja M., 2009, quoting Weiniger, et al., 2006; Çilingiroğlu Ç., 2009; Stefanova T., 1996; Stamboliyska E. & Uzonov Z., 2009) and which were originally published by Vajsov (1993):

- Bln-1571 7535±80BP = 6512-6230 BC (OxCal 4.2 at 93.7%), Horizon 1, Qu. 49, chaff temper – Median 6370 BC.
- Bln-1613 7380±60BP = 6392-6094 BC (OxCal 4.2 at 95.4%), Horizon 1, Qu. 153, chaff temper – Median 6245 BC.
- Bln-1613A 7275±60BP = 6242-6020 BC (OxCal 4.2 at 95.4%), Horizon 1, Qu. 153, chaff temper – Median 6130 BC.
- Bln-1521 7140±80BP = 6213-5876 BC (OxCal 4.2 at 94.6%), Horizon 1, Qu. 153, chaff temper – Median 6045 BC.

These dates are some of the earliest Neolithic dates in Bulgaria, and given their early date strongly suggest an Anatolian provenance via the Sea of Marmara Region and Thrace, whether north up the Black Sea coast or up the Maritsa Valley.

The microlithic element could indicate contact with the Mesolithic substrate, or the Ağaçli Group if the migrants came from the Fikirtepe Culture.

Pomoshtitsa/Pomostica (1) – This Early Neolithic site in North-East Bulgaria, located near the village of the same name, was excavated in numerous small trenches by V. Nikolov in 1995.

Monochrome DFBW pottery was found in the three stratigraphic levels 1.2 m thick, suggesting the site was established by migrants originating from North-West Anatolia, whilst the upper Level yielded similar pottery with the addition of a few sherds of White-Painted Ware. The DFBW contained organic temper, and the decoration was plastic, with finger impressions and impresso (Stamboliyska E. & Uzonov Z., 2009; Stefanova T., 1996).

There are no indications to suppose contact with a local Mesolithic population.

Stara Zagora – Okražna Bolnica (12) – Later Early Neolithic site in the town by the same name. The earliest Level is given as being Karanovo I Culture with the following date (Stamboliyska E. & Uzonov Z., 2009):

- Bln-1587 7139±65 = 6114-5886 (OxCal 4.2 at 89.9%), charcoal – Median 6000 BC.

There is no evidence for the Transition at this site.

Uğurlu-Zeytinlik Mevkii (30) – This is a mound site 300 x 100 m, currently under excavation on the western side of the Island of Gökçeada / Imbros (Fig. R03-12), currently 17 km from the Gallipoli peninsula, but which would have been closer when the settlement was established with sea levels lower.

The earliest phase V has two levels of occupation, the earliest of which has been dated (Erdoğu B., 2013; 2014 EAA presentation):

- Wk-29173 7618±36BP = 6530-6417 BC (OxCal 4.2 at 92.3%) – Median 6475 BC.

The earliest pottery is mostly Red Burnished Ware with some DFBW (Erdoğu B., 2013), and the lithic industry is on local flint with about 1% obsidian, mostly from Melos, with some from 700 km away in Central Turkey. M. Özdoğan (2011a) has identified this site as being a Fikirtepe Culture site, and with the 4 domesticated animals present, B. Erdoğu (2013; 2014 EAA presentation) sees these Neolithic settlers, who most probably arrived from Northwestern Anatolia as competent navigators.

Yabalkovo (13) – This is an Early Neolithic pottery site in South-East Bulgaria, which has a monochrome phase, whose original settlers might have arrived via the Sea of Marmara Region (Özdoğan M., 2012).

Western Anatolia, Marmara and Southern Thrace – Thrace – Conclusions

There is clear evidence for a Late Pleistocene / Mesolithic presence along the Black Sea coast to the east and west of the Bosphorous, in North-Eastern Bulgaria, on the Gallipoli Peninsula and the Islands of Gökçeada / Imbros and Limnos, but no Mesolithic influence has been convincingly discerned in the Initial Neolithic sites of the Region, except possibly at the Fikirtepe Culture sites, such of Kaynarka Mevkii in Turkish Thrace, and possibly Poljanitsa Plateau in Bulgarian Thrace.

As M. Özdoğan (2013) points out, it took 1000-2000 years for the Neolithic to become established in the Macro-Region, with the first evidence appearing some 3000-4000 years after their initial development in the core areas of primary neolithisation, and that it was a multifarious step-by-step happening at varying paces, involving numerous events, trajectories and the movements of different peoples, so that it is not possible to talk about a single Neolithic package. It is also more difficult to discern the involvement of the last hunter-gatherers, although the Neolithic attributes were all initially developed by hunter-gatherers.

Outside the Region, it is possible that the Anatolian Pottery Neolithic, from which the Archaic Fikirtepe Culture appears to have derived, with its monochrome pottery, reached the Danube and turned west, since there is evidence for a monochrome Neolithic at Ohoden-Valoga in North-West Bulgaria, which could have incorporated some Mesolithic elements (Sunken floors and microliths) and which has been dated 6400-6300 BC (Ganetsoski G., 2009).

It is to be hoped that someday, what happened to the Mesolithic folk who knapped at Dekilitazh will be elucidated, even if most of their sites are now probably drowned by the rise in the post-Recent Dryas rise in the Black Sea water-level in the Early Holocene.

Regions 5-8 – Southern Balkans – Introduction

(Maps MR1 and MR2)

Southern Balkans – Regions and geography

This Macro-Region encompasses 4 Regions almost entirely in Greece (excluding Western Greece and Greek Thrace), including most of the islands of the Aegean, but not those in the north-east (Imbros / Gökçeada and Lemnos) which are culturally part of 'Region 3 - Sea of Marmara' and 'Region 4 – Thrace'. Western Greece (Aetolia, Akarnania, Epirus and Ioannina), which lie west of the Pindus Mountains facing the Ionian Sea, are treated with Nort-Western Greece and Albania (Region 13), and Greek Thrace is treated with Turkish Thrace in (Region 4):

- Region 5 covers the Central and Southern Aegean islands, excluding the Northern Sporades, which culturally are attached to Region 7.
- Region 6 covers the island of Crete.
- Region 7 covers mainland Greece north of the eastern half of the Gulf of Corinth, the lands east of the Pindus Mountains and south of the Rhodope Mountains, excluding Greek Thrace. This Region also includes the Northern Sporades Islands.
- Region 8 covers the Peloponnese and Megara.

The Islands of the Aegean comprised a large central island block during the LGM, which slowly broke up into the present configuration as the sea level rose (Fig. Intro-2). At the advent of the Holocene, most of the islands as we now know them would have been slightly larger, but configured approximately as at present. Crete would always have been an island. Whilst the Aegean is easily seen as a barrier between its eastern and western shores, the islands form a link which was used from as early as the Pleistocene with clear evidence for cultural contacts as well as population movements, so that the whole of this Macro-Region is intimately connected to Anatolia during the Mesolithic, Transition and Early Neolithic.

Eastern Greece (Region 7) includes the Lake Kopais Basin, the Thessalian Plain, Greek Macedonia and the lands to the east, south of the Rhodope Mountains as far as Thrace. These areas are separated from each other by hills and mountains with practicable passes, but also connected along the shore which would have had a more extensive plain, and along which it was also possible to navigate.

The geography has changed since the Early Holocene in several ways:

- Lakes and wetlands (e.g. Lake Kopais, Lake Karla in Thessaly and the wetlands on the Plain of Drama) have been drained or dried out;
- Anthropic activities have resulted in deforestation with the consequent slope erosion and sedimentation in the valleys and on the plains;
- The eustatic sea-rise has drowned coastal plains and reduced the size of the islands;
- Plate tectonic activity, subduction (mainly in the Northern Aegean) caused by isostatic uplift in Northern Europe and the impact of the additional weight of the rising seas are hard to quantify; although the tilting of Crete in historical times is well documented.

Southern Balkans – Climate and environment

From the analysis of deep sea cores from the Ionian Sea (Bannock 84 09GC) and the Adriatic (KET 8216) as well as lake cores from Lake Xenias in South-Central Greece, Lake Ioanina (Epirus), Tenaghi Philippon (Macedonia), the climate and vegetation cover has been reconstituted (M. Rossignol-Strick: 1998). During the Recent Dryas RCC event, *Chenopodiaceae* pollen reached levels of 40% at Tenaghi Philippon, associated with Artemisia, indicative of extreme aridity. This episode was followed by the presence of the pistachio in the Boreal, indicative of milder and more humid conditions, whilst at mid-altitudes the broad leafed mesophilic forests prospered, with the lower

altitudes remaining dryer. In North-West Greece, with the advent of the Holocene and the Pre-Boreal, precipitation increased, and during the Boreal and the Early Atlantic (8020-4700 BC), humidity rose further. On the Ionian Sea, with precipitations between 550-600 mm a year spread over the year, there was a substantial increase in oak, hazel, elm, ash, beech and other deciduous tree species at middle altitudes, with a Mediterranean-type maquis at the lower altitudes as evidenced by the pistachio in the pollen charts. C. Perlès (2001) also indicates that the broad-leafed forest cover increased during the Holocene, and became quite dense after 7000 BC between 400 and 800 masl in the northern part of the Macro-Region. In Thessaly, with higher pluviosity than at present, broad-leafed forests would have been found on the plain where there were humid soils, whilst an evergreen oak forest would have subsisted on dryer soils, with steppe vegetation on the slopes; further south, in the Northern Peloponnese, the forest cover would have been made up of evergreen oak with pistachio, interspersed with more open strands of grasslands.

The onset of the '6200 BC event', has been calculated by B. Weninger *et al*., (2006, 2009) to have begun prior to 6200 BC and lasted over 200 years, so that "*the possibility that the introduction of early farming into South-East Europe may have been at least partly climate induced, if not altogether climate triggered*" (Weninger B. *et al*., 2006: 415), needs to be considered as one of the driving forces for the migration of Neolithic colonisers from Anatolia, Cyprus and the Levant.

Southern Balkans – Early human presence

T. Carter (2014) presented the case for a Neanderthal presence on the Island of Naxos at the 20th annual meeting of the European Association of Archaeologists in Istanbul, and Middle Palaeolithic lithics have been found on Crete (Strasser T. F., *et al.*, 2010) and the Island of Gavdos south of Crete (Kopaka K. & Matzanas C., 2009). The Lower/Middle Palaeolithic is also evidenced by 6 lithic scatter sites on the Thessalian Plain identified during the extensive surveys conducted by C. Runnels (Çilingiroğlu Ç., 2009).

The Upper Palaeolithic is represented at several cave sites which have been excavated (e.g. Franchthi Cave, several Klissoura Gorge caves, Sarakenos Cave and Theopetra Cave) as well as by lithic scatters such as those identified by A. Sampson on the islands of the Northern Sporades, and those on the Island of Crete.

Middle and Upper Palaeolithic remains were also discovered during the Berbati-Limnes Survey to the north of the Plain of Argos, near Drama in Eastern Macedonia and near Saloniki in Central Macedonia (Perlès C., 2003b: 108).

Southern Balkans – Funerary practice

Franchthi Cave has produced 15-30 Mesolithic burials, mostly in an extended position, as well as scattered bones of some 25 individuals; fewer than 10 of the burials are attributed to the Late Mesolithic and only one has been dated. Two of the Early Mesolithic burials are cremations and as such are the earliest known in Europe. There are also 4 Middle Neolithic burials. Further north, in Thessaly, Theopetra Cave has yielded Palaeolithic remains and a single Mesolithic burial in a crouched/foetal position.

The site of Maroulas on the Island of Kythnos has also produced several Mesolithic inhumations in a flexed or crouched position, which practice is normally associated with the Anatolian Mesolithic (e.g. Girmeler Cave), Transition and Neolithic. In Continental Europe, the practice only appears with the advent of the Neolithic migrants from Anatolia and the Levant, excepting a few examples along the southern litoral of the Study Area.

Neolithic burials, including cremations, which are considered a Mesolithic practice (Perles C., 2003b: 100), are known from Soufli Magoula in Thessaly, and 6 infant burials have been discovered dating from the Initial Neolithic at Knossos on the Island of Crete.

Southern Balkans – Lithics

There is a marked similarity between the Mesolithic lithics found at sites in the region of the Bay of Antalya and those found on the Aegean islands (Ikaria, Kythnos, Youra and Lemnos) as well as Franchthi Cave on the mainland, suggesting regular contacts and the movement of people between the southern Anatolian coast across the Aegean.

The Mesolithic lithic technology is particular to the region, with a greater reliance on flakes rather than bladelets (Perlès C., 2001), and as N. Kyparissi-Apostolika (2003) has pointed out, each region in the Southern Balkans has its particularities as regards raw material, tool assemblage, knapping technique and activities, so that whilst there are obvious differences between coastal and inland sites, they also subsist between Thessaly and the regions further south in the Argolid, Crete and Epirus on the west coast of the Ionian Sea. The microburin technique is rare and whilst there are geometric microliths, they tend to be irregular and made on flakes. This apparent lack of contact with the Central Balkans and beyond, during the Castelnovian Mesolithic of the Northern Mediterranean, could be in large part due to the difficult geography of the region, which did not facilitate contact with more northerly regions, so that the Southern Balkans remained relatively isolated until the advent of the Neolithic.

J. K. Kozlowski *et al*., (1996: 338) have pointed out the uniformity in the lithic assemblages from the Early Neolithic in Greece between Thessaly and the Argolid, both as regards functional and typological requirements, suggesting an exogenous provenance of the Neolithic. This Neolithic macroblade assemblage, which could not have originated in North-Western Anatolia or the Marmara Region, and which replaced the flake technique, constitutes a fundamental marker of cultural discontinuity (Kozlowski K. J. & Kaczanowska M., 2009: 376).

Southern Balkans – State of research

Until the 1960s, the supposed Transition sites were restricted to Early Neolithic open-air sites, primarily in the Thessalian plain, where a number of archaeologists, of which D. Theocharis and V. Milojčić are the two most prominent, intent on proving that the neolithisation process was a local affair, 'discovered' aceramic phases in the basal levels of a number of open-air sites such as Achilleion (1961), Argissa Magoula (1956), Gendiki (1962), Knossos (1957), Sesklo (1956-1957), and Soufli Magoula (1958). The excavations at these sites were limited to very restricted trenches and surfaces ranging from 10 m^2 to 60 m^2, representing a tiny fraction of each site, excepting at Sesklo, which was more extensively excavated, but which rates as a very poorly published site (Bloedow E., 1991). M. Gimbutas, who conducted more extensive excavations at Achilleion, confirmed the non-existence of aceramic levels in 1974. The indigenist theories have subsequently been discredited, (Efstratiou N., 2005; Perlès C., 1987b; Reingruber A., 2005), and since no Mesolithic basal levels have been found in more than 100 open-air sites of the region, it is now generally accepted that the Initial Neolithic was accomplished by waves of migrants from various regions, following different routes, who brought the Neolithic package with them starting prior to the middle of the 7th millennium BC, and that their demographic growth, and a larger-scale migration in part precipitated by the '6200 BC event', resulted in local or regional splinter settlements and migrational movements beyond the confined of the regions of initial settlement. The Greek indigenist movement is not quite dead yet, with the excavator of Theopetra Cave, N. Kyparissi-Apostolika (2005), as torch-bearer (Çilingiroğlu Ç., 2009).

Prior to the second half of the 20th century, there were a number of Palaeolithic sites known, and most of those with dated stratigraphic contexts appear to have been abandoned during the Younger Dryas (Runnels C., 1995, 2003). Until the 1980s, there were very few clearly identified Mesolithic sites. This gave rise to statements asserting that large tracks of the Southern Balkans were either uninhabited or sparsely inhabited (Perlès C., 2001, 2004; Runnels C., 1995). Citing the island examples of Cyprus and Kythnos, C. Runnels (2001) endorsed the theory of G. Clarke (1980) whereby the Greek

Mesolithic is unconnected with the Palaeolithic, from which it is separated by a hiatus of unknown length, and that the Mesolithic population arrived by sea before the Neolithic migrants. L. Thissen (2005) went further, asserting that Southern Greece was only colonised from *ca.* 6000 BC. There does not appear to be a basis in facts for such statements, so that they have to be treated with caution and not accepted as absolutes. It is true though, that no Mesolithic site, or Initial Neolithic site for that matter, has been identified or recognised in the Peloponnese outside of the Argolid.

The number of known Neolithic sites far exceeds the Mesolithic ones, which is no surprise, but as M. Özdoğan (2011b) points out, many of these have been conducted as small soundings with a lack of clearly defined stratigraphy or architectural features, and that the neolithisation process is far more complex than originally envisaged. This thought is echoed by C. Perlès (2009: 275-277; 2014) who states that It is likely that the maritime migrations departed from several points, in a similar manner to the colonisation of Cyprus, over several centuries; that it is also probable that contact with the autochthonous population gave rise to cultural transfers, such as the armatures and burial practices in Greece, which find no parallels in Anatolia or the Levant, so we have multiple regions of origins over time, multiple contacts, innovation, and amalgams.

Mesolithic sites are being discovered in regions previously devoid of evidence (Runnels C., 1996, 2009; Runnels C. & van Andel T., 1987, 1999, 2003; Runnels C., *et al*., 1999, 2004, 2005, 2009; Sampson A., 2005, 2008, 2010; Strasser T., *et al*., 2010), some of which are to be found in Western Greece. The reasons for the dearth of evidence for Mesolithic occupation of the land can be attributed to multiple causes, other than depopulation, most of which have been mentioned in the general introduction:

- Many hunter-gatherers could have followed the large herd herbivores in their northward migration during warming phases of the post-glacial, so that the remaining population need not have been large;
- The carrying capacity of the land would have become substantially reduced due to the desert-like conditions on the east side of the Southern Balkans and in the Peloponnese during the Younger Dryas, and that the expanding forest cover in the Holocene would have resulted in a reduced biomass of large game;
- Large game became more difficult to hunt in forest environments and hence a more unpredictable source of protein, necessitating the development of new lifeways (Perlès C., 2001);
- The Peloponnese may have been particularly devoid of large game subsequent to the migration of the large herd herbivores during the Postglacial, due to the narrow isthmus through which the red deer and wild boar would have had to enter, although the isthmus of Corinth would have been substantially wider after the LGM until the sea reached its present level during the Neolithic. Alternatively as M. Rossignol-Strick (1998) has suggested, the conditions were desert-like during the Younger Dryas, just prior to the Holocene, in Southern Greece, with precipitation around 100 mm p.a., so that large game could have had difficulty surviving;
- Because of the mobility of the Mesolithic hunter-gatherers and the flimsy or movable nature of their habitation structures, their open-air camp-sites are difficult to identify in the landscape;
- The post-Mesolithic sedimentation of valley-floors, slope erosion and anthropic activities will have hidden or eliminated the remains of many sites;
- With a reduction in coastal plains estimated as high as 40% to 70% primarily due to the eustatic sea-rise (Runnels C., 2001), the habitat for grazing herbivores will have been reduced, and coastal or near-coastal occupation sites will have disappeared beneath the rising sea.

In parallel with these hypotheses and assertions based in part on lack of evidence, the number of surveys has been continually increasing, as can be seen from the following listing. The focus of these surveys was not always on the Mesolithic, but we will have occasion to refer to several of them, since they have led to the discovery of numerous Mesolithic sites, some of which help to understand the Transition:

- In the 1950s, the University of Minnesota Messenia Expedition lasted from 1953 to 1968;
- In the 1970s, The Serres Basin Survey in Macedonia took place in 1978; the Southern Argolid Exploration Project commenced in 1979 and ended in 1982, and the Attica Caves Topographic Survey lasted from 1978 to 1980;
- In the 1980s, The Nemea Valley Archaeological Project lasted from 1984 to 1989; the Kephissos Valley Survey was undertaken in 1980; on Crete, the Spakia Survey lasted from 1986 to 1999; C. Runnels and T. Van Andel conducted a survey of Eastern Thessaly from 1987 to 1991; a survey in Boeotia took place under Bintliff & Snodgrass; the Berbati-Limnes survey lasted from 1988 to 1991, as did the Klissoura Gorge Survey, and the Langadas Survey Project in Macedonia began in 1986 and ended in 1996;
- In the 1990s, the Kopais Project in Boeotia got under way under A. Sampson; The Rhodope Plain Palaeolithic Survey project in Thrace got under way in 1993; The Kato Vasili Valley Survey in Chalcis lasted from 1995 to 2001; the Alonnisos Palaeolithic Research Project in the Sporades lasted from 1994 to 1996, and on Crete the Plakias and Agios Pavlov Survey was undertaken between 1998 and 1999;
- In the first decade of the third millennium the Kandia Mesolithic Survey in the Argolid was undertaken in 2003; The Asea Valley Survey in Arcadia took place in 2000; Adamantios Sampson undertook surveys on Aegean islands identifying Mesolithic sites on Ikaria, Kythnos, and in the Northern Sporades, as well as on the mainland in the region of Lake Kopais.

The precise locations of the two Mesolithic cave sites of Ulbricht (Argolid) and Zaimis (Megara), discovered and investigated by A. Markovits in the 1920s during his extensive investigation of Greek caves, are not known, but his field notes have been rediscovered and reappraised by N. Galadinou (2003).

That the majority of the Mesolithic sites discovered in the region are close to the sea-shore, lakes or wetlands, has often been the subject of comments. The sites scientifically investigated, such as Franchthi Cave, Theopetra Cave, Sarakenos Cave, and the Cave of Cyclops indicate that the diet breadth in the Mesolithic was considerably enlarged to include small game and birds, marine and terrestrial molluscs, fish, and increased plant food (Demoule J.-P. & Perlès C., 1993). As T. Cullen (1995) has stated, "*The radical drop in settlement density in Mesolithic Greece, particularly inland, can be attributed to dwindling herds of large game at that time; the shift to exploiting a broad spectrum of local resources at Franchthi may not have been out of choice*", and as N. Galadinou (2003) has pointed out, the open-air Mesolithic sites are hard to identify due to the lack of *fossiles directeurs*, and when one is identified it is impossible to date.

Thanks in particular to the work of A. Sampson, a number of Mesolithic sites have been discovered on the Aegean islands, attesting to navigation and colonisation at that time, which might well have emanated from South or South-Western Anatolia and/or its Aegean seaboard. That some kind of control over game occurred in the Mesolithic is a distinct probability, evidenced by the discovery of suid bones in Mesolithic contexts on the islands of Kythnos and Youra, when the species was not endemic on the islands, to be replaced by caprines on the island of Youra at a later stage of the Mesolithic. This could be due to the sites being established by PPN populations from Anatolia and/or the Near East, where the early stages of animal domestication are attested. There is also evidence for long distance maritime contact with the Bay of Antalya in South-Western Anatolia, and with the Near East and/or Cyprus, prior to the arrival of Neolithic migrants, as seen in the lithic technology, the stone circular habitation structures at the site of Maroulas and the import of suids and caprines to Youra and Kythnos, which M. Kaczanova *et al.* (2008: 95) equate to the early arrival of Neolithic elements in the Aegean basin from as early as 8500 BC.

We can assume that voyaging to and from the Near East along the southern Anatolian shore and within the Aegean had enjoyed an existence lasting many millennia prior to the arrival of fully Neolithic groups starting in the early 7th millennium BC (Ammerman A., 2011; Clarke G., 1980; Conolly J., 2008; Kaczanowska M. & Kozlowski J. K., 2012; Kozlowski J. K. & Kaczanowska M.,

2009; Runnels C., 2001; Sampson A., 2008, 2010). The early navigators helped create a koine of lithic technology; they discovered, exploited and distributed the obsidian from Melos (Çilingiroğlu Ç., 2009, quoting Perlès C., 1992) and colonised Aegean islands and possibly the mainland, so that there can be little doubt that the Neolithic migrants arrived after navigating from several points of departure from the Eastern or South-Eastern Aegean, the southern Anatolian coast, Cyprus and/or the Levantine coast at a time when there was a breakdown in the social organisation, RCC distress and a demographic crisis. The first PPN Neolithic migrants arrived in Crete and the Peloponnese several centuries prior to those settling in Eastern Greece, and from the standpoint of pottery styles, it can be asserted that they came from different regions of the Eastern Mediterranean (Budja M., 2001b: 38). An initial wave of migrants arrived in Thessaly and the North-West Aegean starting *ca.* 6600 BC, settling on lands where the climatic environment was similar to that in the regions from which they originated (Perlès C., 2001: 105; Çilingiroğlu Ç., 2009). That this initial colonisation of Thessaly and the Peloponnese originated from the Southern Levant is also corroborated by the weeds associated with the cultivated plants (Perlès C., 2009; 269-270). According to J.-F Berger and J. Guilaine (2008, 2009) there was a slowing down in the initial migrational pulse after *ca*. 6400 BC, until the advent of the '6200 BC event', when a substantial increase in the number of sites occurs with the migrants moving rapidly north to areas of greater pluviosity. According to C. Perlès (2009), this second wave, arriving in Greek Macedonia and the Republic of Macedonia, did not originate from the same regions of the Near East, in that elements diffused in Anatolia, but absent in the Southern Levant, are found in South-East Bulgaria at the end of the 7th millennium as well as also largely found in Greek Macedonia and the Republic of Macedonia, whilst these are absent in Thessaly (bone belt-buckles, bone spoons, bone flenders or rough adzes, striated sickles, antler wood adze sheaths, circular scrapers and sickle inserts retouched bi-laterally in a semi-abrupt manner, tubular beads made of bird bones, polypod pottery offering tables, anthropomorphic pottery as well as cooking pots and storage jars).

The provenance of the Neolithic colonisers is also supported by the genetic evidence. S. Colledge *et al.*, (2003), quoting King and Underhill (2002), point to the correlation of the distribution of pottery and anthropomorphic figurines in the Near East and Southeastern Europe, with the distribution of Y-chromosome haplogroups Eu9, which supports the hypothesis of demic diffusion, at least of males, out of South-West Asia. D. Mlekuž, *et al*., (2008), quoting Rootsi, *et al*., (2004) and Rootsi (2006), have indicated that the recent identification of subclades I1a, I1b*, I1b2, and I1c of I Y chromosomes has reshaped the European genetic landscape, in that the haplogroup I is restricted almost exclusively to the European continent with frequency peaks in Scandinavia and Southeast Europe, and with maximum frequencies of the I1b* subclade in Southeast Europe, suggesting strong Mesolithic-Neolithic demographic continuity in the region. R. J King, *et al*., (2008) have also determined that there is a strong genetic link, as well as cultural links, between the Central Anatolia regions (regions of Tarsus, Mersin/Yumuktepe and the Neolithic sites of Aşikli Höyük, Çatal Höyük and Hacilar) and the Cretan Neolithic, as well as to a lesser extent, that of the Argolid in the Peloponnese. The mutation rates in these studies also suggest that the Neolithic immigrants probably arrived in Crete and the Peloponnese some time prior to the arrival of Neolithic immigrants in Eastern Central Greece, where the genetic link of Thessaly and North-Eastern Greece is to be most probably found in South-Eastern Anatolia (region of the Neolithic sites of Çayönü, Göbekli Tepe and Hallam Çemi, as well as Syria and the Levant). The hypothesis that the migrants arrived by sea is comforted by the fact the Haplogroup J2b-M12, to be found in South-Eastern Anatolia and the Levant as well as in Eastern Central Greece, is not known to be present in either Western Anatolia or the region of the Sea of Marmara. Additional genetic evidence is supplied by R. J. King, *et al*., (2007) in that data from the haploid Y-chromosome appears to support the movement of Anatolian/Levantine agro-pastoralists from their place of origin towards South-East Europe. The haplogroups E3b and J2, combined with the distribution of certain distinctive types of Neolithic material culture from their Levantine origin to SE Europe and the Central Mediterranean also supports the demic diffusion model. Finally, the genetic signature of founder populations into areas previously virtually unoccupied (Crete), or very thinly

occupied (Thessaly) is maximized, so that the frequency of haplogroup J2a-M410 shows up as follows (p. 206):

- Crete 25.9%;
- Lerna / Franchthi 14.1%;
- Sesklo / Dimini 8.8%;
- Nea Nikomedeia, the most northerly site has the lowest at 3.6%.

Investigating the population affinities, it was found that:

- Crete clusters with the Anatolian (Central Plateau and coastal Mediterranean in the region of Tarsus), plus Lebanon, Jordan, Iraq and Southern Iran;
- Greece clusters with the Balkans (this says nothing about provenance);
- There is an affinity between Crete with Franchthi and Lerna, and Central and Mediterranean Anatolia;
- Thrace and the Pisidian Lakes District do not show genetic associations with the Thessalian Initial Neolithic, and the suggestion is that this region was colonized from the Euphrates River Region, or from the region of an unleavened wheat economy in the Levant and Syria.

R. J. King, *et al*., (2007: 211) also point out that the Initial Neolithic/Transition of Franchthi is closer to the beginning of the 7th millennium, as compared to that of Thessaly which is closer to middle of the 7th millennium, based on mutation rates, thus strengthening the suggestion that different populations were involved.

K. Kotsakis (2001: 64) has pointed out that "*Although undoubtedly the diffusion of the Neolithic is a physical phenomenon happening in space and time, it is equally a socially embedded process, taking place in social space and time*". He goes on to point out that the evidence available points to a thin Mesolithic presence in Greece with an element of coastal orientation suggesting maritime contacts. There is also much discontinuity between Mesolithic and Neolithic settlement patterns with open sites being settled by migrants, whilst cave sites suggest local adaptations (p. 65-66). He ends by noting that the inability of research to identify clear affinities between the Greek Early Neolithic and specific geographical parts of the Formative Zones (Levant, Fertile Crescent, South-East Anatolia, Konya Plain, Cyprus), above a '*vague resemblance*', indicates that the manipulation of the cultural baggage and resources was multiple and complex, in a variety of contexts over time, so that the concept that the Neolithic folk arrived equipped with a '*standard economic and cultural package*' therefore needs to be tempered (p. 68). With this in mind, we note that S. Hansen (2005) and C. Perlès (2001) have pointed out the conceptual similarities in the modelling techniques and attributes between the Middle Eastern figurines and those from the Thessalian Early Neolithic (e.g. coffee bean / cowry shell eyes, elongated heads, arms crossed beneath the breasts, bisexual attributes, asexual representations), as well as other parallels, such as ear studs and frog-shaped amulets. The Thessalian Neolithic migrants appear to have selected the region within which to settle with care, and arrived with a complete Neolithic package from their regions of origin, probably in multiple waves from South-East Anatolia and/or the Near East (Bellwood, 2003), eschewing the disintegrating complex and centralized hierarchical social organisation to which they had been subjected (Perlès C., 2004, quoting Özdoğan M., 1997, 2001). There is no evidence that they arrived via an overland route across Northern Anatolia, the region of the Sea of Marmara and along the Northern Aegean seaboard, since the cultural attributes of the Neolithic package reaching those regions about the same time as the first migrants arrived in Thessaly are markedly different to those in Thessaly, particularly as regards pottery. The eastern seaboard of the Aegean is now known to have been colonised by Neolithic migrants, possibly coming overland from the Pisidian Lake District or round the coast from Antalya by early in the 8th millennium BC, as evidenced by the dates from the basal levels from the site of Ulucak Höyük, over 20 km inland from Izmir, at about the same time or a century or two earlier than the Neolithic appears on the Island of Crete or in the Argolid.

Southern Balkans – Mesolithic

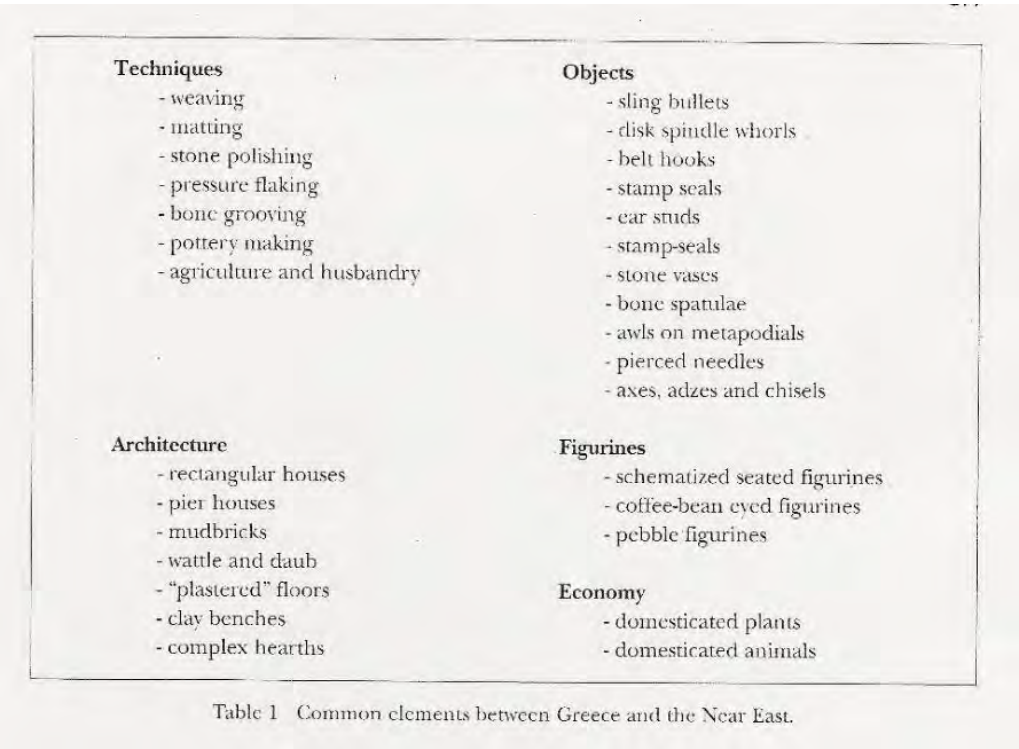
The Mesolithic sites that have been excavated are either on islands or in caves close to the sea or wetlands. A few Mesolithic lithic scatters have been found in this Macro-Region, but dating them is problematical; they do however supply additional evidence for the existence of a Mesolithic population in this Macro-Region, so that even if that population was not large, it nonetheless existed and of necessity came into contact with the Neolithic migrants. The best evidence for this is the Melian obsidian found in virtually all the Early Neolithic sites of this Macro-Region (Runnels C., 2006), which Mesolithic navigators had been exploiting for millennia prior to the arrival of the Neolithic migrants.

Several authors have concluded that the Southern Balkans were sparsely populated during the Mesolithic (Perlès C., 2003b citing also Jacobsen (1993) and Runnels (1995)), and that the Mesolithic population located in regions with access to varied environments, so that their absence from the large alluvial plains is not surprising; their lifeways also involved mobility, so that their temporary camps, hard to locate, would only carry a low density of remains.

Southern Balkans – Neolithic

Whilst a difference needs to be made between Neolithic attributes and the Neolithic way of life, it can be convincingly argued that the early colonisation of the Aegean Islands was undertaken by navigators arriving from Southern Anatolia or the Levant *ca*. 9000 BC, or shortly after, who were carriers of Neolithic attributes (circular permanent structures, crouched burials and the import of suids on the Island of Kythnos, and the import of suids and caprines on the Island of Youra a millennium later). The settlers on the Island of Kythnos may even have originated from the same region as the colonisers of Cyprus. It can be argued therefore that the earliest evidence for the European Neolithic dates from that period, although I would not subscribe to that view, since as matters stand it is an isolated instance only replicated a millennium later in the Northern Sporades on the island of Youra/Gioura. Navigators extracted, knapped and distributed Melian obsidian from the Late Pleistocene, ensuring that knowledge of the shore-lines, their populations and cultures were transmitted through a combination of communication, exchange and population movements. This means that whilst archaeologists attach importance to the binary definitions of Mesolithic and Neolithic, the reality of the process of neolithisation is infinitely more complex and occurred over a period exceeding two millennia in this Macro-Region, with the earliest attributes appearing shortly after 9000 BC and the colonisation of Crete and the mainland by agro-pastoralists commencing *ca.* 7000 BC, and accelerating with the advent of the '6200 BC event'.

Some of the earliest Neolithic attributes became so generally distributed before the colonisation of Greece, that they cannot be used to determine the origin of the colonisers (domesticates, rectangular buildings and limestone terrazzo floors, sickle blade inserts, polishes stone, basketwork, spindle whorls, sling-shots, stone vases, figurines, pintaderas, etc.) (Perlès C., 2009). C. Perlès (2005, 2009) has identifies those attributes found in the Greek Early Neolithic whose origins are to be found in Anatolia or the Near-East:



Techniques	Objects
- weaving	- sling bullets
- matting	- disk spindle whorls
- stone polishing	- belt hooks
- pressure flaking	- stamp seals
- bone grooving	- ear studs
- pottery making	- stamp-seals
- agriculture and husbandry	- stone vases
	- bone spatulae
	- awls on metapodials
	- pierced needles
	- axes, adzes and chisels
Architecture	**Figurines**
- rectangular houses	- schematized seated figurines
- pier houses	- coffee-bean eyed figurines
- mudbricks	- pebble figurines
- wattle and daub	
- "plastered" floors	**Economy**
- clay benches	- domesticated plants
- complex hearths	- domesticated animals

Table 1 Common elements between Greece and the Near East.

From: Perlès C., 2005

C. Perlès (2005) also lists Anatolian and Near-Eastern attributes that were not transmitted to the Early Greek Neolithic in which the suffix (1) indicates they were present in Anatolia (having originated in the Zagros Mountains and diffused into Anatolia) and (2) indicates that they were not present in either Anatolia or the Near East:

- Pointed arrow-heads (1);
- Transverse trapezoidal arrow-heads (2);
- Sanctuaries;
- Copper;
- Naviform cores;
- Pressure flaking;
- Bone spoons (1);
- Auroch craniums (with a possible exception at Dikili Tash);
- Striated needles;
- Antler-wood scythes with flint blade inserts (1);
- Bracelets made of stones;
- Tubular beads made of bird bones (1);
- Bone belt buckles (1);
- Antler wood adze sheaths (1);
- Circular or sub-circular scrapers (1);
- Polypod pottery offering tables (1);
- Anthropomorphic pottery (1);
- Pottery cooking pots and storage jars (1).

C. Perlès (2005: 280-285) suggests that the importance of those attributes not transferred from Anatolia is probably indicative of an initial influx of Neolithic migrants originated from the Near East and that those elements associated with a centralised power, which began to fall apart *ca*. 7000 BC, were discarded by the migrants (bucrania, temples, steles, etc.). The presence of transverse arrow-heads in both Greece and the Balkans during the Early Neolithic, which could be considered to be highly symbolic objects, could represent a Mesolithic legacy from acculturated hunter-gatherers, as could have been the practice of incineration found at Soufli Magoula, both of which attributes C. Perles

(2003b: 100) suggests are Mesolithic attributes "*which the earliest farmers in Greece readily adopted*", which "*demonstrate a strong and balanced interaction between the communities*".

C. Perlès (2003b: 110) has made the interesting point that the Southern Balkans, unlike the rest of Europe (and Western Anatolia as far as this study is concerned), "*should be viewed as a far-off island, settled by small groups of varied origins, who rapidly assimilated themselves with the local hunter-gatherers*".

Southern Balkans – Transition

Only a few Mesolithic sites attest to the Transition, with Franchthi Cave and the Cave of Cyclops representing the two obvious examples, with the possible addition of Anonymous Cave of Schisto, Theopetra Cave and Sarakenos Cave.

There are a number of puzzles regarding the Transition in the region, which have been raised by different authors:

- The first relates to the apparent hiatuses, mentioned by several authors, in the occupation of the Terminal Mesolithic cave sites and their reoccupation after a gap of several centuries by human groups with Neolithic attributes (e.g. Cave of Cyclops, Franchthi Cave, Sarakenos Cave, Theopetra Cave) (Efstratiou N., 2005). S. Colledge, *et al*., (2004) comment that "*Unfortunately, the relation between the latest hunter-gatherers and the earliest Neolithic settlements on the mainland remains ambiguous, and the chronic low density of sites dated to this period (i.e., ca. 7000 B.C.) prohibits detailed modelling of the transition*";
- C. Perlès (2003b: 102) makes the point regarding Franchthi Cave, that "*there is a long period of availability of cultigens and/or domestic animals prior to the full adoption of agriculture*";
- Another relates to the use of clay during the Mesolithic at Franchthi, Klissoura Cave 1 and Theopetra cave (Kyripassi-Apostolika N., 2003);
- A third relates to the provenance of the large honey-flint blades in the Early Neolithic. The blades are found at many Transition, Initial and Early Neolithic sites, and arrive ready-made. It has been speculated that the flint originates in Northern Bulgaria, where several outcrops have been identified. The pressure technology deployed in the manufacture of the blades is not attested in the Mesolithic, and Neolithic sites are only known in Bulgaria from about second half of the 7th millennium, and might not have existed when these blades made their appearance; who made them, and who carried them over their wide distribution range is not at present known.

Specific aspects that have been identified that could attest to the Mesolithic influence on the immigrant Neolithic population are:

- The adoption by Neolithic groups of Mesolithic trapezoidal arrowheads, which is an object with a high symbolic content (Perlès C., 2003b, 2004), and other lithic implements of Mesolithic tradition;
- The adoption of incineration by Neolithic groups (Perlès C., 2003b, 2004);
- The volume of hunted megafauna.

Region 5 – Southern Balkans – The Aegean Islands

(Map R05)

Southern Balkans – The Aegean Islands – Introduction

The configuration of the Aegean Basin during the Middle Palaeolithic would have been substantially different to that at the LGM, with a 10 km channel separating the Central Cycladian island block from the Greek mainland (Fig. Intro-2). Neanderthals appear to have crossed over to what is now the Island of Naxos, where typical Levallois lithics attributed to the Middle Palaeolithic have been found as part of the Stélida Naxos Archaeological Project. The suggestion is therefore that Neanderthals were capable of navigating (Carter T., *et al.*, 2014 presentation to EAA Conference). In a parallel discovery, Middle Palaeolithic artefacts have been discovered on the Island of Gavdos, 46 km south of Crete.

After the LGM the large island block in the middle of the Aegean Basin, progressively broke up into its present configuration during the post-glacial eustatic sea-rise (Fig. Intro-2). By the beginning of the Holocene most of the islands as we now know them existed, although with sea levels some 30 m lower than at present, these would have been larger. Navigation is attested during the Late Pleistocene in Cyprus and by the presence of Melian Obsidian at Franchthi Cave, where the initial quantities are relatively small, suggesting it was obtained by exchange rather than by direct navigation, from competent navigators who also knew how to extract and knap the raw material. Evidence for Early Holocene navigation is attested again on Cyprus, by the similarities in the lithic assemblages in the circum-Aegean basin with those from the region of Antalya in South-Western Anatolia, the colonisation of Aegean islands (e.g. Imbros/Gökçeada, Ikaria, Kythnos, Lemnos and Youra), and the exploitation and wide distribution of Melian obsidian.

Southern Balkans – The Aegean Islands – Mesolithic and Transition sites – Introduction

Recent research, undertaken primarily by A. Sampson, has demonstrated that during the Early Mesolithic, there was a systematic colonisation of the Aegean islands from the east, and that material found on Kythnos and Ikaria (choppers/axe or adze heads, quern stones) only has its respondents in the PPN of the Near East or Cyprus, as do the circular stone habitation structures found at the site of Maroulas on the Island of Kythnos; in addition, the introduction of suids on the islands of Kythnos and Youra, to be later replaced by caprines on the Island of Youra also suggests the colonisation of these islands by migrants from regions of primary neolithisation (Kaczanova M., *et al.*, 2008: 89-90). The authors therefore affirm that elements, considered to be Neolithic attributes, began to appear in the Aegean Basin *ca*. 9000 BC (Kaczanova M., *et al.*, 2008: 95). J. K. Kozlowski and M. Kaczanowska (2009: 366), who have studied the lithics have stated that the "*Chipped stone industries in the Aegean Sea islands are derived from the Epigravettian traditions on the continent; some technological and morphological features are even more marked, namely the decrease in the role of microblade technology and in the proportion of geometrical microliths*".

There are no confirmed Late Mesolithic sites on any of the Aegean Islands other than at the Cave of Cyclops in the Northern Sporades, Maroulas on the Island of Kythnos in the Cyclades, and Ikaria in the Dodecanese, although Melian obsidian continued to be extracted and distributed, so that the absence of known Late Mesolithic sites is more likely to be one of research, rather than a reflection of the reality.

Chalki (11) – A Mesolithic site has been discovered on this small island north of the Island of Rhodes (Fig. R05-1), where much of the lithics were manufactured on obsidian from Giali/Ghiali/Gyali/Yali, a short distance to the north-west. The assemblage is similar to those found on Ikaria and Kythnos (Sampson A., 2014: 203).

Cave of Cyclops/Cyclops Cave (1) – This Mesolithic and Transition site on the Island of Youra is treated with Region 7 - Eastern Greece and the Northern Sporades.

Giali/Ghiali/Gyali (10) – This small island south of Kos in the south-eastern Aegean was a source of poor quality obsidian.

Ikaria (4) – A. Sampson (2014: 201) confirms that 5 Mesolithic sites out of more than 20 prehistoric sites have been discovered during surveys on this island of the Dodecanese in the Eastern Aegean. Most of the Mesolithic sites cluster at the western end between Agios Kirikos and Faros (Sampson A., 2014: 201). J. K. Kozlowski (2007: 47 states that "*recent surveys by A. Sampson on Ikaria Island, north of the Dodecanese and close to the Anatolian coast, yielded lithic finds made from flint and obsidian similar to the industry from Maroulas*". The largest site, Kerame 1 was excavated by A Sampson in 2007 and is discussed below.

Kerame 1 (5) – Mesolithic open-air settlement at the western end of the Island of Ikaria, discovered during a survey on the island under A. Sampson in 2004, who subsequently excavated the site in 2007-2008. The site extended over 8000 m2 on a peninsula jutting out into the sea, and A. Sampson (2014: 201) believes that the only the westernmost part is extant, the rest having been lost to the sea (Fig. R05-2).

The site has been badly damaged by ploughing and no faunal or organic remains survived.

The 1000s of lithics recovered were made of flint and obsidian from both Melos and Giali/Ghiali/Gyali/Yali, and are technologically similar to those on the islands of Kithnos and Youra (Fig. R05-2) (Kozlowski J. K., 2007:47; Sampson A., 2014: 203).

Kythnos (7) – This island in the Northern Cyclades was colonised in the Early Mesolithic, when the site of Maroulas was established (see below). Surveys by K. Honea in 1972 and subsequently by A. Sampson, who excavated the site of Maroulas, brought to light 4 additional pre-Neolithic habitation sites at Agio Sostis, Agia Irini, KT-38 and Naoussa as well as over 20 other lithic scatters (Fig. R05-3) (Sampson A., 2014: 198).

Maroulas/Maroula (6) – The Early and Middle Mesolithic open-air site of Maroulas, close to the village of Loutra, was discovered by K. Honea in 1972. It is on a rocky spur extending out to sea, on the northern-eastern shore of the Island of Kythnos (Figs. R05-3 & R05-4) in the Northern Cyclades, and on the sea route between Southern Euboea or Cape Sounion at the southern tip of Attica, and the island of Melos, where the obsidian was exploited since the Late Palaeolithic. The site is today lapped by the sea and partially submerged and destroyed. It would originally have been situated some 40 masl, with a commanding view of the sea) (Honea K., 1975). Surveys conducted by A. Sampson during the excavations "*in the northeastern part of the island contributed to the discovery of similar industries from quartz, obsidian and white flint with a large number of diagnostic tools*" (Kozlowski J., 2007: 47).

The Mesolithic attribution of this site was at first generally received with scepticism, but now accepted, subsequent to the excavations undertaken by A. Sampson starting in 1996 and again between 2001-2005 (Figs. R05-3 & R05-4). A. Sampson also confirmed the presence of other undated

Mesolithic scatters at Naoussa and Agios Sostis directly on the seashore, where quartz and obsidian implements were found (Fig. R05-3); other inland sites are KT-38 in the valley west of Loutra, and KT-20, which were discovered by K. Honea in the 1970s (Kozlowski J. K. & Kaczanowska M., 2009: 369-370).

Some of the dates for the site of Maroulas are (Kozlowski J. K., 2007; Sampson A., *et al.*, 2002):

- DEM??? 9571±65BP = 9206-8761 BC (OxCal 4.2 at 95.4%) – Median 8985 BC.
- Poz-2220 9440±40BP = 8827-8616 BC (OxCal 4.2 at 95.4%), on organic fraction, Feature 16 – Median 8720 BC.
- Poz-6486 9420±50BP = 8825-8561 BC (OxCal 4.2 at 95.4%), Feature 15 – Median 8695 BC.
- DEM??? 9346±67BP = 8786-8424 BC (OxCal 4.2 at 93%) – Median 8605 BC.
- Gd-15365 7680±120BP = 6828-6248 BC (OxCal 4.2 at 94.8%), on organic fraction, trench 2 below lower pavement – Median 6540 BC.
- Gd-18294 7250±210BP = 6501-5722 BC (OxCal 4.2 at 95.4%), on land snail, feature 16 – Median 6110 BC.
- Gd-15368 7240±120BP = 6381-5896 BC (OxCal 4.2 at 95.4%), on organic fraction, trench 2 just above lower pavement – Median 6140 BC.
- Gd-30025 7130±140BP = 6258-5725 BC (OxCal 4.2 at 94.3%), on organic fraction – Median 5990 BC.
- Gd11655 6880±140BP = 6023-5546 BC (OxCal 4.2 at 95.4%), on carbonates, just below lower pavement in trench 2 – Median 5785 BC.
- Gd-11653 6500±50BP = 5559-5358 BC (OxCal 4.2 at 95.1%), on carbonates, just above lower pavement in trench 2 – Median 5460 BC.

From the above dates, it would seem that the site was occupied for close to 3500 years from the Initial Mesolithic into the Early Neolithic. No pottery was found, but the caprines remains found in the more recent levels suggest that the occupants of the site were in touch with Neolithic settlers.

Of the faunal remains, over 50% is Ichtyofauna, which includes pelagic fish (tuna, bonito and mackerel) as well as inshore fish, which were probably smoked or salted, in the same manner as at the Cave of Cyclops on the Island of Youra (Region 7) (Trantalidou K., 2014: 149; Sampson A., 2014: 201).

The site is important notwithstanding the fact that no pottery was found because:

- Suid remains were found representing over 41% of the vertebrate remains, dating from the 9th to the 7th millennia BC (Sampson A., 2005, 2014: 201), which J. K. Kozlowski (2007) recognised as being imported, contending that they were in the process of domestication. As with the Cave of Cyclops on the island of Youra (Region 7), approximately one millennium later, and also from at least three sites on Cyprus from at least as early as 11th millennium BC (Vigne J.-D. 2014: 129-130), the hypothesis that they were carried there by the settlers and let loose as a source of meat protein to be hunted is more convincing. In fact There is evidence for the transport of wild boar by pre-Neolithic groups to locations outside the area of this thesis (Ireland, Okinawa and the Izu islands), in what P. Rowley-Conwy and R. Layton (2011: 852) call 'niche enhancement' strategies. When the suids disappear in the Late Mesolithic/Transition from the Island of Kythnos, the large faunal assemblage is exclusively made up of caprines (Kozlowski J. K., 2007: 93);
- Over 30 circular or sub-circular house structures were identified (Fig. R05-5), degraded by sea action, with some already below sea-level, most of which were excavated or tested (Sampson A., 2010, 2014). Several of the structures were built in natural basins in the metamorphic shale, with stone pavements at different levels. The apparent permanence of the occupation, as evidenced by the superimposed reconstructions and the spread of ^{14}C dates, are unique for the Southern Balkans at the time, but strongly reminiscent of Cyprus and the Near East (Kaczanowska M., *et al.*, 2008: 90; Kozlowski J. K., 2007: 47; Sampson A., 2008: 211; 2014:

193). As A. Sampson (2008: 211) states, "*The unique Mesolithic Aegean constructions have the same circular or ellipsoid form as Natufian circular structures*", which he later expands on by confirming that the circular structures are unique for the Aegean Mesolithic, and find parallels in the Natufian and Harifian cultures in Syria and Palestine (12000-9500 BC), and the PPNA (9500-8300 BC) of Syria, Palestine and Jordan. At Çayönü in Eastern Anatolia, during the PPNA there were also circular and oval structures with sub-floor burials in crouched positions as at Maroulas, as well as in pits also found at Maroulas. On Cyprus, the Initial Neolithic of Shillourokambos also had circular structures, which are a hallmark of the Cypriot Initial Neolithic and Early Neolithic, and these are contemporaneous with the Maroulas Aegean Mesolithic (Sampson A., 2010: 134-135);

- A total of 26 inhumations with ochre were excavated under the habitations or in pits, excepting 4 of these, whose bones were laid out on the floor of structure C21. A cemetery encroached-on by the sea, was also found to the north and east of the site. The deceased were in flexed or semi flexed positions, overlain with slabs, reminiscent of almost all the pre-ceramic sites from the Levant and Central and Eastern Anatolia (Figs. R05-3 & R05-5) (Honea K., 1975; Sampson A., 2005: 138, 2008: 211, 2010: 135-136, 2014: 193; Trantalidou K., 2014: 148); at Çayönü in Eastern Anatolia, during the PPNA there were also circular and oval structures with sub-floor burials in crouched positions as at Maroulas, as well as in pits in the open, again as at Maroulas (Sampson A., 2010: 134-135). These burials also find a close parallel with the Mesolithic burial at the site of Girmeler in South-West Anatolia. N. Poulianos (2008: 197) considered the slender morphology of the persons buried to be a characteristic of the "*Aegean type and clearly belong to Europeoids*", but he does not define 'Europeioids' nor the provenance of the 'Aegean type'; if we assume that a high proportion of the Neolithic population of Greece, which eventually colonised the Balkans, are descendants of the Near Eastern immigrants, then he is indirectly telling us that the Mesolithic colonisers at Maroulas came from the Near East. That recent analysis of strontium in the teeth of the cadavers indicates the likely provenance of the site occupants as being mainland Greece (Sampson A., 2010: 171), might appear contradictory, but the descendants of the initial migrants at Maroulas would have had to find partners from a wide network of contacts, so that the original genes of the migrants would have been substantially diluted over time;
- The lithic assemblage (Fig. R05-6), which comprises over 6000 pieces has been analysed by J. Kozlowski & M. Kaczanowska. Of the 156 tools, 90 are on local poor quality quartz, 56 (36%) on obsidian (presumed to be from Melos) and 10 on flint or other material, which K. Honea (1975) believes could have originated from Paros or Naxos. The debitage is dominated by flakes, with blades or bladelets being represented by 3 of obsidian and 1 of flint, and there are few projectile points with trapezes which differ from the Castelnovian, being manufactured on flakes Although the debitage has been compared to Ikaria, the Cave of Cyclops, Theopetra Cave and Franchthi Cave Phase VIII, detailed comparisons cannot be made with Franchthi Cave, since the ratio of common tools to microlithic truncations is 176:206 at Franchthi Cave, whereas at Maroulas it is 115:5. The Epigravettian tradition is seen in the backed implements and truncations, which is not representative of the Aegean, whereas the flake technology is. Stone grinders are also present. The lithic assemblage includes macro-choppers known only from the Near East which is also echoed in quern-stones and grinders (Kaczanowska M., *et al.*, 2008; Kozlowski J. K., 2007; Kozlowski J. K., & Kaczanowska M., 2009; Sampson A, *et al*., 2002).

Recent strontium analyses "*performed on a small sample of human teeth stemming from the burials in Maroulas, indicate that the origin of the residents was most likely located somewhere in mainland Greece, more particularly in Attica or southern Euboea*" (Sampson A., 2014: 204, quoting Nalplioti, 2010). Whilst not denying the findings, the dating of the skeletons is of prime importance, since over the occupation of the site, the breeding network must have covered an extended area in the

Aegean and the contiguous mainland, as well as possibly Southern Anatolia and the Levant, so that the signature of the original settlers could have been substantially diluted over time.

The evidence points to a Near Eastern provenance for the initial inhabitants of Maroulas sometime *ca*. 9000 BC. These navigators brought with them elements from the Near East which are considered to be part of the evolutionary process towards Neolithic lifeways, which their descendants retained during the occupation of the site with a high degree of conservatism (permanent structures, suids, burial practices, querns and grindstones). The settlers may have been involved in the trade in Melian obsidian, since they were clearly capable navigators, and a substantial component of the lithic assemblage is manufactured of that material. During the period of occupation, which appears to have lasted about three and a half millennia, and which may or may not have been discontinuous, there would have been plenty of time for the community to change and adapt, but there appears to be a conservatism as regards cultural evolution. Given the appearance of caprids in the faunal assemblage in the later periods, even if pottery is absent, there was probably direct or indirect contact with Neolithic Migrants in the Aegean Basin prior to the abandonment of the sites.

Melos (9) – A. Sampson (2014: 195) reports that a Mesolithic site has been found on the island. Other than that, no direct evidence of Palaeolithic, Mesolithic or Transitional occupation of this island has come to light, yet it was regularly visited, if not inhabited, during some six millennia between the date for the first evidence of Melian obsidian at Franchthi Cave and Sarakenos Cave in the Late Palaeolithic, and the end of the Mesolithic. The fact that the obsidian was discovered and transported from Melos to the mainland in the Late Palaeolithic is evidence for extensive and regular navigation across the Aegean Basin prior to the Holocene. The navigators, who transported the obsidian, or the first intermediaries, wherever they were situated, must have been competent knappers, because virtually all of the Melian obsidian found in pre-Mesolithic and Mesolithic assemblages appears to have arrived as finished pieces. It is possible that the site or sites occupied by the knappers on Melos are now below sea-level. It is also probable that the knowledge of the whereabouts of the sources of the obsidian was rapidly acquired by the Neolithic migrants or that through their contacts with the Initial Neolithic migrants, the navigators who exploited the obsidian acquired the new pressure-flaking knapping techniques on the island to obtain large regular blades.

Naxos (8) – A pre-Neolithic lithic industry has been found on this island (Kaczanowska M. & Kozlowski J. K. 2012; Sampson A., 2014: 195).

Ouriakos – This Early Mesolithic site on the island of Lemnos in the North-Eastern Aegean is treated with Region 3 (The Sea of Marmara).

Southern Balkans – The Aegean Islands – Initial and Early Neolithic sites – Introduction

We are not aware of any Early Neolithic sites on the Aegean Islands, excepting Agios Petros in the Northern Sporades (Region 7), with evidence for a possible Mesolithic substrate or with Mesolithic attributes. N. Efstratiou (2014: 185) states that "*the transition to the very beginning of farming in the Aegean islands (7000 to 6000 cal. BC) remains poor and problematic excepted for Crete where the Neolithic tell is still a unique record*".

Southern Balkans – The Aegean Islands – Conclusions

If we accept that Kythnos was colonised in the early 9th millennium BC by navigators who came from the Levant, Southern Anatolia or Cyprus, bringing suids with them, a new house-building technology, querns and grindstones and Anatolian or Levantine inhumation practices, then we have the first premises of the European Neolithic on this island almost two millennia before the arrival of

migrants bringing farming and animal husbandry to the Island of Crete, according to the current evidence.

Several Aegean Islands were colonised during the Mesolithic and the occupation of at least three of these continued into the Initial Neolithic, with archaeological evidence for this at the site of Maroulas on the Island of Kythnos, Youra in the Northern Sporades, and indirect evidence for the Island of Melos, since the trade in obsidian which flourished during the Mesolithic, expanded considerably in the Early Neolithic.

The lack of archaeological evidence on Melos for the Terminal Palaeolithic and the Mesolithic is a salutary lesson against assuming that a lack of archaeological evidence is evidence for the lack of human presence.

Region 6 – Southern Balkans – Crete

(Map R06)

Southern Balkans – Crete – Introduction

Prior to 2008, there was no general acknowledgement of a human presence on the Island of Crete before the supposed arrival of Neolithic migrants in the early 7th millennium BC, notwithstanding previous research which episodically suggested a prior presence (Strasser T., *et al*., 2010):

- V. Simonelli, reported in the late 19th century human skeletal remains consisting of cranial and postcranial fragments heavily cemented in a calcareous breccia. The breccia was dated by the Protactinium/Uranium method to 51k±12k BP;
- M. Franchet (1917) reported on two sites at Trypiti, 3 km east of Heraklion, discovered in 1912, with material which from the description could have been Mesolithic and/or Palaeolithic;
- J. Penlebury (1937) identified a tool found on the Neolithic and Bronze Ages site of Kastellos in the Lasithi Plain, as being Aurignacian;
- S. Kuss (1969) reported on two sites in the regions of Kalo Korafi and Grida-Avlaki on the north coast between Remithion and Heraklion, which were dated to the Middle Palaeolithic (with faunal remains of the extinct *Cervus cretensis*), although his findings were challenged by A. Sutcliffe and S. Kuss himself;
- Y. Tzedakis (1970) reported the discovery of worked bones of *Megalocerox cretensis* in Gerani Cave, 3, 9 km west of Rethymnon;
- K. Kopaka and C. Matzanas (2006) reported at the 10th International Cretological Conference the presence of Palaeolithic tools in situ on the island of Gavdos south of Crete dating back to all phases of the Middle and Late Palaeolithic.

The fact that the Late Pleistocene mega-fauna became extinct prior to the Aceramic Neolithic is indirect evidence for the prior ocuupation of the island (Sapaki A., 2009), and several surveys conducted in the 21st century have changed and are changing the perception that Crete was unoccupied prior to the arrival of the Neolithic colonisers:

- P. Mortensen (2008) reported the discovery of lithic artefacts near Loutró on the south coast of the island, dating back to the Middle Palaeolithic;
- K. Kopaka & C. Matzanas (2009) reported the existence of Palaeolithic tools dating back to the last interglacial of *ca.* 128-118 kya or earlier on the island of Gavdos, 40 km south of Crete. They also found a microlithic black flint trapezoidal transversal arrowhead made from a blade segment (Fig. R06-1) which has been typologically dated to the Final Mesolithic (8th to 7th millennia BC);
- T. Strasser *et al*., (2010), reported on the 2008-2009 survey of the Plakias and Agios Pavlov regions of South-West Crete, during which 9 Palaeolithic and 20 Mesolithic sites were identified, based on the typology, patination of the maturity of the soil (Fig. R06-2). As they state: "*in the absence of radiometric dates and the excavation of stratified deposits, the age of the microlithic industry is unknown. There are good arguments, however for assigning it to the Mesolithic (9,000-11,000 years ago) in the early Holocene*". The privileged sites for investigation during the survey were caves and rock-shelters near a water-source less than 5km from the present coast. None of the sites has been excavated or scientifically dated, and based on the information given there are at present no indices regarding the Transition;
- M. Galadinou (2011) reported the existence of a Mesolithic site in the region of Mount Kapsa in South-Eastern Crete.

The presence of these Middle Palaeolithic and Mesolithic assemblages, discovered since 2000, suggests navigation by Neanderthals *ca*. 130 kya, whether from North Africa, Anatolia or Greece, as well as by pre-Mesolithic and/or Mesolithic *Homo sapiens* hunter-gatherers.

Genetic research confirms that the Cretan Y haplogroup J2b-M410 is dominant and common with Southern Anatolia, whereas in the Peloponnese and Balkans, the dominant group is J2a-M12 (Kaczanowska M. & Kozlowski J. K., 2012; King R., *et al.*, 2010), suggesting a different provenance for the initial Neolithic colonisers of the Island of Crete as compared to Mainland Greece.

Southern Balkans – Crete – Mesolithic and Transition sites - Introduction

Recent surveys undertaken on the south coast of the island as well as on the small island of Gavdos, some 40 km to the south, have produced evidence of a Mesolithic presence. To date none of the sites has been excavated and there is no direct evidence to support a Transition.

Southern Balkans – Crete – Mesolithic and Transition sites – Site details

Gavdos (5) – A single find of a microlithic black flint trapezoidal transversal arrowhead made from a blade segment (Fig. R06-1), typologically dated to the Final Mesolithic (8^{th}-7^{th} millennium BC), suggests that this small island 46 km south of Crete was visited by Mesolithic hunter-gatherers (Kopaka K. & Matzanas C., 2009; Strasser T., *et al.*, 2010).

Mount Kapsa (4) – N. Galadinou (2011) has reported that a Mesolithic site has been discovered in the region of Mount Kapsa in South-Eastern Crete.

Plakias and Agios Pavlov Survey (2 and 3) – 20 potentially Mesolithic sites (as well as 9 Palaeolithic sites) have been reported subsequent to a survey conducted in the region between 2008-2009 (Fig. R06-2) (Strasser T., *et al.*, 2010). The region selected is one where the eustatic sea rise from approximately -40 m at the inception of the Holocene would have given rise to marine and freshwater wetlands to be exploited. Isostatic uplift and tectonic action, due to the collision of the North African and Eurasian plates, with the subduction of the North African one and warping of the Hellenic forearc, has created steep slopes with ever-changing shelters and caves with collapsing brows; the land is cut by gorges such as the Megas Potamos and the Preveli Gorge; marine terraces are marked by steps up the hillsides and the *terra rosa* is formed by a mixture of windblown aeolian clays from North Africa and local erosion (p. 152-154). Privileged sites for investigation were caves and rockshelters near a water source less than 5km from the sea, of reasonably easy access. None of the sites has been excavated or scientifically dated. The sites were discovered by surveying the ground in front of rockshelters and caves, as well as eroded land surfaces and land disturbed due to modern construction (essentially roads and parking lots).

Sites were defined by a minimum of 20 lithic artefacts of similar technological and typological characteristics. Only a representative sample of lithics was collected from each site, although some sites had less than 100 lithics, whilst the site of Schinaria 1 (Fig. R06-2a), consisted of thousands of artefacts. The lithics were surface finds and from careful examination for patination and abrasion were determined as being close to their original depositional context. The raw material is largely quartz, which fractures in an imprevisible manner, with some chert, so that the typology is an approximation at best. The Mesolithic sites have a high microlithic contents with a debitage similar to that of mainland Greece and Franchthi cave in particular, without using the microburin technique, with geometrics (which appear at the end of the Palaeolithic and continue into the Neolithic, although with a different toolkit) (Strasser T., *et al.*, 2010):

- Domani 1, 2 and 3;
- Ammoudi 1, 2;
- Ayios Pavlos 1, 2, 3;
- Schinaria 1, 2, 3, 4, 6;
- Preveli 1, 2, 3, 6, 8;

- Tineos Stavros 2, 3.

In discussing the sites, the authors state that "*In the absence of radiometric dates and the excavation of stratified deposits, the age of the microlithic industry is unknown. There are good arguments, however for assigning it to the Mesolithic (9,000-11,000 years ago) in the early Holocene*" (p. 171). The arguments range from typology, patination and maturity of soil. No obsidian artefacts have been reported, which suggests that the hunter-gatherers may not have been in contact with the navigators exploiting and distributing this material in the Aegean Basin.

Southern Balkans – Crete – Initial and Early Neolithic sites - Introduction

P. Tomkins (2008) has put together a periodisation of the Cretan Neolithic (Fig. R06-4).

C. Brookbank and T. Strasser (1991) point out that the minimum number of persons, animals and supplies to viably colonise the island, which is visible from Melos and Santorini, as well as the island chain stretching from southern Anatolia (Rhodos, Karpathos and Kasos), and therefore known to the exploiters and Melian obsidian, would weigh approximately 20 tons; needless to say, such a load need not necessarily have been transported in a single crossing.

The only Early Neolithic site adequately investigated, excavated and studied is that of Knossos.

Southern Balkans – Crete – Initial and Early Neolithic sites – Site details

Knossos (1) – This is the key site for the Initial Neolithic of the island, yet it is unlikely to be the earliest one. The open-air site is located over 5 km from the present-day coastline, which is visible from its Kefala hilltop location 85 masl, and which would have been about 2 km further out at the time of initial settlement. The Neolithic site, which is under the Central Court of the Minoan Palace excavated by Arthur Evans (Fig. R06-3), half way between the eastern and western extremities of the island, is to be found inland from the capital Heraklion. The Aceramic occupation covered 0.25 ha, by the end the Early Neolithic I the settlement extended over 2 ha, by the end of the Early Neolithic I it extended over 3 ha, and by the Late Neolithic 5 ha, and the current consensus is that the migrants originated from the Syro-Levantine area (Sarpaki A., 2009).

The Neolithic occupation was initially excavated by A. Evans prior to 1921 (Evans A., 1921: 32-55) when an aceramic basal stratum 30 cm thick known as Stratum X was discovered at the bottom of the 55 m^2 excavation. This stratum was again discovered by J. Evans who undertook 6 seasons of excavations between 1957-1961 and 1969-1970 in two small soundings (X and ZE), in which the aceramic level was almost 2 m thick (Sarpaki A., 2009). The economy was fully Neolithic from inception, with mud brick and stone wall structures, post-holes, domesticated plants and animals (100% of the fauna was domesticated with 75% ovicaprines; 18.5% suids and 6.5% bovines, plus canids), and stone axes. Seven child burials as well as 2 clay figurines were found within Stratum X and sherds were discovered near the top of the Stratum (C. Perlès, 2001: 68).

The ^{14}C dates (Kozlowski J. K. & Kaczanowska M., 2009; Perlès C., 2001), are given below. Commenting on them, C. Perlès notes that the first two come from the same source and that all three come from the same level 27 from Pit F, area AC of the Central Court. Because the first date was obtained by processing the sample with acetylene as against scintillation counting for the second, the latter should be retained, according to E. Bloedow. Seeds occasionally also give younger dates, since they are short-lived and can have carbon fixation problems:

- BM-124 8050±180BP = 7489-6589 (BC OxCal 4.2 at 95.3%), on carbonised wood stake, Level 27 / Stratum X, Pit F Area AC – Median 7040 BC.
- BM-278 7910±140BP = 7145-6471 BC (OxCal 4.2 at 94.7%), on carbonised wood stake, Level 27 / Stratum X, Pit F Area AC – Median 6810 BC.
- BM-436 7740±140BP = 7045-6374 BC (OxCal 4.2 at 95.4%), on carbonised seed near wood stake, Level 27 / Stratum X, Pit F Area AC – Median 6710 BC.

C. Perlès *et al.*, (2013) also mention a date from N. Efstratiou *et al*., (2004):

- OxA-9215 7965±60BP = 7050-6689 BC (OxCal 4.2 at 95.4%) – Median 6870 BC.

A further date from the basal Aceramic Level 39 from the 1997 excavations, which is several centuries younger than the basal level of Stratum X from the A. Evans excavation (Efstratiou N., 2014: 187) is:

- OxA-21418 7735±40BP = 6640-6480 BC (OxCal 4.2 at 95.4%) Level 39, 1997 exc. – Median 6560 BC.

The median date to be retained for the original establishment of Knossos, from the information presently available, is therefore probably no earlier than *ca*. 6900 BC, at the end of the PPNB. If, as we believe, the earliest Neolithic migrants arrived in Crete earlier than that date, they could possibly have arrived sometime between the end of the 8th and beginning of the 7th millennia BC, making them the earliest known fully Neolithic migrants to have arrived in Europe. Knossos and Franchthi Cave Phase IX/X are the only confirmed Aceramic sites known in Greece, if abstraction is made of the island sites of Maroulas (Region 5) and the Cave of Cyclops (Region 7).

The wheat found at this site is *Triticum aestivum*, which is not known in Thessaly, where the wheat types are *Triticum dicoccum* and *monococcum*, which strongly suggests different provenances for the Neolithic migrants (Perlès C., 2001: 62), and this is supported by the DNA studies (King R., *et al.*, 2008).

The latest excavations were undertaken in 1997 under N. Efstratiou, when a 6 m^2 trench 3 X 2 m was opened, in which 1.5 X 1.5 m went down to the bedrock at a depth of 8.5 m. 39 strata were identified (Fig. R06-3) and the excavations gave particular attention to the faunal and plant remains, confirming that the site was fully Neolithic from inception, with all four domesticated animals, plus dog, with evidence for short periods of occupation followed by abandonments, whilst there is no evidence for overexploitation, demographic or environmental stress. The forest was evergreen with fig trees and strawberry trees, so that the climate would have been similar to that currently prevailing. 14 new dates were obtained for the sequence, confirming that the dates obtained from the A. Evans excavations are the earliest ones available. Only 4 obsidian undiagnostic artefacts and a single flint flake were found for the Initial Neolithic and these confirm a flake-based industry, which has no Levantine parallel. When pottery appears, the clay has been obtained from different sources, suggesting other contemporaneous sites on the island (Efstratiou N., *et al.*, 2004), which could have been established at an earlier date.

Because the Basal Level 39 of the recent excavations is several centuries later than Stratum X from the A. Evans excavations, it is unlikely the assemblages can be compared.

C. Perlès (2001: 73), confirming the DNA results referred-to in the introduction, points out that the settlers at this site came from elsewhere than those in mainland Greece, as evidenced by the presence of *Triticum aestivum sp.*, which accounts for over 90% of the seeds, whereas this variety of wheat it is not present on the mainland sites; the lithic assemblage is also different to that of mainland sites east of the bay of Antalya, as is also the pottery assemblage.

The Aceramic Stratum X lithics (Fig. R06-3a) are made up of 376 artefacts of which 69.7% are on obsidian and 30.3% siliceous rocks, including radiolarite. The obsidian comes from two sources on Melos (Adamas and Demenegaki). Blades represent approximately 8%-10% and appear to be imported to the site. Only two objects could be interpreted as sickle inserts and might have migrated from later levels. In the Initial Neolithic levels two large obsidian blades, obtained by the pressure technique are probably imported, whereas in the Pottery Early Neolithic, this technique is used on site. In the Initial Neolithic, flakes, splintered pieces and denticulated notched tools predominate (Fig R06-3a) (Kaczanowska M. & Kozlowski J. K., 2012). The same authors (Kozlowski J. K., 2007; Kozlowski J. K. & Kaczanowska M., 2009; Kaczanowska M., *et al.*, 2008) point out the similarities with the earlier Aegean Mesolithic with marginal semi-steep retouches on blades, retouched flakes, the presence of arched backed pieces on flakes and blades, microlithic truncations, atypical trapezes on flakes and microblades on hypermicrolithic single platform cores; there are however no macro-tools and there are

fewer endscrapers and perforators. In Stratum IX, assigned to the Early Pottery Neolithic, there is continuity of the same technology and the occurrence of thick, arched backed pieces and trapezes on flakes. In the Middle Neolithic a regular blade technique appears, and the use of local siliceous rocks disappears. These authors and J. Conolly (2008) see much in common with Franchthi Cave Level X which is contemporaneous, as is possibly part of Level IX.

The interpretation of this site has fluctuated over time. It has never been in doubt that Crete was one of the first locations, if not the first, to be colonised by migrant farmers in the Aegean Basin, and that the colonisers came from regions to the east different from whence originated the later migrants who arrived on the mainland. M. Kaczanowska and J. K. Kozlowski (2012: 19) indicate that the Cretan Initial Neolithic is synchronous with the Late Phase of the Aceramic Blade Neolithic on Cyprus, and "*suggest that Crete owes its full Neolithic package: economy and elements of blade technique to contacts with the Near East via Cyprus. Blade technique can be seen first of all on blanks for the production of most arched backed pieces. Although layer X from Knossos is younger than the sites of the Aegean Mesolithic dated to the IXth millennium BC (Maroulas, Ikaria – Sampson et al. 2010), yet the tradition of flake technology (co-occurring with splintered technique) is apparent both at Knossos and in the flake industry from Nisi Beach on Cyprus. On these grounds we can claim a common littoral tradition of the Eastern Mediterranean foraging people. On this common sub-stratum were superimposed, at first, elements of the Neolithic package, subsequently elements of blade technology and the full Neolithic package. The basis of the diffusion of these traditions and cultural influences was seafaring practiced since the pre-Neolithic, which is confirmed by lithic raw material circulation, notably of obsidian, in the eastern part of the Mediterranean Sea Basin. In the present state of investigations a parallel evolution cannot be ruled out wherein coastal foraging and early agro-pastoralism would have constituted "alternative and complementary ways of life" – as A. Ammerman (2010a) proposes*".

It is now also becoming clear that Knossos is unlikely to be a site set up by an original migrant group and that there are other sites as-yet undiscovered on Crete (Tomkins P. D., 2008), and as N. Efstratiou *et al*. (2004: 48) have pointed out, the site is likely to be part of a process of short-distance relocations to or within the island, and not an isolated and unique example of sea-borne Aegean migration as suggested by Broodbank and Strasser (1991). The evidence for this is:

- The exploitation of two obsidian sources from Melos;
- The evidence for short periods of occupation followed by abandonments, whilst there is no evidence for environmental stress (overexploitation, demographic);
- When pottery appears, the clay has been obtained from different sources, suggesting other contemporaneous sites on the island.

Because of the varying stratigraphic depths of the basal layers in the various excavation pits, coupled to major differences in dates, it could be that the perceived hiatuses in the settlement are in fact relocations of the inhabitants to different parts of the site and/or extensions to the site consequent on demographic growth over time, and/or reconstruction of the settlement in a more salubrious location.

To this can be added the evidence from the lithic technology, which points to a possible provenance in the region of the Bay of Antalya where the lithics bear comparison with Franchthi, the Aegean Islands Mesolithic and those from this site. Contacts with, and the possible incorporation of Mesolithic inhabitants of the Island of Crete, from other islands or the Greek mainland in the settlement cannot be excluded, since these might well have been attracted by the availability of meat protein, which at best would have been scarce on the island, agricultural products and other Neolithic attributes. The breeding network requirements might also have come into play for the mixing and eventual merging of the Neolithic and Mesolithic communities.

<u>Southern Balkans – Crete – Conclusions</u>

There is increasing depth to the data from Crete for the Early Holocene, mainly as regards the Mesolithic occupation of the island. On the basis of the evidence from Knossos, it is likely that earlier Neolithic sites exist and/or existed (if underwater) on the island. The Aegean and/or Cretan Mesolithic tradition in the lithic technology (unless it is that from the region from which the migrants originated) permits us to surmise that elements of the indigenous population joined up with the Neolithic migrants. The pre-Neolithic exploitation of and trade in Melian obsidian, which had been going on for millennia, clearly reached Knossos where it is the dominant raw material, whether carried by Initial Neolithic or Mesolithic navigators, confirming maritime contacts throughout the Aegean, so that close contacts must have existed between the indigenous Terminal Mesolithic population of the Aegean Basin and the early Neolithic migrants, facilitating exchange and acculturation in a landscape that does not appear to have been highly populated.

If a pre-Neolithic presence is being rapidly brought to light on Crete, it is at present limited to the south coast of the island, and even if there appears not to have been much large game on Crete, there is no reason why the Mesolithic population should have eschewed the north coast, particularly since some of the earliest attestations of a Palaeolithic presence were discovered there.

The location of Knossos, 7-8 kilometres inland when established on a low hill, suggests that other sites, possibly earlier, established on coastal or near-coastal locations have disappeared underground, buried under post-Neolithic alluvial deposits, or lost to the sea subsequent to the eustatic sea-rise of approximately 30 m since 7000 BC, as well as possible tectonic activities, since the eastern end of the island is known to have sunk by several metres, whilst the western end and central part have been uplifted in the past 2000 years.

The Anatolian provenance of the Neolithic migrants at Knossos cannot be in doubt, at a date several centuries earlier than the first known migrants to Thessaly, bringing with them a full Neolithic farming package comprising agriculture and animal husbandry. At present the evidence for the Initial Neolithic on the island is restricted, and it is impossible to determine whether it was the Neolithic navigators who went to fetch the Melian obsidian, or whether this was carried to the island by Mesolithic navigators. Contact between the new colonisers and the Mesolithic population of the Aegean Region is probably attested through the lithic technology, and this would not be surprising given that the Mesolithic of the Aegean most probably derived, at least in part, from the Bay of Antalya region of Anatolia.

Region 7 – Southern Balkans – Eastern Greece and the Sporades Islands

(Map R07)

Southern Balkans – Eastern Greece and the Sporades Islands – General introduction

This Region includes mainland Greece north of the Gulf of Corinth and east of the Pindus Mountains. It includes the Greek administrative regions of Attica, Central Greece, Thessaly, Western Greece, Central Macedonia and Eastern Macedonia, but excludes Greek Thrace, even if little evidence for Mesolithic or Transition sites has been found there. Geographically it includes the Kopais Basin, which contained a large lake, now drained, and Thessaly, which is made up of two interconnected alluvial plains surrounded by mountains, which also contained a lake, now largely drained or dried out. The northern part of the Region lies to the east of the Pindus Mountains and south of the borders with the Republic of Macedonia and Bulgaria where the border follows the Rhodope Mountain Range.

The Northern Sporades are included in this section because of the proximity of this island chain to the coast at the southern end of Thessaly. These islands spread in a northward stretching arc, some 90 km long, into the Aegean from the south-eastern tip of the Magnesia Peninsula, in South-Eastern Thessaly, on the north side of the Trikeri Straits which give access to the Gulf of Pagasai, also known as the Gulf of Volos. During the LGM, the first four islands of the group, Skiathos, Skopelos, Alonnessos/Alonessos/Alonissos and Peristera would have formed a promontory attached to the mainland. The next two islands of Kyra Panagia/Pelagonisi and Youra/Gioura would always have been separated by a strait, and during the LGM these two islands, with Psathoura, would have formed a single island over 30 km long and up to 8 km wide. (Sampson A., 2008). The indications are that the Northern Sporades formed part of an extensive communications and exchange network from Palaeolithic times, in which navigation was an important component.

Megara, which connects the Greek mainland to the Peloponnese, has been included in Region 8.

Several surveys have been conducted in the Region:

- The Euboea Prehistoric Survey was conducted between 1961 and 1965 without producing any evidence for the Mesolithic;
- A. Sampson conducted surveys on the Northern Sporades island chain, and discovered Palaeolithic material on the islet of Psathoura, 8 km north of Youra, on the islet of Gramiza and related islets between Kyra Panagia and Youra, as well as on Kyra Panagia (Efstratiou N., 1985; Sampson A., 2008). Mesolithic scatters were found on the islet of Sfika, at the northern end of Kyra Panagia, to which it would have been attached at the time, whilst the most important site with a stratigraphy covering the Mesolithic and the Neolithic is the Cave of Cyclops on the island of Youra. There are numerous sites with Neolithic remains on the islands; the most important of these sites is Agios Petros, now partly submerged, excavated initially by D. Theocharis between 1969-1971 and subsequently by N. Efstratiou in 1981 (Efstratiou N., 1985). There are also several caves now underwater which could have been used during the Palaeolithic and Mesolithic on Kyra Panagia and Youra (Efstratiou N., 2000; Sampson A., 1998). The peninsula and island group has thus been the continuous subject of occupation and maritime contact since the Palaeolithic. The islets on which evidence for occupation was found would have been substantially larger at the time of occupation, and several of them joined together to form larger islands. During the Early Holocene, the vegetation would have become abundant, with *Cervus elaphus*, which could have swum to Kyra-Panagia and Youra, or, given the small MNI, have been brought to the island as carcass meat. The appearance of suids on Youra in the Early Mesolithic poses an interesting problem, since they are not evidenced previously, and they were possibly imported by the local hunter-gatherers and left to fend for themselves, as a source of meat protein to be hunted as required. Later in the Mesolithic, caprids

(*Capra aegagrus*) also appear, and being more adapted to surviving on sparse vegetation, eventually replaced the suids (Sampson A., 2008). A parallel to this practice has been found on the island of Kythnos (Region 5), where wild boar were imported, and Cyprus, where a raft of large herbivores, some domesticated, some wild and some in the process of domestication were transported from the 9th millennium BC from the Near East (Vigne J.-D., *et al*., 2005; Vigne J.-D., 2009).

Southern Balkans – Eastern Greece and the Sporades Islands – Mesolithic and Transition sites – Introduction

C. Runnels and T. Van Andel conducted a survey in Eastern Thessaly in 1987, 1989, and 1991, during which they failed to find any late Pleistocene or early Holocene sites. The field work proved to them that there was something like a 25000 year hiatus between the end of the Palaeolithic occupation and the beginning of the Neolithic in the region (Runnels C., *et al*., 1999). J. Makkay (2000: 30) has suggested that the Initial advance of the Neolithic in the Southern Balkans proceeded mainly in areas not occupied by indigenous Mesolithic populations, whilst further west and north such populations existed. This might be explained by the respective choice of terrains, with the Mesolithic people preferring Pleistocene terraces and fan soils. These assertions have been in part contradicted by the subsequent discovery of the stratified deposits at Theopetra Cave, and to a lesser extent by the occupation of Sarakenos Cave in Boeotia, as well as by the sites on the islands of the Northern Sporades (Fig. R07-1), although the Mesolithic island populations may have arrived from Southern Anatolia. It should also be noted that there has been substantial sedimentation in the region of the survey since the Mesolithic, so that the discovery of open-air Mesolithic sites, which are almost invariable unstratified, has to be a chance affair.

Southern Balkans – Eastern Greece and the Sporades Islands – Mesolithic and Transition sites – Sites details

Alonnisos Island (24) – A. Sampson discovered an Early Mesolithic knapping station surface scatter on this island in the Northern Sporades and subsequently discovered several other lithic scatters (Fig. R07-1).

Anonymous Cave of Schisto (27) – This cave, near Keratsini in Attica, is 259 masl with extensive views over the surrounding land and out to sea (Fig. R07-2). It became the subject of limited excavations in 2000 subsequent to the discovery of illicit diggings, and new excavations began in 2006 which are ongoing, so that the findings are preliminary, as reported by Mavridis F., *et al.*, (2013).

Four 14C dates have been obtained which point to episodic occupation, from the Late Pleistocene into the Neolithic:

- DEM-1701 9978±100BP = 9877-9264 BC (OxCal 4.2 at 93.9%), on XXX – Median 9570 BC.
- OxA-19113 8856±39BP = 8218-7821 BC (OxCal 4.2 at 95.4%), on XXX – Median 8020 BC.
- DEM-1822 7895±55BP = 7030-6641 BC (OxCal 4.2 at 95.4%), on XXX – Median 6835 BC or 6755 BC at 69%.
- DEM-1961 7076±75BP = 6075-5775 BC (OxCal 4.2 at 95.4%), on XXX – Median 5925 BC.

The lithics on unprepared cores is flake-based with some blades. Flint, radiolarite, quartz and obsidian are present. No microlithic tools are reported, but the results of floatation are not available. The material is Late Pleistocene and Early Holocene, with similar characteristics to that found in the Cave of Cyclops, Klisoura Cave 1, Franchthi Cave, Theopetra Cave and Sidari.

A date on obsidian using the SIMS-SS method gives a date between 12-19kya BC, comforting the theory of Aegean-wide trade in obsidian from the Late Palaeolithic.

In trenches 1 and 2, Layer 4 is subdivided into strata 6 to 14. The fauna through the median date of 6835/6755 BC is all wild, with a preponderance of equids (*Equus hydruntinus*), which appear to be present into the beginning of the Holocene, when precipitation allowed a broad-leafed forest environment to develop, and the appearance of cervids and lagomorphs. The assemblage is disturbed, but domesticated species (mostly ovicaprines with some bovines and suids) appears to be most prevalent in Strata 6-7.

During the Late Pleistocene, wild barley and wild oats appear to have been collected as well as pulses (vetches, vetchling, peas and lentils) and fruits (juniper, fig, grape, cornelian cherry, elder and pistacia).

The faunal remains are very fragmented and include mostly, as indicated above, *Equus hydruntinus*, *Cervus elaphus* and *Lepus europeus*. Although there is stratigraphic continuity after the Mesolithic, there is temporal hiatus before the site is reoccupied in the later Neolithic, when domesticated fauna is present (Trantalidou K., 2014:145).

Pottery appears to be only evidenced from the Middle Neolithic, so that it is possible the cave was abandoned over the Transition and Early Neolithic.

The cave appears to have been used episodically over more than 4000 years from the Pleistocene-Holocene Transition into the Neolithic and beyond, and could throw light on the Transition as the excavations progress. As the authors state (p. 261), "*the date and the contents of these layers are potentially important for the poorly attested and understood transition to the Neolithic period in the Aegean*".

Cave of Cyclops (21) – This cave site on the south-west side of the island of Youra/Gioura in the Northern Sporades would always have required a sea passage to reach it. The west-northwest facing entrance to the cave is today 150 masl up a steep incline (Fig. R07-3). The large almost circular interior chamber is the only damp cave in the Northern Sporades island group and it additionally contains fresh water. According to A. Sampson (2010, 2014), who excavated the site between 1992-1995, the cave was seasonally occupied from the 9th to the 7th millennium and into the Neolithic, when fishing took place. A. Sampson (2010) also indicates that other caves on the island, which would always have required a sea passage, contain evidence of use in the Mesolithic and that there are several caves 20-30 mbsl, which could also have been occupied in the Mesolithic (but not in the Transition).

The lithic technology is flake-based using a hard hammer-stone with minimal core preparation, and splintered pieces dominate (Fig. R07-4), with the Early Mesolithic levels producing 48 flint and 3 obsidian implements, whilst the Later Mesolithic produced 116 flint and 12 obsidian implements. The microliths show affinities with Franchthi Cave as well as with the Mesolithic sites in the Bay of Antalya. The obsidian is however blade-based on carefully prepared cores suggesting they were acquired already knapped from traders in the Aegean with other lithic traditions. The obsidian tools from the Mesolithic levels are similar to those from the Early to Late Neolithic levels, with trapezes and segments which are echoed at Neolithic sites at Agios Petros on Kyra Panagia, Emporio, Chios, and Kitsos Cave on the mainland (Kozlowski J. K. & Kaczanowska M. 2009; Sampson A. 2010).

There are rare remains of *Cervus Elaphus* in the lowest levels, and Suids were imported to the island during the early occupation of the site in the late 9th millennium BC and caprines a little later, possibly at the beginning of the 8th millennium BC (Kaczanowska M., *et al.*, 2008; Mylona D., 2011: 91-92; Trantalidou K., 2003, 2014). A few sheep were also present in the topmost levels (Sampson A., 2014: 198 quoting Trantalidou (2003, 2011); Trantalidou K., 2014:151), suggesting contact with the Thessalian Early Neolithic, and A. Sampson (2014: 198) states that "*the clear stratigraphy of the site indicates the presence of herding and farming similar to the Neolithic*" (Fig. R07-3a). Since, on the basis of current evidence, the domestication of the pig is first attested around the 10th millennium BC in the Zagros mountains in the Near East, we could be dealing with partially domesticated wild boar, and at best, the conscious culling of an animal species at liberty. There is evidence for the transport of wild boar by pre-Neolithic groups to the Island of Kythnos and outside of my region, to Cyprus,

Ireland, Okinawa and the Izu islands, in what P. Rowley-Conwy and R. Layton (2011: 852) call 'niche enhancement' strategies. Their size is relatively small (Trantalidou K., 2014: 152-154), suggesting food stress, island nanism, or human selection. The first attestation for the domestication of goat dates from the second half of the 9th millennium BC in the Near East, so that domesticated goats or goats in the process of domestication could have been imported when they first appear in the archaeological record early in the 8th millennium. Since neither species is endemic to the Greek mainland, the conclusion must be drawn that they were imported from Anatolia, Cyprus or The Levant, whether domesticated, in the process of domestication or wild, and consequently that the Mesolithic population that occupied the Cave of Cyclops would have been migrant navigators from the same region, with the Bay of Antalya being a possibility, since fishing is attested there, and there are similarities between the lithic assemblages.

During the Early Mesolithic the vegetation was dominated by herbaceous plants as found in cool and dry climates, whilst in the Late Mesolithic, the herbaceous element is reduced and a mixed woodland developed with pine, oak and 8 other taxa (Ioakim C., 2011: 294). Whilst few vegetable remains survived in the cave, seeds of *Pistacia ssp*. And *Celtis ssp*. (hackberry), suggest that these fruits were collected (Sarpaki A., 2011).

D. Mylona (2003, 2011) has suggested that subsequent to the breaching of the Dardanelles, the fresh water inflow into the Aegean led to lower salinity and increased fish populations, and J. Powell (2011: 174-175), who analyses the Ichtifaunal remains, indicates that sea bream (*Sparidae*) are the dominant species with some tuna also present, and that their capture would have involved seafaring. The large quantities of fish remains analysed by D. Mylona (2003) appear to indicate that fatty fish (e.g. mackerel, tuna, mullet) were probably smoked and dried (possibly salted as well), whilst the less fatty varieties (e.g. groupers, sea bream) were salted and dried in the wind and sun. The salt could have been collected from rock pools and the cool atmosphere in the cave could have facilitated preservation for the one to two years that well smoked fish can last. The preserved fish could also have constituted a product for barter and exchange. There is a reduction in the volume of fish remains in the Neolithic as well as that of marine shellfish, suggesting reduced exploitation of this food-source (Sampson A., 2008). The 21 Mesolithic fish hooks, most of which come from recent Mesolithic levels, do not differ from the 11 found in Neolithic levels, and the same is true for the double-pointed bone implements, which could be composite fish-hooks, 32 of which belong to the Mesolithic and 8 to the Neolithic; many are made on cervid bones, although few remains have been uncovered of this species, and several manufacturing techniques that have been identified, without any of them being specific to any particular period (Moundra-Agrafioti A., 2003). The four fish hooks found at each of Franchthi and Nea Nikomedeia, as well as those found at Soufli Magoula show different manufacturing techniques (Moundra-Agrafioti A., 2003; N. Efstratiou, 2011: pers. com.), so that their presence is not necessarily indicative of contact and/or exchange. Fish hooks found in levels containing pottery have been dated (Sampson A., 2008: 204), and suggest either Late Mesolithic or Transition dates, without eliminating the possibility of contamination due to disturbance. The fact that there was continuation of fishing and fishing techniques through the Transition into the Neolithic is however evidence of cultural and subsistence continuity and that descendants of the Mesolithic occupants with prior knowledge continued to use the cave.

Human remains include a Middle Mesolithic cranial vault of a 65-70 year old woman, and sparse remains of 9 other individuals, 6 of which date from the Upper Mesolithic, 1 from the Final Mesolithic, 1 from the Early/Middle Neolithic and 1 from the Final Neolithic, with all age groups represented (Poulianos N., 2008). These human remains suggest regular and long-term or seasonal occupation of the site.

The EN pottery is red monochrome, burnished, ROW and WOR, and the same fabric is found on coarse as well a fine ware (Papakosta K., 2011: 342). The imported pottery is coarse ware as well as fine ware, but the more sophisticated pottery is local. The earliest pottery is dated ca. 6350 BC and

is coarse ware, but well fired. The earliest painted ware at the Cave of Cyclops is similar to that found in Thessaly as well as that from Agios Petros (Sampson A., 2008: 30-31).

The cave site excavations took place in 3 distinct areas, with trench E at the entrance, Trenches B, C East and C West close to the right hand wall near the entrance and Trenches A and D in the centre of the cave (Figs. R07-3 & R07-3a) (A. Sampson, 2008):

- Trenches A and D in the centre of the cave yielded Neolithic and later material;
- Trench B, close to the entrance, had relatively horizontal archaeological levels. Level 6 in grid squares 3 and 4 appears to contain Transition material mixed with Mesolithic material, with Mesolithic strata continues through levels 7 to 9 (pig bones, abundant fish bones and 2 fish hooks);
- Trench C, divided into C East and C West (Fig. R07-4), is next to trench B. The Transition and Mesolithic levels found were extremely complex due to probable human-induced stratigraphic mixing and post-depositional pedogenetic changes which caused the stratigraphy to become steeply inclined and possibly mixed. Levels 14-17 in C East correspond to the Upper Mesolithic, and in C West Levels 9-11, with dates in the region of 7500-7000 BC. The excavations were conducted by means of arbitrary horizontal 'Layers' of 10-20 cm, in which the archaeological 'Levels' were tracked. Level 14, in triangle 5, at a depth of 2.2m, yielded Early Neolithic pottery in close proximity to a Mesolithic layer;
- Trench E, at the entrance, produced a possible Transition Level in Level 2, although the pottery sherds are described as Middle Neolithic. The next level is Mesolithic, down to the bedrock;
- Trench F in the great hall produced a little Neolithic material, but nothing earlier.

The lithics, mostly excavated from Trench C have been reported on by A. Sampson (1998, 2003, 2005, 2008) (Fig. R07-3):

- 164 Flint and chert pieces (91.6%) were excavated for the Mesolithic, of which 37 tools and 9 blades (Fig. R07-4). There are no geometric microliths made of this material in either the Mesolithic or the Early/Middle Neolithic, when there are only 2 pieces. Flint appears to have been processed on-site from decortication. Backed pieces appear in the upper part of the sequence (trench C level 10) when obsidian tools become present (*ca.*7315-7085 BC). Analogies do not exist on the western seaboard of Anatolia, but the Argolid has a flake industry with very few blades and bladelets and no large backed pieces (Franchthi Phases VII and VIII, and Layers 3-5a from Cave 1 in Klisoura Gorge); Theopetra Cave is the only site in North-Eastern Greece with large backed pieces from the 8th millennium BC (possible contamination from Early Neolithic levels with macro-blade industries?). In the Early Neolithic (*ca.* 6340-6170 BC) siliceous stone virtually disappears (15 pieces, of which 2 tools, one of which is a sickle blade, possibly from western Bulgaria, and another quartzite blade typical of the Early Balkan Neolithic), to be replaced by obsidian;
- The obsidian is from Melos (Fig. R07-4), and appears from the Late Mesolithic with 15 (8.4%) pieces, of which 8 are tools (3 crescents, 1 trapeze on a backed blade, 1 retouched blade, 2 truncations and 1 denticulated tool) and 4 blades. The pieces appear to have arrived ready-processed, and the shapes continue unchanged during all the Early/Middle Neolithic with 27 pieces (6 crescents, 1 trapeze with three retouched sides, 3 scalene triangles, 2 truncations somewhat similar to the eastern Balkans Early Neolithic, 3 retouched blades with analogues in the Early Neolithic of eastern Greece, 2 burins, 9 splintered pieces and 1 notched tool). In the Early/Middle Neolithic, obsidian becomes the dominant raw material, with 25 blades (many as fragments) and 27 tools. We can again perceive cultural continuity through the Transition into the Early Neolithic.

This is the only instance – so far – of microliths in the late Mesolithic on an island in the Aegean basin, for which parallels can be found at Öküzini Cave and Belbidi Cave in the Antalya region of South-West Anatolia. At Öküzini Cave, levels 1a2 (9th millennium BC) and 1b2 (8th millennium BC) yielded a similar set of microliths to those found at the Cave of Cyclops.

The ^{14}C dates which concern us are given below (Sampson A., 2008), which I have recalibrated using OxCal 4.2. In the 2011 publication on the site, Y. Facorellis (2011) published the corrections for the WRE on *Patella* shells which I have shown as an extension of the information, correcting inconsistencies:

- DEM-415 8834±20 BP = 8003-7812 BC (OxCal 4.2 at 67.2%), on *Helix cincta*, CEast level 14, rect. 1 UM. Facorellis accepts this date – Median 7910 BC.
- DEM-416 8864±37 BP = 8218-7908 BC (OxCal 4.2 at 87%), on *Patella*, CEast level 14, rect.1 UM. Corrected for WRE to 7545-7280 BC (Facorellis Y., 2011) – Median 7415 BC.
- DEM-524 8791±23 BP = 7956-7751 BC (OxCal 4.2 at 95.4%), on charcoal, CEast level 20, rect. 5 LM – Median 7855 BC.
- DEM-435 8776±19 BP = 7944-7744 BC (OxCal 4.2 at 95.4%), on *Patella*, CWest level 11, rect. 4. Corrected for WRE to 7464-7170 BC (Facorellis Y., 2011) – Median 7315 BC.
- DEM-547 8761±29 BP = 7953-7704 BC (OxCal 4.2 at 92.9%), on *Patella*, CEast level 15, rect. 5. Corrected for WRE to 7459-7138 BC (Facorellis Y., 2011) – Median 7300 BC.
- DEM-430 8754±20 BP = 7940-7706 BC (OxCal 4.2 at 93.4%), on *Helix cincta*, CWest level 9, rect. 5 UM – Median 7823 BC.
- DEM-431 8624±20 BP = 7974-7586 BC (OxCal 4.2 at 95.4%), on *Patella*, CWest level 9, rect. 5 UM). Corrected for WRE to 7293-7018 BC (Facorellis Y., 2011) – Median 7155 BC.
- DEM-580 8283±27 BP = 7459-7249 BC (OxCal 4.2 at 85.2%), on charcoal, CEast level 17, rect. 5 UM – Median 7355 BC.
- DEM-368 8218±43 BP = 7356-7077 BC (OxCal 4.2 at 95.1%), on *Patella*, CWest level 8, rect. 3-4 UM. Corrected for WRE to 6725-6452 BC (Facorellis Y., 2011) – Median 6590 BC.
- DEM-595 8209±57 BP = 7363-7067 BC (OxCal 4.2 at 91.9%), on charcoal, CWest level 10, rect. 1-2 UM) – Median 7215 BC.
- DEM-370 7971±41 BP = 7047-6747 BC (OxCal 4.2 at 91.6%), on *Patella*, CWest level 6, rect. 1-4 FM/EN. Corrected for WRE to 6443-6199 BC (Facorellis Y., 2011) – Median 6320 BC.
- DEM 369 7803±41 BP = 6701-6505 BC (OxCal 4.2 at 94.2%), on *Patella*, CWest level 7, rect. 1-4 FM/EN. Corrected for WRE to 6298-6008 BC (Facorellis Y., 2011) – Median 6155 BC.
- DEM-636 7779±32 BP = 6660-6506 BC (OxCal 4.2 at 95.4%), on charcoal, CEast level 15, rect. 6 – Median 6585 BC.
- DEM-393 7398±64 BP = 6418-6200 BC (OxCal 4.2 at 81.8%), on ash charcoal, CWest level 6, rect. 1-4. – Median 6310 BC.
- DEM-594 7351±46 BP = 6274-6080 BC (OxCal 4.2 at 78.5%), on charcoal, CWest level 8, rect. 5-6 FM/EN – Median 6175 BC.

  Gap of *ca*. 300-450 years.
- DEM-266 6837±40 BP = 5802-5641 BC (OxCal 4.2 at 95.4%), on charcoal, B level 4, rect. 4 – Median 5720 BC.

  Gap of *ca.* 350-600 years.
- DEM 525 6754±34 BP = 5718-5623 BC (OxCal 4.2 at 95.4%), on *Patella*, CEast level 14, rect. 9 LN. Corrected for WRE to 5294-5011 BC (Facorellis Y., 2011) – Median 5150 BC.
- DEM-345 6730±38 BP = 5716-5612 BC (OxCal 4.2 at 88.2%), on *Patella*, CWest level 5, rect. 1-4 LN). Corrected for WRE to 5281-4983 BC (Facorellis Y., 2011) – Median 5132 BC.

The dearth of dates (or evidence of occupation) for the end of the 7th and early 6th millennia, might be due to the unfavourable effects of the '6200 BC event'.

Pigs and goats when coupled to the lithic tradition, the maritime trade in obsidian and the suids on the Island of Kythnos, points to the colonisation of the Northern Sporades in the Early Mesolithic by navigators arriving from one of the primary areas of neolithisation in Southern Anatolia, Cyprus or the Levant and that these colonisers maintained contact with their region of provenance.

Taking into consideration fauna, the date of initial occupation of the cave *ca*. 8000 BC, fishing, and the characteristics of the lithic assemblage, it is quite possible that the Mesolithic population that

used the Cave of Cyclops originated from Anatolia, where caves were also extensively occupied. The evidence from the Mesolithic site of Maroulas on the island of Kythnos serves to strengthen this hypothesis, as does the Mesolithic occupation of the island of Ikaria. The occupants of the cave, who must have been capable seafarers, would have necessarily been in contact with the immigrant Neolithic population of Thessaly, since the Northern Sporades are on the sea route across the Aegean to the Gulf of Pagasai, and the Neolithic migrants were avid users of Melian obsidian; this is confirmed by the presence of sheep in the topmost levels inside the cave. From the migrants in Thessaly they could have learned potting skills as well as farming and animal husbandry through contact and/or partner exchange. The continued use of the cave in the Neolithic and the close connection between the Neolithic site of Agios Petros, established in the early 6th millennium BC (Sampson A., 2008: 82), and the Cave of Cyclops, attested by the very particular canvas/weaving/fish-net design decorated pottery found at the two locations, is also indicative of an autochthonous population that has been neolithised and capable of individual cultural development and expression, although M. Özdoğan (1999: 214), sees elements of the Marmara region Fikirtepe Culture in some of the pottery.

Grevena (9) – This is a survey area at the watershed between Epirus and Greek Macedonia, reported on by N. Efstratiou *et al.* (2006), where numerous lithic scatters were found, with the highest density near the village of Samarina (Fig. R07-5). Many of the scatters have been typologically dated to the Upper Palaeolithic, some to the Late Palaeolithic and/or Mesolithic; "*their passage, and most probably summer settling, is indicated by the occurrence of hypermicrobladelet and hypermicroflake cores of different types, obtained from different varieties of exogenous flint collected from several sites, and also by a few fragmented bladelets and one isosceles trapeze, which might be attributed to the (Late) Mesolithic*" (p. 422), After which there appears to be a gap until the Late Neolithic, possibly with the advent of pastoralism (p. 431). The 3 test excavations and ^{14}C dates from Samarina 8, suggest that the earlier artefacts are redeposited. The reforestation might have made the area less attractive for hunting during the Holocene, whereas the open grassland and watering springs made good grazing for large herbivores in previous oscillations, when the climate was not too severe in this ecological niche.

Langada (1) – Possible Mesolithic scatter north of a lake to the north-east of Thessalonika (Sampson A., 2010: 170 quoting Kotsakis K., 2000: 175).

Sarakenos Cave (26) – This cave site, at the eastern end of Lake Kopais (Fig. R07-6), was occupied from the Palaeolithic to the Bronze Age, although not consistently, and like many caves, has been used by shepherds in historical times (Fig. R07-7a). The site was originally excavated by T. Spyropoulos in the 1970s, but never published, and again by A. Sampson between 1994-2000 and 2004-2008. The cave has a wide opening, is large, spacious and relatively dry, situated some 180 masl and 100m above the Lake Kopais Basin, over which it has a dominant view (Fig. R07-7a). Direct access to the cave is relatively difficult, and a traverse would have been required to reach it to circumvent the precipitous lower rock-face, although there are now steps up this part of the ascent, which were constructed for the excavations. There are tens of caves in the region within the calcareous formations of Jurassic or Cretaceous age, most of which are at lower levels, and most have been investigated as part of a systematic survey under A Sampson in the 1990s (Fig. R07-6). He reports that some of these caves contained evidence of Neolithic occupation, but there are no reports of test digs to determine whether the Neolithic levels superimpose Mesolithic ones. Given the elevation and relative difficulty of access to Sarakenos Cave, it is possible that the Initial Neolithic occupation was the result of prior knowledge, and could be interpreted as having been used by acculturated descendants or descendants of mixed parentage.

Whilst the surface inside the cave now appears to be relatively flat (abstraction made of the excavation pits), the stratigraphy is complex (Fig. R07-7. The correlation between the strata of the various trenched where there is evidence for the Final Mesolithic and the Early Neolithic is a little

confusing in the two interim reports, where the findings from trenches A, A Extension, B, B Extension, C and D are reported (A. Sampson, 2008; A. Sampson, *et al*., 2009):

- In Trenches A and C the Neolithic levels start on the bedrock;
- Trench A Extension extends below Trench A into the Mesolithic;
- Trench B Layers 24 and 25 are designated as Mesolithic, and sandwiched between Palaeolithic and Middle Neolithic levels;
- Trench B Extension Layers 6 to 9 are designated Mesolithic-Middle Neolithic, and Layer 10 Mesolithic, and again sandwiched between Palaeolithic and Middle Neolithic levels. Fig. 16 (Fig. R07-07) however shows an Early Neolithic Stratum above the Mesolithic Stratum, which does not appear to be consistent with the narrative;
- Trench D has not yet been the subject of a report but is known to extend into the Mesolithic.

The ^{14}C calibrated dates reported by Y. Facorellis (2011), which are all from Trench B Extension, are a little inconsistent from those reported by A. Sampson (2008) below, but not sufficiently to impact the findings:

- DEM-1206 9233±30BP = 8554-8329 BC (OxCal 4.2 at 95.4%), Layer B7 Ext. on charcoal from same hearth as DEM-1210 (p. 51) – Median 8440 BC.
- DEM-1210 9230±30BP = 8551-8327 BC (OxCal 4.2 at 95.4%), Layer B7 Ext. on charcoal from same hearth as DEM-1206 (p. 51) – Median 8440 BC.
- DEM-1207 8057±36BP = 7084-6907 BC (OxCal 4.2 at 75.6%), Layer B7 Ext. on charcoal – Median 6995 BC.
- DEM-1208 8073±30BP = 7141-7025 BC (OxCal 4.2 at 88.1%), Layer B8 Ext. on charcoal – Median 7085 BC.
- DEM-1209 9177±31BP = 8474-8294 BC (OxCal 4.2 at 94.7%), Layer B9 Ext. – Median 8385 BC.
- DEM-1211 7261±20BP = 6212-6066 BC (OxCal 4.2 at 95.4%), Layer B9 Ext. on charcoal. Earliest date for Early Neolithic (p. 47) – Median 6140 BC.

A. Sampson (2009: 213) states that the last date is indicated as coming from a thin layer of the Early Neolithic in Trench B. This Trench B attribution makes sense, since the Layers of Trench B Extension are numbered sequentially from the top the bottom, and there must have been substantial mixing of the archaeological layers for Layer B9 to produce a date in the Early Neolithic (DEM-1211) over two millennia earlier than the Early Mesolithic / Middle Mesolithic date (DEM-1209) from the same Layer. Layer B7 has also produced dates over one millennium apart. Given the thickness of the Mesolithic strata, the cave is likely to have been occupied episodically during the Mesolithic and the Early Neolithic (Sampson A., 2008).

The ^{14}C dates given by A. Sampson, *et al.*, (2009) and reported below are from Trench A Extension, which was opened to better understand the Early Neolithic and Transition. The archaeological levels are known as 'Units':

1 Unit 1 down to 360 cm contained pottery (the basal Spit 23 at 330 cm in Trench A is considered to represent the Middle Neolithic / Early Neolithic boundary).

2 Unit 2 between 360 cm and 410-430 cm:
   - Poz-9842 7460±50BP = 6425-6236 BC (OxCal 4.2 at 95.4%), on charcoal at 380-390 cm – Median 6330 BC.
   - Poz-9843 7560±50BP = 6500-6348 BC (OxCal 4.2 at 90.1%), at 400-410 cm – Median 6424 BC.
   - Poz-22182 7680±40BP = 6598-6453 BC (OxCal 4.2 at 95.4%), at 430 cm – Median 6525 BC.

3. Unit 3 was a few cm thick on the west side and 30 cm thick on the north and east profiles:
   - Poz-22647 7780±50BP = 6695-6478 BC (OxCal 4.2 at 95.4%), on charcoal – Median 6585 BC.
   - Poz-27941 7740±50BP = 6648-6471 BC (OxCal 4.2 at 95.4%) – Median 6560 BC.

- Poz-27242 7810±50BP = 6778-6501 BC (OxCal 4.2 at 94.7%) – Median 6640 BC.

4. Unit 4 between 410 cm and 430-500 cm:
   - Poz-22649 7959±50BP = 7042-6697 BC (OxCal 4.2 at 95.4%), on humus? At 410 cm – Median 6870 BC.
   - Poz-22648 7960±50BP = 7043-6697 BC (OxCal 4.2 at 95.4%), at 429 cm – Median 6870 BC.
   - Poz-22666 7960±50BP = 7043-6697 BC (OxCal 4.2 at 95.4%), at 395 cm – Median 6870 BC.
   - Poz-22183 7980±50BP = 7051-6745 BC (OxCal 4.2 at 90.8%), at 420 cm – Median 6900 BC.
   - Poz-21360 8590±50BP = 7722-7541 BC (OxCal 4.2 at 95.4%), at 460-465 cm on oak charcoal – Median 7630 BC.
5. Units 5 and 6 down to the bedrock are Early Holocene and Final Pleistocene.

There is good consistency in the dates from the Late Mesolithic through the Initial Neolithic in the above dates. I do not believe we can argue for an occupational hiatus purely on the basis of ^{14}C dates, and the author does not mention a sterile layer between the Final Mesolithic and the Initial Neolithic.

We have not found any reported details for Trench D, which was initiated in 2004, extended to 36 m^2, and which reached Mesolithic levels in 2007 at 110-140 cm, with a much thinner EN level than in Trench A (Sampson A, *et al*., 1998).

The artefactual and faunal finds from the various trenches reported on are as follows:

Trench B:

- Layer 23 – Fragment of a very regular obsidian Neolithic blade and a single sherd;
- Layer 24 – Radiolarite flake and a distal fragment of a radiolarite blade/bladelet. No pottery in this or lower levels;
- Layer 27 – 8 radiolarite objects of probable Palaeolithic age;
- Layer 28 – 3 pieces of obsidian of which one retouched blade could be a Neolithic intrusion. The concave retouched truncation of an obsidian blade is dated to the 13th millennium BC;
- In Layers below 28 was found undated Middle/Upper Palaeolithic material.

Trench B Extention:

- Layer B6 – 2 pieces of obsidian (one cortical flake with bipolar and bifacial retouch, the other a blade), a stone axe and a small amount of MN painted ware;
- Layer B14 – 3 flint and 6 radiolarite Palaeolithic implements from the 13th millennium BC.

Trench A Extention:

- Unit 1 contained pottery;
- Unit 2 contained monochrome sherds of thick and thin-walled pottery, a single yellow flint blade and some obsidian blades. 55 fragments of ovicaprine bones, some with evidence of burning and cutting. The dates are Transition /Early Neolithic;
- Unit 3 contained two macroblade cores of dolomitised pebbles, a single platform sandstone flake core, an obsidian trapeze from a macroblade and flakes from radiolarite and limestone. Two sherds were also found, which could be intrusive, and no domesticated fauna. The dates are as early as any EN dates in Thessaly;
- Unit 4 contained an obsidian bladelet, limestone flake cores and limestone flakes, one radiolarite bladelet, and a cortical flake of hornstone. The dates are Terminal Mesolithic in the upper levels, then Upper Mesolithic, and the one from the lowest level Early Mesolithic;
- Unit 5 is of Final Pleistocene date.

The Melian obsidian found in the Palaeolithic Trench B Layer 28 is contemporaneous with the obsidian found at Franchthi, evidencing long-range contacts, but these contacts were probably more tenuous in the Late Mesolithic when poor quality lithic raw material was used. Adaptation to the changing environment involved the replacement of large game by fowling and the increased reliance

on plant food. For the Transition/Early Neolithic the cave has produced evidence of pastoralism as well as of cervids, but no evidence for agriculture, which only became important later in the Neolithic. (Sampson A., *et al*., 2008).

Sarakenos Cave appears to have had limited use in the Early Neolithic, when ovicaprines are present and the lithics bear both Neolithic and Mesolithic characteristics. The limited pottery is monochrome. There can be little reason for immigrant Neolithics to have used the cave, high up a rock face, with water lapping near the base. The evidence seems to point to an autochthonous population in contact with the Thessalian Early Neolithic, in the process of acquiring Neolithic attributes through contact and exchange (Units 3 and 2 of Trench A Extension between *ca*. 6700-6300 BC, becoming fully Neolithic thereafter). It is interesting that the Transition evidenced in Units 3 and 2 of Trench A Extension should have lasted *ca*. 300-400 years, which could be interpreted as meaning that there were no, or few, Neolithic sedentary immigrant communities practicing agriculture nearby to accelerate the acculturation process, and that for several centuries, the acculturation process was limited to domesticated animals, changing lithic technology and a few prestige objects such as pottery and ground stone implements, before evidence appears for the adoption of agriculture.

Kyra Panagia/Sfika (22) – A. Sampson discovered a Mesolithic scatter on this island, also known as Sfika, in the Northern Sporades, during his survey (Fig. R07-1).

Theopetra Cave (12) – This cave site is located facing north, 60 m above the plain up a steep incline (Fig. R07-8) at the base of a scarp on Mount Theopetra, some 300 masl and 100 km from the Aegean Sea. Karstic aquifers after the Mesolithic have severely eroded the remains in the central area of the cave, as has human activity in historical times disturbed the Neolithic remains in the same area. The excavations begun in 1987 cover 80 m^2 (Fig R07-9) None of the 6.5 m of deposits, dating from the Upper Palaeolithic to Historical times, are sterile, and the Mesolithic levels have been dated *ca*. 9780-6700 BC (Kyripassi-Apostolika N., 1999; 2000c).

The Late Palaeolithic, Mesolithic and Neolithic strata had been seriously disturbed by phreatic waters which formed large channels and blind tunnels. The event which occurred at the end of the Mesolithic "*cut through a constructed mud floor (which has remains of a hearth on its surface) dated to ca. 8 kyr B.P*." (Karkanas P., 2001: 389). The date referred to at the boundary between the Stratigraphic Units IV (Mesolithic) and VI suggests that the cave was occupied at the contact period with the Neolithic:

- DEM-475 7036±44 = 6011-5836 BC (OxCal 4.2 at 94.1%), on segregated charcoal fragments at IV/VI boundary – Median 5925 BC.

N. Kyripassi-Apostolika (2000a: 133) states that "*Excavation data in Theopetra indicate a very normal and natural transition from the Mesolithic to the Neolithic, which is documented by (a) the presence of unbaked masses of clay in the Mesolithic layers and a few atypical and monochrome sherds found at the same layers could show the very initial samples of pottery technology; (b) the presence of domestic sheep and goat in the Mesolithic zoo-archaeological, and a good percentage of wild fauna in the Neolithic deposit, indicating a rather similar way of life in both periods; (c) the presence of cultivated hulled six-row barley and of wild einkorn, both testifying farming as a local development and not as knowledge that came from the Near East to Greece; (d) the biological homogeneity which derives from the DNA analysis of human bones of successive periods*". Similar latter-day indigenist statements are made in 2003.

Referring to her points a, b, c and d above:

- (a) N. Kyripassi-Apostolika (1993) indicates that the unbaked clay come from lower levels dating to the Post-Glacial. The sherds are small, mostly monochrome, and technologically primitive; the few decorated sherds have simple lines, less evolved than those of the Early Neolithic. They were found up to 40-45 cm below the Neolithic levels.

- (b) S. Newton (2003), who analysed the 60 identifiable Mesolithic faunal specimens (Fig. R07-9a), points out that "*the assemblage is dominated, surprisingly, by small ovicaprids, which make up 44% of the total identifiable sample. These specimens are disturbing in several ways. Firstly, they are indistinguishable from domesticated sheep and goats in the reference collection...Secondly, many of these ovicaprids specimens are clearly the remains of very young animals, especially those from trench Z6, where three specimens are under three and a half years old and four are neonatal. Thirdly, we already know that the Mesolithic layer is very thin and that the overlying Neolithic deposits have been severely disturbed. During some preliminary analysis of material from Neolithic levels ... it was observed that neonatal and young ovicaprids occurred frequently. This supports my suspicion that the ovicaprids in the Mesolithic sample, at least those in Z6, are in fact Neolithic contaminants, perhaps resulting from disposal of stillborn or ill herd animals*". The initial findings from the Neolithic point to some 10% of the remains being derived from wild fauna, suggesting a possible continuity of habitat type. There were no available ^{14}C dates on the faunal remains.
- (c) In N. Kyripassi-Apostolika and G. Kotsamani (2005), the authors recognise that the samples of domesticated six-row barley found in squares Δ7 and Γ10 are probably intrusive, since there are no examples in lower strata.
- (d) The genetic study of the HLA, referred to and reported on by D. Evison, in N. Kyripassi-Apostolika, *et al*., (2000), was according to the title of the paper in the bibliography, limited to the Palaeolithic skeleton.

The ^{14}C dates covering the Late Mesolithic and Transition boundary are (Facorellis Y., 1993; Kyripassi-Apostolika N., 1993; Kyripassi-Apostolika N., 1999):

- DEM-454 6563±68BP = 5628-5463 BC (OxCal 4.2 at 86.2%) – Median 5545 BC.
- DEM-455 6890±43BP = 5884-5705 BC (OxCal 4.2 at 94.3%) – Median 5795 BC.
- DEM-360 7995±73BP = 7078-6679 BC (OxCal 4.2, at 95.1%), on charcoal – Median 6880 BC.
- DEM-583 8014±49BP = 7071-6754 BC (OxCal 4.2 at 94.8%), on charcoal – Median 6910 BC.
- DEM-576 8060±32BP = 7085-7001 BC (OxCal 4.2 at 68.3%), on charcoal – Median 7048 BC.
- CAMS-21773 8070±60BP = 7188-6771 BC (OxCal 4.2 at 93.8%), on human skeleton. (Simon Frazer University gives a date of 7044-6720 BC on the same skeleton (Perlès C., 2001)) – Median 6980 BC.

From the dates available there is a gap of *ca*. 1100 years between the median of the last Mesolithic date and the first Neolithic one, as J.-F. Berger and J. Guilaine (2008) also point out, whilst K. Kotsakis (2008: 57) states that "*a full sequence of sixty radiocarbon dates available now from Theopetra Cave definitely proves, despite problems with stratigraphic integrity, that the site was occupied throughout the Mesolithic and into the Neolithic (Facorelli et al. 2001)*", and suggests that the site had to be part of a wider network, part of a larger demographically viable group, which means a larger presence not yet discovered during the Mesolithic of the region.

The skeleton of a young female was buried in a shallow pit in a Neolithic lateral flexed (foetal) position (Fig. R07-9), in archaeological levels dated to the mid-eighth millennium BC, but the skeleton dates from the Terminal Mesolithic, *ca*. 7000 BC. The skeletal evidence points to possible nutritional stress (Stravopodi E., *et al*., 1999) and probably iron deficiency, which can be caused by a combination of diet, nutritional stress and infectious diseases (viral, bacterial, parasitic etc.) (Manolis S. & Stravopodi H., 2003). The bones of the Upper Palaeolithic skull found at lower level are much thicker and of a more primitive morphology compared to the Mesolithic skull (Poulianos N., 2008). That the Mesolithic burial is in a crouched foetal position suggests Eastern Mediterranean contacts, since inhumations in a similar position have been found at Girmeler Cave (Region 2), Franchthi Cave (region 8), Maroulas (Region 5), as well as Grotta dell'Uzzo (Region 19).

The Mesolithic lithics have been briefly analysed by E. Adam (1999, 2000), who comments about "*the low artefact density both for the Upper Palaeolithic and the Mesolithic assemblages*"

(Adam E., 2000: 169). During the Mesolithic, local radiolarite was almost exclusively used, and worked on site, compared to the Upper Palaeolithic, when 'Voïdomatis' flint from the Epirus side of the Pindus was brought to the site as finished tools. The Mesolithic is characterised by a flake technology, with a lack of evidence for laminar debitage and the microburin technique, with virtually no backed bladelets and no geometric microliths. J Kozlowski (2003) indicates that the Mesolithic levels, so far as dates are concerned, contained macroblade industries similar to those found in the Larissa Plain, in contexts also containing non-diagnostic flake tools; he does not accept the local development of the Neolithisation by local groups, associated with primitive pottery. N. Kyripassi-Apostolika (2003) sees the Mesolithic industry as closer to Lithic Phase VII at Franchthi than Lithic Phase VIII, although the range of tools is more limited; referring to K. Skoutopoulou's (2000) analysis of the Neolithic industry, she states:

1. "*There is a distinct continuity in the use of raw material. Extensive use was made of the dark red or 'chocolate' Thessalian radiolarian flint. The source can be traced back to the Pindos, in an area adjacent to western Thessaly (where Theopetra is), where the pebbles were deposited by the rivers Pineios and Portaikos.*
2. *There is also a distinct continuity in the construction technique used to make tools. At Theopetra both the Neolithic and the Mesolithic industry appear to have been largely based on flake. One can observe similarities even in the cores, while the dimensions of the tools are in both cases generally larger than was usual during these periods.*

At Theopetra one can find bladelet cores and bladelets that are typical of the Neolithic as well as many other elements of flake industry that undoubtedly arose earlier than the Neolithic".

The Neolithic lithics have been analysed by K. Skourtopoulou (2000), who comments that whilst there are more than 1000 pieces, it is not possible to differentiate between the 7th, 6th and 5th millennia BC because of the stratigraphic mixing caused by the karstic aquifers and the anthropic activity (p. 283). There is however continuity of the flake-based debitage from the Mesolithic with retouch on flake blanks 49% as against 20.5% on blades, as well as in the use of raw materials and tool-types (notches, denticulates and truncation on flakes) (p. 284). The low incidence of cores and debitage waste suggests that both in the Mesolithic and Neolithic the fashioning of the tools took place elsewhere, whether close to the raw material source or through an exchange network (p. 285), which also suggests that the cave was not regularly used as a residential location.

Because the plates from E. Adam (2000) with the 10 lithics do not differentiate between those attributable to the Palaeolithic and Mesolithic, and because those from K Skourtopoulou (2000) are exclusively of Neolithic blades, they have not been included in the Figures.

The presence of *Triticum boeoticum*, *Lens* sp., *Vicia ervilia* in Mesolithic contexts is indicative that these species were included in the diet, although stratigraphic mixing is highly probable.

It is very hard to make a clear determination regarding the Transition, with the fragmented excavation reports consulted. On the negative side there is the hiatus in the ^{14}C dates and the confirmed indigenist tendencies of the director of excavations. On the positive side we can mention:

- The inaccessibility of the site which can hardly have made it attractive to Neolithic migrants;
- The stratigraphic continuity without sterile levels between the Mesolithic and the Neolithic;
- The continuity in lithic technology;
- The presence of undecorated pottery of primitive technology with affinities with the pottery of the earliest known Neolithic immigrant sites, followed by more sophisticated pottery;
- The continued presence of hunted game during the Neolithic;
- The plant food found in the Mesolithic contexts, which would have prepared the autochthonous population for the Transition and the acceptance of agriculture.

On balance the evidence points to a Transition of the autochthonous population, who incorporated some elements of the Neolithic lifeway over time.

Southern Balkans – Eastern Greece and the Sporades Islands – Initial Neolithic and Early Neolithic sites – Introduction

There are over 100 known Initial Neolithic mound sites (magoulas in Greek) in Thessaly and Greek Macedonia, of which *ca.* 25 were established prior to *ca*. 6300 BC and the rest at the inception or during the '6200 BC event' (Müller J., 2007). No Mesolithic or Transition levels have been identified in any of the newly founded Neolithic settlements (C. Perlès, 2001; N. Efstratiou, 2011: pers. com.). Many of earliest excavations undertaken from the 1960s were conducted over very restricted excavated surfaces by nationalistic archaeologists intent on proving a local neolithisation process with an aceramic phase; V. Milojčić, who excavated Argissa Magoula between 1957-1958 maintained that the basal Levels 1, 2 and 3 representing 40 cm of stratigraphy were Aceramic, or with very few sherds, yet rich in faunal, bone and lithic remains (Milojčić V., *et al*, 1962). At the same time, D. Theocharis, in a test pit at the north-east of the acropolis at Sesklo, 'discovered' an aceramic level, which was subsequently replicated at Soufli Magoula, Achilleion and Gendiki, all of which was disproved by M. Gimbutas (Perlès C., 1987b: 19-21). This situation gave rise to lengthy debates and new excavations, the end-result of which is that the early archaeologists have been discredited, in that a few pottery sherds have been found in the earliest levels of virtually all the sites, and it is now certain that the sites were all established by migrants from Anatolia and/or the Near East or by their descendants. Whether an Aceramic phase existed or not at certain open-air sites is of little consequence, since other attributes of the Neolithic are present (domesticated plants and animals, polished stone objects, permanent structures, new lithic technology, baked clay figurines, etc.), and purely Mesolithic levels have not been found beneath any of the sites. Any Aceramic phase in the Southern Balkans would be likely to coincide with the PPNB and PPNC of the Near East, when some sites were beginning to experiment with pottery manufacturing, whilst prestige or symbolic clay objects were already being fired. This situation is paralleled chronologically in this region, where baked-clay ear-studs and figurines appear in levels reported as being devoid of pottery containers. When pottery appears, there are initially few remains, and the pots can be considered to have been prestige items, without signs of having been used for cooking, so that they could have survived a long time before being broken and discarded. The subsequent independent development of pottery styles in the Balkans initially continued down the line of prestige items, with the utilitarian aspect appearing at a later date (Perlès C., 2001).

The domesticated animals present at all Initial Neolithic sites are sheep, pigs, cattle and dogs, but not necessarily goats (Perlès C., 2001: 73). The non-identification of goat raises interesting issues with regards to the site of the Cave of Cyclops on the island of Youra in the Northern Sporades, where goats were introduced in the Early Mesolithic.

The domesticated plants present at all Initial Neolithic sites (except Knossos on the Island of Crete) are einkorn, emmer, six-row barley and lentils (Perlès C., 2001: 73).

The lithic industry at the Initial Neolithic sites is rich in pressure-flaked blades from inception, on exotic materials (Melian obsidian, grey-green flint from the Pindus and honey flint, which C. Perlès (2001: 78) believes comes from somewhere in a westerly direction, although other authors think it might have its source somewhere in Bulgaria).

The genetic data points to links between Thessaly and North-Eastern Greece with South-Eastern Anatolia (region of the Neolithic sites of Çayönü, Göbekli Tepe and Hallam Çemi), Syria and the Levant. The hypothesis that the migrants arrived by sea is also comforted by the fact the Haplogroup J2b-M12 which is found in South-Eastern Anatolia, the Levant and in Eastern Central Greece is not present in either Western Anatolia or the region of the Sea of Marmara (King R. J., *et al*., 2008).

The ^{14}C dates for the Initial and Early Neolithic have been carefully analysed by C. Perlès (2001: 84-95), for consistency and credibility, and where a discrete Aceramic phase is discernible, it is naturally followed by the Early Neolithic with an ever-increasing number of sites. The earliest dates

for the Initial Neolithic are those for Argissa and Sesklo (plus Knossos in Crete and Franchthi Cave in the Argolid), which all fall within the first half of the 7th millennium BC.

Brief notes on some of the more important Initial Neolithic sites are given below, recognising that they are incomplete. Some of the contentious issues surrounding many of these sites have been highlighted, which in many cases were excavated over half a century ago.

Since many the earliest dates for Early Neolithic sites in Greek Macedonia are several centuries later than in Thessaly, we have only enumerated a few. C. Perlès (2001: 60), quoting N. Efstratiou (1993), points out that the earlier deposits of Makri lie 3 m below the current surface, highlighting the fact that ephemeral occupations have little chance of being discovered on the alluvial plains of western Macedonia.

According to C. Perlès (2001: 60), most of the Neolithic sites north of the Aliakmon show Balkanic influences, leading her to believe that they were settled from the north.

It is impossible to assert that there is a discernible Mesolithic influence at any of these sites, yet it is conceivable that there might have been, even if none has been demonstrated to date.

Southern Balkans – Eastern Greece and the Sporades Islands – Initial Neolithic and Early Neolithic sites – Sites details

Achilleion (19) – Thessalian Early Neolithic mound-site occupied ca. 6400-5600 (Gimbutas M., 1989: 333)**.** The site was initially excavated over a limited surface by D. Theocharis in 1961, who claimed there was an Aceramic Phase, disproved by M. Gimbutas in her 1973-1974 excavations (Perlès C., 2001: 70).

M. Gimbutas re-excavated this site more extensively, albeit 30 m away from the original excavations (Perlès C., 2001). She reported in 1973 "*negatively succeeded: it does not exist at this site*" regarding the Aceramic Phase, according to E. Bloedow (1991). In her excavation report, she indicated having found plenty of course pottery in the lowest Level 1a, as well as figurines (Gimbutas M., 1989). The site was surrounded by a deep water-filled ditch during its initial phase, which was rapidly filled up and built upon (Demoule J.-P. & Perlès C., 1993), suggesting some kind of defensive perimeter.

Over 40 ^{14}C dates were obtained (Gimbutas M., 1989; Gob A., 1990), the earliest of which are:

- LJ-3180 7550±60BP = 6500-6251 BC (OxCal 4.2 at 95.4%), on charcoal – Median 6375 BC.
- LJ-4449 7490±150BP = 6633-6061 BC (OxCal 4.2 at 95.4%), on charcoal – Median 6347 BC.
- P-2118 7470±80BP = 6471-6207 BC (OxCal 4.2 at 93.3%), on charcoal – Median 6339 BC.
- UCLA-1896A 7460±175BP = 6654-5990 BC (OxCal 4.2 at 95.4%) – Median 6322 BC.
- P-7450 7450±80BP = 6459-6204 BC (OxCal 4.2 at 90.5%), on charcoal – Median 6331 BC.

The stratigraphy under M. Gimbutas was almost 5 m, and was divided into Phases I to IV with sub-phases (Shimabuku D. & Winn S., 1989). The lowest level Phases Ia and Ib contained pit houses (Gimbutas M., 1989: 27; Winn S. & Shimabuku D., 1989) (Fig. R07-10).

The lithic assemblage from Level 1 produced 86 pieces which included 39 blades, 28 flakes, 10 cores and 9 broken pieces (27 of obsidian, 32 of jasper, 19 of flint, 5 of chalcedony and 3 of quartz) (Gimbutas M., *et al*., 1989), and can be considered 100% Neolithic with no Mesolithic influence.

As with other Initial Neolithic open-air sites in this Region, it is clear that this site was established by Neolithic migrants. According to B. Weninger *et al*., (2006: 413-414), the dates need to be revised due to the old wood effect, and the authors suggest it was establishes close to the onset of the '6200 BC event'. The site is also important because of its continuous occupation over *ca*. 800 years, which allowed for the phasing and classification of the Sesklo ceramic culture.

Agios Petros (23) – This Early Neolithic site on the Island of Kyra Panagia was established in the early 6th millennium BC (Sampson A., 2008: 82). Agios Petros, now partly submerged, was initially

excavated by D. Theocharis between 1969-1971 (Fig. R07-11) and subsequently by N. Efstratiou in 1981 (Efstratiou N., 1985).

The early pottery from this site, which has affinities with the Fikirtepe Culture of North-West Anatolia (Parzinger H., 2014: 386), developed a particular form of pottery decoration with a criss-cross pattern reminiscent of fish-nets, which is only found in the Northern Sporades, with similar sherds also found in the Cave of Cyclops on the Island of Youra. This development suggests that the population of this settlement was in contact with, but not culturally attached to the Thessalian Neolithic.

This site possibly incorporated the descendants of the neolithised islands population that continued to use the Cave of Cyclops on the Island of Youra, and if this is the case, it represents one of the better illustrations of an autochthonous group having successfully accomplished the Transition.

Argissa Magoula (14) – This Early Neolithic site on the Pineios River is close to Larissa. Some 60 m^2, representing about 1% of the site were excavated between 1957-1958 by V. Milojčić, who maintained that the basal Levels 1, 2 and 3 representing 40 cm of stratigraphy were Aceramic, or with very few sherds, yet rich in faunal, bone and lithic remains (Milojčić V., *et al*, 1962). At the same time, D. Theocharis, in a test pit at the north-east of the acropolis at Sesklo, 'discovered' an aceramic level, which was subsequently replicated at Soufli Magoula, Achilleion and Gendiki, all of which was disproved by M. Gimbutas (Perlès C., 1987b: 19-21). The study of the plant and faunal remains confirmed a fully Neolithic economy (Perlès C., 2001). J.-P. Demoule and C. Perlès (1993) and C. Perlès (2001) have published the following dates, which are the earliest for the Greek mainland Neolithic. Commenting on these dates, C. Perlès (2001: 88) notes that the UCLA dates were obtained on bone (Milojčić V., 1973, Gimbutas M., 1989), and represent early attempts to obtain dates from bone collagen, which could explain why they are so different to the Heidelberg dates, so that the first two Heidelberg dates could constitute the most probable date ranges for the initial occupation of this site at *ca*. 6700 BC:

- UCLA-1657A 8130±100BP = 7381-6775 BC (OxCal 4.2 at 91.9%), on bone – Median 7080 BC.
- UCLA-1657D 7990±95BP = 7144-6644 BC (OxCal 4.2 at 94.9%), on bone – Median 6895 BC.
- H-889-3080 7760±100BP = 6840-6430 BC (OxCal 4.2 at 90.2%), no context – Median 6635 BC.
- H-896-3082 7740±100BP = 6836-6412 BC (OxCal 4.2 at 92.4%), no context – Median 6625 BC.
- H-894-3081 7520±100BP = 6594-6211 BC (OxCal 4.2 at 94.6%), no context – Median 6400 BC.

A. Gob (1990) gives one additional date:

- GrN-4145 7500±90BP = 6513-6208 BC (OxCal 4.2 at 93%), on charcoal from a posthole – Median 6360 BC.

L. Thissen (2000) maintained that the lowest levels contained unsophisticated pottery, which accords with statements by E. Bloedow (1991), who states that C. Perlès "*has discovered a fundamental distinction between the material from Franchthi and that from Argissa. In connection with the latter she notes that "there is nothing in this industry that recalls the Greek Mesolithic". Argissa was Ceramic, or pottery producing from the outset*".

Nonetheless, N. Efstratiou (1995) states that there is a microlithic chipped stone industry from the aceramic levels, and P. Hameau (1987) indicated that the 'Preceramic' levels (read Levels 1, 2 and 3) produced a lithic industry very close to that of Boebe, of Mesolithic type, although not so plentiful. N. Efstratiou (2011: pers. com.) has indicated that trapezes can be of Early Neolithic character based on some typological criteria, and in this respect C. Perlès (1987b: 31-33) in a re-examination of the Argissa lithics, found that 50% were on obsidian, and that the lithics were laminar and of a very high

quality (not evident from the very poor drawings from the original excavations) (Fig. R07-11); it is close to that of the Thessalian plain and to a certain extent that of Macedonia (Nea Nikomedeia) and Franchthi, without any trace of the Mesolithic substrate and that the trapezes are segments of prismatic blades obtained without the use of the microburin technique. In examining the plates from the excavation reports (Milojčić V., *et al*, 1962), we note that the lithic assemblage on plates 4, 5, 6 and 7 comprises blades of a distinctly Neolithic character which appear to be made of obsidian and flint. There are numerous truncations which could have been made for sickle inserts, even if some are in the shape of trapezes, which could be due to statistical chance. More reminiscent of the Mesolithic tradition are the drawings (Fig. R07-12) of trapezes, although against this attribution is the fact that they are manufactured on blade fragments without the use of the microburin technique (Perles C., 1987b: 31-33). The manufacture of obsidian objects was performed at least partially on site, evidenced by the exhausted amorphous multifaceted cores. No cores for blade extraction (flint or obsidian) are represented, suggesting that the end-product was brought to the site. Much of the obsidian debitage is amorphous (comparable to the Early Neolithic lithics referred-to as 'uglylithics' by C. Perlès from Franchthi Cave) with a tendency towards being microlithic, although there are some bladelets. It has to be noted that there are very few armatures represented in the lithic assemblage.

The faunal remains from Levels 1,2 and 3 from Grube α, β, γ, δ, and ε summarise (MNI) (Milojčić V., *et al*, 1962):

- Red deer 2;
- Horse 2;
- Wild (presumably Auroch) 5 and domesticated cattle,
- Ovicaprines 66;
- Wild boar 20 and domesticated pig 19;
- Dogs 2.

It appears that in this Initial Neolithic site, hunting constituted an important activity for obtaining meat protein and it is possible to deduce from the lithic assembly, that whilst there is clearly an immigrant Neolithic group (hut construction, blade lithics technology, domesticated animals, domesticated crop plants (pulses and cereals), polished stone, quern stones and grinders, ear plug, pottery in the level immediately above the Pre-ceramic level), there could possibly be a Mesolithic influence in the lithic debitage practiced in situ on obsidian as well as in the hunting activities.

Given the wild animal biomass represented in the faunal assemblage, it is possible that there existed Mesolithic communities in the Thessalian plain, although no evidence for their existence has been found to date other than in Theopetra Cave, and that the hunted animals could have been in part procured by Terminal Mesolithic groups (which might explain the low armature count in the excavations), and this could indicate some form of cooperation and even cohabitation. Melian obsidian, known to the Mesolithic seafarers, could also have constituted an item of exchange, bringing the Mesolithic population and the Neolithic immigrants into contact. There is however no hard evidence for these hypotheses.

Axos (4) – Early Neolithic site west of Yannitsa in Greek Macedonia, which could be earlier than Nea Nikomedeia (Andreou S., *et al*., 2001).

Dikili Tash (1) – This 17 m high magoula near a permanent spring is located in the Plain of Drama in Eastern Greek Macedonia. It has been under excavation for several years under Pascal Darcque who made six deep core soundings in 2010 to determine the earliest dates for the site, which came from the north-eastern part of the tell (Lespez L., *et al.*, 2013):

- Lyon-7631 7560±35BP = 6468-6383 BC (OxCal 4.2 at 95.4%), on charcoal, core 3 – Median 6410 BC.
- Lyon-7632 7505±50BP = 6451-6251 BC (OxCal 4.1 at 95.4%), on charcoal, core 3 – Median 6350 BC.

- Lyon-7626 7495±35BP = 6437-6332 BC (OxCal 4.2 at 70.9%), on charcoal, core 2 – Median 6385 BC.
- Lyon-7630 7405±35BP = 6382-6222 BC (OxCal 4.2 at 95.4%), on charcoal, core 3 – Median 6302 BC.

These dates, which suggest the site was first established during the RCC commencing *ca.* 6600 BC, but prior to the onset of the '6200 BC event', tie-in with the date obtained in 1993 (Lyon-5018 quoted as 6592-6435 BC – Median 6515 BC), and broadly coincide with the earliest settlement dates in Thessaly and Western Macedonia, and slightly earlier than those from Southern Bulgaria. They correspond with Hoca Çeşme and Makri in coastal Thrace and Uğurlu on the island of Gökçeada/Imbros (Lespez L., *et al.*, 2013).

Elateia (25) – This is an Early Neolithic site in Central Greece with red monochrome pottery established at the inception of the '6200 BC event' by Neolithic migrants. The two earliest accepted dates given by A. Gob (1990) and Weninger B. *et al*, (2006:413) are:

- GrN-2973 7480±70BP = 6458-6227 BC (OxCal 4.2 at 95.4%), on charcoal – Median 6340 BC.
- GrN-3037 7360±90BP = 6414-6059 BC (OxCal 4.2 at 95.4%), on charcoal – Median 6235 BC.

Gendiki/Gediki/Ghediki (10) – This is an Early Neolithic site in North-Eastern Thessaly, at which D. Theocharis opened a trial trench in 1962. The lowest level, some 20 cm thick, was Aceramic and separated from the next pottery-bearing level by a sterile yellow river-sand level 6 cm thick (the only site, with Nessonis, to have such a sterile level between the Aceramic phase and the pottery-bearing levels). Domesticated plants were however found in the Preceramic level (Perlès C., 2001: 68-69). L. Thissen (2000) maintained that the lowest levels contained unsophisticated pottery whilst P. Hameau (1987) claimed that in the earliest level the lithic tradition is Mesolithic on bladelets, followed by a sterile layer, possibly due to rise in level of Lake Karla, followed by a level with monochrome pottery showing a different level of technical competence.

It is unlikely that this undated open-air site was established by Mesolithic people, although elements of the Mesolithic substrate could be present.

Giannitsa B/Yannitsa B (5) – This Early Neolithic site, a little north of Nea Nikomedeia on the Lower Vardar River in the Giannitsa Plain, appears to look both ways, with some red-painted pottery of Thessalian tradition in the lowest levels as well as some white-painted rounded vessels. To the east of the Middle Vardar River, rounded vessels with white painted motifs have been found in the lowest levels at Anzabegovo and Vršnik (Nikolov V., 1997: 184-185).

The Early Neolithic structures are elliptical and the indications are that the farming community cultivated einkorn and emmer wheats (Çilingiroğlu Ç., 2009: 442, quoting Andreou, *et al*., 2001: 293; Alram-Stern, 1996: 389-391).

Lafrouda (2) – This Neolithic site 800 m from the shore on the mainland east of the Island of Thasos in Greek Macedonia is currently 2 mbsl and partially eroded by sea action, proving that sites on the coastal plain will have disappeared (Ammerman A., *et al.*, 2008).

Limenaria (6) – Neolithic site on the island of Thasos, which would have been connected to the mainland during the 6th millennium BC.

Magoulitsa (17) – Early Neolithic site in Western Thessaly, published by Papadopoulo in 1958.

N. Kyripassi-Apostolika (2000a), who is known to be an indigenist, indicates that this site and Prodromos are the earliest Neolithic sites in Western Thessaly and might have been colonised by descendants from Theopetra cave, without supporting her claim.

Nea Nikomedeia (7) – This is an extensive Early Neolithic 2 m high magoula site 220 x 110 m. It is 9-10 masl on the Giannitsa Plain in Greek Macedonia on the Lower Vardar River, some 10 km north of Veroia. The site was discovered during road construction, which caused damaged to the site, and salvage excavations were conducted under the direction by R.J. Rodden between 1961-1964 (Çilingiroğlu Ç., 2009), in artificial spits, rendering the correlation and interpretation problematic (Papaconstantinou D., 2006: 84). The structures are rectilinear from inception, with a 'special structure' in the site which was not a normal habitation structure (Papaconstantinou D., 2006: 84) and hunting plays a minor part, with the faunal assemblage dominated by the four domesticated species. The material from the site appears to look both ways, with some red-painted pottery of Thessalian tradition in the lowest levels as well as some white-painted rounded vessels. To the east of the Middle Vardar River, rounded vessels with white painted motifs have been found in the lowest levels at Anzabegovo and Vršnik (Nikolov V., 2007: 184-185).

The Early Neolithic dates are (Gob A., 1990; Nikolova L., 1998; Weninger B., *et al.*, 2006):

- Q-655 8180±150BP = 7532-6753 BC (OxCal 4.2 at 95%), on charcoal near ground level – Median 7140 BC.
- GX-679 7780±270BP = 7359-6201 BC (OxCal 4.2 at 92.9%), from 1st Early Neolithic building phase – Median 6780 BC.
- P-1202 7557±91BP = 6591-6237 BC (OxCal 4.2 at 95.4%), from ash-pit level with pottery – Median 6415 BC.
- P-1203 7281±74BP = 6266-6007 BC (OxCal 4.2 at 91.5%), from ash-pit – Median 6135 BC.

The earliest dates given by L. Nikolova (1998) are:

- P-1202 7557±71BP = 6529-6246 BC (OxCal 4.2 at 93.5%) – Median 6390 BC.
- OxA-1606 7400±100BP = 6439-6069 BC (OxCal 4.2 at 95.4%) – Median 6255 BC.
- OxA-4282 7400±90BP = 6430-6079 BC (OxCal 4.2 at 95.4%) – Median 6255 BC.
- OxA-1605 7400±90BP = 6430-6079 BC (OxCal 4.2 at 95.4%) – Median 6255 BC.

The two earliest dates, which come from earlier studies and not convincing (Weninger B., *et al*., 2006: 412) can probably be discounted due to the unacceptable standard deviation and improbably early median dates, which are in any case contradicted by the Oxford dates (Nikolov V., 2007), so that the site appears to have been established by Neolithic migrants *ca.* 6400 BC just prior to the onset of the '6200 BC event', but after the onset of the RCC event commencing *ca.* 6600 BC, as indicated by S, Andreou, *et al*., (2001), who may have come up from Thessaly and/or from further east.

Nessonis (15) – This Early Neolithic open-air site is in Northern Thessaly. L. Thissen (2000) maintained that the lowest levels contained unsophisticated pottery, whilst P. Hameau (1987) claimed that in the earliest level the lithic tradition is Mesolithic on bladelets, followed by a sterile layer, possibly due to a high water period of Lake Karla, followed by a level with monochrome pottery showing a different level of technical competence. E. Bloedow (1991) indicates that in the lowest levels microlithic trapezes are found associated with pottery.

The absence of dates renders the interpretation of this site problematical. It is conceivable that Mesolithic people joined up with Neolithic migrants when this site was established.

Otzaki Magoula (13) – Early Neolithic open-air site published by V. Milojčić *et al.,* (1966).

J. Kozlowski (2003) indicated that the lowest levels were either aceramic or with very little pottery, and C. Perlès (2001: 184, 186) stated that the houses are pisé or mud-brick.

This undated site was most likely established by Neolithic migrants.

Prodromos (18) – Initial Neolithic site in Western Thessaly published by Choumouziades in 1971.

N. Kyripassi-Apostolika (2000a) indicated that this site and Magoulitsa are the earliest Neolithic sites in Western Thessaly and might have been colonised by descendants from Theopetra cave, without substantiating her claim.

Pyracos/Pyrassos (20) – Near-coastal Early Neolithic site with fish and domesticate fauna. The habitations are of pisé constructed houses (Perlès C., 2001: 171, 184).

Servia (8) – The Varytimides site is separated by a short distance from the Middle Neolithic site of Servia (Efstratiou N., 2016: pers.com.). The earliest date from a pit covered by a Late Early Neolithic layer is given by A. Gob (1990) as dubious:

- BM-1157 6905±87 = 5928-5646 BC (OxCal 4.2 at 89.1%), on charcoal in pit filled in Late Early Neolithic – Median 5785 BC.

L. Nikolova (1998) gives a similar date:

- BM-1103 6880±89BP = 5923-5631 BC (OxCal 4.2 at 91.4%) – Median 5775 BC.

The date *ca*. 5800 for the earliest establishment of this settlement suggests a later phase of the Early Neolithic, which is too late for there to be any Mesolithic attributes.

Sesklo (16) – This Early Neolithic site, 9 km west of Volos, was initially excavated by A. Tsountas in 1901-1902. D. Theocharis made soundings in 1956-1957 on which he based his Aceramic Phase, having discovered Aceramic levels in 7 trenches mostly on the north-east side (Perlès C., 2001: 69-70); he then conducted systematic excavations between 1962-1968 and 1971-1977, and confirmed there was an Aceramic Phase, yet there were pottery sherds on the virgin soil at the base of the 1962-1968 excavations on the acropolis, as well in the excavations between 1971-1977 beyond the acropolis, over the area of 4 m x 7.5 m, that reached the virgin soil (E. Bloedow, 1991). E. Bloedow's assessment is damning when he states "*It is doubtless the most extensively excavated Neolithic settlement in Greece, and at the same time, given the extent of the excavations and the importance of the site, the most inadequately published*". He goes on to state that the chipped stone tools, ear plugs and bone implements also show a continuity of style from the earliest occupation, which is corroborated by the site of Nessonis, in which trapeze microliths are found associated with pottery in the Early Neolithic. M. Wijnen (1981) confirmed the findings of E. Bloedow, and adds that 73% of the earliest lithic industry is on imported flint, chert and obsidian, that it is a blade industry, and that no cores were found.

Some of the dates quoted by E. Bloedow (1991) and L. Thissen (2000) from the reports of D. Theocharis are:

- P-1681 7755±97BP = 6838-6428 BC (OxCal 4.2 at 91.4%), on soil and charcoal – Median 6635 BC.
- P-1679 7611±83BP = 6637-6351 BC (OxCal 4.2 at 91.5%), on charcoal at 3.88 m – Median 6495 BC.
- GrN-16841 7520±30BP = 6452-6354 BC (OxCal 4.2 at 91.1%) – Median 6403 BC.
- P-1682 7483±72BP = 6461-6226 BC (OxCal 4.2 at 95.4%), on soil mixed with charcoal at 4.32 m – Median 6345 BC.
- P-1678 7427±78BP = 6439-6202 BC (OxCal 4.2 at 85.9%), on charcoal – Median 6320 BC.
- P-1680 7300±93BP = 6377-6012 BC (OxCal 4.2 at 95.4%), on soil and charcoal at 4.10-4.20 m – Median 6195 BC.

A. Gob (1990) includes and accepts all the dates from Pennsylvania; the median of the earliest date, 6635 BC, places the earliest probable date for the establishment of the site sometime around 6600 BC. C. Perlès (2001) notes that the earliest date had no stratigraphic depth associated with it, but that it is supposedly from the end of the Aceramic phase. There are also inconsistencies between the stratigraphic depth and the dates of the other dates from Pennsylvania, suggesting some mixing of the sediments.

At the earliest, Sesklo would appear to have been established *ca*. 6600 BC, which would make it approximately contemporaneous with Argissa Magoula. There does not appear to be any Mesolithic content to the site, so that it was most likely established by migrants.

Soufli Magoula (11) – This open-air Early Neolithic site, on the banks of the Pineios River, had a water-filled ditch in the Initial Neolithic which was rapidly filled in and built upon (Demoule J.-P. & Perlès C., 1993). This was later contradicted by C. Perlès (2001: 175), with this ditch being reattributed to the Middle Neolithic. D. Theocharis opened two small trenches in 1958 and discovered a *ca*. 1 m stratum without pottery, but with domesticated wheat and pulses; K. Gallis, who undertook salvage excavations 60 m from D. Theocharis's excavations several years later, did not find the Aceramic levels, finding only a Late Early Neolithic basal stratum (Perlès C., 2001: 69). L. Thissen (2000) maintained that unsophisticated pottery appeared in the lowest levels. There exists an Early Neolithic cemetery with cremations, which are rare in the Near East, but which exist in the Greek Mesolithic (C. Perlès, 2005). There is an instance of cremations at the Early Neolithic site of Yenikapi in Istanbul (Algan A., *et al*., 2011), which has also been considered a Mesolithic attribute.

Two bone hooks were found by D. Theocharis, one at the limit of the 'Preceramic' and Early Neolithic Level and the other in the Basal Level (Perlès C., 2001: 78). This discovery is not to be placed alongside the hooks found at the Cave of Cyclops, because they were manufactured using a different technique.

This Early Neolithic site was in all probability established by Neolithic migrants.

Southern Balkans – Eastern Greece and the Sporades Islands – Conclusions

There is no confirmed evidence for a Mesolithic presence at any of the open-air sites in Thessaly prior to their establishment. At best, there could be some Mesolithic influence on the lithic technology and in the procurement of hunted large fauna in the earliest levels of Argissa Magoula.

The evidence for a Mesolithic presence on the mainland is increasing with the excavations at the Anonymous Cave of Schisto in Attica, and the lithic scatters in the region of Grevena and Langada. Given the evidence from Theopetra Cave, Sarakenos Cave and the recently interim publication on the Anonymous Cave of Schisto, we can assume there were Mesolithic camp-sites in the region, even if these have not been found by archaeologists. The evidence from the caves indicates that in all likelihood the autochthonous population adapted to the new lifeways, selectively acquiring attractive attributes, as they had adapted to climate induced changes, and that after a Transition, which could have lasted several centuries, became fully Neolithic and integrated into the new order. The genetic evidence points in that direction as well.

The evidence from the islands of the Aegean points to the probable movements of population from Southern Anatolia and/or further east as early as 8000 BC at the Cave of Cyclops (9000 BC in the case of Maroulas on the Island of Kythnos) and to navigators criss-crossing the Aegean. Many littoral sites from the Mesolithic and the Transition are likely to be below the sea level today, with Maroulas and Agios Petros clearly pointing in that direction. The navigators living on the islands would in all likelihood have been aware of the changes taking place in the Eastern Mediterranean, and the transport of large herbivores to island locations during the Mesolithic (Cyprus, Kythnos and Youra) points in that direction. The Cave of Cyclops and Agios Petros evidence points to the adaptation to new lifeways through the generations by the Mesolithic population that might have originated from Southern Anatolia and/or further east.

Region 8 – Southern Balkans – The Peloponnese and Megara

(Maps R08, R08a and R08b)

Southern Balkans – The Peloponnese and Megara – General introduction

Around 9000 BC, the primary vegetation cover of lowland Greece and Southern Italy, becomes progressively oak or mixed oak thermophile forest, which gradually moved to higher altitudes during the Boreal and Early Atlantic climatic periods, whilst the lower altitudes gradually converted to Mediterranean maquis with evergreen and scrub forests, so that by the early 7th millennium BC, this situation prevailed over most lowland and mid-altitudes of much of our study area. The current situation we associate with the Eastern Mediterranean, with its heat and aridity, is a recent development, the consequence of Neolithic and post-Neolithic anthropic activity, since forest cover helps conserve humidity in the soil and restrain erosion. During the Early Holocene, the water table would have been higher, wetlands more extensive, where the geography permitted, and watercourses more abundant, less seasonal, and less channelled, even if during the 7th millennium BC, the average temperatures were about 2° Celsius higher that at the end of the 20th century (Rossignol-Strick M., 1998).

The lost site of Zaimis/Zaïmas in Megara is dealt with in the section on the Peloponnese, since it goes in tandem with the equally lost, but possibly found, site of Ulbricht, both discovered and excavated by A. Markovits in the 1920s.

The coasts around the Peloponnese are mostly steep-to, with a few exceptions. The Plain of Argos, and the river valleys of the southern Peloponnese have been the subject of heavy sedimentation since the Neolithic, so that there is a reduced chance of finding traces of any pre-Neolithic presence in these areas, and the north-western part of the Peloponnese between Olympia and Patrai, which is relatively flat, does not appear to have produced any evidence of a Mesolithic presence.

J. M. Hansen reconstructed the vegetation in the Argolid as at best an open evergreen oak and pistachio forest with open areas of grassland (Perlès C., 2001), yet according to C. Runnels (1996) pollen cores from the Argolid show that the deciduous forest cover expanded rapidly in the Holocene.

Recent genetic studies have determined that there is a strong genetic link, as well as cultural links, between the Central Anatolian and south-eastern coastal regions (regions of Tarsus, Mersin/Yumuktepe and the Neolithic sites of Aşikli Höyük, Çatal Höyük and Hacilar) and the Cretan Neolithic, as well as to a lesser extent with the Initial and Early Neolithic of the Argolid in Mainland Greece. The mutation rates in these studies also suggest that the Neolithic migrants probably arrived in this Region some time prior to the arrival of Neolithic migrants in Eastern Central Greece (Region 7) (King R., *et al*., 2008).

Whilst a number of lithic scatters have been found in this Region, they are unable to tell us much about the Transition. They are nonetheless important in that they confirm the existence of a Mesolithic presence.

The sites which can tell us something about the Transition, lifeways and contacts are, as is usually the case, in caves and rock-shelters.

We will first present the surveys conducted in the Region, followed by the Mesolithic and Transition sites and then the Initial Neolithic sites.

Southern Balkans – The Peloponnese & Megara – Surveys – Introduction

The most fruitful surveys have been those undertaken in the Argolid under or in collaboration with C. Runnels: the Kandia/Kantia Region south of Nauplion; the Berbati-Limnes survey with the follow-up Klisoura Gorge survey and excavations, and the Southern Argolid Survey undertaken during the excavations of Franchthi Cave and re-evaluated by C. Runnels. A survey conducted by Chavaillon

along the River Elis in the North-Western Peloponnese brought nothing to light. The only survey elsewhere in the Peloponnese we will deal with at any length is the Asea Valley Survey in Arcadia.

Asea Valley Survey (11) – The ASEA Survey was conducted under J. and B. Forsén between 1994-1996 in Arcadia, in the centre of the Peloponnese (Forsén J. & Forsén B., 2003). They report having found a Middle/Upper Palaeolithic seasonal hunting camp, and a number of Early/Middle Neolithic sites. They attributed numerous lithic finds, many of which were undiagnostic, to the Neolithic on the basis of the chipped tools, notwithstanding the absence of pottery.

T. Carter (2003), who reviewed the lithics, indicates that distinguishing Early Neolithic chipped stone of purely Early Neolithic date is problematic, since the material does not display clear typological or technological characteristics of the period, so that they could be Middle Neolithic. He reports that 1012 lithic artefacts, 33% of which were made of obsidian, were collected from 24 sites, and that 66% of the obsidian artefacts came from the central place. Several findspots were devoid of pottery, but were nonetheless attributed to the Neolithic.

The sites around the lake appear not to be related to Site S60 on the acropolis nearby, and are described as possibly special purpose sites, thus explaining the lack of pottery. "*Perhaps this is indicative of Whittle's suggestion that 'settling down' would have been a "gradual process" in the earlier Neolithic, inferring a relative fluidity of habitation at this time*" (Carter T., 2003: 133). If this is the case, the author is unlikely to be referring to a migrant Neolithic population, which would have built permanent settlements as in Thessaly, but rather people with a tradition of mobility and therefore possibly autochthonous. The sites are not elevated either, which was apparently the norm in the Arcadian Early and Middle Neolithic:

- Site S63 – Close to lake, and called a seasonal hunting camp, contained 49 lithic artefacts and none made of obsidian;
- Site S64 – Close to lake, contained 10 lithic artefacts, no obsidian and 2 ground stones;
- Site S73/B99 – Close to lake, contained 49 lithic artefacts, manufactured out of at least 9 different raw materials; the 6 pieces of obsidian included fine pressure-flaked prismatic blades with Early Neolithic – Middle Neolithic technological traits; a few pieces of skillfully knapped prismatic blades, one of jasper, and one heat-altered medial section of a fine flint/chalcedony. The rest of the assemblage has been described as rather undiagnostic;
- Site S75 – Contained 27 chipped stones and no obsidian;
- Site S84 – Called a seasonal hunting camp, contained 21 chipped stones, one of which was of obsidian, and 22 sherds.

The lithics from these find-spots (Fig. R08-1) show that some are on blades, whilst others are on bladelets and flakes. Without doubting the attribution to the Early and/or Middle Neolithic, given the lack of pottery and obsidian at Sites S63, S64 and S75 it is possible that there is a Mesolithic element in the assemblages.

Berbati-Limnes Survey (3 plus Map R08a**) –** The survey was conducted between 1988-1991 under the direction of B. Wells and C. Runnels over an area extending some 12 km to the east of Mycenae, to the north of the Plain of Argos. Substantial Middle Palaeolithic remains were found at findspot 600 and stretched toward Klisoura Gorge, with stay finds in other places; Upper Palaeolithic remains are rare, possibly due to the cold dry climate, suggesting that the population would have been concentrated in the Plain of Argos which would have been much larger and richer in vegetation, water and animal biomass at that time. Two Mesolithic findspots (200 and 201) some 300 m apart were found nesting under the western wall of the gorge under and outside rock-shelters; findspot 200 appears to belong to a single occupation, whilst 201 had some 3 m of breccia in front of the shelter with lithic tools, animal

and shell remains. The Klisoura Gorge became the subject of a subsequent more intensive survey and of archaeological excavations – see below (Runnels C., 1996).

Kandia Survey (7 plus Map R08b**) –** The 2003 survey under C. Runnels discovered 15 Mesolithic sites between Nauplion and Kandia. Most of the sites are in caves or under rock-shelters. Some are currently near the seashore (Fig. R08-2), whilst others are along the valley near Kantia/Kandia (Fig. R08-2). According to C. Runnels (2009), they cover all Early as well as Late Mesolithic periods. As with the Southern Argolid Survey, there is no evidence of the Transition, but the mere fact of peopling the Mesolithic landscape is important, because it confirms that the incoming farmers were not necessarily entering a depopulated landscape.

Southern Argolid Survey (8 plus Map R08b**) –** The original survey was conducted between 1979-1983, and C. Runnels later revisited the sites and studied the lithics (Fig. R08-3a) (Runnels C., 2009). He determined that there were 7 Mesolithic sites (Map R08b & Fig. R08-3), believing they were from the Early or Middle Mesolithic, corresponding to phases VII and VIII at Franchthi Cave, but undatable. He states that "*Three are found on the present coastline west of Franchthi, two are in the Fournoi Valley and two more at upland interior locations on the slopes of the Didima Range. These sites are within one day's walk of Franchthi. The Didima Range sites are at the highest elevations in the region. Site D-3 is associated with a cave and a spring, and G-33 is in a high upland basin. The slopes of the Didima Range were once covered with a deciduous oak and pine forest and these two sites are plausibly interpreted as camps for seasonal foraging parties exploiting the uplands for red deer, boar, acorns, and other forest resources. Closer to Franchthi, in the Fournoi Valley, F- 35 is associated with a small cave and a spring. It too was a good place for a foraging party to camp temporarily while hunting in the upland forests because it sits in a convenient pass between two valleys with sweeping views over the surrounding countryside. Near Franchthi itself, F-14 is likely to have been a raw material extraction site. Outcrops of flint at this location were identified as the source of some of the Mesolithic stone tools at Franchthi (Jacobsen and Van Horn 1974). Three sites on the cape to the west of Franchthi (C-2, C-6, and C-7) look over the wetlands and the coastline, which would have been invisible from Franchthi. These sites are good candidates for hunting-fishing stands, or for activities such as launch sites for fishing boats. Foraging parties at these sites were no more than an hour's walk from the cave, and they could have been used for work or rest while an eye was kept on the shoreline stretching to the north and south*". There is no evidence to determine the specific function of the sites, nor whether they were occupied within the same time period. "*The balance of the available evidence supports a prima facie argument for these sites to be part of a logistical network centred on a residential base at Franchthi Cave*" (Runnels C., 2009).

Although there is nothing on the Transition, the information is important in that it demonstrates that focussed surveys, concentrating on probable localities can identify hunter-gatherer sites, peopling a landscape that had previously been considered unpopulated during the Mesolithic.

Southern Balkans – The Peloponnese and Megara – Mesolithic and Transition sites – Introduction

It has been pointed out that almost all the known Mesolithic sites in Greece are coastal or near-coastal. The principal reason given for this is attributed to the shortage of large game, so that the population *in situ*, once the steppe herbivores had migrated north with the retreating ice-cap subsequent to the LGM, needed to adapt to the changing environment by tapping into marine resources, a broad spectrum of plants food, as well as smaller terrestrial animals, including gastropods, to satisfy their needs to survive.

The known Mesolithic presence in the Peloponnese is essentially restricted to the Argolid and the region of the Isthmus of Corinth, according to current archaeological knowledge. Surveys specifically seeking Mesolithic and Palaeolithic sites are largely limited to the Argolid in the

Peloponnese, although a number of Palaeolithic and possibly Mesolithic lithic scatters have been discovered outside of the Argolid.

The Mesolithic sites discovered which have produced a stratigraphy are in caves and rockshelters, but the surveys in the Argolid have brought to light open-air sites as well.

Southern Balkans – The Peloponnese and Megara – Mesolithic and Transition sites – Sites details

Franchthi Cave (10) – This is the key site in the Argolid. The cave has a large opening and an extensive and relatively flat chamber (Figs. R08-4, R08-5, R08-5a & R08-5b). During the Mesolithic the distance from the sea would have been slowly reduced from 2 to 1 km, with a shrinking coastal plain in between (Fig. R08-5c), on which a settlement, now underwater, was built during the Early Neolithic. The site is now lapped by the sea. The cave was occupied intermittently during the Palaeolithic, and almost continuously from the 14th millennium BC until the Neolithic, with varying degrees of intensity and a few hiatuses (Farrand W., 2000); one of these hiatuses is at the Pleistocene-Holocene boundary when it is thought the population might have moved closer to the coast before returning to Franchthi Cave after a gap of 600-650 years, during which they developed a more mixed economy with less reliance on hunting (Koumouzelis M., *et al.*, 2004), with wear analysis on stone tools showing that some of these were used to cut grasses (reeds, oats, barley) (Hansen J. 2006: 180). The excavations inside and outside the cave cover a small fraction of the surface available (Fig. R08-5), and due to the cave brow and roof collapses during the later Neolithic (Figs. R08-4 & R08-5b), even less of the surface than would have been available during the Mesolithic, the Transition and the Initial Neolithic. The entrance to the cave is now partially impeded by large boulders, and the rear of the cave has also been the subject of a roof collapse, opening a window, so that the interior is currently luminous and well ventilated (Figs. R08-4 & R08-5b).

The cave and the Paralia (Shore) were meticulously excavated between 1967-1974, with additional seasons in 1979, 1981 and 1985 in a number of trenches, under the direction of T. Jacobsen, from the University of Indiana. The excavations rank as one of the most meticulous and well published, and have been the subject of an exhaustive series of fascicles, including:

- Maps plans and sections by T. Jacobsen and W. Farrand in 1987;
- The shellfish by J. Schakleton in 1988;
- Lithics in three volumes by C. Perlès in 1987, 1990 and 2004;
- The botanical remains by J. Hansen in 1991;
- The ceramics by K. Vitelli in 1993;
- The human remains by T. Cullen in 1994;
- The depositional history, sediments, stratigraphy and chronology by W. Farrand in 2000.

Due to the confusion caused by the differing periodisations used in the different publications, a sequencing table (Fig. R08-7) has been compiled from data from Y. Facorellis (2003), W. Farrand (2003), T. Jacobsen (1981), J. Hansen (1991), C. Perlès (1987a; 1990; 2001) and K. Vitelli (1993).

The dates, recalibrated using OxCal 4.2, from lithostratigraphic phases W3 (Late Mesolithic), X1/X2 Terminal Mesolithic/Transition, X2 (Transition/Early Neolithic) and Y1 (Early Neolithic) are listed below. There are some inconsistencies between the dates and the lithostratigraphic attributions given by W. Farrand (2003, Table 6.1), and I have chosen to follow the ^{14}C dates, which are all on charcoal, and which appear to indicate probable continuity of occupation over the Transition (Perlès C., 2001) (Fig. R08-6).

Late Mesolithic dates, primarily from Lithostratigraphic Phase W3 according to W. Farrand:

- P-2107 8530±90BP = 7756-7355 BC (OxCal 4.2 at 95.1%), on charcoal, F/A balk, 177N – Median 7555 BC.
- P-1921 8410±90BP = 7595-7284 BC (OxCal 4.2 at 91.1%), on charcoal + earth, F/A balk, 102S – Median 7440 BC.

- P-1536 8189±78BP = 7384-7048 BC (OxCal 4.2 at 89.1%), on charcoal + earth, pit G-1:22, depth 4.12-4.83 m – Median 7215 BC.

Terminal Mesolithic/Transition dates in levels with no pottery according to K. Vitelli, and Lithostratigraphic Phases X1/X2 for W. Farrand. C. Perlès *et al*. (2013) indicate that P-2095 comes from a mixed stratigraphic context:

- P-1526 8022±76BP = 7144-6686 BC (OxCal 4.2 at 94.9%), on charcoal + earth, pit F/F1:43A1 – Median 6915 BC.
- P-2095 7980±110 = 7186-6595 BC (OxCal 4.2 at 95.4%), on charcoal + sediments, F/A balk: 146S depth 4.64-4.83 m – Median 6890 BC.

Transition/Initial Neolithic with pottery according to K. Vitelli (INT 0/1) and Lithostratigraphic Phase X2 for W. Farrand. C. Perlès *et al.* (2013) suggest that the pottery sherds found in the Level for the P-1392 date was possibly Ceramic Neolithic contamination, and that the Levels for the P-1527 and P-2094 dates contained no pottery:

- P-2094 7930±100BP = 7061-6588 BC (OxCal 4.2 at 95.2%), on charcoal + sediments, F/A balk: 143S – Median 6825 BC.
- P-1527 7897±88BP = 7055-6592 BC (OxCal 4.2 at 95.4%), on charcoal + earth, F/F1: 44B5 depth 4.43-4.6 m – Median 6825 BC.
- P-1392 7794±140BP = 7053-6426 BC (OxCal 4.2 at 95.4%), on charcoal + earth, pit A: 63 – Median 6740 BC.

Initial Neolithic/Early Neolithic dates with pottery, FCP 1 according to K. Vitelli and Lithostratigraphic Phases Y1-Y2 for W. Farrand:

- P-1525 7700±80BP = 6687-6422 BC (OxCal 4.2 at 95.4%), on charcoal + earth, FF1: 42B1 – Median 6555 BC.
- P-1667 7280±90BP = 6366-6002 BC (OxCal 4.2 at 95.4%), on charcoal + earth, H: 37Y – Median 6185 BC.
- P-2093 6940±90BP = 5992-5669 BC (OxCal 4.2, at 95.4%), on charcoal + earth, FAS: 129 – Median 5830 BC.

C. Perlès *et al*. (2013) have reported a new series of dates on charcoal for the Late Mesolithic and on cereal seeds from the Terminal Mesolithic/Transition, which are here reproduced:

Terminal Mesolithic dates for Phase XI, when Tuna fishing and non-geometric microliths have virtually disappeared, when transverse arrowheads appear and the mixed economy includes legumes, cereals, fruits, hunting and aquatic resources, are:

- GifA 80049 8025±45BP = 7045-6774 BC (OxCal 4.2 at 95.4%), on charcoal, FAN 169 – Median 6910 BC.
- GifA 80046 7935±40BP = 7032-6686 BC (OxCal 4.2 at 95.4%), on charcoal, FAN 166 – Median 6860 BC.
- GifA 80048 7990±40BP = 7057-6756 BC (OxCal 4.2 at 95.0%), on charcoal, FAN 166bis – Median 6910 BC.

Terminal Mesolithic/Transition dates obtained from levels with cereals but no pottery, which are described as mixed, are:

- GifA 11016 7805±40BP = 6701-6557 BC (OxCal 4.2 at 88.2%), on seed also used for GifA 11455, no sherds in Unit, FAN 163 – Median 6630 BC.
- GifA 11455 7740±50BP = 6648-6471 (OxCal 4.2 at 95.4%), on seed also used for GifA 11016, no sherds in Unit, FAN163 – Median 6560 BC.
- GifA 11017 7780±40BP = 6681-6504 BC (OxCal 4.2 at 95.4%), on seed also used for GifA 11456, no sherds in Unit, FAN 162 – Median 6590 BC.
- GifA 11456 7645±50BP = 6595-6428 BC (OxCal 4.2 at 95.4%), on seed also used for GifA 11017, no sherds in Unit, FAN 162 – Median 6510 BC.

The Transition/Early Neolithic dates below, although problematic, suggest a period in the middle of the 68th century BC, which is earlier than the dates for the Levels above described as Terminal Mesolithic/Transition which span the late 67th to the end of the 66th centuries BC:

- GifA 80045 7875±40BP = 6839-6611 BC (OxCal 4.2 at 87.6%), on charcoal from grey clay stratum, no sherds in Unit, FAN 159 – Median 6725 BC.
- GifA 80044 7555±40BP = 6476-6362 BC (OxCal 4.2 at 94.4%) FAN 158, on charcoal from grey clay stratum, one small sherd, FAN 158 - Date too recent, therefore to be ignored.
- GifA 80043 7910±40BP = 6858-6650 BC (OxCal 4.2 at 70.3%), on charcoal from grey clay stratum, 33g of sherds, FAN 151 – Median 6755 BC. The date calibrates to a plateau stretching from 7028-6650 BC.

Because of the plateaus occurring in the calibration curves, a Bayesian model was created. The dates for FANs 169 to 151 fall in a bracket between *ca*. 7050-6650 BC. The authors see a short temporal gap of 100-200 years between the Final Mesolithic and Initial Neolithic (Perlès C., *et al*., 2013: 1001), but if we include the dates from W. Farrand above, the only time span during which there is no overlap is between 6428 BC and 6366 BC, long after the Transition, which probably commenced in the 68th century BC.

There is "*strong continuity in the chipped stone tool assemblages, marine molluscs and ornaments between the Final Mesolithic and Initial Neolithic... It reinforces the suggestion that the Initial Neolithic reflects a phenomenon of acculturation by local (ex-)hunter-gatherers*" (Perlès C., *et al.*, 2013: 1012), and the authors leave open the question of whether it was Ceramic or Aceramic with only a small quantity of pottery. Whether this is a brief episode of local significance or the beginning of the EN can only be answered by a dating programme of the EN on the Paralia and not the shallow and largely disturbed EN deposits within the cave.

The earliest possible date for the initial contact with Neolithic groups is between 6900-6700 BC, close to the dates currently available for the Cretan Early Neolithic and several centuries earlier than the Early Neolithic of Thessaly, which was colonised by different human groups, as corroborated by the genetic study undertaken by R. King *et al*. (2007).

We have not seen a fascicle on the vertebrate land fauna, but several of the authors above make reference to these (Farrand W., 2003; Hansen J., 1991; Perlès C., 1987a, 2001, 2003b, 2004). At the beginning of the Holocene equids and caprids disappear and the megafauna become restricted to *Cervus elaphus* and *Sus scrofa*, with a few *Bos primigenius*. There is a net weighing in favour of red deer, which appears to have become progressively scarcer during the Mesolithic, and whilst they still represented 70% of the megafauna in the Final Mesolithic, some 50% of the faunal remains were then made up of fish, with the addition of terrestrial gastropods, sea shells and an ever increasing reliance on plant food. The plant food included wild oats, barley, lentils, peas and vetch in the Late Mesolithic, when part of a quernstone made of andesite was found, whose provenance is most probably to be found in the Saronic Gulf. This shift in resources over the duration of the Mesolithic could well have predisposed the hunter-gatherers to progressively adopt Neolithic attributes. In the Aceramic Transition/Initial Neolithic, ovicaprines were penned in the cave, as evidenced by shed milk teeth; this is followed by a reduced occupation (hiatus?) before the Early Neolithic "*during which domesticates might have appeared piecemeal*" (Halstead P., 2001: 134).

The Ichtifaunal remains are important in the sequence and include sea bream and grouper, which are the dominant species in the Neolithic, for which 4 fish hooks were found, and Tuna, which was important in the Mesolithic, but virtually disappears in the Neolithic. These species require off-shore fishing, suggesting that the occupants of Franchthi Cave, like those from the Cave of Cyclops further north, were competent navigators (Powell J., 2003; 2011: 174; Sampson A., 2008: 204).

K. Vitelli (1993) indicates that the archaeological levels appear to be substantially mixed along the Mesolithic/Neolithic interface, where 19 sherds were excavated from the clearly identified moist grey stratum defined as INT 0/1. These sherds from INT 0/1 are from pottery types identical to those from FCP 1 (Lime Monochrome Burnished, which L. Thissen (2000) considers to be similar to the

pottery from Corinth). She also notes that the 3 dates within the moist grey clay stratum overlap not only within INT 0/1, but also with the more recent FCP 1 date. The moist grey clay stratum also contained the first ovicaprine bones and a few charred grains of *Hordeum distichum* and *Triticum dicoccum*, to which J. Hansen (1991) adds *Lens culinaris*. The sparse occupation of the cave could be indicative of occasional occupation by groups which could have been mobile, for whom pottery would have been an encumbrance (or that greater use was made of the Paralia), which might conceivably support the notion that the sherds, ovicaprine bones and cultivated cereal seeds could be intrusive.

The lithics were studied by C. Perlès (1986, 1987a; 1990). She categorises the typology in Phases, with Phase VII being that for the Early Mesolithic, Phase VIII the Late Mesolithic, Phase IX the Terminal Mesolithic, Phase IX/X the Interphase between the Terminal Mesolithic and the Early Neolithic, and Phase X the Early Neolithic (Figs. R08-8 & R08-8a). Obsidian from Melos first appears discretely in the Late Pleistocene; it increases somewhat in the Early Mesolithic, becomes important in the Late Mesolithic, virtually disappears in the Terminal Mesolithic/Transition Phase IX/X and becomes very important again in the Early Neolithic when it represents 28% of the tools. At no period is it accompanied by cores or evidence for having been locally worked, so that it is unlikely to have been fetched by the local population, but rather obtained by exchange from competent navigators and obsidian knappers who exploited the resource; furthermore the Early Neolithic obsidian arrived in the form of pressure-flaked blades, quite different from the locally chipped artefacts which make up 90% of the Early Neolithic tools, and which clearly reflect continuity from the Mesolithic traditions, with trapezes, transverse arrowheads and no sickle inserts. During the Transition Phase IX/X, the small component of blades manufactured using pressure technology were therefore most likely obtained by exchange; that the cave occupants learnt the new technique from Neolithic migrants is less probable in the Early Neolithic (Bailey D. W., 2000: 126-127; Perlès C., 1986: 483-484).

Tracy Cullen (1995) reports that of the 15-30 burials identified for the Mesolithic, only one is dated to the Late Mesolithic: it is that of a child under two years of age, accompanied by 67 shells of *Cyclope neritea*, several of which were pierced, and 2 *Dentalia*. 8 superimposed graves dated to the Early Mesolithic were found near the right hand wall, inside the entrance, in trench G1; the topmost inhumation, that of a young man, whose cranium had been stove-in by a blow, had been buried with care in a flexed position with a ritual evidenced by the position of the skeleton and the stones and ashes covering his body (Fig. R08-6); the 7 burials beneath, found 50 cm below, included 5 inhumations (1 male, 3 females and 1 child), plus 2 intentional cremations, attested by the presence of all body-parts. These cremations are the earliest known in Greece, and amongst the earliest known in Europe and the Near East. Over the rest of the excavations, the disarticulated remains representing approximately 25 individuals were found, of which 19 in Early Mesolithic levels (8 adults, 2 adolescents, 6 juveniles, 2 young children and 1 new-born), and 6 from the Late/Terminal Mesolithic (4 adults and 2 juveniles). Some bones found in anatomical connection point to the possible subsequent disturbance of graves, rather than the remnants of specific rituals which could have caused the Mesolithic scatter, although this cannot be excluded. The burial of both sexes and all age groups, and the appearance of pendants, beads and ochre in the archaeological record "*may signify an emphasis on collectivity as well as differentiation*". "*The contiguity of space used by the living and occupied by the dead may well have been of more importance than the notion of a delimited burial plot. At Franchthi, the concern to preserve the bones of the deceased within the living space may signal the emphasis on the continuity and definition of the social group*" (Cullen T., 1995: 285-286). Four Early Middle Neolithic burials were found inside the cave (Perlès C., 2001: 273 note 2), hinting at a possible cultural continuity, although the elapsed time span from the end of the Mesolithic needs to be taken into consideration.

There is clearly a change of economic strategy and in lifeways in the Transition/Initial Neolithic which occur over a number of centuries, with the introduction domesticated plants and animals (Hansen J., 2006), occupation outside the cave and on the Paralia, the construction of walls on the Paralia, external manufacturing activities, personal adornments, textiles, pottery, diversified bone

tools, changing and new lithic technology and tool types which include sickle blades, and an open-air settlement near the estuary as well as possibly in front of the Paralia (now underwater).

Neolithic migrants did not use caves as habitations, and Franchthi is particular not only in this respect, but due to the fact that structures were built outside the cave (Jacobsen T., 1981).

The arguments supporting continuity of the autochthonous Mesolithic population through the Transition and into the Early Neolithic with acculturation taking place over a number of centuries is strong and includes:

- Uninterrupted, if occasional or much reduced occupation of the cave from the Mesolithic into the Neolithic in the areas excavated;
- Neolithic migrants did not inhabit caves in the Early Neolithic;
- There is a dearth of Neolithic symbolism in the Initial/Early Neolithic (e.g. ear-studs and statuettes);
- Largely sedentary Mesolithic occupation, since fishing equipment is not easily transportable and plant remains indicate multi-season collection.
- The possible cultural continuity of burial practices within the cave;
- Continuity in the lithic tradition, both in terms of knapping technology, flake industry, microlithic industry, geometric armatures, and tool types between the Late and Terminal Mesolithic, the Transition, and the Initial Neolithic into the Early Neolithic;
- Clear indications that the Initial Neolithic blade tradition on honey flint and obsidian represents finished products obtained by exchange;
- Continuity of fishing and shellfish collection into the Neolithic, noting that the collection of *Cerithium vulgatum* requires the collector to dive to a depth approximately 2 m (Dilcock J., 2001);
- Continuity of hunting into the Early Neolithic, reducing over time as ovicaprines increase;
- Continuity in the tradition of perforating seashells;
- The collection and probable grinding of wild cereals, which would have conditioned the Mesolithic occupants to adopt cultivated varieties.

It is of course possible and even probable that as from the Initial Neolithic there was partner exchange and population intermixing with incoming Neolithic migrants (e.g. Dendra, Corinth, Crete), as well as material and cultural exchange; the important point for this study being the probable incorporation of the hunter-gatherers into the Neolithic lifeways over time. As T. Jacobson told N. Efstratiou (1995: 69), the stratigraphic discontinuities could not be considered as cultural gaps; or as J.-P. Demoule & C. Perlès (1993: 365) point out "*there were contacts between the Neolithic and the indigenous Mesolithic groups. At Franchthi, both traditions are represented in the lithics and the fauna of the Initial Neolithic*".

Franchthi Area Survey – See **Southern Argolid Survey** above.

Kephalari Cave (6) – This spacious cave on the southern edge of the Plain of Argos is also the source of the river Erasinos. It is now part of a religious sanctuary (Fig. R08-9) and the cave floor has been concreted over. The site was the subject of salvage excavations in 1974, which apparently identified thick Palaeolithic deposits, but there are no detailed excavation reports (Efstratiou N., 1995; Runnels C., 1996, 2001, 2009).

C. Runnels (2009: 69) hypothesised that "*It would be tempting to consider the great cavern of Kephalari near Argos to have been a residential base like Franchthi; too little is known about this unpublished site to make that determination*".

Klisoura Cave 1 (2) – This site, which corresponds to Findspot 201 from the Berbati-Limnes Survey (Fig. R08-10), is on the right bank of the Berbadiotis River (ancient Asterion), which runs dry in the summer and did so in the Early Holocene, so that agriculture was not possible in the valley of Berbati

(modern Prosymna) in the Initial Neolithic. The site, which was excavated between 1994-1997 by M. Koumouzelis, had a complex stratigraphy (Fig. R08-11). The Mesolithic and Neolithic sequences were under the overhang and are described as follows (Fig. R08-11) (Koumouzelis M., *et al*., 2003):

- Middle Neolithic and Bronze Age Units 1 & 2;
- Mesolithic Units 3, 3b,3/4, 3/5, 5, 5a, 6;
- Lower Units are Epigravettian, Aurignacian, Upper and Lower Palaeolithic;

The not very reliable ^{14}C dates were obtained on carbonates, since the bones did not contain collagen (Koumouzelis M., *et al*., 2003), and are not particularly useful:

- Gd-3784 6230±30BP = 5321-5026 BC (OxCal 4.2 at 95%), on carbonate breccia, Trench B – Median 5175 BC.
- Gd-3790 9150±220BP = 8929-7730 BC (OxCal 4.2 at 91.6%), on carbonate breccia, Layer 6 – Median 8330 BC.

The evolution of the lithics exhibits continuity from the local Epigravettian, as appears also in Cave 7, with possible contacts with the Adriatic zone. The lithic count, the analysis of retouched tools and the analysis of microliths for the Mesolithic are given (Fig. R08-12). One artefact of honey flint was found in each of units 3 and 5, and an obsidian burin spall and a bladelet were found in Unit 5a. Obsidian, although rare, continues in the Neolithic, with 2% of the pieces (C. Runnels, 1996); otherwise the lithics are on local radiolarite and flint with a ratio of bladelets to flakes of 1:3 and 1:4 between Units 3 and 5, which show similarities with Franchthi Cave lithic phases VIII to X. The debitage shows a growing reliance on flakes which are used to manufacture a range of tools including atypical trapezes. Assuming the honey flint is in its correct stratigraphic position, then the dates for units 3 and 5 would correspond to Franchthi lithic phase X, which would place it in the Transition/Initial Neolithic (Kaczanowska M., *et al.*, 2008; Koumouzelis M. , *et al*., 2003).

Faunal remains are poorly represented, with land snails, wild boar, fallow deer and hare, and no indication of domesticated species (Koumouzelis M., *et al*., 2003).

There appears to be a continuity of occupation in the terminal Mesolithic. Given the dearth of Early Neolithic material, it probably attests to contact and exchange, with the same population continuing to use the site into the Transition, prior to the abandonment of the site until a Middle Neolithic occupation with typical Sesklo pottery. (Kozlowski J. K., 2003; Kozlowski J. K. & Kaczanowska M., 2009: 375; Sampson A., 2010: 47), or as stated by M. Koumouzelis (2010: 6), "*In spite of the absence of an Early Neolithic layer with groundstone tools, pottery, botanical and/or Zooarchaeological finds at the site (i.e. signs of a neolithic settlement), some lithic finds in Cave 1 such as macroblades of "honey" flint, chips of obsidian and lithic industry techniques imply exchanges between the late foragers in the area and the Neolithic populations living in the Argive Plain*".

That the site was abandoned after initial contact with the Neolithic population in the wider region suggests that the cave-site occupants moved elsewhere, possibly to join the Neolithic migrants.

Klisoura Cave 2 (2) – This cave corresponds to find-spot 200 of the Berbati-Limnes Survey. The material is Early Mesolithic with no microliths, and the site appears to have been used for about 1000 years. Excavated by J. K. Kozlowski prior to 2001, but apparently not published (Perlès C., 2001: 20). The site could be A. Markovits's Ulbricht Cave (Runnels C., 2001), although this is unlikely (see below).

Klisoura Cave 4 (2) – This cave produced mixed Palaeolithic and Neolithic material (Koumouzelis M., *et al*., 2003). The site yielded large numbers of microburins, which are typical of the Palaeolithic (Galanidou N., 2003: 104).

Klisoura Cave 7 (2) – There were Palaeolithic sediments in this cave, but none attributable to the Holocene (Koumouzelis M, *et al*., 2003).

Koukou Cave (9) – this cave near the crest of a hill with commanding views down the valleys towards the sea near Franchthi Cave is some 5-6 km inland up the Fournoi valley (Fig. R08-3). It is site F35 of the Southern Argolid Survey, and the few flake-bases tools found on the surface are probably Early/Middle Mesolithic. The site appears to be a special purpose site, probably a hunting halt (Runnels C., 2001, 2009; Runnels C. & Van Andel T., 1987). The site would appear not to have been occupied after the Middle Mesolithic and can therefore tell us nothing about the Transition.

Ulbricht Cave (4 guesstimated position) – This cave of unknown location was excavated by A. Markovits in the 1920s. It was occupied since the Palaeolithic, and antedates Zaimis Cave. It is supposedly somewhere in the bay of Nauplion. The attested presence of seashells means it was probably turned towards the sea, and is unlikely to be in Klissoura Gorge as has at times been suggested. There was a poor representation of megafauna, which might have been scarce, and could explain the diet breadth of the occupants (Perlès C., 2001: 30). The occupation appears to end in the Mesolithic, or even in the Late Palaeolithic if we follow N. Galanidou (2003), who studied the lithics, although the attested presence of obsidian throughout the layers and a predominantly flake industry in the upper levels pleads for a Late Pleistocene to Holocene sequence, similar to Franchthi. Nothing more is recorded of the lifeways of the occupants, so that whilst the site could confirm a presence throughout much of the Mesolithic, it cannot inform us on the Transition, since there were pre-Neolithic artefacts just below the surface.

Zaimis/Zaïmas Cave (1) – This cave, of unknown location near Megara at 138 masl, was excavated by A Markovits over a six-week period in 1928**.** N. Galanidou (2003), who has studied the lithics and the notes and publications left by A. Markovits, summarises the archaeological layers as follows:

- Layer V, 30 cm thick is described as Early Neolithic with bones and pottery in the upper part, becoming sterile lower down;
- Layer VI below, 8-15 cm thick was devoid of artefacts, whilst containing bones and land and sea mollusc shells;
- Layer VII, 8 cm thick and sterile at the top, containing flint artefacts, land snails and bones of domesticated ovicaprines. He calls the date Late Megarian;
- Layer VIII, 8-15 cm thick contained burned bone, remains of hearths (burned stones ash and charcoal) molluscs and stone tools made of jasper, flint and chert.

It is not clear whether A. Markovits was able to properly identify ovicaprine bones, since they also 'appear' in the Azilian/Early Megarian Layer IX. N. Galanidou (2003) indicates that J. Boesneck identified the bones in layer VII as belonging to ovicaprines according to Tellenbach (1983), who assigned Layer VIII to a Preceramic Neolithic. N. Galanidou (2003) concludes that Layers VIII and IX relate to an early Mesolithisation during the Late Pleistocene. The small lithic assemblage from Layer VII has similarities with Layer VIII and could therefore date from the Early Holocene or the end of the Pleistocene. She considers the 40 cm 'sterile layer' between the Mesolithic and Early Neolithic, including Layer VI to represent a hiatus in occupation because there are no lithics, yet there are marine molluscs in Layer VI, which had to be transported there by human agency, as well as bones, although no analysis of these is available. She gives no clue as to the date of the Early Neolithic.

In the final analysis it is very difficult to say much about the Transition. If some sort of occasional use of the cave was made over time by Mesolithic groups, it is conceivable that it is their Neolithised descendants that are present in Layer V. Why would Early Neolithic migrants occupy a cave on a rocky escarpment over 150 masl?

Southern Balkans – The Peloponnese and Megara – Initial and Early Neolithic sites – Introduction

C. Runnels (1996), quoting C. Perlès (1987), states that the incoming farmers in Southern Greece had sustained contacts with the local foragers as evidenced by the tool types, manufacturing techniques and raw material.

Southern Balkans – The Peloponnese and Megara – Initial and Early Neolithic sites – Sites details

Dendra (5) – This Early Neolithic site in the Plain of Argos was excavated between 1976-1977 by E. Prontonotariou-Deïlaki who published a preliminary report in 1992 (Perlès C., 2001). The site is unusual in that it is made up of pits interpreted as pit dwellings, substantially deeper than those found at the Mesolithic site of Maroulas on the Island of Kithnos. There is no doubt that the site was Neolithic from the outset, with domesticated plants and animals, polished stone axes, part of a stone vessel, ear-studs and a clay figurine. No dates are available. According to the authors, the chipped stone tools recalled those of the Palaeolithic and Mesolithic, but C. Perlès (2001) states that those on display at the Museum in Nauplion are typical of the Neolithic in that they are made of honey flint and obsidian and include sickle blades.

It is possible that some of the lithics bore a Mesolithic influence, since a Mesolithic presence is attested in the region, but the population appears to have been fully Neolithic, possibly coming from Cyprus.

Lerna (12) – This Early Neolithic open-air site is at the southern limit of the Plain of Argos, near a lake which has now disappeared. The earliest levels produced a macroblade industry on honey flint and obsidian (Kozlowski J. K., 2003).

Southern Balkans – The Peloponnese and Megara – Conclusions

There is no assured evidence for the Mesolithic in the Peloponnese other that in the Argolid and the hill region to the north, as well as in Megara just beyond the Isthmus of Corinth. There could possibly be some Mesolithic influence to be found in the ASEA survey material.

The Mesolithic presence is well attested in the Argolid, Klisoura Gorge and Megara. The sites that supply evidence of continuity of occupation between the Mesolithic and the Transition to the Neolithic are Zaimis Cave, Klisoura Cave I and Franchthi Cave.

There are several Palaeolithic find-spots in the Peloponnese, and it could be that during the Post-Glacial, some of these hunter-gatherers moved to coastal sites to exploit the marine resources, as evidenced at Franchthi Cave, Zaimis Cave and Ulbricht Cave, but that these have been lost to the marine transgression. Against this suggestion is the lack of evidence for Mesolithic camp-sites in the back-country of the Peloponnese.

Regions 9-12 – Eastern Central Balkans – Introduction

(Maps MR1 and MR2)

Eastern Central Balkans – Regions and geography

This Macro-Region encompasses the Republic of Macedonia and the Balkan Peninsula north of the Rhodope Mountains up to the Danube; it then follows the Danube incorporating the territories to the west as far as the Dinaric Alps, and north as far as the Bakony Mountains north of Lake Balaton in Hungarian Transdanubia. Brief excursions will however be made east of the Danube in Romania, particularly in the Regions of the Iron Gates and Serbia, as well as north of the Bakony Mountains in Transdanubia. The Area has been split into the four following Regions:

- Region 9 covers Bulgaria and The Republic of Macedonia.
- Region 10 covers Serbia to Slovenia east of the Dinaric Alps.
- Region 11 covers The Iron Gates where the Danube passes through the gorges between the Dinaric Alps to the south and west, and the Carpathian Mountains to the north and east.
- Region 12 covers Hungarian Transdanubia and Eastern Slovenia.

The penetration of the Neolithic into the Central Balkans from the head of the Aegean followed several routes, which from east to west are as follows:

- From Anatolia following the Black Sea shore up to the Danube;
- From Southern Thrace up the valley of the River Maritsa river system to the east of the Rhodope Mountains;
- Up the valley of the River Néstos / Mesta which cuts through the Central Rhodope Mountains from the coastal plain (Kapitan Dimitrievo);
- Up the valley of the River Strimón / Struma from east of the Khalkidhiki Peninsula into South-West Bulgaria and the region of Sofia (Kovačevo, Vaxevo/Vaksevo, Nevestino, Elešnica/Eleshnitsa, Galabnik, Slatina), where it connects with the valley of the River Iskur which flows north into the Danube in Northwest Bulgaria, as well as the valley of a northwest flowing tributary of the River Morava, which itself flows northwest into Serbia, to join the Danube east of Belgrade;
- Up the valley of the River Vardar into Central Macedonia, where it connects with the valley of the River Morava in the region of Skopje.

It is clear that the earliest penetration is the easternmost with the Neolithic migrants bringing DFBW monochrome pottery, principally up the Black Sea coast and/or up the valley of the River Maritsa. This first occurred shortly after the middle of the 7th millennium BC (approximately coinciding with the arrival of the first migrants in Thessaly), at the same time as the Archaic Fikirtepe Culture, also identified with DFBW, arrived in the region of the Sea of Marmara, suggesting it was an extension of the same migrational movement. Other Neolithic migrants appear to have arrived in Southern Thrace by sea (Hoca Çeşme and Aşağı Pinar). This monochrome phase, which predates the '6200 BC event' reached into Eastern and North-central Bulgaria, where it is known as pre-Karanovo, as well as into Serbia. Some of the sites identified with this DFBW facies in the Central Balkans are:

- Poljanica Plateau/Polyanitsa Platoto (Eastern Bulgaria);
- Ohoden-Valoga, Koprivets/Koprivec, Orlovets, Cherven and Dzhulyunitsa (North central Bulgaria);
- Kraïnitsi/Kraïnici up the Struma River valley (Western Bulgaria);
- Donja Branjevina (Monochrome through the end of the Neolithic) and Divostin (Serbia);
- Gura Baciului (Romania).

Several authors have either considered the DFBW not to have existed as a separate cultural entity to the Painted Ware facies (Stefanova T., 1996; Lichardus-Itten, *et al*., 2002, and Thissen L., 2005, quoted by Çilingiroğlu Ç., 2009) or to be 'Early Starčevo' (Bruckner B., 1997). The dates and

stratigraphies in Bulgaria however strongly suggest an initial, if thin, penetration into the Central Balkans starting early in the second half of the 7th millennium, but that this migration coming from Northwest Anatolia played a minor role in the broader Neolithisation of the Central Balkans (Nikolov V., 2007: 184, quoting M. Özdoğan & L. Thissen, 2002); this is corroborated by the phylogenetic study of plants, which indicates a different provenance for the plants entering via Thrace with the DFBW groups, as against the Starčevo groups which colonised the central Balkans from further west (Coward F., et al., 2008).

The second and more massive migration of Neolithic communities, synchronous with the '6200 BC event', does not appear to have penetrated via the Thracian route into the Central Balkans; this migrational movement appears to have primarily used the valleys of the and Axios/Vardar and Strimón/Strymon/Struma rivers to head north, as Ç. Çilingiroğlu (2009: 422) has stated "*Struma (Strymon) Basin is considered as one of the major dispersal routes of Neolithic way of life from the Aegean into the Southeast Europe (Nikolov 1989; Lichardus-Itten 1993; Todorova 1995). It certainly provided variety of natural resources, micro ecological zones, communication networks and suitable soil and climatic conditions for cereal cultivation and animal herding*". The Central Rhodope route via the Néstos/Mesta River valley was also used according to V. Nikolov (2007), who sees local variations in the pottery styles and decorations in the assemblages from the sites of these migrants, but an overall homogeneity with cultural affinities with Southern Anatolia. N. Tasić (2007), through the study of pottery decorations and its geometric motifs follows M. Garašanin (who excavated the site of Anzabegovo in Macedonia) in attributing the Early Neolithic Starčevo pottery to influences from Anatolia with roots in the Lake District, even if one is painted white on red and the other red on a pale surface.

This substantial and rapid migrational movement is attested by hundreds of sites, known variously as Karanovo (Bulgaria), pre-Sesklo and Sesklo (Greece), Anzabegovo-Vršnik (Republic of Macedonia), Gura Baciului (Romania), and Starčevo, or Starčevo-Körös-Criş complex (primarily in ex-Yugoslavian Serbia, Croatia and Slovenia on the eastern side of the Dinaric Range, Northern Romania and Hungary). John Nantris, in 1997, coined the term 'First Temporal Neolithic' (FTN), to cut through this mess of nationalistic terminology.

During the FTN of the Central Balkans (Northwest Bulgaria, Western Romania, ex-Yugoslavia and up to the parallel on which Lake Balaton in Hungarian Transdanubia lies) the general feeling is one of mobility and the impermanence of sites. The tells found close to the Aegean disappear to be replaced by flat sites, often with flimsy pit-huts or dwellings, which if replaced, tend to be put up close-by (e.g. Bailey D., 2000: 57; Greenfield H. & Jongsma T., 2008; Mazurié de Keroualin K., 2003; Orton D., 2012: 7, quoting Whittle, 1996, Tringham, 2000). It is also thought that many of the early Starčevo migrants, who used a vegetable temper in their pottery, were primarily herders of ovicaprines rather than agriculturalists. M. Spataro (2008) has pointed out that there is a strong correlation between pottery using a vegetable temper (some 34% lighter than pottery using a mineral temper) and mobility, and quotes A. Manson (1995: 73-75) who stated that "*the ethnographic data showed a strong correlation between organic tempering and mobility. The ceramic evidence for increasing residential stability and reliance on cultigens through time may support the hypothesis that Starčevo groups originally relied more heavily on pastoralism than on agriculture*". Interestingly she points out that vegetable temper is not known in Thessaly, so giving weight to the fact that we are dealing primarily with a new wave of migrants with their painted pottery, arriving directly from the Near East; this conclusion is reinforced by the fact that constructions in Thessaly and Northern Greece have stone foundations and often use mud-bricks whereas in the Bulgarian Karanovo Culture these are not known, constructions being of wattle-and-daub without stone foundations (Bailey D., 2000: 47-52); the Central Balkans Neolithic also contains many cult objects and a symbolism which find their origin in Central Anatolia and the Near East (Borić D., 2008), which disappear with the development of the LBK in Transdanubia. S. Colledge and J. Conolly (2007: 30) have further pointed out, referring specifically to the Central Anatolian Plateau, that "*it is clear that the range of crops represented on the Anatolian*

sites is comparable with that for the Bulgarian sites", where there is a high incidence of rye, and whilst this is not the case in the Levant or Greece, it is true for Anatolia, comforting the hypothesis regarding the provenance of the migrants involved in the neolithisation of the Central Balkans. The Bulgarian finds are in the Karanovo I & II horizons (6000-5500 BC), when there is also evidence for contacts with Northern Greece, suggesting that this area is the meeting point of two currents of neolithisation.

The dating of the migrational movement up through the Central Balkans has been variously interpreted, since it cannot be assumed that they only headed north; there were undoubtedly some eastward, westward and return southward movements as well over time, and plenty of contact with cultural and material exchange between regions and sites, as well as probable partner exchange. Some of the earliest Neolithic sites have been dated:

- In Eastern Bulgaria from *ca*. 6400 BC;
- In Northern Macedonia from the end of the 7th millennium (Orton D., 2012);
- Blagotin on the River Morava in Serbia, *ca*. 6200 BC (Bonsall C., 1997, 2008), or *ca*. 6300 BC (Whittle A., *et al*., 2002);
- Iron Gates *ca*. 6050-6000 BC (Bonsall C., 2008);
- Transdanubia *ca*. 5700/5600 BC.

The northward advance of the Neolithic migrants was halted in the Carpathian Basin by a combination of ecological factors, which are discussed below, and possibly also by a stronger Mesolithic presence.

Eastern Central Balkans – Climate and environment

Permafrost did not reach the areas south of the Lower Danube during the last glaciation, and the Balkans were heavily wooded after the Pleistocene-Holocene transition (Willis K. J. & Bennett K. D., 1994: 327). At the end of the 9th millennium BC, in Northern Bulgaria the arboreal cover was mixed oak thermophile forests, with wet areas around the rivers which were used as additional sources of plant resources for the Neolithic inhabitants. Feather grass found at Ohoden-Valoga suggests that there were open areas as well (Marinova E., 2009).

This Mediterranean deciduous forest cover extended up the valleys south of the Danube, into the Iron Gates Gorges, which stretch over 100 km where the Danube cuts through the gap between the Dinaric Alps to the south and west and the Carpathians Mountains to the north and east. The Iron Gates/Đjerdap enjoys a favourable microclimate and was a favoured location for the Palaeolithic and Mesolithic hunter-gatherers, who were able to exploit aquatic as well as terrestrial resources. The Iron Gates Gorges are not a suitable area for agriculture with their mountainous terrain, which is one reason why Early Neolithic agriculturalist sites are only found upstream and downstream in more favourable locations for farming.

West and north of the Iron Gates stretches the Pannonian Plain, where virtually no evidence for the Mesolithic has been discovered. A partial explanation of this situation is probably to be found in the existence of extensive wetlands in the Carpathian Basin before the river regulations (Fig. R10-1).

The Lake Balaton and Carpathian Basin forest cover changed from a Taiga forest during the Late Glacial, to a deciduous one, of Mediterranean type to the south and a Central European one to the north at the beginning of the Holocene, This divide, known as the Central European-Balkanic Agro-Ecological Barrier (CEB AEB) (Bánffy E., 2000; Sümegi P. & Kertész R., 2001; Sümegi P., 2007), runs east-north-east from Lake Balaton (Fig. R12-1) and acted as a barrier to the northward progression of the Neolithic between *ca*. 6000-5500/5300 BC, whilst the population, crops and domesticated animals adapted to the central European climate and different geological conditions.

Eastern Central Balkans – Early human presence

The Southern Balkans are known to have been a refuge area during the last Ice Age and the LGM in particular. Sites in Bulgaria dating from 46k BC (Bacho Kiro and Temnata Dupka somewhat later) attest to extensive sourcing of lithic material. At Bacho Kiro most of the flint came from over 100 km away in North-Eastern and Eastern Bulgaria, especially the Luda Kamchiya region, and some from the Iskur river basin in North-Western Bulgaria; at Temnata Dupka, whilst the flint is partially local or meso-local, most is extra-local sourced from six different locations in Eastern Bulgaria, North-Eastern Bulgaria, the west including the middle Sava basin in Bosnia, the north-west including the mid-Danube basin in northern Voivodjina, the Southern Banat and Northern Danube basin, as well as Greece and Southern Bulgaria as far as the Rhodope mountains. This diversity attests to wide ranging mobility and/or contacts, which fluctuated over time. The Post-Glacial climatic improvements pushed the large herd herbivores (horse and/or steppe ass, bos/bison and reindeer) as well as musk ox and elk further north, starting *ca*. 14k BC, rendering the provisioning more problematic for the hunter-gatherers *in situ*. Reliance on more local but more difficult to hunt herbivores (red and roe deer, ibex, wild boar and chamois) in a closed forest environment, or requiring hunting at altitudes above the tree-line, as well as the exploitation of a wider range of plant an aquatic resources, became the norm (Bailey D., 2000). We can also assume that many hunter-gatherers followed the migrating animals, and several authors (e.g. Kozlowski J. K., 2003: 15) have suggested that the Terminal Mesolithic population was relatively small except in favoured locations, and we can only identify a few pockets of occupation in favourable locations at the beginning of the Holocene.

Pre-Holocene sites are also known in the Iron Gates Region at the cave or rock-shelter sites of Baile Herculane, Climente I & II and Cuina Turcului I, and at the open-air sites of Ilişova and Izlaz. As elsewhere, sites that might have been located near the shore, in this case the Black Sea, are now drowned, and slope erosion, sedimentation and anthropic activity will have eliminated the evidence of a large proportion of short-term sites.

The Mesolithic presence is poorly attested in this vast area, except in the ecological niche of the Iron Gates, along the Danube to the north, in the foothills of the Dinaric Alps and Transdanubia. Whether this is due to the mobility and ephemeral settlement pattern of the Mesolithic population, and/or poor research, and/or the subsequent site destruction of sites due to anthropic activity, is hard to say, but the sites discovered are mostly relatively permanent and close to water, in cavities, extraction sites, or else evidenced by lithic scatters which tend to keep their secrets. It is also true to say that the earliest Neolithic sites have not yielded many clues which can be used to suggest that they include a Mesolithic component or have Mesolithic attributes, except in Transdanubia, even if DNA studies suggest there is an autochthonous component in an increasing cline as the Neolithic progressed in a northern and north-westerly direction (Nowak M., 2007: 3). We can ask the question whether it is possible that the Starčevo Neolithic migrants had already incorporated Mesolithic communities as they moved north, since pit-huts are poorly attested in the Southern Balkans (Maroulas, Hoca Çeşme) for either the Mesolithic or the Neolithic, whilst these are attested in the Central and Northern Balkans during the Mesolithic (Icoana, Lepenski Vir, Ostrovu Banului, Ostrovu Corbului, Ostrovu Mare 873, Padina, Răzvrata, Schela Cladovei, Veterani Terrace and Vlasac in the Iron Gates Region, Regöly-2 in Transdanubia, and Jáztelek I in Northern Hungary), and that many if not most of the Early Neolithic Starčevo sites appear to have adopted this feature for their habitations.

Eastern Central Balkans – Funerary practices

The preferred position for inhumations of the Neolithic communities across the Region is the lateral foetal position, so that when such inhumations are found in Mesolithic or Transition sites contexts (e.g. Iron Gates) there is a *prima facie* probability that we are in the presence of acculturation or mixing of the populations.

The Iron Gates have produced in excess of 600 burials, although the exact number is hard to determine since many are secondary burials of skulls or disarticulated bones. The Mesolithic burials

of complete or headless cadavers are mostly in supine extended position although a few have been found in a sitting position or with the knees separated with the ankles together '*à la turque*'.

Eastern Central Balkans – Lithics

Microliths and geometric microliths in particular are normally associated with the Mesolithic. In Bulgaria these appear in Middle Neolithic and later contexts without there being any convincing evidence for a connection with the Mesolithic.

Honey flint from Bulgaria (also known as Balkan or pre-Balkan Flint) is associated with the Early Neolithic Karanovo Culture. It had a very wide distribution in the Southern and Central Balkans and Thrace, supporting evidence for long-range contact and exchange. M. Gurova (2012b: 40) appears to favour a provenance for the Early Neolithic knappers from the same regions as that of the Fikirtepe Culture in the Marmara Region.

In Transdanubia, microliths are clearly associated with the Mesolithic and these are incorporated by the Early Neolithic Late Starčevo migrants to the Region as well as the occupants of the Formative LBK sites.

Eastern Central Balkans – State of research

- Region 9 covers Bulgaria and Republic of Macedonia, where research is maturing and ongoing.
- Region 10 covers ex-Yugoslavia north of the Republic of Macedonia, where research into the Late Mesolithic and the Transition appears to be in its infancy in the Pannonian Plain in particular.
- Region 11 covers The Iron Gates, where the research has matured, but in the process of being continuously refined.
- Region 12 covers Hungarian Transdanubia, where research is in full flood.

Research in Bulgaria and the Republic of Macedonia, Region 9, goes back several decades so far as the Early Neolithic is concerned, but is going through a process of revision in light of the new evidence coming out of North-Western Anatolia. Given the paucity of evidence for a Mesolithic presence, little attention has been given to the Transition, although there appears to be some growing interest.

In the ex-Yugoslavian Region 10, there is also a paucity of evidence for a Mesolithic presence, other than in the foothills of the Dinaric Range and along the Danube, so that the question of the Transition has been primarily explored along the Danube.

The Iron Gates Region 11 has been an area of intensive research since the 1960s. Many sites have been poorly published, particularly those of the Romanian left bank. Those sites which have been the subject of continuing research have gone through several phases of reinterpretation, and whilst analysis is ongoing with numerous reappraisals of the data, the research can be deemed mature with a wealth of well documented information regarding the Transition.

The west Hungarian area of Transdanubia, Region 12, has been the subject of intensive research these past two decades and a substantial volume of new data is coming to light regarding the Mesolithic, Transition and the formative stages of the LBK culture, in which the Mesolithic population appears to have played an important part.

Eastern Central Balkans – Mesolithic

As indicated above, there is a paucity of information regarding the Mesolithic population in Bulgaria, the Republic of Macedonia and the Central Balkans Pannonian Plain as the Neolithic migrants progressed north from the Aegean following the fertile valleys of the Maritsa, Mesta, Strymon and Vardar Rivers, and down that of the Morava onto the Pannonian Plain west of the Danube.

There is however evidence for the Mesolithic in the foothills of the Pindus Mountains and Dinaric Range on the western side of the Macro-Region, along the Danube on the eastern side and in Transdanubia to the north.

Eastern Central Balkans – Neolithic

The Early Neolithic Starčevo Culture is well attested in all parts of the Macro-Region, if less so in the foothills of the Dinaric Range, the Iron Gates and in the vicinity of the Iron Gates Region. There appears to have been a large influx of Neolithic migrants at the time of the '6200 BC event', who progressed quite rapidly north, reaching Lake Balaton *ca*. 5700 BC, where the Neolithic advance marked a pause lasting several centuries, during which time the Formative LBK Culture evolved.

Eastern Central Balkans – Transition

There is clear evidence for Mesolithic sites adopting Neolithic attributes in the Iron Gates Region, as well as for at least one site in the foothills of the Dinaric Alps, whilst there is also good evidence for Initial Neolithic Starčevo sites and Formative LBK sites adopting Mesolithic attributes in Transdanubia. In Bulgaria, the Republic of Macedonia and the Pannonian Plain, there is little direct evidence for Mesolithic attributes in Neolithic sites, unless it be in the pit-dwellings.

Region 9 – Eastern Central Balkans – Bulgaria and Rep. of Macedonia

(Map R09)

Eastern Central Balkans – Bulgaria and Rep. of Macedonia – General Introduction

This Region is made up of Bulgaria to the east and the Republic of Macedonia to the west. The Black Sea marks the border to the east and much of Northern Thrace is incorporated in this Region as well as that of Thrace (Region 4), due to the Initial Neolithic migrational movement into Thrace from North-Western Anatolia, followed by a second Early Neolithic migrational pulse emanating from the west.

Two major mountain ranges run east-west in Bulgaria: the Rhodope Mountain Range marks the southern boundary with Greece with the Stara Planina Mountains to the north; between the two ranges runs the wide valley of the Maritsa River, and to the north of Stara Planina Mountains we find the Lower Danube Basin, which marks the northern boundary of the Region. In Central Bulgaria, the Rhodope Mountains curl north to join up with those of Stara Planina, to the west of which the river valley systems of the Rivers Strymon/Struma and Axios/Vardar give access to the Central Balkans north of this Region. The western boundary of the Region is marked by Dinaric Alps which form a continuation of the Pindus Mountains of Greece.

The Region is cut by important river systems that flow into the Northern Aegean, and which provided the migrational routes into the Central Balkans. To the east, the Maritsa finds its source in Central Bulgaria where the Rhodope Mountains curl north, from where it flows east, until it turns south towards the sea round the eastern end of the Rhodope Mountains; One of its main tributaries, the Tunja cuts through the Istranka Hills close to the Black Sea and finds its source to the north in the Bulgarian Stara Planina Mountains. Half way along the Rhodope Mountain Range, the Néstos/Mesta River, whose headwaters are close to those of the Maritsa, cuts through the mountains in a southerly direction. To the west of the Region, the Rivers Strymon/Struma and Axios/Vardar, which flow into the North-Western Aegean in Greek Macedonia, give access to the north through the Republic of Macedonia, connecting near their headwaters with the River Morava, which itself flows north into the River Danube, east of Belgrade. The principal access routes into the Central Balkans, based upon the Neolithic settlement pattern, was undoubtedly the western route, whether from Thessaly and/or Greek Macedonia; this was probably fed by a new maritime migrational flux probably induced in part by the social stress caused by the '6200 BC event', which resulted in a severe period of dry cold weather south and east of the Republic of Macedonia and Bulgaria, stretching across Anatolia into the Near East, and a breakdown of the social order.

Eastern Central Balkans – Bulgaria and Rep. of Macedonia – Mesolithic and Transition sites – Introduction

Several authors have pointed out that the only evidence for the Mesolithic in Bulgaria is the lithic scatters of Dekilitazh/Dikilitaş (also known as Pobiti Kamuni/Pobiti Kamini), and that there is a hiatus between the latest Epipalaeolithic/Mesolithic evidence and the Initial Neolithic. (Bailey D., 2000; Gatsov I., 1967; Gurova M., 2008: 167; Thomas H., 1967). M. Gurova (2012b: 2) iterated it as "*the well known fact that we have no reliable evidence of the pre-Neolithic substratum and cultural phenomena*", and in a similar vein to H. Thomas, states she is "*convinced we can find Meso settlements along the Danube*" (2013: pers. com.). The presence of only one Mesolithic site in Bulgaria is surprising given the existence of several Romanian sites south of the Danube Delta, close to the Bulgarian border, as well as several others to the north, north-west and north-east of Bucharest (Boroneanţ A. 2005). There is also the extensive Middle Mesolithic site of Myrne north of the Danube

Delta in the Ukraine close to the Black Sea border with Romania as well as numerous other Mesolithic sites in Southwestern Ukraine and the Crimean Peninsula (Biagi P. & Kiosak D., 2010).

The situation is no better in the Republic of Macedonia, where no Mesolithic sites have been discovered, although these exist in Greece to the south, Albania to the west, Montenegro to the north-west and the Iron Gates to the north.

Eastern Central Balkans – Bulgaria and Rep. of Macedonia – Mesolithic and Transition sites – Site details

Dekilitazh/Dikilitaz/Dikilitaş/Pobiti Kamuni/Pobiti Kamini (8) – This 50 km^2 area west of the town of Varna in North-East Bulgaria is referred to by two different names with diverse spellings. The area is one of dunes formed prior to the Holocene, on which some 11 lithic scatters have been found, producing 11000 chipped stone objects, amongst which were relatively few tools, suggesting the area was one where blanks and tools were manufactured for use elsewhere (Bailey D., 2000: 33). On typological grounds these have been dated to the Late Pleistocene and Early Holocene Mesolithic, with some material from the Late Neolithic.

The material has been studied by I. Gatsov, who points out that it shows a continuation from the Palaeolithic traditions through the Epipalaeolithic into the Holocene Mesolithic, and that it has similarities with the lithic assemblages from the Iron Gates dating from the 11th to the 8th millennia (Gatsov I., 1989, 2005, 2007; Srejović D., 1989: 485). The material includes 424 microliths (points, lunates, triangles, trapezes, truncated and retouched bladelets) and a large number of sub-conical cores. This site is on the route connecting the north shore of the Black Sea, where sub-conical cores originated in the Dnieper-Prut Region, and the south shore of the Black Sea where they are found in the Ağaçli Mesolithic Culture. Özdoğan (1998) has compared the material to that of the Ağaçli Group on the southern shore of the Black Sea, which has been typologically dated to the 7th millennium BC.

The fact that so much material appears to have been worked in this area during the Mesolithic is evidence for a population whose Early Holocene settlements have not been found and whose subsequent movements are currently not known, either because they were mobile and left little archaeological signature and/or because their settlements were close to the shore of the Black Sea and that these sites are now drowned. It should also be noted that there are several sites south of the Danube Delta in Romania (Boroneanţ A. 2005), that the Middle Mesolithic site of Myrne north of the Danube Delta in the Ukraine is close to the Black Sea border with Romania, and that there are several other Mesolithic sites in Southern Ukraine and the Crimean Peninsula (Biagi P. & Kiosak D., 2010).

There is a hiatus between the latest use of this area and the Initial Thracian Neolithic (Gatsov I., 2005: 215), and this has been echoed by several other authors.

Eastern Central Balkans – Bulgaria and Rep. of Macedonia – Initial and Early Neolithic sites – Introduction

"*According to the Kovačevo research team the region of the Strimon* [Strymon/Struma] *and Vardar* [Vardar/Axios] *valleys was probably directly and independently colonized with a continuously maintained direct connection with an Anatolian (Asia Minor) homeland (Lichardus-Itten at al. 2002; 2006)*" (Gurova M., 2012a: 38); or as Ç. Çilingiroğlu (2009: 422) said "*Struma (Strymon) Basin is considered as one of the major dispersal routes of Neolithic way of life from the Aegean into the Southeast Europe (Nikolov 1989; Lichardus-Itten 1993; Todorova 1995). It certainly provided variety of natural resources, micro ecological zones, communication networks and suitable soil and climatic conditions for cereal cultivation and animal herding. The importance of the region is also provided by its regional cultural character which differed to some extent from Karanovo sites of Thrace*".

An early first wave of Neolithic migrants, identified by their monochrome pottery (DFBW), entered Thrace commencing early in the second half of the 7th millennium. M. Özdoğan (2012: 660) identified the following sites:

- Koprivets (Boyadzhiev, 2006);
- Drama (Lichardus, 2000);
- Kovačevo (Lichardus-Itten, *et al*., 2006);
- Yabalkovo (Leshtakov, 2004);
- Krainitsi (only DFBW site in the valley of the River Struma).

To this list can probably be added the sites of Cerven, Dzhuljunitsa, Ohoden-Valoga, Orlovets, Poljanica Plateau/Polyanitsa Platoto and Pomoshtitsa.

C. Perlès (2009) has pointed out that both the female mitochondrial DNA and the male Y chromosome DNA have confirmed the presence of Near-Eastern migrants in the Initial Neolithic of North-Eastern Greece and the migrational push into the Central Balkans. She postulates that the Greek Initial Neolithic did not exclusively originate from Western Anatolia, that the Bulgarian Initial Neolithic did not originate exclusively from Greece and that whilst the overland route into Bulgaria is reasonably well document, the maritime route to North-Western Greece and points north and east is less clear. Some of the earliest Neolithic attributes became so generally distributed before the colonisation of Greece, that they cannot be used to determine the origin of the colonisers (domesticates, rectangular buildings and limestone floors, sickle blade inserts, polishes stone, basketwork, spindle whorls, sling-shots, stone vases, figurines, pintaderas, etc.). C. Perlès points out that an original material culture which developed in the Zagros and which included the following attributes, which overlay the above common background, diffused westward across Anatolia:

- Bone belt buckles;
- Bone spoons;
- 'bone flenders' or rough adzes;
- Striated sickles;
- Antler wood adze sheaths;
- Circular scrapers and sickle inserts retouched bi-laterally in a semi-abrupt manner;
- Tubular beads made of bird bones;
- Polypod pottery offering tables;
- Anthropomorphic pottery;
- Cooking pots and storage jars.

These elements are absent from the Southern Levant and the Thessalian Initial Neolithic, whose cultural connection is corroborated by the weeds associated with the cultivated plants. Almost all of these elements, diffused in Anatolia, can however be found in the North-West Anatolian and Thracian DFBW Fikirtepe Culture sites after the middle of the 7th millennium BC, as well as in the next overland migrational movement into Thrace and Bulgaria during the '6200 BC event', which by-passed the Fikirtepe Culture sites in North-West Anatolia. C. Perlès (2009) also sees similarities between the Greek Macedonian and the Republic of Macedonian Initial Neolithic on the one hand, and the Anatolian Early Neolithic and South-Eastern Bulgarian Early Neolithic on the other.

Microlithics, and geometrics in particular, are normally associated with the Mesolithic, yet they appear in one or two Early Neolithic and later contexts in Bulgaria, without any clear evidence for their having originated from either contact with or assimilation of a local Mesolithic substrate. M. Gurova (2008: 166-167), and J. Lichardus, *et al*., (2000) have listed the following Neolithic sites with geometric microliths:

- Kalojanovets microliths from the Early and Late Neolithic;
- Kovačevo (2 lunates used as armatures) from the Initial Neolithic;
- Karanovo (2 trapezes and 1 lunate) from Karanovo III & IV;
- Drama-Gerena (26 microliths of which 15 trapezes and 11 segments mostly used as armatures, although a few are sickle inserts and cutting instruments) dating from the Middle Neolithic;

- Usoe;
- Damjanica (1 Microlith).

The Early Neolithic of this part of the Region has been well explained by Ç. Çilingiroğlu (1997: 437), who states that "*The Neolithic sequence in the Axios/Vardar river valley is better understood due to the relatively high number of excavations which number 41 only in the territory of FYROM* [Former Yugoslav Republic of Macedonia]. *In the region, Neolithic sites are either in the form of settlement mounds (locally called Toumba) or flat settlements on river terraces. EN period covers more than half a millennium (6400/6200-5700 BCE) in the FYROM. Middle Neolithic is another long period in FYROM corresponding to 5700-5000 BCE and LN covers the entire 5th millennium BCE (for details see Mitrevski 2003)*.

In Greek Macedonian district, Nea Nikomedeia, Servia V and Yannitsa B (Giannitsa B) are the best documented sites which contain EN cultural sequence. The pottery assemblages are clearly dominated by fine red slipped burnished pottery which is typically accompanied by low amounts of medium-coarse impressed and fine painted (white-on-red and red-on-cream) wares".

We will only examine a few of the Initial Neolithic sites in the Republic of Macedonia.

No Early Neolithic sites have been found along the Lower Strymon/Struma or Néstos/Mesta Rivers, but a number of sites with some white-painted rounded or biconical vessels on the middle and upper reaches (Kovačevo, Vaxevo/Vaksevo, Nevestino, Elešnica/Eleshnitsa, Galabnik, Slatina and Kapitan Dimitrievo) have been excavated. The only Early Neolithic in Western Thrace known to date is Tell Kapitan Dimitrievo. Nikomedeia and Gianitsa B, on the Lower Axios/Vardar River in the Gianitsa Plain, appear to look both ways, with some red-painted pottery of Thessalian tradition in the lowest levels as well as some white-painted rounded vessels which look towards South Anatolia and the migrational movement into the Central Balkans. To the east of the Middle Vardar River, rounded vessels with white painted motifs have been found in the lowest levels at Anzabegovo and Vršnik. (Nikolov V., 2007: 184-186).

E. Stamboliyska and Z. Uzonov (2009) list over 50 Early Neolithic sites in Bulgaria, so that when those in the Republic of Macedonia are included, the migrational pulse into the Central Balkans is well represented in the Region.

<u>Eastern Central Balkans – Bulgaria and Rep. of Macedonia – Initial and Early Neolithic sites – Site details</u>

Anzabegovo (27) – This is the eponymous site for the Anzabegovo-Vršnik Early Neolithic Culture in the Republic of Macedonia. The site, on the River Vardar in the district of Ovče Polje, was cut through by a railway line. It was initially excavated in 1960 by the Ljubljana University and Skopje Museum and again in 1969-1970 under the direction of M. Gimbutas, who published her findings in 1996, as well as by M. Garašanin.

"*The stratigraphy of the mound relies on three scattered small excavation areas covering solely 22m. According to Gimbutas, the mound contains nine levels of four distinct periods which are called Ia, Ib, II-III and IV from EN to LN. Garašanin (1998: 29) presents an alternative stratigraphy of the mound relying on his own excavations which covered an area of 230 m2. According to his sequence, Anza I, encompasses actually three sub-phases and represents the EN strata on the mound... Anza I, much disturbed by the upper Layer II, is represented by pits and mud-bricks in one excavation area... Polished axes, bone tools, figurines and fine pottery are typical finds from the Anza I period. The basal settlement has been founded by fully-fledged farmer-herders who brought domesticated cereals and animals with them. The subsistence was provided by einkorn wheat, six-hulled barley, peas and lentils as well as by sheep-goats (Renfrew, J. 1976)*" (Çilingiroğlu Ç., 2009: 443).

The site contained White-Painted pottery in its lowest levels (Nikolov V., 2007: 184-185). Wild fauna represents 2.78% of the total fauna during Phases I-III, reducing to 1.9% during Phase IV (Orton D., 2012: 10-11, Table 1).

The earliest dates for this site are (Nikolova L., 1998: 124; Reingruber A. & Thissen L., 2005: 319):

- Lj-2519 7560±70BP = 6530-6248 BC (OxCal 4.2 at 93.3%), No Level, charcoal – Median 6390 BC.
- Lj-2181 7270±140BP = 6426-5896 BC (OxCal 4.2 at 95.4%) Level Ia, charcoal – Median 6160 BC.
- Lj-3032 7210±50BP = 6211-6004 BC (OxCal 4.2 at 95.4%) Level Ia, charcoal – Median 6110 BC.

The first of the above dates is suspect, since it is not from a clear stratigraphic position, so that a date post-6200 for its establishment would still be an early date for painted White-Painted pottery.

This site can be considered as being established by the migrational movement which gave rise to the Starčevo Culture. With less than 3% hunted fauna in the early Levels (Orton D., 2012 Table 1), there does not appear to be any Mesolithic influence.

Aşaği Pinar (24) – Initial Neolithic site in Central Turkish Thrace near Kirklaredi. The excavations, begun in 1993, were ongoing in 2008 on a surface exceeding 4000 m^2.

The basal Levels 8-9 contained Archaic Fikirtepe DFBW as well as some Red-Slipped Fikirtepe Ware in well stratified contexts.

Level 7 contained Karanovo I Red-Slipped Ware of western tradition, some of which was painted white. The assemblage showed affinities with Hoca Çeşme to the south, which is later than the Fikirtepe Culture (Özdoğan M., 2005, 2008, 2011b, 2011c). It is the most easterly site known to have produced the Karanovo pottery and can be seen as a bridge between Anatolia and the interior of the Balkans (Özdoğan M., 2008).

According to Ç. Çilingiroğlu, (2009: 400-401), quoting M. Özdoğan and Schwarzberg (2008: 20-21), Level 8 contained DFBW, possibly dating from 6400-6300, whereas Level 7 contained RSBW and White-on-Red Ware.

The earliest dates found, indicated as below Level 6 is (Reingruber A. & Thissen L., 2005: 312):

- Bln-4996 6900±48BP = 5895-5705 BC (OxCal 4.2 at 94.4%), below Level 6, on cereal – Median 5800 BC.
- MAMS-15895 6908±27BP = 5846-5725 BC (OxCal 4.2 at 95.4%) from ditch – Median 5775 BC.

M. Özdoğan (2013: 190) indicates that Level 7 has been dated 5950-5750, and that whilst the lowermost Level has not been dated, it is estimated to date from 6200-6000 BC.

There is no indication of any Mesolithic substrate at this site.

Although this site and that of Bulgar Kaynaği are in Turkish Thrace, they throw light on the Neolithisation process up the Black Sea coast into Eastern and Central Bulgaria, since there is a good probability that the Fikirtepe Culture sites incorporated Mesolithic elements.

Azmak/Tell Azmak (12) – This Later Early Neolithic Karanovo Culture site is located 25 km north-west of Karanovo in the Maritsa Valley.

Structures with floors made of mud, clay and plant material packed on to wooden substructures were excavated in the lower levels (Bailey D., 2000).

The earliest dates are (Horváth F. & Hertelendi E., 1994; Nikolova L., 1998):

- Bln-293 7303±150BP = 6452-5901 BC (OxCal 4.2 at 95.4%), on oak – Median 6175 BC.
- Bln-291 7158±150BP = 6273-5739 BC (OxCal 4.2 at 91.3%) – Median 6005 BC.

Because the dates for this site are on oak, and considered to be influenced by 'old wood' to the tune of several centuries, the date for the establishment of this site is estimated to be *ca*. 5700 BC (Reingruber A. & Thissen L., 2005: 312). Even if the site was established *ca.* 6200-6000 BC, there is no indication of any influence from a Mesolithic substrate.

Bulgar Kaynaği (23) – Archaic Fikirtepe Culture flat site in Turkish Thrace destroyed by a sand pit.

No details could be found to determine whether there were any indices of a Mesolithic substrate at this site, although Fikirtepe Culture sites mostly show evidence of Mesolithic traits in the lithic technology and the economic base.

Even if this site and that of Aşaği Pinar are in Turkish Thrace, they throw light on the Neolithisation process up the Black Sea coast into Eastern and Central Bulgaria, since there is a good probability that the Fikirtepe Culture sites incorporated Mesolithic elements.

Čavdar/Chavdar (11) – This Early Neolithic site is in the Topnitsa valley north-east of Sofia.

The earliest dates are (Reingruber A. & Thissen L., 2005: 312; Stamboliyska E. & Uzonov Z., 2009):

- Bln-1583 7208±52BP = 6212-6002 BC (OxCal 4.2 at 95.4%), Level VI, charcoal – Median 6105 BC.
- Bln-2108 7195±65BP = 6221-5982 BC (OxCal 4.2 at 94.0%), Level VI – Median 6100 BC.

This is apparently an Early Neolithic Karanovo site established by migrants with no indication of any Mesolithic influence, even if the date is early for the Karanovo Culture.

Cerje-Govrlevo/Govrljevo (22) – This site, for which there appear to be no dates, in the valley of the River Treska, has been described by P. Biagi and M. Spataro (2010: 124) as the earliest Neolithic site in the Republic of Macedonia, quoting Bilbija (1985) and Zdravkovski (2006). The site is famous for its male figurine 'Adam'. The lithics are unpublished, but include some retouched and unretouched Balkan Flint blades.

Drama (21) –This is an Early to Middle Neolithic site on the middle reaches of the River Maritsa.

This site, established by Early Neolithic migrants has been listed amongst those containing DFBW, presumably shortly after the middle of the 7th millennium BC.

The Middle Neolithic level of this site contained 26 geometric microliths (15 trapezes and 11 lunates), out of a total assemblage of 888 lithics which included other microliths. The geometric microliths were analysed and *ca*. 80% were considered to have been used as armatures. Given the time gap of close to a millennium between the end of the Mesolithic and the appearance of these microliths, it is not possible to postulate any Mesolithic influence (Lichardus J., *et al*., 2000).

Dzhuljunitsa/Dzuljunitsa/Dzhulyunitsa-Smardesh (6) – This is an Early Neolithic DFBW site in the Veliko Tarnovo region of North-Central Bulgaria, near the village of the same name, which was established between 6200-6000 BC (Gurova M., 2012b: 8). The earliest Level has affinities with the earliest phase at Koprivets, whilst the second Level is White-Painted Ware of Koprivets II type and has affinities with Kovačevo in the Struma River basin (Çilingiroğlu Ç., 2009: 417; Gurova M., 2011, 2012b).

The site is also noteworthy for being the earliest site known to date for the working of Balkan Flint, and M. Gurova, who is studying the lithics, has stated (2012a: 41-42) that in relation to the "*demic diffusion from north-west Anatolia (Marmara region) the site of Dzhuljunitsa is at the epicentre of the process, being closely affiliated to the context of Anatolian influences (mainly in pottery style) (Еленски 2008; Elenski 2004). This site is also the most serious candidate for the 'nuclear area' of procurement and subsequent distribution of BF 'Balkan Flint' and blade production. The location of the site at an almost equal distance from the Pleven-Nikopol Moesian flint and Ludogorie deposits (between 60 and 100 km) is quite advantageous for acquisition and transportation of raw material. We have to keep in mind that expeditions over much greater distances are presumed for acquiring high quality raw material in Neolithic times – about 400-500 km (Binder, Perlès 1990, 260).*

According to the available archaeological evidence, among the Dzuljunitsa flint repertoire there are virtually no formal tools of BF in spite of the fact that there are many blanks for their

manufacture. The site's inhabitants were probably only producers and consumers of blades of BF. On the other hand, once they knew the advantages of the Ludogorie BF (my assumption), they could take advantage of this acquisition and reach a local and independent perfection of their technological skills. Becoming thus the 'new flint knappers' they might incorporate BF products into the network of intra- and inter-regional exchange of goods, exotica and social messages".

There is no indication of any Mesolithic substrate at this site.

Elešnica/Eleshnitsa/Elešnitsa (20) – This is an Early Neolithic site near the River Mesta in Southwest Bulgaria with some rounded or biconical vessels of White-Painted Ware (Nikolov V., 2007: 185-186) from the post-DFBW demic migration into the Balkans and is one of the earliest sites with Karanovo pottery (Stefanova T., 1966).

The earliest date for this site is (Reingruber A. & Thissen L., 2005: 314; Stamboliyska E. & Uzonov Z., 2009):

- Bln-3238 7010±60BP = 6002-5758 BC (OxCal 4.2 at 95.4%), Level 2, on charcoal – Median 5880 BC.

There is no indication of a Mesolithic substrate at this site.

Galaknik / Gulubnik (16) – This is an Early Neolithic Karanovo site with some White-Painted Ware rounded or biconical vessels (Nikolov V., 2007: 185-186) from the post-DFBW demic migration into the Balkans, which is dated to the early 7th millennium (Bailey D., 2000).

The earliest dates from this site are (Reingruber A. & Thissen L., 2005: 314; Stamboliyska E. & Uzonov Z., 2009):

- Bln-3579H 7220±80BP = 6245-5976 BC (OxCal 4.2 at 93.3%), Level 1.1, humic acid – Median 6110 BC.
- Bln-4096 7140±80BP = 6213-5876 BC (OxCal 4.2 at 94.6%), Level 1.7, charred wood – Median 6045 BC.
- Bln-3580 7120±70BP = 6109-5842 BC (OxCal 4.2 at 92.6%), Level 1.1, charcoal – Median 5975 BC.
- Bln-3579 7030±70BP = 6022-5752 BC (OxCal 4.2 at 95.4%), Level 1.1, charcoal – Median 5885 BC.

There is no indication of a Mesolithic substrate at this site.

Kachitza (5) – This Early Neolithic site is in North-Central Bulgaria, and according to I. Gatsov (1989:474), the lithics at this Early Neolithic site bear a resemblance to those found at Dekilitazh, although according to M. Gurova (2014: pers. com.) he revised his descriptions of the lithics from Dekilitazh on three separate occasions.

Kapitan Dimitrievo (18) – This EN Karanovo site is located east of the headwaters of the River Mesta and south of the upper reaches of the River Maritsa of Western Thrace in Southern Bulgaria. The site contained some White-Painted Ware rounded or biconical vessels (Nikolov V., 2007: 185-186) from the post-DFBW demic migration into the Balkans.

There is no indication of Mesolithic substrate at this site.

Karanovo (14) – This is the eponymous Early Neolithic site for the first painted pottery phase in Bulgaria, which is dated *ca*. 6000 BC (Bailey D., 2000; Çilingiroğlu Ç., 2009: 404; Stamboliyska E. & Uzonov Z., 2009), although Čavdar/Chavdar would appear to date from *ca*. 6100 BC.

Ç. Çilingiroğlu (2009) has well described this site, whose earliest of 13 Levels, 0.75 to 1.0 m thick, contained 3 superimposed building levels of quasi-rectangular one-roomed houses, made of wattle and daub without stone foundations. "*Karanovo is a 12.4 m high prehistoric mound (250 x 180 m) located on the southern bank of Azmak, a tributary of Maritsa, close to modern settlement Nova*

Zagora on Thracian Plain, close to the foothills of Sredna Gora mountain range. The geographical location enabled the inhabitants of Karanovo to exploit resources from open grasslands and woodland. The mound is one of the largest in the entire Thrace and has been initially excavated between 1947-1957 by V. Mikov and G.I. Georgiev. The southern section of the site ("Südsektor") has been subject to large-scale excavations in years 1984-1992 by a joint Austrian-Bulgarian team which was supervised by S. Hiller and V. Nikolov. The recent excavations brought minor re-arrangements to Georgiev's periodization, although to a large extent, Karanovo sequence remained intact and valid. According to current periodization, Karanovo I and Karanovo II encompass EN period whereas new defined Karanovo II/III phase represents "Middle Neolithic". Nikolov and Hiller published the results in two volumes in 1997 which will be used as primary source of information.

The lithic industry is dominated by retouched blades, flakes, sickle elements and endscrapers made out of high quality flint. Very few cores from Karanovo I deposits have been analyzed which can be classified as blade cores. It is noted that production of "macro-blades" was of primary concern to Karanovo I-II community (Gürova 2004: 246). Biconical sling bullets, bone spatula, bone polishers, awls, needles, polished axes, clay stamps, "offering tables" and few figurines constitute the EN material culture from the site (Hiller and Nikolov 1997).

The subsistence is based on ovicaprines and to a lesser extent cattle and pig. Hunting played a secondary role in the subsistence economy which is dominated by fallow deer (Dama dama), red deer (Cervus elaphus), wild pig (Sus scrofa) and various mammals. Exploitation of secondary animal products is held plausible (Bökönyi and Bartosiewicz 1997: 401). Cultivated plants were einkorn wheat (Triticum monococcum), emmer wheat (Triticum dicoccum), durum wheat (Triticum durum), bread wheat (Triticum aestivum), barley (Hordeum) and pulses like lentil (Lens culinaris) and peas (Pisum sativum) (Thanheiser 1997)" (Çilingiroğlu Ç., 2009: 403-404).

The earliest dates for this site are (Nikolova L., 1998; Reingruber A. & Thissen L., 2005: 318; Stamboliyska E. & Uzonov Z., 2009):

- Bln-4179 7130±70BP = 6112-5871 BC (OxCal 4.2 at 89.5%), Level I.3, charcoal – Median 5990 BC.
- Bln-4336 7110±50BP = 6067-5892 BC (OxCal 4.2 at 95.4%), Level I.1, charcoal – Median 5980 BC.
- Bln-4177 7110±50BP = 6067-5892 BC (OxCal 4.2 at 95.4%) – Median 5980 BC.
- Bln-4339 7090±97BP = 6110-5746 BC (OxCal 4.2 at 91.5%), Level I.1, charcoal – Median 5930 BC.

The bi-conical sling-shots would indicate contact with the DFBW tradition in Thrace, but there is no indication of any influence from a Mesolithic substrate.

Kazanlak/Kazanluk (13) – Early Neolithic site in the valley of the River Tundsa, with pottery, presumably DFBW, which M. Özdoğan (1999: 214) considers to be reminiscent of Archaic Fikirtepe, whilst also within the Bulgarian 'Monochrome Phase'. The dates from the lowest archaeological level are however mid-6th millennium (Stamboliyska E. & Uzonov Z., 2009).

Koprivets/Koprivec (2) – Early Neolithic site near Ruse in North-Central Bulgaria close to the Danube and Romanian border in the valley of the Rusenski Lom, which is a tributary of the Danube. The lowest Levels I-II produced DFBW monochrome pottery with large quantities of organic inclusion, whilst the Levels above yielded White-Painted Ware without evidence for a hiatus (Stefanova T., 1996).

Ç. Çilingiroğlu (2009: 417) has described this site whose lower levels contained DFBW: "*The material from Koprivets has been extensively published in 1996 separately by Popov and Stefanova. We will provide a glimpse at this ceramic material as we consider the ceramics from this site to be important for understanding the initial stages of the Bulgarian EN. Another reason why we include the ceramic data from the site is their unmistakable similarity to Ulucak Va-b ceramics* [Anatolian

Aegean seaboard site]. *The fact that no carbon dates are available from the basal layers of Koprivets is unfortunate as it prevents us from correlating Ulucak and Koprivets chronologically on a firm basis. Nevertheless, it has to be noted that Ulucak IV-V ceramics are technologically and morphologically closer to Koprivets ceramics than any of the Karanovo I assemblages from Thrace.*

The lithic industry is characterized by large flakes, notched tools and tools made on flakes and blades produced on multi-directional cores prepared from local raw material, which according to Gatsov show clear similarities to Hoca Çeşme IV-III lithic industry (Gatsov 2009: 33; 121)". I Gatsov (2007: 120) also suggests contacts with Hoca Çeşme at the beginning of the 6th millennium, whilst I. Gatsov and P. Nedelcheva (2009: 29-34, quoting Tsonev (2000: 29-34)) and R. Zlateva-Uzunova (2009: 74-75) point out that the debitage was by both direct and indirect percussion, that the blades, often irregular, are small to microlithic and that flakes prevail.

The absence of pedestal bases in the earliest levels is an indication it is Pre-Karanovo, and the presence of hole-mouthed jars without necked jars may be another indication of the early date of the basal levels (Çilingiroğlu Ç., 2009: 420). M. Özdoğan (1999, 2005, 2009: 151, 2012: 36) considers the DFBW to emanate out of the Archaic Fikirtepe tradition, whilst J. K. Kozlowski (2003: 16) sees an affiliation with Kraïnitsi.

There is no indication from the lithic assemblage to indicate that there is any Mesolithic influence at this site, and it is regrettable that there appear to be no dates for the earliest Level.

Kovačevo/Kovachevo (26) – This Early Neolithic site close to the River Struma in South-West Bulgaria lies on the bank of Pirinska Bistritsa River (Tributary of the Struma), in the Middle Struma Valley at 450 masl, near Podini. The site, which covers 6 ha, and has 2 m of archaeological deposits, has been damaged by road construction as well as by agriculture and erosion. It was discovered in the early 1980's by M. Domaradzki and extensively excavated by a joint Franco-Bulgarian team between 1986-2000 under the auspices of the CNRS, the Bulgarian Academy of Sciences and the Blagoevgrad Historical Museum.

According to M. Özdoğan (2012), the earliest levels contain DFBW, suggesting it was established by Early Neolithic migrants from North-West Anatolia, although the earliest date does not appear to support this.

The earliest dates are (Çilingiroğlu Ç., 2009: 420; Reingruber A. & Thissen L., 2005: 315; Stamboliyska E. & Uzonov Z., 2009):

- Ly-1437 7180±45BP = 6115-5983 BC (OxCal 4.2 at 87.5%), on charcoal, Period Ia – Median 6050 BC.
- Ly-1564 7090±70BP = 6081-5796 BC (OxCal 4.1 at 95.4%), on charcoal, Period 1a-1b – Median 5940 BC.

Level I with sub-phase a-d, with Ia-Ic corresponding to Karanovo I, and Id to Karanovo II (Çilingiroğlu Ç., 2009: 423), lasted some 400 years. Level Ia contained wattle-and-daub quadrangular structures.

The chipped stone industry, on quartz and flint, is dominated by retouched blades and sickle elements, and the hunt played an insignificant part in the make-up of the faunal assemblage (Çilingiroğlu Ç., 2009: 424). Nonetheless, J.-P. Demoule and M. Lichardus-Itten (2014) maintained that whilst the microliths are of Mesolithic tradition, the bone tools are of Anatolian tradition and the fauna is dominated by ovicaprines.

"*The earliest date (so far) from Kovačevo falls in the range 6159-5926 cal BC (Lichardus-Itten et al. 2006, 85). In the earliest period (phases I a, b) Kovačevo was part of a very early regional facies that extended from Greek western Macedonia in the south (Nea Nikomedeia, Giannitsa) to the Ovče Polje in the north (Anzabegovo, Vršnik)*" in the Rep. of Macedonia (Gurova M., 2012b: 151).

"*It is noteworthy that the formal toolkit made of BF* [Balkan Flint] *appears around level Ic –Id of the Kovačevo sequence, i.e. – later. In this respect, if as seems likely the Strimon was one of the first and direct routes of Neolithic diffusion into the Balkans, then that part of the classical Early Neolithic*

'package' consisting of typical Karanovo I pottery and formal flint toolkits cannot be linked with this first stage of demic and cultural diffusion" (Gurova M., 2012a: 40). The later levels contain White-Painted Ware rounded or biconical vessels (Nikolov V., 2007: 185-186) from the post-DFBW demic migration into the Balkans.

"*Kovačevo (in the Struma river valley) is a key site for eventually resolving the problem of the appearance and subsequent spread of the Neolithic in Bulgaria (**fig. 4**). The pottery sequence reveals an earlier than Karanovo I culture regional facies with connections to Greek western Macedonia and Ovče polje (Lichardus et al. 2002; 2006). Direct contacts between the peculiar "regionality" of early Kovačevo, dated between 6159-5926 cal. BC and 6064-5808 cal. BC (Lichardus-Itten et al. 2006, 85) and the Karanovo I culture are presumed to have taken place in a later period (Kovačevo I d) (Lichardus-Itten et al. 2002, 130)*" (Gurova M., 2012b: 121).

M. Gurova (2013: pers. com.), indicated that the earliest levels contained a few microliths. The Early Neolithic migrants who established this settlement do not appear otherwise to have been acculturated in any way by autochthonous Mesolithic population, yet it is possible that they acquired these microliths by exchange or by the incorporation of some autochthonous elements, notwithstanding that the earliest date for the site does not appear to be particularly early, when compared to the DFBW settlements.

Kraïnitsi/Kraïnitsa (17) – This West Bulgarian Initial Neolithic site lies in the valley of the Dzhubrena, a tributary of the Struma, at 600 masl. It is the only DFBW site known in West Bulgaria. After the Level I occupation, dating from the second half of the 7th millennium, there is a long hiatus before it is reoccupied in the early 6th millennium by a White-Painted Ware Level (Bailey G., 2000).

The site was excavated in 1986, and again in 1990 over an area of 48 m^2 by S. Chohadzhiev and A. Balamska, in four trenches. The lowest Level I, containing DFBW, was covered by alluvium to a depth ranging from 1.5-2.4 m before the site was reoccupied by Levels II and III containing White-Painted Ware (Çilingiroğlu Ç., 2009: 428-429).

The pottery from Level I is mostly of poor manufacture. "*Chohadzhiev (2007: 83) and Chohadzhiev and Bakamska (1990: 57-69) provide a description of the material from the site. The pottery from the Layer I is assigned as the oldest pottery of the region. The pottery is described as mineral and organic (excrement) tempered, coil-built and incompletely oxidized with dark colored fracture centers. Breaks at the coil junctures are very common. The surface is smoothed, occasionally burnished but not smooth and glossy. Thin wash-like reddish slip is observed on many pieces. Coarse and medium ("ordinary ware") wares (together 82%) dominate the assemblage while fine wares (12%) are also present. The wall thickness normally ranges between 0.8-1.2 cm whereas walls up to 2.7 cm are also encountered in the assemblage (Chohadzhiev 2007: 83). The vessel forms are very restricted and show simple forms comprising of hemi-spherical and 's'-shaped profiled bowls. Shallow flaring bowls, pots with hole-mouths, jars with short necks are commonly found (Fig. 6.42). Pierced lugs and vertical tubular lugs are common. Plastic decoration is observed on coarse wares. Other decoration types involve incisions, pinching, impressions and barbotine which all together compose 18% of the assemblage. Impressions are either made with nails or with a triangular edged instrument which are subsequently slipped. Rims are crooked, simple or slightly everted. Bases are flat, disc, ringed or raised. Oval bases are also encountered (Chohadzhiev and Bakamska 1990: 58-59; Tables 10-11)*" (Çilingiroğlu Ç., 2009: 429).

"*Chohadzhiev and Bakamska (1990: 76) and Chohadzhiev (2007: 83) compare this assemblage to Otzaki I, Sesklo and Achilleion Ia and suggest that Struma Valley experienced a similar development to Thessaly in the beginning of the Neolithic period. Indeed, certain technological and morphological traits of this pottery can be matched at these sites. Wijnen (1982: 25) indicates that ENI pottery from Thessalian sites do not contain collared jars or carinated forms. The restricted range and simple form of vessel shapes is, therefore, meaningful as to the early date of Layer I at Krainitsi, although ENI forms from Thessalian Plain look more primitive than Krainitsi Layer I where 's'-shaped*

profiles are already in their developed form (Fig. 6.42). There are other reasons for a denial of contemporaneity of Krainitsi I with ENI horizon on mainland Greece: presence of red slip and impressed wares at Krainitsi. These features appear only in the later stages of Greek EN, i.e. during the PreSesklo stage which follows "Early Pottery" and "Proto-Sesklo" together with painted decoration. Pre-Sesklo stage is dated to around 6000-5800 cal. BCE and is the immediate predecessor of Sesklo phase which is characterized by dark red paint on whitish background (Gallis 1996a: 120)" (Çilingiroğlu Ç., 2009: 430). The author also indicates that two figurines were found, thus tying the site to Southern or Central Anatolia or the Levant.

The only ^{14}C date for Level 1 appears to be patently incorrect (9000±300BP!). D. Bailey (2000) considered the site to have been initially established in the mid 7th millennium BC; M. Özdoğan (1999: 105, 2005: 21, 2008: 151, 2012: 36) considered the DFBW to be controversial, whilst having affinities with the Archaic Fikirtepe tradition, which would date it sometime after ca. 6500 BC; Ç. Çilingiroğlu (2009: 432) considered the Thessalian Early Pottery and Proto-Sesklo to be more archaic, so that the date for the Kraïnitsi DFBW which also includes some Impressed Ware, should be dated with the Pre-Sesklo in the range 6000-5800 BC; T. Stefanova (1996), evaluated the monochrome fine, semi-fine and coarse pottery from trench 3 (of 4): the temper in the fine ware includes mica, fine sand and fine organic material, plus some crushed baked clay; in the coarse ware, sand, some pebbles and a great quantity of larger organic inclusions of straw and grain; the decoration is plastic or impresso; there are many vertically pierced lugs, some of which are slightly oblique. Comparisons have been made with the Thessalian monochrome from Otzaki Magoula (Stefanova T., 1996), for which there are no dates, but which was originally attributed to the Thessalian Aceramic, which whilst not correct, would nonetheless justify a date close to 6400 BC.

Whilst there may not be any indices of a Mesolithic content at this site, it begs a lot of questions about the provenance of these migrants and their relationship with Thessaly, the Marmara Region, Anatolia and the Levant.

Ohoden-Valoga (9) – This site is a single level site, 195 masl, with two successive periods of occupation side-by-side. It is located on the first river terrace of the River Skat, which flows into the River Ogosta, in the Vrasta District of North-Western Bulgaria. The oldest site was excavated between 2002-2006, and appears to have been the subject of a flood in the early 6th millennium BC, after which it was abandoned for several decades before being re-established nearby (Ganetsoski G., 2009: 55). The site is close to a flint outcrop with relatively poor quality material, which was extensively worked by means of extraction pits.

One of the occupations was in pit-huts dug into the surface to a depth up to 60 cm, with a massive roof construction (Gatsov I. & Nedelcheva P., 2009).

G. Ganetsoski (2009), the excavator, has suggested that this DFBW monochrome pottery (including at least one globular hole-mouthed jar) site dates from the second half of the 7th millennium, yet the only date he supplies is (Gatsov I. & Nedelcheva P., 2009):

- KN-5655 6830±45BP = 5805-5635 BC (OxCal 4.2 at 95.4%) – Median 5720 BC.

This date probably does not represent the earliest occupation for the site, since it would place it in the Karanovo culture, yet it is not only described as a monochrome site (defined as Proto-Starčevo II), but also as one with microliths in its lithic assemblage which is made up of 2324 artefacts from building structure N1 (pit house dwelling from early occupation phase) (Fig. R09-1) (Zlateva-Uzunova R., 2009):

- 70% flakes;
- 17% blades (266 bladelets under 2 cm; blades 131; many fragments;
- Predominantly uniplatform bullet-shaped prismatic cores;
- 5 trapezes and 2 lunates.

About 1/3 of the lithics are made of local material. The exogenous material appears to have been brought to the site as prepared cores, originating from the area of the River Vit, Pleven district, and from Razgrad District.

The site has been compared to other DFBW monochrome sites in Northern Bulgaria at Slatina, Orlovec and Pomoshtitsa.

It is not clear when this site was established, but it could well date from the later 7th millennium BC based on the DFBW and pottery shapes, and if this should prove to be the case, there could be some foundation to the suggestion by G. Ganetsoski's that the site was established by Neolithic migrants arriving via the Marmara Region, who turned west up the Danube and that there were contacts with an autochthonous Mesolithic population. This view appears to be shared by I. Gatsov and P. Nedelcheva (2009: 45), whilst M. Gurova (2012b: 5; 2013: pers. com.) has pointed out the lack of convincing evidence supporting this interpretation and that of G. Ganetsoski.

Ohoden-Zaeshkoto (9) – This is an undated Initial Neolithic workshop, attributed to the Early DFBW Monochrome Phase (Stamboliyska E. & Uzonov Z., 2009: 78), on the periphery of the site of Ohoden-Valoga. The lithics come from two pits and include end-scrapers, notched tools, retouched flakes, perforators and drills (Gatsov I. & Nedelcheva P., 2009).

Orlovets/Orlovec (3) – This Early Neolithic DFBW monochrome pottery site is located close to the village of Orlovets on the second terrace of the River Baninski Lom, which is a tributary of the River Rusenski Lom in Northern Bulgaria (Stamboliyska E. & Uzonov Z., 2009: 46-47). The site was probably established by migrants from North-West Anatolia shortly after the middle of the 7th millennium BC.

The lithics are on blades of imported raw material, and there are no indications of a Mesolithic substrate.

Pločite/Plochite (4) – This Early Neolithic DFBW Monochrome pottery site is located on the Yantra River in Veliko Tarnovo District (Stamboliyska E. & Uzonov Z., 2009).

There are no indications of a Mesolithic substrate at this site.

Poljanitsa Plateau/Poljanica-Platoto/Polyanitsa-Platoto/Polianica-Platodo (7) – This Early Neolithic DFBW Monochrome pottery site, on the Goliama Kamchia River, near Tardovishte in North-East Bulgaria, was excavated by H. Todorova in 1976. A single small trench was opened.

Ç. Çilingiroğlu (2009: 416-417) states that "*the lithic industry shows microlithic elements such as trapezes and perforators (Todorova 1990: 72)*", and the pottery, which is red-slipped and mat, includes hole-mouthed jars DFBW tempered with large quantities of chaff, with vertical lugs, some plastic decorations, finger impressions and impresso, which suggests that the Neolithic migrants who established the site originated from North-West Anatolia. The structures are rectangular wattle and daub.

Monochrome pottery and Impressed Ware found in the lowest Level of this Early Neolithic site are associated with trapezes and this level has been dated to the second half of the 7th millennium (Budja M., 2009, quoting Weiniger, et al., 2006; Çilingiroğlu Ç., 2009; Stefanova T., 1996; Stamboliyska E. & Uzonov Z., 2009). The dates quoted originally came from Vajsov (1993):

- Bln-1571 7535±80BP = 6512-6230 BC (OxCal 4.2 at 93.7%), Horizon 1, Qu. 49, chaff temper – Median 6370 BC.
- Bln-1613 7380±60BP = 6392-6094 BC (OxCal 4.2 at 95.4%), Horizon 1, Qu. 153, chaff temper – Median 6245 BC.
- Bln-1613A 7275±60BP = 6242-6020 BC (OxCal 4.2 at 95.4%), Horizon 1, Qu. 153, chaff temper – Median 6130 BC.

- Bln-1521 7140±80BP = 6213-5876 BC (OxCal 4.2 at 94.6%), Horizon 1, Qu. 153, chaff temper – Median 6045 BC.

These dates are some of the earliest Neolithic dates in Bulgaria, and given their early date strongly suggest an Anatolian provenance via the Sea of Marmara Region and Thrace, whether north up the Black Sea coast or up the Maritsa Valley.

The microlithic element could indicate contact with the Mesolithic substrate, or the Ağaçli Group if the migrants came from the Fikirtepe Culture.

Pomoshtitsa/Pomostica (1) – This Early Neolithic site in North-East Bulgaria, located near a village of the same name, was excavated in numerous small trenches by V. Nikolov in 1995.

Monochrome DFBW pottery was found in the three stratigraphic levels 1.2 m thick, suggesting the site was established by migrants originating from North-West Anatolia, whilst the upper Level yielded similar pottery with the addition of a few sherds of White-Painted Ware. The DFBW contained organic temper, and the decoration was plastic, with finger impressions and impresso (Stamboliyska E. & Uzonov Z., 2009; Stefanova T., 1996).

There are no indications to suppose contact with a local Mesolithic population.

Slatina (10) – This Early Neolithic site in the eastern suburbs of Sofia is the most westerly site of the Bulgarian Karanovo culture (Gurova M., 2012b), and one of the earliest (Stefanova T., 1996). "*Slatina is the name of an eastern city district in Sofia which also gave its name to a prehistoric site which has been salvage-excavated in 1985-1987 by V. Nikolov. The site has ca. 4 m cultural accumulation with 8 ha coverage which encompass four different time horizons from Early to LN. The EN layers, represented through two building layers, at the site contained relatively well-preserved remains of post-houses (Nikolov 1992: 68; Nikolov and Sirakova 2002). The younger building phase (Layer 1) yielded remains of nine burnt wattle-and-daub buildings. The best-preserved structure from this phase is called House 9 which is described in detail by Nikolov and Sirakova (2002: 165-166). The house is two-roomed with thin wattle-and-daub walls and stamped clay floor. In terms of inner architectural elements, two clay rectilinear silos and an oven foundation have been spotted which have been accompanied by pottery vessels, stone and bone tools, one fragment of female figurine, loom-weights and fragments of "cult tables*" (Çilingiroğlu Ç., 2009: 432-433).

"*Nikolov and Sirakova (2002: 178) indicate that ceramic data from the site is in accordance with the developed Kremikovči Group of West Bulgaria and Classic Starčevo phase from central Balkans*" (Çilingiroğlu Ç., 2009: 434).

The earliest dates of four almost identical dates (the others are on charred seed) for this site is (Nikolova L., 1998; Reingruber A. & Thissen L., 2005: 316; Stamboliyska E. & Uzonov Z., 2009):

- Bln-3504 6970±60BP = 5983-5736 BC (OxCal 4.2 at 95.4%), wood, Level IV – Median 5860 BC.
- Bln-3441 6960±60BP = 5930-5730 BC (OxCal 4.2 at 84.4%), grain, grain-store 2 – Median 5830 BC.

There is no indication that this site contains any influence from a Mesolithic substrate.

Slatina-Gradini (10) – This site, also in the suburbs of Sofia contained monochrome pottery. There are no dates (Stamboliyska E. & Uzonov Z., 2009).

Stara Zagora – Okražna Bolnica (15) – Later Early Neolithic site in the town by the same name. The earliest Level is given as being Karanovo I Culture with the following date (Stamboliyska E. & Uzonov Z., 2009):

- Bln-1587 7139±65 = 6114-5886 (OxCal 4.2 at 89.9%), charcoal – Median 6000 BC.

There is no evidence for the Transition at this site.

Vršnik (25) – This Early Neolithic site in the Republic of Macedonia contained White-painted pottery in its lowest levels (Nikolov V., 2007: 184-185), and is often associated with Anzabegovo to denote the Early Neolithic of the Republic of Macedonia associated with White-Painted Ware B.

The earliest date for this site is (Reingruber A. & Thissen L., 2005: 314):

- Bln-339 6950±100BP = 6010-5664 BC (OxCal 4.2 at 95.4%), Phase II/III, charred grain – Median 5835 BC.

Because this date is from a storage structure with pisé walls which is later than phase I, the site could have been established some time before 5850 BC, and be contemporaneous with Anzabegovo with which it is often associated (Anzabegovo-Vršnik Culture). There is apparently no evidence for the Mesolithic at this site.

Yabalkovo (19) – This Early Neolithic site in Central Bulgaria was under excavation at the end of the first decade of the current century, and M. Gurova is studying the lithics, which apparently do not include any elements of a Mesolithic substrate. According the M. Özdoğan (2012), the earliest levels include DFBW pottery, suggesting it was established by migrants, sometime after the middle of the 7th millennium BC, originating out of North-West Anatolia.

<u>Eastern Central Balkans – Bulgaria and Rep. of Macedonia – Conclusions</u>

There is evidence for the Palaeolithic and Epipalaeolithic presence in Bulgaria, but evidence for the Holocene Mesolithic has only been confirmed at Dekilitazh close to the Black Sea, whilst this is amply attested along the Black Sea coast north of the Danube Delta and to the south in Region 3 north of the Sea of Marmara.

The possibility exists that there are some Mesolithic attributes at a few sites in Bulgaria – all of them Initial Neolithic DFBW sites – but this would need to be confirmed by future research:

- Kovačevo in the valley of the Struma with the microliths in the earliest level dated 6114-5983 BC;
- Ohoden-Valoga with microliths and an unclear date of establishment;
- Poljanitsa Plateau with microliths in the earliest level dated *ca*. 6400 BC, which could attest contact with a local Mesolithic population, or the immigrant farmers coming from the Archaic Fikirtepe Culture near the Sea of Marmara.

The situation is simpler in the Republic of Macedonia, where we are not aware that any evidence for the Mesolithic has been reported to date.

Region 10 – Eastern Central Balkans – Serbia to Slovenia east of the Dinaric Alps

(Map R10)

Eastern Central Balkans – Serbia to Slovenia east of the Dinaric Alps – General Introduction

This Region treats the water divide along the Dinaric Alps as its western limit, and the Danube as the eastern boundary. The southern limit lies along the northern border of the Rep. of Macedonia, whilst the northern limit is the border with Hungarian Transdanubia and Slovenia. To the west, the region includes the eastern parts of Montenegro, Bosnia Herzegovina and Croatia, whilst all of Serbia is included, with the exception of that part east of the Danube and the Iron Gates, which last is treated as a separate Region, due to the wealth of Mesolithic sites found there and the particular Late Mesolithic culture that developed and interfaced with the advancing Starčevo Neolithic culture.

This Region, particularly in present-day Serbia, is almost devoid of Mesolithic sites, which we attribute in part to lack of research, and in part the nature of the Pannonian Plain with its extensive wetlands (Fig. R10-1), although that cannot on its own account for the dearth of Mesolithic sites. Mobility patterns, settlement-generating behaviour, and the taphonomic processes which transform and obscure site-generating human activities, "*have shown time and again that remains of Mesolithic sites have significantly smaller chances of identification than Neolithic ones*" (Zvelebil M., *et al.*, 2010: 309). These biasing taphonomic factors which seriously impair the discovery of Mesolithic sites have fed into the interpretative literature, downplaying the possible role of Mesolithic communities in the transmission of the Neolithic. This is particularly true of the Initial Neolithic Starčevo culture in this region, in which pit-huts play a prominent role.

Pit-huts or pit-dwellings are known from the Jomon Culture sites in Japan, the Yangshoa Culture in China and the Chulmun in Korea (McPherron A. & Christopher K., 1988: 470); closer to home, they are known during the Levantine PPNA, the European Mesolithic in the Iron Gates (Region 11) (e.g. Alibeg, Icoana, Lepenski Vir, Ostrovu Banului, Ostrovu Corbului, Ostrovu Mare km 873, Padina, Răzvrăta, Veterani Terrace), Eastern Hungary and the site of Maroulas on the Island of Kithnos (Region 5); In the Early Neolithic there is evidence for pit-huts at the sites of Ege Gübre (Region 2) and Hoca Çesme (Region 4), Fikirtepe Culture sites north of the Sea of Marmara (Region 3) and Ohoden-Valoga (Region 9) and as recently as the European Middle Ages as evidenced at Bokrijk, Genk, in Belgium. The use of pit-huts appears to be an FTN adaptive feature as the Neolithic first spread north of the eastern Mediterranean climatic zone, where above-ground quadrangular structures using varying construction techniques were the norm from first arrival of migrants during the second half of the 7th millennium BC.

There are hundreds of Neolithic Starčevo Culture sites, and we will only touch on a few of the earliest ones in this study, in an attempt to reach some conclusions regarding the Transition.

Eastern Central Balkans – Serbia to Slovenia east of the Dinaric Alps – Mesolithic and Transition sites – Introduction

A number of the Mesolithic sites are to be found in caves and rock-shelters in the Dinaric Alps of Montenegro, whilst others are in the Plain of Ljubljana and the northern and eastern sides of Slovenia and Eastern Croatia. In between these two groupings there appear to be no Mesolithic or Transition sites on the eastern side of Bosnia-Herzegovina, whilst Serbia can boast a single Mesolithic scatter close to Belgrade on the right bank of the Danube. Serbia does however have another Mesolithic site on the left bank of the Danube at Bačka Palanka north-east of Belgrade (outside this Region) and another in the far north, east of the Danube, at Noszja Pörös (also outside this Region) (Eichmann W. J., 2004: 169), which possibly has affinities with Hungarian Transdanubia, where dynamic research is currently bringing evidence for a Mesolithic presence and Transition to our attention.

That such few sites have been discovered in Bosnia & Herzegovina and Serbia is possibly due to a lack of focussed research in these countries, since several Mesolithic sites have been found across the border in Hungary, and contact and exchange is assured through the presence of Hungarian lithic raw material at sites in the Iron Gates.

Eastern Central Balkans – Serbia to Slovenia east of the Dinaric Alps – Mesolithic and Transition sites – Site details

Apnarjeva Jama (See Map R12 Transdanubia) – This is a possible East Slovenian Mesolithic cave site listed by I. Turk (2003: 13). The 23 m deep cave is located at 670 masl on the south-facing slope of mount Kotečnik, above Liboje near Celje. It was discovered in 1987 and excavated in 1988-1989 by I. Turk and J. Dirjec, who reported on the excavations in 1989.

The contents are mostly Middle and Upper Palaeolithic with a few Mousterian lithic artefacts in Levels 3-6. The cave was occupied intermittently, with a possible Mesolithic occupation in the Early Holocene, only evidenced by two bone awls. There is no indication of the Transition at this site, even if the topmost Level included Bronze-Age pottery.

Bačka Palanka (7) – Mesolithic site on the left bank of the Danube (Eichmann W. J., 2004: 169).

Betalov Spodmol (See Map 15 Trieste and Slovene Karst) – This cave near Postojna in North-Central Slovenia (Fig. R10-2) was excavated by S. Brodar between 1947-1952. The site has seen human occupation for *ca.* 300k years from the end of the Lower Palaeolithic to the Mesolithic, after which there is a hiatus till the Bronze Age. There are therefore no Transition Levels.

Bíc River boat (13) – A boat made from a single tree trunk, now supposedly in the Croatian Museum at Slavonski Brod, was discovered in the dried-up river Bíc north of the River Drava, which has been dated 8130-7670 BC. K. Minichreiter thought the boat dated from *ca*. 6000 BC and thought it might have been used by the Starčevo occupants of the site of Zadubravlje (Bánffy E., 2004: 351). The date appears to place the construction and use of the boat in the Early Mesolithic, confirming the presence of sedentary or semi-sedentary hunter-gatherers in the region and their exploitation of riverine resources.

Breg (2) – This is an open-air Late Castelnovian site at Breg, Škofijica, at 294 masl, close to the capital Ljubljana, in Central Slovenia which, according to M. Spataro (2002), is one of several, but the only one published in detail.

The site was excavated by M. Budja in the 1980s. P. Biagi has pointed out that this site has supplied some of the best Late Castelnovian Mesolithic data in Level 3A, which produced trapezoidal microliths and Montbani blades, and a subsistence based heavily on *Cervus elaphus*, (Biagi P., 1994: 58-60; Biagi P. & Voytek B., 1994: 63-64). A harpoon was also found, suggesting that aquatic resources were also exploited (Chapman J. & Müller J., 1990: 127; Voytek B., 2006: 171). The same location was repeatedly occupied for almost three millennia, with the earliest dates going back to the second half of the 9th millennium and the most recent, from Level 3A (Biagi P., 1954; Biagi P. & Voytek B., 1994; Srdoč D., *et al*., 1987: 140):

- Z-1421 6830±150BP = 5998-5491 BC (OxCal 4.2 at 95.4%), on charcoal – Median 5745 BC.
- Z-1421 6630±150BP = 5843-5307 BC (OxCal 4.2 at 95.4%), on charcoal – Median 5575 BC.

The Neolithic site of Resnik Canal is close by, and the excavator could not determine whether there was any relationship between the two sites (Budja M., 1993: 187). I. Turk (2003: 66) considered the most recent date to be late for the Terminal Mesolithic, since the Neolithic is attested in the wider region at that time, but there is no evidence of Neolithic attributes at this site, which appears to have been abandoned close to the time, or shortly after the arrival of the Neolithic in the area.

Brodski Drenovak (12) – Josip Kunkera recorded at least one open-air Croatian Mesolithic site near this locality between 1950-1980 (Komšo D., 2006: 77).

Economija 13. Maj (16) – This is a Mesolithic lithic scatter site discovered on the bank of the River Danube, in the Zemun suburb north of Belgrade. Two projectile points, resembling those found at Padina in the Iron Gates were discovered at this site: one is a narrow segment and the other a blade with an abrupt retouched truncation. (Šarić J., 2007b: 13, Pl. I & II).

This lithic scatter proves the existence of a Mesolithic presence further upstream from the Iron Gates, but nothing else is known about this site.

Lakušija (10) – This is one of a number of lithic scatter open-air sites in North-Eastern Croatia, in the Mount Papuk area, discovered by Josip Kunkera, which Malez attributed on typological grounds to the Palaeolithic and Mesolithic (Komšo D., 2006: 77).

Medena stijena (25) – This south-facing rock-shelter in North Montenegro, 30 m wide by 8 deep, is located in the Ćehotina Canyon about 1 km upstream from the cave of Mališina stijena, between 800-900 masl. The site, excavated in the 1980s, contained 140 cm of archaeological deposits stretching from the Late Palaeolithic (Levels X-IX and possibly Level VIII) to the Mesolithic. Levels VIII-V contained microlithics. Level IV contained trapezes but the microburin technique was absent, suggesting a Late Mesolithic date (Biagi P. & Spataro M., 2002: 168; Mihailović D., 1999, 2007, 2009).

For lack of ^{14}C dates, the Late Mesolithic level IV has been tentatively dated to the second half of the 7th millennium (Mihailović D. & Dimitrijevic V., 1999: 395) and the assemblage has been described as para-Castelnovian (Kozlowski J. K. & Kakzanowska M., 2009), or 'technically impoverished' and comparable to Sidari Level D (Mihailović D. & Dimitrijevic V., 1999). D. Srejović (1989: 490) saw a hiatus between Levels IV and III, but attributed Level III also to the Late Mesolithic, and considered that the cave occupants were acculturated in the Neolithic in the same manner as the occupants of the caves of Odmut and Crvena stijena.

Level IV has been described as disturbed (Mihailović D., 2007: 21, 2009: 71), which begs the question as to whether the same might be true for Level III above. There does not appear to be any evidence for a Transition at this site.

Mališina stijena (26) – This Montenegrin north-facing rockshelter 35 m wide by 8 m depth is in a difficult-of-access part of the Ćehotina Canyon about 1 km downstream from the site of Medena stijena. It is located 800 masl and 7 m above the present-day level of the river.

The site was used from the Middle Palaeolithic (prior *ca*. 38000 BC); level 3 has been dated *ca*. 15k BC and the last occupation in Level 2, which has typologically been attributed to the Early Mesolithic, after which the site appears to have been abandoned (Biagi P. & Spataro M, 2002: 168, quoting Mihailović & Dimitrijević, 1995; Çilingiroğlu C., 2009: 437, quoting Kozlowski & Kaczanowska, 2004; Mihailović D., 2009**).**

Noszja Pörös/Nosza Pörös (1) – Lithic scatter near village of Hajdukovo in Northern Serbia, originally reported by Bruckner in 1966 suggesting it was Mesolithic. The collection is in the museum at Subotica.

W. Eichmann (2004: 188) indicated that the collection was examined at the museum and that "*among the significant discoveries were two backed points which fit within the Late Epigravettian tradition: this is quite peculiar given that the collection also includes numerous trapezes (Castelnovian influences), which seem to indicate a later period of site occupation. Like many potential Mesolithic sites in southeastern Europe, this site comes from surface collections and its context is uncertain*".

This appears to be the only Mesolithic site in Northern Serbia, and it tells us nothing about the Transition. Given its location, it has to be seen in the context of the current research in Transdanubia, which explains why W. Eichmann who is working on the Transition and genesis of the LBK in Transdanubia took an interest in this site.

Odmut Cave (27) – This Montenegrin cave site is located deep in the canyon at the confluence of the Vrbnica and the Piva Rivers at 558 masl in the north-west of the country. The cave entrance, 20 m wide and 11 metres deep faces south-east (now below the waters of the Piva Dam). The River Piva is a tributary of the Drina, which flows into the River Sava, which in turn joins the Danube at Belgrade, providing a communication route to the Starčevo Culture during the Transition, although communication through the steep gorge would probably have been problematical (Fig. R10-3). The site is 85 km as the crow flies from Crvena Stijena, but further in overland distance, and 130-150 km from the Adriatic over a couple of passes that rise gently to no more than 1150 masl. There is no suitable agricultural land for many kilometres around the cave, and no evidence for agriculture has been found at the site.

This cave site, like the Neolithic open-air site of Obre in Bosnia & Herzegovina, assimilated influences from the east and west, whilst initially looking east during the early contact period with the Neolithic.

The site was occupied between *ca*. 8100-5200 BC without any visible breaks (Fig. R10-4). The numbering of the four metres of stratigraphy is broken into 8 levels starting from the bottom up, so that the non-pottery bearing Levels Ia and Ib are at the base and contained a flake-based lithic industry showing strong affinities with the Romanellian (Fig. R10-4b), which J. Müller (1998: 119) describes as "*very similar to the chert and flint tools of the Franchthi Cave, partly resembling the stone industry from the Crvena Stijena VII-IV strata, and that from the Lepenski Vir settlements (Srejović 1977: 5). There are notable flakes bearing one or more clearly defined notches, end scrapers, small scrapers, blades used as knives, points retouched on two edges, and geometric microliths, mainly trapezes*", which we found D. Srejović (1989: 489) restating. In Level Ib, trapezes represent 9.2% of the tools (Mihailović D., 2001: 343), attesting to the importance of the hunt in the economy, which was mostly focussed on ibex (Mihailović D. & Dimitrijevic V., 1999: 395). The hunt continued to be important through the Late Transition / Neolithic, when it continues to represent over 50% of the faunal remains (Marijanović B., 2007: 50).

Levels Ia and Ib contained only wild fauna as well as ample remains of fish, shellfish and snails (Batović S., 1987: 355), and during the course of the site excavations 54 harpoons, made of bone or antler wood, with one or two rows of barbs, were found (Mihailović D., 2007, 2009; Mihailović D. & Dimitrijevic V., 199: 395).

The site has a good suite of dates for the lower Mesolithic Levels Ia and Ib, as well as for the Transition / Neolithic Levels IIa and IIb, which have been quoted by a number of authors, who also note that there was no hiatus in the occupation between Levels I and II (Biagi P. & Spataro M., 2002, 2003; Borić D., 2005; Chapman J. & Müller J., 1990):

- Z-413 7350±160BP = 6503-5965 BC (OxCal 4.2 at 93.3%), on charcoal from Level Ia (flakes, blades, geometric microliths and wild fauna) – Median 6235 BC.
- SI-2220 7150±100BP = 6232-5834 BC (OxCal 4.2 at 94.7%), on charcoal from Level Ia (idem) – 6035 BC.
- Z-457 7030±160BP = 6221-5640 BC (OxCal 4.2 at 95.4%), on charcoal from Level Ib (idem) – Median 5930 BC.
- Z-412 6730±160BP = 5925-5459 BC (OxCal 4.2 at 89.4%), on charcoal from Level Ib (idem) – Median 5690 BC.
- SI-2217 6985±100BP = 6047-5705 BC (OxCal 4.2 at 94.7%), on charcoal from Level IIa (wild fauna plus Starčevo pottery) – Median 5875 BC.

- SI-2219 6955±100BP = 6012-5666 BC (OxCal 4.2 at 95.4%), on charcoal from Level IIa (wild fauna plus Starčevo pottery) – Median 5840 BC.
- SI-2222 6900±100BP = 5985-5636 BC (OxCal 4.2 at 95.4%), on charcoal from Level IIa (wild fauna plus Starčevo pottery) – Median 5810 BC.
- Z-412 6736±130BP = 5911-5470 BC (OxCal 4.2 at 94.8%), on charcoal from Level IIb (wild fauna + domesticated fauna; Starčevo pottery + Impressed Ware) – Median 5690 BC.
- SI-2223 6530±75BP = 5623-5357 BC (OxCal 4.2 at 95.4%), on charcoal from Level IIb (wild fauna + domesticated fauna; Starčevo pottery + Impressed Ware) – Median 5490 BC.

From Level IIa, Starčevo pottery begins to appear in the archaeological horizon, whilst the economy is fully Mesolithic. It is only from Level IIb that domesticated animals appear in small numbers in the faunal assemblage, coinciding with the appearance of Impressed Ware, so that it is unclear from which direction the domesticated animals came, although access from the coast had to be easier. The lithics continue the Mesolithic tradition (Fig. R10-4b) (Romanellian according to D. Srejović, (1989: 489), or para-Castelnovian, as J. K. Kozlowski and M. Kaczanowska (2009: 362) describe the sequence), through the regional Late Neolithic (Marijanović B., 2007: 50).

In level III flint which appears to come from Bulgaria makes its appearance, as does opal, possibly from the Rhodope Mountains, but through the end of the occupation the debitage is consistently the same as in the Mesolithic (Kozlowski J.K., *et al*., 1994). The continuity in lithic tradition, which evolves over time with an improving blade technology, thus lasts almost 3000 years (Bailey D., 2000: 125-126).

What we have at Odmut Cave, in Northern Montenegro, is a Mesolithic human group located in an area unsuitable for agriculture, with a well-established and successful economy based on the exploitation of terrestrial and aquatic resources. This group had direct and/or indirect exchange contacts to the Adriatic coast 150 km away during the Mesolithic as attested by the Romanellian influence in the lithic tradition, and downstream to the Danube and at least as far as Bulgaria, distant over 500 km, during the later period of occupation. They acquired pottery by exchange from both directions, as well as domesticated animals ('game in the pen'), which supplemented the hunt, as well as other exotic objects and raw materials. They appear not to have substantially altered their lifeways over a period of almost 3000 years until the end of the occupation towards the end of the 6th millennium BC, whilst accepting those Neolithic attributes which they found appealing.

Papuk Mountain (11) – Numerous Upper Palaeolithic and Mesolithic lithic scatters were discovered thanks to 30 years of research by Josip Kunkera from the 1950s in Croatia, the most famous of which are 13 open-air sites near Ruševo in North-Eastern Croatia producing thousands of lithic artefacts, dated typologically by Malez to the Upper Palaeolithic and Early Holocene. The sites are all close to water and appear to have been regularly visited. The sites attributed to the Mesolithic are Krčavina, Močarnica, Selišće, Baščice, Ćorin grob, Pušivac, Kamen and Busnovac (Komšo D., 2006: 76-77, quoting Malez (1979), Malez, Kunkera & Miletić (1984) and Paunović *et al*. (1999)).

Špehovka (see Map R11 Transdanubia) – Slovenian karstic cave in Tisnik, north-east Slovenia, which was discovered by S. Brodar in the post-war years. The cave had a period of occupation during the Upper Palaeolithic and Mesolithic. Two harpoons and a bone spearhead were found (Voytek B., 2006).

There is no indication that it was used into the Transition, but it does act as a link between Transdanubia and the Pannonian Plain to the east and the *Caput Adriae* to the west.

Šupljata Pećina (5) – This is a cave site south of Zagreb on the right bank of Markuševac Creek, approximately 1,800 m northwest of the village of Markuševac. It was investigated in the 1930s and 1940s and by M. Malez in 1961, who thought the site might be Epipalaeolithic (Komšo D., 2006: 78).

Topole-Bać (9) – This is a Starčevo Initial Neolithic site in Northern Serbia in which two burials were found dated to the Mesolithic (inhumation 2) and the Initial Neolithic (inhumation 1) (Bonsall C., *et al.,* 2004; Borić D., 2005c; Whittle A., *et al.*, 2002):

- OxA-8504 8085±55BP = 7190-6824 BC (OxCal 4.2 at 92%), on human bone, skeleton 2, trench 1- Median 7005 BC.
- OxA-8693 7170±50BP = 6115-5978 BC (OxCal 4.2 at 85.1%), on human bone, skeleton 1, trench 1 – Median 6045 BC.

Both burials are of complete skeletons in a contracted position, which is unusual north of the Mediterranean Basin for the Mesolithic, but not unknown in the Iron Gates (probably Neolithic individuals). The isotopic values of skeleton 2 suggest a terrestrial diet (similar to the later Neolithic humans) with indications that the protein in the diet was made up of a combination of terrestrial animal and plant foods (Whittle A., *et al*., 2002: 77). This Mesolithic inhumation is the only burial outside the Iron Gates with a terrestrial diet (Bonsall C., *et al.,* 2004; Whittle A., *et al.*, 2002: 77), and whilst there is no evidence for a Mesolithic occupation, D. Borić (2008) suggests that there might have been one.

Other than the date for inhumation 2, there is no evidence at this site for a Mesolithic presence. The contracted position of the skeleton and terrestrial diet of the deceased, both suggestive of the Neolithic, lead me to believe that both burials occurred within a short lapse of time of each other, and that the possibility that there has been a mistake in the transposition of the ^{14}C date OxA-8504 to read 8085±55BP instead of 7085±55BP should not be excluded.

Travni vrh (4) – This Mesolithic open-air site, in the Croatian Samobor Hills west of Zagreb, was reported on by S. Forenbaher (2003). The site is described as an activity area for the obtention of lithic tools, which is cautiously dated to the Mesolithic (Komšo D., 2006: 77-78).

Trebacki Krs (28) – This rockshelter in the Lim River valley of South-East Montenegro is close to the border with Albania.

The occupation of this site dates from the Early Mesolithic, with an impoverished lithic industry, characterised by an expedient technology, with a conspicuous Romanellian component. The microliths include triangles and segments of circle, comforting the Early Mesolithic date, and the faunal assemblage is all wild (Biagi P. & Spataro M., 2002: 168; Mihailović D., 1999, 2007: 22; Mihailović D. & Dimitrijevic V., 1999: 393).

Velika Pećina (see Map R11 Transdanubia) – This cave site, 428 masl, 60 km north of Zagreb on the west flank of Plat Peak in the Ravna Gora Mountains has two chambers 8 and 10 m deep. The site was excavated from 1948-1970 and 16 strata were identified from the Palaeolithic and possibly extending into the Mesolithic (Komšo D., 2006: 78; Paunovic M. & Karavanic I., 1999: 401).

Veternica Pećina (3) – This Palaeolithic to possibly Mesolithic cave site is situated on the slopes of Medvednica Mountain in Croatia. It was excavated intermittently between 1951-1971 by Malez (Komšo D., 2006: 78).

Vindija Pećina (see Map R11 Transdanubia)– This cave site is located 55 km north of Zagreb and 2 km west of the village of Donja Voca, in a narrow gorge on the south-west slope of Kriznjakov Vrh in the Ravna Gora Mountains at 275 masl. The cave entrance is 28 m wide, 20 m high and its depth is 50 m. The cave has been excavated several times between 1928 and 1994, initially intermittently between 1928-1958 by S. Vuković, and subsequently under M. Malez between 1974-1986. Whilst most of the occupational levels are pre-Holocene, there is possibly a Mesolithic component (Komšo D., 2006: 78; Paunovic M. & Karavanic I., 1999: 402-403).

I. Karavanić (1995: 23) states that "*According to Malez and Rukavina (1979), the stratigraphic complex of Vindija Cave (see Figure 2, above) spans a continuous time sequence from the Riss*

glaciation to the Holocene. It includes Paleolithic (Mousterian, Aurignacian, Gravettian, Late Gravettian, and final Gravettian/Epigravettian), Neolithic, Eneolithic, Bronze Age, and Roman levels". It is therefore unlikely that that there is any evidence of the Mesolithic-Neolithic Transition in this cave-site.

Zala Pećina (see Map R14 East Adriatic) – This cave north-west of Ogulin is about 40 km from the coast in Northern Croatia. The site was excavated between 2005-2007 under I. Karavanič, when horizons were found for the Late Upper Palaeolithic, Mesolithic and the Bronze Age (Karavanič I., *et al.*, 2008; Komšo D., Meso 2010 presentation). Even if there were a Mesolithic occupation, there is no evidence for the Transition.

Zalog (off-map west of Ljubljana) – Mesolithic site near Verd, in the wetlands close to the Slovenian capital of Ljubljana, at 286 masl on the banks of the Ljubija, tributary of the Ljubljanica River, some 300 m from the steep NE slope of the Javorč Mountain. The Mesolithic site was discovered 2 m below a pile dwelling Bronze Age site in a wetland environment, and has been dated ca. 7500 BC. The extended surface, covering some 6000 m^2, suggests a long term occupation (Gaspari A., & Kavur B., 2006: 200), although, based on the faunal remains, it could have been seasonally occupied (Janžekovič F. & Malez V., 2006; Toškan B. & Dirjec J., 2006), with an economy based on the hunt as well as fishing and fowling (Godevič M., 2006; Janžekovič F. & Malez V., 2006; Toškan B. & Dirjec J., 2006) "*Apparently, a particular cultural phenomenon emerged in the 9th millennium BP in the central Balkan area that was different from the Mesolithic of the Adriatic area or of the Danube basin; both based on the microlithic tradition of the Tardi-Gravettian and containing numerous geometric tools. The sites from both the Iron Gates and the Ljubljansko barje yielded stone industries for which the local communities primarily used local raw material of poorer quality. A common characteristic of these industries is that they were all based on the production of flakes instead of blades and included only few geometric tools*" (Gaspari A. & Kavur B., 2006: 200, 202). Perforated antler axes similar to those found in the Iron Gates at Ostrovu Mare, Schela Cladovei and Vlasac date from the same period (Gaspari A., 2006: 136).

No evidence has been suggested for the Transition.

<u>Eastern Central Balkans – Serbia to Slovenia east of the Dinaric Alps – Initial and Early Neolithic sites – Introduction</u>

The Starčevo Culture, named after the eponymous site of Starčevo-Grad north-east of Zagreb on the left bank of the Danube, is the earliest FTN culture of this Region, first evidenced *ca*. 6300 BC in the south and centre. The culture lasted some 800 years and there are hundreds of sites identified in this Region and that of Transdanubian. The Starčevo Culture is largely defined by white-painted pottery, which has been the subject of numerous studies and debates to define a chronology and its evolutionary phases, but these aspects will not concern us here. The earliest settlements are characterised by monochrome pottery, which is sometimes found in the basal levels before evolving into White-Painted Ware. We will primarily concentrate on those sites dating from the end of the 7th millennium and the beginning of the 6th millennium, to look for clues regarding the inclusion of elements from a local Mesolithic substrate, since there is a large area in the south and centre of the Region devoid of direct evidence for a Mesolithic occupation of the land, which we attribute, at least in part, to lack of research and the nature of the terrain. The Starčevo Culture clearly progressed northward over time, reaching the southern part of Transdanubia in Hungary, around Lake Balaton, not much earlier than 5800 BC, where the evidence points to mixing with the local hunter-fisher-gatherer population, out of which fusion evolved the LBK, which will be discussed in the Transdanubia Region 12. Other than the pottery, some of the characteristic elements of the Neolithic of the Region are:

- Flat settlements of short, or relatively short duration; if reconstructed, they were often rebuilt by expanding outwards;
- The structures are often evidenced by pits, which have been variously interpreted as pit-huts / pit-dwellings or work areas. Some say one and some say the other; the middle ground is probably the safest, since pits with evidence for superstructures exist, and evidence for quadrangular above-ground habitations during the earliest Neolithic of the Region is rare. In Hungary there are two Mesolithic sites which have produced evidence of circular sunken structures with post-holes suggesting tepee-like, or domed habitation structures (Jáztelek in North-East Hungary and Regöly-2 south of Lake Balaton), and this information need to be entered into the equation;
- Ovicaprines are the predominant domesticated fauna, certainly north of Belgrade;
- Hunting often plays a secondary role, and the evidence for armatures is largely lacking;
- Lithics are mostly blade based and the trapezes used as sickle inserts rather than arrow-heads, although in Croatia, between the Sava and Drava Rivers, long blades are lacking in the Starčevo sites, and there are few examples of Balkan flint or obsidian, without there being a proper explanation for the phenomenon (Klindžić R. Š., 2011);
- Material culture attributes whose origin is clearly to be found in Anatolia and the Near East (e.g. bone spoons and cult ceramic objects such as anthropomorphic and zoomorphic figurines and cult tables);
- One of the principal characteristics of mortuary practice in the Starčevo Culture is inhumations in a contracted lateral position (also known as crouched, hocker or foetal position).

K. Minischreiter (2007a) who excavated the Initial Neolithic Croatian sites of Galovo and Zadubravlje, with their pit-dwellings encompassing several rooms, special purpose buildings, cult practices (burial of bull horns, sacrifices?), community hearth, pottery workshops, firing pits and kilns, bread ovens, and the range of pottery vessels, cult objects (altars and figurines, zoomorphic pottery shapes), and which were established some 400 years prior to the arrival of the Neolithic of the Friuli Plain, has hypothesised that the Starčevo Culture of Eastern Croatia may have had some involvement in the Initial Neolithic of the Friuli Plain.

Eastern Central Balkans – Serbia to Slovenia east of the Dinaric Alps – Initial and Early Neolithic sites – Site details

Banja/Banya (20) – This Early Neolithic pit-hut Starčevo site south of Belgrade and west of the Iron Gates was established towards the end of the 7th millennium at about the same time as the site of Divostin further south (Bailey D. W., 2000; Mcpherron A. & Srejović D., 1988).

Blagotin (23) – This open-air site is located in central Serbia north of the village of Poljna (Fig. R10-5). It is located near the headwaters of a stream under Mount Blagotin, up a northern side valley of a tributary to the west of the Morava River, along the Neolithic migration route from the North-West Aegean.

The site was occupied in the Initial Neolithic (and reoccupied in later periods). The earliest proto-Starčevo occupation with its monochrome pottery has been dated (Budja M., 2009; Whittle A., *et al*., 2002):

- OxA-8608 7480±55BP = 6437-6240 BC (OxCal 4.2 at 95.4%), on antler pit JA2, central pit structure 7 – Median 6340 BC.
- OxA-8609 7270±50BP = 6231-6034 BC (OxCal 4.2 at 95.4%), infant burial pit, central pit structure 7 – Median 6135 BC.
- OxA-8760 7230±50BP = 6216-6016 BC (OxCal 4.2 at 95.4%), on bone perforator, central pit structure 7 – Median 6115 BC.

This Early Starčevo site, which covers some 50 X 80 m in the form of an ellipse, was excavated over an area of 300 m2 between 1989-1997 by S. Stanković until his death in 1996, and subsequently by H. Greenfield from the University of Manitoba. Seven small pit structures were found around a larger central pit structure, which contained two 30 cm high free-standing female figurines, an altar, many smaller figurines, a map of the site (the earliest known), large quantities of pottery, numerous remains of young animals and an infant burial in ash layers beneath the structure. Vertical post holes were found around the outlying pits 3 X 6 m, suggesting a vertical superstructure, with evidence for daub in the larger central 8 X 10 m structure, which had been baked hard during a conflagration (Greenfield H. & Jongsma T., 2006). The excavations also produced some 65 amulets (sometimes referred to as ear studs), which recall those found in Thessalian and Eastern Anatolian Neolithic contexts; their size range (0.9-9.3 cm), would appear to preclude their use as ear-studs, or as labial wedges as found in the Iranian Neolithic – they are in any case not found in funerary contexts in the Balkans; they were exclusively found associated with habitations, and on the virgin soil of pit structures initially used as habitations, even if later reused as refuse pits. Finally, these objects are only found in Initial or Early Neolithic contexts, whether in Greece, Bulgaria or further north (Vuković J., 2004).

Occupational density in hunter-gather dwellings is ca. 3 m^2 per person as against 10m^2 for agriculturalists. Applying the agriculturalist formula yields 2.5 persons per structure, which is unacceptably low for a nuclear family, whilst the hunter-gatherer formula yields sufficient space for a 5 person nuclear family. The site appears to have a single occupation horizon with 8 small pit-houses arranged in a 20-25 m diameter circle around a larger 'cult' structure, suggesting a population of *ca*. 40-50 individuals. This spatial pattern has been recognised in other Initial Neolithic sites of the proto-Starčevo Culture of the Region (Vinča-Belo Brdo, south of Belgrade and Foeni-Salaş in Romania) (Greenfield H. & Jongsma T., 2006).

The infant burial was discovered in the central pit structure 7, beneath the 'altar', where a red deer skull was also buried at a lower level (Budja M., 2009; Whittle A., *et al*., 2002). The burial of a red deer skull can be compared to a similar Mesolithic tradition evidenced in the Iron Gates at Lepenski Vir and Vlasac.

"*Pit houses are cross-culturally associated with cultures that have high mobility (Jongsma and Greenfield 2000). If this is accepted, then the question becomes why did the cultures of the northern Balkans have higher mobility patterns than those to the north or south? This leads to the second hypothesis, which is that the occupants of the Early Neolithic sites would be considered similar to or descendants of the indigenous hunter-gatherers of the Balkans. How else can one explain the penchant toward mobile house patterns, the lack of evidence for cultivated crops, and the reliance upon a mixture of domestic and wild stock? The rapidity with which the Early Neolithic cultures of the northern Balkans spread would be a testimonial to the widespread adoption of the trappings of an agricultural lifestyle by indigenous hunter-gatherers rather than the simple migration of sedentary agriculturalists from the south*" (Greenfield H. & Jongsma T., 2006: 77).

The lithics have been studied by J. Šarić (2006, 2007a); 2349 chipped stone artefact, of which chert 1004 (42.7%), quartzite 1311 (55.8%), quartz 29 (1.2%), 3 undetermined and 2 in obsidian. The material is local, the craftsmanship reasonable but not excellent, possibly due to the difficulty of working the material, so that only 17.2% is represented by blades. Geometric microliths represent only 0.29% of the assemblage and a single transverse arrowhead was found. The archaic chopping tools and discoid scrapers on flakes could be hark-backs or convergent with past traditions. Two pieces of obsidian were found, but their provenance is not indicated, so that they could have come up from the Aegean or down from the north-east of present-day Hungary.

The fauna is 8.3% wild and 91.3% domesticated based on the NISP (Greenfield H., 2008a: 108, Table 3). S. Jesik (1998) has studied the plant remains, for which the total number of seeds collected over the site was little more than 50; of these, 42% of botanical remains obtained by flotation were domesticated taxa (einkorn, emmer and barley), 14% weed seeds and 44% gathered seeds (cornelian

cherry (*Cornus mas*), wild apple (*Malus pumila*), pear (*Pyrus mas*) and blackberry (*Rubus fruticosus*)). The lack of storage facilities at the site, the fact that the cereal seeds found were all clean with no evidence for rachis or stems suggesting that the cereal grains were processed elsewhere and might even have arrived at the site as exchange items. The fact that there is also a lack of grinding stones and grinders at the site, and the fact that very few microliths were found at the site with sickle-sheen also suggests that agriculture was not a primary focus of subsistence or representative of the economy.

Given the cultural contents of this site, we can probably conclude that it was a relatively short term settlement established by a small group of Early Neolithic migrants, whose focus was on animal husbandry. The Neolithic people were learning to adapt to a new environment, were heavily dependent on herding, whilst possibly practicing horticulture (Jesik S., 1998: 164), and the small quantities of cereal seeds could be interpreted as the result of problems associated with the plant adaptation to a cooler and damper environment. The site might have been established early in the 64th century BC, if the earliest date is to be believed, although the 63rd century is more probable, and whilst there is no direct evidence for any a Mesolithic content, the question remains as to why the occupants chose to live in pit-huts.

Divostin (21) – This site, near the village of Divostin, some 100 km south of Belgrade was excavated between 1967-1970, and was the subject of a monograph edited by A. McPherron and D. Srejović (1988). The site, located on fertile well drained soil not subject to flooding, with a spring 100 m distant, is exposed to the south and protected by hills from the winter winds. It was first established in the Initial Neolithic by a Starčevo community who built pit-huts on the gently sloping land between the hills and the plain, close to a stream (Levels Ia, Ib and Ic). A later Vinča occupation of the site, established some 800 years after the Starčevo occupation had been abandoned, was established in above-ground quadrangular wattle-and-daub houses (Levels IIa and IIb) (Fig. R10-6). Some 2400 m^2, out of 150.000 m^2 total area eventually occupied, were excavated, with particular focus on the earlier occupation.

The dates from M. Budja (2009), quoting Tissen (2009), A. Mcpherron and D. Sejović (1988) and L. Nikolova (1998) are as follows:

- Bln-866a (or Bln-899) 7200±100BP = 6260-5876 BC (OxCal 4.2 at 93.8%), beneath floor house 14 – Median 6067 BC.
- Bln-826 7120±120BP = 6227-5749 BC (OxCal 4.2 at 95.4%) – Median 5990 BC.
- Bln-823 7080±180BP = 6266-5638 BC (OxCal 4.2 at 93.8%), feature 15, earth cabin 5 – Median 5950 BC.
- Bln-866 7060±100BP = 6102-5726 BC (OxCal 4.2 at 95.0%), beneath floor of house 14 – Median 5915 BC.
- Bln-931 7050±100BP = 6098-5721 BC (OxCal 4.1 at 95.4%), beneath floor of house 14 – Median 5910 BC.

The fauna is 8% wild and 92% domesticated in Levels Ia to Ic (Bökönyi S., 1988: 420, Table 17.1; Greenfield H., 2008a: 108 Table 3), although M. Bogdanović (2007: 87) claims only 87% domesticated, but this does not change the essentially domesticated nature of the faunal assemblage. Domesticated cattle (which A. McPherron and K. Christopher (1988: 465) believed to be locally domesticated!) represent 47% of the total, followed closely by ovicaprines at 41%, with pig and dog representing some 4% between them. Half of the wild fauna is made up of *Bos primigenius* (Bökönyi S., 1988: 420, Table 17.1) and as the author points out, one bovine has as much meat as 7 sheep, so that the assemblage is heavily weighted towards the breeding of cattle and the consumption of beef. Such a high percentage of bovines is unusual for a site of the Starčevo Culture site, since ovicaprines tend to dominate the faunal assemblage at most sites.

The pit-huts were dug in two levels of occupation. The earliest level is Ia, and the subsequent level Ib saw more pit-huts, larger, deeper, and better built than in Phase Ia, with wattle and daub walls and ovens inside (Bailey D., 2000). In total, 30 pits and 7 structures were excavated from the earlier

occupation and 6 above-ground structures from the later Neolithic (Jesik S., 1998: 77, 79). The Phase Ia excavation is made up of three semi-subterranean elliptical features (pit-huts 1, 2 and 3); Phase Ib by three larger rectangular or trapezoidal semi-subterranean features (pit-huts 4, 5 and 6), and Phase Ic by above-ground structures (Fig. R10-6) Bogdanović M., 1988: 35-36). Two of the three pit-huts from Phase Ia contained unstructured hearths, at least one of the pit-huts contained evidence for daub on an unstructured floor surface, and the pit-huts had slanting post-holes outside the pit structure suggesting a beehive-like superstructure in a simple and randomly scattered settlement with varying orientations. M. Bogdanović (1988: 86-89) argues that pit-dwellings are a Gravettian to Mesolithic tradition over a wide area ranging from the Ukraine to Austria, to which can added the Near East, Japan and China, as well as the Americas (Testart A., 2012). We have also found evidence in Western Anatolia at Ege Gübre (Region 2), the Fikertepe Culture (Region 3), Maroulas on the Island of Kythnos (Region 5) Hoca Çeşme in Trace (region 4) and Ohoden-Valoga in Bulgaria (Region 9). The idea that this type of structure was borrowed by the Early Starčevo Culture from the local hunter-gatherer tradition might be corroborated by the lack of sense of proportion in the dwellings of the earliest phase and the lack organisation in the layout of the early settlement. Against this it can be argued that no Mesolithic pit-houses have been found in Serbia, although there are two known instances in Hungary, one in the north-east and the other in Transdanubia.

The knapped lithics comprised 10163 pieces, but all but 772 were lost in a move, and of those, 122 pieces were attributed to Phase I (99 blades, 19 microblades and 2 flakes) for which the debitage appears to be from unfaceted platforms of locally procured pebbles. Few of the pieces appear to have been retouched, mostly to possibly facilitate hafting, whilst some 80% of the lithics showed signs of use. There were no geometric microliths (Tringham R., *et al*., 1988), which is a common feature of Starčevo sites, notwithstanding the wild fauna present. Pollen preservation was poor and most probably represents the environment within the settlement, so that the pollen record is silent as regards evidence for agriculture (Grüger E. & Beug H.-J., 1988).

Anthropomorphic and zoomorphic figurines appear in Phase Ib, but none can be attributed to Phase Ia, and the earliest anthropomorphic and zoomorphic figurines from Phases Ib and Ic are rudimentary (Letica Z., 1988). There are also ear studs / amulets from Phase I, but these come from pits rather than habitation floors, and are not attributed to sub-phases (McPherron A., *et al*., 1988: 326). This situation could suggest that when the site was set up, it included elements of an autochthonous population in the process of Transition.

Donja Branjevina (6) – This Early Neolithic Starčevo site in the north-west of the Region is near the village of Koravukovo in Northern Serbia, on the east side of the Danube north of where the River Drava flows into the Danube on the opposite bank, thus at a crossroad for communications and in a good position for exchange and contacts (Kalicz N., *et al*., 1998). The site is unusual in that it contains both Starčevo and Körös FTN superimposed phases, but the material has been poorly published (Bánffy E., 2012: 53).

The earliest dates for this site, from the monochrome phase Level III are (Biagi P. & Spataro M., 2005; Bruckner B., 1997: 258; Budja M., 2009; Whittle A., *et al.*, 2002):

- GrN-15974 7155±50BP = 6108-5971 BC (OxCal 4.2 at 85.6%), on charred bones, trench V86-87 pit dwelling hearth – Median 6040 BC.
- GrN-15976 7140±90BP = 6221-5841 BC (OxCal 4.2 at 95.4%), trench V86-87 outside pit dwelling – Median 6030 BC.
- OxA-8557 7080±55BP = 6054-5845 BC (OxCal 4.2 at 95.4%), on human body under house structure – Median 5950 BC.

Most of the structures at this site are pit-huts and the deposits are a combination of Starčevo and Körös cultural objects (pottery, anthropomorphic figurines, altars, bone projectile points similar to the Iron Gates), although the cultural context from which the objects were extracted is not always clear (Bánffy E. 2013b: 40).

J. Šarić (2006: 19), in discussing the lithics states that "*the finds from Donja Branjevina confirm how crucial the environment is in establishing the typological character of the chipped stone artefacts. The favourable position next to the great river and the fertile plains were the main driving forces for the development of agriculture at this site. As a consequence of the economy, the industry of blades contributed 42.71% of the entire quantity of chipped stone artefacts. The distinctive characteristic of this site is the parallel existence of the industry of blades (both microblades and long blades) and the industry of geometric microliths [2.86% trapezes].*

The chipped stone artefacts from the Donja Branjevina site, due to their dating into the Starčevo II phase and their geographic position are located in space and time, so the industry of long blades occurred at a time when the traditions of the Balkan–Danubian Epigravettian with trapezes were still strong in that area and this resulted in the parallel existence of these two industries".

Domesticated fauna is over 75% (Tringham R., 2000: 46). Fish-hooks and harpoons have been found at this site.

Inhumations were also found at this site.

This site is one of the earliest, if not the earliest Neolithic site this far north in Serbia. Its location close to Transdanubia where there is a confirmed Mesolithic presence makes it possible that there are some Mesolithic elements, given the number of trapezes, the hunted fauna and the evidence for fishing. It is however not possible to go beyond the realms of speculation.

Galovo-Slovenski Brod / Galovo (14) – This is possibly the earliest Starčevo Culture site known in Croatia, on the north bank of the Sava River at Slovenski Brod; it is also one of the few properly dated sites in Croatia, although some 100 Early and Middle Neolithic sites are known between the Drava and Sava Rivers and the Danube (Minischreiter K., 2007a), of which about 60 are Starčevo sites (Kalicz N., *et al.*, 1998). The site is single layer and has been carefully excavated over a ten-year period in the late 1990s and early 2000s (Fig. R10-7). There is no Monochrome phase known in Croatia, so that the earliest pottery is Starčevo I, which has been compared to the White-Painted Ware at Donja Branjevina (Minischreiter K., 2007b; Minischreiter K. & Bronić I, 2006: 6; Obelić B., *et al.*, 2002).

This site is a sophisticated pit-house settlement with multiple areas for weaving, pottery kilns, bread ovens, etc., with three periods of construction spanning almost a millennium. The earliest phase is best represented by pits 205, 207 and burial pit 9 (Minischreiter K., 2007b; Minichreiter K. & Botić K., 2010). Burial pit 9, dated *ca*. 5700 BC, 15-17 m X 5-7 m, delimited by a fence contained 3 inhumations of a poorly preserved headless man and a twin burial of a man and a headless woman, all in the contracted lateral position, which is typical of the Starčevo culture, although the decapitation is unusual and more typical of the Mesolithic, as found in the Iron Gates. The earliest phase has been dated:

- Z-3586 7060±150BP = 6227-5668 BC (OxCal 4.2 at 95.4%), on western cult object 89 – Median 5950 BC.
- Z-3584 7000±140BP = 6107-5634 BC (OxCal 4.2 at 93.5%), on western cult object 149 – Median 5870 BC.
- Z-3574 6875±35BP = 5842-5704 BC (OxCal 4.2 at 93.1%), bread oven ash pit, house 205– Median 5775 BC.
- Z-2936 6835±110BP = 5927-5557 BC (OxCal 4.2 at 92.0%), ash in burial pit 9 where a ritually buried bovine horn was found, as well as three adult inhumations, two of which were decapitated – Median 5740 BC.

This site appears to have been established *ca.* 6000 BC or shortly after, and continued in occupation some 900 years. Whilst, like most of the Starčevo sites, it is made up of pit-dwellings and pit work areas, in this instance the site appears to be more structured without any indication of a Mesolithic content, unless it be in the practice of decapitation of the deceased and the ritual burial of a horn, with at least one of the burials being dated ca. 5700 BC.

Golokut-Visič (8) – This Early Neolithic Starčevo site close to the Danube in Western Serbia produced a typical Starčevo burial in a flexed position dated 5560-5360 BC, associated with an auroch skull. A. Whittle, *et al*., (2002: 89-90) have suggested that this practice could be indicative of a hunter-gatherer tradition, since similar instances are known from the Iron Gates.

Grivac (22) – This is an Early Neolithic Proto-Starčevo site (with a later Vinča Culture occupation) at which monochrome pottery was found in the basal Level (Whittle A., *et al*., 2002, quoting Bogdanović, 1996). The site is in Central Serbia, some 20 km west of Divostin, and was excavated by Dr. Branko Gavella of the University of Belgrade in the 1960s (McPherron A. & Ralph E., 1970: 15). The site is made up of pit-huts and dated to the end of the 7th millennium (Bailey D., 2000: 57). The dates (Biagi P. & Spataro M., 2005; Biagi P. & Starnini E., 2010; Budja M., 2009; Nikolova L., 1998):

- Bln-860 7250±100BP = 6368-5979 BC (OxCal 4.2 at 93.9%), pit dwelling 1 – Median 6175 BC.
- Bln-869 7250±50BP = 6222-6027 BC (OxCal 4.2 at 95.4%), on charcoal – Median 6125 BC. According to P. Biagi & E. Starnini (2010).
- Bln-869 7250±100BP = 6368-5979 BC (OxCal 4.2) – Median 6175 BC. L. Nikolova, (1998) gives this standard deviation as 100 years.

According to D. Srdoč, *et al*., (1987: 141) measurements made in Berlin gave a date of 7250BP for the Early Starčevo, which ties into the dates quoted above.

Amulets were also found in the pit-dwellings at this site (Vuković J., 2005: 25).

There is no indication of a Mesolithic substrate at this site.

Obre 1 (19) – This Early Neolithic Starčevo Culture tell site in Bosnia is located 65 km north-west of Sarajevo, at a crossroads of communication between the Central Balkans and the Adriatic. The site is on the bank of the Trstionica River, tributary of the Bosnia a few km downstream. Obre II is a later site about 250 m upstream which was established after a hiatus in occupation of the area. The sites were excavated in the 1960s by M. Gimbutas and A. Benac.

The dates for the earliest of the four levels of occupation with Black-on-Red Starčevo pottery are:

- UCLA-1605I 7240±65BP = 6231-6004 BC (OxCal 4.2 at 95.4%), on bone collagen – Median 6120 BC.
- Bln-636 6795±150BP = 5986-5481 BC (OxCal 4.2 at 95.4%), on charcoal – Median 5735 BC.
- UCLA-1605G 6710±60BP = 5723-5529 BC (OxCal 4.2 at 95.4%) – Median 5725 BC.

The earliest date could well be too early since the pottery has been identified with Starčevo II pottery which would place the earliest occupation sometime in the first half of the 6th millennium BC. The site is famous because Adriatic Impressed Ware appeared at the site shortly after it was established (Kalicz N., *et al*., 1998: 155), and the obsidian found at the site has recently been analysed and proven to originate from both Hungary and the Western Mediterranean (Težak-Gregl T. & Burić M., 2009).

The fauna is 20.7% wild and 79.3% domesticated in Levels I-III, with cattle the dominant species, followed closely by ovicaprines (Bökönyi S., 1998: 429; Greenfield H., 2008a: 108 Table 3).

The 25 burials found at the two sites are mostly in a contracted lateral position lying, which is typical of the Starčevo Culture, but some of the earliest are bone depositions of 8 young children in yards outside houses (4 in contracted position, but in 2 cases without hand bones; one was a scattering of bones; one appears to have been placed in a seated position; another could have been a seated burial but skull fragments were found with lithics and animal bones 35 cm beneath and the last was made up of cranial and post-cranial fragments placed under a covering of large stones on the daub floor with an amber ornament and a pot, which were then covered with small stones). A different if similar situation was found at Anza with body parts in primary midden contexts (Chapman J., 2000: 142). These inhumation practices need to be seen in the context of fragmentation of figurines in the Starčevo Culture, as well as the practices in other Starčevo sites during the Early Neolithic (Chapman J., 2010:

35), and they cannot be construed, in the present state of knowledge as emanating out of Mesolithic traditions.

The only clues that there could be a Mesolithic content at this site is the 20.7% wild fauna, but this is more likely to be due to the site location which would have been favourable for hunting.

Rudnik Kosovski (29) – This Early Neolithic site in Kosovo, about 75 km south-west of Pristina, is one of the most southerly sites of the Starčevo Culture, with Monochrome Pottery at its base (Whittle A., *et al.*, 2002: 85), suggesting it was established in the second half of the 7th millennium BC.

Starčevo-Grad (17) – This Early Neolithic site became the eponymous site for the Starčevo Culture. It is a mound site in a brick-works, some 8 km north-east of Belgrade near Pančevo, on the left bank of the Danube, which was occupied over several millennia. It was first excavated in 1928, when Grbíc excavated 7 pits with elliptical bases with diameters ranging from 200-600 cm, of which only two contained hearths. In the later excavations by Fewkes, daub was identified in pit-fill, as well as flooring construction and post holes. Pit 5a had a diameter approaching 10m and had a two-part floor plan, suggesting its use as a habitation. The site was unfortunately only published as a preliminary report (Bogdanović M., 1988: 86).

Excavations were reinitiated in 1969-1970 by D. Garašanin and E. Fewkes, who, according to A. Whittle *et al*., (2002) obtained new dates, the oldest of which is on worked ovicaprine bone, which would appear to indicate that we are not faced with a site of the earliest Neolithic, which is confirmed by the lack of a monochrome phase:

- OxA-8561 6975±60BP = 5984-5740 BC (OxCal 4.2 at 95.4%), on ovicaprine bone – Median 5860 BC.

The faunal assemblage for the earliest levels is 25.9% wild, and the domesticated fauna is dominated by ovicaprines, with a few bovines and suids (Greenfield H., 2008a: 108, Table 3; Tringham R., 2000: 46). The predominance of bovines seen at sites south of Belgrade (Divostin, Obre I) is relinquished in favour of ovicaprines in the regions further north.

This site appears to be a later Early Neolithic Starčevo site. The continuing use of pit-dwellings and the high percentage of wild fauna could suggest a Mesolithic component at the site, where above-ground quadrangular structures were subsequently built.

Tečić (24) – E. Bánffy (2004: 347) states that "*A Mesolithic-Neolithic continuity could be established as regards the lithic assemblage from the Starčevo site of Tečić*".

Topole-Bać (9) – This Early Starčevo site has been reported as having a Mesolithic inhumation, and as such, the details are included in the Mesolithic and Transition section above.

Vinča-Belo Brdo (18) – This site close to Belgrade dates from the Middle Neolithic and is the eponymous site for the Neolithic culture which follows the Starčevo Culture.

Zadubravlje (15) – This Croatian Starčevo site lies on the northern left bank of the Sava River 17 km east of Galovo-Slovenski Brod in or near the village of the same name. The site was excavated by K. Minichreiter in the late 1990s during the construction of the Zagreb-Belgrade motorway. Pit-dwellings, workshops, a well and numerous quern-stones, suggesting a well-organised agricultural community, were uncovered. A horn buried under structure 10 is similar to finds at Galovo and Obre I, and could possibly harp back to Mesolithic traditions. The earliest dates published are (Minichreiter K., 2001; Minichreiter K. & Bronić I., 2006; Obelić B., *et al.*, 2002):

- Z-2924 7620±140BP = 6828-6207 BC (OxCal 4.2 at 94.2%), charcoal from bottom of well n° 11 in centre of settlement – Median 6520 BC.

- Z-2923 6995±115BP = 6067-5666 BC (OxCal 4.2 at 95.4%), on charcoal from pit dwelling 10, beneath which a bovine horn had been ritually buried – Median 5865 BC.
- Z-2921 6710±115BP = 5848-5470 BC (OxCal 4.2 at 94.9%), on charcoal from pit dwelling 6 – Median 5660 BC.
- Z-2922 6705±95BP = 5775-5477 BC (OxCal 4.2 at 95.4%), on charcoal from pit-dwelling 9, containing 2 domed ovens and 2 cylindrical kilns – Median 5625 BC.

The date from the well is substantially more ancient than the rest of the site and the authors question whether there might not have been an earlier occupation (Minichreiter K. & Bronić I., 2006: 15), since the only other explanations are an error in the calibration or (very) old wood. It is reasonable to assume that this Early Neolithic site was established early in the 6th millennium, since it is Early Starčevo and not Proto-Starčevo with Monochrome Ware, which facies is not known in Croatia.

Eastern Central Balkans – Serbia to Slovenia east of the Dinaric Alps – Conclusions

As stated above, pit-huts are not necessarily an invention of the Starčevo Culture. Their ubiquity in the Starčevo Culture is however hard to explain in sites which appear to lack internal organisation, and in which the pits, whilst tending towards being circular or elliptical, are amorphous, unless the idea emanates from the local Mesolithic mobile hunter-gatherers (Bogdanović M., 1988; Jesik S., 1998). The hunter-gatherer presence in the central part of the Region is however almost invisible to us, except at the periphery, mostly in caves and rock-shelters and in the Iron Gates. During the later Neolithic the pit huts are abandoned in favour of quadrangular above-ground wattle-and-daub structures.

Several cave sites attest to the Mesolithic in the Dinaric Alps, but almost all of these were abandoned prior to the advent of the Neolithic, and only Odmut Cave shows a clear tendency for the Mesolithic occupants to accept selected Neolithic attributes over an extended period of time into the Starčevo and Impressed Ware chronologies, maintaining their traditional lifeways whilst practicing a limited amount of pastoralism.

The Neolithic migrants began to arrive in the Region as early as the 64th century BC, with the bulk of the earliest sites, identified by their monochrome pottery becoming established from the 62nd century BC, with the advent of the "6200 BC event". Natural expantion based on population growth is no more than 1 km pa, but in the Central Balkans the rate is between 3-6 km pa, which presupposes some form of leapfrogging to areas with the right soil, salt and pasture, with the movement essentially following the river courses north, with east-west and west-east movements as well, but little anthropogenic impact on the land during the Early Neolithic (Spataro M., 2010: 99). These migrants moving rapidly north, skirted round the Iron Gates Region, which was well populated by hunter-gatherers, and where the terrain in the gorges was unsuitable for agriculture, although the Ključ, at the exit of the gorges would have been, and that is where Neolithic sites were eventually established. In Northern Serbia the role of fishing and hunting was particularly important in the Early Neolithic (Kozlowski J. K., 2003: 15), indirectly supporting the hypothesis that there was integration of the Neolithic and Mesolithic populations, which will be more clearly evidenced in Transdanubia.

Few attempts have been made by archaeologists in the central Balkans to collect and interpret palaeobotanical remains, with the focus of research being on ceramic typologies rather than understanding the provenance and economy of the Initial Neolithic populations (Jesik S., 1998: 158). Storage pits are often absent, suggesting that the economy was primarily based on pastoralism, to which it would have been easier for the autochthonous population to relate. And yet sites in Greece and Bulgaria are of long duration, accommodating large settled communities who relied heavily on agriculture with above-ground rectilinear houses with hearths, whereas in this Region the sites are small, of short duration, with little evidence for dependence on agriculture, whether in the form of storage pits, querns and grind-stones or botanical remains, but with solid evidence for pastoralism. S. Jesik (1998) and M. Bogdanović (1988) believe that the spread of agriculture was done by a

combination of migration and acculturation, which belief is supported by the DNA evidence. E. Bánffy has also suggested that the site of Tečić contained Mesolithic traditions in its lithic assemblage, for which there is also some evidence at some of the sites listed above.

This Region's Initial Neolithic thus appears to be a migrational movement in which the Neolithic people, in combination with the Mesolithic substrate, were learning to adapt the productive economy to a new environment, and we will see that a halt was called to the north of the Region, which lasted several centuries, whilst the domesticated plants and animals, whose provenance was to be found in the semi-arid Near East, adapted to the north European temperate zone.

Region 11 – Eastern Central Balkans – The Iron Gates

(Map R11)

Eastern Central Balkans – The Iron Gates – General Introduction

The Iron Gates Region covers a total of 230 km along the banks of the Danube, half of which are in the Iron Gates Gorges between the entrance and the Iron gates 1 dam and the other half downstream between the Iron Gates 1 and 2 dams. Archaeological research of the Region is mature and ongoing, although excavations are only continuing at the site of Schela Cladovei at the exit from the Iron Gates. The literature is extensive, yet comprehensive reports are available for only 2 sites – Vlasac (Srejović & Letica, 1978) and Cuina Turcului (Păunescu, 1970, 1978); interim reports, and special studies are not lacking, especially for Lepenski Vir, Padina, Vlasac, Hajdučka Vodenica and Schela Cladovei. Regional syntheses have been attempted by I. Radovanović (1996), V. Boroneanţ (2000) and C. Bonsall (2008). The Iron Gates Region is rich in Mesolithic sites, some of which continued to be used into the Early Neolithic, making the Iron Gates "*an area of critical importance for understanding the processes involved in the transition from hunting and gathering to farming in Europe*" (Bonsall C., *et al*., 2008: 2).

The Iron Gates Region lies on the border between Serbia and Romania, where the Danube has carved a series of gorges between the foothills of the Dinaric Alps to the south and west, and the Carpathians to the east and north. The Iron Gates Gorges, which we will refer to as the 'Iron Gates' are also referred to in the literature as the Đjerdap, Đerdap, Clisoura, Klisoura, Klissoura, or Portiles. The Gorges contained whirlpools and rapids as the Danube was funnelled through the narrow passages, whilst dropping several metres before exiting into the Lower Danube Plain in the large oxbow known as the Ključ. Numerous Palaeolithic, Mesolithic, Neolithic and later sites were discovered on the banks and near the Danube in the 1960s, prior to, and during the construction of a hydroelectric dam near the exit to the gorges (known as Iron Gates 1 in the English publications), and several of these sites became the subject of salvage excavations between 1964-1971 by both Yugoslavian and Romanian archaeological teams in a race against the rising waters. A second dam (Iron Gates 2), downstream from the Iron Gates and the Ključ, has been subsequently constructed, drowning further sites on the river banks and islands upstream, which were subject to salvage excavations between 1980-1984. C. Bonsall (2008) reminds us that whilst the banks of the Danube were well prospected, the higher terraces, which were not in danger of flooding have been insufficiently explored and could supply answers to what happened to the population of the Region during the '6200 BC event' when most sites were abandoned.

The Iron Gates sites are split into those in the Upper Gorges, those in Central Gorges, and those in the Lower Gorges and downstream, including the Ključ, since the nature of the archaeological evidence differs between the three areas in the same manner as does the geology, geography and vegetation. Some of the differences noted by I. Radovanović (1996b, 1999, 2000) are:

- Greater use of trapezoidal structures in the Upper Gorges and reinforced ideology during the Transition; In the Lower Gorges, Ključ and downstream, irregular-shaped dugouts or above-ground rectangular huts with circular hearths make their appearance (Răzvrăta II, Ostrovul Mare km873, Hajdučka Vodenica II, Donje Butorke and others), after contact with Neolithic groups;
- Lime floors in Upper Gorges;
- Triangular A signs associated with hearths in Upper Gorges and downstream from the Ključ;
- Alters and sculptures in Upper Gorges and a different variety in the Lower Gorges and Ključ;
- Different types on rectangular hearths, ash-pits covers, side channels;
- Greater use of local flint in the Upper Gorges, as against quartz and other local silica rocks;

- More red deer and wild boar in the Lower Gorges, with red deer and aurochs in the Upper Gorges;
- More fishing in the Upper Gorges;
- The sites in the Upper Gorges maintained a stronger degree of ideological integration during the Transition, whilst those in the Lower Gorges and downstream integrated more rapidly into the Neolithic.

The Palaeozoic and Mesozoic rocks rise abruptly to 700 m along most of the length of the gorges, with the Treskavac Mountain dominating the horizon on the opposite bank of the Danube facing Lepenski Vir and Vlasac (Fig. R11-1). There are occasional terraces along the banks of the Danube and its tributaries, and the limestone reliefs contain caves and rockshelters, some of which were occupied during the Late Pleistocene and Early Holocene. In the last 100 km of the Region, the Danube traverses open terrain, known as the Ključ, made up of quaternary sediments, with terraces dating from the Glacial, Post-Glacial and Holocene. Whilst the weather is mostly continental with hot dry summers and cold wet winters to the point where the Danube can freeze over, the gorges enjoy a more clement microclimate (Bonsall C., 2008).

The earliest evidence for occupation in the region dates from the Late Pleistocene in Romania, at the cave site of Băile Herculane some 20 km north of the Central Iron Gates up a tributary of the Danube, at the caves of Climente I and II, Cuina Turcului and Veterani in the Middle Gorges, and at the open-air lithic scatters sites of Ilişova and Izlaz on the left bank of the Upper Gorges, all close to the Danube. The Mesolithic and Transition sites are on the other hand all open-air, excepting the rockshelter of Cuina Turcului which continued to be occupied. The first attested dates for the open-air sites are from the mid-10th millennium BC (Ostrovul Banului I-II, Padina A, Veterani Terrace, Vlasac, and probably Cuina Turcului II), when the seeds of the future cultural development were sown (Bonsall C., 2008; Mihailović D., 2007). Burials appear at Padina at this time.

The economy in the Region shifted progressively from one primarily based on hunting *K*-selected (ungulates) fauna to *r*-selected (fish and presumably plant) species at the beginning of the Holocene. In the Early Mesolithic there are instances of diets based 50% on aquatic resources, and by the Late Mesolithic, fishing was intensively practiced at many sites, with evidence for diets based on aquatic resources exceeding 80%, which continued at several sites during the '6200 BC event'. The progressive transition after 5900 BC to the consumption of domesticated fauna appears to accompany a disintegration of the ideological system and the social structures put in place during the Mesolithic (Bonsall C., 2008; Bonsall C., *et al*., 2004; Borić D., 2008: 108-110; Radovanović I., 1996a). Conditions in the Danube Gorges were more favourable than elsewhere during the Mesolithic, where in addition to the microclimate and aquatic resources, 44% of the 371 plant species are useful in human nutrition, and 59% in animal nutrition as "*seemingly demonstrated by the height of both men and women, with values well above any other in Europe (Bonsall et al., 1997)*" (Roksandić M., 2000: 6). In this Region the incentive to take up Neolithic attributed would have been less pressing than for those Mesolithic populations living in less favourable environments (Merkyte I., 2003: 316). The exploitation of the aquatic resources was accompanied by a more sedentary life style, whether partial or permanent, with many sites being used over more than a millennium, presumably in part due to the heavy nature of the equipment used, the storage of surpluses (although there is not much evidence for this practice), the security afforded by an abundant source of protein, the more permanent nature of the habitation structures, the probable acquisition of rights over preferential locations, which D. Bailey (2000: 46) calls a "*commitment to the places*", as well as for demographic reasons, changing belief systems and evolving social structures. Ethnographic examples inform us that sedentism and territoriality are reinforced by symbolic structures and ritual, often associated with funerary rites and ancestor cults, and there is plenty of evidence for this in the Region (Whittle A., 1996).

As E. Bánffy (2013: 121) stated, whilst not conforming strictly to the tripartite location of sites proposed here, that "*the Mesolithic settlements in the Danube Gorges and the Lower Danube region can be divided into several groups and it has been suggested that some survived to see the arrival of*

the early Vinča groups in the mid-6th millennium BC (Radovanović 1996, p. 39). The assumed three regional groups share a similar architectural tradition: the semi-sedentary communities occupying the settlements of Padina, Vlasac and Lepenski Vir by the upper gorges, the sites of Kula and Ostrovul Mare by the middle gorges, and the settlements of Hajdučka Vodenica, Icoana, Ostrovul Banului, Schela Cladovei and Ostrovul Corbului by the lower gorges all lived in sunken or surface-level oval or trapezoidal houses (Radovanović 1996, p. 41, 1994, pp. 95-97; Jovanović 1987; Boroneanţ 1970). It has been suggested that these groups, whose subsistence was primarily based on fishing, in part or wholly lived on permanent settlements and pursued a more-or-less sedentary lifestyle. This may have been the first step towards food production and social ranking, as in David Harris's (1997) view – it must be borne in mind, however, that this process was by no means irreversible (Voytek and Tringham 1989 pp. 495-496)". The terraces the settlements occupied inside the Iron Gates were mostly small, limiting the demography of the sites, suggesting that extensive networks needed to be maintained for social reproduction, and this is confirmed by the relative cultural homogeneity of the Region. Whilst there is evidence for conflictual relations during the Mesolithic at Schela Cladovei and Vlasac, none has been found dating from the Transition.

Eight Mesolithic sites have produced human remains in the Region (Merkyte I., 2003) and the remains of more than 600 individuals have been found in the Iron Gates covering the Mesolithic, Transition and Early Neolithic. The sites containing recorded human remains are almost exclusively on the Serbian right bank, and the earliest burials dating from 9200-7500 BC are known from Lepenski Vir, Padina and Vlasac (Bonsall C., 2008), attesting the growing commitment to place. Some 250 burials are disarticulated bones and over 400 mostly whole skeletons, *ca*. 150 were found at Lepenski Vir, 130 at Vlasac, 75 at Padina, 30 at Hajdučka Vodenica and 33 individuals in 20 graves at Schela Cladovei. The Mesolithic burials attesting to violent deaths at Schela Cladovei (6 violent and 6 fractures) and Vlasac (3 violent), can probably be related to issues of territoriality and/or ownership of resources, and may also reflect a certain density of population (Merkyte I., 2003: 313; Thorpe I., 2003), resulting in stress (the raiding for partners cannot be excluded). Inhumations exist in particular positions and orientations, with most of these following typical Mesolithic traditions as single or multiple burials, with a few following Neolithic flexed lateral traditions, all of which "*were female, indicating there was exchange between the newly arrived farmers and fishermen, which most likely included marriages between different groups*" (BorićD., 2015). The burials are in, under or near structures, special areas or cemeteries, with numerous burials as disarticulated bones and a few cremations. Burials are sometimes accompanied by grave goods (animal, adornments, ochre and graphite, tools and decorated objects) and sometimes not, and at Lepenski Vir in particular, burials are occasionally marked by boulder art. Neonates, infants, young people, adults and old people are interred, both male and female. There is thus a wide variety of practice (Bailey D., 2000: 116-121).

Evidence for cult practices and social markers, particularly as regards the dead, are amply attested, and many aspects of the archaeological record can be included under this heading, such as (Radovanović I., 1996b):

- Structured depositions (Chapman J., 2001);
- Trapezoidal structures and their location within the site;
- Hearths and altars;
- Carved boulders, which have been found at Lepenski Vir, Padina, Vlasac, Cuina Turcului, and Schela Cladovei (Boroneanţ V., 1989);
- Portable objects made of decorated stone and hard animal matter;
- Pottery, which appears *ca*. 6200 BC, several centuries prior to domesticated animals (6000-5900 BC) (Budja M., 2008).

A distinction needs to be made however between the evidence for cultural complexity and social complexity. We must not assume that there is a natural correlation between the two, and in fact there is relatively little evidence for social complexity within the Mesolithic and Transition of the Iron Gates Region (e.g. storage facilities, richer burials, larger or special structures) (Cvekić R., 2009;

Greenfield H., 2008a: 105), but there is evidence for social and ideological integration (Mihailović D., 2007; Radovanović I., 1996a: 37), and for long lasting traditions looking back over the millennia.

Contact and exchange over distances of several hundreds of kilometres is evidenced from the earliest records of the Region, when extended networks might have been required for social reproduction due to the thinly populated landscape, with Hungarian/Slovak obsidian from 440 km away at Cuina Turcului I-II, Ostrovul Banului I-II and Băile Herculane, as well as Mediterranean gastropods at Cuina Turcului. During the Initial Mesolithic the lithic technology declined with local quartz-quartzite and silica rocks usage representing up to 90% of the raw material (Merkyte I., 2003: 311), although this was less pronounced in the Upper Gorges where the settlements were able to obtain flint from the hill of Sviniţa, whilst in the Lower Gorges only small quantities of flint were obtained from the local Privod Hill; "*All this indicates that mobility and, most probably, the need to acquire high quality raw materials decreases markedly in the Mesolithic*" (Mihailović D., 2008: 15). During the Transition the use of flint increased, to become over time the predominant raw material (Mihailović D., 2001: 340). Whilst the population presumably grew during the Mesolithic in the Iron Gates Region and the contacts required to maintain breeding networks could have been maintained within a smaller geographic region, long distance contacts continued to exist, as evidenced by the continuity of supply of Hungarian/Slovak obsidian at Vlasac, Padina A1, Ostrovul Banului and Lepenski Vir; Bulgarian graphite at Vlasac; more generally, radiolarite from Transdanubia, Northern Serbia or Vardar, south-east of Belgrade, and exotic flint, quartz, quartzite, opal, chalcedony and igneous rock, most of which emanated from North and West of the Iron Gates Region (Bonsall C., 2008; Chapman J., 1989; Mateiciucová I., 2010: 281; Whittle A., 1996). During the Transition, evidence of contact becomes more pronounced with a few *Spondylus* shell objects and Balkan honey flint, as well as pottery, ground stone objects and domesticated animals (Kozlowski J. & Nowak M., 2007).

The bipolar technology and microlithisation represents a major trait of the Iron Gates Mesolithic lithic industry, with end and side scrapers, retouched blades and bladelets, flakes, backed pieces, bifacial tools, borers, Montbani-type blades and geometric microliths, whilst other stones were used as sling-shots, pendants, hammer-stones, axes, grinders and mortars, weights, fireplaces, alters construction material, boulder art, etc. (Bonsall C., 2008; Mihailović D., 2008: 15). The Mesolithic technology can be traced into the Transition with the addition of new tool-types (Radovanović I., 1996a: 314; 1999) and other objects made of various types of stone, as well as lime plaster floors.

During the Mesolithic the faunal assemblages include a wide range of terrestrial, aquatic and bird species as well as the domesticated dog which was not only eaten, but also associated with funerary practices; It is possible that dog domestication occurred in the Region (Bökönyi S., 1978; Greenfield H., 2008b: 213), but there is no evidence of Mesolithic domestication of ungulates in the region. "*There is solid evidence for human biological continuity between the Late Pleistocene and the Middle Holocene populations in the Iron Gates, who adopt new subsistence strategies and technologies as supplements, rather than replacements*" (Greenfield H., 2008b: 217). Faunal remains were however not systematically collected during excavations, no sieving practiced at sites such as Lepenski Vir, Padina or Hajdučka Vodenica, resulting in poor analysis, but Vlasac was a noteworthy exception to this rule under Srejović & Letica (1978) (Greenfield H., 2008a: 106). Whilst the collection of vegetable matter is assumed, there is no unambiguous evidence in the lithic assemblage of any site attesting the cultivation or preparation vegetable matter, until possibly after the 5900 BC (Bonsall C., 2008; Borić D., *et al*., 2004b: 231). It should be noted that the abrupt terrain in the Iron gates did not lend itself to cultivation.

The best documented sites in the Region, particularly those in the Upper Gorges are characterised by complex stratigraphies and rapid excavations. The interpretation of the archaeological data has gone through clearly defined stages. The earliest of these relates most particularly to the most famous site of the Region, Lepenski Vir, in that the archaeologist responsible for the excavations, Dragoslav Srejović, who was a convinced indigenist, manipulated some of the evidence to fit his preconceived views, favouring the flourishing of an autochthonous culture, with incipient

domestication; he suppressed or ignored archaeological data (e.g. ^{14}C dates and Neolithic attributes in stratigraphic contexts) which ran counter to his theories; in addition, the Lepenski Vir site interpretation suffered from the fact that drawings of different archaeological levels were labelled incorrectly by one metre on the east-west axis, leading to the belief that there had been a rebuilding phase. These errors were gradually brought to light during the last quarter of the 20th century in numerous publications and partial reappraisals. Additionally, ^{14}C dates were impacted by the Water Reservoir Effect (WRE), in that aquatic resources or terrestrial animals who consumed these in measurable quantities, as evidenced by the δ^{13}C (Carbon isotope) and δ^{15}N (Nitrogen isotope) values of the collagen in their skeletal remains, were systematically giving ^{14}C dated older than their true date. A number of archaeologists, including C. Bonsall (Bonsall C., *et al*., 2000, 2004, 2007, 2008a), D. Borić (Borić D., 2002; Borić D., *et al*., 2004b, 2004c, 2007, 2008) and G. Cook (Cook G., *et al*., 2000, 2001), initiated programmes to recalibrate the dates for sites in which human remains had previously been used to determine the dates of various occupational levels; the results of this research, with the new dates obtained, and a reappraisal of the site histories and their evolution were published in a series of publications commencing in the early 21st century. In order to understand the Late Mesolithic, the Transition and the impact of the contact with the Starčevo and Criş Cultures in the wider region, it is therefore important to use the latest research, reassessments and interpretations of the data for the Region.

Based on the ^{14}C dates, many sites appear to have been abandoned during the '6200 BC event' (Fig. R11-1), but not quite all, without there being any knowledge of what happened to the population. When the sites were reoccupied after 6000 BC, they contain domesticated animals, pottery and ground stone artefacts, as well as new forms of stone tools. New trade items in the form of obsidian and high quality Balkan flint are present, and foetal position burials (typical of the Neolithic and the Starčevo culture in particular, but unknown in the Mesolithic) appear. The most likely scenario is one of exchange (partners, domesticated animals as well as artefacts and raw materials) and the adoption of some of the Neolithic skills and attributes (Bonsall C., 2006: 177-178, 2007: 56; 2008). The Starčevo Neolithic culture of the region appears to have also marked a partial pause some 150 km to the south during the '6200 BC event', where the Starčevo site of Blagotin has been dated:

- OxA-8608 7480±55BP = 6437-6239 BC (OxCal 4.2), antler pit JA2, central pit structure 7 – Median 6338 BC.

Neolithic sites only reached the area close to the Iron Gates with the climatic improvement which set in *ca*. 6000 BC, as the Neolithic migrants moved rapidly north into the Pannonian Plain at a time when the risk of flooding was probably reduced (Bonsall C., 2008, Whittle A., *et al*., 2002), and possibly also when the Mesolithic population of the broader region had returned to the Iron Gates Region.

Based on the latest corrected dates and the on-going project to obtain new dates from human and animal bones from secure stratigraphic contexts, to better understand the chronology of the changes in burial rites and technologies, the following tentative chronology has been proposed (Bonsall C., 2008 Table 10.2):

- <7200 BC Early Mesolithic;
- 7200-6300 BC Late Mesolithic;
- 6300-6000 BC Final Mesolithic – (Here: 'Early Transition');
- 6000-5500 BC Early Neolithic – (Here: 'Transition' for the Mesolithic sites with Neolithic attributes which continue in use after 6000 BC).

<u>Eastern Central Balkans – Iron Gates – Mesolithic and Transition sites – Introduction</u>

Excavations or investigations have been undertaken at 8 Mesolithic sites on the Serbian bank (Ajmana, Hajdučka Vodenica, Kula, Lepenski Vir, Padina, Stubica, Velesnica and Vlasac), and 16 on the Romanian side (Alibeg, Climente I and II, Cuina Turcului, Icoana, Ilişona, Ostrovul Banului,

Ostrovul Corbului, Ostrovul Mare km 875 and km 873, Privod, Răzvrăta, Schela Cladovei, Veterani Cave, Veterani Terrace and Vodneac) (Bonsall C., *et al*., 2008: 2).

Eastern Central Balkans – Iron Gates – Mesolithic and Transition sites – Site details

Ajmana (21) – This Serbian open-air site is located on the right bank of the Danube at the exit of the Gorges where the Ključ commences, where agriculture become possible, which was probably established during the Terminal Mesolithic or Early Transition during the period from 6200-5950/5900 BC. D. Boric and T. D. Price (2013) indicate that of 12 individuals buried, 3 have non-local values of Strontium isotopes ($^{87}Sr/^{86}Sr$), that there was a group burial of superimposed individuals, and that all were buried in the typical Neolithic crouched position (p. 3301). They conclude that "*there are also two AMS-dated burials from the Early Neolithic site of Ajmana that seem to suggest the existence of a newly founded fully Neolithic settlement in the downstream area of the gorges and its contemporaneity with forager sites farther upstream*" (p. 3299). D. Borić (2007: 42) indicates that the diet becomes less fish dominated after 5900 BC, whilst the practice of fishing continued. The site also produced evidence of workshops for the manufacture of polished stone axes (Antonović D., 2008: 25). The sum of the evidence suggests either acculturation or the incorporation of Neolithic people at the site.

This site appears to have been set up by acculturated hunter-gatherers incorporating Neolithic migrants, or a mixed community of Neolithic migrants and local acculturated hunter-gatherers.

Alibeg (3) – This Romanian left bank open-air site, located at the entrance to the Upper Gorges, was the subject of rescue excavations in 1969-1971 by V. Boroneanţ, who was unable to reach virgin soil due to the rising waters of the Danube. It was first occupied *ca*. 7000 BC, for which an oval pit structure and circular hearth were found; this Horizon I was partly superimposed by a trapezoidal structure with a rectangular hearth dated *ca*. 6000 BC (Bailey D., 2000: 63, 67; Radovanović I., 1996: 17).

I. Radovanović (1996: 316-317), citing V. Boroneanţ (1973), states that the later Horizon II occupation produced a coarse Starčevo-Criş type pottery, a blade industry on flint representing 5% of the lithic industry, whilst the remainder was on quartzite and not blade-based, polished stone miniature chisel-axes, grindstones, painted burned pebbles and a bone industry which included projectile points and two perforated beads. She quotes a date for this Horizon II:

- Bln-1193 7195±100BP = 6256-5871 BC (OxCal 4.2 at 93.9%), on unspecified material – Median 6065 BC.

V. Boroneanţ (1999) later maintained that the flint used for the blade-based industry was of exogenous provenance, having previously confirmed that sherds were recovered from inside the habitation structure (1989).

From the data available, Horizon II of this Early Transition site was established by autochthonous people who formed part of the Lepenski Vir / Vlasac / Padina cultural complex in the Upper Gorges, as evidenced by the trapezoidal structures and rectangular hearths, at a time when contact had already been established with Neolithic groups. Since the sherds are described as coarse ware, it is possible that pottery skills had been acquired by the local Mesolithic population who occupied this site for an indeterminate time before and/or after 6100 BC.

Băile Herculane (1) – This cave site, 20km north of the Danube in the Central Gorges, is up a tributary of the Danube at 44°87.97N ; 22°41.25E. It was occupied at the end of the Pleistocene and/or beginning of the Holocene. Danube fish were found at the site, as well as Hungarian obsidian (Chapman J., 1989: 506-507). Human remains previously thought to have dated from the same period have now been dated to a considerably more recent date (Bronx Ramsey C., *et al*., 2009):

- OxA-16327 5123±34BP = 3988-3800 BC (OxCal 4.2 at 95.4 %), on human remains – Median 3895 BC.

This site saw a hiatus in use between the beginning of the Holocene and the Late Neolithic, when human remains were deposited in the cave.

Climente I (13) – This Romanian cave site close to the Danube in the Central Gorges lies 62 masl. It was excavated between 1965-1969 by V. Boroneanţ who, quoting himself (1979), discovered the remains of steppe fauna (*Equus ferus, Alces alces*) and a microlithic industry which included geometrics (lunates, triangles and trapezes), bladelets, backed pieces, notched blades, etc. (Boroneanţ V., 1989). The site is considered to predate the Holocene.

Climente II (13) – This Romanian cave site in the Central Gorges, close to, but higher than Climente I, lies at 178 masl. It is close to the cave sites of Veterani and Cuina Turcului and the Mesolithic open-air sites of Veterani Terrace, and opposite the Transition site of Hajdučka Vodenica on the Serbian right bank of the Danube.

As with Climente I, the site was excavated by V. Boroneanţ between 1968-1969. He discovered the same wild fauna, a lithic industry dating to the post-glacial, Mesolithic human remains and a possible Early Neolithic inhumation based on the contracted position of the robust individual (Bailey D., 2000: 34; Boroneanţ V., 1989; Mihailović D., 1998: 11; Radovanović I., 1996: 317-318).

This site is considered to contain primarily the remains of a Late Pleistocene occupation, whilst continuing in use into the beginning of the Holocene.

Cuina Turcului (12) – This Romanian rockshelter close to the other caves in the Central Gorges lies at 60 masl. 200 m^2 were excavated between 1964-1970 by V. Boroneanţ, who identified three levels of occupation, of which the earliest, Phases I and II, are Late Pleistocene and Initial Mesolithic, with Phase III being Transition.

Phase I, in which 3% of the lithics are Hungarian obsidian, testifying to long distance contact, and 96% flint, and described as Azilian or Clisourian, has been dated *ca*. 13k BC (Boroneanţ V., 1989: 476; Radovanović I., 1996: 318-321). "*The ratio of faunal remains and the lithic raw material used point above all to the greater exploitation of resources in the immediate vicinity of settlements, although there are elements that point to regional mobility, and even, inter-regional contact (obsidian). It may be assumed that that during this period the rockshelter was a base camp, and that the activities of the human groups were directed towards the Iron Gates hinterland*" (Mihailović D., 1998: 15). He goes on to describe Phase II as belonging either to the Younger Dryas and/or the Early Holocene, with the evidence pointing to the exploitation of a poor environment (ibex, chamois, *Equus ferus, Alces alces*, and resources from a steppe biome) during a period prior to the first occupation of Padina.

There follows a multi-millennia hiatus before the rockshelter is reoccupied, when fishing is attested and grows in importance; decorations on bone implements in the form of chevrons and zigzags are comparable to Late Mesolithic equivalents from Lepenski Vir and Vlasac in the Upper Gorges and Schela Cladovei in the Lower Gorges; the structured hearths are oval and there are sculptured boulders; Hungarian obsidian increases to 5% and Bulgarian honey flint makes its appearance, but the lithic industry, which includes trapezes, continues to contain a strong Mesolithic content; The fauna in Phase III/1 and III/2 is dominated by fish bones with the land fauna in Phase III/1 predominantly suids, red deer and dog and Phase III/2 seeing an increase in bovines, suids, red deer and dogs, whilst the Phase III/3 faunal assemblage is dominated by bovines, suids, ovicaprines, red deer and dogs; white on red painted pottery appears prior to Phase III/3 containing high quantities of chaff temper, which reduces in Phase III/3. Whilst human remains are present, no formal depositions were found. Although no dates are available, the pollen analysis indicates an Atlantic date, with a final occupation at the time Lepenski Vir is also abandoned in the mid-sixth millennium BC (Chapman J., 1989: 510-511; Mihailović D., 2007; Radovanović, 1996: 318-321).

The Phase III sequence, with the initial continuity of Mesolithic traditions (fishing, hunting, lithics, no formal disposal of the skeletal remains found) and a slow uptake of domesticated fauna and other Neolithic attributes speaks for population continuity from the Mesolithic which progressively incorporates Neolithic attributes during the Transition.

Hajdučka Vodenica (15) – This open-air site, whose name means 'Brigands Watermill' is the only one located on the Serbian right bank of the Danube in the Central Gorges, and is opposite the sites of Răzvrăta and Icoana on the Romanian side. The site was excavated by B. Jovanović, who also excavated the site of Padina, in 1966-1967, 1969 and again in 1984 over an area of 630 m^2 in two distinct areas, the first being residential only and the second also containing a burial cult site. The salvage excavations were one of the first in the area, and the importance of the site was not initially recognised. No sieving took place and the archaeological material was selectively kept, preference being given to remains showing signs of human modification (Greenfield H., 2008b: 208).

The habitation part of the site was partially eroded near the river-edge and partially preserved under the remains of a Roman fort. The 2.6 m of deposits have been split into two primary archaeological Levels, the oldest of which is Level I, which is probably Mesolithic, followed by Ia and Ib which are probably Early Transition and Level II, which is probably Later Transition. Level I is an aceramic level with early structures; Level Ia is mostly aceramic although a few coarse sherds were found; Level Ib produced more sherds which did not appear to be *in situ* at spots with later constructions. Level II contained Starčevo-Criş pottery. Rectangular hearths were covered by elongated stone constructions which were piled up into 4 strata, the lower 2 of which were associated with abundant bone tools, but no pottery, whilst the top 2 contained Early Neolithic sherds of Starčevo-Criş type of open-mouthed vessels thought to have been used for presenting fish meals, with mostly chaff temper, which is usual for the Early Starčevo. No radiocarbon dates are available for the habitation area (Borić D., 1999: 52-53, 56-57; Greenfield H., 2008b: 208; Radovanović I, 1996: 321-324).

The Central Area contained a 'grave chamber', partially cut into the rock with at least 29 burials (Figs. R11-2 & R11-2a). Those at the rear, numbered 26-28 are undated disarticulated bones which could be older than those nearer the front, where many of the 22 bodies were placed in extended positions parallel to the Danube with the heads pointing downstream, in a manner considered to be of symbolic and ideological significance, possibly in association with the Beluga migration (Fig. R11-2). The burials are behind a rectangular 'sacrificial hearth area' with two levels, surrounded by packed flooring of red burned earth (quoting from Jovanović, 1984: 307) and two large ornamental boulders in the front part of the hearth area at the lower level. The complex is thought to have been in use for over a millennium (Bonsall C., 2008: 258; Borić D. & Miracle P., 2004: 357).

There are no radiocarbon dates before those reported by D. Borić and P. Miracle (2004), which were corrected for the WRE, and which have subsequently been corrected once again by D. Borić (2011) (the * indicates that the date is matched to an inhumation on Fig. R11-2), and which led D. Borić and P. Miracle (2004) to suggest that this part of the site may have been abandoned for an extended period between 7500/7000 (read 7000-6900 after correction for the WRE) to 6500/6400, (read 6550 BC after correction for the WRE) and that the siting of the later burials in relation to burial 8, exemplifies the depths of social memory:

- OxA-13613 (replaces OxA-11128) 8456±37BP corrected to 8016±58BP = 7076-6746 BC (OxCal 4.2 at 92.8%), Burial 8* – Median 6910 BC.
- AA-57774 8151±60BP corrected to 7711±75BP = 6680-6435 BC (OxCal 4.2 at 95.4%), Burial 29* – Median 6560 BC.
- OxA-17146 (replaces OxA-11127) 7835±43BP corrected to 7395±62BP = 6406-6097 BC (OxCal 4.2 at 95.4%), Burial 12* – Median 6250 BC.
- OxA-16941 (replaces OxA-11109) 7784±44BP corrected to 7340±63BP = 6368-6069 BC (OxCal 4.2 at 95.4%), Burial 20* – Median 6220 BC.

- OxA-16942 (replaces OxA-11126) 7755±44BP corrected to 7315±63BP = 6272-6050 (OxCal 4.2 at 87%), Burial 15* – Median 6160 BC.
- AA-57773 7435±70BP corrected to 6993±83BP = 6016-5725 BC, Burial 13* – Median 5770 BC.

D. Borić (2007: 34) noted that "*dated burials from Padina, Hajdučka Vodenica and Vlasac show no dietary change in the period from around 6300 to 5900 cal. BC, i.e. the period that saw dietary changes at the sites of Lepenski Vir and Ajmana*"

The vertebrate fauna, which only became available for analysis in the 21st century, has been examined by H. Greenfield (2008a, 2008b) (Fig. R11-2a). Because the fish bones appear not to have been preserved (Roksandić M., 2008: 57), the percentages of domesticated fauna, at 15.6%, which appear in Levels IIa and IIb in association with the Starčevo type pottery (Bonsall C., 2008: 270), are higher than at other Transition sites in the Region but lower than Starčevo sites. This percentage increases to 33% of NISP in the topmost Level IIb, and the domesticated fauna include suids and bovines as well dog, but no ovicaprines (Greenfield H., 2008b: 209).

The remains of 9 domesticated dogs were found in the Mesolithic and Transition Levels. H. Greenfield (2008: 217) concludes that "*there is solid evidence for human biological continuity between the Late Pleistocene and the Middle Holocene populations in the Iron Gates, who adopt new subsistence strategies and technologies as supplements, rather than replacements*".

The data for the site are patchy, particularly as regards the dating of events during the Transition, Early Neolithic and site abandonment, but it is clear that Hajdučka Vodenica was established in the Mesolithic, possibly during the Early Mesolithic, and that the autochthonous population maintained much of its lifeways whilst accepting some Neolithic attributes through contact and exchange well into the 6th millennium BC.

Icoana (16) – This open-air site, close to the Danube river bank on the Romanian side, is located in the Central Gorges 200 m upstream from the site of Răzvrăta, and opposite Hajdučka Vodenica. The site was excavated by V. Boroneanţ between 1967-1968, but never properly published. Three occupational levels were identified, which I. Radovanović (1996: 324-326) identifies as I, II and III, or Ia, Ib, II and III, for which she supplies the following dates:

- Bonn n.2 8070±130BP = 7361-6649 BC (OxCal 4.2 at 93.9%), Level Ia – Median 7005 BC.
- Bonn n.3 8010±120BP = 7308-6634 BC (OxCal 4.2 at 95.4%), Level Ib – Median 6970 BC.
- Bonn n.4 7660±110BP = 6712-6249 BC (OxCal 4.2 at 94.1%), Level Ib – Median 6480 BC.
- Bln-1056 7445±80BP = 6456-6203 BC (OxCal 4.2 at 89.6%), Level III – Median 6330 BC.

I. Radovanović (1996: 325), who describes the site as one occupied throughout the year in the oldest Levels Ia and Ib, contained oval semi-subterranean huts with circular hearths, which occupation is followed by a sterile layer.

Level II contained semi-subterranean trapezoidal structures with two post holes and oval hearths in the interior and rectangular and square ones outside. There were also above-ground huts.

Level III contained two typical Mesolithic burials in extended positions below a small rectangular hearth, one of which was accompanied by a boar tusk tool (p. 222, 325). Pottery is present, but no details are given (p. 281).

D. Bailey (2000: 63) and J. Chapman (1989: 510) mention an occupation of the site after the '6200 BC event' continuing as late as 4500 BC.

There is no indication of the material used for dating, but the date for Level III appears to be correct for the first appearance of pottery, so that a WRE can probably be excluded. It would also seem that the site was abandoned prior to the '6200 BC event'.

Ilişova (7) – This is an unexcavated open-air site on the left bank of the Upper Gorges opposite Padina and Lepenski Vir. Surface finds suggest it is an Epipalaeolithic site located between sources of flint (Radovanović I., 1996: 326).

Izlaz (10) – This is also an unexcavated open-air site on the left bank of the Upper Gorges opposite Lepenski Vir and Vlasac, a little downstream from Ilişova. The surface finds suggest it is an Epipalaeolithic site (Radovanović I., 1996: 326).

Kula (27) – This open-air site, on the fluvial terrace at Mihajlovac in Serbia, is opposite the site of Ostrovu Mare downstream from the Ključ (Fig. R11-11). The site was excavated by M. Sladić from 1980-1984 over 350 m^2 in two sectors (Fig. R11-3). The lowest 60cm of the 3m stratigraphy was Mesolithic and Transition, followed by a hiatus before the Early Iron Age occupation (Radovanović I., 1996: 326-327; Sladić M., 1986). There are no details on the faunal assemblage.

The early stratigraphy has been designated as Kula I, II and III, with Kula I being the most ancient:

- Kula I had two trapezoidal bases containing hearths which were rectangular with inverted 'A' signs/supports (Fig. R11-3), as well as two semi-circular bases also interpreted as huts. Single and double barbed harpoons were found as well as a burial in a flexed position '*à la turque*' comparable those found at Lepenski Vir (Fig. R11-8) and Vlasac. This site has been compared to Vlasac with a hypothesis suggesting that it was set-up by a splinter group;
- Kula II follows after a sterile horizon. It contained two amorphous house shapes with packed floors and hearths smaller than in Phase I. Two burials were found with one deceased in an extended position and the other '*à la turque*'. The lithic assemblage is similar to Kula I;
- Kula III appears to have been a working area for the manufacture of chipped stone implements dominated by quartz, with a similar manufacturing technology to Kula II. Sherds of chaff-tempered Early Starčevo ware were also present.

The site appears to have been abandoned at the time of the '6200 BC event', after Starčevo pottery had been acquired, although there is evidence for conservatism in that the ground stone implements are of local manufacture and not Starčevo imports (Antonović D., 2008: 37).

Lepenski Vir (8) – This is the eponymous site for the Mesolithic and Transition culture of the Iron Gates Region. It is located in the Upper gorges, some 7 km downstream from Padina, about 1 km upstream from the Boljetinska canyon where the boulders were collected for the 'boulder art', and 3 km upstream from Vlasac. The wide river terrace facing a whirlpool and the Treskavac Mountain is now under water, but the remains of the earliest occupation with trapezoidal structures has been moved to a museum above the site (Fig. R11-4).

The site, with its 3.5m of stratigraphy, was excavated over an area of 2500 m^2 by Dragoslav Srejović between 1965-1971. He identifies nine building horizons and labelled the periodisation: proto-Lepenski Vir, followed by Lepenski Vir I, II, IIIa and IIIb (Figs. R11-4 & R11-5). The excavations were poorly published, and the excavator, who appeared determined to demonstrate an autochthonous development, withheld data detrimental to his thesis, and supplied tendentious interpretations of the data. The errors began to be corrected in the late 1990s (Borić D., 1999, 2002). M. Radovanović (2000: 346) further stated that the stratigraphic misinterpretation of Early Neolithic pottery in Lepenski Vir I by D. Srejović and its reclassification to LV IIIa had wrought a lot of confusion ever since, and the following year she and M. Garašanin published details of data that was wilfully withheld (Fig. R11-5) (Garašanin M. & Radovanović I., 2001). The dates on human remains corrected for the WRE also began to appear at that time in a stream of publications, demonstrating that the trapezoidal buildings (Fig. R11-5) were more recent than initially thought, so that the phasing of the site has ended up being split into three broad phases (Bonsall C., 2006, 2007, 2008; Bonsall C., *et al.*, 2004; Borić D., 2002, 2005c, 2007; Borić D. & Dimitrijević V., 2007):

- Phase I is pre-'6200 BC event' with the earliest dates for the Proto-Lepenski Vir site, with 9 oval semi-subterranean structures appearing prior to *ca*. 7600 BC, followed by a long hiatus of *ca*. 1300 years, after which trapezoidal structures appear starting *ca*. 6400-6300 BC as the site begins to be used on a continuous basis with eventually 95 such structures with rectangular

hearth and a few aniconic sculptures and alters. The Lithic industry is Mesolithic with microliths made mostly of local raw material, but some obsidian from the Northern Hungarian Plain is present. The fauna is wild but includes dog. A few sherds possibly appear right at the end of this Phase I;

- Phase II, *ca*. 6200-5900 BC covers the '6200 BC event' with 45 trapezoidal structures, of which about 20 appear to have been in use at any one time, with complex rectangular hearths, decorated altars and figural boulder sculptures. Neolithic attributes progressively appear with pottery, polished stone and flint followed by domesticated animals about 100 years later. A few Starčevo-type burials appear in crouched positions at the end. There follows a period of abandonment at the end of Phase II;
- Phase III, *ca*. 5900-5500 BC covers the period after the '6200 BC event' until the site is finally abandoned. In the early stages semi-dugout structures of irregular shape appear, replaced in the later stages by above-ground quadrangular structures with wattle-and-daub. The trapezoidal structures also continue in use until the site is abandoned. Imported flint rapidly increases in importance with the continuing presence of obsidian, and the technology become Neolithic. In the later stages (Lepenski Vir IIIb), clay quadrangular tables/altars, zoomorphic figurines, cylindrical amulets with stylised bovine heads appear, as well as horseshoe ovens. Starčevo-type burials in a contracted lateral position become more prevalent whilst the Mesolithic burial traditions continue in parallel.

There is a considerable number of publications dedicated to the study and reinterpretation of the material and the changing function of the site within the context of the Iron Gates Mesolithic and Transition, which D. Borić refers to as 'Transformation', whilst other authors name it 'Early Neolithic'.

Lepenski Vir has been variously described as a '*religious site*' (Boroneanţ V., 1999), a '*ritual site as well as residential*' (Chapman J., 2001: 152), a '*special place*' or '*sacred site inhabited by the spirits of ancestors*' (Bonsall C., 2008), a '*special or central place*' (Borić D., 2005b), or '*a place of shrines*' (Whittle A., 1996). D. Borić (2005b) discusses at length in anthropological terms the relationships between the site layout, the burial practices, the special depositions, the aquatic diet and the special relationship with the Beluga sturgeon *Huso huso*, and the figured representations of hybrid fish/humans (Fig. R11-6) which only appear after first contact with the Starčevo-Criş Culture, although these were probably preceded by aniconic boulder art. In his mind the "*art objects constitute a network of relationships that are primarily social*", whose main objective is their effectiveness and social potency – doing rather than representing in the context of animistic or totemic societies (p. 46), and "*suggest that the aesthetic efficacy of boulder artwork along with the belief in ancestral metamorphosis actively mediated social relations in this society*" (p. 58). Caution is however called for in the interpretation of the representational boulder artwork, which, given their aesthetic uniformity, could be the work of a single individual.

Unlike Vlasac downstream, Lepenski Vir appears to have been more open to contact with the Neolithic migrants, in that the locally manufactured ground stone implements were almost entirely replaced by Neolithic Starčevo-Criş Culture imports by the time of Lepenski Vir III (Antonović D., 2008: 37).

The WRE on ^{14}C dates of the human remains of individuals who consumed aquatic resources in the Iron Gates gives an older date than short-lived terrestrial species found in the same stratigraphic context. The lower $\delta^{13}C$ stable isotope values and more specifically the higher $\delta^{15}N$ stable isotope values in the human collagen samples "*indicates that there was a significant non-terrestrial (i.e. aquatic) component to the Mesolithic diet*" (Cook G. & Bonsall C., 2002: 78). The WRE in the Iron Gates was established by comparing the dates obtained on ungulate arrow-heads embedded or associated with human burials at Schela Cladovei dating from ca. 7000 BC, and shown to be in the range of 300-500 years at that date, dependant on the level of human reliance on aquatic resources in the diet (Cook G., *et al*., 2001). Dates corrected for the WRE were first published by G. Cook, *et al*.,

(2001, 2002) (Fig. R11-7). For example, human skeleton 31a from Level IIIb had originally been firmly dated to the first half of the 7th millennium, prior to any possible contact with Neolithic migrants:

- OxA-5827 7770±90BC = 6837-6438 BC (OxCal 4.2 at 91.5%), on human skeleton 31a – Median 6640 BC.

The revised date places the burial at the beginning of Phase II, when contact with Starčevo sites could have occurred:

- OxA-5827 7310±108BP = 6404-6001 BC (OxCal 4.2 at 95.4%), on human skeleton 31a – Median 6200 BC.

A more complete list of revised dated was published by C. Bonsall *et al.* (2008) (Fig. R11-7), in which two inhumations (burials 60 and 69) can be seen to date from the late 9th or early 8th millennia, after which there is a gap of *ca*. 1500 years before the rest of the dated burials.

The earliest trapezoidal buildings are found in the Upper Gorges (the earliest manifestation being at Vlasac) and replicate the form of Treskavac Mountain facing Lepenski Vir; these can also be seen from Vlasac and Padina (Fig. R11-1). The earliest dates for such structures are *ca*. 6500-6400 BC during the late Mesolithic at the end of Phase I (Bonsall C., *et al*., 2008a: 192; Borić D., 2002).

These structures are a particular feature of the Upper Gorges, which evolved to include complex hearths and lime plaster floors, whose duration spans the period *ca*. 6300-5500 BC (Stefanović S. & Borić D., 2008: 158), and which include 'alters', burials, 'bolder art' and ritual depositions. The earliest dates based on skeletal remains, corrected for the WRE, on inhumations associated with trapezoidal buildings are from the end of Phase I / beginning of Phase II:

- OxA-11698 7374±80BP = 6408-6073 BC (OxCal 4.2 at 95.4%), supine burial 61 – Median 6240 BC.
- OxA-11704 7368±75BP = 6397-6072 BC (OxCal 4.2 at 95.4%), supine burial 14 – Median 6235 BC.
- OxA-11700 7353±72BP = 6387-6068 BC (OxCal 4.2 at 95.4%), disarticulated burial 54d – Median 6230 BC.

All the early burials are according to Mesolithic traditions (Fig. R11-8) and at dates when first contact could have been made with Early Neolithic migrants into the Balkans, without there being any evidence for such contact during the earliest construction phase. Use of trapezoidal buildings continues until the site was abandoned *ca*. 5500 BC.

As indicated above, the ^{14}C dates recalibrated for the WRE on two human skeletons indicate that the earliest occupation of the site was prior to 7600 BC, and that their diet was in excess of 58% based on aquatic resources. There are no further skeletal remains before *ca.* 6300 BC, and 9 of the 12 dated to Phase II indicate aquatic diets greater than 80%. In Phase III, the importance of aquatic resources in the diet reduces to the range of 20-43%, at a time when livestock is present (Bonsall C., 2007: 59; Bonsall *et al*. 2004). In his analysis of the faunal remains of Lepenski Vir III, H. Greenfield (2008a) (Fig. R11-3a), indicates that domesticated fauna represents 27% of the NISP. E. Bánffy (2013c: 354-355), quoting A. Boroneanţ (2011: 120), stresses the point that "*diet analyses show that fish were eaten throughout the year, despite the fact that fishing might have taken place on a seasonal basis. This also pointed to the existence of some means of preserving the fish for later consumption, indicating a certain level of sedentarisation of the Early Mesolithic communities*". Dog (*Canis familiaris*) is evidenced at numerous sites during the Iron Gates Mesolithic including Lepenski Vir, where it was both a companion whose body was occasionally the subject of special treatment, as well as a source of protein. Domesticated livestock appears after 6000 BC, but fishing in particular as well as hunting continue to be important (Bonsall C., 2007; 2008a: 269-270; Bonsall C., *et al*., 2008a). Any assumption about a Mesolithic-Neolithic shift in the diet from being largely fish-based to a diet significantly altered by the introduction of agricultural products after 5900 BC is not supported by the existing skeletal evidence, and a possibly increasing reliance on terrestrial fauna after 6000 BC does not seem to be related to the introduction of agriculture in the Upper Gorges sites (Borić D., *et al*., 2004b: 241-242). If the faunal remains were poorly collected and analysed, bones of domesticated

animals were nonetheless found in features assigned to Late Phase II, suggesting these were introduced *ca*. 5900 BC. Five AMS dates were made on domesticated animal bones, with sheep also present, which suggests that all four domesticated species were introduced at the end of Phase II, about a century after the first confirmed presence of pottery (Borić D. & Dimitrijević V., 2007):

- OxA-16079 7037±39BP = 6005-5842 BC (OxCal 4.2 at 95.4%), on *Sus domesticus* scapula in pit 1, quad. a/VI, spit 9 – Median 5925 BC.
- OxA-16212 7041±35BP = 6000-5870 BC (OxCal 4.2 at 91.3%), on *Capra hircus* metacarpus in domed oven, quad. d/3, spit 6 – Median 5935 BC.
- OxA-16213 7043±37BP = 6002-5870 BC (OxCal 4.2 at 91.4%), on *Bos taurus* metatarsus in quad. c/I, spit 7 – Median 5935 BC.
- OxA-16211 7021±36BP = 5995-5836 BC (OxCal 4.2 at 94.1%), on *Bos taurus* horn core in pit 3, quad a/VIII, spit 9 – Median 5915 BC.
- OxA-16253 7008±38BP = 5988-5799 BC (OxCal 4.2 at 95.4%), on *Capra hircus* mandible in quad. C/XVI, spit 6 – Median 5895 BC.

H. Greenfield (2008a, 2008b), who re-examined the faunal assemblage salvaged from the Hajdučka Vodenica excavations, compared this to data already published for Padina and Lepenski Vir (Borić D., 2016: pers. com.). He indicates that in Phase III domesticated fauna represents at best 27% of the faunal assemblage.

"*A very large number of Starčevo-type sherds (c.200,000) were found through the site deposits which include the whole range of shapes from bowls and amphora to pithoi. Decorative techniques are varied too, from dark painting in linear designs, barbotine, and monochrome finish, to nail-pinched surfaces, applied bands with finger impressions, and plastic decorations in the form of the human hand or plastic spiral motifs (Srejović, 1971). Very characteristic are large open dishes with hollow pedestals (for serving/preparing fish?)*" (Whittle A., *et al.*, 2002: 67). Pottery formed the largest category of finds with much of it coming from pits, some of which were dug into earlier trapezoidal structures. A relatively small number of pottery sherds (between 57 and 93) had been found, but not published, in the levels of Phase II (Lepenski Vir I & II) (J. Chapman J., 2001: 155); according to M. Garašanin and I Radovanović (2001) these sherd were found in 15 trapezoidal structures and arbitrarily reclassified by the excavator to Phase III; furthermore, the excavator suppressed the evidence of a typologically dated Early Starčevo pot found in building 54 (Fig. R11-5) (Garašanin M. & Radovanović I, 2001; Whittle J., *et al*., 2002) in a Phase II context (dated 7132±64BP = 6111-5878 BC (OxCal 4.2 at 91.9%) – Median 5995 BC), at a time when Starčevo-Criş sites begin to appear in the vicinity (Bonsall C., *et al*., 2008a: 193). It has been noted that Neolithic sites in Bulgaria date from *ca.* 6400 BC and that the site of Blagotin, some 120 km distant in Central Serbia, has been dated:

- OxA-8608 7480±55BP = 6437-6240 BC (OxCal 4.2 at 95.4%) – Median 6340 BC.

It is therefore possible that contact with Neolithic migrants could have existed from that date (Bonsall C., *et al*., 2008a: 192).

Axes and adzes of Starčevo type, made from large flakes of fine-grained rocks begin to make their appearance in Late Phase I or early Phase II, with local variants making up 50%, along with mallet-sceptres typical of the Lepenski Vir culture, and by late Phase II and Phase III the imported variants represent 90%, indicating how open the inhabitants were to contact and exchange (Antonović B., 2008: 35-37). Starčevo pottery and the blade-based lithic industry on Mesozoic pre-Balkan Plateau flint go hand-in-hand, and there was contact with the Neolithic migrants before these reached the Iron Gates Region, according to J. K. Kozlowski (2003).

Another item of material culture which confirms early contact is the V-shaped spoon, which is a type-fossil on the FTN, which was being manufactured primarily from the metacarpal of *Bos primigenius* at Lepenski Vir from Late in Phase II (Nandris J., 2007: 19).

146 burials of whole or partial skeletons, plus a large number of bones, have been excavated with ages of the deceased ranging from neonates (40) to the old of both sexes. During the Mesolithic, whole skeletons, or decapitated skeletons are mostly buried in a supine position (Fig R11-8); the two

Early Mesolithic burials are perpendicular to the river, so that the tradition of burying the deceased parallel to the river with the head downstream appears to be a Late Mesolithic innovation (Bonsall C., *et al.*, 2004). Crouched inhumations (Fig. R11-8) are characteristic of the Starčevo Early Neolithic culture through the Early Bronze Age. In a recent reappraisal of the evidence, (Boric D. & Price T.D., 2013), the authors state that "*of the sample of 45 individuals with available dental evidence, there are five nonlocal individuals associated with Mesolithic–Neolithic transition phase I-II (~6200–6000/5950 cal B.C.)—three primary extended inhumations (nos. 13, 54e, and 27a) and two isolated skulls (nos. 122 and 7-II)—and seven individuals (nos. 8, 17, 20, 32a, 56, 66 and 88) associated with Early/Middle Neolithic phase III (~6000/5950–5500 cal B.C.), all primary crouched/flexed inhumations (of the total number of 20 primary crouched/flexed burials associated with phase III at this site)*" (p. 3301). During Phase III, after 6000/5950 BC, until the site is abandoned, the majority of the inhumations are in a flexed position; of the 3 non-local skeletons from Phases I and II, and the 7 from Phase III, all but one are confirmed as being female, with two (burials 32a and 88) from Phase III producing the only evidence for caries during the Iron Gates Mesolithic (typical of carbohydrate-rich diets); the strontium evidence points to the 10 non-locals as coming from multiple geographic locations, suggesting extensive partner exchange networks, with the focus in Phase III on FTN sites (Boric D. & Price T.D., 2013: 3302), confirming the findings previously published (Bonsall C., *et al*., 2008a: 185; Borić D., 2007: 24; Radović R. & Stefanović S., 2013)

Disarticulated burials and skull removal/caching are dated 6385-5845 BC after correction for the WRE, so clearly a Mesolithic practice, which appears to have continued into the Transition. The stratigraphic context cannot be used for disarticulated burials, since it cannot be known how long the bone circulated prior to burial. The 6 examples in the study indicated diets heavily dependent on aquatic resources. A similar practice existed at Schela Cladovei (Bonsall C., *et al*., 2008a: 188). The increasing number of burials in a crouched position in Phase III clearly suggests an influx of Neolithic peoples in the midst of the local population completing their Transition to Neolithic lifeways.

There can be little doubt that this site was populated by sedentary or semi-sedentary hunter-fisher-gatherer communities prior to any contact with the Starčevo Neolithic immigrants to the wider region. As with many Mesolithic communities they adapted and broadened their subsistence base during the Holocene to include aquatic resources, as well as presumably collecting nature's bounty. They are exceptional in having extensively used the domesticated dog and evolved a sedentary or semi-sedentary life-style with a belief system visible in their settlement, burial practices and extant material culture. These people evolved a particular life-style and culture in the Iron Gates Region, and the site of Lepenski Vir is one of the most important ones discovered, excavated and studied. The Mesolithic community maintaining exchange relations within the Balkans and the inhabitants were not averse to acquiring Neolithic attributes (as well as Neolithic female partners), as part of their continuing adaptation, whilst maintaining and possibly reinforcing their group identity. Mixing of the population with Neolithic migrants undoubtedly occurred after 6000 BC, but the site, which continued to evolve with structures copied from the Starčevo Culture, whilst maintaining a mix of Mesolithic and Neolithic attributes, was not finally abandoned until *ca.* 5500 BC, some 700 years after first contact.

Ostrovu Banului / Ostrovul Banului (18) – This Romanian Mesolithic open-air site, located on the island of the same name just below the Iron Gates 1 dam (Fig. R11-9) at the exit of the Gorges, was occupied from the beginning of the Holocene through the end of the Mesolithic into the Transition.

The site was investigated in 1965-1966 by V. Boroneanţ, and excavated between 1977-1981, initially by F. Mogoşanu and later by A. Păunescu. The lowermost Levels I and II were evidenced at the lowest Level by unstructured fireplaces, above which hearths in oval semi-subterranean structures have been attributed to the beginning of the Holocene, with Level II thought to be contemporaneous with and Vlasac Ia. Numerous remains of fish were found and amongst the lithics, obsidian from Hungary attests to long-range contacts (Bailey D., 2000: 64; Boroneanţ V., 1999; Chapman J., 1989; Radovanović I., 1996).

Level IIIa has been considered contemporaneous with Vlasac I and Proto-Lepenski Vir, Padina A and Schela Cladovei I (Radovanović I., 1996: 336).

Level IIIb has been considered to be Late Mesolithic and contemporaneous with Late Phase I and Phase II of Lepenski Vir, Vlasac II and III, Schela Cladovei II and Padina A or B-1. Two dates from undifferentiated Level III are also given (Radovanović I., 1996: 336):

- Bln 1080 8040±160BP = 7382-6596 BC (OxCal 4.2 at 92.8%) – Median 6990 BC.
- Bln 1079 7565±100BP = 6608-6229 BC (OxCal 4.2 at 95.4%) – Median 6420 BC.

As with most of the Romanian sites, the site has not been properly published and there is no clear indication as to when the site was abandoned and whether there is any evidence of contact with the Starčevo-Criş Neolithic migrants.

Ostrovu Corbului / Ostrovul Corbului (23) – This Romanian open-air site near the southern tip of the island of Ostrovu Corbului (there are no details for the site at the northern end of the island) in the bend of the Danube in the Ključ (Fig. R11-10), downstream from the Iron Gates Gorges, was excavated in 1977-1978 by F. Mogoşanu and subsequently by Al. Păunescu until 1981.

The stratigraphy has been split into 3 Levels (Radovanović I., 1996: 336-338):

- Level I (Horizons I-IV) is the lowest stratigraphic level from -160 to -140 cm; it contained semi-dugout structures with nearly rectangular bases, dug to a depth of 55 cm with circular or oval hearths. One burial was found in an extended Mesolithic position. The earliest levels supplied the following dates:
  - Bln-2135 7710±80BP = 6696-6421 BC (OxCal 4.2 at 95.4%) – Median 6560 BC.
  - Bln-2135A 7695±80BP = 6683-6421 BC (OxCal 4.2 at 95.4%) – Median 6550 BC.
- Level II (Horizons V-VII) from -140 to -95 cm; horizons V and VI contained rectangular hearths, whilst Horizon VII had a circular hearth with a foundation layer of stones. The three skeletons found in this level were in flexed positions and the individuals (a man, a woman with child and a child) had all suffered violent deaths. The date for this Level, which has an unacceptable standard deviation, is:
  - SMU-588 7827±237BP = 7356-6233 BC (OxCal 4.2 at 95.4%) – Median 6795 BC. The date is suspect, since stratigraphically incoherent with the two later dates for the preceding Level I above (Horizons I & II).
- Level III from -95 to -70 cm contained Starčevo-Criş material.

According to D. Bailey (2000) there is a hiatus between Levels II and III, but this is contradicted by the stratigraphy above, so that this site appears to have been occupied into the contact period and abandoned during the Transition. The contracted flexed position of the three burials could be indicative of Neolithic migrants, possibly killed at a later date, but whose grave-pit(s) was/were dug into Level II, in which case it is the only instance in this study of a violent death during the Transition. It is regretable that the site has not been properly published.

Ostrovu Mare km 873 / Ostrovul Mare km 873 (24) – One of 2 (out of 7 discovered) open-air sites on the Romanian island of Ostrovu Mare in the Danube excavated by V. Boroneanţ as part of the Iron Gates 2 project, between 1977-1981. The site has been poorly published, but appears to have subsisted into the Transition, since in Level III sherds, an antler and stone ards, as well as polished stone axes were found (Boroneanţ V., 1989; Radovanović I., 1996: 333).

Levels I and II had sunken dwellings, whilst the top Level III had surface ones with rectangular or trapezoidal fireplaces. The lithics in Level III contained trapezes and crescent points, as well as sherds (Boroneanţ V., 1999).

The site appears to be a Transition site which might have practiced agriculture or horticulture, whilst much of the culture appears to have remained anchored in the Mesolithic past.

Ostrovu Mare km 875 / Ostrovul Mare km 875 (25) – Second of 2 (out of 7 discovered) open-air sites on the Romanian island of Ostrovu Mare (Fig. R11-11) in the Danube excavated by V. Boroneanţ between 1977 and 1981. Little detail is available on this site, supposedly similar to that at km 873, which, according to I. Radovanović (1996: 333-334) is dated 6050 BC. A trapezoidal semi-sunken habitation contained a hearth whose longer sides were made of baked clay, which V. Boroneanţ (1989: 478) considered to be a transition to the Neolithic oven.

As with the site at km 873, this could be a Transition site abandoned during the contact phase.

Padina (7) – This site is on the Serbian right bank of the of the Danube in the Upper Gorges, some 7 km upstream from Lepenski Vir, and faced Gospodin Vir ('the Lady's Whirlpool'). The site encompasses four natural sectors (Figs. R11-12, R11-12a & R11-13), which have been numbered I to IV by B. Jovanović, who excavated this site (as well as that of Hajdučka Vodenica), between 1968-1970 (Radovanović I., 1996: 338-342):

- Sector I is a flat depression in a cove between rocky slopes, 30 m long. 675 m^2 were excavated. The site was highly eroded and contained remains from Padina A (Mesolithic) and B (Transition and Early Neolithic);
- Sector II is an arch-like plateau 50 m long following the shoreline. 650 m^2 were excavated in blocks of 5X5 m. The site was highly eroded and contained remains of Padina A with no clear evidence for a Padina B occupation;
- Sector III is a long riverside belt 100 m long on the loessic ground at the foot of the vertical rock. 1100 m^2 were excavated in eight trenches. This area was well preserved and contained remains of Padina B;
- Sector IV is another riverside belt, larger than Sector III and named ‘Babice’, which was not excavated due to lack of time.

If the excavations were not fully published, B. Jovanović kept detailed field journals, which allows for a proper interpretation of the detailed stratigraphic history of this site, which is key to understanding the evolution of the Iron Gates Mesolithic and Transition (Borić D., 1999: 54-55). The stratigraphy has been broadly defined in two phases, as Padina A for the Mesolithic and Padina B for the Transition (Padina C refers to the Late Eneolithic Kostolak-Coţofeni Culture, Padina D to the Early Iron Age and Padina E to the Roman Period):

- Padina A refers to the Mesolithic, with the site of Padina hosting the earliest phase of habitation on the banks of the River Danube in the Iron gates Gorges (Mihailović D., 1998: 13);
- Padina A/B refers to the period *ca*. 6300 BC when trapezoidal structures make their first appearance (Fig. R11-13);
- Padina B, which is subdivided into B1, B2 and B3, refers to the Transition starting *ca*. 6300 BC until abandonment of the site during the Late Starčevo or Vinča Cultures, possibly as late as the end of the 6th millennium BC (Radovanović I., 1999: 382).

According to D. Borić and P. Miracle (2004c), there are a total of 22 ^{14}C dates available for Padina, of which 15 are usable because they are either corrected for the WRE, or need no correction. In the following chronological calibrated listing, the "*" after the ^{14}C date indicates that the uncalibrated date has been corrected for the WRE:

- OxA-11102 9990±55 BP = 9761-9309 BC (OxCal 4.2 at 95.4%), on red deer Sect. III, beneath house 14 – Median 9535 BC.
- OxA-11104 9780±64 BP* = 9379-9132 BC (OxCal 4.2 at 92.6%), on human collagen from burial 11 in Sect III – Median 9255 BC.
- OxA-11106 9655±71 BP* = 9256-8820 BC (OxCal 4.2 at 95.4%), on human collagen from burial 21 in Sect III – Median 9040 BC.
- OxA-11105 9040±71 BP* = 8356-8166 BC (OxCal 4.2 at 71.3%), on human collagen from burial 15 in Sect III – Median 8260 BC.

- OxA-9055 8445±60 BP = 7591-7446 BC (OxCal 4.2 at 85.2%), on red deer from midden in Sect III-P3 – Median 7520 BC.
- BM-1403 8138±121 BP = 7480-6754 BC (OxCal 4.2 at 95.1 %), on brown bear in Sect III? – Median 7115 BC.
- OxA-11108 7750±50 BP = 6656-6471 BC (OxCal 4.2 at 95.4%), on antler tool in burial 1a in Sect I – Median 6565 BC.
- OxA-11107 7535±67 BP* = 6490-6240 BC (OxCal 4.2 at 95.4%), on human collagen from burial 1a in Sect I – Median 6365 BC.
- OxA-9053 7465±64 BP* = 6443-6226 BC (OxCal 4.2 at 95.4%), on dog beneath house 18 in Sect III-P3 – Median 6335 BC.
- OxA-9056 7405±60 BP* = 6419-6203 BC (OxCal 4.2 at 87.2%), on dog on floor of house 9 in Sect III-P6 – Median 6310 BC.
- OxA-11103 7315±55 BP = 6265-6054 BC (OxCal 4.2 at 91%), on bone tool from hearth of house 17 in Sect III-7 – Median 6160 BC.
- GrN-8230 7100±80 BP = 6106-5783 BC (OxCal 4.2 at 93.5%), on charcoal Sect ?, occupational level? – Median 5945 BC.
- GrN-7981 7075±50 BP = 6034-5846 BC (OxCal 4.2 at 94.6%), on charcoal Sect ?, trap. bldg? – Median 5940 BC.
- OxA-9052 6965±60 BP = 5932-5733 BC (OxCal 4.2 at 83.1%), on red deer antler from floor of house 18 in Sect III-P2 – Median 5835 BC.
- OxA-9054 6790±55 BP = 5788-5617 BC (OxCal 4.2 at 95.2%), on worked bone beneath house 15 in Sect III-P4 – Median 5705 BC.
- GrN-8229 6570±55 BP = 5626-5467 BC (OxCal 4.2 at 94.6%) on charcoal Sect ?, hearth (trap. bldg?) – Median 5545 BC.

"*The dates indicate that people used and returned to the site over a very long time span, at least from the mid-tenth to the mid-sixth millennia Cal BC. This occupation span may have been discontinuous, with periods of abandonment, i.e. dispersion and renewed aggregation of occupation, up to around 6300 Cal BC. At this time, most likely, the construction of the first structures with trapezoidal floors starts at Padina and at other sites in the Upper Gorge of the Danube coinciding with the appearance of Early Neolithic pottery. This Early Neolithic phase of occupation at the site can largely be characterised as continuous, most likely from around 6300 to 5500 Cal BC, when the location was finally abandoned by this regional tradition*" (Borić D. & Miracle P., 2004c: 356-357).

"*For the moment, it is difficult to claim unbroken continuity for almost 4000 years, and we suspect that there were discontinuous phases and (seasonal) episodes of occupation. However, it seems that populations that visited this site over several millennia of the Mesolithic development belonged to the same material culture/regional tradition throughout the period, with a good knowledge of the significance of the locale. Furthermore, it seems that there is no major chronological break in the sequence of radiocarbon dates at the time when new material paraphernalia, such as pottery, Balkan yellow-spotted flint and polished stone tools in this region as general traits of Early Neolithic material culture tradition*" (Borić D. & Miracle P., 2004c: 367-368).

The earliest habitations during Padina A include oval semi-subterranean structures, whilst from Padina B1, trapezoidal semi-dugout habitations are built. In sector III Padina B1 has a lowest row of houses numbered 5-10, Padina B2 a middle row of houses numbered 11-15 and Padina B3 a top row of houses numbered 16-21 (Fig. R11-13). In sector I, 4 above-ground habitations were found without clear trapezoidal base on levelled ground, with house 3 having pottery in situ. Hearths are rectangular (ovens) with 'A' dug-in stone plaques in sectors I and III, which increase in complexity over time. In Sector III, Padina B1 houses had monochrome coarse ware, ornamented by pinching & impresso; In Padina B2 the same style of pottery subsists, but there are larger and more numerous vessels, and in Padina B3 the ware is black-grey with bi-conical vessels, globular amphora and red coarse ware, whilst pinched and impresso ornamentation decreases (Radovanović I., 1996a: 339-340). The increasing

complexity of the hearths during the contact phases of Padina B suggests the strengthening of ritual bonding of the community over the centuries whilst accepting Neolithic attributes (Pottery, Balkan honey flint blades (Fig. R11-13), ground stone objects, domesticated animals, and possibly some form of agriculture evidenced by antler hoes).

The faunal remains were selectively collected and preserved, so that the data is biased. H. Greenfield (2008a, 2008b) has reanalysed the faunal remains (Fig. R11-2a) and for Padina B, the domesticated fauna represents 7.4% of the remains which is mostly made up of ovicaprines (Radovanović I., 1996: 341); according to C Bonsall (2008: 270), the domesticated fauna is present after 6000 BC. During the Mesolithic, dog was included in the diet according to Clason (1980), and the $\delta^{13}C$ and $\delta^{15}N$ isotopic evidence on the human skeletal remains points to the increasing importance of aquatic dietary resources during the Mesolithic (Bonsall C., 2008: 262), which did not reduce during the '6200 BC event' between 6300-5900 BC, contrary to what occurred at Lepenski Vir, after which point in time, domesticated fauna was acquired (Borić D., 2007: 34).

As is the case at Lepenski Vir, 7 km downstream, pottery appears sometime after 6300 BC and domesticated fauna around 5900 BC. There is clear evidence for the continuing occupation of the site of Padina by the autochthonous population, who used the site over about 4000 years, before finally abandoning it. The primary interest of the site was its location for the exploitation of the aquatic resources, which became an important source of protein as the Mesolithic hunter-gatherers adapted their lifeways and broadened their resource base. Contact with the Neolithic migrants was an opportunity to continue with their natural adaptability, which appears to have been used on a selective basis without abandoning many of their traditional values or life-style.

Privod (2) – Little information is available on this Romanian open-air Transition site at the entrance to the Iron Gates Gorges.

Răzvrăta (17) – This Romanian Transition site is in the Central Gorges, 200 m downstream from Icoana, on the left bank of the Danube at the mouth of the Mraconia River. The site was excavated by V. Boroneanţ between 1967-1968, as the waters of the Danube were rising. The excavations were poorly published, but two levels were identified (Radovanović I., 1996: 342-343):

- Level 3a is described as Early Mesolithic with oval dugouts and circular hearths at the centre;
- Level 3b is described as Late Mesolithic with parallels to the Early Transition of Lepenski Vir from *ca*. 6300 BC, Vlasac II and III, Ostrovul Corbului III, etc. The habitation structures are described as oval-rectangular, with or without a stone-constructed hearth, which V. Boroneanţ (1999) has described as sunken huts, whereas I. Radovanović (2000) suggests that they might have been above-ground. The faunal assemblage, which is made up of 194 bones, is not described, so that there is no indication regarding the presence of domesticated animals, and by the same token there is no mention of pottery or any other Neolithic attribute. The only date given is:
  - Bln-1057 7690±70BP = 6647-6433 BC (OxCal 4.2 at 95.4%), with no details on material – Median 6540 BC.

This date, assuming it is not on human bone, suggests that the site might have been abandoned prior to the '6200 BC event' and therefore not involved in the Transition.

Schela Cladovei (19) – This Romanian Transition site is located some 7 km below the Iron Gates 1 dam on the left bank, at the exit of the Gorges and the beginning of the Ključ. The site was first excavated in 1965, 1967-1968 and again from 1985, with new excavations in 1992-1996 under a joint Romanian-British team.

The site was first occupied at the end of the 8th millennium and there are 45 ^{14}C dates for the period 7100-6300 BC, after which the site appears to have been unoccupied for some 300 years during the '6200 BC event'. When the site is reoccupied *ca*. 6000 BC, it is by people with domesticated

animals, although they continued to hunt and fish. There are also traces of rectangular structures, pottery, ground stone implements, new bone tools, plus obsidian and 'Balkan' flint (Bonsall C., 2007: 54; 2008). There is therefore a clean break between the end of the Mesolithic and the Transition at this site, at a time when the expansion of the Neolithic along the River Danube and to the north along the River Tisza occurs (Bonsall C., 2007: 55).

From inception, in the Early/Middle Mesolithic, Danube fish were an important part of the diet and this grew in importance to represent 60-85% of the diet during the Late Mesolithic. The lack of caries in the skeletal remains is an additional indication of a diet rich in protein and poor in carbohydrates. Sedentism is suggested by semi-subterranean trapezoidal structures, often with inhumations below these, the presence of what could be storage pits, since one of these contained the remains of fish, with no indication that these had been cooked or that the pit had been used as a hearth (Bonsall C., 2008: 260-263). The Mesolithic tool-kit is manufactured on local material and the only indication of exchange or contact is the presence of sea-shells as grave offerings with some of the burials. C. Bonsall (2006) indicates that some plant material was recovered during the 1992-1996 excavations.

Over 60 burials have been excavated at the site, all according to Mesolithic traditions (supine or disarticulated) (Boroneanţ V., *et al*., 1999), all dating from before 6300 BC, with the majority being Late Mesolithic. About 15% of the persons buried died of violent deaths, and those that were buried with ungulate projectile points embedded in their bodies or in secure stratigraphic contexts associated with the burial were used to calculate the WRE (Figs. R11-14 & R11-15), which correction was then applied to other sites in the Iron Gates (Bonsall C., 2008: 263-264; Borić D., 2008: 93; Cook G. T., *et al*., 2001, 2002; Thorpe I., 2003: 155). There is no evidence for conflict in this Region during the Transition, other than possibly at Ostrovu Corbului.

The evidence suggests that there had been no contact with Neolithic farmers prior to abandonment of the site, and that when the site was reoccupied some 12 generations later, two possible scenarios can be postulated:

1. The site was reoccupied by descendants of the hunter-gatherers, who maintained some of their traditions, such as fishing and hunting, which continued to be important (Barttosiewicz L., *et al*., 2001), whilst being largely assimilated into the Neolithic lifeways, with rectangular above-ground structures, domesticated animals (ovicaprines, bovines and suids), pottery, new bone implements (spoons and awls) (Fig. R11-15), obsidian, Balkan honey flint, and polished stone objects. The lack of in-site burials is however problematical, whilst the lack of evidence for agriculture, whether in the form of macrorests, storage facilities, querns and grinders or ovens, supports this hypothesis;
2. Because of the lack of in-site burials, it is plausible that the site was reoccupied by Neolithic migrants, who had incorporated part of the Mesolithic population, thus maintaining the fishing tradition, although the lack of evidence for agriculture speaks against this scenario.

The first scenario is that preferred by L. Barttosiewicz, C. Bonsall *et al*., (2008) as well as R. Tringham (2000). I tend to agree.

Stubica (6) – This site on the Serbian right bank of the Upper gorges is located 2-3 km downstream from Padina and some 5 km upstream from Lepenski Vir. It was explored in 1970 by B. Jovanović, but not properly excavated due to the rising waters. At least 2 building horizons, with semi-dugout stone constructions and hearths made of stone slabs, were identified in the 1.20 m to 1.50 m cultural layer with Starčevo-Criş material, over 110 m of shoreline, making it about the same size as Padina Sector III. The pottery is monochrome reddish-grey with thick walls and black cores and includes bowls and quadrangular perforated pedestals (Radovanović I., 1996: 345).

The site would appear to have been occupied by the autochthonous hunter-gatherers during the Transition.

Velesnica (24) – This site is on the Serbian right bank of the Danube in the Ključ half way between the islands of Ostrovu Corbului and Ostrovu Mare. The site was excavated by R. Vasić between 1980-1982, with some additional cuttings in 1984 for a total of 920 m^2 along 300 m of river bank (Fig. R11-16). A large part of the site had been washed away by the Danube. The post-'6200 BC event' settlement stretches some 80 m along the bank and at least 40 m inland, with archaeological layers ranging from below 1 m to 1.5 m in thickness, suggested a long occupation of variable size. Cutting 8 and Block A were the best investigated. Two occupation horizons separated by a hiatus were identified in cutting 8; in the earlier, two hearths were found which were roughly circular with packed earth and stone bases, as well as 'gravel' (man-made concentrations of pebbles) and pottery. In the later horizon another hearth was found, more 'pebbles', remains of daub, a floor of packed earth, and pottery. There was possibly an even earlier occupation, based on finds below the earlier occupational level which could be Mesolithic. In Block A, the later occupational level occupied the entire surface, connecting to that of cutting 8. The structures were possibly rectangular and above ground. Two 'alters' with hemispherical depressions were found, (connecting to the Mesolithic/Transition tradition of the Iron Gates at Lepenski Vir, Padina, Cuina Turcului, Schela Cladovei and Hajdučka Vodenica) (Vasić R., 2008: 227-232).

In the earlier occupation horizon wild fauna represents over 94% of the assemblage in block A.

The later occupation horizon had evidence of above-ground quadrangular structures with daub, plus coarse as well as fine unpainted pottery, and rare polished stone axes. The chipped stone industry is 80% quartz and 20% flint; Of the 104 pieces on flint, 56 are unretouched blades or flakes, chips or cores and of the 48 retouched flint pieces, 35 are retouched blades (Vasić R., 2008).

In the earlier occupation horizon, three graves were excavated, associated with monochrome pottery. One of which contained 7 burials, the lowermost of which lay in a supine position with legs '*à la turque*' or butterfly position, which finds its parallel at Padina, Lepenski Vir, Vlasac, Ostrovul Corbului and Kula, where it is dated to the Late Mesolithic or Transition. The other burials were piled higgledy-piggledy with different orientations and positions one on top of the other in a roundish grave-pit. Whilst the skeletons had deteriorated, the dentitions showed no evidence of caries, although some showed signs of abrasion probably due to their use to hold. In the later horizon, the two burials excavated had been placed in a crouched lateral position (one with a pot), which is typical of the Starčevo Culture (Bonsall C., 2007, 2008; Radovanović I., 1996; Vasić R., 2008; Živanović S., 1986).

This appears to be a Mesolithic Transition site, which in its later occupation horizon sees a merging of Mesolithic and Neolithic communities, with the Neolithic way of life on the ascendant, even if there is no indication of there being any evidence for agriculture. The site in the Ključ is on a river bank with plenty of flat land for pasture and agriculture.

Veterani Cave (14) – This cave in the Central Gorges on the Romanian left bank was excavated in the 19th century.

Veterani Terrace (14) – This open-air site is located a short distance downstream from Climente I and II and about 7 km upstream from Icoana, on the Romanian left bank of the Central Gorges. The site was excavated by D. Rosseti between 1967-1969, but little has been published on this site, which appears to have been abandoned before the end of the Mesolithic.

There are two archaeological levels numbered I and II, with two building horizons in Level II, described as IIa and IIb. D. Bailey (2000: 63) states that the occupation dates from the late 8th millennium BC, whilst I. Radovanović (1996: 346-347) supplies more details regarding the oval pit-dwellings, simple hearths, stones with concave cups, bone projectile points, whilst V. Boroneanţ (1999) mentions that the lithic industry contained a strong Romanellian component.

The description above would appear to be typologically Early Mesolithic.

Vlasac (11) – This is the third important site in the Upper Gorges, with Lepenski Vir and Padina, 3 km and 10 km upstream respectively. Vlasac is opposite the site of Ilişova and upstream from the flint extraction sites near Sviniţa. The site was excavated by D Srejović and Z. Letica in 1970-1971. They excavated 640 m^2 out of some 2000 m^2 in three sectors (West Sector 1; Centre Sector 2; East Sector 3) with unexcavated sections in between (Fig. R11-17). Mesolithic, Transition/Neolithic and Bronze Age Levels were uncovered, and Vlasac I, II and III were defined as Mesolithic, with Neolithic attributes appearing in Vlasac IV (Radovanović. I., 1996: 348-351). This periodisation has now been superseded and is no longer tenable. The geography of the site was not properly understood at the time, and this has been corrected by D. Borić, *et al*., (2008), who noted that the geography of the subsoil is in the form of a solid rocky plateau in the centre with a probable palaeo-channel behind, so that there is a reverse slope at the rear of the plateau, away from the Danube, with deep sedimentation, compared with little sedimentation on top of the plateau. This situation, unknown at the time of the 1970-1971 excavations has had a considerable effect on the deposition history and the interpretation of the stratigraphy (Borić D., *et al*., 2008: 264). The sloping terrace thus has a complex stratigraphy and the cultural levels were not deposited uniformly across the site (p. 266). "*It is difficult to justify the assumption that cultural levels Ia-b to III identified by Srejović and Letica were laid continuously across the site since the deposition of cultural strata at Vlasac must have taken place at different times in different areas of the site*" (p. 271). The correction of ^{14}C dates on skeletal remains for the WRE, has also had an impact on the interpretation of site, as have the 2006-2007 excavations under D. Borić (Fig. R11-17a), so that the belief that the site was abandoned during the '6200 BC event' no longer holds true, and the focus for understanding the history of the site, and of the Transition in particular, needs to be based on articles and reports dated after 2005.

The earliest indication of occupation comes from an antler and a burial dating from the 10th millennium BC. The importance of fish increased progressively between the 10th and the 8th millennia and peaked in the Late Mesolithic when it might have represented 65%-80% of the diet (Bonsall C., 2008; Borić D., 2008).

The initial excavations uncovered a sequence of habitation structures dating from the Early Mesolithic. The first use of trapezoidal structures has been confirmed by the dates on human bones corrected for the WRE; new dates, and a careful review of all available dates in relation to their stratigraphic context confirms their first use beginning in the early 7th millennium BC (Borić D., *et al*., 2008). Over 200 burials were uncovered in the early excavations, although the exact number is hard to ascertain since mortuary rituals included the burial of entire or partial skeletons, disarticulated burials, scattered bones, secondary burials and cremations (Borić D., 2006, 2007, Borić D., et al., 2009; Radovanović I., 1996). A further 8 inhumations were uncovered in the 2006-2007 excavations, and no burial has been dated later than *ca*. 5925 BC on skeletal remains. All the burials at Vlasac can be attributed to a variety of Mesolithic traditions. A number of dates obtained from charcoal in dwellings 1 and 2, and associated with burials 54 and 11 suggest that the site continued to be used, possibly on an occasional basis, until the middle of the 6th millennium or a little beyond (Borić D., *et al*., 2008):

- Z-262 7000±90BP = 6033-5719 BC (OxCal 4.2 at 95.4%), on charcoal dwelling 1 – Median 5875 BC.
- Bln-1053 6865±100BP = 5931-5619 BC (OxCal 4.2 at 90.7%), on charcoal dwelling 2 – Median 5775 BC.
- Bln-1014 6805±100BP = 5904-5533 BC (OxCal 4.2 at 95.0 %), on charcoal dwelling 2 – Median 5720 BC.
- Z-268 6713±90BP = 5762-5481 BC (OxCal 4.2 at 95.4%), on charcoal burial 11 – Median 5620 BC.
- Z-264 6335±92BP = 5481-5196 BC (OxCal 4.2 at 84.0%), on charcoal burial 54 – Median 5340 BC.

Although the site is close to Lepenski Vir, and shares many common features, such as trapezoidal structures, hearth designs, sculptured stones and subsistence strategies, there are

indications of a more conservative approach to external influences as seen in the lack of imported Starčevo-Criş type ground stone axes, adzes and chisels (Antonović D., 2008: 37). The presence of exotic products does however attest to an exchange network, with the presence of Hungarian obsidian, an igneous rock, marine shells, Bulgarian graphite, brown and honey flint (Chapman J., 1989) and, we may add, Starčevo pottery. There is also no mention of domesticated animals in the faunal remains, other than dog, and there is no evidence for dietary change in the most recent burial.

The 2006-2007 excavations under D. Borić were undertaken well after the main site had been drowned by the rising waters behind the Iron Gates 1 dam (Fig. R11-17a), subsequent to the discovery in 2005 of human skeletal remains emerging from the eroding bank above the site, lapped by the fluctuating waters of the reservoir. The individual lay in a supine position parallel to the Danube with his head pointing downstream and his hands over his pelvis, in a position common for the Late Mesolithic. A worked stone was found where the missing head would have been and at least 350 carp teeth and a number of beads of *Cyclope neritea* marine shells (found at sites since the Upper Palaeolithic) were found with the inhumation. A flint 'arrowhead' was found on the pubic bone, but not embedded, possibly pointing to a violent cause of death. After correction for the WRE, the inhumation has been dated to the Late Mesolithic (Borić D., 2006: 8-9):

- OxA-16541 7788±60BP = 6775-6471 BC (OxCal 4.2 at 95.4%), on human bone – Median 6625 BC.

The 2006-2007 excavations are important in that in another area close-by, a collective sepulchre containing 7 superimposed burials behind a dry stone wall was discovered, which was ritually closed by placing large stone slabs above antler woods used in the ritual closing (similar rituals have been observed at Lepenski Vir and Hajdučka Vodenica). The infill had decomposed and there was burned vegetable matter and disarticulated human and animal bones, some of which were burned, and there were also red and white limestone, as well as *Spondylus* beads, across the deposit. Above the dry stone sepulchral construction, Early Neolithic pottery sherds and yellow white-spotted Balkan honey flint were found without any apparent hiatus between that event and the ritual closure of the sepulchre. Additionally, a whole Starčevo-type pot was found near to the base of the exterior of the structure. Dating the antler woods establishes a *terminus ante quem* for the inhumations and a *terminus post quem* for the pottery and honey flint:

- OxA-16544 7035±40BP = 6006-5839 BC (OxCal 4.2 at 95.4%), on antler wood – Median 5925 BC.

The pottery level has been dated on a large mammal bone fragment, suggesting that the pottery is older than the closing of the sepulchre, although it is more likely that older residual material was dated, since the date is improbably early for contact with Starčevo-Criş communities. We have chosen to ignore this date in our interpretation of the Transition:

- OxA-16539 7425±39BP = 6392-6230 BC (OxCal 4.2 at 95.4%), on animal bone – Median 6310 BC.

The topmost burial in the collective sepulchre, Unit 53, which is undated, lay in an extended supine position with the head upstream, in a typical Mesolithic position; the first in burial sequence below Unit 53, Unit 63, was a headless articulated adult which has been dated; the individual was lying on his back parallel to the Danube oriented downstream, with pierced carp teeth suggesting a headpiece, and a large *Spondylus* bead. After correction for the WRE, this individual has been dated:

- OxA-16542 7261±60 BP = 6232-6020 BC (OxCal 4.2 at 95.4%), on human bone – Median 6125 BC.

Below the lowermost burial in the sepulchre a trapezoidal building in which a broken bone projectile point has been dated, representing the *terminus ante quem* for the occupation of the dwelling:

- OxA-16540 7764±38BP = 6656-6486 BC (OxCal 4.2 at 95.4%), on animal bone – Median 6570 BC.

This sequence confirms that trapezoidal structures were in use at Vlasac stretching back beyond 6500 BC, at the same time as at Lepenski Vir; furthermore, the dating, the similarity in the red and

white limestone beads found at both Vlasac and Lepenski Vir (tombs 54, 87 and 46), suggest contemporaneity and interdependencies during the Terminal Mesolithic and Transition. The sequence also suggests that the site was occupied during the '6200 BC event', and the *Spondylus* bead associated with inhumation Unit 63, that contact or exchange occurred with Neolithic settlers prior to 6000 BC, and possibly as early as 6200 BC, when they are first known to be present in the wider region. The *Spondylus* beads, pottery and flint are the first instance of contact with the Early Neolithic being detected at Vlasac, as well as being the earliest evidence for such contact. The formal closing of the sepulchre also coincides with the abandonment of trapezoidal structures at Lepenski Vir (Borić D., 2006, 2007, 2008; Borić D., *et al*., 2008).

Vlasac is key to understanding the Transition in the Iron Gates Gorges, with the early acquisition, through contact and exchange, of Neolithic material attributes, whilst the community maintained their traditional lifeways.

Vodneac (4) – Little information is available on this Romanian open-air Transition site at the entrance to the Iron Gates Gorges.

Eastern Central Balkans – Iron Gates – Initial and Early Neolithic sites – Introduction

Given that the terrain inside the Iron Gates Gorges is poorly suited for agriculture, the only Early Neolithic site discovered to date is the small open-air site of Aria Babi above Lepenski Vir.

D. Borić (2007) has produced a map of the Early Neolithic sites in the wider region of the Iron Gates (Fig. R11-18). The only ones which we will detail here are those upstream of the Iron Gates 2 dam, where contact would have been made between the Mesolithic population and Neolithic migrants.

Eastern Central Balkans – Iron Gates – Initial and Early Neolithic sites – Site details

Aria Babi (9) – This Early Neolithic open-air site, which covers 0.8 ha, lies on Košobrdo (Košo Hill) above the site of Lepenski Vir at 310-318 masl (Fig. R11-19), with a path leading down to Lepenski Vir, past Lepenski Abri several metres above Lepenski Vir, in which Early Neolithic pottery was found, according to Jevtić (1983: 37). Aria Baba, which is the only Early Neolithic site inside the Iron Gates known to date, was excavated by D. Borić and Starivić between 2004-2005. Aria Babi is a single occupancy site with a stratigraphy of 40-60 cm, in which no faunal remains were found due to the acidity of the soil, nor any evidence for the habitation structures. Pits were uncovered in which anthropic remains accumulated, including sherds from the Starčevo Early/Middle Neolithic (post 5900 BC) type, strikingly similar to those found at Lepenski Vir in contexts post 5900 BC when many of the trapezoidal structures had been abandoned, with band appliqués with regular finger imprints as well as regular finger imprints on the rims of vessels. This is also the time when flexed inhumations, typical of the Starčevo Culture are prominent at Lepenski Vir.

Pieces of ground stone implements, as well as Balkan or pre-Balkan platform yellow flint, which is characteristic of the period, were also discovered. One of the blades had what is possibly sickle gloss, which needs to be analysed. Unfortunately, no vegetable matter or pollen were recovered from the site, but the pottery contained a lot of chaff, which is indirect evidence of agriculture (Borić D., 2005d, 2007, 2008, 2009, 2010: pers. com.).

Almost all of the land in the vicinity is steep-to so that it is hard to understand why Starčevo migrants would have established themselves at Aria Baba. It is possible that the site was used by autochthonous shepherds grazing the flocks of domesticated animals acquired from the Neolithic migrants.

Donje Butorke (20) – This Early Starčevo site in the Lower Gorges, 500m upstream from the village of Kladovo on the Serbian right bank, was excavated in 1964 by D. Srejović. After its abandonment

and a long hiatus, it was resettled by the Coţofeni Culture (post Vinča Culture). It is mentioned by I. Radovanović (2000: 321-322) as being one of several (others being Răzvrăta II, Ostrovul Mare km 873, Hajdučka Vodenica II) containing irregular-shaped dugouts or above-ground rectangular huts with circular hearths which make their appearance after the contact period of the Iron Gates groups with Neolithic groups.

This and the other sites might have been set up by immigrant Starčevo groups and/or accommodated the Mesolithic population when they abandoned their sites inside the Iron Gates. There appear to be no dates.

Kamenički Potok (2) – (also known as **Ušće Kamenič potoka/Ušće kog Poloka Kamenič/Ušće Kameničkog potoka?) –** This small open air Early Starčevo site is on the Serbian right bank of the Danube downstream from the Ključ, located where the Kamenički Potok Stream joins the Danube, opposite the Transition site of Ostrovu Mare and downstream from the Early Starčevo site of Knjepište. The site was almost fully excavated over an area of 400 m^2 in 1980-1981 (Stanković S., 1986a).

The site has three levels of occupation, the earliest of which has been described as proto-Starčevo or Gura Bačului (Romanian Early Neolithic culture). The pottery is rough, mostly undecorated, often with a red slip on the exterior and occasionally on the interior. The material found includes altars and figurines, although this could date from the later occupations.

The faunal assemblage includes fish and water fowl, but predominantly wild boar and deer, whilst domesticated fauna includes ovicaprines and bovines. No details are given regarding the lithic assemblage.

A typical Starčevo burial was also found, lying in a contracted lateral position with a flint nucleus in his hand and associated with two intact undecorated vessels of Early Starčevo type (Stanković S., 1986a).

There can be no doubt that this is a small Early Neolithic site, but the fish and wild fauna could be indicative of the inclusion of autochthonous hunter-fisher-gatherers in a mixed community.

Knjepište (28) – This open air site, a short distance upstream from Kamenički Potok, sits on a small plateau 400m X 200m where the Zemma Stream joins the Danube, on the Serbian right bank opposite Ostrovul Mare. It was discovered in early 1983, during prospections associated with the excavations at Kamenički Potok and proved to be a larger Early Neolithic Starčevo site.

The 1983 excavations covered an area of 80 m2 in four pits, which uncovered Early Starčevo pit-dwellings associated with hearths (Fig. R11-20). Three distinct levels of occupation were identified, the richest of which was the second (Bonsall C., 2007: 54; Stanković S., 1986b).

The pottery, almost entirely monochrome, with a red slip and occasionally with digital decoration comprises many forms, including rimless platters, jars, small caldrons, bowls, alters, and most importantly, anthropomorphic figurines with coffee bean eyes, 2 fragmented animals and ear studs, which are strongly reminiscent of Thessaly and the Near East (Fig. R11-20). The lithics with a high percentage of flint as compared to quartz, include flint blades and scrapers as well as 3 broken polished axes (Stanković S., 1986b, Vasić R., 2008: 235).

The bone tools include awls, spatulas and fish-hooks. Sturgeon ribs were also used as awls. Details on the faunal assemblage are sparse and are indicated to include bovines as well wild fauna, snails and aquatic resources from the second Level only (Stanković S., 1986b). No mention is made of ovicaprines.

This is clearly an Early Neolithic settlement established by migrants, which has unfortunately not been dated, but given the importance of fishing could have incorporated an element of the autochthonous population.

Eastern Central Balkans – Iron Gates – Conclusions

As has been noted by many authors, The Iron Gates is one of the richest areas in which hunter-gatherers can be seen to evolve and adapt between the Late Pleistocene, the Early Holocene and into the contact period with the Neolithic migrants.

This adaptation can be seen to be primarily in response to:

- Climatic changes, resulting in ecological changes (flora and fauna);
- Demographic growth;
- Contact with the FTN Neolithic Cultures.

The post-Pleistocene climatic adaptation took the form of developing an ever-growing reliance on the plentiful aquatic resources, which gave rise to a more sedentary life-style, leading to demographic growth as evidenced by the increasing number of sites, social complexity and conservatism. Whilst aspects of the adaptive process can be seen to be common between the upper gorges, the central gorges and downstream as far as the Iron Gates 2 dam, there were nonetheless differences, and the downstream part of the region, which came into direct contact with Neolithic migrants earlier than the inhabitants of the Upper and Central Gorges, adapted and integrated more rapidly to the Neolithic lifeways.

Whilst there is clear evidence for conflict during the Later Mesolithic, there is only one possible instance at Ostrovu Corbului for the contact period and Transition. This leads to the conclusion that the Transition was essentially peaceful.

The earliest Neolithic migrants settled some distance from the Iron Gates Region (Fig. R11-18), unless the undated sites of Knjepište and Kamenički Potok downstream from the Ključ gainsay this. First contact appears to have been in the form of exchange during the '6200 BC event', when pottery appears at several sites *ca*. 6200 BC, as well as a limited amount of other exchange items, such as Spondylus shell beads. For the first centuries after initial contact, not much change in the lifeways is discernible at those sites which continue to be in use, with, if anything, a reinforcement of the autochthonous cultural identity, particularly in the Upper Gorges. At the end of the '6200 BC event', around 5900 BC, domesticated animals appear in limited numbers in the archaeological record and the adaptation to the Neolithic gathers pace, with the adoption of above-ground quadrangular habitation structures, the progressive abandonment of trapezoidal habitations and structured hearths, the reduction in the reliance on aquatic resources and the mixing of the populations. The mixing of the populations can also be discerned through the local production of pottery and the Neolithic technology in the manufacture of body ornaments after 6200 BC as well as the introduction of new types of ornaments, particularly at the site of Lepenski Vir (Cristiani E., Meso 2015 presentation).

D. Borić (2002: 1038), recognising the complexity of the Mesolithic, Transition (he prefers the term 'Transformation') and Neolithic of the Iron Gates Region and the Central Balkans argues for a need to appreciate the complexity and ambiguity of available evidence, so as to provide a thick description of the past, one that would replace uniform visions of cultural change. He later expands further in not wanting to straightjacket the interpretations of the archaeological data into '*some grand theory*' or '*generalizing model*', such as the frontier model, which tend to essentialise the differences between foragers and farmers in social evolutionary terms and fall prey to simplistic and universal models; he states that "*there is a growing need to appreciate the complex workings of social processes at different scales that are frequently inadequately lumped under the proxy notions of 'culture contact' or 'acculturation'*", and points out that "*dated burials from Padina, Hajdučka Vodenica and Vlasac show no dietary change in the period from around 6300 to 5900 cal. BC, i.e. the period that saw dietary changes at the sites of Lepenski Vir and Ajmana (Fig 3.2). Such a pattern indicates the heterogeneous nature of the process of transformation even within this micro-region ... re-examination of the faunal evidence from the sites of Lepenski Vir and Padina did not indicate the presence of domesticates in the period marked by the dietary change, i.e. c. 6300-5900 cal BC, which shows that the subsistence change cannot be connected with the introduction of domestic animals*", and "*New*

strontium data indicate an intensified mobility that probably characterised the region on the whole in the period after 6300 cal BC with admixtures of different groups and communities... Destabilizing our grand narratives of the Neolithic as sedentary and the Mesolithic as mobile, the current evidence from the Danube Gorges suggests that at the micro-regional level one observes a greater mobility in the Neolithic in comparison to a more regionally confined pattern of Mesolithic existence" (Borić D., 2007: 33-35).

Other authors have perceived the Transition a little differently, stressing that over time the contacts via the regional network made the "*Iron Gates Mesolithic community vulnerable in maintaining its cultural identity*", which risked being absorbed by the large FTN cultural complex. The answer at the end of the 7th millennium was '*intensive ideological integration*', which is more apparent in the Upper Gorges than further downstream, to ensure the social (and biological) reproduction of the community and its 'world-view' regarding the present and the past. Integration into the Neolithic was more rapid in the Ključ and further downstream (Radovanović I., 1996b: 42); or as M. Roksandic (2008a: 73) states, "*The biological descendants of Lepenski Vir culture remained in the locality, in smaller groups, and adopted a different material culture, but retained the same burial practices, and to a large extent the hunting and fishing economic base. The greater percentage of domestic animals and definite use of domestic varieties of cereals classified them as a Neolithic group, but in many respects this population remained unchanged. Only within the fully developed Starčevo phase (Lepenski Vir IIIb) and with a change in burial ritual towards more canonised forms (Antunović, 1990) did this population finally integrate itself into a larger Neolithic community*".

The Lepenski Vir culture disappears *ca*. 5500 BC, with the final abandonment of the sites within the Iron Gates Gorges, but there can be little doubt that over the centuries that the sites were progressively abandoned, the population integrated into the Neolithic lifeways.

Region 12 – Eastern Balkan Peninsula – Hungarian Transdanubia and Eastern Slovenia

(Map R12)

Eastern Balkan Peninsula – Hungarian Transdanubia and Eastern Slovenia – General Introduction

This Region is enjoying a dynamic state of research primarily under the aegis of the Hungarian Academy of Sciences and the University of Prague. Current research is uncovering both direct and indirect evidence for a Mesolithic presence in the Region and additional evidence for the Late Starčevo presence. "*According to our present knowledge, the Starčevo communities reached Lake Balaton during the culture's classical and late phase (phases Linear B and Spiraloid B in Stojan Dimitrijević's framework). There is growing evidence for interaction between the Starčevo population and the indigenous groups of the Carpathian Basin, which undoubtedly led to exchanges, adaptation and, most probably, genetic mixing*" (Bánffy E., 2013b: 41). This intermixing of Mesolithic and Neolithic elements is believed to have resulted in the genesis of the LBK Culture.

The region of Lake Balaton has changed substantially over the millennia. "*In some periods Lake Balaton split into two or three smaller lakes with clear cold water; when the climate turned warmer and wetter, natural dams were breached and even the northern Tapolca Basin and valleys south of the lake also became part of the lake. During these periods, the lake flooded the north to south valleys, to its south down to the Kapos River, occasionally as far as the Drava valley (Cserny 1999). At these times the Sárrét bog, somewhat east of Lake Balaton became a one-meter-deep lake (Juhasz, Sumegi, Zatyko 2006, in press; Banffy, Juhasz, Sumegi, in press). The water level of the lake was fairly low at the end of the Mesolithic, rising significantly around 5500–5400 calBC. The wetter climate and the rise in the water level meant that lake shore inhabitants were forced to move away from the lowest stream shores and river terraces, and to follow the growing water level along the shores of Lake Balaton (see also: Juhasz, Sumegi, Zatyko 2006, in press)*" (Bánffy E., 2006: 129). This means that Late Mesolithic lake-shore sites are now below the current water level, whilst Neolithic ones are further from the shore than at the time they were established (Fig. R12-2).

P. Sümegi and R. Kertész (2001) identified the 'Central European-Balkanic Agro-Ecological Barrier' (CEB AEB), marking the maximal northward expansion of the FTN (Starčevo-Körös-Kris complexes), north of which it was not possible to continue the south-east European mode of agriculture (Fig. R12-1) (Bánffy E., 2000: 183; 2013a). The CEB AEB boundary was not only climatic and vegetational, but also geological (rock-bed and soil conditions). South of Lake Balaton the forest cover is Submediterranean oak forest, whilst to the north it is central European mixed oak forest; to the east the Pannonian Plain is forest steppe. At the time the duration of the pause in the northward push of the Neolithic, the Starčevo migrants adapted to the new environment, integrating those hunter-gatherers in their midst over time, whilst those beyond their range also adopted Neolithic attributes (Kértesz R., 2002).

The red radiolarite from the Bakony Mountains, with the best known extraction site of Szentgál, was an important source of raw material in the Mesolithic and into the Neolithic. It was exchanged up to 400 km in the Mesolithic as far as Southern Moravia (Bánffy E., 2008: 153) and has been found on sites at distances up to 800-1000 km in the Neolithic in the Hessen and Saale regions of Germany. It is found at Initial Neolithic sites between the River Drava and Sava in Croatia and it is the most important raw material in the Starčevo, Formative and Early LBK sites in Transdanubia, supplying convincing evidence that there was contact between the two cultures (Bánffy E., 2004: 346, 2005: 380; Mateiciucová I, 2010: 280-281), although Z. Mester (2014: pers. com.) has pointed out that neither the Sauveterrian or Castelnovian are present in Transdanubia, so that the lithics from the Epipalaeolithic to the Early Neolithic tend to be undiagnostic and not particularly useful for dating sites based on lithic

typologies. This situation furthermore suggests limited contacts between Transdanubia and Friuli-Venezia Giulia during the Mesolithic, and this situation probably continued during the Initial Neolithic.

The main features associated with the Late Mesolithic, Initial Neolithic and the Transition to the LBK Culture have been summarised as follows (Bánffy E., 2005; Bánffy E., *et al*., 2007; Bánffy E. & Oross K., 2010; Bánffy E. & Sümegi P., 2011; Divišová M., 2011; Eichmann W., et al., 2010; Gronenborn D., 1999a; Kemenczei T., 2005; Kertész R., 2002; Oross K. & Bánffy E., 2009; Otte M., 2001; Sümegi K. & Kertész R., 2001; Zvelebil M., *et al.*, 2010):

1. The Mesolithic evidence is:
   - Pre-Neolithic forest burning and the management of the environment to favour the expansion of hazel (*Corylus avellana*), which would have predisposed the hunter-gatherers to take up horticulture and agriculture;
   - Mesolithic control of the Szentgál radiolarite mine;
   - Mesolithic presence in the Bakony Mountains, the Sárrét area to the east of Lake Balaton where harpoons have been found; south of Lake Balaton with lithic scatters and the excavated stratified site of Regöly; at the western end of Lake Balaton where a pre-Neolithic coracle was found, and along the banks of the Danube in Hungary;
   - Late Mesolithic sites are mostly in wetlands or near lakes or rivers.
2. The Starčevo evidence is:
   - Starčevo sites have now been discovered north of Lake Balaton at Tihany Aszófö and Balatonfüred (Regenye J., 2010);
   - Many of the Starčevo sites are on raised land unsuitable for agriculture close to the shores of Lake Balaton or in wetlands, where fishing, collecting and horticulture were practiced. The sites appear to be smaller than further south and about the same size as the Mesolithic sites, at about one acre.
   - Some of the pottery has linear decorations;
   - Ovicaprines were in part abandoned in favour of bovines and suids, which were more suited to a forest environment;
   - The chipped stone assemblage contains many tool-types of Mesolithic tradition and the preferred raw material is Radiolarite from the Bakony Mountains.
3. The Formative and Earliest LBK evidence is:
   - The LBK evolved from a fusion of the Mesolithic and the Starčevo over several generations;
   - The Formative LBK pottery is very similar to the Starčevo pottery, but evolved into the new pottery style during the Earliest LBK;
   - Mesolithic affinities of the lithic industries in the Earliest LBK;
   - Location of the Earliest LBK sites around the shoreline of Lake Balaton and coeval with the Starčevo sites in the Balaton Region and to the west. In the Early LBK, the sites tend to move upland;
   - A relatively high incidence of the hunt, as well as of fishing;
   - A readiness to scission and 'move-on' attitude, not anchored in the fixed habitat;
   - A slash and burn agriculture – then move on;
   - The development/adoption of the longhouse and the adaptation of lifeways to a Central European/non-Mediterranean environment;
   - Local copies of Starčevo cult devices, particularly of animal figurines, whilst the anthropomorphic ones were abandoned;
   - Disposal of the deceased in a manner culturally closer to that of the Mesolithic, with ochre.

In addition, DNA tests indicate that some 80% of the Thessalian Neolithic population was made up of immigrants, that this reduces to 50% in Transdanubia, and 20% on the Rhine, even if local variations can be noted (Kalicz N., 2005: 370; Zvelebil M., *et al*., 2010).

There are 65 recorded settlements around Lake Balaton, in or close to the marshland near the then-shoreline, and the authors hypothesise that they were occupied by ex-hunter-gatherers in the process of being acculturated, in areas unsuitable for agriculture, although horticulture was possibly practiced (Bánffy E., *et al.*, 2007: 229).

Landward Balkan Peninsula – Hungarian Transdanubia and Eastern Slovenia – Mesolithic and Transition sites – Introduction

A number of Mesolithic sites have been identified in the region, but there is also indirect evidence that the Mesolithic population managed the environment to favour the growth of hazel (*Corylus avellana*), for which this region was a *refugium* during the LGM, and from which it spread out naturally (Bánffy E., 2008: 153; Bánffy E., *et al*., 2007: 240). During the 8th to 6th millennia BC *Corylus avellana* pollen became the dominant arboreal pollen in several regions where cores have been analysed, and evidence has been found for regular burning of the forest to create clearings to favour the growth of this valuable source of food as E. Bánffy *et al.* (2007: 226) have summarised:

1. Near the site of Pityerdomb traces of pre-Neolithic forest burning in the waterlogged marshy banks of the stream were discovered, and the evidence suggests that the forest burning was repeated every 15-30 years:
   - Deb-5018 8771±54BP = 7992-7607 BC (OxCal 4.2 at 89.5%), on charcoal – Median 7800 BC.
2. In Sárrét region borings have been made near the village of Sárkeszi (Mesolithic site of Nádasdladány), also suggesting intentional burning in a lacustrine lakeshore environment between 7800-5600 BC (Sümegi, 2003):
   - Deb-3579 8637±60BP = 7820-7552 BC (OxCal 4.2 at 95.4%), on charcoal – Median 7685 BC.

   A sudden increase in *Corylus* took place after:
   - Deb-3501 8349±83BP = 7571-7181 BC (OxCal 4.2 at 95.4%), on charcoal – Median 7375 BC.

   And a second instance of peaking occurred:
   - Deb-3498 6874±55BP = 5885-5661 BC (OxCal 4.2 at 95.4%), on charcoal – Median 5760 BC.
3. The Zalavár cores, at the western end of Lake Balaton, indicated a peak in *Corylus* at the following dates and shortly thereafter (Juhász, 2005):
   - Gif-10245 7530±110BP = 6607-6206 BC (OxCal 4.2 at 93.5%), on charcoal – Median 6405 BC.
   - Ly-11223 7260±40 BP = 6222-6051 BC (OxCal 4.2 at 95.4%), on charcoal – Median 6135 BC.

These sudden increases in *Corylus avellana* pollen initially from 10% to 30% and later to over 50% are attributed to the management of the environment to favour the collection of hazelnuts.

An important advance in Mesolithic studies was the discovery of a Mesolithic site at Regöly, where excavations uncovered the remains of a circular structure (Bánffy E., *et al*., 2007; Eichmann W. J., et al., 2010). Mesolithic oval huts were found in Northern Hungary at Sződliget in the 1960s, and some 20 years ago, a dense settlement in the region of Jászság between the Danube and the Tizla also led to the discovery of an oval structure (*ca*. 5.8 m X 5 m) visible as a dark stain on the sterile sand, traversed by a NW to SE row of post-holes. 2 similar N-S alignments of post holes have been found in the German Mesolithic. Several clusters of sites around Lake Balaton have recently been discovered, but many are under water or completely perished. Mesolithic sites often go undetected because of their ephemeral nature. In the Late Mesolithic small settlements of equal rank are supplanted by two base camps (summer & winter?) with clusters of small hunting sites, suggesting an incipient sedentary lifestyle. This was followed by central sites with radiating forays. There is no evidence for pit-houses in the Mesolithic, which would have been incompatible with the mobile life style (Bánffy E., 2013a: 120-122).

"*Prospection surveys for Mesolithic sites in the Middle Kapos Valley began in the fall of 2003. The results of the survey in the Middle Kapos region led to the discovery of several potential Mesolithic*

sites defined by lithic scatters without Neolithic or Copper Age ceramics, located along abandoned meanders of the River Kapos" (Bánffy E., *et al.*, 2007: 56). One of the sites discovered during the survey conducted by W. Eichmann, Regöly-2, has since been excavated.

Before the LBK evolved and travelled outward, the local Mesolithic population had to acquire the Neolithic attributes and mix with the Starčevo migrants in their midst. Prior to this phase they may well have undergone some of the psychological and cultural changes that would have predisposed them to adapt to the new lifestyle (Mateiciucová I, 2010). The Transition between *ca*. 5600-5300 BC has been well described by K. Oross and E. Bánffy (2009: 178-179):

"*The single most striking feature of the lithic assemblage is the astonishing diversity of types. According to Katalin T. Biró, the many tool types are a reflection of a wide range of activities, such as hunting, fishing, gathering and, also, food production (Biró 2001; 2002; 2006). The raw material used almost exclusively for the manufacture of stone tools in the earliest LBK assemblages was red radiolarite from the Bakony Mountains, preferred not only by the Transdanubian Starčevo communities, but also by the early LBK migrants advancing along the Danube Valley. The presence of Szentgál radiolarite has been documented on Austrian and Moravian LBK sites, although in a decreasing proportion (Mateiciucová 2001; 2002), and even as far away as central Germany (Gronenborn 1994; 1997; Zimmermann 1995).*

Taken together, the above suggest a transitional phase between Late Mesolithic and Early Neolithic subsistence strategies. The Mesolithic lithic tradition has much common with LBK manufacturing techniques: the similarities in tool-making technology can probably be interpreted as reflecting similarities in subsistence strategies (Mateiciucová 2003; 2004). The plants earlier tended as part of Late Mesolithic garden cultivation were most probably cultivated in small Early Neolithic fields (Gronenborn 1999; Jeunesse 2003; Gehlen and Schön 2003) and complemented with cereals. Domestic animals, such as sheep, goat and cattle, were brought to this region from the northern Balkans (Halstead 1996), enabling the diet to be enriched without a break in overall subsistence patterns. The first phase can thus be conceptualised as a slow transformation rather than a sweeping change".

J. K. Kozlowski (2005) was sceptical about the Late Mesolithic presence in Transdanubia, but with the number of Mesolithic sites confirmed in Transdanubia, as well as in the Great Hungarian Plain, where none were known a few years ago (Bánffy E., 2004: 21), he is unlikely to be correct.

<u>Eastern Balkan Peninsula – Hungarian Transdanubia and Eastern Slovenia – Mesolithic and Transition sites – Site details</u>

Apnarjeva Jama (22) – This is a possible Slovenian Mesolithic cave site listed by I. Turk (2003: 13). The 23 m deep cave is located at 670 masl on the south-facing slope of mount Kotečnik, above Liboje near Celje. It was discovered in 1987 and excavated in 1988-1989 by I. Turk and J. Dirjec, who reported on the excavations in 1989.

The contents are mostly Middle and Upper Palaeolithic with a few Mousterian lithic artefacts in Levels 3-6. The cave was occupied intermittently, with a possible Mesolithic occupation in the Early Holocene, only evidenced by two bone awls. There is no indication of the Transition at this site, even if the topmost Level included Bronze-Age pottery.

Belecska (23) – This Mesolithic lithic scatter south-west of the village of the same name, produced geometric microliths collected on the surface (Eichmann W., 2004: 187).

Breg (32) – This is an open-air Late Castelnovian site at Breg, Škofijica, at 294 masl, close to the capital Ljubljana, in Central Slovenia which, according to M. Spataro (2002), is one of several, but the only one published in detail.

The site was excavated by M. Budja in the 1980s. P. Biagi has pointed out that this site has supplied some of the best Late Castelnovian Mesolithic data in Level 3A, which produced trapezoidal microliths and Montbani blades, and a subsistence based heavily on *Cervus elaphus*, (Biagi P., 1994: 58-60; Biagi P. & Voytek B., 1994: 63-64). A harpoon was also found, suggesting that aquatic resources were also exploited (Chapman J. & Müller J., 1990: 127; Voytek B., 2006: 171). The same location was repeatedly occupied for almost three millennia, with the earliest dates going back to the second half of the 9th millennium and the most recent, from Level 3A (Biagi P., 1954; Biagi P. & Voytek B., 1994; Srdoč D., *et al*., 1987: 140):

- Z-1421 6830±150BP = 5998-5491 BC (OxCal 4.2 at 95.4%), on charcoal – Median 5745 BC.
- Z-1421 6630±150BP = 5843-5307 BC (OxCal 4.2 at 95.4%), on charcoal – Median 5575 BC.

The Neolithic site of Resnik Canal is close by, and the excavator could not determine whether there was any relationship between the two sites (Budja M., 1993: 187). I. Turk (2003: 66) considered the most recent date to be late for the Terminal Mesolithic, since the Neolithic is attested in the wider region at that time, but there is no evidence of Neolithic attributes at this site, which appears to have been abandoned close to the time, or shortly after the arrival, of the Neolithic in the area.

Csór-Meritöpuszta (3) – Possible Mesolithic site in the Sárrét bog region where a Mesolithic harpoon was found as early as 1935. Borings made in the vicinity produced evidence of intentional burning in a lacustrine lakeshore environment, which has been dated (Bánffy E., *et* al., 2007: 225):

- Deb-3579 8637±60BP = 7820-7552 BC (OxCal 4.2 at 95.4%), on charcoal – Median 7685 BC.

Kaposhomok (28) – This is probably a Late Mesolithic site south of Lake Balaton on a sand dune in a dead meander of the River Kapok near a village of the same name, evidenced by a lithic scatter. The site was discovered in the 1950s by a local, Mr. Trombitás, who collected some 100 lithics (Eichmann W., 2004; Eichmann W., *et al*., 2010).

The lithics include trapezes, triangles, backed microliths, notched blades, end-scrapers and steeply retouched points which indicate a Mesolithic context, similar to Mesolithic assemblages in South Germany (Fig. R12-3) (Bánffy E. 2000; Bánffy E., *et al*., 2007: 56). S. K. Kozlowski (2005: 178) points out that the trapezes are associated with other backed microliths, so that a Late Mesolithic date is probable, but needs to be treated with caution, since the surface finds could also include later material (as evidenced by the presence of pottery and macro-blades).

Keszthely/Keszthely-Gyóngyós (14) – This is a location near the village of the same name at the north-western corner of Lake Balaton, where a pre-Neolithic flat-bottomed wooden boat – now lost – was discovered close to the Gyóngyós Stream (Bánffy E., 2004, 2006: 130, 2007a, 2008: 153).

Nádasdladány (2) – This site is in the Sárrét region, near the village of Sárkeszi. A Harpoon was found in the peat-bog and borings made in the vicinity produced evidence of intentional burning in a lacustrine lakeshore environment, which has been dated (Bánffy E., *et al*., 2007: 225):

- Deb-3579 8637±60BP = 7820-7552 BC (OxCal 4.2 at 95.4%), on charcoal – Median 7685 BC.

Noszja Pörös/Nosza Pörös (Not on distribution map) – Lithic scatter near village of Hajdukovo in Northern Serbia, originally reported by Bruckner in 1966 suggesting it was Mesolithic. The collection is in the museum at Subotica.

W. Eichmann (2004: 188) indicated that the collection was examined at the museum and that "*among the significant discoveries were two backed points which fit within the Late Epigravettian tradition: this is quite peculiar given that the collection also includes numerous trapezes (Castelnovian influences), which seem to indicate a later period of site occupation. Like many potential Mesolithic sites in southeastern Europe, this site comes from surface collections and its context is uncertain*".

This appears to be the only Mesolithic site in Northern Serbia, and it tells us nothing about the Transition. Given its location, it has to be seen in the context of the current research in Transdanubia, which explains why W. Eichmann who is working on the Transition and genesis of the LBK in Transdanubia took an interest in this site.

Páli-Dombok (not on map) – Early Mesolithic site found in 2014 and subject to rescue excavations, about 75 km north of the western end of Lake Balaton. The site was discovered 2 m below the present-day surface whilst quarrying for gravel some three km south of the village of Páli. Some 925 chipped stone artefacts were recovered from a 5-6 cm stratum made of radiolarite from the Bakony Mountains to the south (Mester Z., *et al.*, 2014).

The site is important (Fig. R12-4) because it confirms a Mesolithic presence some 50 km north of the Bakony Mountains radiolarite sources on which the site occupants relied almost exclusively, and which appears to have been worked on-site.

Regöly-2 (25) – This Late Mesolithic site covers an extended area of 1.0 ha on the left bank of the channelled Koppány River, 3 km NE of the confluence with the Kapos River, on a small rise of 2-3 m, near the village of Regöly, south of Lake Balaton. The site was the subject of a small-scale excavation in 2004, after the examination of the surface collections made over 15 years by Mr. Cziráki (Eichmann W., 2004). The site is surrounded by filled meanders and a 0.5 ha lithic scatter exists on the opposite side of one of these meanders. Full excavations were conducted between 2005-2006 (Eichmann W., *et al*., 2010: 225-226).

The lithics (Fig. R12-5) are predominantly made of radiolarite from 2 locations:

- Bakony Mountains (sites of Szentgál, Úrkút, Hárskút and Sümeg) 50-60 km to north;
- Eastern Mecsk Mountains 50-60 km to the south;
- Two pieces of obsidian from North-Eastern Hungary or Eastern Slovakia were also found.

Many blades bear traces of utilisation and some have sickle gloss possibly from reed-cutting, which deposits more silica than cereal stems. Debitage using the pressure technique and trapezes and other microliths are present in small numbers, which are consistent with Mesolithic findings from Southern Germany.

A possible circular feature 4-5 m in diameter with post holes was partially excavated.

The site confirms the existence of the Mesolithic located on flood plains and their extensive use of medium to long range contacts. The Neolithic sites nearby, in similar locations on floodplains, are of a similar size to the site of Regöly-1, and also have similar lithic assemblages (Eichmann W., *et al*., 2010: 223-227).

Sárrét Basin (4) – The manipulation of the environment began around 10k BC in the Sárrét Basin east of Lake Balaton. Two potentially Mesolithic sites in this region are evidenced by stray finds of two harpoons in the peat bogs (one of which is now lost), one under a thick peat layer at Nádasdladány and the other beneath 180 cm of peat at Merítőpuszta near Csór and reported on by Makkay (1970) and Marosi, (1936) (Bánffy E., 2007a, 2007b: 235). Whilst neither harpoon has been directly dated, one of the two locations where the harpoons were found, near the village of Sárkeszi (Mesolithic site of Nádasdladány, the other being that of Csór-Meritöpuszta), produced evidence of intentional burning in a lacustrine lakeshore environment, which has been dated (Bánffy E., *et* al., 2007: 225):

- Deb-3579 8637±60BP = 7820-7552 BC (OxCal 4.2 at 95.4%), on charcoal – Median 7685 BC.

The earliest Neolithic settlements of the region appear to date from the end of the 6th millennium BC (Bánffy E., 2007b).

Špehovka (21) – Slovenian karstic cave in Tisnik, north-east Slovenia, which was discovered by S. Brodar in the post-war years. The cave had a period of occupation during the Upper Palaeolithic and Mesolithic. Two harpoons and a bone spearhead were found (Voytek B., 2006).

There is no indication that the site was used into the Transition, but it does act as a link between Transdanubia and the Pannonian Plain to the east and the *Caput Adriae* to the west.

Szekszárd-Palánk (30) – This Mesolithic site near Szekszárd, close to the Danube on a fossil oxbow bend, near the Serbian border, was excavated at the end of the 1950s and reported on by Vértes (1962: 54). The material has been considered comparable to Sződliget-Pec / Sződliget-Vác further north, but this is not tenable since the latter sites contains trapezes associated with the Late Mesolithic (Bánffy E., *et al*., 2007: 56).

Szentgál Mine (5) –This radiolarite mine in the Bakony Mountains north of Lake Balaton, was in use during the Mesolithic and the raw material extensively distributed as far as Southern Moravia (Bánffy E., 2008: 153). It is the best known of several radiolarite outcrops in the region, others being Úrkút, Hárskút and Sümeg. The area around the outcrops of radiolarite is rich in surface finds of microlithic trapezes and other types of Late Mesolithic tools (Bánffy E., *et* al., 2007: 232). The site, some 25 km north of the lake is beyond the most northerly known Starčevo site of Tihany (Regenye J., 2010).

During the Initial Neolithic of the Region, Bakony Mountains radiolarite is found as the preferred raw material in the Starčevo, Formative LBK and Earliest LBK sites, suggesting intensive contacts and eventual merging with the autochthonous hunter-gatherer population who appear to have controlled the mines, since to date only one Starčevo site has been identified on the north shore of Lake Balaton at Tihany-Apáti.

Szentgyörgyvölgy (17) – Mesolithic flint scatters have been found in the area around the town of the same name, which is close to the Formative LKB site of Szentgyörgyvölgy-Pityerdomb (Bánffy E., 2006: 132). Traces of pre-Neolithic forest burning have also been found near the site of Pityerdomb in the waterlogged marshy banks of the stream, which suggests that forest burning was repeated every 15-30 years during the Mesolithic. A single date has been supplied (Bánffy E., *et al*., 2007):

- Deb-5018 8771±54BP = 7992-7607 BC (OxCal 4.2 at 89.5%), on charcoal – Median 7800 BC.

Sződliget-Pec & Sződliget-Vác (1) – There are two sites some 200 m apart, possibly an extended area of repeated hunter-gatherer occupation on a sand dune, on the left bank of the Danube, a few km downstream from the 30 km long gorge in the north-east corner of Transdanubia. One site was excavated in the early 1950s and the other in the 1960s, and reported on by Gábori (1956, 1965). It is attributed on typological grounds to the Mesolithic, but the excavations have been poorly published. A re-examination of the lithics has shown that the site contains trapezes associated with the Late Mesolithic, so that the site could have been used over an extended period of time from the end of the Pleistocene to the Late Mesolithic (Bánffy E., *et al.*, 2007: 56; Eichmann W., *et al.*, 2010: 219-221).

Vázsony Basin (8) – This area north of lake Balaton has produced 5 potentially Mesolithic sites, 2 of which are listed separately here as Neolithic (Mencshely and Vöröstó). The other 3 are Nagyvázsony-Csapás, Nagyvázsony-Egervíz and Ragonya. It has been suggested that the sites of Mencshely and Vöröstó could be later than the Mesolithic (Bánffy E., *et al.*, 2007: 56; Eichmann W., *et al*., 2010: 227), which highlights the difficulties of attributing dates to sites on typological grounds.

The five sites with lithic scatters in the Vázsony Basin are either Mesolithic, or acculturated Mesolithic, or Neolithic with a Mesolithic tradition. In all cases we need to assume a Mesolithic presence in the area. If the Neolithic farmers acquired the lithic technology from Mesolithic hunter-gatherers and maintained this tradition until the Keszthely Phase, this in itself is important information, suggesting also that hunting continued to be an important activity. The Formative and Initial LBK culture contained a more varied lithic tool-kit than the later LBK Culture (Bánffy E., 2004: 320-321).

Velika Pećina (19) – This cave site, 428 masl, 60 km north of Zagreb on the west flank of Plat Peak in the Ravna Gora Mountain has two chambers 8 and 10 m deep. The site was excavated from 1948-1970 and 16 strata were identified from the Palaeolithic and possibly extending into the Mesolithic (Komšo D., 2006: 78; Paunovic M. & Karavanic I., 1999: 401).

Vindija Pećina (20)– This cave site is located 55 km north of Zagreb and 2 km west of the village of Donja Voca, in a narrow gorge on the south-west slope of Kriznjakov Vrh in the Ravna Gora Mountains at 275 masl. The cave entrance is 28 m wide, 20 m high and its depth is 50 m. The cave has been excavated several times between 1928 and 1994, at first intermittently between 1928-1958 by S. Vukovic, and subsequently under M. Malez between 1974-1986. Whilst most of the occupational levels are pre-Holocene, there is possibly a Mesolithic component (Komšo D., 2006: 78; Paunovic M. & Karavanic I., 1999: 402-403).

I. Karavanić (1995: 23) states that "*According to Malez and Rukavina (1979), the stratigraphic complex of Vindija Cave (see Figure 2, above) spans a continuous time sequence from the Riss glaciation to the Holocene. It includes Paleolithic (Mousterian, Aurignacian, Gravettian, Late Gravettian, and final Gravettian/Epigravettian), Neolithic, Eneolithic, Bronze Age, and Roman levels*". It is therefore unlikely that that there is any evidence of the Mesolithic-Neolithic Transition in this cave-site.

<u>Eastern Balkan Peninsula – Hungarian Transdanubia and Eastern Slovenia – Initial and Early Neolithic sites – Introduction</u>

There are some 29 confirmed Starčevo sites now identified in Hungarian Transdanubia, 11 of which are in the south-east corner between the Rivers Danube and Drava (Bánffy E., 2013b: 40). This is a much lower density than is found in the Srem Region of Northern Serbia, or Eastern Croatia to the south-west between the Drava and Sava Rivers, and far fewer when compared to over 1000 Körös sites known west of the Danube in the Alföld, of which some 400 are on the Great Hungarian Plain, an area of comparable size to Transdanubia (Bánffy E., *et al*., 2007: 223; Kalicz N., 2010).

The first Neolithic sites in Northern Serbia and the Transdanubia Region are dated no earlier than *ca*. 5700-5600 BC (Kalicz N., 2010). "*The Starčevo occupation was quite dense, especially in the Kapos Valley. The recent identification of sites in areas, which in the Neolithic were covered by marshland and on islets in the former marshland along Lake Balaton indicate that these farmers of southern origin were capable of adapting to strikingly different environments. The settlements at Vörs-Máriaasszonys-Ziget (Kalicz et al., 1998; Kalicz et al., 2002) and Tihany–Apáti (Regenye in press) reflect this different type of adaptation*" (Bánffy E., *et al.*, 2007: 59). The earliest Neolithic sites are all on the lowest terraces or river banks, suggesting a continuation of the Starčevo-Körös tradition in the choice of site location, as well as fishing, water-fowling, collecting and hunting, but not agriculture (Bánffy E., 2008: 154). The evidence for agriculture is limited to a few grains at the water-edge sites of Kéthely, Zánka-Vasútállomás, Balaton-Szentgyörgy, Tapolca-Plébániakert and Adorjánháza, suggesting it was horticulture between the houses or on the limited land available on the rise on which the settlement was built. Within a few generations, the settlements had moved to higher terraces more favourable to agriculture (Bánffy E., 2004: 322-334).

The Starčevo sites in Transdanubia tend to be smaller than further south, and the impression is one of infiltration and mixing with the autochthonous population. The reasons that have been advanced for the halt in the northward expansion of the Neolithic are (Kalicz N., *et al*., 1998):

1. A blocking Mesolithic population in a line east-west of Lake Balaton;
2. Climatic factors north of Lake Balaton;
3. Unfavourable environment resulting from climatic, geographic and hydrographic factors, creating more exposed ecological factors (the CEA AEB).

The pause in the Neolithic expansion allowed the Mesolithic population to the north time to adapt to the Neolithic technical and economic lifeways, without integrating demographically or culturally into the Balkan Neolithic culture originating from the Mediterranean.

Several sites with Starčevo pottery are on the water's edge in marshy areas (Vörs, Tihany, Zalavár, Sármellék, and Rezi). These sites are in areas which hunter-gatherers would have selected, rather than loess arable plateaux, and the pottery at these sites exhibit ornaments alien to the Starčevo Culture. There are also two phases to the Early LBK discernible after 5500 BC: a Formation phase and a subsequent 'Earliest' LBK phase. The sites were situated some distance from the current shoreline of Lake Balaton, but alongside the mid 6th millennium shoreline (Fig. R12-2). They are often close to the Late Starčevo sites, and there was a fusion in this habitat more suitable to the hunter-gatherer lifestyle. During several generations of this 'formation' phase there is ambiguity as to whether the life-way was primarily hunter-gatherer or agricultural (Bánffy E. & Sümegi P., 2011: 234-235; Oross K. & Bánffy E., 2009).

The lithic industry of the Formative and Early LBK of Transdanubia (and other regions further east and north) contain microliths and trapezes, which are a continuation of the Mesolithic tradition, "*The stone tools from the early Linear Pottery sites in Hungary are microliths, with the trapezoidal blades resembling those of the late Mesolithic*". The Early LBK (formative phase) has a more varied lithic tool kit than the later Keszthely Phase (which had a more humble assemblage made up essentially of end scrapers and sickle-blades), resembling that of the Late Mesolithic, suggesting that the economy was based on a wider range of activities including hunting, fishing and collecting. The simpler tool-kit appears at about the time the settlements abandoned the lacustrine and marshland environment, moving onto higher ground on loess land, and the economy became based primarily on agriculture, so that the more complex tool-kit was no longer required. (Bánffy E., 2004: 348-349).

The cult figures found at Kéthely (Early LBK site some 5 km south of the western end of Lake Balaton, which would have been on a rise near the lakeshore at the time) and that of Balatonszentgyörgy (1-2 km south of the western tip of Lake Balaton, but also on the lake-shore at the time) suggest that Starčevo cult devices were copied by local people. This poor copying and assimilation of eastern and/or southern cult devises (human figurines with coffee bean / cowry shell eyes and animal representations as found at the Formative LBK site of Szentgyörgyvölgy-Pityerdomb) by indigenous people, helped bridge the gap in beliefs and created syncretised belief systems (Bánffy E., 2005: 380-381) during the many centuries that the Transition appears to have lasted in this frontier zone, when Starčevo and Formative LBK sites would have been coeval within the region (Kalicz N., 2005).

<u>Eastern Balkan Peninsula – Hungarian Transdanubia and Eastern Slovenia – Initial and Early Neolithic sites – Site details</u>

Alsónyék-Bátaszék (31) – This is the largest and most significant Starčevo site known in Transdanubia, which is located some 25 km north of the Serbian border on the right bank of the Danube. An extensive archaeological excavation was undertaken between 2006-2009, when over 400 features were uncovered (Bánffy E., *et al.*, 2010; Bánffy E., 2013b: 40).

Aszófő (10) – This is an Early Neolithic site 2 km north of the site of Tihany, on the north shore of Lake Balaton, at which only two sherds were found (or at least in the archaeological collection of the Veszprém museum), which appear to be early types. The location suggests a connection with the site of Tihany, and has been described as a Starčevo site which did not survive (Regenye J., 2010: 61-62).

Balatonfüred-Arács (6) – This site is 6 km north-west of Tihany in the valley of the Koloska Stream. In 1980 pieces of two pots came to light in a Roman burial, similar to those found at Tihany. The site is at the gate of the valley, above the marshy mouth of the stream, on the communication route towards

the Szentgál radiolarite extraction sites, and has been described as a Starčevo outpost site which did not survive (Regenye J., 2010: 62).

Balatonlelle (13) – This Starčevo site lies half way along the south bank of Lake Balaton near the village of the same name, close to wetlands.

Balatonszárszó-Kis-erdei-dűlő (12) – During the construction of the motorway running along the south shore of Lake Balaton, some 50 LBK longhouses were uncovered at the site of Balatonszárszó-Kis-erdei-dűlő, which were established ca. 5350 BC "*a few generations after the formative phase of the LBK*" and occupied through the Late LBK (Bánffy E., 2013a: 133).

Dombóvár-Kapospart (27) – This is a Transdanubian Starčevo site in the town of Dombóvár next to the Kapos River wetlands (Eichmann W., *et al*., 2010: 227).

Gellénháza-Városrét (16) – This is a contact zone site in Western Transdanubia, west of Lake Balaton, south by south-east of Zogloegerselg and east by north-east of Zalar to the south. The site has multiple chronological horizons, the earliest one being Late Starčevo Spiraloid (Bánffy E., *et al*., 2007).

The chipped stone assemblage is 77.5% radiolarite from the Bakony Mountains. Of the 431 pieces, 33 are cores, 195 flakes, 75 blades and 44 retouched tools, which include points, borers, burins, wedges, end-scrapers, trapezes and segments without the presence of the microburin technique, although, according to R. Kertész (1996, 2001, 2002), this is present in the Mesolithic of North-Central Hungary (Biro K., 2007; Eichmann W., 2004: 179).

Given the almost total lack of trapezes from the hundreds of Starčevo sites in ex-Yugoslavia, the argument in favour of cultural transfer from the local Mesolithic is strong.

Maroslele Pana (not on distribution map) – This Early Neolithic site is located north of the Serbian-Romanian border in the Banat, east of the Danube. It is included here because of its early date, but more importantly because of the Mesolithic skull found in association with burials at a Körös site. It might not be a coincidence that the site is within some 25 km of the Serbian Mesolithic site of Noszja-Pörös.

"*The site lies approximately 3 km northwest of Maroslele and 10 km northeast of the mouth of the Tisza–Maros rivers. The area has long been the subject of archaeological research; Ottó Frogmayer excavated settlement features and objects of the Early Neolithic Körös culture in this area*". The Early Neolithic Körös excavations took place in 1963 (Paluch T., 2013: 203). The site is at the top of a hill at 46°17'00.7" N, 20°18'05.0"E. Excavated in 1963 by O. Trogmeyer over an area of 300 m^2.

The Mesolithic skull, identified as Burial 7 has been dated to (Borić D., 2005c):

- OxA- X-922-30 7680±70BP = 6644-6430 BC (OxCal 4.2 at 95.4%) – Median 6535 BC.

The next oldest dates for the site are:

- OxA-9399 6965±50BP = 5926-5736 BC (OxCal 4.2 at 85.2%), Burial 1 – Median 5830 BC.
- OxA-205 6845±50BP = 5838-5643 BC (OxCal 4.2 at 95.4%), Burial 3 – Median 5740 BC.
- OxA-9400 6740±50BP = 5730-5607 BC (OxCal 4.2 at 86.7%), Burial 3 – Median 5670 BC.
- OxA-9401 6780±50BP = 5752-5617 BC (OxCal 4.2 at 95.4%), Burial 5 – Median 5685 BC.

Since the dates from the site indicate an Early Neolithic occupation, the lone skull date may be an outlier, so far as the date is concerned. It could however also be a relic or heirloom of the group that settled the site sometime around 6000 BC or shortly after. It should also be noted that the two undated skeletons were interred in a supine position which is a Mesolithic attribute (Fig. R12-6). The implication is that they originated in a Mesolithic context, and we could be facing a mixed group of immigrant farmers and converted local hunter-gatherers, or a late group of hunter-gatherers, who buried the skull (Borić D., 2005c).

Medina (26) – This is a Starčevo Site in Transdanubia close to wetlands (Eichmann W., *et al*., 2010: 227).

Mencshely (9) – This Transition site near the village of the same name is in the Vázsony Basin north of Lake Balaton. The site is an Initial and Late LBK site with a Mesolithic stone assemblage at the base in the Formative LBK Level (Bánffy E., 2000: 183, Fig. 15).

E. Bánffy (2006: 132) describes the site as follows: "*The rich lithic assemblage found near Vöröstó and Mencshely, two Linear Pottery sites in the Vázsony basin by the northern shore of Lake Balaton, is in the late Mesolithic Tardenoisien microlithic tradition. A closer examination of the stone artefacts reveal traces of sickle gloss on a few samples. There are two possible explanations: the sickle gloss can be attributed to their use in Mesolithic horticulture, or the lithics came from an early Linear Pottery settlement preceding the occupation in the classical phase (Biro 2001; 2002b). An interesting observation is that the disappearance of this tool-kit coincided with changes in settlement patterns and subsistence at the beginning of the developed Transdanubian LBK, the Keszthely phase – the very period when the occupants of the Transdanubian settlements began to use the more simple range of tools generally characterizing Linear Pottery cultures, restricted to sickle blades and a few other types (Biro 1991; 2001; 2002a; 2002b)*".

The chipped stone assemblage is 94.5% manufactured of radiolarite from the Bakony Mountains (Fig. R12-7). Of the 865 pieces, 138 are cores, 434 flakes, 190 blades and 71 retouched tools (Biro K., 2007).

Regöly-1 (29) – This Starčevo and Early LBK site is on a small rise on the Koppány flood plain south of Lake Balaton. Other Neolithic sites have also been discovered suggesting the flood plain was stable after *ca*. 5600 BC (Eichmann W., *et al.*, 2010: 219).

The Mesolithic sites found nearby (Regöly-2 and Kaposhomok) suggest continuity in the occupation of wetlands by human groups between the Mesolithic and the Neolithic.

Resnik Canal (33) – Early Neolithic site close to the Slovene capital Ljubljana and the Mesolithic site of Breg.

Sármellék I & II (15) – These are two Starčevo sites are at western end of Lake Balaton.

Szentgyörgyvölgy-Pityerdomb (18) – This Early Neolithic Formative LBK site some 90 km west of Lake Balaton in the Kerka Valley, close to the Slovenian border, is the most westerly Starčevo / Formative LBK site known in Transdanubia. Out of 12 LBK sites discovered during surveys in the Kerka valley, it is the one that was chosen for excavation (Bánffy E., 2004). It was occupied for about 120 years between 5480-5360 BC, and E. Bánffy, who excavated it in the 1990s, brought to light two Formative LBK longhouses 33 m apart (Fig. R12-8), occupied simultaneously; these are the only structural remains discovered for this period, and their shape and orientation are purported to emanate from the local Mesolithic tradition (Bánffy E., 2000, 2004: 69-71, 2005, 2013; Bánffy E. & Oross K., 2010; Barttosiewicz L., 2005), which is also visible at a Mesolithic site in Bavaria (Bánffy E., 2005: 378). The dates for this site are (Bánffy E. 2004: 299-309):

- VERA-209 6420±35BP = 5473-5329 BC (OxCal 4.2 at 95.4%), on charcoal Feature 17 – Median 5400 BC.
- VERA-216 6420±40BP = 5473-5326 BC (OxCal 4.2 at 95.4%), on charcoal Feature 17 – Median 5400 BC.
- VERA-215 6475±40BP = 5516-5354 BC (OxCal 4.2 at 95.4%), on charcoal Feature 18 – Median 5435 BC.
- VERA-218 6610±40BP = 5619- 5488 BC (OxCal 4.2 at 95.4%), on charcoal Feature 18 – Median 5555 BC.

- VERA-213 6415±40BP = 5474-5325 BC (OxCal 4.2 at 95.4%), on charcoal Feature 19 – Median 5400 BC
- VERA-214 6380±35BP = 5469-5370 BC (OxCal 4.2 at 95.4%), on charcoal Feature 19 – Median 5420 BC.
- VERA-217 6450±45BP = 5483-5329 BC (OxCal 4.2 at 95.4%), on charcoal Feature 19 – Median 5405 BC.
- VERA-219 6390±50BP = 5478-5298 BC (OxCal 4.2 at 95.4%), on charcoal Feature 19 – Median 5390 BC.
- VERA-212 6475±40BP = 5516-5357 BC (OxCal 4.2 at 95.4%), on charcoal Feature 9 – Median 5435 BC.
- VERA-210 6425±35BP = 5474-5330 BC (OxCal 4.2 at 95.4%), on charcoal Feature 21 – Median 5400 BC.

Due to the acidity of the soil, no osseous material was preserved.

The LBK ceramic style is present but weak, whilst most of the characteristics on the diagnostic pieces have affinities with the Starčevo culture (Barttosiewicz L., 2005; Kemenczei T., 2005), including the pottery figure of what is possibly a bovine (Fig. R12-8).

The pollen record and plant remains suggest that horticulture rather than agriculture was practiced (Kemenczei T., 2005).

The chipped stone assemblage is 93% radiolarite from the Bakony Mountains, distant 180-190 km, which arrived as cores, although there are sources of raw material closer to hand. Of the 710 pieces, there are 52 cores, 383 flakes, 111 blades and 114 retouched tools (Bíro K., 2007), which show evidence of the Mesolithic tradition (Kalicz N., 2005), with a high incidence of microlithic flakes and scrapers (Fig. R12-8) (Bánffy E., 2004).

E. Bánffy (2004) compared the site to the Starčevo settlement of Gellénháza-Városrét 45 km away, half way to Lake Balaton, where the Early Neolithic site used the same raw material and where the debitage was similar. The same author describes the site as a "*niche in which a group of people with a true Balkan origin settled down and integrated with the local population*" (Bánffy E., 2008).

This well-excavated and published site appears to have been established between 5500-5400 BC, incorporating the LBK longhouse construction, whilst including a strong element of Mesolithic tradition in the lithic debitage elements, suggesting the incorporation of elements of the autochthonous population.

Tihany-Apáti (11) – This is a Late Starčevo site on the peninsula on the north shore of Lake Balaton (Fig. R12-9) with Spiraloid B pottery (Bánffy E., *et al.*, 2007). Only 7 pieces of chipped stone are listed (One flake, 3 blades, 2 retouched tools and 1 core), which are all of Bakony Mountains radiolarite (Biró K., 2007), attesting probable contact with the Mesolithic extractors of this raw material.

Vöröstó (7) – This site, near the village of the same name is in the Vázsony Basin north of Lake Balaton, was occupied during the Formative and Late LBK phases. There is however a Mesolithic stone assemblage of Late Mesolithic tradition at the base in the Formative LBK Level (Bánffy E., 2000: 183).

E. Bánffy (2006: 132) has specified that "*the rich lithic assemblage found near Vöröstó and Mencshely, two Linear Pottery sites in the Vázsony basin by the northern shore of Lake Balaton, is in the late Mesolithic Tardenoisien microlithic tradition. A closer examination of the stone artefacts reveal traces of sickle gloss on a few samples. There are two possible explanations: the sickle gloss can be attributed to their use in Mesolithic horticulture, or the lithics came from an early Linear Pottery settlement preceding the occupation in the classical phase (Biro 2001; 2002b). An interesting observation is that the disappearance of this tool-kit coincided with changes in settlement patterns and subsistence at the beginning of the developed Transdanubian LBK, the Keszthely phase – the very period when the occupants of the Transdanubian settlements began to use the more simple range of*

tools generally characterizing Linear Pottery cultures, restricted to sickle blades and a few other types (Biro 1991; 2001; 2002a; 2002b)".

Vörs-Máriaasszony-Sziget (24) – This is a Starčevo site at the south-western tip of Lake Balaton, with affinities with the regional Mesolithic populations, and characteristics in its lithic and pottery assemblages which connect it to the development of the LBK.

The chipped stone assemblage is 77% Bakony Mountains radiolarite; of the 124 pieces, 32 are flakes, 19 blades and 35 retouched tools (Biró K., 2007), and W. Eichmann (2004: 179) who suggests a date for the site of ca. 5550-5300 BC, states that "*Vörs-Máriaasszony-sziget is dominated by raw materials from the Bakony Mountains with primarily flakes and chips with blades present in lower numbers. The high proportion of retouched tools and overall low number of cores, as a proportion of the overall assemblage, suggest that the inhabitants either processed the materials off-site, or acquired the materials in processed form through trade. In this sense the Vörs-Máriaasszony-sziget differs from the Gellénháza-Városrét site where a more direct connection with the same raw material sources is implicated. The tool kit is described as "fairly varied" and the following items are mentioned amongst the inventory of retouched tools: end scrapers, segments, burins, but no "classical trapezes." There is no mention of the microburin technique, recognized at Mesolithic sites in north central Hungary (Kertész 1996b, 2001, 2002), at either Gellénháza-Városrét or Vörs-Máriaasszony-sziget*".

The pottery from this site has close affinities with that of the Starčevo culture further south between the Drava and Sava Rivers, whilst also containing "*new features present in the pottery that turned out to be main characteristics of the Oldest Linearband Pottery culture evolving later to the north of the frontier zone*" (Kalicz N., *et* al., 1998: 167-168).

<u>Eastern Balkan Peninsula – Hungarian Transdanubia and Eastern Slovenia – Conclusions</u>

This Region, north of the Central Balkans where the Starčevo Culture reached its most northerly extension *ca*. 5700-5600 BC has produced rich and growing evidence for an autochthonous Mesolithic presence, both to the north and south of the CEB AEB divide, which interacted with the Starčevo groups that infiltrated their territory. The Starčevo sites, which are situated primarily south of the Lake Balaton and the CEB AEB boundary, are often close to wetlands rich in aquatic and terrestrial plant resources as well as wild fauna, on land suitable at best for horticulture, but not agriculture. "*The late Mesolithic settlements and their occupants appear to have played a major role in the transformation of the terminal Starčevo culture*" (Oross K. & Bánffy E., 2009: 177). The arboreal pollen of Hazel is at its highest before the advent of the Starčevo Culture *ca.* 5600 BC, when hazel expanded on the shores of Lake Balaton and the Little Balaton Region, so that it represented 50-55% of the arboreal vegetation (Bánffy E., 2005: 382, 2007a), after which it declines in favour of cereal pollens, which is an indication that hazel was 'harvested' during the Mesolithic (Bánffy E., 2004: 322). Plant management can thus be postulated for the Late Mesolithic, making these people amenable to horticulture and agriculture.

The chipped stone industry at these sites is manufactured primarily of radiolarite from the Bakony Mountains to the north, extracted in a region devoid of Starčevo sites, strongly suggesting contact and exchange with the Mesolithic population, who had already been extracting the radiolarite for millennia and exchanging it over an area extending several hundreds of kilometres from its source. The lithics at the Starčevo sites contain a recognisable element of Mesolithic technology, suggesting that the two cultures merged over a period of several generations, developing a type of pottery containing elements of the Starčevo culture as well as new elements, which become more accentuated in the formative stages of the LBK culture which evolved in this Region. If the Neolithic farmers acquired the lithic technology from Mesolithic hunter-gatherers and maintained this tradition until the Keszthely Phase, this in itself is important information, suggesting also that hunting continued to be

an important activity. The Formative and Initial LBK culture contained a more varied lithic tool-kit than the later LBK (Bánffy E., 2004: 320-321, 2007a).

The earliest Formative LBK Culture sites, which evolved starting *ca*. 5550 BC, are contemporaneous with the last Starčevo sites, at a time when the Mesolithic sites appear to disappear. "*this phase reflected intense cultural influences from the Starčevo culture, especially in pottery (Bánffy 2004, 2009), while at the same time harking back to Mesolithic traditions regarding the lithic tool-kit and settlement patterns (Biró 2001, 2002, 2005; Mateiciucová 2008a, 2008b)... The blend of Balkan and local traditions, as well as the settlement patterns and subsistence strategies seemed to indicate that the eventual outcome of the encounter between the marginal Starčevo groups migrating to the marshland areas of Lake Balaton and the local forager groups was uncertain: it was by no means a settled issue whether the newcomers would assimilate the locals or whether the first farmers would revert to hunting and fishing, exploiting the diverse resources offered by the wetland habitats (Oross and Bánffy 2009)*" (Bánffy E., 2013a: 129). The Formative and Earliest LBK sites thus continue the tradition of being located close to water in wetlands, where horticulture was practiced, as evidenced by the wide range of cultivated species, but without evidence for a subsistence based on agriculture. It would thus appear that the Starčevo groups arriving in Transdanubia adapted to the new cool and wet climatic environment in wetlands by diversifying their economy, whilst their crops also adapted to this new environment, and at the same time, the autochthonous population adopted cultivation, animal husbandry and other Neolithic attributed, which the site of Pityerdomb suggests took place over several generations (Bánffy E., 2004: 349). Other Transition sites are mentioned by E. Bánffy (2008), who states that "*at some sites, different proportions of the mixture of local and Balkan populations can be observed; sites such as Révfülöp, Balatonszentgyörgy or Balatonszepezd represent local late Mesolithic groups adopting some southern Balkans customs*".

S. Rigaud (2011: 317), in her European wide study of body ornaments over the Transition, also suggests that the changes in personal ornaments during the Transition and the Formative LBK were the consequence of the integration of the Mesolithic and Starčevo communities.

"*In Transdanubia, the beginnings of intensive agriculture did not coincide with the beginnings of the Neolithic; agriculture emerged some generations later, as is reflected in the settling on the higher river terraces and hillsides where good loess soil was located.*" (Bánffy E., 2008: 156). The Formative and Earliest LBK sites also continue to contain Mesolithic elements in their lithic technology, and the pottery continues to evolve from Late Starčevo towards typical LBK. This suggests that many aspects of the Mesolithic lifeways as regards subsistence continued, *"complemented by certain elements of the Neolithic package brought here by migrant late Starčevo groups*" (Oross K. & Bánffy E., 2009: 175). It is only on the advent of the Classical LBK, after 5300 BC, that the "*location of the sites indicates that they no longer lay directly by the lakeshore, but slightly higher, on terraces and hills overlooking rivers and lakes, and that fertile loessy areas, river and stream valleys and their lower terraces were chosen for settlement. This would suggest that in Transdanubia the major change in lifeways and subsistence patterns occurred not at the beginning of the Neolithic, as earlier believed, but some three or four generations later*" (Bánffy E., *et al*., 2007: 59). "*New evidence from 53rd century BC sites such as Balatonszárszó-Kis-erdei-dűlő reflects fundamental changes in the size and layout of settlements, as well as in subsistence strategies*" (Oross K. & Bánffy E., 2009: 175).

As has also been noted by S. Hansen (2001), figural representations are only found in the Formative and Earliest LBK sites, after which they disappear, suggesting the supremacy of the Mesolithic contribution to beliefs and customs (Bánffy E. 2008: 158).

It would therefore seem that the acculturation of the last hunter-gatherers of Transdanubia occurred peacefully over several generations in a context in which they integrated with the Late Starčevo migrants, and that out of this merging evolved the LBK Culture.

Regions 13 & 14 – Eastern Adriatic –Introduction

(Maps MR1 and MR2)

Regions and geography

This Macro-Region encompasses the eastern seaboard of the Ionian and Adriatic Seas. From the landward point of view, it is bounded by the western watershed of the mountain ranges forming the backbone of the Balkans – the Pindus mountain range in the south-east and the Dinaric Alps in the north-west.

The Area has been split into the two following Regions:

- Region 13 – North-Western Greece and Albania where research is maturing and ongoing.
- Region 14 – Western Montenegro, Western Bosnia and Herzegovina, and Western Croatia. Research is in full flood in Croatia, but limited in the other two countries.

Documentary research is rendered complicated by the language barrier, but research over the last two decades benefits from either being published in English, or from extensive summaries in English. The archaeologists whom we have met all spoke a Western European language, which facilitated communication, and were all extremely helpful with information and documentation.

The geography of the Area is varied and is dealt with in more detail in the regional chapters. In the south-east, a wide coastal strip runs north from the Gulf of Corinth, narrowing close to the Albanian border, before widening out again in Albania, where it is marked by a coastal range in the south and wide river valleys going into the interior. North-south land communication in Region 13 did not pose any particular problems during the Early Holocene, when the coastal strip would have been wider than at present, and relatively easy passes led to the interior of Albania into Northern Greece, the Republic of Macedonia and the Central Balkans. The Montenegrin coast is mostly steep-to, but marked by bays and deep indentations with plains and lakes behind the coastal range, becoming steep-to in the north-west where the Dalmatian coast begins; coastal contact with the Central Balkans in Montenegro is over two easy passes to Plužine (Odmut Cave), from where the River Piva, as part of the Drina River System, cuts through a deep gorge in the Dinaric Range on its way to join the Drina, which in turn flows into the River Sava (Fig. R10-3). The Dalmatian coast is mostly steep to, dropping abruptly, so that the coastline today is relatively unchanged over the more difficult stretches. The coast is lined with a string of islands, many of which were connected to the mainland during the LGM. At the southern end, the Pelješac Peninsula and the near-coastal islands of Korčula, Hvar and Brač form a whole, facing 150 km of inhospitable coastline, rendering land communication difficult north-west to the small plain close to Split, after which the coast becomes once again difficult for land communication for some 50 km, until to the wide plains and plateaus of Ravni Kotari between Šibenik and Zadar. North of Ravni Kotari the coast becomes once more impracticable for over 200 km until the Istrian Peninsula, where most of the large islands in the Kvarner Bay between Istria and the mainland to the east, Krk, Cres, Lošinj and Rab were connected to the mainland during the Early Holocene. Land access to the Istrian Peninsula from the east, is made difficult due to the steep coastal range which drops abruptly into the sea. Finally, the tip of the Istrian peninsula would have been a couple of km further out to sea at the time of the Initial Neolithic (Komšo D., *et al*., 2008: 130-131).

Climate and environment

During the Late Pleistocene herd ungulates became rare, as the coastal plains disappeared under the marine transgression, and in the Early Holocene these disappeared with the expanding mixed Mediterranean forest cover. The sea-level has been estimated at 50 m below current levels at the onset of the Holocene and 10 m below current levels ca. 6000 BC (Fig. Intro-1) (Komšo D., 2006: 79). B. Bass (1998) states that the island vegetation would have been predominantly *Juniperus-Phillyrea*

forest, whilst the vegetable macrorests from the 1996 excavations at Grapčeva Špilja on the Island of Hvar suggest that during the Neolithic the vegetation cover on the Island included oak, pine, almond, juniper and cypress (Borojević K., 1999-2000); D. Mlekuž (2003: 143) describes the changing vegetation as follows "*during the early Holocene the east Adriatic was covered with open woodland. Deciduous trees, mostly oak, predominated in these forests. Although evergreen species were present in the coastal regions, they remained of minor importance until about 6400-6000 BC, with the transition to a Mediterranean type of climate (Beug 1961; Brande 1989; summary in Chapman et al. 1996). There was a vegetational gradient from the Mediterranean type along the coast to a sub-Mediterranean in the uplands and a continental one inland (Brande 1989). In the northern Adriatic (Istria and Karst) the woodland included thermophiluous trees as well as more cold-tolerant species; evergreen species were never as important as in southern Dalmatia (Beug 1977; Culibert 1995; Andrič 2001)*". The Holocene forest cover was able to supply a wide range of nutritious vegetation and became the home of deer and wild boar, as well as small fauna. Reliance on the hunt for protein became problematical and the Mesolithic populations of the region adapted by broadening their resource base, and developed new hunting, fishing and collecting techniques.

Along the Ionian Sea coast of Greece and Albania, there is suitable lands for agriculture, whilst along the Adriatic coast, other than the plains and Plateaus of Ravni Kotari in the Central Sector, and the flysch lands at the southern end of the Istrian peninsula, there is little scope for agriculture, and according to the archaeological record, much of the Early Neolithic economic presence in the unfavourable terrain in between appears to focus on animal husbandry.

Early human presence and navigation

The Middle and Upper Palaeolithic human presence is attested at several sites along the entire length of the two Regions (Galaty M., 2006; Vujević D., 2013: pers. com.) except in the southernmost section south of the Gulf of Ambrakia. There is no evidence for the exploitation of marine resources, or of navigation, during the Glacial and post-Glacial, when subsistence strategies were focussed on terrestrial resources, with equids, bovines and cervids, and the known sites tending to be about 25 km from the coastline of the time. During the Pleistocene Post-Glacial the sea rose some 80 metres, drowning the coastal plain and valleys between the now-islands, where large game had roamed previously. At the same time the Mediterranean vegetation and climate developed as we know it (the denudation of the landscape is a recent anthropic-driven event). Navigation in the Mesolithic is attested by a pierced Columbella shell found on Palagruža island, since such pierced shells were not used in the Neolithic, and a gabrodiorite stone object, most probably from the same island (or from Jabuka or Brusnik islets) found with burial N° 2 at Vela Spila on Korčula, dated *ca*. 6900 BC; fish remains at Vela Špilja on the Island of Korčula, Vlakno Špilja on the Island of Dugi and Kopačina Špilja on the Island of Brač also attest to navigation (Radić D., 2008: 13, 15). To this list can be added a Gargano flint bell-axe found in a Mesolithic context at Markova Špilja on the Island of Hvar (Marijanović B., 2013: pers. com.), which would confirm Late Mesolithic navigation across the Adriatic.

Navigation increased during the Neolithic, both along the coast and across the Adriatic, transporting the Impressed Ware culture with Neolithic migrants, so that the culture developed synchronically on both shores.

Early Holocene human presence is well attested throughout the two regions and as B. Marijanović (2007) has pointed out for the Croatian coast, all of the sites connected with the very beginning of the Neolithic/Transition are in caves on the Eastern Adriatic, which were mostly in use in prior periods and continued in use during the Neolithic, and all the sites are characterised by rugged terrain. At these sites the lithic tradition is Mesolithic, except for Vela Spila on the Island of Korčula. Wild fauna predominates, indicating Mesolithic traditions, and hunting continues during the Neolithic. There is no evidence for agriculture in this infertile hilly, karst region with little cultivatable land. The stratigraphic depths are often small, suggesting small communities with mobility continuing from the

Mesolithic. The early open-air Neolithic sites are in flat-lands, near water with agricultural land to hand, in which domesticated animals predominate so that stock-breeding takes precedence over hunting, whilst the collection of marine molluscs constinues to be an important activity.

Funerary practices

The evidence for funerary practices during the Mesolithic is restricted to a few cave sites, and there appears to be none covering the Transition. A Neolithic burial at Crno Vrilo in the central sector, dating from the end of the occupation *ca.* 5400 BC, is in a typical crouched Neolithic position.

Lithics

During the Mesolithic, in line with most of the regions, there is an accentuation of the microlithisation of the lithics and the presence of geometrics of Sauveterrian tradition, followed in the Late Mesolithic by those of Castelnovian traditions. Many cave sites containing Neolithic attributes – primarily pottery and to a lesser extend domesticated animals – maintain Mesolithic lithic and economic traditions.

State of research

In Greece, there is not much prehistoric research on the Ionian Sea which is not driven by foreign universities. In Albania, research was dynamic under M. Korkuti during the communist rule, often with the collaboration of foreign universities, and this is continuing, albeit at a slower pace under the direction of the University at Tirana. Research in Montenegro has focussed on a few key sites, where foreign universities have often collaborated. In Croatia research is dynamic with strong prehistoric faculties at the universities of Zagreb and Zadar, and the director of the Pula Archaeological Museum also committed to Mesolithic, Transition and Neolithic field research, with foreign universities contributing to field research at several sites.

As D. Mlekuž, *et al*., (2008: 401) have noted, "*Current distributions of Mesolithic sites have been distorted by sea level rise during the early- to mid-Holocene, and the Mesolithic settlement pattern is biased in favour of upland caves throughout the Dinarides, while there is a selective field survey bias in favor of lowland, open-air Neolithic sites (Chapman, 1994). The dated archaeological records for the Mesolithic-Neolithic transition is thus an obviously biased sample, based mainly on cave stratigraphies*".

Comments

There is no evidence for Starčevo Neolithic migration across the Dinaric Range to the Eastern Adriatic, and little evidence for cultural contact. The consensus appears to be one of complex interaction between the Terminal Mesolithic population and The Neolithic migrants moving up the coast and across the Adriatic over an extended period of several centuries combining exchange networks and mobility. There is no evidence for conflictual interaction, so that immigration, acculturation and integration appear to be the outcome of the Transition.

"*Beyond the coastal strip in the Southern Adriatic and Albania, Impressed Ware and other innovations were introduced through contact between agricultural and hunter-gatherer groups. Radiocarbon dates suggest a piecemeal adoption of parts of the Neolithic package at Konispol cave, Odmut cave, Crvena Stijena Zelena Pećina, slightly after the initial spread of Impressed Ware up the Adriatic*" (Forenbaher S. & Miracle P., 2005: 523).

E. Lightfoot, *et al*., (2011: 83) in discussing the diet from the isotopic evidence of human remains at sites in Croatia indicate that this "*has shown that the Mesolithic–Neolithic transition cannot*

be seen as a simple dichotomy between people who used aquatic resources and people who did not. Naturally, some Neolithic coastal dwellers did exploit the sea. There is a growing consensus that we must go beyond the oppositional views of foragers versus farmers across the Mesolithic–Neolithic transition, since the archaeological evidence is showing diversity in patterns of behaviour related to material culture within and between regions".

S. Forenbaher and P. Miracle (2005; 2006) have explored the possible modes and the time frame for the Neolithic to travel up the eastern seaboard of the Adriatic. According to the archaeological record, it took 900 years for pottery to travel between Sidari in the south, where plain pottery is attested *ca*. 6500 BC, almost simultaneously with, or shortly after, its appearance in Thessaly, and the appearance *ca.* 5600 BC, of Vlaska / Vasi a Coppa pottery north of Istria in the Trieste and Slovenian Karst at the head of the Adriatic, a distance under 900 km. The slow uptake of Neolithic attributes by the Terminal Mesolithic population and the slow progression of the Neolithic migrants bearing the full Neolithic package can probably be attributed to a combination of factors, including the inhospitable terrain, the halting progress of a small number of Neolithic migrants up the coast, and the small number of Mesolithic groups available to take up the Neolithic attributes, and transmit these via contact and exchange.

Region 13 – Eastern Adriatic – North-Western Greece and Albania

(Map R13)

Eastern Adriatic – North-Western Greece and Albania – General introduction

This Region, to the south and west of the Pindus Range, stretches 450 km along the north shore of the western end of the Gulf of Corinth, up the Ionian coast to include Albanian on the Adriatic coast, as well as the islands in the Ionian Sea, some of which (e.g. Levkas) would have been attached to the mainland in the Early Holocene, or separated by narrow channels (e.g. Corfu). Geographically, Albania is a continuation of the Greek Aetolian, Acarnanian and Epirote landscape, with rivers coming down from the Pindus Range, wide coastal plains and extensive wetlands. The climate has always been more humid than Eastern Greece and the Peloponnese, although during the LGM and the Recent Dryas, the plains and lower slopes were arid, with pockets of deciduous trees at around 500 masl and pine forest above. With the advent of the Holocene, precipitation increased to *ca.* 600 mm a year, the deciduous forests spread at mid altitudes, with a Mediterranean-type maquis at lower levels (Rossignol-Strick M., 1998). With the increased precipitation and the spread of the forest cover, the equids and bovines migrated north, to be replaced by cervids and suids. The Palaeolithic sites of Grava on Corfu and Kastritsa, Klithi, Asprochaliko and Voïdomatis in Epirus were abandoned prior to the Holocene or shortly thereafter, possibly with the population moving down to littoral sites such as those found near Preveza, the Lower Acheron River on the Greek mainland or the regions of Butrint or Mallakastër in Albania. It should be noted however that there was already a Palaeolithic presence on the littoral during the Pleistocene.

There is scarce evidence for a Mesolithic presence in the southern part of this Region, and all the surveys have concentrated on the areas to the north of the Gulf of Ambrakia, with the town of Preveza at its mouth. The better known surveys in Greece are those conducted under C. Runnels in the region of Preveza and further north in the lower Acheron Basin (Runnels C., 2001; Runnels C. & Van Andel T., 2003) and those under A. Sordinas on the Ionian Islands.

In Albania the first surveys were conducted by L. Cardini in the 1930's during the Italian occupation (Francis K., 2005). During the post-war period until the fall of the dictatorial regime in Albania, archaeology had a strong political bias, with little emphasis on prehistory, although M. Korkuti kept the flame alive. The surveys conducted since the 1990s have been listed by O. Lafe (2006):

- 1995-1996 Butrint. Survey concentrated on the Korafit Hills south of the Byzantine port of Butrint;
- 1998-2003 Mallakastër Regional Archaeological Project (MRAP), in which 35 km^2 surveyed over 5 seasons. Full publication is awaited;
- 2001 Durrës Regional Archaeological project (DRAP);
- 2005 Shala Valley Project (SVP) In the Northern Albanian Alps;
- Post 2005 Korçë Basin Archaeological Survey Project (KOBAS) in Southeastern Albania, covering 86 km^2.

Whilst a large number of Mesolithic and Neolithic sites have been identified in the last quarter century, only Sidari on Corfu and Konispol Cave in Southern Albania are well excavated and published sites covering the Transition.

It is possible that with the arrival of Neolithic migrants in the region, the autochthonous populations moved down into the valleys, but this hypothesis, based on the fact that there appears to be little continuation of occupation of Mesolithic sites at any altitude, is unlikely to be substantiated due to the Neolithic and post-Neolithic sedimentation of the valley floors.

A number of Mesolithic sites in Albania for which details are lacking are listed below under 'Albanian Mesolithic sites'.

Eastern Adriatic – North-Western Greece and Albania – Surveys – Introduction

Some of the principle surveys that have been undertaken in this Region will be listed in geographical order from the south to the north. The sequence of surveys focussing on probable sites occupied by hunter-gatherer groups has been particularly successful in both Epirus and Southern and Central Albania. Surveys have not been conducted in the District of Shkodra in Northern Albania, with its large coastal plain and freshwater lake, which mirrors the conditions of the Fier District, and which, according to C. Runnels, *et al*., (2009: 177), should produce evidence of Mesolithic settlements, particularly since there is evidence of Mesolithic occupation in Montenegro to the north (Region 14). In Greece, the area south of Preveza with the wetlands and estuary of the Akhelóos/Achelous River has not been surveyed, and the same is true of the region north of Acheron River, where the Kalodiki wetlands, which resemble the environment in which the last hunter-gatherers would have lived, lie south of Igoumenitsa in North-Western Greece (Fig. R13-1).

Eastern Adriatic – North-Western Greece and Albania – Surveys – Details

The surveys below are listed in approximate geographical order from south to north:

The Regional Survey of Zakynthos in 1965 was conducted by A. Sordinas. No Mesolithic or Transition site was found on the island.

The Corfu Prehistoric Survey (45) was conducted by A. Sordinas between 1964 and 1966, during which he discovering the site of Sidari, which he excavated, as well as the Palaeolithic cave-site of Grava, which last would have been occupied at a time when Corfu was attached to the mainland.

The Higgs Palaeolithic Survey of Epirus (43) was undertaken between 1962-1964, during which he discovered and investigated the Palaeolithic sites of Asprochaliko and Kastritsa (Murray T., 2007: 489-490).

The Epirus Palaeolithic Survey (43) took place between 1987-1992.

The Preveza Regional Survey (54) was part of the 1991-1996 Nikopolis Project in Epirus, which covered the area from Preveza to the Acheron River, some 35 km to the north (Fig. R13-2). C. Runnels and T. van Andel (2003) reported on the find spots called 'site/scatters' dated to the Palaeolithic (4 sites for the Lower, 30 for the Middle and 6 for the Upper Palaeolithic) and the Mesolithic (6 sites). Three of the Mesolithic find spots were found near Preveza (2 at Alonaki Beach and 1 at Tsarlambas) and the other three in the area of Acheron River. No Mesolithic sites were found inland, suggesting that the base camps could have been close to the shore, and that these have disappeared subsequent to the eustatic sea-rise.

The Mesolithic of the region might have lasted into the 6th millennium BC, after which the area of the Nikopolis Survey appears to have become uninhabited, or at least become archaeologically invisible, until the Late Neolithic (Runnels C. & van Andel T., 2003: 123). This could possibly be due to malaria, which is known to have been prevalent in Roman times.

An accumulation of 65 flakes was also found, but not catalogued at the summit of Tourkovouni at the south-eastern tip of the Agios Thomas Peninsula to the east of Preveza. The only tool is a minute end scraper and the assemblage could possibly date to the Mesolithic, since it is comparable to similar tools from Sordinas's Mesolithic layer D at Sidari (Runnels C. & van Andel T., 2003: 121-122).

The Grevena Survey Project (29) begun in 2002. The findings are reported in Region 7.

N. Efstratiou, *et al*., (2006) have reported on a survey in the highland region above Grevena, near the village of Samarina, spread around the watershed between Epirus and Macedonia, where a large number of lithic scatters dating from the Palaeolithic to the Mesolithic have been found (Fig. R07-5). The authors believe that the area became less attractive to hunters towards the end of the Mesolithic with reforestation and the disappearance of herd herbivores. Occupation is again attested from the Late Neolithic, possibly related to pastoralism. The information therefore tells us nothing about the transition, whilst it does attest to a likely route for exchange, communication and contact between the Aegean and the Ionian/Adriatic sides of the Pindus Range.

The Acheron Valley Survey (50) was part of the 1991-1996 Nikopolis Project. Three Mesolithic find spots were identified (one at Loutsa, one at Tsouknida, and one at Ammoudia) (Figs. R13-1, R13-2 & R13-7) (Runnels C. & van Andel T. H., 2003).

L. Cardini undertook numerous surveys of cave-sites in Albania prior to 1940, when the country was under the control of Italy. He discovered sites such as Mursi, Shën Marinë and Xarë.

The Sarandë District (36) of Albania was the subject of research in the 1980s and 1990s under M. Korkuti, who investigated the caves of Shën Marinë and Konispol, the second of which was subsequently the subject of the first scientific excavations in Albania.

More recent surveys under I. Gjipali in the districts of Sarandë, Gjirokastër, Tepelenë and Vlorë produced new Palaeolithic sites and the following Mesolithic sites:

- **Butrint-Diaporit (35) –** District of Sarandë. Open-air sites typologically dated to the Middle and Upper Palaeolithic, as well as Mesolithic in this triangular lakeside area close to Butrint, between Lake Bufi to the south and Lake Butrint to the west and north. The area was also a quarry site for the production of flakes for tools.
- **Flimarë Cave** – Cave-site near the coast in the District of Vlorë.
- **Ksamil (33) –** Site in the District of Sarandë, typologically dated to the Middle, Upper Palaeolithic and Mesolithic.

Drinos Valley Survey (28) was conducted during 2002 in the District of Gjirokaster, some 50 km north-east of Sarandë District, in which Palaeolithic as well as the following Mesolithic sites were discovered:

- **Derviçan (24) –** Site close to the village of the same name in the Drinos valley (Fig. R13- 5) in the district of Gjirokastër, with flint quarries found nearby. The material has been typologically dated to the Upper Palaeolithic and Mesolithic.
- **Goranxi (25) –** Cave site in the Drinos valley, close to the village of the same name (Fig. R13-5) in the district of Gjirokaster.
- **Lazarat (23) –** Site near village of same name in Drinos valley in the district of Gjirokastër, with flint quarries nearby, which has been typologically dated to the Middle Palaeolithic and Mesolithic.

The Mallakastër Regional Archaeological Project (16) was conducted over 5 seasons between 1998 and 2003. This joint Albanian-University of Cincinnati survey focussed on 35 km^2 in the hinterland of Appolonia, in Fier District, near the coast in Central Albania. The survey focussed on the ridges north and north-west of the Vjosa River before it reaches the sea, where a total of 59 sites were recorded (Fig. R13-3) (Lafe O., 2006).

According to C. Runnels, *et al*., (2009) the extent of the survey represents about 10% of the estimated home range of a hunter-gatherer band, possibly 20 to 70 people strong, covering coastal, estuarine, wetlands, plains and hills. Their mobility would have allowed them to exploit the hills in the

summer, as well as the coastal areas, where migratory wildfowl and transhumant herds seeking winter fodder would have used the wetlands and coastal areas.

In the Early Holocene the landscape and biotope would have been different in that the sea-level was lower with a coastal plain which would have largely disappeared by the Early Neolithic. This loss of coastal plain has today been compensated by the rapid deposit of river-born sediments. The large herd herbivores (horse, bison, etc.) would already have been forced out of the region, to be replaced by fewer forest species (deer and wild boar). There would have been less alluvial sedimentation due to erosion, mostly the result of anthropic activities with the resulting river avulsion, deposited by rivers which today are in different locations. From the Early Holocene, the warmer and wetter climate would also have favoured the growth of thermophile forests, so that the Late Palaeolithic population would have had to adapt their land-use strategy, which is visible in their lithic industry, to take advantage of the greater diversity of plants, riverine and marine aquatic resources, probably using traps, nets, fishing lines, weirs, reed boats, fowling equipment, bows and arrows, etc. (Runnels C. *et al.*, 2009: 175)

Two Mesolithic sites were identified during the survey at Kryegjata B (Site Kr B S003), close to the coast, and possibly Rusinja (Site Kr B S046) further inland, both on anticlinal limestone ridges (Fig.R13-3). All the lithic artefacts were found on the uplands, since all remains in the valleys and plains will have been covered by the sedimentation, or eroded. A total of 3335 lithic artefacts were collected, of which 99% were Palaeolithic or Mesolithic. 1593 chipped stone pieces collected from survey tracts and 140 from excavation units at Kryegjata B were assigned to a cultural or chronological period based on the Bordes typology, raw material, patination, morphology, retouch, and size (Fig. R13-4). Palaeolithic material represents 30.9% and Mesolithic 67.6%, with the remaining 1.5% being Neolithic. The elevated position of the sites was not on land propitious to agriculture, but well positioned for spying out game on the wooded slopes and on the valley floor. The average size of the Palaeolithic lithic artefacts is double that of the Mesolithic, when the greatest length is rarely over 2 cm. Mesolithic types include scrapers, burins, perforators, truncations, notches, and geometrics (Fig. R13-4). There are many combination tools and geometrics, which are characteristic of the Mesolithic. The Late Palaeolithic microliths were often made using the microburin technique, whereas the Mesolithic ones were produced by retouching the edge of small flakes, segments of blades and irregular fragments, making them difficult to characterise. The Mesolithic lithics are rarely patinated and are often made of a different material. The excavations at Kryegjata B would indicate an Early as well as a Late Mesolithic occupation extending over some two millennia down to *ca*. 6000 BC (C. Runnels, *et al*., 2004).

Whilst the data does not tell us much about the Transition, it does confirm the presence of Mesolithic occupation of the area as well as some continuity into the Early Neolithic, and that there is now evidence that the western seaboard of the Southern Balkans was occupied from at least the region of Preveza going north. It also confirms the cultural affinities of the Albanian Mesolithic with the rest of the Southern Balkans.

The Vjola River Valley Survey (21) was conducted along this river which flows into the sea where the Mallakastra survey was conducted. It brought to light a number of Palaeolithic and Mesolithic sites both in caves and in the open (Gjipali I., 2006). This valley connects high up in the Pindus with other valleys, now in Greece, which would have facilitated contact between bands. N. Efstratiou, *et al.*, (2006) have reported on lithic scatters in the Grevena region of Greek Macedonia (Region 7), at the watershed between Epirus and the Aegean basin, which have been typologically dated from the Palaeolithic to the Holocene.

The Byzantine Butrint Project (41) was a joint Albanian-British survey undertaken between 1995-1996. The survey concentrating on the Korafit Hills and the adjacent Vrina Plain south of Butrint at the southern tip of Albania, in Sarandë District. The survey area is close to, and to the north-west of Konispol Cave. Some Palaeolithic and later finds were made (Lafe O., 2006).

Durrës Regional Archaeological Project (7) was undertaken in 2001. This coastal region in Central Albania was the subject of a joint Albanian and University of Cincinnati project, which focussed on 6 km^2 threatened by urban development. 29 sites were identified (Lafe O., 2006). During the 2002-2005 rescue excavations of archaic temples north of Durrës, material dated to the Palaeolithic and Mesolithic was found at Bisht Pallë close to Porto Romano (Gjipali I., 2006).

The Korçë Basin Archaeological Survey (10) was initiated in 2005 in South-East Albania, with a view to covering the 86 km^2 of the Korçë Basin (Gjipali I., 2006).

The Shala Valley Project in the Northern Albanian Alps began in 2001, but produced no Mesolithic sites (Gjipali I., 2006).

Eastern Adriatic – North-Western Greece and Albania – Mesolithic and Transition sites – Introduction

A large number of Mesolithic sites have been discovered Between Preveza and Central Albania during surveys, but only the open-air site of Sidari in Greece and the Albanian close-by cave-site of Konispol have been the subject of scientific excavations covering the Transition.

Eastern Adriatic – North-Western Greece and Albania – Mesolithic and Transition sites – Sites details

Albanian Mesolithic sites – We have listed here the Mesolithic sites for which only sparse details are available at this time in Albania, all of which are listed by I. Gjipali (2006), often without any details regarding the material found, on the basis of which the attribution is based:

- **Bisht Pallë (6) –** Coastal site in Central Albania in Durrës District, close to Porto Romano where material typologically dated to the Palaeolithic and Mesolithic was found.
- **Butrint / Diaporit (35) –** District of Sarandë. Open-air sites typologically dated to the Middle and Upper Palaeolithic, as well as the Mesolithic. The area covered is a triangular lakeside area close to Butrint, between Lake Bufi to the south and Lake Butrint to the west and north. It was also a quarry site for the production of flakes. The naturally spherical nodules were tested, flaked around the periphery and subsequently halved. The area has produced leaf-pointed tools of Mousterian and Levallois Palaeolithic industries. The later Palaeolithic tools of the Early Upper Palaeolithic are reminiscent of Asprochaliko. This open-air site should be excavated.
- **Çorraj (21a) –** District of Sarandë. Mesolithic scatter on hilltop.
- **Derviçan (24) –** Site close to the village of the same name in the Drinos valley in the district of Gjirokastër (Fig. R13-5), with flint quarries found nearby. The material has been typologically dated to the Upper Palaeolithic and Mesolithic.
- **Dropul Valley –** Near the Drinos Valley in the district of Gjirokastër, where tools were found similar to those at the site of Goranxi Cave (see below).
- **Flimarë Cave (22) –** Cave-site near the coast in the District of Vlorë.
- **Himarë Cave (18) –** Vlorë District. This coastal cave south of the Karaburun Peninsula was excavated in 2002-2003 (Gjipali I, 2006). The indications are that the site was intermittently occupied during the Mesolithic, Bronze and Iron Ages as well as later. The Mesolithic flint tools are similar to those found at the Rrëza e Kanalit rockshelter on the Karaburun Peninsula, the Butrint area, and the site of Çorraj; their shape, size and knapping technique suggest an Upper Mesolithic date.
- **Jorgucat (27) –** District of Gjirokastër. Mesolithic scatter on hilltop.
- **Kamenicë (12) –** Korçë District. Mesolithic scatter on hilltop.
- **Ksamil (33) –** District of Sarandë. Typologically dated to Middle and Upper Palaeolithic as well as Mesolithic.

- **Lazarat (23) –** District of Gjirokastër. The site is near the village of the same name in the Drinos valley, where flint quarries were found nearby. The material has been typologically dated to the Middle Palaeolithic and Mesolithic.
- **Lepenicë (20) –** This is a hilltop Mesolithic scatter close to border between Vlorë District and Tepelenë District.
- **Rrëza e Kanalit Rockshelter (19) –** On the Karaburun Peninsula, Vlorë district. The lithics were collected during the excavations in 2004 in a trial trench 6m x 0.5m along at the eastern end of the terrace in front of the rockshelter, which produced 120 flint tools and flakes, suggesting a flint knapping surface. The dates have been estimated between 8000 and 6000 BC.
- **Shëndëlli (40) –** District of Sarandë. Mesolithic scatter on hilltop.
- **Vanistër (26) –** District of Gjirokastër. Mesolithic scatter on hilltop.

Alonaki Beach (55) – The two sites at Alonaki Beach (Fig. R13-6) were found during the Preveza Regional Survey between building zones where the sandy fossil palaeosol scarp was being eroded by sea action. The palaeosol of site SS94-23 has been dated by TL and IRSL to *ca*. 8500-5000 BC, in the later Mesolithic. From this site was collected a trapeze and a piece with silica gloss, whose function is not determined. The other site, SS94-22, produced two bifacially retouched projectile points, a trapeze and two further geometric pieces, as well as five sherds which may or may not be contemporaneous (Fig. R13-6). At the time of occupation, they would have probably been campsites overlooking a complex and rapidly changing network of lagoons, swamps, estuaries and braided streams, separated by dunes and low rises. The lithics are rich in trapezoidal microliths and other projectile points, plus very small flake tools with tiny nibbling retouch, rare blades and one piece of obsidian, not of Melian origin. The tools have affinities with Sidari, Franchthi Cave and Konispol Cave (Runnels C., *et al*., 1999; Runnels C., 2001; Runnels C., *et al*., 2004).

Although the two sites are dated typologically to the Mesolithic, the silica gloss and pottery could indicate a Transition site, although the 2 sites can tell us little about the Transition, other than to confirm the presence of hunter-gatherers in the region prior to the arrival of Neolithic groups. Given the continuity in the Mesolithic lithic tradition at Konispol Cave during the Transition, it is possible that the Mesolithic groups at Alonaki beach had contact with Early Neolithic migrants.

Ammoudia (49) – The site of Ammoudia is on the present shoreline on a low limestone ridge about 1km to the north of the mouth of the Acheron River (Fig. R13-7). 173 lithic artefacts were recovered from a 50 cm thick palaeosol cut by coastal erosion and include 10% retouched tools on snapped bladelets and flakes, including trapezes (Fig. R13-7). It is later than Tsouknida and dated typologically to the Late Mesolithic. The site was discovered during the Acheron Regional Survey. Two other Mesolithic sites near Loutsa (Tsouknida and Loutsa) to the south of the Acheron River (Fig. R13-2), overlooking the wetlands near its mouth were discovered during the same survey. All three sites appear to have been turned towards the sea, with riverine, estuarine and maritime resources. The sites are dated typologically to 8000-5000 BC (Runnels C., *et al.*, 1999; Runnels C., 2001; Runnels C., *et al*., 2004).

The 3 sites can tell us little about the Transition, other than to confirm the existence of hunter-gatherers in the region prior to the Neolithic. Given the continuity in the Mesolithic lithic tradition at Konispol Cave during the Transition, it is possible that the Mesolithic groups that occupied the sites near the mouth of the Acheron River had contact with Early Neolithic migrants.

Asprochaliko Rockshelter (48) – Site on the Louros River north of the Gulf of Ambrakia mostly occupied during the Middle and Late Palaeolithic. G. Bailey (1999: 166) says that "*Geometric microliths were illustrated by Higgs from the top of the Asprochaliko sequence (Higgs and Vita-Finzi,*

1966), although subsequent work has failed to confirm their presence". P. Biagi (2016: pers. com.) confirms that he has never seen any geometric lithic in this collection.

Boïla Rockshelter (30) – Upper Palaeolithic Preboreal site at the mouth of the Voïdomatis gorge in the Pindus Range in Epirus (Fig. R13-8). It may have been in use in the Early Holocene when the microburin technique was used for the manufacture of armatures including geometric microliths and backed bladelets (Adam E., 1999). E. Kotjabopoulou *et al.* (1999: 206) state that "*Boïla illustrates the dominance of projectile technology (Micrograveттes, Sauveterre points, certain forms of geometric microliths) for the production of which the microburin technique was employed*". The author considers the lithics to be comparable to Lithic Phase VI at Franchthi (11th millennium). "*Sometime during the Pleistocene/Holocene transition Boïla takes over as a prominent locus of activity in the Voïdomatis catchment. It exemplifies a location where the manufacture and maintenance of hunting gear acquires unprecedented specialisation in the Epirus cultural context. Forays into the circumscribed Voïdomatis catchment are being operated from small-sized sites (see also Megalakkos and the very sparse use of Klithi), presumably by small task groups and/or one of restricted composition. To date, Boïla Unit IV is the first stratified record of an occupation at the onset of the Holocene so far inland in the NW Greek mainland*" (p. 208).

R. Franco (2011: 37) supplies the following date:

- RTA-3529 9540±75BP = 9205-8706 BC (OxCal 4.2 at 94.5%) – Median 8955 BC.

Goranxi Cave / Goranxi (25) – Cave site located in the Drinos valley, close to the village of the same name, in the district of Gjirokaster (Fig. R13-5). Some 3000 flint flakes were found on the surface deposits of the terrace in front of the cave, dating from the Palaeolithic and Mesolithic. The Mesolithic material includes diagnostic scrapers, perforators, blades, tools for working wood and bone, arrow-heads, and geometrics. These tools, made of good quality flint, vary in size between 5 and 35 mm, with the majority around 15mm. Most of the material has been attributed to the Lower Mesolithic, with limited material from the Upper Mesolithic. The intense activity at the site suggests it was probably a flint-working site, since flint quarries were found nearby.

I. Gjipali (2006) believes this cave-site should be excavated, but since there are no dates and the site has not to date been excavated, it can tell us nothing about the Transition at this time.

Grava Rockshelter (46) – This rockshelter in the south-west of the island of Corfu was discovered by A. Sordinas during his survey of the island between 1964-1966 (Fig. R13-9). G. Bailey (1999: 166) states that the "*Radiocarbon dates from the Grava rockshelter also show evidence of occupation in the 9th millennium BP (Gowett et al., 1997) but these are more problematic, because they are associated with an industry more typical of the Late Glacial and quite unlike the Mesolithic industries recorded at Franchthi from the same period. These surprisingly late dates may perhaps represent a case of isolation at a time when Corfu peninsula was becoming cut off from the mainland*".

Even if the site was occupied in the Early Mesolithic, it was abandoned shortly afterwards.

Grevena (29) – This area, at the watershed between Epirus and Greek Macedonia, principally in the region of Samarina and the slopes of Mount Vasilitsa has been the subject of ongoing surveys for several years (Biagi P., *et al.*, 2015; Efstratiou N., *et al.*,2006). Numerous lithic scatters have been found, with the highest density near the village of Samarina (Fig. R07-5). Many of the scatters have been typologically dated to the Upper Palaeolithic, some to the Late Palaeolithic and a few the early Mesolithic; "*their passage, and most probably summer settling, is indicated by the occurrence of hypermicrobladelet and hypermicroflake cores of different types, obtained from different varieties of exogenous flint collected from several sites, and also by a few fragmented bladelets and one isosceles trapeze, which might be attributed to the (Late) Mesolithic*" (Efstratiou N., *et al.*,2006: 422), After which there appears to be a gap until the later Neolithic, possibly with the advent of pastoralism (p.

431). The 3 test excavations and ^{14}C dates from Samarina 8, suggest that the earlier artefacts are redeposited. The reforestation might have made the area less attractive for hunting during the later Mesolithic and Early Neolithic, whereas the open grassland and watering springs made good grazing for large herbivores in previous oscillations, when the climate was not too severe in this ecological niche.

P. Biagi *et al.* (2015) summarise the situation as follows: "*The discovery of Late Palaeolithic and Early Mesolithic tools along watersheds that surround Samarina, and the slope of Mount Vasilitsa, improves our knowledge on the seasonal peopling of the high altitudes of the Pindus Mountains. They show that at the end of the Pleistocene, and the very beginning of the Holocene, groups of late hunter-gatherers moved across the favourable hunting landscape of the alpine pastures above 1500m*".

Kamenicë Cave (12) – This cave site near Delvinë in Eastern Albania is, according to B. Voytek (2006: 172), potentially Mesolithic.

Kastritsa Cave (44) – Late Pleistocene occupied cave in the Pindus, on the edge of Lake Ioannina. M. Spataro (2002: 17) indicates that "*Kastritsa Cave in the Pindus Mountains (HIGGS et al., 1967), whose topmost, disturbed layers yielded a few Impressed Ware potsherds*", whilst indicating that the site remained unoccupied during the Mesolithic.

Without details regarding the lithics and fauna in the topmost disturbed layers, it is not possible to determine whether the Impressed Ware occupation was by migrant farmers, or by Terminal Mesolithic / Transition hunter-gatherers who had acquired the pottery.

Katundas (13) – This cave site in Central Albania in Berati District is shown on the distribution map as having an Early Neolithic component (Korkuti M., 2000: 114). We do not know whether it contained a prior occupational level covering the Mesolithic-Neolithic Transition. A. Bunguri (2014) indicates that it contained Impressed Ware similar to Blaz II as well as Barbotine Ware, one fragment of a white on red painted vessel as well as coarse ware. This site appears to be at the boundary between Impressed and Painted Ware.

Klithi Cave (31) – This cave, 430 masl, above the Voïdomatis Gorge in the foothills of the Pindus Range (Fig. R13-8) some 30 km north of Lake Ioannina, was excavated between 1983-1988. The occupation of the cave ended at the beginning of the Holocene (Bailey G., 1999).

Kokytus River (47) – Possible Mesolithic site in Greek Thesprotia discovered by Danish archaeologists (Sampson A. 2014: 204), which N. Galadinou (2011) specifies as being in the Kokytus/Cokytus River Basin.

Konispol Cave (39) – This cave site is in the south-west corner of Albania, 400 masl near the summit of a limestone ridge above the village of Konispol on the limestone Mali I Saraqinit Massif, in the District of Sarandë (Figs. R13-10, R13-11, R13-11a & R13-12). This cave, known locally as Shpella e Kërçmoit, which is 7 km from the channel separating the mainland from the Island of Corfu, is a carstic cavity 6 m deep, 50 m wide and up to 6 m high, overlooking the Pavel River and the sea towards the Island of Corfu (Fig. R13-10). It was the subject of the first scientific excavation in Albania, as a joint Albanian-University of Texas at Arlington project between 1992-1994, under M. Korkuti and K. Petruso, after having been first investigated by M. Korkuti in the 1980s (Gjipali I., 2006). A number of trenches were opened within the cave, numbered VIII, IX, X, XII and XXI (Fig. R13-11).

The occupation goes from the Palaeolithic to the Metal Ages with a clear Transition from the Mesolithic to the Neolithic (Fig. R13-12), with which D. Borić (2005c: 19) and D. Mlekuž *et al*. (2008) agree, whereas J.-F. Berger and J. Guilaine (2008: 4) believe there is a hiatus of some 200 years

between 6080-5850 BC, which S. Forenbaher and P. Miracle (2005) reduce to 130 years. No obvious hiatus is apparent in the recalibrated dates below, using OxCal 4.2. If there is a hiatus at the time indicated, it would in any case be within the Initial Neolithic. The Late Mesolithic, Transition and Early Neolithic horizon is Stratum 6, which is rich in cultural materials. Stratum 6 lies between 1.85m and 2.85m and is divided into 4 Substrata numbered a-d. Substrata a and b are deemed to be Early Neolithic (Transition) and Substrata c and d are deemed to be Late Mesolithic, although there would appear to be some mixing of the strata. M. Korkuti *et al*. (1996) indicate that the excavation was conducted in 10 cm passes, respecting the lithostratigraphy in so far as possible.

The dates straddling the Transition from the Trenches indicated with the Roman numerals, followed by the Unit, recalibrated using OxCal 4.2, are as follow (Schuldenrein J., 1998: 510):

- Beta-80001 8900±180 BP = 8464-7590 BC (OxCal 4.2 at 95.4%), charcoal XXI/49, Stratum 6d No diagnostic material. Median 8025 BC.
- Beta-67084 7630±140 BP = 6832-6212 BC (OxCal 4.2 at 94.0%), charcoal XXI/39, Stratum 6b,c? Early Neolithic pottery – Median 6520 BC. Pottery possible migrated down.
- Beta-80000 7550±80 BP = 6532-6237 BC (OxCal 4.2 at 92.9%), charcoal XXI/49, Stratum 6d Geometric microliths – Median 6385 BC.
- Beta-76083 7510±90 BP = 6534-6212 BC (OxCal 4.2 at 93.6%), charcoal XXI/39, Stratum 6b Early Neolithic pottery – Median 6375 BC.
- Beta-79990 7410±80 BP = 6428-6096 BC (OxCal 4.2 at 95.4%), charcoal XXI/42, Stratum 6c Geometric microliths – Median 6260 BC.
- Beta-56415 7060±110 BP = 6109-5723 BC (OxCal 4.2 at 92.5%), charcoal IX/20, Stratum 6a Early Neolithic pottery – Median 5915 BC.
- Beta-67802 6830±80 BP = 5895-5615 BC (OxCal 4.2 at 94.5%), charcoal XXI/29, Stratum 6 Middle/Early Neolithic pottery – Median 5755 BC.
- Beta-56416 6800±140 BP = 5928-5486 BC (OxCal 4.2 at 91.9%), sediment IX/18, Stratum 6a Early Neolithic pottery – Median 5705 BC.

The correlation of the various Units in the different Trenches has been attempted by N. Russell (1999-2000) (Fig. R13-12). The Mesolithic occupation continues down to *ca*. 6000 BC and is characterised by a microlithic blade and trapeze industry (Figs. R13-11a & R13-16) and an absence of bone tools, which continues into the Early Neolithic. The occupation of the cave appears to have moved to the area of Trench XXI in the Later Mesolithic due to excessive humidity nearer the entrance, but this area was largely abandoned prior to the Transition, which is mostly evidenced in the area of Trench IX and to a more limited extent in Trench VIII, an area that was intensively occupied, whilst a hiatus exists in the area of trench X. There is little evidence of post depositional disturbance, although there is some sloping of the sediments, and the rate of deposition appears to be about 50cm for every 1000 years, with the Transition lasting several centuries (Russell N., 1999-2000: 82). Trench X produced a trapeze and a microlithic triangle from the Mesolithic Units 19-22, which are similar to those from the nearby Mesolithic site of Vlushë, and the microlithic industry continues in the same trench into the Neolithic (Korkuti M., *et al*., 1996).

In Trench IX, the Transitional Units 20-29 contain a Mesolithic lithic industry, which K. Petruso *et al*. (1994) have likened to that of Epirus and Greece in general, and which C. Runnels and T. van Andel (2003) have described as consisting of small flakes and blades with intensive minute retouch, plus composite tools and denticulates, notches, perforators and end-scrapers. N. Russell (1999-2000) reports that there are no plant remains covering the Transition, but plenty of faunal remains. Units 20-21 contain a limited amount of pottery (Fig. R13-13) and a Neolithic faunal assemblage, whilst Units 22-27 beneath have very few sherds, which could be intrusive; Unit 22 has a mostly Neolithic faunal assemblage with a few bovines and wild taxa; Unit 24 has an increasing Neolithic faunal assemblage in comparison with Units 26-27 which have a predominantly wild one dominated by red deer and boar with a few domesticates (Cattle, sheep, goats and pig); the fauna in units 28-29 is unfortunately missing (Russell N., 1999-2000). The author concludes that "*Konispol*

cave adds to the evidence that the spread of farming in the southern Balkans involved a combination of immigrants and interaction with local hunting and gathering populations, which may have been quite sparsely distributed. If my interpretation of the Konispol sequence is correct, this interaction would appear to be a long process of exchange and intermarriage rather than a rapid acculturation, at least in this instance" (p. 85).

J. Schuldenrein (1998: 517) states that "*Konispol Cave preserves one of the richest occupational histories of any site in the Balkans for the critical Mesolithic-Neolithic transition*" and that "*The intensive habitation of the cavern during the pivotal Mesolithic and Early Neolithic transition parallels a period of significant environmental change when adaptive strategies in the Balkans generally shifted from hunting and gathering to sedentism*" (Schuldenrein J., 2001: 564). After the Transition, during the Later Neolithic, the cave appears to have been used as a pastoral facility.

Konispol cave is situated high above any agricultural land in a rugged environment with extensive views down to the valley and out to sea (Fig. 13-10), which is a good location for Mesolithic occupants wanting to spy out the movements of game. There is a continuity of the Mesolithic lithic tradition through the Transition with a slow and progressive shift to predominantly domesticated animal species over a period of several centuries. The adoption of pottery occurs early in the Transition from *ca*. 6500 BC if the date from Trench XXI is to be believed, with the Transition continuing into to the early 6th millennium with ever increasing numbers of domesticated animals (Russell N., 1999-2000), which strongly suggests the slow acculturation of autochthonous hunter-gatherers, who maintain their Mesolithic lithic tradition throughout the Transition. Trench IX, which N. Russell (1999-2000: 82-83) relies on for the analysis of the fauna over the transition contained a Mesolithic industry throughout Units 20-29, with the Transition occurring over this depositional period; Units 22-27 have few sherds, with Units 20-21 having more, with the only date for Trench IX being for Unit 20; the faunal remains for Units 29 and 28 were missing, a few bones of all four domesticated species are present in Unit 27 and by Unit 24 ovicaprines predominate with a reasonable presence of wild taxa, which almost disappear by Unit 22; by Units 20-18 the fauna is almost exclusively ovicaprines with a high proportion on neonates and young (*ca.* 5900 BC). The adoption of pottery, which appears to occur simultaneously with Sidari, also suggests a selective acceptance of Neolithic attributes (virtually no evidence for cultivation, no polished stone or bone tools) over many generations by a group, whose main habitation centre might have been elsewhere, and whose descendants appears to continue to use the site throughout the Neolithic, more as a sheep-pen than as a residential site.

Kryegjata B (14) – This near-coastal open-air site in Central Albania was discovered during the Mallakastra Regional Archaeological Project on the Kryegjata Ridge overlooking the Vjosa River wetlands and coastal plain near the sea (Fig. R13-3). The larger site, Kryegjata B (Site Kr B S003), is close to the coast, whilst Rusinja (Site Kr B S046) is further inland, with both situated on anticlinal limestone ridges. There is evidence for continuity of use of this site from the Middle Palaeolithic, when the site would have been some 3 km from the sea, to the Mesolithic, at which time much of the coastal plain would have been drowned by the eustatic sea rise, and the ridge covered in a deciduous oak forest. The site is in fact made up of a number of lithic scatters spread over some 8000 m^2 on the ridge, suggesting a shifting occupation (Korkuti M., *et al.*, 1998; Merkyte I., 2003; Runnels C., *et al*., 2004, 2009).

The site was partially excavated, and of the lithics recovered, 17 were attributed to the Middle Palaeolithic, 33 to the Upper Palaeolithic and 839 to the Mesolithic (Figs. R13-4 & R13-16). Much of the Mesolithic component, which is flake-based without the microburin technique, is comparable to the Early Mesolithic of Franchthi Cave (Lithic Phase VII), whilst less than 5%, representing the microlithic and bladelet component, could be attributed to the Late Mesolithic (Franchthi Lithic Phases VIII/IX). There are also affinities with Sidari and the Montenegro site of Odmut Cave (Region 10). The site is interpreted as either a base camp or a seasonal camp which was used during the Mesolithic between *ca.* 8000-6000 BC (Franco C., 2011: 36; Runnels C., *et al.*, 2004).

This site, which is also discussed above under the Mallakastra Regional Archaeological Project Survey, cannot tell us much about the Transition even if it was used up to the period when the Early Neolithic was making an appearance in the region.

Loutsa (52) – The site of Loutsa is on a limestone buff 200 masl to the south of the Lower Acheron River Valley, overlooking the coastline to the north and the Lower Acheron wetlands below (Figs. R13-1, R13-2 & R13-7). The 135 pieces recovered contain 18.8% cores and 21% retouched pieces, including trapezes and four retouched flakes with silica gloss on the edges (Fig. R13-13). The pieces of burned daub with impressions of cane or wood found in the same area are enigmatic according to the authors. The site was discovered during the Preveza Regional Survey. Two other Mesolithic sites nearby (Ammoudia and Tsouknida) were discovered during the same survey. All three sites appear to have been turned towards the sea, with riverine, estuarine and maritime resources. The sites are dated typologically to 8000-5000 BC (Runnels C., *et al.*, 1999; Runnels C., 2001; Runnels C., *et al*., 2004).

Loutsa, with its four retouched flakes with silica gloss and burned daub could represent a Transition or Early Neolithic site, incorporating elements of the Mesolithic tradition in its lithics, whilst having permanent structures and practicing some form of agriculture.

Maganisi Island (56) – N. Galadinou (2011) has reported that a Mesolithic site has been discovered on the island of Maganisi, which is the first indication of a Mesolithic presence south of the Bay of Ambrakia in this Region.

Megalakkos Rock Shelter (32) – This small rockshelter some 400m upstream from Klithi Rockshelter (Fig. R13-8), last occupied in the Late Pleistocene or beginning of the Holocene, has supplied a ^{14}C date suggesting the passage of hunter-gatherers during the Early Mesolithic (Bailey G., 1999).

Rusinja (15) – This open-air site is the second of two Mesolithic sites identified during the Mallakastra Regional Archaeological Project. The larger site, Kryegjata B (Site Kr B S003), is close to the coast, whilst Rusinja (Site Kr B S046) is further inland, with both situated on anticlinal limestone ridges (Fig. R13-3). All the lithic artefacts (Fig. R13-4) were found on the uplands, since all remains in the valleys and plains will have been covered by the sedimentation, or eroded. The two sites are reviewed together above under the Mallakastra Regional Archaeological Project (Runnels C., *et al.*, 2009).

Shën Marinë (38) – This small cave in the south-west corner of Albania 3 km up a gorge from Pavël, in the District of Sarandë, was excavated by the Italians in the late 1930s. It was subsequently investigated by M. Korkuti (Gjipali I., 2006). F. Harrold, *et al*., (1999) report that there was an upper horizon with pottery and domesticates and a lower horizon without. Nothing else appears to be known about this site, which could be a Transition site.

Sidari (34) – This open-air site, located in a small coastal valley on the north shore of the Island of Corfu (Fig. R13-14) was discovered by A. Sordinas, who excavated the shell-midden site between 1964-1965. He designated his stratigraphy as Levels A to E, with Level D being Mesolithic, followed without a hiatus by Level C Initial Neolithic, after which the site was unoccupied until two Neolithic horizons with Impressed Ware (Fig. R13-14) (Sordinas A., 2003). New excavations were undertaken in 2004 under J. Guilaine and G. Philippakis, since the site was being eroded by wave action, with the sea having encroached on the shoreline some 15 m since the mid-1960s (Fig. R13-14) (Berger J.-F., *et al*., 2014). The new excavations have added depth of detail to the occupation of the site and slightly modified the chronology, whilst so far not fundamentally changing its interpretation, since the J.-F. Berger *et al*. (2014) publication essentially focuses on the site formation processes and new ^{14}C dates.

The site, which lay between 4 km down to 500 m from the shoreline during the almost 4000 years it was occupied, sits at the bottom of a dry watercourse on the landward slope that fed into the

Peroulades Stream to the south or south-east. Marine erosion has eliminated much of the cliff, thus exposing the site. At the inception of the Initial Neolithic *ca.* 6400 BC, thus prior to the "6200 BC event" the sea-level would have been between 15-20 lower than at present, leaving a wide alluvial plain with plenty of standing fresh water and a strait about 2 km wide between the mainland and the Island of Corfu (Berger J.-F., *et al*., 2014: 216-217).

New dates have been obtained; those for the Mesolithic and Initial Neolithic, mostly on deciduous oak charcoal, which species dominated the humid environment at the time, are consistent and are shown here incorporating the dates obtained by Sordinas (Sordinas A., 1967, 2003). The periodisation is now as follows, with the Initial Neolithic dates in two groups according to their provenance from two separate locations (Berger J.-F., *et al*., 2014):

Residual Mesolithic Levels possibly reworked, in which the Sordinas date is younger than the date from the more recent excavations, by between 120-350 years:

- Lyon-3174 8000±90BP = 7143-6649 BC (OxCal 4.2 at 95.2%), unit 4a (Sid2) – Median 6895 BC.
- No lab ref. 7770±340BP = 7524-6032 BC (OxCal 4.2 at 95.4%), on charcoal, Sordinas Level D – Median 6778 BC. J. Guilaine and G. Cremonesi (2003) give the median date as 6700-6600 BC.
- GXO-771 7670±120BP = 6825-6241 (OxCal 4.2 at 95.4%), on ash, Sordinas Unit EN1 – Median 6535 BC. Y. Facorellis (2003) gives a ΔR date of 6980-6230 for presumably the same ^{14}C date, which is a little earlier with a median date of 6605 BC, whilst J. Guilaine & G. Cremonesi (2003) indicate 6466 BC.

Initial Neolithic Plain Pottery Level group 1 from pit F2 and Unit 4a, which give a coherent spread of dates on deciduous oak charcoal of *ca*. 6350 BC:

- Lyon-5637 7500±60BP = 6453-6243 BC (OxCal 4.2 at 95.4%), base of Unit 4a (Sid5, no monochrome pottery) – Median 6350 BC.
- Lyon 3175 7470±90BP = 6476-6202 BC (OxCal 4.2 at 89.9%), middle of Unit 4a (Sid2, -0.45, monochrome pottery) – Median 6340 BC.
- Lyon 3175? 7480±70BP = 6458-6227 BC (OxCal 4.2 at 95.4%), top of Unit 4a (A3-1, monochrome pottery) – Median 6345 BC.

Initial Neolithic Plain Pottery Level group 2 from the base of Unit 4b and pits F2-F4, which give dates a little more recent of *ca*. 6310 BC:

- Lyon-3169 7530±70BP = 6491-6236 (OxCal 4.2 at 95.4%), ENI pit F2 (Cut2, ch8) – Median 6365 BC.
- Lyon-3172 7370±80BP = 6403-6070 BC (OxCal 4.2 at 95.4%), ENI pit F4 (Cut2, ch8) – Median 6235 BC.
- Lyon-3170 7400±60BP = 6414-6202 BC (OxCal 4.2 at 84.5%), ENI layer of raw clay F1-F2 (Cut 1.ch6) – Median 6310 BC.
- Lyon-3168 7460±40BP = 6416-6241 BC (OxCal 4.2 at 95.4%), base of erosional Unit (Cut 3,ch4, 5a) – Median 6330 BC.
- Lyon 3173 7310±110BP = 6406-6001 BC (OxCal 4.2 at 95.4%), base of destruction and rapid fluvial aggradation Level caused by "6200 BC event" (Cut 3, ch4, 5a) – Median 6205 BC.

Early Neolithic Impressed Ware Level, in which the Sordinas median date is *ca*. 160 years earlier than that from the more recent excavations:

- GXO-772 7340±180BP = 6533-5877 BC (OxCal 4.2 at 94.4%), on ash, Sordinas Impressed Ware Level C – Median 6205 BC. Level C, about 1 m above the previous stratum, containing impressed ware similar to that of Stratum III of Zelena Pećina, comparable with Grotta delle Mura in Southern Italy, and Stratum III of Crvena Stijena.
- Lyon-5633 7170±40BP = 6105-5981 BC (OxCal 4.2 at 93.6%), EN2 Impressed Ware hearth – Median 6045 BC.

The recent excavations were undertaken in 10 cm spits through the 5 m of stratigraphy (Fig. R13-15a), which cover almost 4 millennia of discontinuous occupation. The site, established in a water course, has been much disturbed and reworked by climatic events, particularly the "6200 BC event" with its high pluviosity, with several episodes of heavy rain which eroded the surface, transported and mixed the archaeological levels, created channels cutting into the stratigraphic levels, which events were followed by sedimentation. This complex series of events has resulted in a palimpsest difficult to read for the Mesolithic, Initial Plain Pottery Neolithic and the Early Impressed Ware Neolithic (Figs. R13-15a & R13-15b). There is no assurance of the length of the occupation of the site by the hunter-gatherer collectors of shellfish, which may have begun in the early 7th millennium and continued beyond the middle of the millennium, without leaving any evidence of habitation structures (although see below for contrary view). There is no apparent stratigraphic hiatus between the Final Mesolithic and the Initial Neolithic Level with wattle and daub habitations and plain burnished pottery devoid of mica temper. Two Early Impressed Ware Neolithic occupations appears 40-60 cm above the Initial Neolithic Level with a 10 cm hiatus between them, after which the site is abandoned until Late/Final Neolithic and Early Helladic occupations (Berger J.-F., *et al*., 2014).

E. Adams (1999: 269) reviewed the Mesolithic lithics from the earlier excavations (Fig. R13-15) and concluded that "*the assemblage is dominated by flakes followed, in decreasing order by debris, chips, cores and technical pieces, tools, bladelets and a single blade. All cores are flake cores, mostly globular or worked to the point of exhaustion. The rare laminar debitage products are twisted or curved. Tools include mostly retouched flakes (lateral alternating retouch), few retouched bladelets, few truncated bladelets and only two backed bladelets. There is no evidence for the practice of the microburin technique. The vast majority of the artefacts is manufactured on flint, macroscopically identical to the Voïdomatis type, while varieties present in the area and already employed in the Upper Palaeolithic assemblages from Grava Cave in SW Corfu are under-represented (Adam, 1998). The unknown provenance of this grey to black translucent flint was noted by Sordinas (1969: 402) but in the absence of proper laboratory analysis its source and procurement are open to speculation. Still, the strong presence of a non-local material at Sidari recalls the early occurrence of obsidian in Franchthi (Perlès 1987; 1990) and raises the question of contact and trade*". It is curious that the brown flint available on the surface close to Konispol Cave was not utilised. C. Perlès (2001: 34) finds the assemblage comparable to that of the Franchthi Cave Final Mesolithic both typologically and technologically, with atypical backed microliths on snapped blade segments without recourse to the microburin technique. S. Tiné (1987: 352) indicates that the lithics in the lower part of Level C include about 10% of blades, as well as pottery, interrupting the previous Mesolithic sequence, and that this needs to be interpreted as heralding the arrival of immigrants, although J.-P. Demoule and C. Perlès (1993: 365) state "*that at Sidari, we have observed that the lithics show continuity in techniques between the Mesolithic and the EN, while the ceramics of the earliest Neolithic level (C Base), which directly overlies the Mesolithic, are both technologically and stylistically different from those of the surrounding regions. Here, a local adoption of domesticates and pottery by Mesolithic groups with minimal external contacts seems probable*", so that in 2005, S. Forenbaher and P. Miracle, quoting C. Perlès (2001) could state that this site provides provocative evidence of an *in situ* adoption of pottery by indigenous Mesolithic people, at *ca.* 6500 BC in Level C, with no stratigraphic break between the Late Mesolithic horizon (Level D) and the next one (Level C) in which there is abundant non-impressed ware pottery, stone tools using a 'Mesolithic' technology, plus some sheep/goats.

There is however a hiatus between this Plain Pottery Level and the top of Level C, in which Impressed Ware is present. The first pottery appearing after 6500 BC in Level C could have been acquired through social interaction, exchange or through the acquisition of pottery manufacturing skills through contacts or partner exchange. Interestingly, pottery is not present 35 km away in levels dated 6500-6200 BC at Konispol cave, which with the lack of Konispol flint at Sidari, suggests that there were no or minimal contacts between the two sites. P. Hameau (1987) notes however that A. Sordinas

indicated that the lithic industry at the base of Level C was not microlithic, in that the dimensions had doubled, and that this situation continues in the top part of Level C.

A. Batović (1987) mentions plaques of baked clay in the Mesolithic level, which he presumes were used for the construction of the roofs, representing a unique instance at this date in the Adriatic, whilst C. Runnels (2001: 248) indicated that in the Corfu Museum, remains of burnt wattle and daub from Level D, found on virgin soil, represent the remains of house structures. He points out that the date for this level partly overlaps with the Initial Neolithic of Crete and Thessaly. The pottery from the lower part of Level C contains undecorated globular profile pottery other than for one sherd decorated with incised lines (Guilaine J. & Cremonesi G., 2003).

C. Perlès (2001: 30) summarises that the sites of Zaimis, Ulbricht and Sidari "*indicate the exploitation of diversified and patchy environments, resulting in large diet breadth, with an apparent emphasis on the exploitation of numerous small-sized species. Land snails and coastal resources could have offset seasonal shortages in plant resources and it is often argued that these r-selected species provide a more stable economic base, less vulnerable to short-term stress, than does large game. But the poor representation of the higher ranked species, such as red deer and boar, remains to be explained. It is difficult to escape the conclusion that large game was difficult to procure, at least seasonally and/or locally*". J. Guilaine and G. Cremonesi (2003) conclude that the lower part of Level C indicates an essentially Mesolithic subsistence with ovicaprines, which cannot be assimilated into the Adriatic Early Neolithic, even if it plays a role in the early development of pottery in the region, and that it is the upper part of Level C which shows the first manifestations of Impressed Ware in the region, *ca*. 6200-6000 BC.

C. Runnels and T. van Andel (2003) appear to agree with A. Sordinas that Sidari was an open-air coastal midden site set up by Mesolithic people arriving by sea. The lithic industry is close to that of Franchthi, quite different from that of Grava Rockshelter, and also different from that at Konispol Cave, 35 km distant across the narrow straights.

Given the known early date for the Transition at Franchthi Cave where the lithic industry is similar to that of Sidari, and knowing that the occupants practiced navigation, it is quite possible that a Mesolithic group could have arrived navigating round the Peloponnese, or having navigated through the Gulf of Corinth, settled on the north shore of the Island of Corfu, possibly maintaining contact with their home base, thus facilitating the early acquisition of ovicaprines and pottery. It is however intriguing that no Melian obsidian was found at Sidari, so that the above hypothesis could be at least partially invalidated by this fact, except that the lithics are made in a flint which is thought to be non-local, attesting contacts and exchange; furthermore, there do not appear to be any similarities with Konispol Cave (where a certain resistance to the Neolithic transition can be perceived), which is the only other well excavated site in the Region.

We do not appear to be in the presence of fully neolithised migrants in the Initial Neolithic of J.-F. Berger *et al.* (2014) / lower part of Level C in A. Sordinas's 1964-1965 excavations, so it would seem that the Mesolithic and Early Neolithic occupants of Sidari were autochthonous to the Southern Balkans, and were going through the Transition before the site was abandoned prior to being reoccupied, probably after 6200 BC by a group with Impressed Ware pottery, agriculture and a new lithic technology; the fact that they reoccupied a site previously occupied by hunter-gatherers transitioning to the Neolithic suggests that they might have incorporated the descendants of the earlier occupation.

Thesprotia (same as Kokytus) (47) – Possible Mesolithic lithic scatters found by Danish archaeologists in the region of Thesprotia (Sampson A., 2010: 170, 2014: 204). This is probably the same location as **Kokytus** above.

Tsarlambas (53) – The site of Tsarlambas, SS94-19, consists of a wave cut palaeosol scarp. No details of the lithics are given, except to infer that the site is probably to be dated to the Late Mesolithic. This

is one of three Mesolithic sites north of Preveza on a palaeosol facing the Ionian Sea, discovered during the Preveza Regional Survey (Fig. R13-2). The other two sites are at Alonaki Beach. The site is dated typologically to the Mesolithic. At the time of occupation, it would have probably been a campsite overlooking a complex and rapidly changing network of lagoons, swamps, estuaries and braided streams, separated by dunes and low rises. The lithics are rich in trapezoidal microliths and other projectile points, plus very small flake tools with tiny nibbling retouch and rare blades. The tools have affinities with Sidari, Franchthi Cave and Konispol Cave (Runnels C., *et al*., 1999; Runnels C., 2001; Runnels C., *et al*., 2004).

The site can tell us little about the Transition, other than to confirm the existence of hunter-gatherers in the region prior to the Neolithic.

Tsouknida (51) – This open-air site, discovered during the Acheron Valley Survey, is on an alluvial fan 50 masl overlooking the Lower Acheron wetlands. The 200 Mesolithic lithics were found close to a Palaeolithic findspot and resemble the Early Mesolithic of Franchthi Cave (Figs. R13-1, R13-2 & R13-7). Two other Mesolithic sites (Ammoudia and Loutsa) were discovered during the same survey. All three sites appear to have been turned towards the sea, with riverine, estuarine and maritime resources. The sites are dated typologically to 8000-5000 BC (Runnels C., *et al.*, 1999; Runnels C., 2001; Runnels C., *et al*., 2004), with that of Loutsa conceivably being a Transition site.

Vidhëz – See **Vlushë (17)**

Vlushë/Vlush/Vlusha (17) – Two sites about 300 m apart, near the village of Vlushë in the South-Central Albanian District of Skrapar, were excavated by Y. Luftin during the 1980s and published in Iliria (1990. 2: 249). At the first site, **Armenia**, where 4 m^2 were excavated to a depth of 0.9 m, two occupational levels, each with a hearth, were distinguished, both of which contained crude pottery fragments in association with retouched trapezoidal flints of microlithic size (Fig. R13-16). At the second site, **Vlusha I/Vidhëz**, 9 m^2 were excavated with a cultural stratum 0.85 m thick, in which flints of microlithic type were excavated, but no pottery, which the excavator suggested might be a Mesolithic site (Bunguri A., 2014; Korkuti M., 1993). M. Korkuti (2007: 116) has suggested that the site represents the earliest site with Neolithic attributes in Albania, with microliths which in 1989 he said "*were a continuation of a Mesolithic tradition towards the Early Neolithic*" (Gjipali I., 2006). A. Bunguri (2014) sees connections with Konispol Cave and Sidari, believing that migrants came from the Thessalian Early Neolithic plain pottery period and merged with local hunter-gatherers, in a similar manner to Sidari.

The site is unfortunately undated; the material is unstudied and mostly lost subsequent to the troubles in 1990, with a few pieces in the National Archaeological Museum in Tirana, and the excavator has retired (Gjipali I., 2012-05: pers. com.).

This is an intriguing site which could be compared to the Initial Neolithic of Sidari, but without dates and studied material we can only hypothesise that it represents occupations by Mesolithic groups who were in the process of Transition with the addition of few Neolithic migrants.

Xarë (37) – This unexcavated and undated open-air Albanian site, first mentioned by M. Korkuti in 1983, was the subject of surface collections which have been attributed to the Palaeolithic with possibly some Mesolithic material (Harrold F. B., *et al.*, 1999; Runnels C., *et al.*, 2004: 4).

<u>Eastern Adriatic – Western Greece and Albania – Initial and Early Neolithic Sites – Introduction</u>

No Neolithic occupation is known in Western Greece on the coastal plain prior to *ca.* 5600 BC (Andreou S, *et al*., 2001), so that we need to look further north for its first manifestations in this Region. The earliest undecorated and untempered burnished pottery is found at Sidari on the island of Corfu

sometime either side of 6400 BC, associated with a few ovicaprines, which is over half a millennium after the first evidence for the Neolithic on the Island of Crete, a little less for the appearance of Neolithic attributes at Franchthi Cave in the Argolid, and only a century or two after the first appearance of Neolithic migrants on the eastern side of the Pindus Range. If we make abstraction of a possible sherd with incised decorations found at Sidari in a Level dated *ca*. 6400 BC in the Initial Plain Pottery Neolithic level, which was noted by J. Guilaine and G. Cremonesi (2003), Impressed Ware first appears at Asfaka and Sidari at about the same time a century or two later. The earliest known Impressed Ware pottery is in the Levant (Fig. Intro-8), and small quantities are found at numerous sites around the Aegean Basin during the 7th Millennium BC, so that this decorative technique could have been imported to the Ionian coast and Epirus by migrants, through contact or exchange, or even, if unlikely, reinvented locally. What is certain is that it became the form of pottery decoration of predilection for the Initial Neolithic of the Adriatic Basin, Southern Italy and points further north and west. J. Guilaine and G. Cremonesi (1996: 440-441) have suggested that that the genesis for Impressed Ware is to be found in Epirus, from where it was disseminated northward and westward. It is more probable that the earliest migrants on the Ionian coast, the Southern Adriatic and points further west came from Neolithic populations of Impressed Ware tradition, and that this consequently became the dominant pottery style, evolving over time.

Albania is divided into two currents of neolithisation, with the Dinaric Range marking the dividing line between the two. The earlier current comes from the Aegean, and is found in the east of the country with the regions of Përrenjas, Pogradec and Korçë (Lakes Ochrida and Grand Prespa) being particularly rich in sites with Painted Ware (Barçi, Böçirnes, Burim, Rajce, Rajtan, Podgorje, Vashtëmi). The second current is Impressed Ware coming up the Ionian / Adriatic coast (Gjipali I., 2012 pers.com.), which M. Korkuti (2007:116) indicates is coarse with a few impressed decorations in its original manifestations before it is followed by better quality ware. We know of no dates for these Albanian coastal Early Neolithic sites, but the indication that the earliest sites contained coarse pottery with only a few impressed decorations suggests that the sites could represent an extension of the area in which Impressed Ware evolved before crossing the Southern Adriatic and moving up the eastern Adriatic shore.

<u>Eastern Adriatic – North-Western Greece and Albania – Initial and Early Neolithic sites – Sites details</u>

Armenia – See **Vlushë (17)** in 'Mesolithic and Transition sites' above

Asfaka (42) – Early Neolithic Impressed Ware site, possibly ditched, and probably practicing a slash and burn agriculture, north of Lake Ioannina in Epirus, (A. Manfredini, 1987). A date with an unacceptably large standard deviation is quoted by R. Skeates (2000) from Higgs & Vita-Finzi (1966):

- I-1959 7380±240BP = 6766-5737 BC (OxCal 4.2 at 95.4%) – Median 6250 BC.

R. Whitehouse (1987) suggests that this site may well have been a ditched village, and R. Skeates (2000) suggests that it could prefigure the later ditched enclosures on the Apulian Tavoliere.

Barçi (9) – Site in Eastern Albania close to lakes in Korçë District, which according to M. Korkuti's site distribution map (2000: 114), was occupied in the Early Neolithic. Given its location, this site is likely to have been established by migrants arriving overland from the Aegean.

Blazi/Blaz Cave (4) – This cave-site is close to Burrel, in Central Albania north of Tirana, some 35 km from the coast. A. Benac (1987: 339), quoting F. Prendi and Zh. Andrea (1981), mentions an Early Neolithic horizon with pottery similar to that at of Zelena Pećina in the Neretva Valley (Region 14), thus a little more recent than that at Crvena Stijena. The distribution map from M. Korkuti (2000) shows it as being Early Neolithic, and I. Gjipali (2012-05: pers. com.) confirmed that Cardium Impressed Ware was found in this cave-site.

I. Gjipali (2014-11: pers. com.) confirmed that during 2012 field work with the University of Cologne, the pre-Neolithic lithics were ascertained to be Palaeolithic, so that there is no Transition at this site.

Burim (5) – This Early Neolithic Impressed Ware site (Fig. R13- 13) is located on the eastern edge of the central lowland area of Albania in Dibra District. It is mentioned by J. Evans (1987: 324) as being published by Predl and Andrea (1981), and is shown on the M. Korkuti's Neolithic sites distribution map (2000: 114).

Cetush (3) – Site in Eastern Albania, close to the border, in Dibra District, close to the site of Burim, and shown on the distribution map (Korkuti M., 2000: 114).

Kolsh (1) – Initial Neolithic site in North-Eastern Albania, in Kukes District, which is shown on the distribution map (Korkuti M., 2000: 114).

Nezir (2) – This cave site occupied in the Early Neolithic in Central Albania close to that of Blaz is shown on the distribution map (Korkuti M., 2000: 114).

Podgorje/Podgorie (8) – Initial Neolithic site in the east of Albania close to lakes in Korçë District shown on the distribution map (Korkuti M., 2000: 114). Given its location, this site is likely to have been established by migrants arriving overland from the Aegean. F. Prendi who excavated the site, reported in 1982 that the basal layer was Neolithic (Bunguri A., 2014: 85)

Vashtëmi (11) – This is an Early Neolithic open-air site near a village by the same name, close to the lakes in Korçë District, recently excavated by the University of Cincinnati and the Institute of Archaeology, Tirana, under I Gjipali (http://www.uc.edu/news/NR.aspx?id=15552: 2012). The project comes under the SANAP (South Albania Neolithic Archaeological Project). It could possibly be one of the earliest Neolithic sites in Eastern Albania, set up by migrant farmers coming over the passes from Eastern Greece. "*The findings show that Vashtëmi, located in southeastern Albania, was occupied around 6,500 cal BC, making it one of the earliest farming sites in Europe. The location of early sites such as Vashtëmi near wetland edges suggests that the earliest farmers in Europe preferentially selected such resource-rich settings to establish pioneer farming villages*".

We have no confirmation of the ^{14}C dates at this time.

Eastern Adriatic – North-Western Greece and Albania – Conclusions

This Region has witnessed a lot of activity in the last few decades, with numerous Mesolithic open-air sites as well as a few caves and rock-shelters being discovered, particularly in Albania. The potential for excavations is substantial, again particularly in Albania, and areas at the southern and northern end of the region could benefit from surveys.

As is almost invariably the case, Palaeolithic and Early Holocene hunter-gatherer open-air sites are hard to date other than typologically, are seldom stratified, and whilst confirming the existence of hunter-gatherers in particular territories, can seldom inform on the Transition, unless the assemblage bears characteristics from both the Final Mesolithic and Initial Neolithic, as is the case with the two sites at Vlusha in Central Albania. This is also possibly the case for the two Alonaki Beach sites near Preveza, and Loutsa from the River Acheron Valley area. In addition, there are the cave sites of Kastritsa in Greece, and Blazi, Katundas and Shën Marinë in Albania, which might have been occupied by Terminal Mesolithic hunter-gatherers during the Transition, having acquired some pottery.

The two key sites of Konispol Cave and the open-air site of Sidari on the island of Corfu, are within some 35 km of each other, yet whilst both appear to have archaeological levels marking the

Transition of the Mesolithic groups that occupied the respective sites, they are strikingly different in several respects:

- The coastal site of Sidari on the island of Corfu was turned towards the sea with its shell midden, whilst the mainland site of Konispol Cave, a few kilometres inland and 400 masl, is focussed on a terrestrial diet;
- Sidari appears to have been initially established by a migrant population, possibly arriving by sea during the Mesolithic, whilst the occupants of Konispol would appear to be autochthonous of longer standing;
- The Sidarian population acquired both ovicaprines as well as pottery early in the Transition, prior to vacating the site, whereas the Konispol Cave folk acquired a few domesticated animals a century or more later than Sidari, whose numbers grew progressively in importance in relation to wild fauna over several generations before acquiring pottery; the occupants also continued to use the site into and beyond the Neolithic;
- The lithic technology at Sidari shows greater similarities to that of Franchthi Cave and Vlusha than it does with that of Konispol cave, using flint of unknown origin, whilst the flint at Konispol cave is of local origin. The flake-based lithic technology from these sites is nonetheless typical of the Southern Balkans for the Mesolithic, and they continue to use the Mesolithic lithic tradition during the Transition, whilst at Konispol cave and Sidari also acquiring lithics of Neolithic tradition.

This Region with its well attested hunter-gatherer presence north of the Gulf of Ambrakia transitioned to the Neolithic under a combination of Neolithic migrants arriving up the coast and/or over the Dinarics from *ca.* 6400 BC or a little later, and the acculturation of the autochthonous population, who appear to have completed the transition (at least at Konispol Cave) at the beginning of the 6th millennium BC. Inland the Neolithic migrants appear to have arrived overland near Lakes Ochrida and Grand Prespa a century or more earlier, *ca.* 6500 BC, with painted pottery, but there is no clarity as regards the Transition in this area of South-Eastern Albania.

Region 14 – Eastern Adriatic – Western Montenegro, Croatia and Bosnia & Herzegovina

(Map R14)

Eastern Adriatic – Western Montenegro, Croatia and Bosnia & Herzegovina – General Introduction

This Region encompasses the Adriatic coastline from Montenegro up to and including the Istrian Peninsula, and treats the water divide along the Dinaric Alps as its eastern limit. Because of the two long stretches of rugged coast detrimental to settlement and communication other than by sea, the Region is best treated as three sectors (Marijanović B., 2007; 2009a):

- The Southern Sector, made up of Montenegro, the Croatian coastline including the Pelješac Peninsula and parts of South-Western Bosnia & Herzegovina, as far as Split in Croatia; it incorporates the islands (Brač, Hvar, Korčula, Palagruža, Sušac and Vis in particular), most of which were attached to the mainland in the Early Holocene. (Fig. R14-1). There is a stretch of some 160 km of mostly impracticable shoreline along this Southern Sector to the Central Sector;
- The Central Sector begins in the small plain at Split, after which there are a further 50 km of inhospitable coastline before the coastal plains and plateaux up to 40 km wide of Ravni Kotari. Ravni Kotari stretches over 120 km in a north-westerly direction between Šibenik to beyond Zadar. The Sector includes the offshore islands (Dugi in particular), most of which were connected to the mainland in the Early Holocene, with the exception of Dugi, with its channel 60 m deep. This Sector is separated from the Northern Sector by about 200 km of impracticable coastline, which stretches part of the way down the southern coast of the Istrian Peninsula;
- The Northern Sector, made up of the Istrian Peninsula and the islands to the south in the Kvarner Bay (Cres, Krk, Lošinj and Rab in particular), which were attached to the mainland during the Mesolithic.

Compared to the Eastern Balkans, a reasonable number of Mesolithic sites have been identified, many of them lithic scatters, and not all excavated. D. Komšo (1996) had identified 58 Mesolithic sites in Croatia alone, which number has subsequently increased; many of these are in Istria, with several on the eastern side of the Dinaric Alps, in areas where focussed and targeted research has taken place. When the sites in Bosnia & Herzegovina and Montenegro are included, the pre-Neolithic and Transition presence of this region is substantially more impressive than in ex-Yugoslavia on the eastern side of the Dinaric Range.

Several authors have noted that in this Region, pottery appears initially in cave contexts in which the economic base seldom differs from the Mesolithic. The earliest pottery is either plain or crudely decorated Impressed Ware, with little by way of plastic art, which only appears in the Middle Neolithic with the Danilo Culture, at the same time as painted pottery. Domesticated animals, which appear in small numbers in the earliest pottery levels of several cave sites, are almost exclusively ovicaprines (Crvena Stijena, Vela Špilja on Korčula, Gudnja Pećina and Zelena Pećina in the Southern Sector; Jami na Sredi on Cres, Vorganska Peć on Krk and Vela Špilja on Lošinj in the Northern Sector), where the Mesolithic lifeways continue largely unchanged (Benac A., 1989; Chapman J. & Müller J., 1990: 132; Evans J., 1987; Forenbaher S & Miracle P., 2005: 517, 2014). The initial interest in the Neolithic economy amongst the hunter-gatherers, other than pottery, appears to have been stock-breeding (Budja M., 1993: 190), and as stated by M. Budja (2001b: 34), "*The dispersal of farming was embedded in the pre-Neolithic social contexts, economic parameters, patterns of mobility and the Palaeoenvironmental conditions of each geographical entity in Southeast Europe*". The earliest full Neolithic package has only been attested in lowland sites on the Dalmatian coast and the Flysch soils at the western tip of Istrian Peninsula (Chapman J. & Müller J., 1990: 132; Forenbaher S. & Miracle

P., 2005: 517; Legge A., *et al.*, 2011), where it is attested some two centuries after the first appearance of Neolithic attributes.

Eastern Adriatic – Western Montenegro, Croatia and Bosnia & Herzegovina – Mesolithic and Transition sites

Southern Sector – Mesolithic and Transition sites – Introduction

Montenegro, at the southern end of the Region, is a meeting ground between the different Mesolithic traditions emanating out of the Palaeolithic (Epigravettian, Sauveterrian, Romanellian, Castelnovian) at sites such as Crevena Stijena near the coast, Odmut, Medena Stijena, Mališina Stijena and Trebački Krš inland, and Zelena Pećina in South-West Bosnia & Herzegovina; it is also geographically close to the Greek and Albanian Mesolithic, Transition and Early Neolithic, as well as that inland and further north-west along the Dalmatian coast. The Mesolithic of Montenegro emanates from the 'Epitardigravettian', and includes the technologically impoverished industries from Trebački Krš and Crvena Stijena Levels VII-V, characterised by the expedient technology and rather conspicuous Romanelian component. The Castelnovian appear first in horizon IVb2 at Crvena Stijena, where changes in the repertoire preceded the introduction of new technology (denticulated blades and blades with notches), and this Castelnovian technology probably spread inland from the coast (Vruća Stijena, Crvena Stijena) to the hinterland (Kozlowski J. K., 2007: 39; Kozlowski J. K. & Kaczanowska M., 2009; Merkyte I., 2003: 309-310; Mihailović D., 2007a: 23-24; Müller J., 1988: 119). Several of these Montenegrin sites have supplied evidence of the Transition with Final Mesolithic hunter-gatherers acquiring Neolithic attributes.

Further north, up the Dalmatian coast and its hinterland, and on the islands, most of which were attached to the mainland during the Early Holocene, there are several known Mesolithic and Transition sites, exclusively in caves and rock-shelters, as well as Early Neolithic open-air and cave sites. The colonisation of the Istria uplands occurred during the Late Palaeolithic and Early Holocene (Pellegatti P., 2009: 51), according to present knowledge, along natural passageways to the uplands, inside canyons and on flat terraces. There are up to 18 known Early Mesolithic cave and open-air sites in North-East Istria, out of 25 known on the peninsula, which served different purposes (hunting sites, knapping sites, watch-out sites, residential or multiple activity sites) (Komšo D., 2009: 288-289; Komšo D., *et al*., 2008).

Southern Sector – Mesolithic and Transition sites – Site details

Badanj (66) – This is a cave in Bosnia & Herzegovina some 7 km downstream from Stolac on the right bank of the River Bregava, which was used during the Palaeolithic and Mesolithic. Because the upper Levels have been lost (Marijanović B., 2013: pers. com.), little is known of the Mesolithic other than the fact that land snails were collected (Rizner M., *et al*., 2009).

Crvena Stijena (74) – This rock-shelter, which means 'Red Rock', at 700 masl, is in a dramatic location some 600 m above a canyon in Montenegro, facing the border of Bosnia & Herzegovina on the opposite side of the canyon (Fig. R14-2). The sea is distant some 30 km over difficult karstic terrain and steep mountains. The mouth of the rock-shelter is 26 m wide and 15 m deep at the top and 25 m at the base of more than 20 m of stratigraphy, with the occupation going well back into the Middle Palaeolithic or earlier. The surrounding land is unsuitable for agriculture, which even today is minimally practiced within many kilometres on the karstic terrain.

The site was first excavated in 1960-1964 by A. Benac, and M. Baković undertook fresh excavations between 2004-2006. In 1987 A. Benac reported that Level IV (from a total of XXXI Levels) was Mesolithic, whilst Level III saw a continuation of the Mesolithic lithic tradition and

economic base, except that Impressed Ware was present (Figs. R14-3 & R14-3a) (Marijanović B., 2007: 49). This has been confirmed by J. K. Kozlowski, *et al*., (1996: 66), who states that the industries of the 'para-Castelnovian' type evolve in layer IV, and are still in evidence at the moment when the Impressed Ware appears in Level III, with little modifications (Fig. R14-4); the thumbnail circular scrapers in particular also appears to be of epi-Romanellian tradition. The 2004-2006 excavations, which focussed on the Late Pleistocene and Holocene (Fig. R14-3), confirmed the findings from the earlier excavations, and M. Baković, *et al.*, (2009) correlated their Level 2 with Level III from the earlier excavations. Late Mesolithic deposits were found in Level 2 at the western end of the top plateau in Area 1. "*Although only remnants, these layers were intact, containing several hearths and ash lenses, provided a small but good sample of Mesolithic archaeological materials, and produced a series of three consistent 14C dates of about 6400 cal BC for one of the upper layers and around 8000 cal BC for one of the lower layers*" (p. 11). Level 1 was disturbed with material from several periods (Middle Neolithic, Early and Late Bronze Ages, and Early Iron Age), as well as two post-holes near the base. The Mesolithic dates from Level 2, for which the uncalibrated dates were not shown, are (Baković M., *et* al., 2009: 22):

- Beta-211504 6510-6430 BC, Level 2 squares E-F97 – Median 6470 BC.
- Beta 211503 6500-6420 BC, Level 2 square E97 – Median 6460 BC.
- Level 3 was thin and could be the result of ground levelling. It was only visible in a limited area
- Beta-211505 8190-7700 BC, Level 4 – Median 7945 BC.

They also state that the Early Neolithic pottery found in squares A96-103 to O100-105 can be linked to Level III of the previous excavations (p. 13).

The mention of *Capra hircus* in Level IV of the early excavations (Budja M., 2001: 132, quoting Malez, 1975: 160; Marijanović B., 2007) is problematical, whilst S. K. Kozlowski (1987:15) mentions domesticated sheep in the Impressed Ware levels. The possible presence of ovicaprines in Level IV could be an intrusion from upper levels (Mihailović D., 2007a: 24). D. Mlekuž (2003: 143) states that the bones were those of sheep according to Basler (1983) and that according to Malez (1975) level IIIa contained pottery, a large number of ovicaprine bones and continuation of the Mesolithic lithic tradition.

This is a clear instance of a cave site, in terrain totally unsuitable for agriculture, occupied by hunter gatherers since the Lower Palaeolithic, who acquired pottery in the Late Mesolithic, probably by exchange, given the amount of Impressed Ware pottery found, as well as ovicaprines, in an otherwise Mesolithic cultural and economic context. It is unfortunate that there are no dates for the earliest Impressed Ware levels, which also contain remains of ovicaprines, which could date between 6500-6400 BC. The presence of domesticated animals is not surprising, and must have been obtained at some point, possibly later than the Impressed Ware during the Transition, after which the occupants appear to have abandoned the site.

Gudnja Pećina (73) – This south-facing cave site near Ston at the base of the Pelješac Peninsula is located at 400 masl (Fig. R14-5). The site was originally excavated over 150 m^2 in the 1960s by S. Petrak, curator of the Dubrovnik Archaeological Museum, but never published; it was re-examined by B. Marijanović in 2004, who excavated a restricted surface and published his findings in 2005. The entrance faces south, is 15 m wide, and the cave is 20 m deep and 33 m wide in the interior. Agriculture is impossible anywhere near the vicinity of the cave.

The 2004 excavations uncovered a thin basal Level over part of the surface (Fig. R14-4) with a maximum depth of 30-35 cm, which produced some archaic lithics and bone tools, with some sherds of archaic Impressed Ware (Fig. R14-5). "*The Early Neolithic (phase I) is represented by a thin deposit and small number of finds that makes the hypothesis of the cave's short-time occupation during this period very plausible. Its position within the periodisation of the Impresso culture is difficult to determine owing to the limited number of finds, but Mesolithic traditions of flint artifacts, and simple*

and quite rustic ornamental system on pottery suggests determination of this phase to the beginning of the Early Neolithic" (Marijanović B., 2005: 111).

The site does not appear to have been used on a continuous basis, but continued to be visited as a temporary station until it was abandoned in the Bronze Age when the build-up of the cultural Layers reached the ceiling. During the earliest occupation, B. Marijanović (2005: 101, 2009a: 248) indicates that there appear to have been a limited number of occupants; he makes no mention of faunal remains in his excavations report, although domesticated taxa are referred to with the dates obtained from the earlier excavations, which have been quoted by several authors (Biagi P., 1994; Budja M., 1993; Chapman J. & Müller J., 1990), whilst others have commented that these came from insecure contexts since the Early Neolithic stratum was only a few cm thick and the excavation used arbitrary levels (Budja M., 2001: 130; Marijanović B., 2007):

- GrN-10315 7170±70BP = 6216-5970 BC (OxCal 4.2 at 87.4%), on charcoal, Level with domesticated caprines & pigs with Impressed Ware – Median 6093 BC.
- GrN-10314 6935±50BP = 5916-5723 BC (OxCal 4.2 at 92%), on charcoal, domesticated caprines & pigs with Impressed Ware – Median 5820 BC.
- GrN-10311 6560±40BP = 5569-5472 BC (OxCal 4.2 at 86.4%), on charcoal, wild fauna & Impressed Ware – Danilo transition.
- GrN-10313 6520±40 = 5559-5461 BC (OxCal 4.2 at 77.0%), on charcoal, Danilo culture.
- GrN-10312 6415±40 = 5472-5325 BC (OxCal 4.2 at 95.4%), on charcoal, Danilo culture.

Gudnja Pećina appears to have been first occupied towards the end of the 7th millennium BC by Mesolithic hunter-gatherers undergoing the Transition. The site may have been used by herders and/or hunters, since the terrain does not appear to lend itself to occupation as a base camp, and is totally unsuitable for agriculture. Both B. Marijanović and D. Vujević independently confirmed (2013: pers. com.) that some Mesolithic tradition is visible in the Basal Level.

Kopačina Špilja (62) – This cave-site is on the Island of Brač at 280 masl. There is a porch area and the cave entrance is 10 m wide and 3.5 m high (Fig. R14-6). The site appears to have been poorly excavated and has never been properly published (Bass B., 1998: 174; Marijanović B., 2009a; Paunovic M. & Karavanic I., 1999; Vujević D., 2013: pers. com.). The island became detached from the mainland shortly before the occupation, which includes the collection of *Helix sp.*, which form a midden between the Mesolithic and Bronze Age Levels (Bass B., 1998: 172; Paunovic M. & Karavanic I., 1999; 403; Rizner M., *et al*., 2009).

A single date from the level below that of the Bronze Age is supplied by J. Chapman and J. Müller (1990):

- Z-778 7850±140BP = 7076-6442 BC (OxCal 4.2 at 95.4%) – Median 6760 BC.

D. Vujević (2013: pers. com.) informs that the site is currently the subject of new on-going excavations, which will hopefully clarify details regarding its occupation.

Krajicina Špilja (71) – This cave site on the northern coast of the Island of Vis, currently some 40 km off the coast of Southern Dalmatia, 40 km west of the island of Korčula and 15 km from the Island of Hvar, has a lower stratigraphy with marine and terrestrial shells and evidence of hearths. One sherd of Impressed Ware was also found, without there being any evidence for continuity of occupation. The site is not known for its Mesolithic content (Bass B., 1998; Marijanović B., 2013: pers. com.). In the absence of dates it is not possible to assess the significance of this site which could only have been reached after a sea crossing since a date prior to the Holocene, but it was used by Late Mesolithic/Transition and/or Early Neolithic navigators.

Markova Špilja/Markus cave (68) – This cave site on the island of Hvar was excavated in the early 1950s by Novak, who also excavated Grapčeva Špilja a few km away. The occupation which commenced right at the end of the Mesolithic/Transition, continued throughout the Neolithic. S.

Forenbaher (1999-2000: 374), commented that "*the two sites on Hvar already have been extensively excavated, and the finds published in great detail (Novak 1955, 1959, 1962, 1967, 1968). Unfortunately, however, these finds were accompanied by only the most basic information about their stratigraphic context*". The lowest Level, whilst disturbed, contained Impressed Ware in an otherwise Mesolithic context (Bass B., 1998, quoting Müller 1991; Budja M., 1993: 188; Manfredini A., 1987: 369). B. Marijanović (2013: pers. com.), whilst recognising that the basal layer contained some Mesolithic, indicated that a Gargano flint bell-axe was also found in the Mesolithic context, adding confirmation to the Mesolithic trans-Adriatic navigation using the islands as stepping stones.

This is most likely a Transition site at its lowest levels, but no further details are available.

Nakovana Špilja (70) – This cave site, close to the extremity of the Pelješac Peninsula is listed with the Neolithic sites below.

Odmut (59) – This cave site in North-Eastern Montenegro, now beneath the waters of the Piva Dam reservoir, which is treated in detail with the Central Balkans (Region 10; Figs. R10-4, R10-4a & R10-4b), is mentioned here because of the evident continuity between the Mesolithic and the Neolithic. *Ca.* 5700 BC, the occupants first acquired Starčevo pottery, and later Impressed Ware, whilst maintaining Mesolithic lithic traditions, and a predominantly hunting and collecting economy with a few ovicaprines, until almost the end of the regional Early Neolithic. The Transition at this site thus lasted about 700 years until the site was abandoned towards the end of the 6th millennium BC, prior to the Transition being completed, during which time they accepted those Neolithic attributes which they found appealing.

Palagruža Island (77) – This bare rock, and its sister islet of Mala Palagruža, (Fig. R14-7) devoid of vegetation other than scrub, as well as of water, is about half way between Lastovo and Sušac Islands on the eastern seaboard and the Gargano Peninsula in Apulia on the western shore of the Adriatic. The island was visited and used as a stepping stone for navigation across the Southern Adriatic from the Early Mesolithic if not the Late-Glacial as evidenced by the similarities in the lithic assemblages on both shores during the Romanellian, a pierced Columbella shell (not known in Neolithic contexts), a gabrodiorite stone object, most probably from the island (or from Jabuka or Brusnik islets) found with burial N° 2 at Vela Spila on Korčula, dated *ca*. 6900 BC (Radić D., 2009: 13), and a Gargano flint bell-axe found in a Mesolithic context at Markova Špilja on the Island of Hvar (Marijanović B., 2013: pers. com.). The islands were also a source of flint.

The Neolithic is attested by a few sherds of Early Neolithic Impressed Ware found in three separate locations, with most coming from a small plateau known as Jonkova Njiva (Fig. R14-7) associated with a few prismatic blades and tools made on flakes (Forenbaher S., 2014). These finds confirm navigation and, most probably, one of the principal routes for the Neolithic migrants, the trade in obsidian from Lipari, as well as other objects and knowledge in both directions.

Vela Špilja/Vela Spila – Korčula (72) – This is an important Mesolithic, Transition and Early Neolithic cave site without any important occupational discontinuity between the Palaeolithic and historical times. The cave, above the port town of Vela Luka at the western end of the Island of Korčula, is 130 masl with a spring 200 m below the cave (Fig. R14-8). The land surrounding the site is steep, rocky and not propitious for agriculture. The island is only 1.5 km from the Pelješac Peninsula, to which it would have been attached at the beginning of the Holocene, when the sea would have been some 15 km distant (Fig. R14-1) (Čečuk B. & Radić D., 2005), as well as during the Transition. The site has been extensively excavated (Fig. R14-9) with the latest reports based on the excavation conducted by D. Radić in 2004. The 2004 excavations appear to have substantially changed the interpretations based on the previous excavations, particularly as regards the appearance of Monochrome Pottery before the Impressed Ware (Fig. R14-9), the evolution of the lithic technology

during the Transition, the appearance of ovicaprines and the changes in diet over the Transition and Early Neolithic. We will therefore base our information primarily on the 2004 excavations, as reported by D. Radić (2005, 2009).

The stratigraphy from the earlier excavations is here correlated with that of 2004 which was conducted on a 5m high cut next to the wall, 3 m^2 at the top 4 m^2 at the bottom, since it risked collapsing into the excavations, and which was split into 19 strata numbered from top to bottom (Radić D., 2005):

- Strata 4-6 are Impressed Ware;
- Strata 7-9 are mostly Mesolithic (Transition) (the Neolithic with earliest pottery starts with Level VI in the previous excavations (Čečuk B. & Radić D., 2005));
- Strata 10-15 are Mesolithic (the Mesolithic ends with Level VII in the previous excavations);
- Strata 16-19 are Late Pleistocene and the beginning of the Holocene.

During the Palaeolithic the principal animals hunted were red deer and equids with some suids and fallow deer (Čečuk B. & Radić D., 2005: 33). In the Mesolithic Strata 16-9 there are land snail remains, mostly of *Eobania vermiculata*, which are still eaten to this day. The only land mammals are roe deer and hare, plus marten, fox and wildcat. Given the prevalence of large mammals attested for the Late Palaeolithic, the explanation can maybe be found in the occasional use of this cave-site for fishing and navigation (Radić D., 2005: 332-333). During the Mesolithic, the sea-level rose to -20m and the coastline crept closer to the cave, so that by the Late Mesolithic, estuarine birds were captured, shellfish collected and fish caught, including sea bass, tuna, swordfish and dolphin, whose capture required proficient navigation and deep-sea fishing (Bass B., 1998, 2008; Čečuk B. & Radić D., 2005: 61-62; Radić D., 2005: 340); additional evidence for Mesolithic navigation is chert from Palagruža Island in the middle of the Adriatic, found in the Mesolithic horizons (Radić D., 2005: 340) and the presence of an igneous cobble of gabrodiorite from Palagruža Island or Brusnik Islet west of the Island of Vis, found with burial N° 2, dating from the early 7th millennium BC (Čečuk B. & Radić D., 2005: 61-62; Radić D, 2009: 13):

- Wk-24217 8004±14BP = 7050-6829 BC (OxCal 4.2 at 95.4%) – Median 6940 BC.

  A further date on a Mesolithic human bone is reported (Forenbaher S., *et al.*, 2013: 591):
- OxA-18171 8110±37 = 7186-7037 BC (OxCal 4.2 at 94.2%), on human bone – Median 7110 BC.

During the Mesolithic the lithic tradition changed, becoming non-standard, primarily on flakes and poor in quantity (Batović S., 1987: 344; Čečuk B., Radić D., 2005). The lithics in the Transition Strata 8 and 7 of the 2004 excavation are of mostly Mesolithic tradition with a tendency over time towards better quality raw materials and Neolithic debitage, although B. Marijanović (2007: 247) indicates that there is a lithic discontinuity between the two phases in the flint artefacts, which could indicate that changes in the debitage occurred elsewhere. Some of the chert appears to be from Palagruža Island.

A fragment of monochrome pottery, which "*due to the quality of manufacture, the absence of decoration, as well as the fact that it was found below the Impressed Ware layer, we presume this to be a fragment of 'monochrome ware' similar to that which characterizes the earliest pottery production in Greece*" (Radić D., 2009: 17-18) (Fig. R14-9a). This monochrome pottery, together with other sherds found at the same levels at the site, are similar to that found in the lower ceramic Level at Sidari dated between 6400-6300 BC, suggesting coastal contact or migration from 500 km the south (Radić D., 2005: 336-337). "*The fragments from Vela Spila are exceptionally well-preserved, as conditions for their preservation in the cave are incomparably better than those at open sites such as Sidari. The total quantity of fragments in strata no. 8 and 7, and even in stratum no. 6 (table 1), imply the gradual and long-lasting acceptance of ceramics. The monochrome vessel fragment from stratum 7 does not mean that ceramics played an important role in the life of this population. It is more likely evidence of the process of slow acceptance of a new media, and there are hypotheses on the original use of pottery for other, not entirely practical purposes.*

The differences between the remains of material culture in sediments 16 through 9 and those in sediments 8 and 7 appear primarily in the fact that in the more recent strata there is a gradual advance of the new, Neolithic technology of knapping stone and sporadic use of ceramic vessels. A change in a larger number of examples was only observed in stratum 6, and in 5 and 4, whereas previously it was only present in individual items intermixed with those more numerous, made using earlier technology. In this manner, strata 8 and 7 are a link, something of an introduction to the Neolithic, i.e. the transition period between the previously (for now) poorly defined Mesolithic production of flint implements and the well known, relatively rich Neolithic production characterised primarily by long blades with trapezoidal cross-sections" (Radić D., 2005: 337).

The transitional nature is further attested by a small number of ovicaprine remains starting at the top of Stratum 9 and continuing in Strata 8-7 in the pre-Impressed Ware Strata of the 2004 excavations. The remains of fish and molluscs diminish in importance, whilst still important compared to subsequent strata when the Neolithic is more affirmed.

There are no new dates for the 2004 excavation, but those from Levels equivalent to Strata 9-8 of other areas, representing the earliest pottery Strata are:

- Z-1967 7300±120 BP = 6425-5984 BC (OxCal 4.2 at 95.4%), on wood charcoal from the base of Level 6 of earlier excavations, which at the time was incorrectly thought to be Impressed Ware; in fact, the base of Level 6 is primarily Mesolithic, with some Neolithic attributes including plain monochrome pottery (i.e. Transition) – Median 6205 BC.
- VERA-2340 7200±30BP = 6110-6003 BC (OxCal 4.2 at 91.4%), on wood charcoal from Level 7-4 of the earlier excavations, underlying the first Impressed Ware in Level 6 – Median 6055 BC.
- VERA-2342 7175±35BP = 6096-5987 BC (OxCal 4.2 at 95.4%), on animal bone from the top of Level 7-3 of the earlier excavations, underlying the first Impressed Ware in Level 6 – Median 6040 BC.
- Z-1968 7000±120BP = 6081-5647 BC (OxCal 4.2 at 95.4%), date for earliest farming context (Forenbaher S. & Miracle P., 2014, quoting Radić, 2009) – Median 5865 BC.

S. Forenbaher and P. Miracle (2014: 239) state that according to the excavator (Radić, 2009), "*undisturbed deposits were encountered at several locations within the cave that were marked by Late Mesolithic lithic industry and faunal remains reflecting hunting of wild animals, but which also contained occasional ovicaprine bones, as well as an odd potsherd or a prismatic blade segment. Two of the associated radiocarbon dates are contemporary with the earliest dates from farming contexts in Dalmatia, whilst a third date is a century older. One is tempted to see those finds as reflecting the "availability phase" of Neolithic transition (Zvelebil and Lillie, 2000)*". D. Radić (2005) considered the earliest date for the introduction of Impressed Ware to the region to be not much earlier than the date obtained from Sušac Island of:

- ETH-22912 6925±65BP = 5926-5706 (OxCal 4.2), on wood charcoal – Median 5815 BC.

It is probable that the process of neolithisation and the acceptance of the new economic model occurred over several generations. The first indications (monochrome pottery and ovicaprines) appear to have first come up from the south, whether from Corfu, some 500 km to the south, or a combination of locations, sometime around 6200 BC. Impressed Ware, Neolithic knapping, polished stone and possibly agriculture were added sometime around 5850 BC either from the south or from Apulia, via the Gargano and across the Adriatic via Palagruža and Sušac Islands. In the Impressed Ware Strata 6-4 the economic use of marine products is very much reduced, and hunting played a very much secondary role with the predominant component in the diet being ovicaprines (Radić D., 2005: 344).

This is clearly a Transition site, which might have been used on a seasonal basis during the Late Mesolithic, and which could have incorporated some Neolithic migrants with their exotic cultural baggage during the Transition.

Vrbička Pećina (67a) – This cave-site in Montenegro, 920 masl, which was recently used as an animal pen, appears to have a rockshelter to the side. The cave was under excavation in 2012 (Fig. R14-10). The stratigraphy would appear to indicate that the rockshelter was subject to discontinuous occupation, and that whilst the Late Mesolithic Level has been dated ca. 6900 BC, there is a subsequent hiatus until the Bronze Age (Fig. R14-10) (Cristiani E., 2014 presentation at MesoLife Convention at Selva di Cadore, N. Italy, and the Meso 2015 Convention in Belgrade).

Vruća Pećina (76) – This Late Mesolithic cave site in Montenegro is about 10 km north of the capital Podgorica. It was excavated by L. Đuričić, who reported briefly on the excavations in 1997. Levels Ia and Ib are recognised as Late Mesolithic Castelnovian even if the lithics have not been properly studied. (Fig. R14-10a) (Đuričić L., 1997; Mihailović D., 2007: 22; 2009). Harpoons were also found in the Mesolithic horizon, similar to those dating from the Transition at Odmut Cave (Mihailović D., 2007: 22; 2009). Above the Mesolithic levels Impressed Ware pottery was found, with lithics that appear to continue with the Mesolithic tradition (Fig. R14-10a), suggesting that the hunter-gatherers acquired the pottery as part of the Transition process.

Zelena Pećina (63) – This rock-shelter, which means 'Green Rock-Shelter' (Fig. R14-11), Excavated by A. Benac in the 1950s, is located south-south-east of Mostar in Bosnia & Herzegovina, at some 700 masl, in a location propitious for communication and animal husbandry, but not for agriculture (Budja M., 1993: 188; Forenbaher S. & Miracle P., 2005: 517; Manfredini A., 1987: 369; Marijanović B., 1990: 12: Müller J., 1988).

The site contained Impressed Ware in an otherwise Mesolithic context in which the hunt predominated (Budja M., 1993: 188; Forenbaher S. & Miracle P., 2005: 517), above a purely Mesolithic Level, comparable to Crvena Stijena (Manfredini A., 1987: 369, quoting Benac A., 1957).

This site was occupied in the Mesolithic and into the Transition, when the hunter-gatherers acquired pottery. There is no indication of domesticated fauna during the early Transition, nor are there any dates.

Central Sector – Mesolithic and Transition sites – Site details

Stray Mesolithic finds have been discovered on the islands of Molat (north of Dugi Island), Dugi (Long island furthest out to sea in front of Zadar) and Ugljan (island in front of Zadar), as well as at Unešić (west of Danilo) and Sinj (inland north of Split). The Mesolithic sites and stray finds are important in that they supply additional evidence that the Eastern Adriatic was inhabited in the Holocene prior to the arrival of the Neolithic (Marijanović B., 2009: 223).

Dugi Island (44) – Stray Mesolithic finds on this island (Marijanović B., 2009).

Gospodska Pećina (42) – Transition cave site close to the springs of the Cetina River. It was excavated by I. Marović and M. Malez, who both reported on the excavations in 1979. The occupation goes back to the Palaeolithic and after a long hiatus is occupied again in the Late Mesolithic and again in the Early Neolithic, for which there is a single date quoted from Srdoč *et al*., (1981) (Biagi P. & Spataro M., 2002):

- Z-579 (or 597) 7010±90BP = 6034-5726 BC (OxCal 4.2 at 95.0%), level with Early Impressed Ware and domesticates – Median 5880 BC.

This date is also quoted by J. Chapman and J. Müller (1990) and M. Budja (1993: 189). S. Forenbaher and P. Miracle (2005: 518) indicate that there is a gap of 1100 years between the youngest Mesolithic and earliest Neolithic, which is given as Level 3A where pottery and some domesticated animals were found. B. Marijanović (2007: 51) considers the site to have been used by hunters or as a

shepherd's halt, and in a personal communication (2013) indicated that whilst there were signs of Mesolithic traditions, these were not in a stratigraphic position.

From the information gleaned, it is possible that this is a Transition site.

Molat Island (37) – Stray Mesolithic finds have been discovered on this island north of Dugi Island (Marijanović B., 2009a: 223), which would have been part of the mainland at the time.

Sinj (54) – Stray Mesolithic finds have been collected inland north of Split at Sinj (Marijanović B., 2009a: 223).

Ugljan Island (41) – Stray Mesolithic finds have been discovered on this island in front of Zadar (Marijanović B., 2009a: 223), which would have been part of the mainland at the time.

Unešić (54) – Stray Mesolithic finds from this village near Danilo have been discovered (Marijanović B., 2009a: 223).

Vaganačka Pećina (33) – This near-coastal cave site (Fig. R14-12) is to be found at some 500 masl on the Velebit Massif 5 km north of Starigrad Paklemica. The site was the subject of a limited excavation in 1984, and S. Forenbaher and P. Vranjican (1985) reported that a "*sondage trench excavation of a very limited area of the site was carried out (7 m^2 or about 2% of the total area). Nevertheless, in the cultural stratum that is more than 4 m thick it was possible to distinguish 8 successive phases of occupation, beginning in the Mesolithic and continuing without major breaks almost to the end of the prehistoric period.*

Phase 1 belongs to the mesolithic and is represented by a number of microlithic tools and a bone awl (plate 1a).

Earliest pottery appears in phase 2, and although scarse, there are some sherds of cardium-impresso decorated ware which are typical for the early neolithic of the Mediterranean".

For the Mesolithic occupation D. Komso (2006: 70-71) states that "*three roughly 10 cm thick embedded layers were registered, which consist almost entirely of whole snail shells, mutually separate embedded layers of soil or soot of uniform thickness. A total of 40 lithic artefacts, including two thumbnail endscrapers and two blades with linear retouch, one bone awl, faunal remains and numerous shells of terrestrial (Helix) and marine molluscs were collected*". According to D. Mlekuž (2003: 143), quoting S. Forenbaher and P. Vranjican, ovicaprine bones were also found in the Mesolithic context.

It is highly probable that this undated site was occupied over the Transition by Terminal Mesolithic hunter-gatherers in the process of acculturation, who acquired Impressed Ware and ovicaprines and that the cave continued in use into the Neolithic. D. Komšo (2013: pers. com.) also confirmed that this cave was probably a Transition site.

Vlakno Špilja (44) – This is a Palaeolithic and Mesolithic site in the middle and narrowest point of the Island of Dugi (Dugi Otok means Long island) opposite Zadar, which would have been part of the mainland at the time it was occupied. This cave site, 100 m from the shore at 50 masl is being excavated by Dario Vujević, who has yet to publish details of the excavation (Vujević D., 2013: pers. com.). Two dates have been published for the Late Palaeolithic of this site for levels 7 and 10 (Komšo D., 2006: 74-75):

- Z-3383 10160±100BP = 10214-9378 BC (OxCal 4.2 at 95%), Level 10 – Median 9795 BC.
- Z-3382 9640±80BP = 9256-8796 BC (OxCal 4.2 at 95.4%), Level 7 – Median 9025 BC.

According to B. Marijanović (2013: pers. com.), this small cave-site was used in the Late Mesolithic, but is unlikely to have any evidence for the Transition.

Zemunica Pećina (55) – This Mesolithic cave site near Bisko was the subject of rescue excavations during the construction of the Adriatic motorway. Two trenches 3 x 3 m were excavated in 2005 in which "*numerous faunal remains and several hundred lithic artefacts, as well as terrestrial snail shells, were collected, and several fireplaces were registered. The collected materials indicate a rich Mesolithic site*" (Komšo D., 2006: 75). S. Forenbaher and P. Miracle (2014) report on a date for the appearance of Neolithic attributes at this site, which we have shown for two percentage spreads using OxCal 4.2, and which suggest that the Neolithic attributes appear *ca.* 6000 BC:

- Beta-225630 7120±40BP = 6066-5969 BC (OxCal 4.2 at 76.5%) – Median 6020 BC.
- Beta-225630 7120±40BP = 6066-5909 BC (OxCal 4.2 at 95.4%) – Median 5990 BC.

The date for the appearance of the Neolithic attributes is one of the earliest in the Central Sector, suggesting that the Mesolithic occupants of the cave-site acquired Neolithic attributes prior to the arrival of Neolithic migrants with the full Neolithic package.

Northern Sector – Mesolithic and Transition sites – Site details

Abri Šeraja (22) – This site of unknown extension is located in a series of dolina sunken river channels/collapsed underwater rivers in Istria, some 5-8 m below the surrounding plateau which is 225 masl (Fig. Fig R14-13). The site is about 30 m south of 45°13599N; 13°79827E and potentially stretches some distance in channels around the rock overhangs, which provide rock-shelters (Fig. R14-13). These were possibly in use from the Mesolithic to the Bronze Age (when they were used as pens for the ovicaprines of the Castelleri hilltop settlements nearby). A trench 2 x 1 m was opened in 2005 by D. Komšo (Fig. R14-13), who showed me the site in 2011, where he found no visible stratigraphy in the compacted deposits. No Castelnovian diagnostic material was found, but bladelets and Middle Neolithic lithics. It is the only site known in Istria north of the Limski River to have produced Impressed Ware (Komšo D., 2011: pers. com.).

There is no assured Mesolithic occupation, but the location, deep into karstic country and far from any agricultural land, with its Impressed Ware, suggests that it could have been occupied by hunter-gatherers during the Transition.

Brgujčeva Loza 1 (2) – This cave site north-east of Rijeka at the northern end of Dalmatia, is located at 705 masl. It was excavated by M. Malez in 1954 and 1971, and again by R. Starac in the 1990s. The material found suggests that is was occupied during the Mesolithic (Komšo D., 2006: 63-64).

Čepićko Poljer/Poljer Čepić (21) – This polder lake on the east side of Central Istria, was dried out in 1932; it has been the subject of an extensive survey under D. Komšo, and five open-air sites dated on typological grounds to the Mesolithic have been identified round its perimeter which was 25 masl (Frankoli, Kostadini, Kralji, Marišće, Žiganti). Of these, the sites of Frankoli and Kostadini have been the subject of limited excavations (Balbo A., *et al.,* 2009; Komšo D., 2006). None of the sites appears however to have been occupied during the Transition.

Dančeva Peć (17) – Unpublished probable Late Mesolithic site in Central Istria near Baderna reported on by Malez in 1987 (Komšo D., 2006: 72).

Frankoli (21) – One of 5 sites round Čepićko Polje on the Istrian Peninsula. 4 m2 have been excavated and 56 lithic artefacts were collected of which 9 tools and 4 cores. Typologically it has been dated to the Late Mesolithic. (Komšo D., 2006).

Jačmica Pećina (4) – This Karst cave site, 385 masl, 4.8 km northwest of the town of Buzet, close to the Slovenian border, was first examined at the end of the 19th century and re-examined in 2004 by D. Komšo and P. Miracle, when two test-pits were dug, one at the entrance and the other inside the cave.

The 3 m^2 excavation at the entrance produced a wealth of Mesolithic lithic material and wild fauna. Two dates were obtained (Forenbaher S., *et al.*, 2013; Komšo D., 2006: 69):

- OxA-18025 9115±45BP = 8456-8252 BC (OxCal 4.2 at 95.4%), on *Pinus* charcoal – Median 8355 BC.
- OxA-18181 6191±31BP = 5228-5039 BC (OxCal 4.2 at 94.4%) on *Fraxinus* charcoal – Median 5135 BC.

The material suggests that a Mesolithic group used this cave for a period of time during the Early Mesolithic, with no indication of any Transition. The dates suggest a three millennia hiatus between occupations (Komšo D., 2006-69).

Jami na Sredi/Jamina Sredi (31) – This cave site is located on the western side at the southern end of the Island of Cres, which would have been connected to the island of Krk and the mainland in the early Holocene. The cave opening in 13.3 m high and the cave is 69 m deep. The site was excavated by Mirosavljević in the late 1950s, who opened 3 trenches in 1955, 1957 and 1958. The archaeological deposits were 4.35 m thick and covered the Solutrean, Gravettian, Mesolithic, Early Impresso B Neolithic and middle Neolithic (Spataro M., 2002: 50). During the Mesolithic *Helix sp.* were collected, confirming the 'wide spectrum revolution' (Rizner M., et al., 2009), and continued without any interruption over the Transition, when Impressed Ware and a few domesticated animals are present in an otherwise Mesolithic lithic and economic context, with over 50% wild fauna (Batović S., 1987: 344; Benac A., 1987: 337; Budja M., 1993: 188; Marijanović B., 2007). A. Benac (1987: 336-337) is not certain whether the domesticated animals were acquired at the same time as the pottery, or whether these arrived a little later as is the case at Crvena Stijena in Montenegro and Vorganska Peć on the Island of Krk.

M. Spataro (2002: 67), who studied the Impressed Ware from the Transition, considered this to be of local provenance with many similarities with that of the close-by site of Vela Špilja Lošinj, which might have been contemporaneous.

It is clear that there is continuity of occupation over the Transition and that the Mesolithic occupants and their descendants acquired Neolithic attributes which appealed to them as a continuation of the 'broad spectrum revolution'. Given the proximity of this site with that of Vela Špilja Lošinj, the two sites may have been used by the same group that exploited the resources of the North Adriatic Plain during the last glaciation, with their descendants adding the coastal resources as the sea encroached on the plain.

Klanjčeva Pećina (11) – This cave-site at 828 masl, a few hundred metres distant from Abri Šebrn on the Istrian peninsula, was first occupied in the Early Mesolithic. Examined by M. Malez in 1953 and again in 1966, it was re-examined in 1998 as part of the Pupićina Cave Project, when a 2 x 2 m trench was excavated. "*During the Mesolithic the cave probably served as a short-term logistical camp for a small group of hunter-gatherers during the summer hunting season at higher elevations. Most of the materials can be dated to the Early Mesolithic, while the trapeze made by microburin technique dates at least one phase of use of this cave to the Late Mesolithic. Since this last item was collected outside of a certain archaeological context, this dating should be approached with caution*" (Komšo R., 2006: 66).

Kostadini (21) – This is the largest of five open-air Mesolithic sites found round the perimeter of the lake at the bottom of Poljer Čepić / Čepićko Polje (dried in 1932), which was 24 masl in Central Eastern Istria. The site, 45 m above the lake level, and estimated to spread over 2000 m^2, was the subject of a 6.5 m^2 test excavation in 2005, which produced 46 tools and 28 cores out of 407 lithic artefacts.

Because there are no trapezes or prismatic blades, the assemblage is deemed to be Early Mesolithic, notwithstanding the microburin technique. The representation of most tool types (triangles,

bladelets, endscrapers, burins, pieces with lateral linear retouch, notches, perforators and composite tools) suggests that this site was a multipurpose base camp, with most of the flint coming from a site 2 km to the east (Balbo A., et al., 2009; Komšo D., 2006).

Kotle/Kotli (9) – Mesolithic open air site in Istria from which about 1000 lithic artefacts were collected from the surface and reported on by P. Miracle and S. Forenbaher (1998) (Komšo D., 2006: 71). According to B. Voytek (2006) the material is Late Mesolithic Castelnovian.

Kralji (21) – This is one of the three unexcavated Mesolithic open-air sites near the perimeter of the lake in Čepićko Polje in East-Central Istria (Komšo D., 2006).

Lim 001 (19) – Rockshelter 28 masl at the base of a limestone ridge 9 m wide and 2.5 m deep, with an esplanade in front 2.5 m wide supported on rock-fall boulders, which have prevented the erosion of the sediments. It faces south near the head of the sunken valley/estuary of the Limski river, some 10 km from the open sea (Fig. R14-14).

The site was tested in 2008 with a 1 m^2 trench by D. Komšo. The sediment is made up of almost 100% shell, mostly burned, of limpets, oysters and muscles. Perforated *Columbella rustica* were also found. The lithics are Castelnovian, with no evidence for occupation in the Transition or later. There are several other caves and rockshelters along the Limski Canal with potential (Komšo D., 2011, 2013: pers. com.).

Lopar (30) – This is an open-air site on the Island of Rab in Northern Dalmatia, which would have been attached to the mainland at the beginning of the Holocene. According to D. Komšo (2013: pers. com.) the material collected dates from the Late Palaeolithic to the Bronze Age. "*Lopar on the island of Rab (Malez 1974; 1974a; 1974b; 1979) was researched by Malez, and a portion of the collected materials were attributed to the Mesolithic. A review of the published materials indicated numerous erroneous chronological determinations of certain tool types (e.g. prismatic blades typical of the Neolithic and Eneolithic attributed to the Upper Palaeolithic, or biface arrowheads typical of the Neolithic and Eneolithic attributed to the Mesolithic), but a portion of the materials can conditionally be classified as Mesolithic*" (Komšo D., 2006: 71).

Because of the nature of this site, there is no way of knowing whether it was occupied during the Transition.

Lokve (5) – This open-air site at 915 masl was established in Istria during the Late Mesolithic on a 135m x 35m terrace on Ćićarija Mountain, 9 km north of Pupićina Cave.

Two concentrations of material were found during the 2002-2003 excavations, when 21.5 m^2 were opened out of an estimated site surface of ca 700 m^2.

"*A total of 648 lithic artefacts were collected: 38 tools, 18 cores and core fragments, and 3 microburins. The most common tool group consists of hunting tools (backed points, backed bladelets, and trapeze), while other tool types are rarer. Two trapeze made by microburin technique should be emphasized. They are a clear indicator of the Late Mesolithic, i.e. the Castelnovien tradition, for they are almost unknown in the Early Mesolithic. All collected materials indicate that Lokve is a relatively large and important site for the (Late) Mesolithic, which was used as an open-air camp, generally for specialized hunting activities, and for other activities to a lesser extent*" (Komšo D., 2006: 66-68). In 2009, the author confirmed that the activities undertaken at the site were the debitage of blanks, retooling, rehafting and resharpening, and that the site was a relatively important one for hunting and maintenance activities during the Mesolithic.

Marišće (21) – This is one of the three unexcavated Mesolithic open-air sites near the perimeter of the lake in Čepićko Poljer in East-Central Istria (Komšo D., 2006).

Nugljanska Peć (6) – This Mesolithic cave site, located at 550 masl near Roč at the edge of the Cićarija chain in Northern Istria, has been examined several times, most recently in 1998, when a 4 m^2 pit was opened. The material was Mesolithic, confirmed by the date from a hearth (Komšo D., 2006: 68):

- Beta-127704 8150±70BP = 7367-7028 BC (OxCal 4.2 at 92.6%) – Median 7200 BC.

The quantity of material found, which reduces in size from the Upper Palaeolithic through the Early Mesolithic to the Later Mesolithic suggests that the cave was occupied for longer stays, possibly as a home base (Komšo D., 2006: 68; Pellegatti P., 2009: 50-51).

There is no indication that the site was used during the Transition or the Early Neolithic.

Ovčja Pećina (15) – This Mesolithic cave site is located at 750 masl on the west side of Učka Mountain, opposite Sklepova Cave. It was examined in 2002-2003, when a 5 m^2 trench was excavated. Three periods of occupation in a regional settlement pattern, separated by sterile levels, were found with Mesolithic material, wild fauna, shellfish and land snails. The dates confirm the Mesolithic occupation (Forenbaher S., *et al*., 2013; Komšo D., 2006: 63; Pellegatti P., 2009: 47):

- OxA-18023 9315±45BP = 8715-8430 BC (OxCal 4.2 at 94.2%), on pine charcoal – Median 8575 BC.
- OxA-18024 9310±45BP = 8659-8426 BC (OxCal 4.2 at 87.7%), on pine charcoal – Median 8545 BC.

Podosojna Pećina (20) – Mesolithic cave site 335 masl, to the south side of Učka Mountain in Mošćenička Draga Canyon in Istria. The site was excavated by M. Malez in 1970, R. Starac in 1987-1988 and again in 1997. The material from the later excavations is relatively poor, and the site appears to have been occasionally visited for short term stays by small groups. The single date obtained from the earlier excavations is very late for a Mesolithic context (Komšo D., 2006: 63):

- Z-198 6460±95BP = 5571-5292 BC (OxCal 4.2), Horizon g – Median 5430 BC.

D. Mlekuž (2005: 17) quotes this date to suggest the co-habitation of Neolithic and Mesolithic elements on the Istrian peninsula, notwithstanding the 350 years difference with the earliest median date at the Neolithic open-air site of Medulin-Vižula at the tip of the Istrian Peninsula.

Podpribeniš (1) – This is an open-air site some 15 km north by north-east of Rijeka. "*At Podpribeniš, situated next to a pond at Platak Mountain, about 70 lithic artefacts were collected, out of which a trapeze made by microburin technique should be distinguished, for it designates at least a portion of the materials collected at this site as Mesolithic*" (Komšo D., 2006: 71).

Pupićina Pećina (12) – This south-east facing cave site, 220 masl, is in the Vranja Canyon in Northern Istria; the entrance, up a steep incline some 30 m above the bed of the canyon, is 25 m wide and the depth 30 m (Fig. R14-15), with the sea 9 km to the east over the Učka mountain range, or 20 km down the valley to Plomin Bay. The cave, initially excavated by Ranko Starac at the end of the 1980s and early 1990s, was subsequently excavated under P. Miracle and S. Forenbaher from the mid-1990s.

The cave was occupied episodically from the late Pleistocene into the Middle Mesolithic, after which there is a hiatus of over 2000 years before the cave is again occupied by Neolithic people during the Danilo/Vlaska culture. The stratigraphic context and dates are as follows (Biagi P., 2003b; Forenbaher S., *et al.*, 2004, 2013; Miracle P., 1997; Miracle P. & Forenbaher S., 2005; 2006):

- Levels 23-24 are given as Mesolithic;
- Level 22 is given as the earliest Neolithic, covering the entire area (also given as Horizon H and I);
- Levels 19-21 were Neolithic but almost sterile with 2 ovicaprine bones and a single sherd. One ^{14}C date was obtained for this Level. The single lithic tool (borer) is technically similar to the underlying Mesolithic lithics, with other dates as follows:

- Z-2635 8708±170BP = 8266-7505 BC (OxCal 4.2 at 95.4%), level 24 Middle Mesolithic – Median 7885 BC.
- Beta-131625 6680±100BP = 5782-5469 BC (OxCal 4.2 at 95.4%) on charcoal, Horizon H – Median 5625 BC.
- OxA-18128 6606±36BP = 5617-5488 BC (OxCal 4.2 at 95.4%), on ash charcoal – Median 5550 BC.
- Z-2575 6600±240BP = 6000-5042 BC (OxCal 4.2 at 95.4%), on charcoal, levels 20-21 Neolithic (also given as Horizon I) – Median 5520 BC.
- OxA-18119 6516±36BP = 5552-5378 BC (OxCal 4.2 at 77.0%), on ash charcoal – Median 5465 BC.
- OxA-8471 6495±60BP = 5559-5327 BC (OxCal 4.2 at 95.4%), on ash charcoal, Horizon I – Median 5445 BC.

The first Neolithic occupants appear to have relied almost exclusively on the flocks they penned in the cave for meat protein. They were clearly not Mesolithic hunter-gatherers who had recently acquired domesticated animals and going through a transitional phase, since the kill patterns indicate intensive exploitation of the flock, whilst wild fauna, at about 10%, corroborates the heavy reliance on the domesticated fauna. Use of the site appears to have been mostly in the spring and early summer, shortly after the lambing season. The extensive use of local poor-quality flint in the early phases, whilst there is also good quality exogenous raw material in the lithic assembly points however, to people familiar with the region, so that the possibility that the ancestors of the site occupants were Mesolithic cannot be excluded. The site could have been a special purpose site attached to a nearby village (Miracle P. & Forenbaher S., 2005: 273-274).

Rovinjsko Selo 1 Pećina (24) – This coastal cave near Rovinj on the north side of the Istrian Peninsula was briefly occupied during the Late Palaeolithic or Early Mesolithic (Komšo D., 2006: 69).

Šandalja II (28) – This cave site close to the tip of the Istrian Peninsula was discovered in 1961 in a stone quarry. It is the only known Palaeolithic site on the peninsula, and was occupied through the Mesolithic (Hameau P. 1987: 344). Some 15k lithics were found and some pottery and remains of ovicaprines remains at the top of Mesolithic context, but this probably infiltrated from the Neolithic and Bronze Age settlement above the cave, which was razed when a fort was built in the 19th century under the Austrian-Hungarian Empire (Čuka M., 2013: pers. com.).

Savudrija (3) – Open air Mesolithic site in the north-west of the Istrian Peninsula, at which M. Malez collected a numerous lithic assemblage in the 1970s and 1980s, and according to whom, at least partially dates to the Mesolithic (Komšo D., 2006: 71).

Šebrn Abri (10) – This south-east facing special purpose rock-shelter in the uplands of Istria at 750 masl, some 12 km from the sea, was occupied some 800 years in the Early Holocene between *ca.* 8400-7600 BC. It was excavated in 1997 in a 3 m^2 trench, when marine shells, land snails, wild fauna and lithic artefacts which included many armatures, as well as 14 *Columbella rustica* pierced shells were found. The site started as a hunting halt, and in the later stages of occupation it was used by a larger community (Benghiat S., *et al.*, 2009; Komšo D., 2006: 65, 2009; Lightfoot E., *et al.*, 2011: 75; Rizner M., *et al.*, 2009).

Sklepova Pećina (14) – This cave site is located at 760 masl, opposite Ovčja Pećina, on the Istrian Peninsula. First investigated by M. Malez, who reported on it in 1955 and 1960, it was the subject of a later test excavation of 2 m^2 in 2002 under D. Komšo. The site appears to have been occasionally visited during the occupation of Ovčja Pećina (Komšo D., 2006: 63; Pellegatti P. 2009: 47).

Sveti Stjepan I (8) – This unexcavated site is at the rear of a thermal spring and religious centre in North-Central Istria (Fig. R14-16). The floor of the cave is concreted over, but a Mesolithic stratum in the breccia, visible a few cm above the current ground level, was discovered by D. Komšo in 2011 at the back of the cave. He has described the stratum as undifferentiated Mesolithic (Komšo D., 2011 pers. com).

Sveti Stjepan II (8) – A second unnamed (Sveti Stjepan II temporarily) cave was also discovered at the same time as Sveti Stjepan I, about 1 km to the East at the base of a rock-face some 100-200 m higher up the hillside than Sveti Stjepan I (Fig. R14-16) (Komšo D., 2011 pers. com).

Valenari (7) – Open-air site close to town of Buje in Northwest Istria, where a dozen lithic artefacts attributed to the Mesolithic were collected (Komšo D., 2006: 71).

Vela Pećina (14) – This cave is located on the opposite side of Vranjska Draga canyon to Pupićina Pećina on the Istrian peninsula. It originally formed an underground stream which was cut by the Vranjska Draga long before the Palaeolithic. No occupation is attested.

Vela Špilja Lošinj (32) – This Cave (Fig. R14-17) at 268 masl is on the steep western slope of Mount Televrin, the highest mountain on Lošinj Island, which only became detached from the mainland during the Neolithic, and which lies south of the Istrian Peninsula. The cave was first excavated in the 1950s and 1960s by V. Mirosavljevic, who opened three trenches with 4.12 m of stratigraphy, covering the Middle Palaeolithic to the Metal Ages, but which was poorly published (Spataro M., 2002: 60-61). The site was re-examined in 2004 by P. Miracle and D. Komšo, when the Mesolithic occupation were confirmed (Komšo D., 2006: 70). The site was thus used in the Pleistocene, Mesolithic, Transition, Neolithic and into the Metal Ages.

Dates have been obtained for this site, confirming the Mesolithic occupation, as well as a very early date for a Transition Level with Impressed Ware (Forenbaher S., *et al.*, 2013; Forenbaher S. & Miracle P., 2014):

- OxA-18041 9805±50BP = 9365-9211 BC (OxCal 4.2 at 95.4%), on charcoal – Median 9290 BC.
- OxA-18170 9494±39BP = 8919-8702 BC (OxCal 4.2 at 66.6%), on charcoal – Median 8810 BC.
- OxA-18118 7134±37BP = 6069-5977 BC (OxCal 4.2 at 87.2%), on charcoal from Impressed Ware level – Median 6025 BC.

During the Pleistocene the site would have been on the edge of the North Adriatic Plain, which shrank with the eustatic sea-rise, so that the cave use changed over time.

From the draft of an article prepared for the Croatian Archaeological Society in 2004 by D. Komšo, the following details of the faunal remains were obtained (Čuka M., 2013-06: pers. com.):

- Pleistocene (deer 45%; chamois/ibex 30%; hare 15%; horse 5%; other 5%);
- Mesolithic (deer 18%; chamois/ibex 2%; pig 18%; fish 16%; hare 24%; ovicaprines 18%; other 4%);
- Early Neolithic (ovicaprines 65%; hare 18%; fish 7%; other 10%);
- Late Neolithic/Copper Age (ovicaprines 88%; rabbit 7%; other 5%).

During the Mesolithic land snails were an important constituent in the diet, whilst marine molluscs, which grew progressively in important only represented one tenth of the volume. During the early Neolithic, land snails decreased rapidly to match the marine molluscs, which only increased marginally.

It would seem that the Mesolithic occupants of the cave acquired pottery and ovicaprines at a surprisingly early date, sometime prior to 6000 BC, and no more than 100-200 years after their first appearance north of Montenegro, and that these attributes increased in importance over time. The

precocious appearance of the Neolithic attributes over a distance of several hundreds of kilometres, as well as the importance of fish at this site, suggest that the Mesolithic occupants were adept navigators. An alternative reading is that intrepid Early Neolithic explorers carrying Impressed Ware and ovicaprines exchanged these items with the indigenous Late Mesolithic occupants of the cave. It does not seem plausible that Neolithic migrants would scale the steep slopes to establish themselves in a cave which would have been occupied by a hunter-fisher-collector group for millennia.

Vergotinova Pećina (17) – This cave site is near Novi Vasi on the Istrian Peninsula. It was first examined by Malez in 1962, and later by D. Komšo in 2003. The occupation possibly extended into the Mesolithic from the Upper Palaeolithic (Komšo D., 2006: 72)**.**

Vorganska Pećina (23) – Cave site on the Island of Krk east of the Istrian Peninsula, reported on by V. Mirasavlević in 1962. A. Benac (1987: 336-337) compared the site to Crvena Stijena in Montenegro, in that the earliest Levels to include Impressed Ware were of Mesolithic tradition so far as the lithic tool-kit and the economic base was concerned, since this was entirely based on hunting, gathering and collecting. They left the question open regarding the presence of domesticated animals in the earliest Transition Levels.

This Transition site is in need of control excavations to establish with more precision the dates and sequence of events (Komšo D., 2013: pers. com.).

Zala Pećina (16) – We have no details regarding the occupation of this cave-site in the mountains on the mainland east of Rijeka.

Žiganti (21) – This is one of the three unexcavated Mesolithic open-air sites near the perimeter of the lake in Čepićko Polder in East-Central Istria (Komšo D., 2006).

Eastern Adriatic – Western Montenegro, Croatia and Bosnia & Herzegovina – Initial and Early Neolithic sites

Initial and Early Neolithic sites – Site details – Introduction

The first Neolithic of the Eastern Adriatic is strikingly similar to the earliest Neolithic of Apulia (Prato Don Michele Facies) and dates from the same period. The evidence points to connections with Thessaly and/or the Eastern Mediterranean, and given the coastal nature of the earliest sites on the eastern shore and the fact that to reach Apulia navigation across the Southern Adriatic was indispensable, it is probable that the first Neolithic migrants arrived by sea, some staying on the eastern shore and some crossing over to the heel of Italy. This implies that communication could have been maintained across the Southern Adriatic, and this is confirmed by evidence on the islands used as stepping stones, as well as the occurrence of material finds originating from the opposing shores.

The earliest evidence for the Neolithic attributes on the Eastern shore of the Adriatic, mostly in the form of plain pottery followed by Impressed Ware and ovicaprines, is primarily in caves and rockshelters, and occurs without the introduction of agriculture sometime after 6500 BC in contexts with Mesolithic attributes, suggesting the direct involvement of the Mesolithic substrate in the Transition (Forenbaher S. & Miracle P., 2014; Marijanović B., 2007: 49). Agriculture and permanent settlements are only evidenced a couple of centuries later, signalling the first arrival of farmers with the full Neolithic package, who may have come up the coast and/or crossed back from Apulia, which appears to have been colonised by farmers at an earlier date (Forenbaher S. & Miracle P., 2014).

In the Southern Sector, the evidence for the Initial Neolithic is primarily in caves and rock-shelters, with little evidence for agricultural settlements, which first appear in the Central Sector, where terrain suitable for agriculture first occurs in the plains of Šibenik at the southern end of Ravni Kotari.

The Central Sector with the plains around Šibenik and those of Ravni Kotari are particularly rich in open-air Early Neolithic settlements, not all of which have been treated in this study (e.g. Bribir, Konjevrate).

Neolithic settlements are next established in the Northern Sector, on the flysch lands at the western tip of the Istrian Peninsula, a century or two later.

Southern Sector – Initial and Early Neolithic sites – Site details

Čairi (Stolac) (67) – This undated open air site in Bosnia & Herzegovina has Early Neolithic Impressed Ware (Marijanović B., 2007; Vujević D., 2013: pers. com.).

Grapčeva Špilja (69) – This south-facing cave site is on the seaward side of the Island of Hvar (Fig R14-18). It is 230 masl up a gully from the small cove of Virak, where there is a fresh water spring. Once past the narrow opening, a large chamber 25 x 22 m and up to 5 m high opens up. The cave, known since the 19th century, has been repeatedly excavated. The first systematic excavations were undertaken by Novak in 1936, 1937, 1939 and between 1947-1952; unfortunately, as S. Forenbaher (1999-2000: 374) stated, "*the two sites on Hvar already have been extensively excavated, and the finds published in great detail (Novak 1955, 1959, 1962, 1967, 1968). Unfortunately, however, these finds were accompanied by only the most basic information about their stratigraphic context*". In 1996, a small test trench 1 x 2 m was opened by Forenbaher and Kaiser. The lowest Stratigraphic Unit (SU 1400 to SU 1310) is broken into Phase 0 and Phases 1.1 to 1.3 (Fig. R14-18).

Phase 0 contained one Impressed Ware sherd, one polychrome figulina sherd and a few later Danilo sherds, suggesting occasional visits during the Early and Middle Neolithic. Phase 1 is 5th millennium Hvar complex, after a hiatus of about one millennium. Two dates were obtained for Phase O (Forenbaher S., *et al*., 2010):

- Beta 103488 7030±60BP = 6017-5773 BC (OxCal 4.2 at 95.4%), on wood charcoal, Impressed Ware Level – Median 5895 BC.
- Beta 103487 6000±80BP = 5079-4707 BC (OxCal 4.2 at 92.3%), on Level with Polychrome figulina – Median 4895 BC.

For Phase 0, "*only a small quantity of wood charcoal was recovered from the three samples from this horizon and there were no non-wood remains. The paucity of plant remains is not surprising since the horizon was only 15 cm thick and was directly over the stalagmite crust (table 1, fig. 5). The excavators (Forenbaher and Kaiser 2008) interpreted the evidence to indicate rare and ephemeral visits to the cave during the Early and Middle Neolithic stretching over a period of about a thousand years*" (Borojević K., *et al*., 2008: 290).

Since the earliest date above comes from a level without clear material culture characteristics (Radić D., 2009: 18), there is no way of knowing whether the earliest occupation was by incoming Neolithic migrants or Mesolithic hunter-gatherers in the process of acculturation.

Gudnja Pećina (73) – This cave site near Ston at the beginning of the Pelješac Peninsula is treated with the Mesolithic and Transition sites above.

Hateljska Pećina (65) – This cave site is located *ca*. 700 masl at the top of a slope on a mountain named Trusina above the hamlet of Hatelji, on the territory of the village of Berkovići near Stolac in South-Western Bosnia & Herzegovina. The cave covers a surface area of 28 x 20 meters. Only the frontal section of the cave was suitable for human settlement. A test pit was dug in 1984, while more systematic digs were conducted in 1987 and 1988 under B. Marijanović. A total surface area of 96 m^2 was investigated, which roughly corresponds to the inhabitable portion of the cave.

The lowest level is Early Neolithic Impressed Ware and whilst the location is unsuitable for agriculture, it is in a good for animal husbandry, hunting and gathering. There is however no Mesolithic level at this cave site (Marijanović B., 1990, 2000, 2013: pers. com.).

The site is undated and there is unfortunately a lack of information regarding the lithic and faunal assemblages, which could inform us as to whether the first occupants were acculturated hunter-gatherers, or Neolithic settlers from the valley floor, possibly using the site as an animal pen.

Ilčinova Lazina (61) – This is an Early Neolithic short term stay Impressed Ware open-air site in South-Western Bosnia & Herzegovina, with good lines of communication. The site is in a location not propitious for agriculture (Marijanović B., 1990: 12).

Jejinovača Pećina (64) – This is an Early Neolithic Impressed Ware cave site in South-Western Bosnia & Herzegovina (Marijanović B., 1990: 12), without Mesolithic or Transition levels (Marijanović B., 2013: pers. com.; Vujević D., 2013: pers. com.).

Nakovana Špilja (70) – This cave site, recently used as a bergeries as evidenced by the dry-stone wall, is located near the tip of the Pelješac peninsula some 300 masl, near the top of a limestone hill over rugged terrain (Fig. R14-19). The prehistoric archaeological levels were discovered in 1999 and excavated by S. Forenbaher. The dates are as follows (Forenbaher S., *et al*., 2013):

- OxA-18120 7050±37BP = 6009-5872 BC (OxCal 4.2 at 92.6%), on *Juniperus* sp. – Median 5940 BC.
- OxA-18121 6982±36BP = 5926-5760 BC (OxCal 4.2 at 81.7%), on *Juniperus* sp. – Median 5845 BC.
- OxA-18122 6975±31BP = 5920-5762 BC (OxCal 4.2 at 86.8%) – Median 5840 BC.
- OxA-18123 6711±36BP = 5707-5605 BC (OxCal 4.2 at 76.1%) – Median 5655 BC.
- OxA-18124 6609±37BP = 5618-5489 BC (OxCal 4.2 at 94.5%) – Median 5555 BC.

Remains of ovicaprines were found from the earliest levels, and these dominate the faunal assemblage (Forenbaher S. & Miracle P., 2006: 91), but we have no details on the lithic assemblage, so that whilst the indications are that it was first occupied at the beginning of the 6th millennium BC, it is not possible to determine whether by Neolithic migrants moving up the coast, who continued to use it for a millennium or more, or by Mesolithic navigators during the Transition. Because the Island of Korčula was attached to the Pelješac Peninsula at the time, it could even be that the same Mesolithic group that used Vela Špilja during the Transition occupied the cave, which is in an unconventional location for Early Neolithic migrants.

Obre I (56) – Whilst this Early Neolithic site is in the Central Balkans (Region 10), it is noted here since it is one of the few sites in which contact between the Eastern Balkans Starčevo Culture and the Adriatic seaboard Impressed Ware Culture is attested. The site was established *ca*. 6100 BC as a Starčevo site, and Adriatic Impressed Ware appeared shortly afterwards (Kalicz N., *et al*., 1998: 155); the obsidian found at the site has recently been analysed and proven to originate from both Hungary and Lipari in the Western Mediterranean (Težak-Gregl T. & Burić M., 2009), supplying proof for long distance exchange and contact across the Dinaric Alps as well as across the Southern Adriatic.

Ravlića Pećina (57) – This cave in South-East Bosnia & Herzegovina was excavated between 2008-2010 by B. Marijanović, who confirmed that the earliest level was Middle/Late Neolithic Impressed Ware. One date was obtained:

- Beta-302246 6710±40BP = 5710-5558 BC (OxCal 4.2 at 95.4%) – Median 5635 BC.

The site appears to have been occupied for about 100 years before being abandoned for several centuries until reoccupied in the Late Neolithic during Hvar Culture (Marijanović B., 2012: 210-212).

Smokvica (78) – Early Neolithic open-air site on the island of Korčula near the eponymous village in a polder with terra rossa, reported as newly discovered (Bass B., 1998: 174). D. Vujević (2013: pers. com.) indicated that D. Radić was responsible for the excavations, for which I have found no details.

Sušac Island (75) – This small island south-west of Korčula is one of the stepping off points for crossing the south Adriatic via Palagruža Island to the Gargano Peninsula, both of which are visible on clear days to the west (the Tremiti Islands close to the Gargano were used as additional stepping stones for the crossing). Sušac Island may also have been used to exploit an outcrop of radiolarite found there at Velo Polje. Four Early Neolithic sites have been found on the island during research starting in 1997, but the open-air site SU002, lying 6 masl in Duga Cove, is the only one to have supplied sufficient data from a 3 m^2 excavation pit; this site has been dated (Bass B., 2004):

- ETH-22912 6925±65BP = 5927-5705 (OxCal 4.2 at 88.8%), on wood charcoal – Median 5815 BC.

Whilst the earliest monochrome and Impressed Ware found at the sites is closer to the styles on the eastern seaboard at Tinj-Podlivade on the plain of Ravni Kotari, some of the lithic material comes from Palagruža Island and the Gargano, and includes blades, end-scrapers on blades, blades with sickle-gloss, flakes and some points which are similar to the 'Sipontian' points from the site of Coppa Nevigata south-west of the Gargano (Region 16). A single clay bead was also found, as well as marine molluscs, bivalves and gastropods (Bass B., 1998, 2004, 2008; Della Casa P. & Bass B., 2001; Radić D., 2009).

There is no evidence for the Mesolithic on this island, which appears to have been used quite extensively from the Initial Neolithic sometime after 6000 BC, suggesting that adept navigators played an important role in the diffusion of Neolithic attributes up the Eastern Adriatic seaboard (Bass B., 2004: 56), as well as across the Adriatic.

Vukove Njive (60) – Very Early Impressed Ware open-air site at a location and at an altitude not propitious for agriculture, in South-Western Bosnia & Herzegovina, with Coarse Ware pottery only, using finger-pinching and nail impressions (Marijanović B., 1990: 12; Vujević D., 2013: pers.com.).

Žukovička Pećina (58) – This cave-site in Bosnia & Herzegovina, located at a certain elevation in terrain propitious for hunting, collecting and animal husbandry, but unsuitable for agriculture, saw a short period of occupation during the Impressed Ware Early Neolithic, as evidenced by a thin anthropic stratigraphic level (Marijanović., 1990: 10-12).

Central Sector – Initial and Early Neolithic sites – Site details

Benkovac (43) – An Early Neolithic Impressed Ware settlement was established in the Benkovac Valley, which was subsequently occupied by the Danilo Culture (Marijanović B., 2014a).

Crno Vrilo (38) – This is an open-air Early Neolithic agricultural site near Zadar in Croatia, in the region of Ninski Dračevac, about 12 km north-east of Zadar in the north-western part of Ravni Kotari Plain. Crno Vrilo is the hydronym for a spring of local importance used by inhabitants. The site was excavated over an area of 550 m^2 between 2001-2005 by B. Marijanović who obtained several 14C dates, of which the earliest are (Forenbaher S. & Miracle P., 2014; Marijanović B., 2009a, 2009b, 2014b):

- Poz-18395 6925±35BP = 5886-5731 BC (OxCal 4.2 at 95.4%), on bone collagen – Median 5810 BC.
- Poz-18395 6900±40BP = 5881-5716 BC (OxCal 4.2 at 95.4%), on bone collagen – Median 5800 BC.

- Z-3398 6397±108BP = 5561-5205 BC (OxCal 4.2 at 90.3%), on animal bone – Median 5385 BC.

Because the diet of these Neolithic migrants included some aquatic resources, as evidenced by the faunal remains and a bone fish-hook (Fig. R14-20), and that the dates have not been corrected for the WRE, if the earlier dates were on human bone, it could be that the settlement, which lasted several centuries into the Early Danilo Culture, was established a little later than 5800 BC, later than the site of Pokrovnik to the south-east, but nonetheless at about the same time as the Neolithic migrants were colonising the Tavoliere in Northern Apulia. Ovicaprines constituted 88% of the terrestrial faunal, bovines 6% and suids under 2%. The hunt represented 1-5% at most, with agriculture being very important. The pottery suggests that this site was not established during the earliest phase of the Impressed Ware Culture, even if it is one of the earliest Neolithic sites in the Central Sector. Within the lithic assemblage, 2% of the tools are trapezoidal microliths (Fig. R14-20), which constitute one of the only indices suggesting that the site might have incorporated some Terminal Mesolithic elements (Marijanović B., 2009b, 2014b).

There can be little doubt that this site was set up by Neolithic migrants who brought the entire Neolithic package with them, whether from another location in Ravni Kotari, from down the coast or from across the Adriatic.

Danilo / Danilo-Bitinj (53) – This open-air site is the eponymous site for the Middle Neolithic culture of the Eastern Adriatic. It is located near the coast south of Pokrovnik, near Sebenico in the Danilo Valley. The first occupation is in the later 6th millennium. The Early Neolithic Vlaska/Vasi a Coppa Group in the Karst of the Northern Adriatic evolved from this culture.

Konjevrate (51) – This open-air Initial Neolithic site sits 210 masl and close to the course of the River Krka, 15 km inland from Šibenik under the cemetery of the village of the same name. The site was discovered by chance, whilst digging a new grave in 1993 in the cemetery of the Church of St. Ivan. A trench 2,5 X 2,5 m was opened which produced some 1000 sherds of Initial Neolithic Impressed A Ware, blades and bladelets, as well as burned faunal remains. (Spataro M., 2002: 103-104).

Whilst this site is unpublished and undated, the faunal assemblage appears to be dominated by ovicaprines and bovines (Zavodny E., *et al.*, 2014: 4).

Krivače (46) – Early Neolithic Impressed Ware open-air site some 20 km north of Šibenik and close to the Early Neolithic site of Vrbica (Marijanović B., 2007).

Nin (35) – Early Neolithic scatter near Nin to the north of Zadar and at the north-western end of Ravni Kotari, in flat low-lying land extensively used for agriculture today.

The site, with surface collection and limited excavation by S. Batović, appears to have been made up of an agglomeration of huts from the Early Neolithic. There are no dates, but the site has no Mesolithic content and there are no details on the fauna (Benac A., 1987; Vujević D. & Marijanović B., 2013: pers. com.). According to J. Evans (1987: 323, 325), the occupants probably engaged in mixed farming and hunting, whilst A. Manfredini (1987: 369), indicated that agriculture, plus bovines as well as ovicaprines are present, that the pottery is Impressed Ware with Monochrome Graffito and that the lithics include trapezoidal armatures.

It would seem that this is an Impressed Ware Early Neolithic site that could contain some discrete Mesolithic attributes.

Pokrovnik I (50) – This Early and Middle Neolithic open-air site is close to Dalmatinska Zagora some 15 km north-east of Šibenik and 18 km inland (Fig. R14-21). The site covers some 3 ha on a karstic plain, close to a spring, with good terra rossa soil (Budja M., 1993: 198). The site was originally excavated in 1979 by Z. Brusi. Four trenches were dug across the site in 2006, under A. Moore from

the Rochester Institute of Technology, N.Y., USA, and M. Men from The Ministry of Culture, Šibenik, Croatia. Seven new dates were obtained for the earliest 1 m of Impressed Ware Phase I deposits to the later 1 m of Danilo Phase II deposits, neither of which contained much wild fauna. The earliest and latest of these dates are (Legge A., Moore A., 2009: 178; Podrug E., *et al*., 2014):

- PSU-5293/ UCIAMS-116205 7090±25BP = 6091-5906 BC (OxCal 4.2 at 95.4%), on *Bos taurus*, Impressed Ware – Median 6000 BC.
- OxA-17194 6999±37BP = 5985-5789 BC (OxCal 4.2 at 95.4%), on domesticated wheat Phase I Impressed Ware – Median 5885 BC.
- OxA-17223 6170±35BP = 5218-5017 BC (OxCal 4.2 at 95.4%), on domesticated wheat Phase II Danilo – Median 5120 BC.

These dates confirm earlier ones with larger standard deviations (Bass B, 2008: 258; Biagi P., 1994; Budja M., 1993, 2001b; Chapman J. & Müller J., 1990).

This Initial Neolithic site arrives with the full Neolithic package, including agriculture, ovicaprines and bovines, so that there can be little doubt that the settlers were Neolithic migrants, who created a settlement *ca*. 6000 BC, which lasted almost a millennium, although it could have been longer lasting since there was also some evidence for Hvar Culture on the hill above the site. The basal level from the Impressed Ware Phase contained shallow pit dwellings with holes for solid wooden pillars (Marijanović B., 2014c), in which a female figurine was found (Fig. R14-22) as well as large quantities of pottery. Ovicaprines represented 82.5% of the faunal assemblage, *Bos tauros*15.3 %, pig 0.5% and dog under 1%, so that other taxa totalled less than 2% of the assemblage, of which red deer is 0.7%. "*All the evidence that we have accumulated thus far is tending in a single direction: that farming reached Dalmatia as a comprehensive system, that it was based on a variety of domestic crops and animals brought in from elsewhere, and that the new economy was swiftly imposed upon, and adapted to the Dalmatian landscape. The transition to farming appears to have been abrupt here, and had an immediate and permanent effect upon human settlement and culture, as well as the environment*" (Moore A., *et al.*, 2007). The ovicaprines and bovines were reared primarily for meat protein, as was the case for most Early Neolithic settlements, with the use of milk products appearing later in the Neolithic (Zavodny E., *et al*., 2014).

The human figurine strongly reminiscent of Anatolia and Thessaly suggests that the settlers at Pokrovnik arrived at the end of the 8th or the beginning 7th millennium BC with the full Neolithic package. They may have come from the region of Albania after acquiring the Impressed Ware Culture, since we know that Neolithic migrants crossed the Pindus Mountains there, or even from Southern Italy, since they were bearers of the Impressed Ware Culture, although their most likely provenance is the same as that for the migrants arriving in Northern Apulia at the same time.

Rašinovac (48) – Early Neolithic Impressed Ware site southwest of Krivače, test excavated in 2013, and for which one date has been obtained (Podrug D., *et al.*, 2014):

- PSU-5612 / UCIAMS-127394 7060±25BP = 6001-5895 BC (OxCal 4.2 at 95.4%), on *Bos tauros* – Median 5950 BC.

Škarin Samograd (49) – Karst cave in a doline near Drnis, east of Skradin, some 20 km from the coast north-east of Šibenik in Central Croatia, in an area of lakes and waterways with good connections to the sea. The site was poorly excavated in the 1940s using arbitrary spits of 30 cm; the excavation is also poorly documented and unpublished. The karst region is not suited to agriculture, but the site with its sheer walls would have enabled the shepherds to pen their flock and the area is suitable for grazing. The economic activity appears to have been animal husbandry and hunting (Budja M., 1993; Marijanović B., 2007: 50-51, 2009a).

The Lower Level contained monochrome pottery, whilst the Upper Level contained Impressed Ware. The dates given by J. Chapman and J. Müller (1990) all seem to be grouped within the period

of 5750-5370 BC, or 5660-5540 BC using the median of the calibrated dates, which are too recent for Monochrome Ware as found at Vela Špilja on the Island of Korčula:

- HD-11773 6740±50BP = 5730-5607 BC (OxCal 4.2 at 86.7%), on animal bones, Monochrome pottery, ovicaprines & wild fauna, phase I – Median 5670 BC.
- HD-12094 6750±55BP = 5737-5606 BC (OxCal 4.2 at 88.0%), on animal bones, Monochrome Pottery, ovicaprines & wild fauna, phase I – Median 5670 BC.
- HD-11950 6780±50BP = 5752-5617 BC (OxCal 4.12 at 95.4%), on animal bones, Impressed Ware, ovicaprines & wild fauna, phase II – Median 5685 BC.
- HD-11952 6600±100BP = 5707-5372 BC (OxCal 4.2 at 95.4%), on animal bones, Impressed Ware, ovicaprines & wild fauna, phase II – Median 5540 BC.

It has been suggested that this could have been a special purpose location related to the nearby open-air site of Pokrovnik (Budja M., 1993: 189), and whilst the wild fauna could suggest a Mesolithic content within the community using the site, there does not appear to be any evidence to support this hypothesis.

Smiljčić (40) – This open-air site, extending over about 5 km^2, in a natural depression with a perennial stream, 21 km east of Zadar in Ravni Kotari, was excavated by Š. Batović between 1957-1962 over a surface of 1148 m^2 to a depth of 3.3 m. The site, occupied for a millennium has been typologically dated to the Impressed Ware, Danilo and Hvar Cultures (Benac A., 1987; Spataro M., 2002: 73; Vujević D., 2013: pers. com.). The similarities with the site of Tinj-Podlivade, suggest they were contemporaneous in their earliest phases (Spataro M., 2002: 92).

The lithic industry for the Impressed Ware phase is poor and is "*represented by only 7 retouched tool types, among which are 1 transverse burin on retouch, 1 rectangular trapeze on bladelet, 6 retouched bladelets with simple, inframarginal (2) marginal (3) or deep (1) retouch, and 1 side scraper on flake. Of particular importance is 1 (broken) bladelet with simple, deep retouch, which has a transversal gloss indicating it had been inserted obliquely in a sickle for harvesting cereals*" (Spataro M., 2002: 73). According to J. K. Kozlowski *et al.* (1994) the assemblage associated with the Impressed Ware is pseudo-Castelnovian with only minor modifications in larger blade dimensions and new types of trapezes.

The faunal assemblage is unusual for the coastal villages, which normally contain a large proportion of ovicaprines, in that it appears to show a subsistence based mixed herding (with a high proportion of bovines and suids, and few ovicaprines) with a high incidence hunting and marine exploitation (Bass B., 2008: 259; Evans J., 1987: 323; Kozlowski J.K. & Nowak M., 2007: 107; Mlekuž D., 2014: 144; Spataro M., 2002: 73).

It appears possible that the initial settlement incorporated elements of the hunter-gatherer population as evidenced by the lithics and the faunal assemblage.

Tinj-Podlivade (45) – This is an open-air Initial Neolithic site some 20 km south-east of Zadar on the Ravni Kotari Plain. The site, which was probably occupied for a little less than a millennium, appears to show a fully developed mixed farming economy, with the domesticated fauna primarily based on ovicaprines, with some hunting and marine muscle collection. Daub found could relate to house structures. Ovicaprine account for 90% of the faunal assemblage, wild fauna 5% and 13 species of marine molluscs the other 5% (Bass B., 2008: 258-260).

The dates are given as (Biagi P., 1994; Chapman J. & Müller J., 1990; Marijanović B., 2007):

- GrN-15236 6980±160BP = 6126-5619 BC (OxCal 4.2 at 91.8%), on charcoal – Median 5875 BC.
- GrN-15237 6670±260BP = 6081-5046 BC (OxCal 4.2 at 95.4%), on charcoal – Median 5565 BC.
- GrN-15238 6280±210BP = 5624-4770 BC (OxCal 4.2 at 95.2%), on charcoal – Median 5195 BC.

The most recent date is appropriate for the Danilo Culture, and the excavator has suggested two periods of occupation, with the first being Impressed Ware (Spataro M., 2002: 68).

The lithic assemblage contained 255 chipped stone tools, which whilst mostly made up of sickle blades and abrupt retouch truncations, includes two trapezes, one with a *piquant trièdre* point, denticulated blades and one crested blade (Spataro M., 2002: 69-70).

The presence of marine molluscs and trapezoidal armatures could suggest the incorporation of Mesolithic elements at this site according to J.K. Kozlowski and K. Nowak (2007: 107), but the fact that the full Neolithic package is present indicated that the settlement was established by Neolithic migrants.

Vrbica kod Bribir (47) – This Early Neolithic Impressed Ware open-air site, whose existence extended into the Danilo Culture, was discovered accidentally in 1973 some 20 km north of Šibenik during the excavations of a later site. The pottery is similar to the Prato Don Michele Facies of the Western Adriatic and has been typologically dated to *ca*. 6000-5900 BC or a little earlier, thus representative of the earliest Impressed Ware facies of the Eastern Adriatic (Spataro M., 2002: 93). The site also produced an ear-stud/labret, similar to those found in Thessaly (Brusić Z., 1976: 34; Müller J., 1988: Spataro M., 2002: 93).

M. Spataro (2002), in her study, determined that the pottery was manufactured locally.

The lithics are not detailed but include several unretouched blades and a few flakes (Spataro M., 2002: 93).

The evidence points to this being a site set up by the same movement of Initial Neolithic migrants into the Adriatic. Some navigated across the Adriatic to Apulia, whilst some progressed up the eastern shore until they found suitable agricultural land on which to settle, or else formed part of a return movement from the Western Adriatic. Although undated, this site appears to be one of the earliest Neolithic sites with the full farming economy on the eastern seaboard without any evidence for a Mesolithic substrate.

Vrsi (34) – One of two, with Vrsi Janesici Early Neolithic surface scatters north of Zadar (Marijanović B., 2007).

Vrsi Janesici (35) – One of two, with Vrsi, Early Neolithic surface scatters north of Zadar (Marijanović B., 2007).

Ždrilo (38) – This cave site at the north-eastern corner of Ravni Kotari, where the plain meets the Dinaric Alps, was used in the Initial Neolithic (Marijanović B., 2007). This is a small cave in which rescue excavations were undertaken, but which has not been published (Marijanović B., 2013: pers. com.).

Northern Sector – Initial and Early Neolithic sites – Site details

Debeljak (29) – This is an unexcavated Early Neolithic open-air site with Impressed Ware at the southern tip of the Istrian Peninsula.

Kargadur (27) – This Early Neolithic site lies near the tip of the south-eastern coast of the Istrian Peninsula. The site is partially eroded by the sea at the northern end of the Bay of Kuje near the village of Ližnjan Fig. R14-22). The early phase has Impressed Ware and the later Danilo. Fishing was important in both phases, and the site has produced the earliest evidence for the manufacture of fish-hooks in the Eastern Adriatic (Fig. R14-23). Exotic materials appear in the later phase, possibly imported through navigation.

This is one of two Early Neolithic open-air sites to have been excavated on the Istrian Peninsula, with the following dates (Forenbaher S., *et al.*, 2013: 591; Forenbaher S. & Miracle P., 2014; Komšo D., *et al.*, 2008):

- OxA-21092 6769±33BP = 5721-5629 BC (OxCal 4.1 at 95.4%), on charred seed of *Hordeum* – Median 5675 BC.
- Beta-188924 6760±60BP = 5751-5558 BC (OxCal 4.2 at 95.4%) – Median 5655 BC.
- OxA-21093 6612±32BP = 5618-5491 BC (OxCal 4.2 at 95.4%), on charred seed of *Hordeum* – Median 5555 BC.
- OxA-18172 5686±33BP = 4611-4452 BC (OxCal 4.2 at 95.4%), on domesticated pig bone, Danilo-Vlaška – Median 4530 BC.

This site appears to date from a little later than that of Medulin-Vižula, the only other excavated Early Neolithic Impressed Ware site on the Istrian Peninsula. The lithics contain trapezes and the microburin technique, suggesting the possible incorporation of Mesolithic elements, and the exotic opaque reddish flint could possibly be the same as that used west of the River Tagliamento (Pordenone, Northern Italy).

Whilst this is a fully Neolithic site, it contains a few intriguing elements in the lithic technology which appear to harp back to Mesolithic traditions.

Medulin-Vižula (26) – Early Neolithic open-air site in Southern Istria located on a low peninsula in the Bay of Medulin, to the south-west of the village. At the time of initial occupation, the site would have been on dry land about 1 km from the sea. The site was excavated in the 1960s and is one of two Early Neolithic open-air sites excavated on the Istrian peninsula, the other being Kargadur.

A single date is available for the Initial Neolithic and another for the Middle Neolithic (Andreasen N., 2009; Chapman J. & Müller J., 1990; Forenbaher S. & Miracle P., 2014; Komšo D., *et al*., 2008; Miracle P., 1997):

- HD-12093 6850±180BP = 6085-5471 BC (OxCal 4.2 at 95.4%), on animal bone from Impressed Ware Level, domesticated fauna and marine molluscs, Phase I – Median 5780 BC.
- HD-11733 6140±65BP = 5230-4908 BC (OxCal 4.2 at 92.5%) – Median 5070 BC.

The standard deviation of the first date is large, so whilst the median gives a date 125 years earlier than Kargadur, there can be no assurance as to which is earlier. If, as J.K. Kozlowski and M. Novak (2007: 107) indicate, wild game played a major role at this site, it could possibly be due to the incorporation of some Mesolithic elements in the early settlement.

Vela Gromača (25) – Unexcavated Initial Neolithic site on the uplands at the SE end of the Istrian Peninsula.

<u>Eastern Adriatic – Western Montenegro, Croatia and Bosnia & Herzegovina – Conclusions</u>

The earliest dates for the appearance of Neolithic attributes in the three Sectors, according to the 14C dates available appear to be:

In the Southern Sector, probably after 6300 BC, with all the early sites being cave sites with Mesolithic attributes and no agriculture:

- Z-1967 7300±120 BP = 6425-5984 BC (OxCal 4.2 at 95.4%), on wood charcoal from the base of Level where monochrome pottery was discovered at Vela Spilja on Korčula – Median 6205 BC.
- GrN-10315 7170±70BP = 6216-5970 BC (OxCal 4.2 at 87.4%), on charcoal; Level with domesticated caprines & pigs with Impressed Ware at Gudnja Pećina – Median 6093 BC. There is an undated earlier level with sparse Early Impressed Ware and a few lithics of Mesolithic tradition, suggesting an earlier initial occupation.

- OxA-18120 7050±37BP = 6009-5872 BC (OxCal 4.2 at 92.6%), on *juniperus* sp. from Nakovana Špilja – Median 5940 BC.

In the Central Sector, probably *ca.* 5900 BC, with some of the earliest open-air sites having the full Neolithic farming package with possibly some Mesolithic attributes, whilst some sites in caves also have Mesolithic attributes:

- GrN-15236 6980±160BP = 6126-5619 BC (OxCal 4.2 at 91.8%), on charcoal at Tinj-Podlivade – Median 5875 BC.
- Z-579 (or 597) 7010±90BP = 6034-5726 BC (OxCal 4.2 at 95.0%), level with Early Impressed Ware and domesticates at Gospodska Pećina – Median 5880 BC.
- OxA-17194 6999±37BP = 5985-5789 BC (OxCal 4.2 at 95.4%), on wheat, Phase I, with Impressed Ware at Pokrovnik – Median 5885 BC.
- Poz-18395 6925±35BP = 5886-5731 BC (OxCal 4.2 at 95.4%), on bone collagen at Crno Vrilo – Median 5810 BC.
- HD-12094 6750±55BP = 5737-5606 BC (OxCal 4.2 at 88.0%), on animal bones; Monochrome Pottery followed by Impressed Ware; ovicaprines & wild fauna, phase I at Škarin Samograd – Median 5670 BC.

In the Northern Sector pottery and ovicaprines reach the cave of Vela Špilja Lošinj *ca.* 6000 BC, after which there is a hiatus before the full Neolithic package arrives at the tip of the Istrian Peninsula, probably *ca.* 5800 BC:

- OxA-18118 7134±37BP = 6069-5977 BC (OxCal 4.2 at 87.2%), on charcoal from Impressed Ware level at Vela Špilja Lošinj – Median 6025 BC.
- HD-12093 6850±180BP = 6085-5471 BC (OxCal 4.2 at 95.4%), on animal bone, with Impressed Ware, domesticated fauna and marine molluscs, Phase I at Medulin Vižula – Median 5780 BC.
- Beta-188924 6760±60BP = 5751-5558 BC (OxCal 4.2 at 95.4%), at Kargadur – Median 5655 BC.

The spread of farming appears to have marked a halt at the extremity of the Istrian Peninsula and it is only a couple of centuries later that it is seen to arrive in Friuli and the Po Valley. In fact there are approximately 200 year pauses (7 to 8 generations) between Sidari in Region 13 (6400 BC), the southern sector of this Region (6200 BC), the central sector (6000 BC), the northern sector (5800 BC) and the plains at the head of the Adriatic (5600 BC).

Initial Neolithic sites with the full package (agriculture, animal husbandry and manufactured objects) have not been found in the Southern Sector, except possibly inland, where there is little land propitious for agriculture. Such sites appear suddenly in the Central and Northern Sectors. They are all Impressed Ware Culture sites, which means that the migrants arrived (presumably by sea) from either some 300 km or more to the south, or from the Western Adriatic. There is also evidence in the Central Sector for contact or affinities with the Thessalian and/or Eastern Mediterranean Neolithic, whilst clearly forming part of the same Impressed Ware Culture that reached Apulia on the western seaboard. It is not clear whether the population density of hunter-gatherers was greater in the Southern or Northern Adriatic, since finding the sites is dependent on archaeological research, the impact of the rising sea-level, the availability of caves and rock-shelters and post-Mesolithic erosion and colluvium. S. Forenbaher and P. Miracle (2005: 524; 2014) believe in a two-stage model for the dispersal, starting with pioneer exploration limited largely to the south, followed by colonisation. They could even have seeded the islands with domesticated animals, such as occurred at Kithnos and Youra in the Aegean, although it needs to be borne in mind that many of the islands were attached to the mainland in 6000 BC. Vela Spila and Gudnja may be evidence for the 'scouts', but scouts do not live for centuries, and the Mesolithic attributes found at the cave-sites suggest that hunter-gatherer navigators acquired (one way or another) attractive Neolithic attributes (pottery and ovicaprines initially that we can see, but why not partners and other attributes as well), as part of their on-going opportunistic adaptation to their environment, so that the autochthonous population played a role in the diffusion of the Neolithic over

the course of the centuries as they acquired the skills and material attributes. That over many generations some joined up with the incoming sedentary farmers and that others retained an element of their nomadic life-style by becoming shepherd-hunter-gatherers, whilst probable, can only be surmised.

B. Marijanović (2007: 54) posits an important role for the Mesolithic autochthonous substrate in the development of the Initial Neolithic. He also points out that all the now-island sites known are in caves or rock-shelters, and that these, with those on the mainland, point to the fact that "*The archaeological realities of this region are considerably close to various forms of interactive relations of population groups corresponding to different cultural environment*". B. Bass (2008: 258) states it differently when he questions whether "*the archaeological record reflect a hunter-gatherer society supplemented by agro-pastoralism, an agro-pastoral society supplemented by maritime hunting and gathering, or variable adaptations depending on location and resource availability?*". There is an overlap of some 400 years in the region between the Terminal Mesolithic and Initial Neolithic (Budja M., 1998: 188; Komšo D., *et al.*, 2008: 129) which undoubtedly allowed for many different forms of contact, exchange, adaptation and eventual acculturation. The cave sites are in rugged terrain and contain Neolithic attributes that exclude agriculture, and rarely include polished stone artefacts. Many authors concur that the spread of farming was the affair of seafarers moving along the coast as well as across the Adriatic (e.g. Chapman J. & Müller J., 1990; Forenbaher S. & Miracle S., 2005, 2014; Lightfoot E., et al., 2001; Marijanović B., 2007), with which we concur.

Unlike the Apulian Early Neolithic, ditched enclosures are virtually unknown in the Region (Bass B., 2008: 258), and many sites, particularly those in caves or rock-shelters with Neolithic attributes, contain a large percentage of wild fauna and a Mesolithic technology during the Transition. Many coastal or near-coastal open-air Initial Neolithic sites for which the evidence is strongly in favour of an important component of migrant farming communities (e.g. Crno Vrilo, Kargadur, Medulin-Vižula, Smiljčić, Tinj-Podlivade), also contain evidence for marine mollusc collection as well as fishing, suggesting that they acquired this skill as their forebears moved up the coast and/or through the incorporation of Mesolithic coastal populations.

We can conclude that contact between Terminal Mesolithic groups and migrant Neolithic farmers as well as with and between partially acculturated groups, whether via maritime and/or overland contact, was an ongoing process during the Transition and Early Neolithic.

<u>Eastern Adriatic – Western Montenegro, Croatia and Bosnia & Herzegovina – Southern Sector – Conclusions</u>

The Palaeolithic is well attested, with the known sites near-coastal (e.g. Vela Špilja) as well as inland (e.g. Crvena Stijena, Vrbička Pećina).

All the coastal or near-coastal Southern Sector sites are in caves or rock-shelters with the possible exception of Smokvica for which we lack details. It is curious that the three Early Neolithic inland open-air sites in South-Western Bosnia & Herzegovina appear to be small and that these are complemented by six caves; such a configuration begs the question as to whether we are not dealing with sites that incorporated acculturated Mesolithic people. The Initial Neolithic infiltration comes across as being small scale and as quite likely involving the Mesolithic population.

The Island of Korčula and the site of Vela Spila lie on a terrestrial-maritime route that extends from Lipari, across the Apennines to The Gargano, thence to the Tremiti Islands, Palagruža, Sušac, Korčula and Pelješac, the valley of the Nevetva, the Sarajevo-Zenica Basin and the valley of the Bosna to the Pannonian Plain. Via this and possibly other routes, there is a great deal of concordance between the Mesolithic and Early Neolithic on both sides on the Adriatic (Čečuk B. & Radić D., 2005).

B. Marijanović (1990) has pointed out that the Initial Neolithic sites in Western Herzegovina (Ilčinova Lazina, Jejinovača Pećina, Vukove Njive, Zelena Pećina, Žukovička Pećina) are small scale, whether in caves or the open-air, and of short duration, suggesting small groups similar to hunter-

gatherer bands or units. This contrasts with the long-term settlements along the Danube river systems, on the eastern side of the Dinaric Alps, which are mostly larger, based on longer term settlements with agriculture. Those sites on the western side show no evidence for agriculture, and are located above the plains in locations propitious for hunter-gatherers or herder-hunter-gatherers. The suggestion is that these sites were used by splinter groups from larger settlement or for seasonal movements by a part of a community. Another or additional use may have involved acculturated hunter-gatherers who became herders and needed locations to pen their flock. Such explanations do not exclude the inclusion of partner exchange in the merging of the populations.

Eastern Adriatic – Western Montenegro, Croatia and Bosnia & Herzegovina – Central Sector – Conclusions

There is extensive evidence for a Palaeolithic presence in this Sector (Zadar Museum and Vujević D., 2014: pers. com.), and whilst Mesolithic sites are not numerous, they are spread around the periphery of Ravni Kotari. The fact that Mesolithic sites should not have been found on the plains and plateaux of Ravni Kotari could be attributed to the fact that there are no cavities, that Mesolithic open-air sites are ephemeral and that the eustatic sea-rise will have drowned coastal and near-coastal sites. The cave sites of Vaganačka Pećina and Gospodska Pećina probably contain evidence for hunter-gatherers during the Transition. The Mesolithic site on Dugi Island, which is separated from the mainland by a 60m deep channel, indirectly attests to navigation during the Mesolithic (Vujević D., 2009: 9).

There are several Early Neolithic open-air sites of this sector, only two of which have been properly excavated and dated. An ear plug at the Early Impressed Ware site of Vrbica kod Bribir, some 20 km north-north-east of Šibenik, attests to affiliations with Thessaly, as does the female figurine at Pokrovnik. Given the sudden appearance of the Early Impressed Ware Neolithic in the region with the full farming package, the only conclusion that can be reached is that there was a migrational pulse starting at the time of their first establishment. The evidence for the incorporation of elements of the Mesolithic population in these Early Neolithic sites is tenuous although this cannot be excluded as seen through the lithic technology, the exploitation of marine resources and wild fauna (Smiljčić and Nin).

Eastern Adriatic – Western Montenegro, Croatia and Bosnia & Herzegovina – Northern Sector – Conclusions

Most of the known Mesolithic sites are in the eastern and landward end of the Istrian peninsula, which is difficult of access overland from the Dalmatian coast, so that there would not necessarily have initially been intensive interaction with the incoming migrant farmers who settled at the western tip on the flysch agricultural land; additionally, few of the Mesolithic sites have been dated, so that the late Mesolithic presence is hard to determine. Because the Early Neolithic sites are near the western extremity of Istria, which is where much of the agricultural land is to be found, it has been assumed that the first farmers arrived by sea, and it is hard to determine how these immigrants interacted with the terminal Mesolithic people over the Transition (Komšo D., *et al.*, 2008: 133). Because the Early Neolithic farmers appear to have mostly used local flint, N. Andreasen (2009:57) believes this is possibly indicative of limited interaction with the indigenous hunter-gatherers.

Regions 16-21 – Southern Italy and West Adriatic Seaboard – Introduction

(Map MR1)

Southern Italy and West Adriatic Seaboard – Regions and geography

This Macro-Region, which covers the maximum expansion of the Western Adriatic Impressed Ware Culture, encompasses 6 Regions between Sicily in the south and Imola at the south-eastern end of the plain of the River Po in Emilia Romagna. The distance covered is a little over 1300 km between Trapani at the western tip of Sicily and Imola in Romagna and about 850 km between the heel of Italy and Imola. Sicily is included, and Calabria, Eastern Basilicata and Apulia marks the southern limit of the Macro-Region, and on the Adriatic seaboard the water divide along the Apennines marks the western limit, except that the Fucino Basin in the Central Apennines of Abruzzo is included. The Regions are as follows:

- Region 16 covers Northern Apulia and Eastern Basilicata.
- Region 17 covers the Salento Peninsula of Apulia.
- Region 18 covers Calabria and Western Basilicata.
- Region 19 covers Sicily.
- Region 20 covers the western seaboard of the Adriatic between Apulia and Imola in Romagna.
- Region 21 covers the Fucino Basin.

The geography of the Regions is varied and will be treated in more detail within each Region. Sicily has been an island since at least the LGM, with the Straits of Messina currently less than 100 m deep, but which have been estimated to have risen by many metres due to tectonic uplift, so that the question is unresolved as to whether it was connected or not during the last glaciation (Mussi M., 2001: 89); the coastline has changed substantially, particularly to the south, with the disappearance of the wide coastal plains, which at the LGM extended as far as Malta. The south of Italy between Apulia and the toe of Italy is made up of a coastal plain at the northern end of the Bay of Taranto and uplands, before rising to the higher mountains of the Southern Apennines in Basilicata and the toe of Italy, at the southern end. On the Tyrrhenian side of the toe of Italy the coast is mostly steep-to with intermittent coastal plains along the Calabrian coast, rising to the Southern Apennines inland. The Salento Peninsula, which forms the heel of Italy, has a wide coastal plain in most areas, which would have extended further out to sea at the beginning of the Holocene, before rising to rolling uplands, with a few short water-courses and wetlands. Further north on the Adriatic coast, Northern Apulia is marked by the Gargano peninsula and fertile Tavoliere Plain, which runs up as far as the region of Molise. The Adriatic coast north of Apulia (the regions of Molise, Abruzzo and Marche) is marked by coastal plains of varying width with hills rising progressively to the Apennines, cut at regular intervals by rivers and fertile river valleys coming down from the Apennines. At the LGM the North Adriatic Plain extended down to Ancona, although this had mostly disappeared at the advent of the Holocene, leaving a wider coastal plain than at present which receded progressively under the impact of the rising seas. Not all areas have been impacted in the same manner by the eustatic sea rise, since tectonic activity has also changed the landscape, saving sites such as Torre Sabea on the Salento peninsula, and post-Neolithic soil erosion has pushed shorelines further out, largely filling the lagoon south of the Gargano Peninsula and creating new coastal plains, such as those near Acconia in Western Calabria, and the lower Po Plain.

Southern Italy and West Adriatic Seaboard – Climate and environment

Based on core information from Lake Monticchio at 550 masl, in Southern Italy, semi-desert arid conditions prevailed in the Recent Dryas. This was followed by the presence of Pistachio in the Boreal from *ca*. 8000 BC, which continued though the Early Atlantic, indicative of milder and more

humid conditions, so that at mid-altitudes the broad leafed mesophilic forests prospered whilst the lower altitudes remained dryer (Rossignol-Strick M., 1998).

The land to the south of the Tavoliere is relatively flat, whilst further north it becomes hillier near the coast, although a coastal plain exists or existed most of the way up the coast. The landscape is also cut by numerous rivers coming down from the Apennines, with a good and constant source of fresh water, with agricultural land on the valley floors or on fluvial terraces. It is mostly along these river valleys that the Initial Neolithic sites are to be found at varying distances from the coast in the Central Adriatic.

In much of this Macro-Region the vegetation was a rich and varied deciduous forest towards the end of the 7th millennium, giving way to sparser Mediterranean forest cover in the south in areas less well endowed with water, particularly in the Salento Peninsula and Sicily.

Several authors have suggested that the large fauna became scarce in Southern Italy. C.H. Andersen *et al.*, (1990) even suggested that *Sus scrofa*, *Cervus elaphus*, *Capreolus capreolus* and *Bos primigenius* had disappeared from Southern Italy and Sicily by 6600 BC, but S. Bökönyi (1988-89) is however more cautious, confirming that *Sus scrofa* had disappeared by 6000 BC.

Several authors have also commented that wild game played an insignificant role in the Initial Neolithic of the Tavoliere, with percentages in the faunal assemblage well below 10% (Cipolloni-Sampo M., 1987), yet it exists in Initial Neolithic sites such as Torre Sabea in the Salento, as well as in Late Mesolithic and Transition sites. If, as was possibly the case, large game became progressively scarcer and the hunt less predictable, we can discern one of the primary causes for the broad spectrum revolution and the appeal of coastal sites.

Southern Italy and West Adriatic Seaboard – Early human presence

There is plenty of evidence for pre-Holocene occupation of Sicily, Southern Italy and the Fucino Basin in particular. In Sicily many of the sites are centred around Palermo, the north coast and the Egadi Islands which were attached to Sicily at the time (e.g. Grotta dell'Acqua di Mondello with its Palaeolithic occupation, Grotta della Cala dei Genovesi on the island of Levanzo and Grotta dell'Uzzo); On the Salento Peninsula, the Grotta del Cavallo in the Bay of Uluzzo, occupied from the Palaeolithic, and Grotta Romanelli, which each became respectively eponymous sites for Palaeolithic and Epipalaeolithic cultures, are only two of numerous sites, some of which are lithic scatters (e.g. Alimini Lakes), occupied prior to the Holocene; in Calabria, the Grotta della Madonna at Praia am Mare was also occupied from the Palaeolithic, and in Basilicata there is evidence from inland sites; on the Adriatic coast the evidence is more sparse.

Evidence for Mesolithic occupation of the land is variable, and given that during the Mesolithic, the evidence points to a growing reliance on marine resources for many Mesolithic groups, it is likely that many of their habitation sites are now below sea level. In Northern Apulia and the Adriatic seaboard further north, only sparse Mesolithic evidence exists along the coast, and virtually none in the foothills (Skeates, 2000), whilst reasonable evidence exists in the Salento, in Sicily and the Fucino Basin.

Southern Italy and West Adriatic Seaboard – Funerary practice

In this Macro-Region more than 50% of the Italian Mesolithic inhumations have been found in Sicily. The Initial Neolithic is poorly represented although Neolithic burials are known in the Fucino Basin in Grotta Continenza and at the near-coastal site of Ripabianca di Monterado in Marche, where the inhumations could be of Mesolithic tradition.

Mortuary practice tells us little, mostly due to the small number of Middle and Late Mesolithic and Initial Neolithic inhumations. Most of the Mesolithic burials found in Sicily are represented by 12 individuals in 10 inhumations at the Grotta dell'Uzzo covering all age groups and both sexes, as well

as scattered bones; 4 individuals in 3 graves in a flexed position at Grotta della Molara; 1 possible Early Mesolithic burial at Grotta d'Oriente and another possible Late Mesolithic one at Petraro di Melille in a natural cavity. 2 infant burials have been excavated at Grotta della Madonna. Inhumation in an extended position appear to be the norm, although flexing of the joints to fit the cadaver to the pit occurs, although the flexed position could be culturally driven. Funerary fires have been noted associated with the Grotta dell'Uzzo burials as part of the mortuary ritual, as has the presence of ochre, pebbles in the grave pits and boulders to partially cover the body. Grave goods also exist but are relatively rare in the south and the orientation is varied (Martini F., 2006). Mortuary practice in Peninsular Italy in the Early Neolithic is attested from 18 sites with a total of 54 inhumations; most are in pits, occasionally lined with stones, some within habitation areas or close by, others in caves; the flexed foetal position with the body placed on the side gains in importance, and the norm is for single burials with few grave goods, with both sexes and all age groups represented. Exception occur, such as at Canale Samari in Apulia, close to the Bay of Taranto, with an accumulation of bones and the remains of a large hearth (Grifoni Cremonesi R., 2006).

Southern Italy and West Adriatic Seaboard – Lithics

Traditionally, lithic studies in Italy have been typological, mostly following G. Laplace (1964, 1966, 1972) and to a lesser extent technical (Collina C., 2009). The pressure technique for the extraction of standardised micro-blades at the Grotta dell'Uzzo from the Late Mesolithic through the Early Neolithic finds similarities at the sites of Scamuso (Salento) on flint and obsidian and Favella di Sidari (Calabria) in the earliest Impressed Ware levels, for the manufacture of geometrics possibly to be used as sickle inserts (Collina C., 2009: 568-569).

In Southern Italy, the Early Holocene evolves out of the Terminal Palaeolithic in different ways, with the Romanellian in Apulia, an industry with denticulates in Calabria, whilst in Sicily a particular industry with microliths develops with trapezes, and where the technology may have originated in North Africa. These industries are different from the Castelnovian found in Central and Northern Italy, even if trapezes are found, since these isosceles trapezes with concave truncations appear to be a particular southern development (Dini M., *et al*., 2008). When they are found in an Initial Neolithic context in Molise, Abruzzo, Marche and Romagna, they supply evidence for either migration, contact, exchange or acculturation.

One of the main characteristics of the Romanellian, which appears at the end of the Pleistocene, is the development of short scrapers, often circular or sub-circular. The characteristics of this cultural facies are (Martini F., 1996):

- Reduction in the number of burins;
- Accentuation of scrapers, particularly circular and often 'thumbnail'/microlithic;
- Tendency to a reduction in backed pieces, whether blades, points, or truncations;
- Few geometrics;
- Increase in the number of denticulates;
- Reduced laminarity of the assemblage.

The Initial Neolithic migrants brought a lithic industry with them which appears to have been modified as they moved away from their landfall in Apulia, possibly through the inclusion of elements from the Mesolithic substrate. It is almost impossible to determine whether these elements were acquired through contact and exchange only, or through the assimilation of Mesolithic elements of the population. It would be surprising if assimilation did not take place.

From the earliest contacts with the Neolithic, there is evidence for the circulation of obsidian, which implies that people moved around.

Southern Italy and West Adriatic Seaboard – State of research

This area encompasses the heel and toe of Italy, Sicily, and the Italian Adriatic seaboard up to the Paduan Plain south of the River Po. The Northern Adriatic will be dealt with separately, since the southern reaches of the lower valley of the River Po mark the approximate boundary between two different Early Neolithic cultures. The first was the Impressed Ware pottery culture, which worked its way up the western Adriatic seaboard till it met the Early Neolithic Fiorano Culture of the Po Valley, which was already in place, although traditional Impressed Ware is not found north of the valley of the River Pescara (Radi G. & Ventura O., 1993).

In Sicily, Grotta dell'Uzzo, which was excavated over a number of years, is the most important site on the island covering the Mesolithic and Transition. Numerous Late Palaeolithic and Mesolithic sites have been discovered and investigated, particularly along the north coast, and new locations have recently been discovered. Whether there were contacts with and influence from North Africa during the Mesolithic and Initial Neolithic is a debated issue.

In Calabria, Grotta della Madonna is the most important site covering the Palaeolithic, Mesolithic and Neolithic, which has recently been re-excavated; Otherwise the sites are mostly Early Neolithic

In Basilicata, Grotta di Latronico 3 is the reference site covering the Late Mesolithic and Transition; Otherwise as with Calabria, most of the well excavated sites are Early Neolithic.

The Salento Peninsula, which is the southern half of Apulia, has a wealth of sites testifying to the occupation of the territory from the Late Palaeolithic to the Early Neolithic, with numerous sites attesting the Transition which have been adequately documented, even if there are few monographs. Conversely, Northern Apulia, with the Tavoliere Plain, is mostly rich in Early Neolithic sites.

The Adriatic coast north of Apulia is strangely lacking in Mesolithic sites, but there are one or two attesting the Transition and many of the Early Neolithic sites appear to incorporate cultural affinities from the Late Mesolithic.

The Fucino Basin in Abruzzo has been the subject of intensive research and has numerous Late Upper Palaeolithic and Mesolithic sites, with Grotta Continenza, which continues to be excavated, being the most important one covering the Transition. There are also several Early Neolithic sites attesting affinities with the late Mesolithic.

Southern Italy and West Adriatic Seaboard – Mesolithic

The Mesolithic was a period of adaptation in the technological, economic and social spheres, largely in response to the changing environment (Biagi P., 2003; Larusso P., 2008; Taschini M., 1983; Tusa S., 1996) (shrinking littoral plains, increasing forest cover, disappearance of large cold climate herd herbivores, shrinking large biomass, changing hunting techniques, adaptive lithic technologies, economic intensification with plant gathering, gastropod collection, greater reliance on small game and the exploitation of marine and aquatic resources, increasing sedentism, increasing maritime contact and wider exchange networks), so that contact with the Initial Neolithic migrants can be seen as yet another aspect of the expanding contacts and continuing adaptation, although the changes and adaptations associated with the Neolithic are fundamentally different in that they are cultural as well.

The Late Mesolithic and Transition is best attested in the Salento Peninsula and the Fucino Basin in Abruzzo, but evidence for contact and the Transition exists in all the Regions with some notable sites elsewhere. Many Late Mesolithic communities appear to have turned towards the sea for part of their subsistence, particularly in Southern Italy and Sicily (Biagi P, 2003), although this could be equally true for the Adriatic seaboard, where sites are quite likely to have been lost to the post-LGM eustatic sea-rise. Several authors have seen a hiatus between the Final Mesolithic and the Initial Neolithic in stratigraphic contexts, such as Grotta della Madonna in Calabria, Grotta Continenza in the Fucino Basin, and possibly Grotta di Latronico 3 in Basilicata, and that Terminal Mesolithic sites are

rare, whilst recognising that open-air sites, evidenced by unstratified lithic scatters, are often impossible to date with precision (Guilaine J. & Cremonesi G., 2003).

The lithic tradition of the Final Mesolithic in South Italy was essentially of Romanellian tradition, although the Castelnovian tradition can be discerned in the trapezes, and Sicily developed a particular lithic tradition of its own (Dini M., *et al*., 2008).

The discrete presence of obsidian, particularly in Sicily, during the Late Mesolithic, coupled to deep sea fishing attested at Grotta dell'Uzzo, confirms that navigation was practiced, so that contacts across the Straights of Messina would have existed at that time (Piperno M., *et al.*, 1980: 59), as well as possibly with North Africa.

Southern Italy and West Adriatic Seaboard – Neolithic

The earliest evidence for the Adriatic Impressed Ware is to be found on the eastern seaboard at the head of the Ionian Sea at the sites of Konispol Cave, Asfaka and Sidari, dating from after 6500 BC (Grifoni Cremonesi R. & Tozzi C., 1996, Guilaine J. & Cremonesi G., 1996; Schuldenrein J., 1998: 510). It is supposed that the Initial Neolithic migrants island-hopped across the Southern Adriatic via the islands of Lastovo, Sušac and Vis close to the eastern shore, Palagruža (with its flint and finds of Impressed Ware) in the middle and Pianosa and the Tremiti islands close to the western shore, bringing the Impressed Ware culture with them (Cazzella A., 2000; Manfredini A., *et al*., 2005). The earliest known Neolithic site in Italy is to be found on the Tavoliere in Apulia at Masseria Santa Tecchia dated *ca*. 6400-6200 BC, although this date, as with the earliest date from Coppa Nevigata, could be incorrect. The site of Scamuso, on the coast south of Bari has produced a date *ca*. 6300-6100, which is also very early. Most of the earliest Neolithic sites are dated from *ca*. 6000 BC or a little later). The Tavoliere Plain, cut by water courses flowing from the hills, offered extensive areas of light and fertile arable land, and the number of ditched enclosure Neolithic sites increased rapidly during the 6th millennium BC. The initial area colonised has not produced any evidence of a Mesolithic presence, although there are some indices of Mesolithic lithic traditions. The Initial Neolithic is attested in the Bay of Taranto *ca*. 5900-5700 BC at Torre Sabea and Favella di Sibari; in Abruzzo *ca*. 5750-5650, and in Eastern Romagna ca. 5400 BC, where it came into contact with the already-established Fiorano culture near the head of the Adriatic in the Paduan Plain (Forenbaher S. & Miracle P., 2005; Pessina A., 2000). The Fucino Basin is a special case in that the Initial Neolithic is earlier that that known north of Apulia along the coast and its hinterland with the exception of the site of Portonovo di Ancona; It could have been colonised from the eastern seaboard, or even from the Tyrrhenian side of the Apennines, although the cultural influence discernible in the Impressed Ware is from the Adriatic, yet the obsidian found from the Initial Neolithic is mostly from Palmarola, and this raw material is found in relative abundance in Early Neolithic sites in Marche and Romagna, confirming the trade and contact with the Tyrrhenian coast, where the site of La Marmotta produced a lithic assemblage with trapezes and an industry reminiscent of the Fucino basin (Grifoni Cremonesi R., 2003a: 129).

Some of the reasons put forward for this slow progress north are the difficulties in adapting to the environment north of the Tavoliere and local resistance (Cazzella A., 2000). To these reasons (to which we do not necessarily subscribe) can probably be added the fact that there was sufficient space available for new waves of migrants and the demographic growth on the Tavoliere for several centuries, after which the need grew for some of the population to move out of this privileged area.

The lack of demonstrable continuity from the Mesolithic at Initial Neolithic sites in Southern Italy argues for a colonising movement, which introduced the complete Neolithic package (Tine S., 1987; Whitehouse R., 1987: 364). "*The first Neolithic phase in southern Italy and Sicily is associated with impressed ware, which is characterised by very simple forms and by impressed and incised decorations lacking a specific syntax or structural pattern"* (Tusa S., 1996a: 44); S. Tusa (1996a) also argues for substantial cultural continuity, which at the time of writing is a reference for acculturation of the hunter-gatherer substrate. The Initial Neolithic colonisers throughout Southern Italy, Sicily and

the Adriatic seaboard tended to be turned more towards the land, with the sites further from the sea by several kilometres when they were established, than is currently the case as a result of the eustatic sea rise. These migrants sought favourable land for agriculture and animal husbandry (Biagi P., 2003; Conati Barbaro M. & Silvestrini M., 2005). This is clearly the case for the earliest settlements on the Tavoliere Plain in Northern Apulia, where over 500 ditched enclosure sites have been identified between the River Fortore, north of the Gargano, and the River Ofanto some 30 km to the south of the Gargano Peninsula, all of which are within 1.5 km of a present-day watercourse, on relatively light well-drained soils overlying a calcareous geological stratum (Skeates R., 2000: 157). In time these Initial Neolithic migrants, who privileged coastal plains and river valleys, colonised the Murgia uplands south of the Gargano, and the Salento Peninsula further south, so that the region has produced sites which are fully Neolithic and others with evidence for certain attributes of the productive economy, which appear to be contemporaneous (Lorusso P., 2008: 12). At approximately the same time, Neolithic settlements also appear around the Bay of Taranto. The chronology for the neolithisation of the Western Adriatic, north of Apulia, is not particularly clear over the 450 km as far as Imola, with only a few dated sites.

Some of the earliest dates for the Italian Neolithic are contemporaneous with, or possibly even earlier than those for the Eastern shore of Ionian Sea or the eastern shore of the Southern Adriatic, with the exception of Sidari on the island of Corfu, recognising that dates for early sites are sometimes controversial (e.g. Asfaka on the eastern side, and Coppa Nevigata, Masseria Santa Tecchia and Scamuso on the western side). If the Neolithic migrants arrived on craft, there is no reason why the earliest dates in Southern Italy should not be more or less contemporaneous with those from the eastern shore, whilst also recognising that our current knowledge is based on a small number of sites. M. Spataro (2002), in her extensive study of the Impressed Ware pottery in the Adriatic has determined that the Impressed Ware pottery was locally produced on both sides of the Adriatic; this means that the Neolithic migrants on both shores of the Southern Adriatic originated from a common cultural background, arriving during the 6600-6000 BC RCC Episode, which culminated with the '6200 BC event'. The stylistic development of this pottery did however follow differing trajectories; *"From typological and stylistic points of view, the Impressed Wares of the two areas are very different. The Dalmatian aspect has been subdivided into different groups first by BATOVIĆ (1966) and later by MÜLLER (1988; 1994). Both these authors recognized different phases of development of the ceramic assemblages. While the Cardium Impressed Ware is distributed, along the eastern Adriatic coastline, from Montenegro to Istria (MÜLLER, 1988: 121), along the Italian side, the same type of pottery is not attested north of the Pescaro River, in the Abruzzi. North of this river, the Impressed Ware Culture consists of regional variants that make their appearance around the middle of the seventh millennium BP, at the sites of Maddalena di Muccia and Portonovo di Ancona (SILVESTRINI and PIGNOCCHI, 2000)*" (Spataro M., 2002: 195). Contact was however maintained between the two shores throughout the Early Neolithic as evidenced by the trade in obsidian and flint, the traffic in other cultural materials and the archaeological remains on the islands bridging the Adriatic.

Southern Italy and West Adriatic Seaboard – Transition

Authors such as A. Radmilli (1972), B. Bagolini and G. Cremonesi (1987), J. Guilaine (1987), R. Grifoni Cremonesi (1996) and P. Lorusso (2008) have espoused the diffusionist model in which the autochthonous element is very important. This situation created complexity in that various degrees of neolithisation occurred in different places at different times, based on the interrelationship between hunter-gatherers and the new economic model (Grifoni Cremonesi R., 1998: 58; Lorusso P., 2004: 11). This interaction means that the local development of the "*Neolithic culture and economy rapidly became highly individual, and remained that way for most of the succeeding 3-4 millennia*" (Malone C., 2003: 237).

In 1997, M. Pluciennik maintained that there was a gap of at least 1000 years between the latest Mesolithic dates and the earliest Neolithic ones in Southern Italy and Sicily. This supposed gap, based on research information then available, has since been largely filled; which highlights the risks inherent in making suppositions or drawing conclusions using the limited information available at any one time.

The Neolithic or neolithisation process moved up and down the coast from the area of primary settlement on the Tavoliere Plain and the Materano, whether overland, along and around the coast, or by way of new waves of migrants from regions to the east. Most of these new settlements produce no evidence for prior occupation, and the complete Neolithic package has almost invariably been present, comforting the hypothesis that we are dealing with the movement of Neolithic migrants. Such sites, particularly outside the areas of primary colonisation on the Tavoliere Plain and the Materano, often include elements of the Mesolithic substrate (e.g. lithic technology, faunal assemblage), suggesting the incorporation of these Mesolithic peoples in the diffusion process. Such sites could be interpreted as settlements of acculturated hunter-gatherers, but the presence of the total Neolithic package makes it more probable that we are in the presence of a migrational movement of Neolithic settlers, who have either incorporated elements of the autochthonous hunter-gatherer population in their midst and/or adopted some aspects of the Mesolithic technology and lifeways. This can be seen at sites such as Torre Sabea, near Gallipoli in the Salento, and sites in Abruzzo, Marche and the Fucino Basin (Collina C., 2009: 37, quoting Tiné S., 1983; Manfredini A., *et* al., 2005).

The overall homogeneity of the Early Impressed Ware across the region also suggests that the Neolithic diffusion originated from a common cultural background, and that contacts were reasonably intense across the cultural area, and it is only as the Neolithic advanced that new regionally specific pottery styles and decorations evolved (e.g. Guadone, the Sicilian pre-Stentinello variant of Impressed Ware, the Stentinello, etc.).

Whilst the chain of the Apennines acted as a barrier between the eastern and western Italian seaboards, contacts are attested across this divide between the Neolithic on the Tyrrhenian side of the Apennines with that in Abruzzo, Umbria, Marche and Emilia Romagna, as evidenced by the trade in obsidian, other siliceous rocks, and some of the pottery in certain Initial Neolithic sites (Grifoni Cremonesi R., 2003: 127), so that the provenance of the Initial Neolithic in the Central and Northern Adriatic may have been influenced to a greater or lesser extent from the Tyrrhenian side of the Apennines, where the Neolithic probably arrived somewhat earlier, given the dates from Liguria. Unfortunately, there are insufficient data to understand the relations between the last hunter-gatherers and the incoming farmers (Grifoni Cremonesi R., 2003: 128), but there are some clues in the archaeological levels which can be teased out, as indicated above. B. Bagolini (1987: 22) has noted that the Adriatic Impressed Ware Neolithic is impregnated with a strong Mesolithic influence in the lithic assemblage (burins, scrapers, trapezes, denticulated blades), and the absence of elements from the Fiorano Culture would indicate that this acculturation of the Neolithic migrants probably occurred in the southern part of the peninsula. Whilst the Mesolithic tradition can thus be discerned in many Early Neolithic sites in Southern and Central Italy, with a lithic technology which includes a microlithic geometric component, backed blades, denticulated blades, small circular scrapers and the microburin technique, there is no indication to date of aggression either between Mesolithic groups or with incoming agriculturalists, so that the evidence appears to point towards a mixing of the populations with transfers of technology. A. Corrado and E. Ingravallo (2011) have also suggested that the Neolithic moved and developed up and down the coast incorporating the Mesolithic substrate, who had largely abandoned their traditional life-style based entirely on the hunt, for a more sedentary one along the coast, with an economy largely based on the exploitation of marine resources, and that this is visible at sites like Torre Canne, Torre Bianca and Fontanelle.

The adaptive processes associated with acculturation are hard to define and will vary from area to area based on physical and socio-economic factors (Lorusso P., 2008: 10). In the archaeological record we can find evidence for the acquisition of traits associated with the Neolithic, such as pottery, domesticated animals, new lithic technology, obsidian and other exotic raw materials in Mesolithic

Transition contexts, or sites with continuity beyond the Final Mesolithic, as well as Mesolithic traits in Neolithic contexts.

Regarding the genetic information, "*The European genetic landscape was reshaped recently by the identification of subclades I1a, I1b*, I1b2, and I1c of I Y chromosomes. Haplogroup I is the only autochthonous haplogroup that is almost entirely restricted to the European continent, where it shows frequency peaks in two areas, Scandinavia and southeast Europe (Rootsi et al., 2004: 129-134; Rootsi, 2006). The I1b* subclade reaches maximum frequencies in southeast Europe, including the Balkan peninsula, suggesting strong Mesolithic-Neolithic demographic continuity in the region (Barać et al., 2003)*" (Mlekuž D., *et al*., 2008: 400).

Region 16 – Southern Italy and West Adriatic Seaboard – Northern Apulia and Eastern Basilicata

(Map R16)

Southern Italy and West Adriatic Seaboard – Northern Apulia and Eastern Basilicata – General introduction

This region includes Northern Apulia as far south as a line between Monopoli on the Ionian coast and Matera to the south-west, thence west to Potenza and north-west to the northern Apulian border. It thus encompasses the Tavoliere, the Tremiti Islands, as well as inland North-Eastern Basilicata. Apulia south of Monopoli will be dealt with as the Salento Peninsula, whilst the coastal strip of Basilicata around the Bay of Taranto will be included with Calabria; and since the territory covered by this thesis stops on the north-western border of Calabria on the Tyrrhenian Sea, the far western part of Basilicata, which reaches the coast north of Calabria is excluded.

At the northern extremity of the Region, the Gargano peninsula which rises abruptly from the coastal plain to a height of over 500 masl, juts out into the Adriatic Sea. This steep-to Peninsula, with a narrow coastal plain around its perimeter, which would have been wider during the Early Holocene (Fig. R16-1), is visible on clear days from Sušac Island close to the eastern shore of the Adriatic directly north, with the inhospitable island of Palagruža as a stopping-off point half way between the two. Just north of the Gargano Peninsula are found the Tremiti Islands which were also used as stepping stones across the Adriatic. Navigation across the Adriatic is attested from the Early Mesolithic with the Romanellian lithic tradition evidenced on both shores, whilst in the North Adriatic, the lithic traditions were dominated by the Sauveterrian, followed by the Castelnovian. To the east and to the south of the Gargano, the fertile Tavoliere Plain rises gently to the uplands of Eastern Basilicata (Map R16). This plain, with its rich fertile soil and numerous watercourses, was prized by the Initial Neolithic migrants, who colonised it extensively, to the virtual exclusion of areas to the south, west and north for several centuries, until population pressures, *inter alia*, probably pushed them to expand out of this enclave (Fig. R16-2). To the south-east of the Tavoliere there was a lagoon, now largely silted up, behind which is a wide coastal plain, which rises to the upland plateau known as the Murge which stretches south. There are fewer watercourses descending to the plain from the Murge, and the land is less fertile in this southern part of the Region than on the Tavoliere. The vegetation was largely mixed deciduous forest during the Early Holocene throughout the Region.

Historically this Region is host to the first landfall of Neolithic migrants west of the Balkans, on the Italian Peninsula, with dates suggesting that they may have crossed the Southern Adriatic to the west side before moving up the east side. There are hundreds of Early Neolithic sites on the Tavoliere, in the Ofanto valley and surrounding areas. Only a few of the Initial Neolithic sites will concern us, since these migrants arrived from their points of origin with their Impressed Ware over an extended period of time with the full Neolithic package, and whilst their origin continues to be a source of debate, we will not be concerned with this issue.

Southern Italy and West Adriatic Seaboard – Northern Apulia and Eastern Basilicata – Mesolithic and Transition sites - Introduction

There are only two Mesolithic sites in this region which contain Mesolithic and Transition levels; they are both cave sites, with Grotta Disiglia on the north side of the Gargano Peninsula and Grotta Scaloria on the south side. Inland, the cave site of Tuppo dei Sassi / Riparo Ranaldi contained only Mesolithic material.

On the Tavoliere, Epipalaeolithic lithic remains are surface finds that cannot be attached to specific sites. Open air sites to profit from the lagoons, ample estuaries and wetlands are likely to have

been destroyed by subsequent anthropic agricultural and landscaping activities (Mlekuž D., *et al*., 2008), sedimentation, as well as drowned by the eustatic sea-rise.

Southern Italy and West Adriatic Seaboard – Northern Apulia and Eastern Basilicata – Mesolithic and Transition sites – Site details

Grotta Disiglia (3) – This Mesolithic and Early Neolithic cave site is near the tip on the north side the Gargano Peninsula, close to the village of Peschici. It was published by S. Puglisi (1948) and has no dates.

A. Manfredini (1987) mentions this site as being connected with Prato Don Michele, in the Tremiti Islands (see below). In the levels above those of 'Epipalaeolithic tradition', Impressed Ware and Black Lustre Ware were found, similar to that from the island site.

It is possible that Late Mesolithic occupants of this site acquired Early Neolithic pottery. Today there is a little agricultural land to the west of Peschici, on the north side of the Gargano Peninsula, but it cannot be claimed that the location is one that would have been desirable to Early Neolithic migrants, so that it is possible that the Mesolithic occupants acquired pottery before abandoning the site.

Grotta Scaloria (6) – This Mesolithic and Early Neolithic cave site in the plain north of Manfredonia in front of the steep scarp on the south side of the Gargano Peninsula was discovered in the first half of the 20th century during construction work on a canal (Fig. R16-3).

P. Biagi & M. Spataro (2001: 24) estimated that some 2300 years separated the Mesolithic and Initial Neolithic occupation of this site, the dates for which are (Pluciennik M., 1997):

- LJ-4982 9560±140BP = 9278-8569 BC (OxCal 4.2 at 95.4%), on charcoal – Median 8925 BC.
- LJ-5098 9030±120BP = 8554-7816 BC (OxCal 4.2 at 95.4%), on charcoal – Median 8185 BC.
- LJ-4649 6720±100BP = 5808-5479 BC (OxCal 4.2 at 95.4%), on charcoal – Median 5645 BC.
- LJ-4981 6530±260BP = 5986-4932 BC (OxCal 4.2 at 95.2%), on charcoal – Median 5460 BC.

The medians for the second and third date are in fact 2500 years apart. The first Neolithic date with a median of 5645 BC, is at *ca.* 500 years after the appearance of the Initial Neolithic in Southern Italy. B. Bass (1988) states that the Neolithic Impressed Ware is comparable to that on Sušac Island on the Dalmatian coast, Prato don Michele, Coppa Nevigata, Grotta delle Mura level B, and Villaggio Leopardi. These sites all have Late Early Neolithic strata, so it is reasonable to accept that the Neolithic occupation of Grotta Scaloria dates from a late stage of the Early Neolithic, after a long period during which the cave was abandoned. Whether the occupants were descendants of the autochthonous Mesolithic population or of immigrant Neolithic people, or a mixture of both, we will never know, but because of the cave art with its depiction of the hunt, R. Whitehouse (1988-1989) develops the idea of secret societies in the southern Italian Neolithic, which are evidenced by cave art (Grotta Scaloria and Grotta di Porto Badisco, to which can be added Tuppo dei Sassi), and other evidence. She makes the point that certain elements, such as the overriding importance of the hunt, which was of very secondary importance in the Neolithic, harp back to the Mesolithic and earlier, when the hunt was of primary importance to the survival of the group. This activity essentially belonged to the male domain, and its development into 'secret societies', possibly with initiation rites, helped ensure the primacy of males as well as 'elder' males, in the Neolithic.

There is no evidence for the Transition at this site.

Latronico 3/Grotta di Latronico 3 (west of distribution map) – This cave site, excavated by G. Cremonesi between 1972-1988, is located in the high valley of the River Sinni on the Tyrrhenian side of Central Basilicata (Region 18), close to the water divide, at 760 masl. It is mentioned here because of the similarities with the poorer site of Tuppo dei Sassi/Riparo Ranaldi in this Region. The site is discussed with Region 18 (Calabria and Western Basilicata).

Le Macchie (15) – This coastal area close to Polignano a Mare, between Bari and Monopoli is rich in pre-Neolithic surface finds. An Early Neolithic settlement was excavated in the 1980s in which all four domesticated animals were present, but no wild fauna. Agriculture was also attested (Coppola D. & Costantini L. 1987; Lorusso P., 2008: 13).

Tuppo dei Sassi/Riparo Ranaldi (11) – This rock-shelter near the village of Filiano, some 15 km north of Potenza, in Basilicata, at ca. 800 masl, was discovered by F. Ranaldi, director of the Archaeological Museum in Potenza, in 1965. It was excavated by E. Borzatti von Löwenstern from 1971. The cave is known for having the only cave paintings in Basilicata (Fig R16-4). In 1996, O. Chiaradia also discovered the engraving of two cervids on a rock above the cave.

E. Borzatti von Löwenstern (1971) identified a Mesolithic level evidenced by a triangle and half a dozen trapezes in the lithic assemblage. This level, devoid of pottery, finds parallels in Northern Italy and the site of Latronico 3, with the microburin technique, regular microblades, rare backed pieces, and Montbani-type denticulated blades, as well as plenty of debitage waste (Bonato M., 1997: 112; Callatini M., 1996: 51; Guilaine J. & Cremonesi G., 2003; Ingravallo E., 1997: 73; Martini F., 1996: 38). Parallels can also be found in the Early Neolithic lithic assemblage at Torre Sabea (Bonato M., 1997: 112; Guilaine J. & Cremonesi G., 2003). There is however no Neolithic occupation of the site.

No faunal remains were found due to the acidity of the soil (Guilaine J. & Cremonesi G., 2003: 297), but wall paintings and engravings depict cervids and anthropomorphic figures, or possibly trees (Fig. R16-4), generally attributed to the Mesolithic, but which have similarities with the Neolithic cave art at Porto Badisco in the Salento Peninsula.

This site and Latronico 3 are the only two Mesolithic sites of Castelnovian tradition in Southern Italy. Tuppo dei Sassi is not a residential site, and whilst it could have been a hunting halt or temporary shelter for the hunter-gatherer occupants of Latronico, the two sites are some 60km apart as the crow flies, suggesting that there was more than one group of hunter-gatherers in this region.

Southern Italy and West Adriatic Seaboard – Northern Apulia and Eastern Basilicata – Initial and Early Neolithic sites – Introduction

Some of the earliest dates put forward for the Italian Neolithic sites, which originated in this region are suspect (Casa san Paolo, Coppa Nevigata, Santa Tecchia), so that dating the earliest arrival of the Neolithic migrants is problematic; in this connection the Initial Neolithic site of Scamuso on the Salento Peninsula with a date of *ca*. 6200 BC should be taken into consideration. It should also be noted that some sites have produced no faunal remains due to the acidity of the soil on the Tavoliere, so that a major aspect of the subsistence diet and economy of the Initial Neolithic escapes us at these sites (Skeates R., 2000).

A number of sites at which archaic Impressed Ware has been found in the earliest levels have produced lithics containing elements of Mesolithic tradition. Whilst classified as Neolithic sites, the possibility that at least some of the occupants came from the hunter-gatherer substrate, or that there was contact and exchange between the immigrants and autochthonous hunter-gatherers, is discussed in each instance.

Southern Italy and West Adriatic Seaboard – Northern Apulia and Eastern Basilicata – Initial and Early Neolithic sites – Site details

Casa san Paolo (12) – This Early Neolithic open-air site near Altamura is over 50 km south-west of the southern margin of the Tavoliere Plain. The one date available, quoted by A. Manfredini (1987) and M. Pluciennik (1997) from S. Vinson (1974), is taken from an agriculturally disturbed level 35-50

cm below the current ground level, and is associated with evolved Impressed Ware and Painted Ware. The date does not include a laboratory reference, and by S. Vinson's own acknowledgement, is suspect:

- ?? 7900±100BP = 7062-6567 BC (OxCal 4.2 at 94.7%), on soil and charcoal from a hearth – Median 6815 BC.

We concur that the date is suspect since the material is Late Early Neolithic, and the site far from the Tavoliere in the Murge uplands. It can therefore not be used to establish the date for the earliest Neolithic in Southern Italy. The possibility that the EN site sits on top of a Late Mesolithic hearth or camp-site cannot be excluded, but no evidence for continuity of occupation has been put forward.

Coppa Nevigata (7) – This site is on a small rise now 10 masl, and *ca*. 7 km from the sea on the edge of a now-filled marine bay and former estuary of the River Candelaro, known as the '*Laguna di Salpi*' (Caldara M., *et al.*, 2002), to the south-west of Manfredonia and south of the Gargano Peninsula. At the time of occupation, it would have been close to the water as evidenced by the sand in the lowest levels. There are other Initial Neolithic sites nearby which have also been excavated (e.g. Santa Tecchia).

Coppa Nevigata was originally excavated by A. Mosso prior to 1909, re-excavated in 1955 by C. Drago and S. Puglisi, again by S. Puglisi in 1971, and the subject of a fourth excavation between 1983-1987 under S. M. Cassano and A. Manfredini.

S. Puglesi (1955) states that the early 20th century stratigraphy was 3.95 m deep. The lowest level was 30 cm thick and contained Impressed Ware. His 1955 excavations found a defensive wall 5.6 m thick surrounding the settlement with a passageway 70-80 cm wide, allowing only one person at a time through the wall. This was built above the Impressed Ware level after a period of abandonment. The Impressed Ware level was found to be 2.2 m thick going down to 5.3 m. Above this level a sterile level was deposited on which the Apennine folk constructed their walled settlement during the Bronze Age. The Neolithic lithics were on blades or bladelets obtained from river pebbles using prepared knapping platforms. 173 microlithic tools were recovered over 9 m^2 reducing to 2.25 m^2 (Fig. R16-5). The quantity of tools increased and decreased in relation to the stratigraphic volume of cardium shells, which bore the stigmata of being forced open (Fig. R16-5). In his summary the author suggests that the technique is comparable to the Sub-Capsian and Oranian of North Africa, thus "*Supporting the theory that the technique of impressed vases was the work of decoration derived from Africa*" (Puglisi S., 1955). We do not necessarily support S. Puglisi's theory regarding the provenance of Impressed Ware in Southern Italy, but it could support the theory of contacts with North Africa during the Mesolithic and Early Neolithic, which we explore in more detail in relation to Sicily (Region 19), and it is probable that the Early Neolithic in Southern Spain was carried by navigators from North Africa.

During the excavations by S. Cassano and A. Manfredini, a ditch was found, whose infill included carbonised cereal grains from the deepest deposits, associated with Impressed Ware and a single sherd of Guadone pottery (Skeates R., 2000: 167). Dating ditch infill is however always delicate, and this pottery association could suggest that neither the feature nor the date reflect the earliest occupation of the site, which is known to have been occupied over a long period of time from the Initial Neolithic up to and including the Bronze Age. A. Ronticelli (1987) confirms that agriculture is attested not only by the grains, but also by sickle elements. The lithics are essentially similar to other Initial or Early Neolithic sites in the broader region and quite different from sites such as Latronico and Torre Sabea.

M. Pluciennik (1997: 119-120) quotes S. Puglesi (1955: 26) and S. Cassano and A. Manfredini (1987: 749), who all reported having found Impressed Ware, as well as A. Ronticelli (1987: 757) who confirms the discovery of a single obsidian bladelet from the 1955 excavations. Given the long occupation of the site, without a date for the archaeological level in which the obsidian bladelet was found, the information is not usable for a better comprehension of the Initial Neolithic. The dates on

the carbonated grains found during the 1983-1987 excavations (see below), also suggest that the ditch and its contents might not be contemporaneous with the earliest occupation of the site.

The site is particular in that it is close to the sea and includes large quantities of *Cardium edule* seashells collected for consumption primarily in the summer and autumn (Deith M., 1987; Skeates R., 2000), and has an unusual 'Sipontian' lithic assemblage with microlithic points with bi-facial retouch, which have been interpreted by A. Mosso (1909) and S. Puglesi (1955) as shellfish opening tools, and in which A. Benac (1987: 338) and S. Puglisi (1955: 37) saw parallels with the North African Capsian culture. B. Bass (1998), on the other hand, compared the bilaterally retouched points found on the eastern side of the Adriatic on Sušac Island with the 'Sipontian' points found at Coppa Nevigata, whilst also comparing the earliest (archaic) Impressed Ware from the Sušac Island sites with Coppa Nevigata as well as that from Prato don Michele in the Tremiti Islands.

If the cultural provenance of the early site occupants has been hotly debated, so has the dating of the site also given rise to polemics, since some of the earliest dates (non-AMS) were on seashells, when the WRE was also an unknown factor. The more ancient ^{14}C dates are older by up to 1000 years compared to those from the most recent excavations (Ammerman A., 1989: 163).

The dates associated with this site are:

- Date never properly published as 8200BP from the 1950s excavations (= 7308-7139 BC OxCal 4.2 at 94.2%) (noted in *Radiocarbon* 1989-31.1: 27). This date is improbably earlier and should be rejected.
- R-?? 8150±?? = 7145-7076 BC (OxCal 4.2 at 86.3%), on shell. This date is quoted by M. Pluciennik. (1997), referencing Tongiorgi *et al*., (1959), and could be the same date as the one above, which would be distorted by the WRE, producing an older date requiring correction of possibly *ca*. 500 years. This date should also be rejected.
- BM-2557 7780±320BP = 7484-6067 BC (OxCal 4.2 at 95.4%), on carbonised grain – Median 6775 BC. (Radiocarbon 1989-31.1: 27). It is also quoted by M. Pluciennik (1997), who publishes it as being approximately 6550 BC. This date is apparently the oldest one in Italy on carbonised grain. Because of its large standard deviation, this date should also be rejected.
- Gif-6339 7290±110BP = 6401-5985 BC (OxCal 4.2 at 95.4%), on charcoal – Median 6195 BC. (Tinè V., *et al*., 2000).
- OxA-1475 6889±90BP = 5926-5635 BC (OxCal 4.2 at 90.3%), on carbonised *Hordeum* grains from ditch, strata 6-7 (bottom), with 'Archaic' Impressed Ware (finger, stick, point) and 1 sherd of impressed / painted ware – Median 5780 BC. (Skeates R., 2000).
- OxA-1474 6850±80BP = 5921-5617 BC (OxCal 4.2 at 93.1%), on carbonised grains from ditch CN II/III (lip), with Impressed Ware (more frequent cardium and 1 sherd of 'Guadone') and one sherd of '*figulina*') – Median 5770 BC. (Skeates R., 2000).
- Other dates fall in the 6th millennium BC.

Archaeologists who have considered this site to be a transition site are S. Cassano, *et al*., (2012), who saw a Mesolithic substrate; M. Cipolloni-Sampo (1987), who considered the site to date from *ca*. 6200 BC; F. Martini (1996), who also saw evidence for a hunter-gatherer substrate; R. Whitehouse (1971: 250), who thought that whilst Phase 1 could possibly be a special purpose Early Neolithic site, it could also be attributed to hunter-gatherers.

Based on present knowledge, there is little doubt that this site, and the one nearby of Masseria Santa Tecchia (see below), have produced some of the earliest dates for the Neolithic in Italy. Given its location near the sea, the reliance on marine resources for a part of the diet, and the microlithic assemblage, it is conceivable that the earliest occupation (which could have been as early as the mid-7th millennium BC) included an autochthonous element, although evidence is lacking. The recalibration of dates from the Iron Gates initiated in the early years of the 21st century also suggests that the WRE is more likely to have aged the seashells by some 500 years rather than the 1000 years quoted by A. Ammerman (1989); this would make the earliest dates for the Southern Italian Initial

Neolithic not more than two to three centuries more recent than the earliest known dates from the eastern seaboard Impressed Ware sites of Asfaka, Konispol and Sidari (see Region 13).

Defensola flint mines (4) – Flint mines on the Gargano, where the extraction activities are only attested from the first half of the 6th millennium BC during the Early Neolithic, without any evidence for the Mesolithic use of the flint (Ingravallo E., 2011: pers. com.).

Le Macchie (15) – This coastal area close to Polignano a Mare, south of Bari is rich in pre-Neolithic surface finds. An Early Neolithic settlement was excavated in the 1980s in which all four domesticated animals were present, but no wild fauna. Agriculture was also attested (Coppola D. & Costantini L. 1987; Lorusso P., 2008: 13).

Malerba (16) – This inland site near Altamura which is located some 35 km inland from Bari. The site contained a Neolithic laminar lithic industry, with the presence of obsidian; there is also hunting and collecting, incipient agriculture, as well as marine resources (Lorusso P., 2008: 40).

Discounting the exploitation of marine resources at such a distance from the coast, given the brief description of this site, we could be in the presence of acculturated hunter-gatherers completing their Transition.

Masseria Giuffreda/Masseria Giuffredda (8) – This Early Neolithic site on the Tavoliere is about 6 km south-east of Foggia on the road to Trinitapoli between km 5 and 6. Whilst most of the site produced painted pottery, charcoal from a hearth from the lowest level of trench G, associated with Impressed Ware only, gave the only ^{14}C date (Collina C., 2009; Guilaine J., *et al*., 1981: 155-156):

- MC-2292 7125±20BP = 6051-5982 BC (OxCal 4.2 at 93.1%), on charcoal – Median 6015 BC.

Little detailed information is available from this ditched enclosure site dating from *ca*. 6000 BC, which does not *prima facie* contain any Transition material.

Masseria Santa Tecchia (9) – This site is close to that of Coppa Nevigata, on the right bank of the River Candelaro, just south of the Gargano Peninsula.

The dates for this site are:

- ?? 7550±100BP = 6603-6222 BC (OxCal 4.2 at 95.4%) – Median 6415 BC. (Manfredini A, 1987: 375); M. Pluciennik (1997), referring to S. Cassano and A. Manfredini (1983), quoted what is probably the same date as being 7600±100BP, whilst stating that the date comes from a level associated with Impressed Ware as well as Red-painted Ware; The same date of 7600±100BP, without laboratory reference, indicated as coming from Level 6, is also quoted in the notes from *Radiocarbon*, 1989-31.1: 27; the same date is finally also quoted by M. Caldara, *et al*. (2002: 127), referencing Belluomini and Delitala (1983).
- BM-2414 6520±70BP = 5618-5357 BC (OxCal 4.2 at 95.4%), on collagen from human bone, ref ST F4, from Level 4 of the compound ditch around the Neolithic ditched village – Median 5490 BC. (*Radiocarbon* 1989-31.1: 27); also quoted by M. Pluciennik (1997: 120-121) as being on human collagen taken from a level few cm higher up than the first date, suggesting that the first date should be treated with caution.

The two dates appear to confirm a long occupation of the site. There is no indication as to whether the human bone from which the collagen was extracted, from two archaeological levels higher up than the first date, came from a Neolithic burial which might have cut into earlier levels, or whether the human bone appeared to be part of the natural fill of the ditch. The earlier date, slotted between the two dates from Coppa Nevigata, for which laboratory references are available (Gif-6339 7290±110BP, and OxA-1475 6889±90BP), give credence to a date for the Italian Initial Neolithic of *ca*. 6400 BC, although some archaeologists (e.g. Guilaine J., 2016: pers. com.) consider this date to be too early for the first Neolithic presence in the Region.

Palagruža (2) – This island, devoid of water, in the middle of the Adriatic Sea, half way between the eastern and western shores was visited by seafarers who extracted flint and left sherds of Impressed Ware. Palagruža Island is dealt with in greater detail in Region 14.

Passo di Corvo (not shown on distribution map) – Neolithic ditched enclosure site on the Tavoliere famous because it is the largest such site. It dates from the end of the Early Neolithic or the beginning of the Middle Neolithic and is therefore not relevant for this study.

Prato Don Michele (1) – Early Neolithic open-air site on the island of San Domino in the Tremiti Islands, to the west by north-west of the Gargano Peninsula, which was occupied or visited through much of the Neolithic. The site was originally published by S. Puglisi (1948). Whilst the open-air site has archaic Impressed Ware (Lorusso P., 2008; Manfredini A., 1987), the Early Neolithic lithic assemblage is of Mesolithic tradition, with little domesticated fauna and less evidence for agriculture. The lithics are similar to those found at the Grotta Disiglia, facing the island, near the tip of the Gargano Peninsula, where there is evidence for a Mesolithic and Transition occupation (Manfredini A., 1987: 369). Obsidian from Palmarola found at the site, probably dates from a later phase of occupation (Pessina A. & Radi G., 2006: 444).

B. Bass (1998), referencing Palma di Cesnola (1967) and A. Castiglioni (1967), states that "*Especially with its Early Neolithic Impressed Wares and later Neolithic pottery ex-Dalmatia, supports the notion of trans-Adriatic links via the Archipelago*". This statement is supported by two other island sites:

- The Early Neolithic Impressed Ware site on the Croatian island of Palagruža (see Region 14), from which flint was extracted, to the north of the Gargano Peninsula, about half way across the Adriatic, and almost equidistant from Prato Don Michele and Sušac Island on the Croatian side;
- The four Neolithic sites on Sušac Island (see Region 14), on the Croatian side of the Adriatic, in a direct line further north, where archaic Impressed Ware was found at three of the sites.

It is thus possible that this island site of Prato Don Michele, visible from the northern coast of the Gargano Peninsula, and thus from Grotta Disiglia, was visited by Late Mesolithic people who had acquired Impressed Ware from the initial wave of Neolithic migrants. The later occupation of the site includes pottery with Dalmatian affinities, confirming it was used as a stepping stone for movements across the Adriatic (Bass B., 1998).

Rendina (10) – Initial Neolithic site located in the valley of the River Ofanto, at the southern margin of the Tavoliere. The site was excavated between 1970-1976 by M. Cipolloni-Sampo. The earliest levels have not been dated but the lithic assemblage includes a strong element of Mesolithic substrate with short/thumbnail scrapers and denticulates (Martini F., 1996, quoting Cipolloni-Sampo M. & Ronticelli A., 1996; Ronticelli A., 1996: 356).

The faunal assemblage is primarily domestic, although, according to M. Cipolloni-Sampo (1997: 184), wild fauna made up 20-25% by weight of the meat.

The dates available from ditch B, attributed to Phase II are (Collina C., 2009; Grifoni-Cremonesi R., 1998, 2003; Pluciennik M., 1997; Skeates R., 2003):

- LJ-4548 7110±140 BP = 6252-5715 BC (OxCal 4.2 at 95.2%), on charcoal – Median 5985 BC.
- LJ-4551 6900±150 BP = 6060-5544 BC (OxCal 4.2 at 95.45), on charcoal – Median 5800 BC.
- LJ-4549 6780±65 BP = 5807-5607 BC (OxCal 4.2 at 91.3%), on charcoal and earth – Median 5705 BC.
- LJ-4550 6530±150 BP = 5744-5207 BC (OxCal 4.2 at 95.4%), on charcoal – Median 5475 BC.

Phase I, represented by a larger enclosure ditch surrounding structures than in Phase II, had a similar range of ceramic fabrics and styles as in phase II, but the painted wares only become present towards the end of the phase, so that if Phase II commences *ca*. 6000 BC, Phase I should be dated prior

to the 7th millennium (Pluciennik M., 1997, quoting Cipolloni-Sampo M., 1983: 207). V. Tiné (1987: 352) also recognised that the site was to be attributed to very early Neolithic migrants.

Given the very early nature of the site, established prior to 6000 BC, it is conceivable that contact with the local autochthonous population led to the assimilation of some or all of these into the recently established settlement, which would have resulted in the Mesolithic tradition visible in the lithic assemblage during Phase I, as well as the relative importance of hunted game by carcass weight.

Ripa Tetta/Ripatetta (5) – This Early Neolithic open-air site on the Tavoliere near Lucera, produced advanced Guadone Impressed Ware and proto-Figulina pottery (Skeates R., 2000: 173). The interest of the site lies in that a number of isosceles trapezes, as well as circular scrapers and segments of circle used as sickle inserts, were found, similar to those found at Torre Sabea (Bonato M., 1997a: 112; Giampetri A., 1996: 328; Guilaine J. & Cremonesi G., 2003: 382).

The earliest date for this site is (Pluciennik M., 1997):

- Beta-47808 6890±60BP = 5903-5661 BC (OxCal 4.2 at 95.2%), on carbonised cereal grain – Median 5780 BC.

There is no way of determining whether there is any connection between this site and the coastal site of Torre Sabea (see Region 17), close to Gallipoli in the Salento, but it would seem that the people who set up this Neolithic ditched enclosure site, typical of the Tavoliere, appear to have maintained elements of a Mesolithic tradition in their lithic technology.

Scamuso (13) – This partially eroded Initial Neolithic settlement is located on the coast, 18 km south-east of Bari and 3 km from Torre a Mare. The site was excavated in 1983 and again between 1985-1988 by D. Coppola, who published his findings in 1987, 1988 and 1989. A final season of excavations was undertaken by D. Coppola with Biancofiore in 1997.

The earliest dates for this site are (M. Pluciennik, 1997; R. Skeates, 2003; Spataro M., 2002: 164; V. Tinè, *et al.*, 2000):

- Gif-6339 7290±110BP = 6401-5985 BC (OxCal 4.2 at 95.4%), on charcoal, quoted from D. Coppola, (1987) – Median 6195 BC.
- TAN-88056 6950±140BP = 6083-5615 BC (OxCal 4.2 at 94.9%), on charcoal – Median 5850 BC.
- Gif-7055 6810±80BP = 5882-5611 BC (OxCal 4.2 at 92.9%), on charcoal, quoted from D. Coppola, (1988).
- Gif-7345 6600±120BP = 5723-5329 BC (OxCal 4.2 at 95.4%).

"*Finds attributed to the earliest phase of the site were found in alens of compact brown deposit directly overlying the calcarenite bedrock to the west of trench A1 and in a test pit (area B) dug to the west of the site where intonaco (baked daub) was found associated with 'ancient' impressed ware, and a few ovicaprid and cattle remains, as well as marine molluscs (Cassoli and Tagliacozzo, 1986)*" (M. Pluciennik, 1997: 121). To the north of the site the area is being eroded by the sea. A hearth was discovered between 1m and 1.07m; below this level there was a further 18cm rich in archaeological material, including charcoal, burned clay, coarse impressed ware and sherds of polished black ware; below, yet a further 18cm of red-brown soil above the bedrock. The hearth which was dated produced the earliest date.

In the earliest horizons, the pressure technique was used to produce bladelets, which were used to produce straight borers, bladelets with abrupt marginal retouch and trapezoidal instruments, possibly obtained using the microburin technique, although no burin spalls are reported (Collina C., 2009: 568-569; Spataro M., 2002: 164-165).

The fauna is essentially domesticated, although fishing was practiced as evidenced by the bone fishhooks, and agriculture is well attested (Spataro M., 2002: 165).

This Initial Neolithic settlement was founded by seafaring migrants at some time, probably after 6200 BC, arriving from the eastern shore of the Adriatic, or directly from regions further east. The material culture is very similar to that found in the earliest Impressed Ware sites in Central Croatia dating from approximately the same period, suggesting there was a migrational push westward coinciding with the '6200 BC event'. The only evidence for the possible incorporation of Mesolithic elements is in the lithic technology, but this is in no way assured.

Trasano (14) – This open-air site was occupied from the Early Neolithic through the Final Neolithic. It lies a few km east of Matera in the Bradano Valley in the Murge Hills of Basilicata, at *ca*. 370 masl, and was excavated between 1984-1991. The site had a stratigraphy 1.3-1.4m thick covering the Early, Middle and Late Neolithic, in which the Early Neolithic decorated pottery was dominated by Impressed Ware with only 4% being incised (Guilaine J. & Cremonesi G., 1996). In the lowest levels of the eastern sector, trapezes were present with abrupt retouch (Di Lernia S., 1996).

The dates for the earliest Impressed Ware levels are as follows (Collina C., 2009; Fuolega F., 2009; Radi G. & Danese E., 2003; Skeates R. & Whitehouse R., 1995-1996; Tinè V., *et al*., 2000):

- Lyon-5297 7030±160BP = 6221-5640 BC (OxCal 4.2 at 95.4%), on charcoal Zone B, Level 2.4. This date is sometimes quoted as 7025±150BP which calibrates to 6212-5646 BC – Median 5930 BC.
- Gif-TAN-88248 6980±130BP = 6081-5631 BC (OxCal 4.2 at 95.4%), on charcoal Zone A, Level 3 – Median 5855 BC.
- Lyon-5296 6950±150BP = 6101-5608 BC (OxCal 4.2 at 94.1%), on charcoal Zone B, Level 2.4 – Median 5855 BC.
- Gif-TAN-88056 6950±140BP = 6085-5571 BC (OxCal 4.2 at 94.9%), on charcoal Zone A, Level 3 – Median 5830 BC.
- Gif-TAN-88067 6950±130BP = 6062-5626 BC (OxCal 4.2 at 95.4%), on charcoal Zone A, Level 2 inf. – Median 5845 BC.

Thermoluminescence (TL) dating was reported by E. Vartanian *et al*., (2000), who included the following ^{14}C dates in their comparison:

- Lyon-5297 7030±160BP = 6221-5640 BC (OxCal 4.2 at 95.4%), on charcoal Zone B, Level 2.3 – Median 5930 BC.

The weighted average dates for the 3 TL dates for Level 2.4 came out at 6129±362 BC and for the 8 TL dates for Level 2.3 6163±288 BC, thus somewhat older. E. Vartanian *et al*., (2000: 264-266), were reluctant to draw any conclusions due to the complexities and variables that enter into the TL dating, which suggest a date 200-300 years older than the ^{14}C dates. J. Guilaine (1996), who was a co-author to the later Vartanian publication, suggests a date for the Initial Neolithic of 6300-6200 BC, but this date appears to be even earlier. The ^{14}C dates would appear to be more realistic, as well as in line with the dispersal of the Neolithic from Northern Apulia, the Initial Neolithic of the Salento at Torre Sabea (Region 17), and Favella di Sibari (Region 18) in the Bay of Taranto in the early 7th millennium.

This site has preserved fumier (Angelucci D., *et al*., 2009), and the faunal assemblage confirms that animal husbandry, principally of ovicaprines, was practiced from inception, with only a small element of wild fauna (Guilaine J., 1996).

P. Lorusso (2008: 38, 47) has suggested that this is a Neolithic site with lithics of Mesolithic tradition, where the earliest levels (Phase 1) are the result of a combination of cultural aspects of possibly East Adriatic origin, filtered by the Tavoliere, and reworked on site.

The trapezes found in the earliest levels could indicate contact with autochthonous hunter-gatherers or even some admixture of the local population, but Trasano is essentially a Neolithic settlement from inception, so that if acculturation of hunter-gatherers took place, it happened rapidly.

Southern Italy and West Adriatic Seaboard – Northern Apulia and Eastern Basilicata – Conclusions

Several authors have suggested that there were few Mesolithic hunter-gatherers in Southern Italy, and that the large wild fauna made up of bovines, cervids and suids had either disappeared or was thin on the ground. The evidence points to a greater utilisation of marine resources (see the Salento Region 17), which suggests the loss of coastal sites to the eustatic sea rise, and fewer inland sites. Based on current evidence, the first Neolithic migrants arrived in Southern Italy, to settle principally on the Tavoliere, in the second half of the 7th millennium BC. There can be little doubt that they encountered an autochthonous population, even if sparse, and in the absence of evidence for confrontation, it is likely that these progressively welcomed the Neolithic attributes.

There are only a few Mesolithic sites retained for this study, but the number of lithic scatters found near the coast, particularly further south in the Salento Peninsula (Region 17) of Southern Apulia suggests that Late Mesolithic sites will have been lost to marine transgression.

There are also a number of Initial or Early Neolithic open-air sites which have produced evidence which can be interpreted as representing contact with the Mesolithic autochthonous population, and/or the incorporation of elements of the Mesolithic population, and/or representing acculturated hunter-gatherers, even if this last possibility is not defensible from the archaeological evidence, except possibly in the case of Malerba.

Region 17 – Southern Italy and West Adriatic Seaboard – The Salento Peninsula

(Map R17 and Map R17a)

Southern Italy and West Adriatic Seaboard – The Salento Peninsula – General introduction

This Region includes Apulia south of a line stretching between Monopoli on the Adriatic coast, south of Matera to the south-west, to the head of the Gulf of Taranto west of the town of Taranto. The Salento is rich in Palaeolithic and Epipalaeolithic sites (e.g. Fontanelle, Grotta del Cavallo, Grotta Paglicci, Riparo C delle Cipolliane), as well as Mesolithic, Transition and Neolithic sites. There are also numerous surface scatters that have been identified, testifying to a continuing human presence which can only be dated on typological grounds.

The Post-Glacial is particular in this region, in that the Holocene hunter-gatherers evolved a particular lithic assemblage of Sauveterrian tendency known as the Romanellian, after the eponymous coastal site of Grotta Romanelli in the south-east of the Salento, facing the Ionian Sea. The Romanellian evolved over three millennia in relative isolation into the Epiromanellian (Alimini Lakes, Grotta del Cavallo, Grotta dei Veneri, Grotta Marisa, Grotta della Mura di Monopoli, Grotta delle Prazziche, Grotta di Uluzzo, etc.) with trapezoidal armatures which could have evolved under the influence of Castelnovian, or from maritime contacts with Sicily, towards the end of the Mesolithic. These symmetrical trapezes with concave truncations appear to be a southern development (Grotta di Latronico 3, Torre Testa, Alimini Lakes Region, Torre Sabea, Grotta dell'Uzzo in Sicily), which continues into the Neolithic (Dini M., et al, 2008: 73). The principal characteristics of the Romanellian are (Ingravallo E., *et al*., 2004: 43-44; Fuolega F., 2009; Mussi M., 1988: Dictionnaire de la Préhistoire, PUF, 2001):

- Short end-scrapers, increasing and becoming small to very small thumbnail and circular scrapers in the Epiromanellian;
- Backed points;
- Backed bladelets;
- Prismatic burins on truncations, reducing in the Epiromanellian;
- Microburins;
- Trapezes in the Epiromanellian;
- Notched blades in the Epiromanellian.

C. Collina, (2009) points out that several Initial Neolithic sites have produced trapezes and/or circular end-scrapers of Epiromanellian tradition (Torre Sabea, Terragne, and sites along the coast between Bari and Brindisi, such as Fontanelle, Torre Bianca and Torre Canne) where the author suggests that the pressure technique was used for the extraction of microblades. The provenance of the technology is unclear, but the author suggests that there could be a Romanellian facies with trapezes which continued into the Early Neolithic. The occasional presence of trapezes at Grotta Cipolliane I, Grotta del Cavallo and San Foca however carry a low cultural significance, particularly since they show different technical choices in their manufacture.

There are several Final Mesolithic, and Initial Neolithic sites, which attest to contact and acculturation during the Transition. In the case of the hunter-gatherers, this process of acculturation could have lasted several centuries into the 6th millennium BC. If it is possible to follow the broad lines of the acculturation process of the hunter-gatherers at sites with continuing occupation, this is less easy to do in the case of fully Neolithic sites which include Mesolithic attributes, and this difficulty is clearly sensed in the excavation reports and articles.

The supposed absence of local flint has recently been partially corrected, since flint has recently been found near Nardo at Santa Caterina on the western side of the Salento Peninsula (Ingravallo E., 2011: pers. com.). Local siliceous stone is extensively used in the region during the Mesolithic and Neolithic, sometimes on rolled pebbles.

The large mammalian faunal assemblage in the early Holocene included aurochs and equids, as well as red deer and wild boar, probably reflecting a less wooded karst environment (Pluciennik M., 2000: 178).

Southern Italy and West Adriatic Seaboard – The Salento Peninsula – Mesolithic and Transition sites – Introduction

If large game became scarce in the later Mesolithic, it was nonetheless present. Many of the sites dating to prior to the arrival of the Neolithic are close to the coast, or in ecological niches such as the Alimini Lakes, to exploit the marine or aquatic resources, as part of the adaptive response to changes in the environment and the availability of resources. The arrival of 'game in the pen' with the Neolithic migrants appears to have been welcomed by the autochthonous population, as was the acquisition of selected Neolithic attributes, such as pottery.

The Alimini Lakes area north of Otranto is a privileged area (Map R17a), with numerous sites from the Palaeolithic to the Neolithic and more recent periods. The area encompasses two spring-fed lakes near the coast, and depressions at a higher elevation, originally humid but now dry, to the west of the lakes. The region was substantially modified at the beginning of the 20th century, when hundreds of hectares were brought into cultivation, a canal cut to the sea from Alimini Grande and the two lakes made to communicate. This inter-lake communication has now been corrected by a barrier on the canal connecting the two lakes, so that Alimini Piccolo (or Lake Fontanelle) is now a fresh water lake again. Prior to the 20th century, Alimini Piccolo was a closed basin fed by sub-aquatic springs which seeped water, being permeable. In prehistory the area was a prized location for hunter-gatherers (A. Piccino & F. Piccino, 1978: 123-124), with numerous sites evidencing hominid presence since the middle and late Palaeolithic. The area incorporates the Transition site of Grotta Marisa, the Neolithic (and possible Transition) site of Grotta Sacara, as well as numerous surface scatters, the principal ones being listed below. The area was surveyed initially by the brothers A. and F. Piccino, starting in 1961, and they first published their findings in 1978. Several sites not covered in this research are listed as surface scatters (Grotta Antonio, Riparo Bosco Piccinu, Albino, Capello, Ginesio, Pedone, Tamborrino) (A. Piccino & F. Piccino, 1978). The area was the subject of further research at the sites of Alimini B and C by S. Milliken and R. Skeates, who published their findings in 1989. Whilst they thought that the nearest source of flint was at least 180 km distant, E. Ingravallo (2011: pers. com.) informed me that a source of flint had been recently been found 50 km to the north-west near Nardo.

The Alimini Lakes area has produced a substantial Mesolithic Romanellian lithic industry, which, as indicated above, developed over time to include a Castelnovian-like element with the exclusive use of trapezoidal armatures (E. Ingravallo, 2003: 184). The Early Neolithic is also well represented in the region of the Alimini Lakes, with Impressed Ware at Grotta Marisa and Campo Belmonte Domenico. There is also undiagnostic Early Neolithic pottery at Alimini C, whilst Grotta Sacara is also a Neolithic site.

On a site visit in the spring of 2011 with Giuseppe Muci from the University of Lecce, several surface collections were made, which were all handed over to the Archaeological Department of the University of Lecce.

Southern Italy and West Adriatic Seaboard – The Salento Peninsula – Mesolithic and Transition sites – Site details

Alimini Lakes Survey (Map R17a)

Alimini Masseria Paiarone/Alimini A (34) – This is an open-air surface scatter on the west side of the canal joining the two lakes, to the north of the road leading down to the bridge, at *ca*. 12 masl. The surface scatter is partly in an olive grove (Fig. R17-1). S. Milliken & R. Skeates (1989) surveyed 11600

m^2 out of an estimated total of 18600 m^2. The site is disturbed by ploughing to a depth of 25 cm, and rock is found at 50 cm. During the site visit in 2011, G. Muci and I collected 15 undiagnostic microliths (Fig. R17-1).

The site has been ascribed to the Epipalaeolithic and Mesolithic on typological grounds. The lithics (Fig. R17-1) are mostly on flakes, with 3.5% bladelets and 1 blade (>5cm by 1.2cm); the cores which are mostly single platform with some opposed platform, were worked out, suggesting that the raw material was scarce, and the fact that no primary flakes were found indicates that cores were probably prepared off-site; the numerous rejuvenation flakes are also indicative of scarce raw material; 36 microburins and several backed bladelets exhibited *piquant trièdre*, which is a microburin scar; backed tools outnumbered other types 2:1, and retouched non-backed tools are mostly semi-steep, with some flat invasive retouch; 2 trapezes and 3 triangles were also found, as well as a single Liparian obsidian bladelet (Milliken S. & Skeates R., 1989: 80-81).

The site is of Romanellian tradition, and according to S. Milliken & R. Skeates (1989), Early Mesolithic, with a lithic assemblage similar to Grotta Marisa about 200 m distant, although the cave site contained a greater range of geometric microliths (see below). A. Piccino & F. Piccino (1978: 126) considered the site to be Final Epigravettian.

The obsidian bladelet can be interpreted as attesting to maritime contacts during the Mesolithic, and helps explain the diffusion of Romanellian elements as far as Sicily and the Eastern Adriatic, and the appearance of non-Castelnovian trapezes in this region, since a few pieces of obsidian have also been found in Mesolithic contexts in Sicily. There is no indication that this open-air site was occupied during the Transition, or in the Neolithic, which is not surprising, since the terrain is not necessarily propitious for primitive agriculture.

Alimini C (32) – Surface scatter some 300 m to the west of Alimini Grande Lake, near the top of a rise, at 40 masl, some 200-300 m south of the site of Alimini Campo Casetta. S. Milliken & R. Skeates (1989) surveyed 11776 m^2 and found that the 7360 m^2 lithic scatter covered two distinct areas of occupation, with that to the east and south-east producing patinated relatively large lithic artefacts comfortably assigned to the Middle Palaeolithic (S. Milliken & R. Skeates, 1989: 83). The olive grove is ploughed to a depth of 25cm annually, so that the site is disturbed, and rock is found at 50 cm.

The analysis of the unpatinated lithics produced 99 cores, none of which were used for blade production, 14 trapezes but no triangles or lunates, 38 microburins, 55 endscrapers, 55 retouched flakes, 38 whole or fragmented backed bladelets, 884 unretouched flakes or fragments and 13 unretouched bladelets or fragments, plus the 5 blades referred to below (Fig. R17-2).

During a site visit with G. Muci in 2011, 39 lithics were collected (Fig. R17-2), including a patinated end-scraper on a large flake, attributable to the Palaeolithic, a Late Romanellian microlithic circular scraper and what appears to be a truncated blade, found in the north-west sector, where S. Milliken & R. Skeates (1989: 89) found poorly-fired undiagnostic sherds associated with 5 blades. The fabric of the sherds was found to be similar to that of Neolithic pottery in the Maglie Museum. No polished stone, obsidian, grinding stones, sickle inserts or advanced pottery were found. No faunal remains have survived, so that nothing can be said about the subsistence strategy, or whether domesticated fauna was present. The authors summarise as follows: "*It seems more likely that Mesolithic style subsistence activities hunting, gathering and fishing were carried out at Alimini C, with the similarity of its assemblage to Alimini B, its lakeside location, and the absence of potential tools such as sickle blades and axes, although herding of domesticates may have occurred*" (p.92).

The site appears to have enjoyed two periods of occupation, possibly as residential locations: the first during the Palaeolithic, and the second during the Late Mesolithic and into the Transition, when pottery and blades were present, acquired by the autochthonous hunter-gatherers. Alternatively, the site, abandoned in the Late Mesolithic, could possibly have seen a last period of occupation when used by Initial Neolithic folk from a nearby village whilst herding domesticated animals.

Alimini Campo Belmonte Cesario (39) – This open-air site is at the north-eastern point of Alimini Piccolo Lake, was discovered by the Piccino brothers in what is now a deep-ploughed field and very disturbed site. On a site visit in 2011, G. Muci and I collected a few undiagnostic lithics and sherds.

Mesolithic material has been found at this site (backed blades and points, side scrapers, burins and microburins), as well as Neolithic material in obsidian and flint (Piccino A. & Piccino F., 1978: 130).

Whilst this site has been classified as a transition site, it is quite possible that the Neolithic occupation succeeded the Mesolithic one after an interruption of unknown duration.

Alimini Campo Casetta (33) – Surface lithic scatter discovered by Giuseppe Muci in an olive grove (Fig. R17-3) several hundreds of metres to the west of the Alimini Grande Lake, on a terrace some 30 masl, within 200-300 m of the site of Alimini C. The site has neither been investigated nor published. The 25 microlithics collected (Fig. R17-3) are probably Mesolithic.

Alimini Masseria Pagliarone (34) – This open-air site on the west bank of Alimini Grande, on a plateau 22 masl, was discovered by the Piccino brothers in the 1960s.

E. Ingravallo, *et al* (2004), report on this site. Being a surface scatter, the attribution to facies and dating is delicate. The lithic material is microlithic and hypermicrolithic, with a tendency towards laminarity, on flat supports, with the microburin technique attested. Of the 1297 tools collected, there are 222 end-scrapers of varying sizes (mostly short, with a high incidence of circular ones), 222 backed blades, 64 geometrics (almost all trapezes), 96 side scrapers on blades and 33 others, 42 denticulates and 491 undiagnostic tools. It is possible that the assemblage accumulated over a long period of time, but the trapezes speak for a late regional Mesolithic assemblage (at least in part), which cannot be compared to the Castelnovian of Tuppo dei Sassi or Grotta di Latronico 3. They conclude that in many respects this assemblage is similar to that of Alimini C, but without the pottery.

The absence of Neolithic attributes at this site suggests that it was abandoned prior to the Transition.

Alimini Grotta Marisa (37) – See below under ‘Grotta Marisa’ in this section.

Alimini Grotta Sacara (36) – See below under ‘Grotta Sacara’ in the Neolithic section.

Grotta del Cavallo (18) – This cave site in the eponymous Bay of Uluzzo, north of Gallipoli in the Bay of Taranto has a deep stratigraphy stretching from the Palaeolithic ‘Uluzzian’ to the Epiromanellian (Fig. R17-4). It was initially excavated by A. Palma di Cesnola in the 1960s.

A. Palma di Cesnola (1963) describes the first digging season, the stratigraphy and gives a summary of the lithic finds:

- The topmost Stratum A, which is much disturbed, contained Middle Neolithic pottery, many marine and terrestrial molluscs, which could be the continuation of the Terminal Mesolithic (p. 71);
- Stratum B1 is Romanellian, showing a continuing evolution from earlier Romanellian levels, with more circular scrapers and microburins;
- Stratum B2 is Romanellian.

That the sandy stratum B contained Final Romanellian material and shell middens has been reiterated by later authors (Coppola D. & Costantini L., 1987: 250; Guilaine J. & Cremonesi G., 2003: 297; Manfredini A., 1987: 368; Martini F., 1996: 36; Palma di Cesnola A., 1966: 290-291).

There has been no indication of an Early Neolithic occupation at this site on a steep scarp dropping into the sea and a back-country sloping steeply uphill, suggesting the possibility that the Final Mesolithic occupants moved elsewhere prior to, or at the advent of the Neolithic.

Grotta delle Cipolliane C (31) – The site is one of 3 caves on a cliff edge 10 masl facing the Ionian Sea, south of Marina di Novaglie at Taurisano. Cave C, was excavated by A. Palma di Cesnola, F. Minellono and E. Borzatti von Löwenstern between 1961-1964 (Fig. R17-5).

The caves appear to have suffered severe erosion since the Neolithic with the sea at the foot of the cliff, so that what would have been caves, appear now to be deep rock-shelters. The 100 m depth-line is some 10km offshore (p. 29), so that during the occupation in the Upper Palaeolithic and Early Holocene, there would have been an extensive coastal plain with lagoons. Cave A has not been excavated, although there is evidence of occupation in the deposits in front of the cave (Sammarco M. & Parise M., 2005: 29).

The archaeological levels of cave C have been described (Gambassini P., 1970; Sammarco M. & Parise M., 2005: 28):

- Layer 1- identified as reworked sediments to level the ground, "*producing a mixture of different strata in the original sequence. This layer was very rich in marine mollusk shells; in addition to recent pottery, it also contained plentiful Romanellian industry of likely Holocene age, and scarce Neolithic material (fragments of impressed ware, fragments of ceramics painted with red bands, obsidian, some flint-blade)*" (Sammarco M. & Parise M., 2005: 28);
- Layer 2 - Material attributed to the Late Epigravettian and the Proto-Romanellian with hearths, but no molluscs;
- Layer 3 - Late Epigravettian;
- Layer 4 - Early Epigravettian and Gravettian.

The exterior of the cave is made up of brown incoherent soil on the surface with diffuse bone fragments, mollusc shells and a microlithic industry.

"*The Neolithic material of Grotte Cipolliane, which includes impressed ware and ceramics painted with red bands, comes entirely from a layer which was characterized by the presence of deep pockets, and, not being covered by upper layers, was interested* [the subject of] *by intense reworkings (Palma di Cesnola, 1962). For these reasons it is practically impossible to define the real importance of the Neolithic deposit and to propose any interpretation about characteristics and function of the site*" (Sammarco M. & Parise M., 2005: 29).

The Neolithic occupants dug holes in the caves (as at Grotta Morelli and Grotta delle Veneri), and placed stones and votive objects in them, attested in conjunction with Impressed Ware and painted pottery (Sammarco M. & Parise M., 2005). No dates appear to be available for this site.

The site appears to have been occupied from the Palaeolithic and into the Neolithic. A. Palma di Cesnola and E. Borzatti von Löwenstern (1962) considered the site to be one in which the autochthonous hunter-gatherers were acculturated, whilst others have seen only a late Epiromanellian occupation (Coppola D. & Costantini L., 1987: 250; Guilaine J. & Cremonesi G., 2003: 297, quoting Palma di Cesnola A., *et at*., 1983 and Palma di Cesnola A., 1993; Manfredini A., 1987; Martini F., 1996). There was nonetheless some Impressed Ware as well as later pottery and lithics attributable to the Neolithic in the reworked sediments, suggesting that the Late Mesolithic occupants might have been present during a Transition phase. This hypothesis does not exclude the later use of the site as some sort of shrine.

Grotta delle Mura di Monopoli (2) – This cave site is currently on the water's edge just south of Monopoli on the Adriatic coast (Fig. R17-6). The site, with its 3 m of stratigraphy covering the Middle and Late Palaeolithic, Mesolithic and Early Neolithic, was originally excavated by A. Castiglione and O. Menghi in 1960 and again by M. Calattini in 1988, who supplied two dates only for the Sauveterrian Level (Calattini M., 1996):

- UtC-1417 8290±50BP = 7490-7179 BC (OxCal 4.2 at 95.4%), cut 5 – Median 7335 BC.
- UtC-780 8240±120BP = 7572-7028 BC (OxCal 4.2 at 94.7%), cut 10 – Median 7300 BC.

M. Calattini (1996: 48) indicates than a level not previously identified was brought to light in the more recent excavations, which he describes as an Early Neolithic level with a Romanellian-

type/Sauveterrian industry beneath, sitting on top of a Romanellian level. This 60 cm level in question was divided into upper cuts 1-7 and lower cuts 8-15, all of which produced ample microlithics with triangles, Sauveterrian points, short scrapers some of which are circular and the microburin technique, comparable to Grotta Marisa between the two Alimini Lakes (Calattini M., 1996; Grixoni E., 1997).

Several authors, referring to the earlier excavations, have spoken of a Castelnovian level beneath the Impressed Ware (Guilaine J. & Cremonesi G., 2003) and a date *ca*. 6200 BC (Martini F., 1996: 38), whilst others, quoting Cornaggia, Castiglioni and Mengis (1963), state that the Neolithic begins in the upper cut of stratum C with a few sherds of coarse impressed pottery, plain burnished figulina and blackish coloured pottery, one obsidian bladelet, a blade, 3 trapezes, and an otherwise Mesolithic style lithic industry (Manfredini A., 1987; Milliken S. & Skeates R., 1989: 92; Pluciennik M., 1997: 137; Taschini M., 1983: 118; Tinè S., 1987: 352) and that "*In the early Neolithic upper cut of stratum C and in stratum B of Grotta delle Mura, marine and terrestrial molluscs were collected, hunting was carried out, and the only domesticate was the dog*" (Milliken S. & Skeates R., 1989: 92). A. Benac (1987: 338) states it as "*Le niveau V de la Grotta delle Mura di Monopoli appartient au Mésolithique, avec « industrie litica romanelliana ». Dans le niveau suivant (niveau IV) apparait la céramique « impressa », mais l'industrie en silex demeure identique, tandis que chasse et collecte sont à la base de l'économie de subsistance (une économie nettement « mesolitica » et « epipaleolitica »)*".

It would seem that the earlier excavations determined that there was continuity of occupation during the Terminal Mesolithic and that the Castelnovian hunter-gatherers acquired pottery, obsidian and some Neolithic lithics. Unfortunately, there are no dates for the various cuts (Upper cut of stratum C and Stratum B, referred to by Roman numerals by some authors), associated with the Transition, so that its duration cannot be determined.

At the MesoLife 2014 convention at Selva di Cadore, M. Calattini and C. Tessaro confirmed that The Mesolithic levels, 60 cm thick, are sandwiched between Epigravettian and Late Early Neolithic Levels, that the Mesolithic occupation is Sauveterrian with some Epigravettian features and that the Neolithic is Late Early Neolithic, so that there is no Transition Level.

Grotta delle Prazziche (30) – This site near Marina di Novaglie, faces the Ionian Sea near the tip of the Salento Peninsula. The site, occupied from the Palaeolithic to the end of the Neolithic, was published by E. Borzatti von Löwenstern (1969: 91-143) (Fig. R17-7). The stratigraphy, substantially disturbed by the extraction of soil for agricultural purposes and clandestine digs is as follows, without any apparent hiatuses:

- Level A is Late Neolithic, preceded by Levels α and β;
- Level B is Early Neolithic, starting with incised Impressed Ware of Apulia-Materano type and Figulina in the lower levels, evolving towards less Impressed Ware and more painted Figulina and burnished black or brown ware;
- Level C is Terminal (*scadente*) Romanellian;
- Level D appears to be Mousterian.

He states that "*di un certo interesse era la persistenza in tutto il deposito neolitico di une industria litica di tipo Romanelliano, associate a lame neolitiche certamente importate, a differenza della maggior parte dell'industria, non lavorate in grotta*" (p. 93). There is also "*Chiara testimonienza di lavorazzione litica in grotta con technica antiche (romanelliane); oggetti appartenuti non a genti neolitiche colonizzatrice, ma a genti indigene in via di acculturamento discendenti dagli ultimo epipaleolitici rimasti isolate fino ad un momento relativamente tardo dal resto del mondo neolitico...*" (p. 94). His analysis of the faunal assemblage (Fig. R17-7) shows that ovicaprines make their appearance in the Transition Level B with a presence between 27% and 50% in the four defined sub-levels B1-B4, with the rest of the fauna being wild. In the later Neolithic, domesticated fauna represents 50% to 60%, with a growing incidence of wild boar (which could include domesticated pig, as suggested in the conclusion) and the quasi disappearance of red deer. Marine molluscs make a discreet appearance in the Late Mesolithic Level C, become important in the Early Transition and continue to

occur in reasonable quantities throughout the Transition/Neolithic. The Neolithic lithics are portrayed in Figs. 4-7 (Fig. R17-8), with the lower Level B4 contained trapezes as well as some blades of Neolithic tradition; in the subsequent Levels B3, B2 and B1, the trapezes disappear, and there appear to be more blades of Neolithic tradition. However, in all the Transition/Neolithic levels the Romanellian circular end-scrapers and backed pieces are present, and the microburin technique is attested. In Level β the geometrics and the microburin technique disappear, and the backed pieces and scrapers become rare, but there are few lithics, many of which are now manufactured on limestone, as is also the case for Level α. The top of the stratigraphy, Level A, continues to contain circular end-scrapers and other elements of Romanellian tradition, whilst also containing obsidian and Neolithic blades, as well as a substantial industry on limestone. The author concludes by suggesting that many Neolithic elements were imported (blades, obsidian, polished stone implements, and some of the pottery) and that agriculture, evidenced by quernstones and grinders as well as sickle inserts with silica gloss, makes its appearance in the later Neolithic levels.

All the above is confirmed by other authors (Cipolloni-Sampo M., 1987: 183; Manfredini A., 1987: 371; Martini F., 1996: 371, with some reservations; Milliken S. & Skeates R., 1989; Pluciennik M., 1997: 137; Taschini M., 1983: 118; Tinè V., 1987: 352; Whitehouse R., 1971).

The evidence points to a slow Transition, with continuing occupation of the site by descendants of the autochthonous hunter-gatherers, who progressively acquired pottery, domesticated fauna and other Neolithic attributes, whilst remaining attached to many elements of their traditional life-style, some of which were not relinquished before the site was abandoned (Romanellian lithic traditions, hunting, collection of marine molluscs). The location of this site, close to the tip of the Salento Peninsula, in an area little propitious for agriculture, may have helped keep the occupants of this site in relative isolation from the invasive Neolithic influence for an extended period of time, which probably exceeded a millennium. Without ^{14}C dates the duration of the transition can only be established by the pottery which includes Serra d'Alto and in the topmost Level, Diana pottery, both of which appear to be imports, given the very small quantities present.

Grotta delle Veneri (23) – This inland site about 2 km north-west of Parabita, in the southern Salento Peninsula is made up of the cave, the external rock-shelter resulting from the cave lip-falls, and the exterior. The cave was used as a sanctuary during the Epipalaeolithic and possibly the Early Holocene.

Excavations began in 1966 under G. Piscopo and A. Radmilli, who the same year reported that the first year of excavation brought to light Palaeolithic levels plus levels with Impressed Ware, Red Painted Ware, Serra d'Alto Ware in the top Level D, which was 80-160 thick and much disturbed by clandestine digs, faunal agency, and water. The next level down, Level C, 20 cm thick, contained ashes and a few sherds of Impressed Ware and painted Ware. The next level down, Level B, contained pits dug by the Impressed Ware and Red Painted Ware occupants. Level A was sterile.

The upper level of the external cave (rock-shelter?) is Final Epigravettian/Epiromanellian and comparable to the sites of Grotta del Cavallo (Levels B-II-I), Grotta delle Cipolliane C (Levels 1-2), Grotta del Uluzzo (Levels I-F) and Grotta Romanelli (Levels D-A). 88% of the 2083 instruments are microlithic, at or below 25 mm, with intensive exploitation of the cores, and that 79% of the debitage is laminar; the microburin technique is present; 33% of the tools are scrapers, all short to very short and 31% of them are circular of Romanellian type; 4.4% of the tools are burins; backed bladelets and points are well represented, whilst truncations are a little less present; retouched bladelets are also present, as are scrapers on flakes and denticulates; two trapezes were found dating from the Early Holocene Epiromanellian, as well as triangles (Isosceles and scalene), and segments of circle (M. Bonato, 1997). J. Guilaine and G. Cremonesi (2003: 297) did not consider this to be a transition site.

From the above information it would seem that there could be a relatively long hiatus between the latest Epiromanellian Mesolithic occupation and the earliest occupation with Impressed Ware. The question remains open as to why immigrant Neolithic folk would have occupied the cave, with the

possibility that hunter-gatherers, who had come into contact with the first immigrant farmers, moved away from the coast and used the rock-shelter and cave-site.

Grotta di Uluzzo (17) – This cave is located 15 masl on the left of the outcrop on which the Uluzzo Tower was built. The cave is 10 m deep and approximately 2.5 m wide, widening in the last 4 m. The height is 4 m at the entrance and 6 m at the rear. This cave, in the same bay as Grotta del Cavallo, and excavated by E. Borzatti von Löwenstern in 1963, was occupied in the Palaeolithic and Epiromanellian (Martini F., 1996).

E. Borzatti von Löwenstern (1963: 84-86) describes the upper part of the stratigraphy as follows:

- Levels E-C are highly disturbed, including holes dug by clandestine digs, with the material continuing to be Romanellian;
- Level F Upper Level contained 787 lithics of Romanellian Tradition and the large fauna is made up exclusively of red deer.

The site appears to have been abandoned prior to the Transition.

Grotta Marisa (Alimini Survey Map 17a, 37) – Cave site on the west side of the canal between the two Alimini Lake *ca.* 8 masl, discovered by the brothers Piccino, and excavated by G. Cremonesi in 1978-1979 (Fig. R17-9). It has a semi-circular plan 8m in diameter. The maximum height is 1.5m, but there are 0.6 to 1.0m of deposits. Much of the deposit had been disturbed by clandestine excavations, so that only about 10 m^2 in the centre were sufficiently undisturbed to be excavated. Most of the material came from an area of 5 m^2.

The disturbed surface contained Neolithic and later pottery, as well as Mesolithic material. There is a continuity of Romanellian tradition in the cave, often labelled Sauveterrian, for which the archaeological material was found in deposits 25-30 cm thick below the disturbed surface, which was split artificially in five levels ranging from 4-7 cm, except for the 5th, which was 10cm. The richest deposits were 1, 3-4, with the 5th being the poorest. The 5 levels identified contained an Initial Mesolithic microlithic to hypermicrolithic lithic industry of Sauveterrian tradition (Romanellian circular/sub-circular scrapers, Sauveterrian points, backed pieces and triangles (Fig. R17-9), but in the upper levels there were trapezes, which could be interpreted as secondary introductions post-Mesolithic. The 202 microlithic armatures comprise all those types present in the Italian Mesolithic (points on laminar flakes, backed points, double backed points, segments of circle both backed and truncated, triangles and trapezes). The trapezes only appear in the upper 2 levels and there are only 3 examples (1.5% of the armatures). Because these 2 levels were partly disturbed, they could be in primary positions or infiltrations from above. The industry at Grotta Marisa is more recent than the Romanellian, it compares to level 2 of Grotta delle Mura di Monopoli (see above), thus datable prior to 7000 BC (Astuti P., *et al*., 2005; Grixoni E., 1997: Guilaine J. & Cremonesi G., 2003: 297-298; Martini F., 1996; Milliken S. & Skeates R., 1989; Tozzi C., 1996).

The early economies concentrated on hunting deer, bovines and equids, replaced in the later Mesolithic by deer and boar, and eventually, domesticated animals in the Early Neolithic (Malone C., 2003, quoting Tozzi C., 1996: 54-55; Tozzi C., 1996).

It would seem that Sauveterrian/Epiromanellian occupation was probably followed by a hiatus or reduced occupation of the site, and that subsequent to this it was reoccupied, as evidenced in the disturbed levels with trapezes in their lithic assemblage, pottery and some domesticated fauna. These could be the same group as occupied Grotta Sacara (see below) on the opposite bank of the canal some 200 m to the north. The location of these two cave sites, down short vertical escarpments, with little agricultural land in the immediate vicinity, make them unlikely to have been used by Neolithic migrants, so that its use by acculturated hunter-gatherers, for which there is evidence in the region, is possible if not probable.

Grotta Morelli (6) – Cave site, about 1 km inland south-east of Torre Canne on the Adriatic coast, on a dead arm of the River Morelli.

Q. Punzi (1968), reporting on the excavations, states that the contents of the cave were badly disturbed by clandestine diggers. The lowest Stratum A is 15-20 cm thick with a lithic industry, remains of fauna which are not described, and no mention of pottery. The next Stratum B is 50 cm thick and contains Impressed Ware and shellfish remains, with no further details. The next Stratum C is 30 cm thick and contains Scaloria and Serra d'Alto pottery, as well as a few sherds of Impressed Ware '*a graffita'*, and there is also mention of flint and obsidian blades. The top Stratum D is close to 1 m thick and contains Diana pottery sherds.

Based on this sparse information we can deduce that the site was probably first occupied by hunter-gatherers, who subsequently acquired Impressed Ware, whilst continuing to collect marine molluscs, with the cave continuing in use during later phases of the Neolithic.

Grotta Romanelli (28) – This eponymous cave-site, currently some 5 masl, is on the coast near the south-eastern tip of the Salento peninsula, facing the Ionian Sea, north of Castro Marina (Fig. R17-10). The cave was occupied during the Middle and Upper Palaeolithic and into the Early Holocene, when the coast-line would have been several km offshore. The site was discovered in 1900 by P. Stasi, who excavated it between 1900-1905. G. Blanc excavated the site again in 1914 and established the stratigraphy. The occupation ended at the beginning of the Holocene and served to define the Romanellian (Hameau P., 1987; Milliken S. & Skeates R., 1989; Pluciennik M., 1997, 2008). The dates are (Alessio M., *et al.*, 1970):

- R-056 11969±320BP = 13102-11277 BC (OxCal 4.2 at 95.4%) – Median 12190 BC.
- R-058 11800±600BP = 13834-10697 BC (OxCal 4.2 at 95.4%) – Median 12265 BC.

Even if a few Neolithic remains were found at this site, there is no continuity over the Transition.

Masseria Malapezza (25) – This extensive lithic scatter lies on the edge of a now-dry lake 8 km north-west of the Alimini Grande, a few km inland from the Southern Adriatic, near Malendugno.

Most of the extensive material of over 9000 artefacts appears to be Epigravettian and Mesolithic, extending into the Neolithic. Triangular, semilunate and trapezoidal armatures are present and the Neolithic presence is probably confirmed by the presence of the 21 obsidian flakes and bladelets. No pottery however was found. The artefacts are generally similar to Alimini C (see above), whilst possibly being a little earlier (Milliken S. & Skeates R., 1989).

This area appears to have been a privileged area over many millennia during the post-glacial, close to a fresh water supply from which aquatic and terrestrial resources could be exploited. In the absence of pottery, it can be inferred that the area continued to be visited by hunter-gatherers after the arrival of the Neolithic in the wider region.

Monticello (10) – This open-air site near Martina Franca in North-Eastern Salento, is about 20 km inland from the Adriatic Sea.

S. Milliken & R. Skeates (1989: 92), quoting Gambassini (1969), state that this site is similar to Masseria Malapezza (see above) with what is essentially a final Epigravettian/Mesolithic industry but accompanied by retouched blades, an obsidian blade fragment, semilunates and trapezes.

This site appears to have been used by hunter-gatherers up to and including the appearance of the Neolithic in the wider region.

Porto Fetente (9) – This is a lithic scatter near Marina di Ostuni between Brindisi and Bari.

Material from the Upper Palaeolithic/Mesolithic as well as the Neolithic (7 cm flint blade and an obsidian bladelet) attest the use of this area, without any evidence of permanent occupation (Punzi Q., 1968).

There is no convincing evidence for the Transition at this site, although the blade and obsidian bladelet could be Neolithic.

Santa Foca/San Foca (19) – This lithic scatter site, on the coast south of Lecce, was the subject of a small excavation of 3 m X 2 m in someone's garden, under E. Ingravallo at the end of the 1970s.

The lithic assemblage is partly Middle Palaeolithic, mostly Sauveterrian, Romanellian and Epiromanellian with trapezes as well as Montbani notched blades (Ingravallo E, 1997a: 73) (Fig. R17-11), with apparently some Neolithic material from when the site was reoccupied (Guilaine J. & Cremonesi G., 2003: 297, quoting Ingravallo E., 1980; Ingravallo E., 1997a).

This particular location appears to have been repeatedly used over the millennia, and even tens of millennia. It speaks more about the density of population or repeated occupation than about the Transition.

Terragne (16) – This open-air site near Manduria sits on a rise 98 masl, some 10 km inland from the Bay of Taranto. The area was disturbed by deep ploughing, except for the area covered by a trullo (local dry-stone structure), which was removed for the archaeological excavations, which lasted from 1988-1991. The notes below are taken from Gorgoglione M., *et al*., (2003), Di Lernia S. (1996), Di Lernia S. and Fiorentino G. (1995), and Lorusso P. (2008).

Archaeological Levels US 1 and US 2 at the top were heavily disturbed and included Bronze Age remains.

Archaeological Level US 3 was Early Neolithic with lithics of Epiromanellian tradition similar to US 5. 36 m^2 were excavated. Pottery containers for storage are present in US 3, but not in US 5. Ovicaprines represent some 31% of the fauna, and *Bos sp.* 15% (MNI 2, so it is hard to be certain they represent domesticated species); hunting continues to be important (31% of bones or 69% if the bovines, which are equally as small as in US 5, are included, and 47% of the MNI without the bovines, and 62% with); cervids represent 20% (25% of the faunal assemblage is wild in US 3 and 50% in US 5 according to S. Di Lernia (1996: 89) in the Q&A session).

The lithics assemblage (Fig. R17-12) of 2673 pieces from Level US 3 is mostly of Romanellian tradition and very similar to that from US 5, being 94% microlithic or hypermicrolithic, with 80% flakes and 20% blades and the presence of the microburin technique; it includes 10.1% geometrics used for composite tools as well as armatures, 13.7% scrapers, mostly short and circular, and backed pieces; 9 pieces of obsidian were also present. As the Neolithic progressed, the presence of Gargano flint appears. A habitation structure was defined and the anthropic content of the excavations would indicate a long-term occupation.

Archaeological Level US 4 was reattributed to US 3 and US 5 based on context. S. Di Lernia (1996), in the question and answer session pointed out that level US 4 was "sterile", and hard to identify over the extent of the excavation.

Archaeological Level US 5, covering 23 m^2, was Terminal Mesolithic/Transition, with contacts with Neolithic folk, and includes archaic Impressed Ware, cultivated cereals (mostly *Hordeum sp.*, with the pollenic diagram indicating increasing quantities at the top of this Level), and ovicaprines. The faunal assemblage is dominated by bovines, which could be domesticated given their small size, followed by cervids at 40%, with a few ovicaprines, and the presence of marine molluscs. 93% of the lithic assemblage (Fig. R17-12) of 1813 pieces is microlithic or hypermicrolithic; 80% is flakes and the other 20% blades; the lithics are of Epiromanellian tradition with the presence of the microburin technique; 7.4% are geometrics for armatures as well as possibly composite tools; 17% are small circular scrapers and backed pieces, as well as Montbani notched blades (Ingravallo E., 1997a: 73); 2 pieces of obsidian from Lipari and green stone were also present. The surface area occupied for this Level appeared to be smaller than that for Level US 3, and no habitation structures were found. The indications are that it is a permanent settlement of short duration.

The ^{14}C dates are:

- Beta-67093 CAMS-9557 7300±60BP = 6261-6027 BC (OxCal 4.2 at 92.6%), on *Bos* bone, Level US 5 corrected for ^{13}C – Median 6145 BC.
- Beta-59934 CAMS-7588 6930±70BP = 5983-5706 BC (OxCal 4.2 at 94.7%), on *Cervus* bone, Level US 3 – Median 5845 BC.
- Beta-59933 CAMS-7854 6890±70BP = 5993-5631 BC (OxCal 4.2 at 95.4%), on charcoal, Level US 3 – Median 5810 BC.

Whether the *Bos sp*. was wild or domesticated is a moot point. At Torre Sabea (see below), the *Bos sp*. were deemed to be large, therefore aurochs. It should be remembered that all the large game species tended towards being of smaller size near the tip of the Italian Peninsula, and given the low MNI of 2 in the lower Level US 5, it is hard to make a determination. The ovicaprines, with a MNI of 3 in US 5, are indisputably domestic, so that the nature of the site is not in question. There is little doubt that we are dealing in the lower level with an open-air settlement of hunter-gatherers in an advanced state of Transition, which is further affirmed in the upper levels, with permanent structures and a longer settlement period, during which the continuing neolithisation process can be discerned through time. The total time span would appear to cover several centuries, suggesting that the Transition was of long duration, with hunter-gatherer traditions firmly engrained, as evidenced by the lithic technology and hunted fauna (cervids represented 40% of faunal remains in Level US 5, reducing to 20% in Level US 3, still comfortably double the percentage normally seen in Early Neolithic sites).

This is undoubtedly a key Transition site, which exceptionally is also an open-air site, for understanding some of the issues and time frames relative to the Transition from the Mesolithic to the Neolithic.

Torre Testa (13) – This extensive lithic scatter site, covering some 50,000 m^2, 7 km north of Brindisi on the Adriatic coast (Fig. R17-13), was discovered and subsequently excavated by Q. Punzi with G. Cremonesi in 1967, and again by G. Cremonesi in 1978. The site is now on a terrace some 10 m above the current sea level, although it would have been at some distance from the sea, close to a water-course and wetlands, during the time the site was occupied.

The lithics were deposited over a considerable period of time, stretching from the Upper Palaeolithic, through the Mesolithic and the Neolithic on the Casa Rossa Hill, 100 m to the south (Punzi Q., 1968; Guilaine J. & Cremonesi G., 2003).

The mostly Post-Glacial and Mesolithic microlithics collected totalled 26,094 pieces of which close to 92% were undiagnostic unretouched / technical pieces (Fig. R17-13), to which can be added the 17 pieces we collected (Fig. R17-13). Given the presence of 7 trapezes (as well as 7 semilunates and 2 triangles), notched pieces, and thumbnail and circular endscrapers, the site was probably used until late in the Mesolithic (Coppola D. & Costantini L., 1987; Cremonesi G., 1967; Ingravallo E., 1997a: 73; Milliken S. & Skeates R., 1989). M. Taschini (1983: 107) has suggested that the presence of cardium shells, coupled to the presence of microlithic points on double-backed points probably mirror the 'Sipontian' points found at Coppa Nevigata (Fig. R16-5).

At the Neolithic site 100 m to the south, blades, bladelets, obsidian and fragments of polished stone axes were found (Punzi Q., 1968).

There does not appear to be any evidence of continuity or Transition into the Neolithic at this open-air site in a favoured location on a terrace close to a fresh water stream, which was repeatedly occupied in various parts of the extensive area.

<u>Southern Italy and West Adriatic Seaboard – The Salento Peninsula – Initial and Early Neolithic sites – Introduction</u>

There are a large number of Initial or Early Neolithic sites in the Region. I have made a selection of those sites which have been well excavated and for which the documentation suggests a Mesolithic heritage.

Alimini Campo Belmonte Domenico (38) – This open-air site, discovered by the Piccino brothers in the 1960s, is at the north-western corner of Alimini Piccolo, opposite Campo Belmonte Cesario. Field walking on the site produced Early Neolithic Impressed Ware, Middle Neolithic pottery, blades and sickle inserts (several with silica gloss), some of which were in obsidian, and other Neolithic material (Piccino A. & Piccino F., 1978: 130-131).

From the information available, it would seem that this is a Neolithic settlement set up by migrants on the landward side of Alimini Piccolo. Whilst it could have incorporated elements of the autochthonous hunter-gatherer population, there is no evidence pointing in that direction.

Canale Samari (24) – This open-air Early Neolithic site is located 2 km south of Gallipoli on the Gulf of Taranto, and 1.5 km inland. It was excavated by G. Cremonesi in 1985-1986.

M. Orlando (1997: 123-124) informs us that the upper level of the site had been disturbed by ploughing. Some 70 m2 were excavated. Impressed Ware was found which typologically has been dated to the Trasano II phase, ca. 5800-5600 BC, or the Guadone phase. At least three burial structures containing a minimum number of 9 individuals was excavated, which is the largest number of Early Neolithic inhumations in South and Central Italy; they are associated with a large hearth, which is assumed to have been used as part of the funerary rituals, as were the pottery fragments found nearby. Bones were shifted when the structures, which are outside of any residential context, were reused. The lithics found at this site include thumbnail scrapers and trapezes, which are either out of context, or suggest that the people using the site maintained elements of the Epiromanellian and Mesolithic tradition (Fig. R17-14). A Pessina and G. Radi (2006: 444) confirm that the obsidian also found at the site is to be dated to the second phase of Impressed Ware Neolithic.

This is clearly an Early Neolithic site, which could contain a few elements of a Mesolithic tradition in the lithic assemblage, similar to those found at the nearby site of Torre Sabea, although the Epiromanellian elements are so typologically specific, they could equally be out of context and relate to a previous occupation of the site.

Chianca di Palo (8) – Neolithic open-air site on the Adriatic coast at Rosa Marina south of Monopoli in the direction of Brindisi. It is known only from material washed up on the beach. Whilst this site is interesting in supplying evidence for drowned archaeological sites, it tells us nothing about the Transition.

Cimino/Masseria Cimino (11) – This Early to Middle Neolithic open-air site is located about 2 km south of Mare Piccolo near Otranto, on the edge of a 3 km wide marshy depression. There are several Early Neolithic sites in the area (e.g. Pizzone and Masseria Rhao) with Impressed Ware (Corrado A. & Ingravallo E., 2011: 9).

According to P. Lorusso (2008: 39) the lithic industry has a Mesolithic component, although the author does not classify the site as one belonging to the Initial Neolithic sites in the area (Pizzone, Capo San Vito, Monte Fusco, Grotta di San Angelo, Grotta di Monte Fallone, Montedoro, Masseria Caprarica, Monte Teragna, Torre Sabea, etc.). By the author's admission, the Final Mesolithic is poorly known in the area, as are the complex processes of acculturation.

Costante di Campo Latini (21) – This Neolithic settlement, a few hundred metres inland from Torre Sabea on the Bay of Taranto, and excavated by E. Ingravallo, had highly disturbed archaeological levels. Whilst fully Neolithic, the lithic assemblage contained trapezes made of flint as well as obsidian (M. Bonato, 1997), possibly harping back to a Mesolithic tradition.

Fontanelle (12) – This Neolithic open-air site is near Ostuni, west of Brindisi.

The Early Neolithic occupation sits on top of what is probably a Palaeolithic occupation of the site. The Early Neolithic settlement produced a lithic assemblage and Impressed Ware similar to that of Torre Sabea with trapezes made of flint and obsidian from Lipari (Bonato M., 1997; Cremonesi G., *et al.*, 1987: 250-251). The presence of an obsidian blade-based industry, patinated sickle insert, polished stone objects, Impressed Ware, and evidence for a hut all confirm that this is an Early Neolithic Site.

Several authors have seen a Mesolithic tradition or component in the lithic assemblage, with the trapezes with concave edges and backed points (Bagolini B. & Cremonesi G., 1987, quoting Coppola D., 1981; Collina C., 2009; Coppola D. & Costantini L., 1987: 250-251; Guilaine J. & Cremonesi G., 2003: 382; Larusso P., 2008: 47; Martini F., 1996). C, Collina (2009: 571) also sees a Mesolithic tradition in the pressure debitage of blades.

The site supposedly dates from the end of the 7th or beginning of the 6th millennia, but there are no specific dates (Coppola D. & Costantini L., 1987), and these authors considered this site as possibly the earliest Neolithic site in this area.

Whether the Mesolithic tradition in the lithic assemblage is due to the incorporation of hunter-gatherers, or a consequence of exchange or contact, cannot be affirmed.

Forcatella (3) – This is an extensive lithic scatter along 1 km of coastal terraces and fields north of Torre Canne on the Adriatic coast. Most of the diagnostic lithic finds appear to be of Neolithic date, notwithstanding microliths and bladelets, which might be indicative of Mesolithic material as well (Q. Punzi, 1968).

Grotta del Fico (20) – This cave site, at Santa Maria al Bagno, north of Gallipoli in the Bay of Taranto was excavated by A. Palma di Cesnola at the end of the 1950s and early 1960s.

According to M. Cipolloni-Sampo (1987), and R. Whitehouse (1971), this is a Transition site. The second author explains that layer 2 is Late Neolithic with residual Romanellian lithics (2 semilunates and 2 trapezes) in an essentially poor Neolithic assemblage, with a sickle insert with silica gloss attesting agriculture, and 90% of the terrestrial faunal remains being of domesticated animals; Levels 3 and 4 are late Early Neolithic with Impressed Ware becoming uncommon, shellfish collection decreases over time but still represents close to 50% of the faunal assemblage (mostly *Patella* and *Trochus*), whilst wild fauna represent some 25% (mostly red deer, with some roe deer and wild boar as well as smaller game), and sheep with some cattle make up the other 25%.

R. Whitehouse (1971: 250) describes this site as being occupied by a peripheral community that "*acquired many aspects of the Neolithic culture, in order to survive in the changed conditions that followed the arrival of the farmers*".

This is not much to go on, but if hunting represented some half of the terrestrial fauna in the later Early Neolithic, trending towards greater reliance on domesticated fauna, Grotta del Fico can be considered a Transition site, which evolved steadily from mixed food-collecting/hunting with food producing to a primarily food producing economy.

Grotta di Porto Badisco/Grotta dei Cervi (27) – This extensive cave site at Porto Badisco was discovered when a man walking his dog lost and found his pet down the entrance hole. The coastal site faces the Ionian Sea and was used in the Neolithic as a sanctuary, which was decorated with wall paintings. The site appears to be unsuitable for habitation.

Grotta Sacara (Alimini Survey Map 17a, 36) – This cave site on the east side of the Canal Strettu, between the two Alimini Lakes, down a steep scarp, is no more than 200-300 m north of Grotta Marisa. It was not occupied at the end of Mesolithic. The Initial Neolithic occupation with Impressed Ware (which can be seen in the Maglie Museum) is accompanied by lithics of Epiromanellian tradition.

As with Grotta Marisa, it is hard to believe that Initial Neolithic migrants (with lithics of Mesolithic tradition) would use such a cave. It is therefore probable that the first occupants might have been hunter-gatherers who had acquired pottery during the Transition.

Grotta Zinzulusa (29) – This large cave at the end of a cove south of Castro Marina appears to have been used as a sanctuary in the Neolithic. The site is in the next cove south of that in which Grotta Romanelli is to be found. Access by land is today only possible via a narrow path specially constructed for that purpose but when the sea level was 15-20 m lower it could probably have been accessed more easily. There is no evidence of a Mesolithic occupation.

Le Macchie (1) – This Neolithic open-air site at Polignano a Mare, south of Bari on the Adriatic coast, is in an area which has also produced pre-Neolithics remains.

The Neolithic settlement is rich in cereal remains and the fauna appears to be 100% domesticated (Coppola & Costantini, 1987; P. Larusso, 2008).

With no indication of the presence of a Mesolithic substrate, this site can be considered a Neolithic settlement.

Montedoro (10) – This is an Early Neolithic open-air site some 10 km east of the north-eastern corner of the Mare Piccolo near Taranto.

P. Lorusso (2008) has extensively reported on this site located on a rocky plateau at a low elevation, with water catchment wells and channels dug into the rock, close to the habitations. The economy appears to be mixed based on agriculture, stock-breeding and the hunt. There are also marine and terrestrial molluscs. The inference is that we are in the presence of a community whose economy is mixed, partly based on Mesolithic traditions (p. 16). Polished stone is evident from the earliest levels associated with domesticated fauna (principally ovicaprines, but small bovines are also present) and wild fauna, as well as both terrestrial and marine malacofauna (p. 37). The flint lithic assemblage is composed of a fully Neolithic element (blades and sickle blade inserts), associated with a Mesolithic component (microliths, retouched flakes, trapezes with the absence of triangles, truncations and backed blades). Some 90% of the assemblage is fragmentary, split between unretouched and retouched tools, with a discrete presence of obsidian from Lipari (p. 37). "*Sono aspetti che certamente reconduscono ad un eterogeneo modello di sviluppo economico-culturale attestato dalla presenza di gruppi di cacciatore con forme incipienti di domesticazione del bove e di gruppi ad economia productive, in progressiva ibridazione ed integrazione*" (p. 37).

The author indicates a date towards the end of the 6th millennium, without quoting any references, but the Impressed Ware shown in the publication includes archaic and late Impressed Ware, as well as Bi-Chrome and Tri-Chrome painted pottery, suggesting a long period of occupation.

It is possible that this site was initially set up by, or included an element of autochthonous hunter-gatherers, although the author appears to believe that the bovines might have been domesticated locally, which in my opinion makes her judgement suspect.

Pappada and Sant'Anna (15) – This site, or rather, series of sites, is near the town of Oria in the centre of the Salento Peninsula, some 33 km from Brindisi and 20 km from the Bay of Taranto, in an area surveyed by C. Coppola (1981).

Several Neolithic sites have been identified around Oria on the hills of Sant'Anna in Monte Papalucio, where scatters of lithic fragments were found; the pattern occurs in the region Contrada Pappadà, close to San Giovanni lo Parete, where obsidian tools were found; in the region of Contrada Monti, there were more trapezoidal blades and obsidian tools; in the region of Contrada Fontane more trapezoidal blades and obsidian blades. Traces of a Neolithic occupation were also found at a place called Madonna della Scala of the Canale Reale with blade fragments and obsidian blades. The provenance of 36 of the 37 obsidian objects is from Lipari, with 1 from Palmarola. The Neolithic sites

in the region are dated to the early 5th millennium BC. (de Francesco A., *et al*., 2011: 99-100; Guilaine J. & Cremonesi G., 2003: 380; Martini F., 1996).

There appear to be no traces of a Mesolithic heritage in these lithic scatters, which appear to date from one millennium after the Neolithic first appeared in the region.

Sant' Anna (14) – Early to Middle Neolithic site near Oria in West-Central Apulia.

Six trapezes were found in the lower Middle Neolithic levels, suggesting a Mesolithic tradition (Ingravallo E., 1997b: 152).

Scamuso (north of map) – The location of this site in shown on Map R16, and it is also dealt with in Region 16 (Northern Apulia and Eastern Basilicata), with which it is more logically linked.

It is a partially eroded Initial Neolithic settlement located on the coast, 18 km south-east of Bari and 3 km from Torre a Mare. The site was excavated in 1983 and again between 1985-1988 by D. Coppola, who published his findings in 1987, 1988 and 1989. A final season of excavations was undertaken by D. Coppola with Biancofiore in 1997.

The earliest dates for this site are (M. Pluciennik, 1997; R. Skeates, 2003; Spataro M., 2002: 164; V. Tinè, *et al.*, 2000):

- Gif-6339 7290±110BP = 6401-5985 BC (OxCal 4.2 at 95.4%), on charcoal, quoted from D. Coppola, (1987) – Median 6195 BC.
- TAN-88056 6950±140BP = 6083-5615 BC (OxCal 4.2 at 94.9%), on charcoal – Median 5850 BC.
- Gif-7055 6810±80BP = 5882-5611 BC (OxCal 4.2 at 92.9%), on charcoal, quoted from D. Coppola, (1988).
- Gif-7345 6600±120BP = 5723-5329 BC (OxCal 4.2 at 95.4%).

"*Finds attributed to the earliest phase of the site were found in alens of compact brown deposit directly overlying the calcarenite bedrock to the west of trench A1 and in a test pit (area B) dug to the west of the site where intonaco (baked daub) was found associated with 'ancient' impressed ware, and a few ovicaprid and cattle remains, as well as marine molluscs (Cassoli and Tagliacozzo, 1986)*" (M. Pluciennik, 1997: 121). To the north of the site the area is being eroded by the sea. A hearth was discovered between 1m and 1.07m; below this level there was a further 18cm rich in archaeological material, including charcoal, burned clay, coarse impressed ware and sherds of polished black ware; below, yet a further 18cm of red-brown soil above the bedrock. The hearth which was dated produced the earliest date.

In the earliest horizons, the pressure technique was used to produce bladelets, which were used to produce straight borers, bladelets with abrupt marginal retouch and trapezoidal instruments, possibly obtained using the microburin technique, although no burin spalls are reported (Collina C., 2009: 568-569; Spataro M., 2002: 164-165).

The fauna is essentially domesticated, although fishing was practiced as evidenced by the bone fishhooks, and agriculture is well attested (Spataro M., 2002: 165).

This Initial Neolithic settlement was founded by seafaring migrants at some time probably after 6200 BC arriving from the eastern shore of the Adriatic, or directly from regions further east. The material culture is very similar to that found in the earliest Impressed Ware sites in Central Croatia dating from approximately the same period, suggesting there was a migrational push westward coinciding with the '6200 BC event'. The only evidence for the possible incorporation of Mesolithic elements is in the lithic technology, but this is in no way assured.

Torre Bianca (4) – This open-air Early Neolithic site is located half a km to the north of Torre Canne on the Adriatic coast, north of Brindisi.

The site is spread over 15,000 m^2, with daub remains. Palaeolithic and Early Holocene material was also found (Punzi Q., 1968), although most of the material found is Neolithic, with trapezes with

concave truncations, backed points, notched blades, blades and bladelets with silica gloss, with some artefacts made of obsidian; small greenstone axes were also present and the lithic assemblage bears many similarities with Torre Sabea, as does the Early Impressed Ware (Bonato M., 1997; Cremonesi G., *et al*., 1987; Guilaine J. & Cremonesi G., 2003; Milliken S. & Skeates R., 1989; Punzi Q., 1968).

Whilst there is no evidence for continuity between the Mesolithic and this Early Neolithic settlement, there is evidence for the Epiromanellian tradition in the lithic assemblage at this site. As with other similar sites, this could be interpreted as evidence for the incorporation of hunter-gatherer elements in the population and/or exchange, and/or the adoption by the migrant farmers of Epiromanellian elements in their lithic technology.

Torre Canne (5) – This open-air site at Torre Canne on the Adriatic coast, north of Brindisi and about 1 km south of Torre Bianca, was excavated by D. Coppola in 1971.

About 1000 lithic artefacts with some dating from the Middle and Late Palaeolithic, many from the Epipalaeolithic (notched blades, backed pieces, scraper points and geometrics), and Mesolithic, with those from the Early Neolithic being of Epiromanellian tradition (microlithic trapezes with concave truncations, backed points, notched bladelets, presence of obsidian bladelets) (Coppola D. & Costantini L., 1987: 251-252; Bonato M., 1997; Cremonesi G., *et al*., 1987: 384; Guilaine J. & Cremonesi G., 2003: 382).

The Neolithic settlement is attested by habitation structures, daub, Impressed Ware and later pottery, pestles, grinders and blades (Coppola D. & Costantini L., 1987). The material has been compared to Torre Bianca close-by (Punzi Q., 1968), and Torre Sabea (Bonato M., 1997; Guilaine J. & Cremonesi G., 2003: 382). G. Cremonesi, *et al*., (1987: 384) caution that some of the material could date from the Diana pottery occupation phase. C. Collina (2009:570) compares the pressure debitage of blades with Scamuso (above).

The dates are (Coppola D. & Costantini L., 1987; Tinè V., et al., 2000):

- TAN-88248 6980±130BP = 6081-5631 BC (OxCal 4.2 at 95.4%), on Charcoal – Median 5855 BC.
- Gif-6725 6900 ± 80 BP = 5923-5640 BC (OxCal 4.2 at 90.8%), on charcoal from the floor of a habitation – Median 5780 BC.

The median of the two dates is *ca*. 5800 BC, but there is no assurance that this represents the earliest date for the Neolithic occupation. Scamuso, further north, has a date several centuries earlier. The dates nonetheless correspond to the Early Neolithic, when several sites in the Salento have produced evidence for settlements with lithics containing Mesolithic attributes. Whether the settlement included acculturated hunter-gatherers or merely Neolithic migrants who had adopted a Mesolithic lithic technology subsequent to contact with the autochthonous population, cannot be determined.

Torre Sabea (21) – This open-air Neolithic settlement, which is presently lapped by the sea and partially submerged, lies on a beach some 3 km north of the town of Gallipoli on the Bay of Taranto (Fig. R17-15).

The site was several metres above the sea level when it was established, and 140-240 metres from the shoreline. The site has been saved from being totally submerged by the eustatic sea rise by local tectonic action, which has been raising the land by 10 cm every century, thus elevating the site by ca. 8 m since its occupation for some 200 years at the beginning of the 6th millennium BC (Guilaine J. & Cremonesi G., 2003).

The site of Torre Sabea has produced 462 diagnostic lithics, used for domestic, artisanal and agricultural purposes, as well as the hunt; they included 23 scrapers of which some are small circular ones of Epiromanellian tradition whilst most are long end-scrapers, 108 retouched blades, 105 splintered pieces, 24 borers, as well backed points, truncations, backed blades, a few notched Montbani blades, segments of circle used as sickle inserts, and 58 armatures (11 points with abrupt retouch and 47 trapezes mostly with concave truncations obtained using the microburin technique) (Fig. R17-16).

Much of the lithic assemblage shows a high degree of affinity with the Epiromanellian substrate (trapezoidal armatures, points and backed pieces, notched blades, circular scrapers and the microburin technique), whilst the large blades and sickle blades, 8 pieces of obsidian, polished stone and mortars are of Neolithic tradition (Bonato M., 1997; Giampetri A., 1996; Grifoni Cremonesi R., 1998; Guilaine J. & Cremonesi G., 2003; Lorusso P., 2008: 39); the laminarity ratio is as high as at Latronico 3 (Collina C., 2009: 74-75), and indirect percussion appears to have been used.

The faunal assemblage is predominantly domesticated, with 53% made up of ovicaprines whose large size could be due to their direct import from the Near East. Due to their large size, the remains of several bovines might be those of aurochs, but have been considered as domesticated bovines, so that hunted animals (red and roe deer, wild boar, badger, otter, etc.) represent only 10% by weight of the mammalian faunal assemblage, which also includes fish and marine molluscs (Guilaine J. & Cremonesi G., 2003; Lorusso P., 2008; Milliken S. & Skeates R., 1989: 93).

The pottery is coarse Early Impressed Ware with some incised and graffiti decorated pottery (Fig. R17-15) (Cremonesi G., 1987; Milliken S. & Skeates R., 1989: 92), and according to C. Collina (2009: 74) as ancient as that of the earliest levels from Coppa Nevigata, Rendina I and Prato Don Michele, although the dates do not appear to support this.

The dates, which produce a mean average date of 5825 BC, are (Fuolega F., 2009; Guilaine J. & Cremonesi G., 2003; Skeates R., 2003; Tinè V., *et al*., 2000):

- Gif-TAN-88066 6960±130BP = 6067-5625 BC (OxCal 4.2 at 95.4%), Pit TU/11-12 – Median 5845 BC.
- Gif-TAN-88247 6890±130BP = 6021-5607 BC (OxCal 4.2 at 93.5%), Pit TU/11-12 – Median 5815 BC.

The start of the occupation of the site appears to fall in the 59th century BC, which appear to be a little later than the earliest dates from Favella di Sibari further west in the Bay of Taranto (Region 18). The site is clearly a Neolithic settlement, since all the Neolithic attributes are present from inception. Some of the questions that remain open relate to the provenance of the migrants bringing large ovicaprines, and possibly cattle, and the degree of contact and/or admixture with the local Epiromanellian hunter-gatherers. Some sort of contact can be surmised.

Southern Italy and West Adriatic Seaboard – The Salento Peninsula – Conclusions

There is plenty of evidence for the Middle Palaeolithic, Late Palaeolithic, Post Glacial and Holocene occupation of the land in this region, which can be considered to have been a refuge area during the LGM. The number of Mesolithic sites discovered is substantial and many of these sites continued to be occupied into the Initial Neolithic. It can also be comfortably assumed that a large number of sites have been lost to the eustatic sea rise, since many of the sites are now coastal, with evidence for drowned sites (Chianca di Palo) and partially drowned or eroded sites (Grotta delle Mura, Scamuso, Torre Sabea). Of these sites, only Grotta delle Mura was occupied before the Neolithic. This begs the question regarding the number of Palaeolithic and Mesolithic sites which might have been lost to the sea, which at 6000 BC would have been *ca*. 20 metres lower than today, after rising rapidly over the previous millennia.

The earliest evidence for the Neolithic colonisation of the Salento Peninsula comes from Scamuso at *ca*. 6200 BC, using the median of the earliest ^{14}C date, with Terragne not much later, if the presence of ovicaprines in Level US5 is accepted. The next earliest dates are those from Torre Canne and Torre Sabea at *ca*. 5800 BC, although the earliest dates for Favella di Sibari (Region 18), which lies further west, are 50-100 years earlier. There is some evidence at Torre Sabea that this site might have been established as a consequence of a more recent wave of colonisation than that in Northern Apulia, based on the size of the ovicaprines and possibly the bovines at the site. P. Larusso (2008: Fig 2), indicates 10 Early Neolithic sites in the area of Taranto on her map, including that of Montedoro with its archaic Impressed Ware, reviewed in this Region, suggesting a relatively rapid

colonisation of the Bay of Taranto, from as early as *ca*. 5900 BC. This early colonisation, which, on current evidence, appears to be spread over several centuries, allowed plenty of time for contact to be established with the autochthonous hunter-gatherer groups, and for two-way exchange to have occurred.

The Salento Peninsula Region is rich in sites in which hunter-gatherers from the end of the Mesolithic can be seen to be going through the various stages of Transition towards the Neolithic lifeways. The site with the best evidence is undoubtedly the stratified open-air site of Terragne, with the earlier level dated *ca*. 6200 BC, and the later one some 400 years later, suggesting a long and slow process of acculturation. The other open-air sites analysed are neither dated, other than typologically, nor stratified, so whilst they suggest a Transition the dating and sequence of events remain fuzzy. There are not many cave sites with evidence for occupation during the Late Mesolithic and Early Neolithic, given the Karstic nature of the terrain, but those that do (e.g., Grotta delle Cipolliane C, Grotta delle Prazziche, Grotta Marisa and Grotta Sacara between the two Alimini Lakes, Grotta Morelli and Grotta del Fico) can be argued to have been occupied by hunter-gatherers transitioning to Neolithic lifeways.

As suggested above, the evidence for hunter-gatherer content in Neolithic settlements is hard to interpret. All we can suggest is that there was plenty of time over the centuries for the mixing of the populations, and in the absence of evidence for violent confrontation, we can assume that the Transition was broadly peaceful. There is no reason why acculturation should be unidirectional, so the fact that the best of the hunter-gatherer lithic technology, such as trapezes and the microburin technique, appears to have been adopted by the people in the Neolithic settlements should not surprise us.

Region 18 – Southern Italy and West Adriatic Seaboard – Calabria and Western Basilicata

(Map R18)

Southern Italy and West Adriatic Seaboard – Calabria and Western Basilicata – General introduction

This Region takes in all of the Gulf of Taranto to the west of Taranto, and all of Calabria. Whilst the region is extensive, there are only pockets of terrain where there is evidence of a Mesolithic presence continuing into the Neolithic, or an Early Neolithic presence with possible evidence of Mesolithic influence in the archaeological remains.

The Bay of Taranto needs to be seen as a continuation from the eastern coast in the Salento Region 17, and the bay has only been arbitrarily split for the purposes of this study. There is plenty of land suitable for agriculture between Taranto and Sibari, with numerous rivers coming down from the hills. Deforestation, however, has resulted in erosion and silting, so that we can assume that other Initial Neolithic sites like Sibari remain to be discovered, and that Mesolithic coastal sites have either been lost to the eustatic sea rise, or also buried, with less chance of being discovered than the Neolithic settlements, given their more ephemeral nature. The south-west of Calabria, or toe of Italy, beyond Sibari is steep-to with high mountains, and few areas suitable for Neolithic colonisation; one such area would be the lower basin of the River Nero to the north of Crotone; the next, after rounding the toe, might be the basin of the River Mésima between Gióia Táuro and Nicóteria. Nothing however is signalled south of Piana di Curinga, north of which there is a 120 km archaeological blank without any evidence for the Initial Neolithic till the site of Grotta della Madonna at Praia a Mare, to be found at the north-western edge of Calabria, which marks the limit this Region.

Southern Italy and West Adriatic Seaboard – Calabria and Western Basilicata – Mesolithic and Transition sites – Introduction

There are few Mesolithic sites with any indications of Transition in this Region, which does not appear to make sense, given the wealth of sites in the Salento Peninsula. It does however include the well excavated site of Latronico 3.

Southern Italy and West Adriatic Seaboard – Calabria and Western Basilicata – Mesolithic and Transition sites – Site details

Crotone - Castello (7) – This site is 25 masl on the site later occupied by the acropolis of the Greek colony.

The material, probably *in situ*, is made up of truncations and geometrics, recalling the Late Epigravettian, similar to that of the Grotta della Madonna at Praia a Mare, in the upper-middle of Level L (Marino D., 1996; Robb J. & Marino D., 2010: XV).

There does not appear to be any evidence of a Late Mesolithic occupation at this location.

Crotone - Gravina (8) – This site is in a Hellenistic residential area close to the current sea level on the Crotone Peninsula.

According to D. Marino (1996), this is one of 2 Mesolithic sites discovered on the Crotone peninsula in the area known as 'Gravina'. The material could be in a secondary position and is made up of truncations and geometrics, recalling the Late Epigravettian, similar to that at the site of Crotone - Castello, and similar to Grotta della Madonna at Praia a Mare, in the upper-middle of Level L (Marino D., 1996; Robb J. & Marino D., 2010: XV).

There does not appear to be any evidence of a Late Mesolithic occupation at this location.

Crotone – Semaforo di Campione (6) – This site, close to Crotone is at 150 masl.

The microlithic industry is on flakes. Denticulates are well represented, but geometrics are rare. It can be compared to the Mesolithic Level I of the Grotta della Madonna at Praia a Mare. It is possible that there was continuity of occupation in this area, given the selection of the same location for the future Neolithic settlement, but there is a long hiatus between the two occupations. Several locations in the vicinity have produced archaic Impressed Ware (Marino D., 1996; Robb J. & Marino D., 2010: XV).

Whilst it is possible that there was continuity of occupation in the area, no evidence supporting this has been signalled.

Grotta della Madonna (2) – This large cave is about one third of the way up the cliff facing the Tyrrhenian Sea, behind the coastal town at of Praia a Mare in North-Western Calabria on the border with the western tip of Basilicata (Fig. R18-1). Excavations were conducted in the 1960s against the northern wall of the cave under A. Blanc and L. Cardini (Fig. Fig R18-1), which were extended with new excavations initiated in 2002. The recent excavations were undertaken with a view to better understand the Neolithic. A second smaller cave also exists next to the principal cave which contains Palaeolithic material and engravings. Whilst the sea is now within 500 m of the cave, it would have been several km offshore at the inception of the Holocene; there would therefore have been a plain in front of the cave at the beginning of the Neolithic where agriculture could have been practiced.

The cave is now a religious sanctuary with a levelled floor and monumental steps leading up to the entrance.

The L. Cardini stratigraphy (Fig. R18-2) incorporates some of the dates (Gob A., 1990; Newell R., *et al*., 1979; Pluciennik M., 1997):

- R-188 9070±80BP = 8490-8171 BC (OxCal 4.2 at 83.9%, on bone, spits 45-46a – Median 8330 BC.
- R-287 9035±100BP = 8495-7938 BC (OxCal 4.2 at 92.3%), on bone, spits 49-50b – Median 8215 BC.
- R-286 9020±125BP = 8551-7787 BC (OxCal 4.2 at 95.2%), on charcoal, spits 49-50a – Median 8170 BC.
- R-288 8600±120BP = 7996-7450 BC (OxCal 4.2 at 91.2 %), on marine shell, spits 49-50c. This date is problematic, since it is not only too young given its stratigraphic level, and needs to be corrected for the WRE as noted by M. Pluciennik (1997).
- R-187 8735±80BP = 8001-7591 BC (OxCal 4.2 at 87.9%), on charcoal, spits 45-46b – Median 7795 BC.
- R-187a 8875±85BP = 8262-7737 BC (OxCal 4.2 at 95.4%), on charcoal, presumably spits 45-46 – Median 8000 BC.
- R-285 7555±85BP = 6571-6239 BC (OxCal 4.2 at 94.7%), on charcoal, spits 40-41 ~10cm thick Cardini Transition line – Median 6405 BC.
- ??? 7120±80BP = 6125-5837 BC (OxCal 4.2 at 89.2%) – Median 5980 BC.
- ??? 6785±80BP = 5844-5548 BC (OxCal 4.2 at 95.4%) – Median 5695 BC.
- ??? 5605±80BP = 4619-4327 BC (OxCal 4.2 at 93.0%) – Median 4473 BC.
- R-284 5555±75BP = 4546-4260 BC (OxCal 4.2 at 95.4%) – Median 4405 BC.

The recent excavations claim to have confirmed the hiatus between the latest Mesolithic date and the Neolithic occupation, with the Neolithic levels in contact with the underlying Mesolithic ones, which are heavily disturbed by the installation of Neolithic structures. The latest Mesolithic date is (Tagliacozzo A., *et al.*, 2014):

- LTL-13713A 7463±40BP = 6420-6243 BC (OxCal 4.2 at 95.4%), on charcoal from US 543 – Median 6330 BC.

If there is a hiatus in occupation, it must have been of short duration, since there is no stratigraphic hiatus.

P. Biagi and M. Spataro (2001) state that Level H from which the R-285 date came was characterised by red-painted Figulina and Stentinello pottery. This is probably an error, since the date can at best relate to archaic Impressed Ware. Spit 43 is close to the base of Levels H with Level I, and Spits 41-43, which are below this Transition line on L. Cardini's stratigraphy (Fig. R18-1), contained a Castelnovian-type industry (Tozzi C., 1996: 53); whilst rich in Mesolithic material, Spit 43 and those above contained sporadic remains of domesticated animals, as well as rare fragments of pottery and obsidian, which M. Pluciennik (1997: 128) considered to be intrusive from Spit 39, regarding which he states that "*The Neolithic material, presumably mainly from the top of layer H (spit 39), including a Stentinello sherd and red painted wares, is of unknown date, though one may suggest on analogy with other sites such as those from Acconia that it may fall into the early to mid-sixth millennium cal. BC, and thus post-date the Mesolithic from layer H by 500 to 1000 calendar years*". M. Taschini (1983) and C. Malone (2003), on the other hand, quoting L. Cardini (1970) state that the lower levels (below the Transition line on L. Cardini's stratigraphy) of Spits 38-42 in Level H contained fragments of Impressed Ware "*a bande rosse non marginate*", as well as a few remains of domesticated animals, whilst in the upper levels (above the Transition line on L. Cardini's stratigraphy), particularly from Spits 39-40 a blade industry is found in flint and obsidian, with polished stone axes and a predominantly domesticated fauna and a rapid diminution of marine molluscs.

During the Mesolithic there was a shift to Marine resources, paralleling Grotta dell'Uzzo and Grotta della Cala dei Genovese in Sicily (Leighton R., 1999: 33), with a change from land gastropods in the Late Pleistocene and Early Holocene (Lubell D., 2004), which could be attributable to the approaching shoreline. The use of marine molluscs diminished rapidly from a peak at the end of the Mesolithic in Spit 43, to disappear in a steady decline over the next three Neolithic Spits up to Spit 40 (Fig. R18-2) (Durante S. & Settepassi F., 1972; Taschini M., 1983).

The two infant inhumations dating from the end of the Mesolithic discovered in 1966 by A. Blanc and L. Cardini, whilst interesting, do not inform us about the transition (Newell R., *et al*., 1979: 140-141).

From the above, I conclude that there was a Transition at the end of the Mesolithic involving hunter-gatherers in process of acculturation (Spits 41-43), with a little Impressed Ware and a few domesticated animals, but no polished stone, and that during this Transition, the occupants progressively reduced their reliance on marine molluscs. The cave may subsequently have been deserted for between 500-1000 years (during which time any occupants left no archaeological signature in the small section of the cave excavated), until the site was reoccupied by Neolithic or neolithised occupants with Stentinello pottery and Red-painted Ware, a blade industry in flint and obsidian, and polished stone.

Grotta/Riparo del Romito (3) – This cave or rock-shelter, located 12 km inland from Praia a Mare in North-Western Calabria (Fig. R18-3), is best known for its Palaeolithic rock-art and 8 inhumations dating from the Upper Palaeolithic. The site was excavated in the 1960s by P. Graziosi, but poorly published (Bernarbò Brea M. & Redevin A., 2004; Pluciennik M., 1997).

M. Alessio *et al.* (1970) published four dates from the terminal Pleistocene occupation. The youngest of which is:

- R-298 10250±450BP = 11077-8759 BC (OxCal 4.2 at 95.4%) – Median 9920 BC.

More recent excavations under the University of Florence have brought to light an Early Mesolithic occupation with a Sauveterrian / Romanellian assemblage including microlithic and hyper-microlithic armatures (Martini F., *et al.* 2014), confirming what A. Broglio had claimed (1983: 71).

The date for the Late Neolithic occupation is (Gob A., 1990; Pluciennik M., 1997):

- R-223 6420±70BP = 5513-5293 BC (OxCal 4.2 at 93.0%), on charcoal – Median 5405 BC.

There is clearly an occupational hiatus lasting several millennia between the Early Mesolithic and the Neolithic occupations.

Latronico 3/Grotta di Latronico 3 (1) – This cave site, excavated by G. Cremonesi between 1972-1988, is located in the high valley of the River Sinni on the Tyrrhenian side of Central Basilicata, close to the water divide, at 760 masl (Fig. R18-4). Much of the site was destroyed when the provincial road 57 was built through the cave which contained the stratigraphy (Figs. R18-4 & R18-5). Caves 1, 2 and 4 to the north of the road do not appear to have contained any occupational stratigraphy, which is curious considering their size and layout, whilst Cave 3 was occupied from the Mesolithic to the end of the Neolithic and into the Metal Ages (Fig. R18-5).

The stratigraphy was primarily based on sectors II and V (Fig. R18-5), since they were the least contaminated, and produced a Mesolithic stratigraphy 4 m deep. The lack of flint-knapping debris in the stratigraphy suggests that the site was a Mesolithic residential location. The stratigraphy is given as follows (Dini M., *et al*., 2008):

- Strata 1-22 contained Bronze Age material;
- Strata 23-25 contained Serra d'Alto and Diana pottery;
- Strata 26-40 are Mesolithic with numerous lenses (presumably analysed as Level E), with a few sherds that had migrated from higher levels were reported;
- Strata 41-54 are Mesolithic, analysed as Levels D (41-44), C (45-48), and B (49-54);
- Strata 54-56 contained a few lithics and faunal remains, analysed as Level A;
- Strata 57-64 contained cultural material that became progressively scarcer, also analysed as Level A
- Strata 65-68 were sterile.

The site is the most southerly in Italy with a Castelnovian lithic assemblage rather than a Romanellian one, as found in almost all other sites in Southern Italy, which raises the question regarding the provenance of the earliest occupants of the site. Current thinking is that the provenance of the trapezoidal blade and trapeze industry, which appears *ca*. 6600 BC, is to be found in the North African Capsian, as is that at the Grotta dell'Uzzo in Sicily approximately one century earlier (Perrin T. & Binder D., 2014: 274). This Castelnovian Mesolithic is followed by levels with Impressed Ware, with a continuation of the Mesolithic lithic industry that includes trapezes, some of which are on obsidian, the microburin technique, as well as Montbani and denticulated blades (Fig. R18-6) (Barra A., *et al*., 1990; Collina C., 2009; Evans J., 1987; Grifoni-Cremonesi R., 1998: 59-60; Grifoni-Cremonesi R., *et al.*, 2014; Guilaine J. & Cremonesi G., 2003; Martini F., 1996).

The Impressed Ware Neolithic of Castelnovian tradition is also associated with a high incidence of wild fauna (Guilaine J. & Cremonesi G., 2003: 387). According to M. Pluciennik (1997: 136), Wilkins (1987) excluded the bones of domesticated fauna found in pre-ceramic levels from the faunal count on the basis they had to be intrusive, and comments that "*There is no reason to suppose that bones will be subject to downward movement, while pottery sherds and obsidian will not*".

Marine shells found in the Mesolithic levels, attest to contacts with the coast some 100 km distant (Pluciennik M., 2008: 341, quoting Mussi M., *et al*., 2000).

The site of Latronico 3 is recognised as the only one in this region with a reasonable sequence of dates for the Mesolithic. The Transition/Initial Neolithic follows almost seamlessly from the Final Mesolithic (Guilaine J. & Cremonesi G., 2003: 381). The ^{14}C dates are as follows (Dini M., *et al*., (2008), and the discontinuity of these dates, (Franco C., 2011; Grifoni Cremonesi R., *et al.*, 2014), could be due to site disturbance during the occupation of the site:

- Rome-445 7420±90BP = 6440-6089 BC (OxCal 4.2 at 95.4%), Strata 41-42 Level D, Terminal Mesolithic – Median 6265 BC.
- Rome-446 7620±90BP = 6644-6346 BC (OxCal 4.2 at 91.2%), Stratum 43 Level D – Median 6495 BC.
- Rome-447 7400±90BP = 6430-6079 BC (OxCal 4.2 at 95.4%), Stratum 52 Level B – Median 6255 BC.
- Rome-448 7570±90BP = 6594-6243 BC (OxCal 4.2 at 95.4%), Strata 53-54 Level B – Median 6370 BC.

- Rome-449 7800±90BP = 6846-6461 BC (OxCal 4.2 at 86.0%), Stratum 55 Level A – Median 6655 BC.
- Rome-450 7045±90BP = 6066-5736 BC (OxCal 4.2 at 95.4%), Stratum 57 Level A – Median 5900 BC.
- Rome-451 7160±80BP = 6219-5891 BC (OxCal 4.2 at 95.4%), Stratum 58 Level A – Median 6055 BC.
- Rome-452 6970±90BP = 6017-5706 BC (OxCal 4.2 at 94.9%), Strata 59-60 Level A – Median 5860 BC.
- Rome-453 8024±100BP = 7190-6648 BC (OxCal 4.2 at 93.8%), Strata 63-64 Level A – Median 6920 BC.

The Mesolithic occupants appear to have procured domesticated fauna soon after the arrival of the first Neolithic migrants in Southern Italy, whilst continuing to maintain their traditional lifeways, evidenced by wild fauna and continuity of the lithic tradition. The subsequent acquisition of Impressed Ware appears to be the next step in this Transition, since the lithic technology shows continuity with the Mesolithic tradition (Fig. R18-6), and hunting of wild game continues. There does not appear to be any evidence for agriculture during this period, which is not surprising, given the location of the site. The Neolithic strata 23-25 indicate that the acquisition of pottery continued in line with changing pottery styles, whilst usage of the cave site diminishes over time, again suggesting that the residential nature of the site may have become attenuated as the Neolithic evolved.

According to P. Biagi (2016: pers. com.) the disturbed stratigraphy, visible in the inverted dates, explains why the site has never been properly published, whilst also maintaining that properly conducted surveys in the region would in all likelihood discover other sites.

Southern Italy and West Adriatic Seaboard – Calabria and Western Basilicata – Initial and Early Neolithic sites – Introduction

Over 200 Neolithic sites have now been identified in Calabria. Most are lithic scatters, and only 13 have been excavated (J. Robb & D. Marino, 2010: XVIII):

In the Northern Calabria:
- Grotta San Michele;
- Grotta Sant'Angelo (published);
- Grotta della Madonna (published);
- Grotta della Monaca;
- Favella (published).

In Central Calabria:
- Lago di Cecita;
- Capo Alfiere (published);
- Corazzo;
- Girifalco;
- Piana di Curinga (published).

Is the Southern Calabria:
- Aspromonte;
- Umbro:
- Penitenzeria;
- Castello di Bora.

Only two Initial Neolithic sites will be considered here, Favella di Sibari, or Favella della Corte as it has sometimes been named, and Piana di Curinga. All other Neolithic sites appear to be later establishments, or insufficiently excavated or published.

Favella di Sibari (4) –This is an Early Neolithic site on a riverside terrace in the plain of Sibari. "*From an environmental point of view the site occupied a typical ecotonic position at the confluence of diverse environments, but predominantly fluvial, given its proximity to the main water system of the Crati river and to the coastline, through an intervening lagoon, as highlighted by geo-archaeological surveys and remote sensing. The infra-site model of settlement, reconstructed from data recovered by a digging and prospecting approach, is that of a small village, extending over 15,000 sqm, consisting of no more than a dozen huts and inhabited by a few dozens people*" (Tinè V., 2009).

Of particular interest are the female statuettes found at the site, suggesting it was established by migrant Neolithic people from some point to the east of Italy. The excavations under V. Tinè were the subject of a monograph in 2009, in which he estimated the life of this settlement to have lasted 200-300 years at the beginning of the 6th millennium, which corresponds well with the archaic Impressed Ware found at the site, with no evidence for evolved Impressed Ware (p. 584).

The earliest dates for the site suggest it was established *ca*. 5875 BC, 50-100 years before Torre Sabea, on the opposite shore of the Gulf of Taranto (F. Fuolega, 2009), as well as about a century before Piana di Curinga on the Tyrrhenian coast (Tinè V., 2009):

- LTL-778A 7003±55BP = 5993-5757 BC (OxCal 4.2 at 95.4%), on bone, pit G, 3IV – Median 5875 BC.
- LTL-202A 6956±75BP = 5991-5716 BC (OxCal 4.2 at 95.4%), on charcoal, pit E20, 3I – Median 5855 BC.
- Beta-165482 6940±40BP = 5905-5730 BC (OxCal 4.2 at 94.2%), on seed, pit D – Median 5820 BC.
- Beta-71663 6910±60BP = 5913-5674 BC (OxCal 4.2 at 93.1%), on charcoal, pit Z, 4 – Median 5795 BC.
- LTL-203A 6890±50BP = 5886-5674 BC (OxCal 4.2 at 95.4%), on seed, pit E30, 4II – Median 5780 BC.

The analysis of the siliceous lithic industry for the Initial/Early Neolithic is comparable to that of Torre Sabea, with which it is typologically closest (Fuolega F., 2009; Guilaine J. & Cremonesi G., 2003). In his conclusion, F. Fuolega (2009: 278) states that he does not believe there to be any evidence of a Mesolithic substrate in the lithic assemblage and it cannot be excluded that the blade industry which accompanied the Impressed Ware was part and parcel of the technical baggage imported by the Neolithic settlers (Fig. R18-7). J. Guilaine and G. Cremonesi (2003: 295), on the other hand, see similarities with Torre Sabea, where the influence of a Mesolithic substrate is suggested in the bladelets, double backed points, beaks and trapezes (Fig. R18-7), whilst recognising that the micro burin technique does not appear to be present at Favella di Sibari. This last statement is contradicted by V. Tinè (2009: 601-602), who confirms the presence of the microburin technique, suggesting it was part of the Neolithic baggage of the Neolithic settlers, which they brought with them, possibly from north-western Greece and Albania, as a second wave of migration after the initial one into Northern Apulia.

Regarding the fauna, A. Tagliacozzo (1995: 437) states that "*the subsistence economy of the settlement of Favella falls perfectly within the economy of the Early Neolithic in Italy. This is, in most of the cases, characterized by a well-developed herding activity and reflects the arrival of populations already with a technical knowledge. These people introduced animals domesticated a long time before as suggested by the reduced size of all domestic species and the prevalence of hornless female sheep*". The fauna is 97% domesticated (Tinè V., 2009: 584), who goes on to state that "*Among the domestic animals, sheep and goats are largely prevalent (68.5% NISP; 55.4% MNI) over cows (NISP 21%; 21.5% MNI) and pigs (NISP 10.4%, 23.1% MNI). Determination of the age of the remains (killing pattern) reveals the predominant slaughter of young or sub-adult individuals among pigs – with the*

clear purpose of optimizing the exploitation of meat – while almost all ranges of age are documented among cattle, sheep and goats – used mainly for their meat but also for milk production". "*The means of subsistence are based almost exclusively on herding – mainly goats and sheep but also cattle and pigs – only occasionally supplemented by hunting and perhaps more systematically by fishing, and on agriculture, as witnessed by seeds of strong cereal and leguminous species, such as barley, einkorn and lentils*" (Tinè V., 2009: 602).

This is clearly an important and well studied Initial Neolithic site in the region, established by Neolithic Migrants. It tells us little about possible contact with, or integration with a local hunter-gatherer substrate. If anything, given the paucity of hunted fauna, the theory put forward by F. Fuolega (2009), that all the lithic tradition came with the migrants, gains credence.

Piana di Curinga (5) – This Early Neolithic deries of sites sits on Pleistocene sand-dunes some 8 km inland (Fig. R18-8), in Central Western Calabria. A large number of structures were found spread over 3 sand dunes, in 10 separate settlements (Ammerman A., 1987a, 1987b) (Fig. R18-8). At the time of occupation, the sites would have been 1.5 to 2 km from the shore-line, which has moved out due to silting. The sites were discovered during the Acconia Survey, and excavated by A. Ammerman (Ammerman A., 2003: 12). He found Impressed Ware and Stentinello pottery (Ammerman A. & Bonardi S., 1985-1986), and the occupation of the sites covered the period from the Impressed Ware, Stentinello, Diana, Serra d'Alto to Piano Conte (Ammerman A., 1987b).

The dates obtained are (Ammerman A., 1987; Collina C., 1996; Pluciennik M., 1997):

- P-2946 6930±60BP = 5925-5712 BC (OxCal 4.2 at 89.8%), on charcoal – Median 5820 BC.
- P-2949 6710±80BP = 5734-5489 BC (OxCal 4.2 at 95.4%) – Median 5610 BC.

A total of 48 structures made of wattle and daub were identified on three dunes, and the sites have been described as a Stentinello Early Neolithic settlement (Ammerman A., *et al*., 1988), whereas M. Pluciennik (1997) called it an Impressed Ware site, with no Painted Ware. A. Ammerman (2003:12) stated that "*at Acconia, some Palaeolithic remains were collected from the surface but nothing was found on the Mesolithic side in either the survey or the excavations. In short, at least in the areas where we had done extensive fieldwork in Calabria (Acconia, Nicotera, and Le Castella, two conclusions could be drawn: (1) there was no evidence for continuity in settlement patterns over the Neolithic transition, and (2) there was good evidence for local population growth in different parts of Calabria with the appearance of the Neolithic*".

We cannot add to what A. Ammerman has said. Given the early date, it is possible that the earliest occupation was of Impressed Ware tradition, evolving into Stentinello.

<u>Southern Italy and West Adriatic Seaboard – Calabria and Western Basilicata – Conclusions</u>

Grotta di Latronico 3 is the only site with an assured continuity of occupation from the Mesolithic to the Transition with the acquisition of pottery and domesticated animals. The site is furthermore in a location on the hillside and at a height not propitious for agriculture.

Grotta della Madonna is the only other site which shows any possible continuity from the Mesolithic into the Neolithic, with the Final Mesolithic hunter-gatherers probably acquiring Impressed Ware and a few ovicaprines in the early stages of the Transition, after which they seem to have gone elsewhere (to eventually become fully Neolithic?).

Neither Initial Neolithic site considered appears to show any influence from the substrate in its lithic technology, unless it be in the trapezes at Favella di Sibari, or in the faunal assemblage.

Region 19 – Southern Italy and West Adriatic Seaboard - Sicily

(Map R19)

Southern Italy and West Adriatic Seaboard – Sicily – General introduction

Sicily and its associated islands (Aeolian Islands, Egadi Islands, Pantalleria, Lampedusa and Ustica) is the westernmost Region in the Mediterranean so far as this study is concerned. Sicily is the largest island of the Mediterranean, some 3 km from the Italian mainland, to which it may or may not have been connected at the LGM (Mussi M., 2001: 89), across the deep and turbulent Straits of Messina at its north-eastern corner. To the north, the Sicilian Apennines, rising to 2000 masl, stretch from Messina more than half way along the north coast as far as the Torto River. From the western end of this chain, the Erei and Iblei Mountains stretch in a south-eastern arc towards the southern tip of Sicily, encompassing Mount Etna which rises to 3370 masl in the north-east and the Catania Plain to the east. South of the Catania Plain, a low-lying coastal strip stretches down the east coast to Cape Passero, where it widens out, before continuing all along the south coast, with several indentations for river valleys coming down from the hilly or mountainous interior, before widening out west of Sciacca, to constitute a wide plain stretching round the western end of Sicily as far as Trapani. The northern coast is mostly steep-to with coastal plains in the region of Palermo and the head of the Gulf of Castellammare del Golfo. At the LGM the geography was substantially different, particularly along the south coast, where there existed an extensive plain stretching 100 km south as far as Malta from the south-east corner of Sicily, and another as extensive stretching 60 km south-west from the region between Sciacca and Marsala, with the sea-level between more than -120 m below present-day levels. by 8000 BC most of these plains has been submerged with the sea level having risen to *ca*. -50 m, and *ca*. -20 m by 6000 BC (Fig. R19-1). Sometime after 8000 BC, the Island of Levanzo in the Egadi became detached from the mainland, whilst that of Favignana did so during the Neolithic.

The climate and vegetation changes during the Holocene have been established from cores from Lake Pergusa in the centre of the island (Fig. R19-1) (Sadoni L. & Narcisi B., 2001), and more recently from a stalagmite from the Grotta di Carburangeli, 15 km west of Palermo and 22 masl (Frisia S., *et al*., 2006). At the Pleistocene-Holocene boundary steppe conditions prevailed with little tree pollen; over the next 1500 years the arboreal cover increased slowly and the steppe vegetation of *Artemisia* and *Chenopodiaceae* is enriched with *gramineae*; the arboreal cover reaches its maximum extent *ca*. 7000 BC, and with the '6200 BC event', which heralded dryer conditions, begins a steady if hiccupped decline during the Neolithic; This decline is arrested for a few centuries after 5700 BC, but the inexorable decline is reinitiated *ca*. 5000 BC (Fig. R19-1). During the reforestation, deciduous oak appear to prevail, which is confirmed by evidence from sites on the Italian Peninsula as well as marine core KET 8003, 80 km north of Sicily (Rossignol-Strick M. & Planchais N., 1989), but other deciduous as well as evergreen species are well represented (Sadoni L. & Narcisi B., 2001).

The presence of *Homo sapiens* is attested from the Upper Palaeolithic, with Riparo di Fontana Nuova near Ragusa having a stratigraphy stretching back to the Aurignacian, 30k BC (Mannino M. & Thomas K., 2004-2006), with other sites having been identified as dating to prior to the LGM (e.g. Grotta Perciata, Grotta dell'Acqua Fitusa and Grotta dell'Acqua di Mondello). M. Mannino and K. Thomas (2004-2006) have postulated that there was probably a migrational movement at the time of the LGM into Sicily (with *Equus asinus hydruntinus*), when the sea level was at its lowest. There are more sites dating from the Post-Glacial prior to the Holocene (e.g. Fontana Nuova di Ragusa, Grotta Addaura, Grotta della Cala dei Genovesi, Grotta dell'Aqua Fitusa, Grotta delle Uccerie, Grotta di Cala Mancina, Grotta di San Teodoro, Grotta d'Oriente, Grotta Giovanna, possibly Grotta Mazzamuto, Grotta Niscemi, Grotta Perciata, Riparo del Castello, Rocchicella di Mineo, San Corrado), most of which are listed by Mannino M. and Thomas K. (2004-2006: 16) as well as by D. Lo Vetro and F. Martini (2012). The richest evidence for the Post-Glacial Epipalaeolithic/Epigravettian, Mesolithic and

Transition occupation is to be found to the north and north-west of the island. The area is characterised by coastal limestone hills, rich in caves, some occupied in the Upper Palaeolithic prior to the LGM, and many occupied since the LGM prior to the Holocene. In 1928 R. Vaufrey had identified 56 caves below 600 masl on the coast between Trapani and Castellammare del Golfo, conducting test excavations in several of these, including Grotta dell'Uzzo (Piperno M., *et al*., 1980: 276). Several Mesolithic, Transition and Early Neolithic sites have recently been discovered and investigated along this same stretch of northern coast, adding to the wealth of data already available.

Because many of the cave-sites have been used as sheep pens (*bergeries*) until recent times, and that the excrements were regularly dug out, thus disturbing the upper sedimentary levels, evidence of possible Mesolithic and Post-Mesolithic occupation will in many instances have either been tossed out or mixed, with the extraction of humus for agricultural purposes and clandestine digs additionally exacerbating the situation. A further complication arises in that the Early Holocene toolkit does not differ materially from that of the Final Epipalaeolithic/Epigravettian with geometric microliths. S. Tusa (1999) has stated that he believes the number of Mesolithic sites to be underestimated, which is not an unreasonable position given the almost total absence of open-air sites.

At some time during the Upper Palaeolithic, the dwarf elephants and hippopotami were exterminated. During the Post-Glacial *Equus asinus hydruntinus* was hunted, and this continued into the Early Holocene, until the warming environment, reforestation and loss of habitat, and/or overhunting eliminated this species as well. Thereafter, the large herbivores were restricted to a few specimens of *Bos primigenius*, which appears to have survived into the Middle Mesolithic, and *Cervus elaphus* and *Sus scrofa*, more adapted to a forest environment. According to S. Andersen, *et al*., (1990), the red deer and wild boar may have become rare in the less mountainous southern part of the island by 6600 BC.

Human groups that had crossed the Straits of Messina in the Upper Palaeolithic left their signatures in several caves (hand-prints at Grotta Perciata and Grotta dell'Acqua Fitusa), and during the post-Glacial left some splendid engravings in the Grotta Addaura near Palermo and the Grotta della Cala dei Genovesi on the Island of Levanzo off the north-western tip of Sicily, which was connected to Sicily at the time. The precise dating of the engravings is problematic, but can most probably be attributed to the Pleistocene-Holocene boundary. What is remarkable about some of the engravings is the fact that humans (albeit bird-headed) are represented, and that the styles of representation at the two sites are quasi-identical, although they are 100 km apart. The engravings probably testify to shamanism and therianthropes, both of which are hallmarks of hunter-gatherer groups, and are two of a handful only of such human representations for the 30000 years of the European Upper Palaeolithic and Epipalaeolithic. The bird-headed therianthropes will find possible Transition or Early Neolithic parallels in the statuettes from the Grotta dell'Uzzo, Piano Vento and the bird-like head from Grotta Kronio (Fig. R19-2) (Tusa S., 1997: 189), suggesting possible continuity in the beliefs and cult practices over the millennia.

The human population of the island possibly increased beyond its carrying capacity, in terms of megafauna, prior to the Holocene, as evidenced by the reduction of the large fauna, and the evidence from several sites for the exploitation of lower trophic level and r-selected food sources, such as marine resources, terrestrial gastropods, birds and smaller mammals (e.g. Grotta della Cala dei Genovesi, Grotta del Arco, Grotta Addaura, Grotta dell'Uzzo, Riparo della Sperlinga di San Basileo). Whilst this trend was initiated in the Pleistocene, it accelerated during the Mesolithic as overexploitation and forestation led to resource depletion, leading to some form of sedentism, particularly at coastal sites where marine resources could be exploited, to the extent that the Terminal Mesolithic population could well have welcomed the Neolithic (Mannino M. & Thomas K., 2009: 142-144; Tusa S., 1997: 181). M. Mannino also made the point at the MESO 2010 convention in Santander, Spain, when he presented the data showing that the collection of marine molluscs was restricted to the winter, with some in the autumn, during the Late Epigravettian (Grotta di Cala dei Genovesi and Grotta Perciata), whilst at Grotta della Ucceria it is undetermined; In the Early Mesolithic this changed to the winter, with some

in the autumn and spring (6 sites); and In the Late Mesolithic the collection was split equally between the four seasons (Grotta dell'Uzzo, Grotta di Mezzo, Grotta di Punta Capperi and Grotta della Cala dei Genovesi).

The climate generated and man-induced changes to the vegetation and faunal assemblage of the island most certainly meant that the population adapted and changed its socio-economic behaviour seamlessly over the millennia, and that this process of adaptation and change continued into the Transition, Neolithic and beyond.

Evidence of navigation is indirectly attested by the presence of *Homo sapiens* in the Upper Palaeolithic, when Sicily would have been disconnected from the mainland. It is also evidenced by fishing at the Grotta dell'Uzzo during the Mesolithic, and the discreat but increasing evidence for the presence of obsidian from Lipari, clearly visible from the north coast as well as from the coast of Calabria, from the early 8th to the 7th millennia BC at a few sites (Grotta dell'Uzzo, Grotta d'Oriente, Riparo di Perriere Sottano, Rocchicella di Mineo) (Malone C., 2003). Navigation would have facilitated contact and exchanges along the coast, with the Italian mainland, and possibly as far east as Anatolia, as suggested by similarities in funerary rites along the northern shore of the Mediterranean (Girmeler Cave, Theopetra Cave, Franchthi Cave and Grotta dell'Uzzo). Cultural affinities with the Capsian culture in North Africa can also be demonstrated, since there are similarities in the prismatic blades and trapezes lithic traditions *ca*. 6700 BC before this technology diffused across Italy and Western Europe (Perrin T. & Binder D., 2014: 274); the presence of coarse pottery sherds at Grotta dell'Uzzo prior to *ca.* 7000 BC, which find no parallel on the Italian Peninsula, requires an explanation, and since pottery is attested in the Sub-Sahara as early as the 10th millennium BC, and at Capsian sites (e.g. the site of SHM-1 on the eastern coast of Tunisia from its initial occupation *ca*. 6800 BC (Mulazzani S., 2014)), it is quite possible that the provenance of the technology also originated from contacts with the Capsian Culture. Í. García-Martínez de Lagrán (2015) also suggests that the initial neolithisation of Andalucía in Spain and Southern Portugal originated from North Africa *ca*. 5600 BC, giving credence for contacts across the Sicilian Straits. S. Tusa (1999: 118) has also pointed out that Haplotype U6 (mtDNA), which is well represented in North Africa, and Sub-Saharan sequences of Haplotype L have been identified in Sicily (wikipedia.org/wki/genetic_history_of_europe_note-16), and this could have been the consequence of maritime contacts. Finally, the thought that the pre-Stentinello pottery in Sicily, evidenced from *ca.* 6200 BC, might have originated from North Africa should not be discounted.

D. Lo Vetro (2008) indicates that the main source of obsidian from Lipari at Vallone Gabellotto is dated by fission track to 13000-4800 cal. BP (Median 6950 BC), which given the very wide range cannot be used to determine an assured *post quem* for the few pieces of obsidian from Lipari found in Mesolithic and Transition contexts in this Region (Grotta d'Oriente and Riparo di Perriere Sottano dated between 8200 and 7500 BC, and from undated sites at Grotta Corruggi di Pachino, Isolidda and Riparo della Sperlinga di San Basileo in what could be the Transition). All that can be said is that this obsidian might have been obtained by Mesolithic navigators, as might the two instances known from Liguria from the Final Epigravettian at Riparo Mochi and Riparo dell'Arma dello Stefanin. The easily recognisable green obsidian from the Island of Pantalleria has been dated by fission track to 140-70k BP, but it is only known to have been exploited from the Early Neolithic, as is also the case with the obsidian from Sardinia.

The development of the lithic assemblage on the island, which is not uniform during the Epigravettian, Mesolithic and Transition into the Neolithic, is rooted in a continuity of tradition, with little external influence (R. Leighton, 1999; M. Taschini, 1983: 119). The early stages have been summarised by B. Aranguren and A. Redevin, (1996):

- The Epigravettian is characterised by a lithic assembly comprising a development of geometrics outside the Sauveterrian tradition with triangles, followed by segment of circles with a few trapezes and rhomboids; there are also scrapers on burins, most frequently on blades

with lateral retouch, and the absence of circular forms; amongst the backed pieces, a clear predominance of points, indicates a strong continuity from the past;

- The second phase, represented by Grotta della Cala dei Genovesi level 3 and the upper strata of Grotta di San Teodoro, is characterised by the almost total absence of geometrics during the Final Epigravettian; the abrupt retouch, particularly on curved points, with denticulates and scrapers on blades, continue to indicate a continuing tradition from the past;
- A new cycle of microliths commences at the Riparo della Sperlinga di San Basileo, Grotta Corruggi and Grotta dell'Uzzo during the Early Mesolithic. At the Grotta dell'Uzzo however there follows a new phase in which the microliths seem to disappear around 7500 BC, slightly earlier than from the lower stratum at the Riparo di Perriere Sottano;
- When trapezoidal geometrics reappear in the Later Mesolithic, it is not in a Castelnovian tradition.

The burials of some 30-40 individuals are known for the Late Epigravettian and Mesolithic in Italy, and *ca*. 26 of these are inhumations from the following sites in Sicily:

- Grotta di San Teodoro with 7 individuals from the Late Pleistocene;
- Grotta della Molara with 4 crouched inhumations;
- Grotta dell'Uzzo with 12 individuals from the Middle Mesolithic in 10 burials;
- Grotta d'Oriente with 3 single inhumations two of which are Late Mesolithic and one Early Mesolithic (Lo Vetro D. & Martini F., 2006; Mannino M. & Thomas K., 2009);
- A burial in a natural cavity at Petraro di Melille could be that of an acculturated hunter-gatherer or that of an Initial Neolithic individual.

The Neolithic Stentinellian funerary practices seem to be conservative, following the Mesolithic tradition; inhumations in pits lined with stones at Gisira, near Brucoli; in a natural cavity near the village of Petraro di Melille (could be an earlier inhumation since it was associated with Pre-Stentinello ware); in one of the ditches of Stretto-Partanna and several *tombe a lastre* identified in Contrada Paolina in the region of Ragussa (S. Tusa, 1997: 188). Cult practices in the Early Neolithic are evidenced at the Grotta dell'Uzzo, Grotta Kronio and Piano Vento, with zoomorphic and anthropomorphic statuettes, some of which are covered in incised striations with at least one having a bird-like head, dating from the Pre-Stentinello and Stentinellian phases (Fig. R19-2) (V. Tusa, 1997: 189). The bird-like headed figurine is reminiscent of the wall engravings dating from the Pleistocene-Holocene boundary at Grotta Addaura and Grotta dei Genovesi, suggesting possible continuity of tradition and therefore population continuity.

The Pre-Stentinello, which strongly resembles Archaic Impressed Ware, was first identified at Grotta Kronio in 1962 (Tinè S. & Tinè V., 1998: 133-134), although it was also found by L. Bernarbò Brea at Grotta Corruggi in 1949. It was subsequently found at Grotta dell'Uzzo in 1974, and by 1994 a total of 16 sites had been identified by N. Marconi (1994) (Fig. R19-3), where Pre-Stentinello pottery either was found or could have been found. 7 of these sites, have not been published, whilst others are ancient and poorly published. The sites listed are coastal (11), island (2), or near-coastal on primary river systems (3), with all but two sites below 300 masl, and those two below 500 masl; there is little evidence for agriculture from these sites, which are mostly located in ecotones, or in regions little propitious for primitive agriculture, with the site of Piano Vento being an exception. To the list of 16 sites S. Tusa (1996a, 1997) hypothesises that the four additional sites of Grotta Geraci, Grotta Corruggi, Riparo della Sperlinga and the open-air site of Parcazzi could possibly have contained Pre-Stentinello pottery. Of these, Grotta Corruggi is a clear candidate, according to the excavation reports (Bernabò Brea L., 1949). There is coarse and semi fine ware, and in the initial phase the shapes are limited to platters and globular containers, which evolve in a discontinuous manner over time towards the Stentinello. The evidence for agriculture at these Pre-Stentinello sites, other than Piano Vento, is limited to a single cotyledon of *Triticum monococcum* at Grotta dell'Uzzo, dated to *ca*. 6180 BC, without any proxy evidence in the form of sickle inserts or grinding stones. It is only when the Stentinello appears that new sites are established with a more obvious focus on arable land, and many

of these new sites have produced evidence for being ditched enclosed sites with permanent structures, suggesting the intervention and organisation of a large number of people; these sites, mostly on the east coast, also incorporate the full panoply of Neolithic attributes (e.g. Stentinello, Megara Hyblaea, Matrensa, Ognina, etc.) (Marconi N., 1994). The blade-based lithic industry found at the newly establishes Stentinello sites loses its affinities with the Mesolithic, adding to the evidence that these sites are established by mainland colonisers, who also colonised the interior of the island (Tusa S., 1997: 185).

The detailed evidence for the evolution of the subsistence economy during the Mesolithic, Transition and Early Neolithic comes primarily from the Grotta dell'Uzzo, which is also the only site with evidence for agriculture. Only fragmentary data appears to be available from the coastal plains (Catania, Gela, Licata, etc.) (Marconi N., 1994: 138), although the area around Sciacca could produce interesting data (Gullì D., 2014). S. Tusa (1997: 181) suggests that the neolithisation process was made up of a slow but steady acquisition of new elements coming from Italy via the Balkans, which led to a mutation of the Mesolithic population, which was predisposed to the agro-pastoral transition by its exploitation of marine resources. When the first Neolithic attributes appear, mostly Archaic Impressed Ware/Pre-Stentinello, it is often in the context of Mesolithic continuity, and mostly at the western end of the island (Collina C., 2009: 29; Costantini L., *et al*., 1987: 400; Leighton R., 1999; Tusa S., 1997), although there are undated sites at the eastern end (Leighton R., 1999). The first indications of the Transition are found in the second half of the 7th millennium, and the acquisition of Stentinello pottery in the middle of the 6th millennium BC. The Neolithisation process was therefore not made up exclusively of elements introduced from outside by migrants, nor of autochthonous developments, nor of reactions to the changing environment, but rather the interaction of all of these and other factors.

Southern Italy and West Adriatic Seaboard – Sicily – Mesolithic and Transition sites – Introduction

The number of sites identified as having been occupied during the Mesolithic has been increasing rapidly over the past 20 years. Not all of these have been excavated, and few have been adequately published, but sufficient data is available to paint a relatively detailed picture of how the Mesolithic population of Sicily adapted to their changing environment and the advent of the Neolithic.

Southern Italy and West Adriatic Seaboard – Sicily – Mesolithic and Transition sites – Site details

Grotta Corruggi di Pachino (36) – this collapsed cave is 3 km north-east of Cape Passero at the south-eastern tip of Sicily, and 1 km north of the Stentinellian site of Vulpiglia. It was originally created by wave action, probably in the last interglacial, and whilst it is today within 50 m of the sea, at the LGM it would have faced the coastal plain stretching 100 km, beyond Malta, which would have become largely drowned before the advent of the Holocene. The roof of the cave, which originally had a porch over 8 m wide and a depth of *ca*. 7 m, collapsed at an unknown date in recent times (Fig. R19-4), protecting the archaeological deposits under the rock-fall. The site was originally excavated at the end of the 19th century by P. Orsi, who left two small areas unexcavated, and these were the subject of test-digs in 1944 by L. Bernarbò Brea, who subsequently completed the excavations in 1948 (Fig. R19-4).

The lithic assemblage includes trapezes in greater number than triangles and a continuity from previous traditions (Fig. R19-5), including microlithic spherical scarpers of Romanellian tradition. A new tool, also found at Grotta dell'Uzzo, is the end scraper with a marked lateral indentation.

The large fauna was made up of *Equus asinus hydruntinus*, *Bos primigenius*, *Cervus elaphus*, *Sus scrofa*, *Canis lupus* and *Canis familiaris*, as well as smaller mammals, abundant marine and terrestrial molluscs, with fish also present. Perforated *Columbella* were also found (Aranguren B. & Redevin A., 1996: 32-33; Iovino M., 2003). M. Iovino (2003: 605) further confirmed that there was no evidence for agriculture.

The P. Orsi original dig waste was sieved by L. Bernarbò Brea, so that many of the lithics missed at the end of the 19th century were also recovered, and found to be mostly microlithic or hypermicrolithic, with backed blades, end-scrapers, side-scrapers, backed points, segments of circle and trapezes. One microburin spall was also found.

L. Bernabò Brea (1949) described the stratigraphy of his two zones as follows:

- Zone A was divided into 9 cuts (p. 16-18):
  - Cuts A 1 and A 2 produced small sherds (Fig. R19-5), one piece of obsidian and 30 to 60 lithics;
  - Cuts A 3 to A 5 produce *ca*. 200 lithics in each cut;
  - Cuts A 6 to A 9 produced progressively fewer lithics, reducing to 100 in Cut A 9;
  - All the cuts produced backed points and end-scrapers and a trapeze appeared in Cut A 6.
- Zone B was divided into 11 cuts, which produced less material than Zone A (p. 18-20):
  - Cuts B 1 to B 5 produced sherds (Fig. R19-5) reducing to one sherd in each of Cuts B 4 and B 5;
  - Obsidian was found in Cuts B 1 and B 2;
  - There is no substantial differentiation between the lithic material found in the different cuts;
  - 2 backed bladelets were found in Cut B 1 and another in B 6;
  - An end-scraper on bladelet-end was found in Cut B 7 and another in B 9;
  - A bladelet retouched on one side was found in each of Cuts B 2, B 5 and B 8;
  - A trapeze was found in Cut B 2 and two more in Cut B 5.

The pottery (Fig. R19-5), which B. Bernabò Brea defines as coarse ware, is clearly Pre-Stentinello with similarities to Archaic Impressed Ware, although some of the pottery from the higher cuts may have been Stentinello.

No differentiation appears in the lithic assemblage between the top and lower cuts, and "*The major novelty which this excavation offers is the association of a Palaeolithic* [read Mesolithic] *industry with pottery, which occurs in five cuts out of a total of eleven in Zone B, and only two out of nine in Zone A*" (author's translation). Post depositional disturbance is excluded, since the Zones were covered by sections of collapsed vault. This situation is in contrast to the trenched Stentinello open-air sites of Stentinello, Megara Hyblaea, Matrensa, etc., where the lithic assemblage is clearly Neolithic and bears no comparison with that found at Grotta Corruggi (Bernarbò Brea L., 1949: 20).

The stratigraphy stretches from the Epipalaeolithic through the Early Holocene into the Initial Neolithic without visible interruption (Aranguren B. & Redevin A., 1996; Bernarbò Brea L., 1949: 21), and is comparable to the Grotta dell'Uzzo in that the neolithisation occurs on a Mesolithic substrate (Costantini L., *et al*., 1987: 403; Marconi N, 1994: 141, quoting Tusa S., 1992; Taschini M., 1983). S. Tinè (1987: 352), in support of his convictions, quotes L. Bernabò Brea, who considered that the local hunter-gatherers had come into contact with Neolithic colonisers, from whom they had acquired pottery, whilst continuing their traditional lifeways.

There is no mention of domesticated fauna, other than *Canis familiaris*, in any of the sources. It would therefore appear that the occupants of Grotta Corruggi continued their traditional Mesolithic lifeways, whilst having acquired pottery as well as obsidian through contact and exchange. The site appears to have been abandoned before having progressed much further into the Transition, although L. Bernarbò Brea (1949) mentions a fragment of quernstone.

Grotta Dei Ciavarelli (13) – This site, not far from Grotta dell'Uzzo, identified by R. Vaufrey in 1928, produced evidence for the exploitation of marine molluscs, but not for fishing.

N. Marconi (1994: 117) indicates that the site had been poorly published, so that little is known about it, but B. Vargo (2003: 30), quoting S. Tusa (1985, 1992), suggests that like Grotta Maiorana, Grotta d'Oriente, Grotta Regina and Grotta della Molara, the site shows an emergence of Neolithic patterns from Late Mesolithic layers, whilst recognising that the evidence is limited. S. Tusa (1996,

1997: 182) hypothesised that the earliest Neolithic Impressed Ware could/should have been found at this site, and N. Marconi (1994) includes it in her list of Sicilian Pre-Stentinello sites.

Little can be said about this site without further excavations, other than that it is most sprobably pre-Neolithic, and could have been occupied into the Transition.

Grotta dei Puntali (11) – This large near-coastal cave site is located near Carini, west of Palermo and east of the Gulf of Castellammare; it is 90 masl, 15 m wide at the entrance and 100 m long. The site, famous for its Palaeolithic fauna, was excavated by G. Gemellaro between 1868-1870, and visited by G. Vaufrey in the 1920s. No stratigraphic details regarding the human occupation of this cave have been found for this site, which was occupied during the Mesolithic, the Neolithic and into the Metal Ages, so that whilst S. Tusa (1996, 1997: 182) hypothesised that the Initial Neolithic Pre-Stentinello could/should have been found at this site, the evidence appears to be lacking.

Little more can be said about this site, which could well have supplied information concerning the Transition.

Grotta della Cala dei Genovesi/Grotta di Levanzo/Grotta dei Cervi/Grotta del Genovese (18) – This is one of several caves on the west side of the island of Levanzo in the Egadi Islands off the western tip of Sicily (Fig. R19-6), others being Grotta di Punta Capperi, Grotta dei Porci and Grotta Schiacciata/Grotta di Cala Tramontana III. The island of Levanzo was attached to the mainland until *ca.* 8000-6000 BC, which means that it was probably reachable without having recourse to navigation during most of the Mesolithic, but not during the Transition.

The cave, *ca*. 20 masl and close to the shoreline, down a steep scarp from the uplands which rise steeply to over 100 masl, would have been a greater distance from the sea in the Late Mesolithic (Fig. R19-6). It has a 5 m wide entrance porch and a first chamber about 15 m deep, leading to a narrow passageway into an inner chamber (Fig. R19-6), which contains engravings and paintings dating from several periods between the Late Pleistocene and/or Early Holocene, and the Neolithic. Apart from the engravings of fauna dating from the Late Pleistocene, there are three of human figures, one of which is a bird-headed, (Fig. R19-7) bearing a strong resemblance to the engraved figures found in the Grotte dell'Addaura about 100 km distant, as discussed in the Introduction above. The cave was excavated in the mid-20th century by B. Marconi and in the 1970s by A. Vigliardi.

The Late Pleistocene date for Level 3 is (Alessio M., *et al.*, 1970; Piperno M., 1997):

- R-566 11180±120BP = 11326-10827 BC (OxCal 4.2 at 95.4%) – Median 11075 BC.

M. Mannino and K. Thomas (2004-2006, 2009) quote a ^{14}C date on *Monodonta turbinata* from the Late Mesolithic Level 2 Spit 4 giving a calibrated date of 6800-6450 BC (presumably unadjusted for the WRE), above the Epigravettian Level 3, and that this Level contained a few pottery sherds and some obsidian, which need not be intrusive if the date needs to be adjusted for the WRE by some 500 years. The overlying levels starting with Level 2 Spit 3 were disturbed, but contained Neolithic Diana pottery. Level 2 has been attributed to the Mesolithic on the basis of the faunal assemblage, which other than a high percentage of large game, includes avifauna, fish, turtles, seals and marine as well as terrestrial molluscs, with similarities to Grotta dell'Uzzo (see below). R. Leighton (1999: 33-34) also noted that "*in the post-glacial environment, the herds of large game (notably Bos and Equus) were becoming scarcer*" whilst deer and wild boar grew in importance, and that during the Early Holocene, "*in the growing emphasis on the exploitation of marine life lay the potential for a more stable pattern of residence at coastal sites, indicated by the study of fish bones, indicating catches at different times of the year. The presence of various birds including winter migrants, reinforces the idea of multi-seasonal if not year-round occupation, following a pattern of radiating mobility*".

A. Vigliardi (1982: 80-81), in discussing the excavations indicates that the lower Cut 4 of Stratum 2, (averaging 30 cm thick, but ranging between 15 and 45 cm), contained Mesolithic lithics (*sensu lato*), small sherds and small obsidian flakes which the author assumes to be intrusive from upper levels due to the activity of rabbit burrows, but which could be in place as discussed above as

regards the WRE on the date; Cut 3 above, 25 cm thick, contained "*ceramica di impasto, tra cui anse a rocchetto e fragmenti con ingubbiatura rossa (probabilmente riferibili alla cultura di Diana), industria in selce ed obsidiana*" (p. 80-81). Unfortunately, the author does not supply details (description and quantity) of the material from Cut 4 of Stratum 2, nor a comparison with that found in Cut 3 above to support her claim. A. Aranguren and A. Redevin (1996: 32) only indicate that the lithic assemblage, whilst showing continuity with the Epigravettian, shows a slight increase in microlithic elements in the Mesolithic.

F. Cassoli and A. Tagliacozzo (1982) confirm that the faunal assemblage of Stratum 2, Cuts 3 and 4 from the A. Vigliardi excavations included domesticated species (Fig. R19-7). The domesticated species increase as a percentage in Cut 3 as against Cut 4 and hunting and fishing reduce, whilst remaining important, comforting the hypothesis that we are in the presence of hunter-gatherers transitioning to the production society.

N. Marconi, (1994: 119) and S. Tusa, (1996, 1997) state that the Early Neolithic pottery is Stentinello, and whilst there is no evidence of a Pre-Stentinello facies, there exists a Mesolithic presence prior to the Stentinello level. The early excavations were poorly undertaken, with a tendency to wanting to prove the existence of migrants to the detriment of a local Mesolithic population, and that it is possible to presuppose an earlier Pre-Stentinello level.

The terrain in the vicinity of the cave is unsuitable for agriculture. It is therefore more likely that we are in the presence of Late Mesolithic occupants who had acquired pottery and ovicaprines during the Transition, rather than of Neolithic migrants visiting an island recently separated from the mainland.

Grotta della Molara (10) – This is a near-coastal site, 5 km from the present coastline west of Palermo, on the north coast. The excavations have never been properly published, so that little information is available on the archaeological levels, although Neolithic levels are said to have been present above 1 m of Mesolithic and Upper Palaeolithic levels (Aranguren B. & Redevin A., 1996; Marconi N., 1994; Pluciennik M., 1997).

A single date has been obtained on a human bone from one of the 4 crouched Mesolithic inhumations in three graves (Aranguren B. & Redevin A., 1996; Meiklejohn C., *et al*., 2009; Pluciennik M., 1997):

- OxA-534 8600±100 BP = 7963-7475 BC (OxCal 4.2 at 95.4%), on human bone – Median 7720 BC.

M. Tusa (1997: 182) hypothesised that Pre-Stentinello could/should have been found at this site. There is however no evidence that I know of for such an assertion, so that the possibility remains speculative, and we cannot determine whether the Neolithic levels contained any evidence for continuity from the Mesolithic lithic tradition or mode of subsistence.

Grotta dell'Aqua Fitusa (30) – This is an Epigravettian cave site near Agrigento on the south coast, excavated by P. Gambassini *ca*. 1970. A single date is available *ca.* 14750 BC (Piperno M., 1997). The cave was subsequently occupied from the later Neolithic, when it had a funerary use (Gullì D., 2014b: 74-75).

Grotta dell'Arco (6) – This cave site is currently 25-30 m below sea level near Cape Zaferrano, east of Palermo on the north coast.

The sea level has been estimated to have been about 20 m below current levels *ca*. 6200 BC, and that it rose rapidly to 15 below current levels by 6000 BC under the effect of the 6200 BC event. The cave contained lithics and the shells of marine molluscs. One of the limpet shells produced a date of 9900-9350 BC (presumably uncorrected for the WRE), and given the current location of the cave, it must have been abandoned well before the end of the 7th millennium BC (Antonioli F., 1997: 155).

Grotta della Ucceria/Grotta delle Uccerie (19) – This cave is close to Punta Faraglione at the northern tip of the Island of Favignana. It is the remains of a larger eroded karstic cave 33 masl. The site was discovered in 1870 and subjected to surface collections for the last time by G. Mannino in the 1960s. The site was excavated in 2005. The anthropic deposits were originally *ca*. 1 m thick, but these have been substantially eroded and only subsisted close to the cave walls (Fig. R19-8) (Martini F., *et al.*, 2012a).

The archaeological Levels in Sector D are as follows (Martini F., *et al.*, 2012a):

- Stratum 1 is Neolithic, concretioned, with a sterile level beneath. The Stratum has been dated:
  - XXX 5921±50BP = 4935-4696 (OxCal 4.2 at 95.4%), on charcoal – Median 4815 BC.

  The few lithics include regular blades and one trapeze. The pottery sherds are evolved Impressed Ware;
- Stratum 2 is Mesolithic, divided into concretioned Levels 2A and 2B. The collection of marine molluscs reduces from that prevailing in Stratum 3. This Stratum has been dated:
  - LTL1514A 7998±80BP = 7084-6655 BC (OxCal 4.2 at 94.6%), on charcoal – Median 6870 BC.

  The lithics are scarce and as with Stratum 3 appear to be of Epigravettian tradition;
- Stratum 3 is a Mesolithic concretioned Level. The collection of marine molluscs is at its apogee in this Stratum with *Osilinus turbinatus* being the dominant species in all periods, this gastropod was collected throughout the year, shedding light on the seasons of occupation when the cave was in use. This stratum has been dated:
  - LTL1515A 8320±85BP = 7545-7139 (OxCal 4.2 at 94.5%) – Median 7340 BC.

  The lithics are scarce and appear to be of Epigravettian tradition;
- Stratum 4 is Epigravettian, divided into concretioned Levels 4A, 4B, 4C and 4D. The large faunal assemblage is dominated over 50% by *Caballus hydruntinus* and *Bos primigenius*. The collection of marine molluscs makes a discrete appearance. The dates obtained are all in the 14th millennium BC.

Whilst this cave was occupied during the Middle Mesolithic and again during the Later Early Neolithic, there is a hiatus of about two millennia between the two periods of occupation, so that there is no evidence of the Transition.

Grotta dell'Uzzo (14) – This is a large cave, 60 masl facing north-east on the eastern side of Capo San Vito (Fig. R19-9), facing the Gulf of Castellammare between Palermo and Trapani on the north-east coast of Sicily. The brow is 40 high, the entrance almost equally wide and the maximum depth not substantially different. It is located about half way between the western edge of the coastal plain to the west of Castellammare del Golfo, and Capo San Vito, and is some two hours walk in either direction along the escarped coastline, with steep hills rising to over 1000 masl, suggesting that the Mesolithic occupants may have also used navigation as a means moving up and down the coast. The lower sea level could however have made land communications along the coast easier during the Mesolithic. The cave faces a steep fan which would not have been suitable for agriculture, at the end of an almost vertical gully, with natural springs, some of which are now below sea-level. At the base of this fan a drowned coastal shelf can be discerned *ca*. 10 m below the current sea-level (Fig. R19-9), which stretches round Capo San Vito to the north, and which would have been drowned by 5500-5000 BC (Antonioli F., 1997). The fan in front of the cave is suitable for grazing, and the coastal shelf would have been used for the collection of marine molluscs.

Grotta dell'Uzzo is the most important pre-Neolithic site in Sicily as well as one of the key sites in the Mediterranean Basin, with deep stratigraphies stretching from the Epipalaeolithic, through the Mesolithic and the Transition into the Neolithic. The excavations undertaken between 1973-1978, under S. Tusa and M. Piperno, have been the subject of numerous partial reports, but no monograph. The excavated areas (Fig. R19-9) are inside the cave, where the upper surfaces have been substantially disturbed, the ridge under the brow, and down the ridge outside the cave, where the most complete

sequences covering the Holocene were found in Trenches F and M (Figs. R19-10 & R19-10a) with up to 5 m of deposits. 9000 bone fragments out of 50.000 were identifiable in Trench F (of which 2400 referred to fish), and 3000 out of 18000 from Trench M (of which 650 referred to fish). To this can be added 17.000 shells of marine molluscs from Trench F (Cassoli P., et al., 1987).

The 5 m of deposits from Trench F were excavated in 48 Cuts ranging from 7-10 cm each, divided into 5 main phases, the last 3 of which cover the Mesolithic, Transition and Neolithic (Fig. R19-11) (Mannino M., *et al*., 1997), without intermediary sterile levels (Costantini L., *et al*., 1987). The dates obtained from Trench F, starting with the Pleistocene/Holocene boundary, are listed below; those on seashells were obtained by M. Mannino some 25 years after the original dates, and calibrated using the Marine04 calibration curve from Hughen, *et al*., (2004), incorporating the marine reservoir correction for Sicily in Siani, *et al*., (2000) (Biagi P. & Spataro M., 2001; Collina C., 2009; Mannino M., 1997; Mannino M., *et al*., 2006):

- XXX 10370±100BP = 10608-9982 BC (OxCal 4.2 at 92.6%), unknown cut mentioned by M. Piperno (1997) as the basal layer – Median 10295 BC.
- P-2736 10070±90BP = 10037-9333 BC (OxCal 4.2 at 95.4%), unknown cut – Median 9685 BC.
- OxA-13441 9720±50 BP = 8678-8412 BC (Marine04), on shell, Cut 22, Early Mesolithic – Median 8545 BC.
- P-2556 9030±100BP = 8490-7937 BC (OxCal 4.2 at 92.1%), unknown cut – Median 8215 BC.
- OxA-13419 8745±55 BP = 7543-7178 BC (Marine04), on shell, Cut 18 – Middle Mesolithic – Median 7360BC.
- P-2735 8330±80BP = 7551-7166 BC (OxCal 4.2 at 94.5%), on charcoal, Cuts 16-18 – Median 7360 BC.
- P-2734 7910±70BP = 7042-6642 BC (OxCal 4.2 at 95.4%), on charcoal, Cuts 13-14. (According to M. Piperno (1980) the date is 8130±80BP) – Median 6842 BC.
- OxA-13662 7744±33 BP = 6345-6040 BC (Marine04), on shell, Cut 12 – Early Transition – Median 6190 BC.
- OxA-13661 7410±32 BP = 5983-5714 BC (Marine04), on shell, Cut 10 – Transition – Median 5850 BC.
- P-2733 6750±70BP = 5769-5531 (OxCal 4.2 at 95.4%), on charcoal, Cuts 7-9, (According to M. Piperno (1980) the date is 6940±70BP) – Median 5650.
- OxA-13808 7173±37 BP = 5730-5510 BC (Marine04), on shell, Cut 7 – Median 5620 BC.
- UD-165 6720±80BP = 5743-5489 BC (OxCal 4.2 at 95.4%), presumably Cut 7 – Median 5615BC.

Certain authors (e.g. Collina C., 2009; Compagnoni B, 1991; Mannino M., *et al*., 2006; Marconi N., 1994) have considered the transition to have commenced from Cut 14, because of the intensification of resource exploitation. The first clearly Neolithic attribute, archaic coarse pottery, first appears however in Cut 15, whilst Pre-Stentinello appears in Cut 12, with a few sherds; domesticated pig possibly appears in Cut 10, shortly before ovicaprines and bovines, and all 4 species are present by *ca*. 5800-5700 BC (Frisia S., *et al*., 2006), but P. Cassoli *et al*. (1987) caution against the attribution of domesticated status to the suids, since the Sicilian wild boar are small; S. Tusa (1987: 363) however, who believes in its local domestication, maintains it can be ascertained by the young age at death. From Cuts 6-5 to Cut 2, the pottery is Stentinello (Collina C., 2009).

Adaptation to the environment, broadening of the resources base and intensification all commenced by the Early Mesolithic if not earlier, and this can be tracked by the figure from Cassoli F., *et al*., (1996) in S. Tusa, (1996) and R. Leighton, (1999) (Fig. R19-10), as well as in the peak and decline of *Cervus elaphus* and *Sus scrofa* (fig. R19-10a). There is an interesting relationship between the increasing reliance on fish and marine molluscs with the increased incidence of microburins and transverse cutting edge geometrics, which has been reported by P. Cassoli et al. (1987: 811).

During the Early Mesolithic in the 10th millennium BC (Trench F, Cuts 32-23), the dietary breadth increased, but no details are given (Mannino M., *et al*., 2006):

- Occupation of the site is episodic;
- The lithics in the earliest Mesolithic levels in Trench A are marked by the almost total absence of truncations, geometrics and microburins, the rare presence of backed pieces and the presence of burins and scrapers on blades which hark back to the Upper Palaeolithic. In Trench F, which is difficult to relate to Trench A, the earliest Mesolithic industry is characterised by geometrics (primarily triangles) associated with backed tools and the occasional scraper and burin (Aranguren B. & Redevin A., 1996: 34);
- Details of the faunal remains:
    - The ratio of land mammals to avifauna is not available;
    - *Helix sp*. are present in the faunal remains;
    - Marine molluscs are discreetly present.

During the 9th millennium BC (Trench F, Cuts 22-21):

- The occupation of the site was episodic;
- The lithics show a progressive increase of geometrics (triangles, lunates and rare trapezes), which become common in the upper level dated *ca*. 8000 BC. There are also scrapers with a substantially reduced working end and deep lateral incisions, and the microburin technique is attested (Aranguren B. & Redevin A., 1996: 33);
- Gathering included acorns, vetchling or pea and the fruit of the strawberry bush in the second half of the 9th millennium (Costantini L., 1987: 398), whilst wild grape seeds and olive pips are also attested during the Mesolithic (p. 400). R. Leighton (1999: 32) echoes this when he states that gathering "*in the early Mesolithic included strawberry bush fruit (Arbutus unedo), wild legumes, a vetchling or pea (Lathyrus or Pisum) and later, oak acorns, wild grape (Vitis sylvestris) and wild olive (Olea sp.)*". To this list S. Tusa (1987: 363) adds wild almond and carob;
- The faunal remains begin in Trench F Cut 22:
    - Large herbivores and other wild game represent *ca*. 60% and avifauna the rest of the faunal assemblage;
    - *Helix sp.* are present in substantially lesser quantities;
    - Marine molluscs (principally *Patella sp*. and *Monodonta turbinata*) are more common, if still in modest quantities.

During the first half of the 8th millennium BC (Trench F, Cuts 21-19):

- The occupation was mostly during the winter and into early spring, based on the evidence from the $\delta^{18}O$ values, which change dependant on water temperature, and which has been analysed for time-of-death of *Monodonta turbinata* throughout the Trench F Holocene stratigraphy (Mannino M., *et al*., 1999). The high incidence of microfauna also points to occasional use of the cave (Tagliacozzo A., 1997: 238);
- The undated 'Phase 1' Mesolithic concave clay hearth with rims found in Sector Q, in a back corner of the cave (Tagliacozzo A., 1997: 238) (Fig. R19-11) is evidence for the use of clay prior to the use of pottery. R. Leighton (1999: 32-33) maintains that this 50 cm long and 2 cm thick baked clay platform dates from the Late Mesolithic. Whichever date is correct, the clay platform predates the coarse pottery sherds found in Trench F, cut 15 (Fig. R19-11), and whilst it speaks for the initiative of the cave occupants at a point in time, it tells us little about the Transition;
- The lithics continue to be atypical;
- The faunal remains evolved as follows:

- Large herbivores, including rare remains of *Bos primigenius*, and other wild game increase to *ca*. 80% and avifauna make up the balance of the faunal remains;
- Fish and cetaceans make a discreet appearance at the end of the period;
- Marine molluscs (principally *Patella sp*. and *Monodonta turbinata*) continue to be modestly present;
- *Helix sp*. may still be present in very modest quantities.

During the second half of the 8th millennium BC (Trench F, Cuts 19-15):

- The occupation of the site became year-round, whether on a continuous or episodic basis, from Cut 18 (Mannino M., *et al*., 1999; Tagliacozzo A., 1997: 241-242);
- The lithics change in Trench F *ca*. 7550-7150 BC, when the geometric microliths disappear, and backed tools, burins and especially scrapers are present with a lateral indentation (Aranguren B. & Redevin A., 1996: 34);
- Exchange is hinted at by a similarly decorated *Columbella* shell to one found at Riparo di Perriere Sottano, some 200 km distant (Fig. R19-11);
- The faunal remains evolved as follows:
  - Large herbivores and other wild game increases to *ca*. 80-85%;
  - Avifauna represent *ca*. 5%;
  - Fish and cetaceans grow in importance to represent 5-10% of the faunal assemblage;
  - Marine molluscs (principally *Patella sp*. and *Monodonta turbinata*) continue to be modestly present;
  - *Helix sp*., if present, virtually disappear from the archaeological record.

During the first half of 7th millennium BC, (Trench F, Cuts 15-13):

- The occupation was probably year-round, although the $\delta^{18}O$ values at time of death on *Monodonta turbinata* in Cuts 14-11 suggest an autumn and winter collection; "*This contrasts with the seasonal interpretations of the bird and fish remains. Among the bird bones, little bittern (ixobrychus minutes) is a summer migrant, while winter migrants such as bean goose (Anser fabalis), spotted crake (Porzana porzana) and corncrake (Crex crex) also occur. Biometric analyses of vertebrae of the grouper (Epinephelus) suggests exploitation in all seasons of the year, perhaps with a slight predominance of summer fishing (Cassoli and Tagliacozzo 1995)*" (Mannino M., *et al*., 1999: 129). A. Tagliacozzo (1997) also confirms that the occupation is multi-seasonal, as evidenced from the growth rings on grouper vertebra;
- "*Impressa pottery appears in level 12, but already in level 15 very small fragments of poorly fired, unpurified clay make their appearance, burnished on one side only, and devoid of decorations (fig. 11 t)*" (author's translation) (Piperno M., *et al*., 1980: 59) (Fig. R19-11); the sherds, designated 't' in dating from the early 7th millennium BC (earlier than the Initial Neolithic in Thessaly), could be indicative of contacts with the North African Capsian culture, since pottery is attested in the Sub-Sahara as early as the 10th millennium BC. The poor quality of the pottery found in Cut 15 may have discouraged further experimentation until the Pre-Stentinello pottery appears in Cut 12 over half a millennium later. The undated Middle or Late Mesolithic concave clay hearth with rims found in Sector Q, in a back corner of the cave is additional evidence for the use of clay prior to its use in the manufacture of pottery;
- The lithics debitage from Cut 14 in Trench F becomes more laminar, with the acquisition of pressure technology, which also finds a parallel in the Late Capsian (Binder D., 2013; Binder D., *et* al., 2012: 213; C. Collina, 2009: 347, quoting N. Rahmani, 2004, 2007; Perrin T. & Binder D., 2014: 274); there is an ever growing incidence of tranchet tools with a transversal cutting edge associated with the microburin technique, which will continuously increase, so that by Cuts 9 and 8, when the Transition is well established, they will be by far the most prevalent (M. Piperno, *et al*., 1980: 59);

- The faunal remains evolved as follows:
    - Large herbivores and other wild game reduce to *ca*. 85% (Trench M) and 75% (Trench F). *Bos primigenius* disappears, red deer and wild boar are hunted selectively, and dog appears (A. Tagliacozzo, 1997);
    - Avifauna continue to be discretely present at *ca*. 3%;
    - Fish and cetaceans grow in importance to between 12% (Trench M) and 25% (Trench F);
    - Marine molluscs (principally *Patella sp*. and *Monodonta turbinata*) become an important source of food.

During the second half of the 7th millennium BC (Trench F, Cuts 13-12):

- The occupation of the site continued with year-round occupation as in the first half of the millennium;
- Pre-Stentinello pottery appears *ca*. 6200 BC. This early date is close to that of the Initial Neolithic of South-east Italy. This pottery is similar to the later phases of the Pre-Stentinello of Grotta Kronio (see below) (Collina C., 2009: 30; Tiné S. & Tiné V., 1998: 133-134), where the site was probably established by migrants;
- The lithics continue to evolve along the lines established in the first half of the millennium. Obsidian from Lipari makes a discrete appearance in Cut 13, during the Final Mesolithic, and its presence steadily increases over time (M. Piperno, *et al*., 1980: 59), although M. Iovino *et al*. (2008) contend that it first appeared in cuts dated *ca*. 5750-5490 BC;
- The faunal remains evolved as follows:
    - Large herbivores and other wild fauna remain steady at *ca*. 75-85%, with red deer peaking at the end of the millennium in Cuts 12-11, before reducing rapidly over the next 600 years to Cut 7 (Fig. R19-10);
    - Avifauna continue to track at *ca*. 3%;
    - Fish and cetaceans remain steady at *ca*. 12-25%;
    - Marine molluscs (principally *Patella sp*. and *Monodonta turbinata*) continue to be an important source of food.

During the first half of the 6th millennium BC, the Transition is largely completed, but Mesolithic traditions continue to be present in the lithic assemblage and the faunal assemblage (Trench F, Cuts 11-6):

- The occupation was year-round at the beginning of this period, possibly becoming more sporadic towards the end, since the area around the cave is not propitious for agriculture, and the flocks of ovicaprines grow in size. A stone wall was built across the cave mouth either *ca*. 5800 BC (Costantini L., *et al*., 1987: 398-399), or associated with Trench F, Cut 5 (Leighton R., 1999: 58-59), which would date it closer to 5500 BC. S. Tusa (1997) places the construction of the wall in the Stentinello phase, which implies a date no earlier than 5500 BC and possibly later. There is no evidence for other permanent structures, and none have been discovered in the nearby plains;
- Stentinello pottery appears at the end of the period;
- Agriculture is mentioned as attested in the first half of the 6th millennium, with *Triticum*, *Hordeum*, *Lens culinaris* and *Vicia faba* (Costantini L., *et al*., 1987: 399; Leighton R., 1999: 58-59; Marconi N., 1994: 131). R. Leighton (1999) states that the first evidence comes from Trench F, Cuts 9-7, which would date this *ca*. 5650 BC. The cereals found in small quantities in the Initial Neolithic would have been imported according to S. Tusa (1997: 180). L. Sadoni and B. Narcisi (2001: 669) on the other hand state that the first evidence for agriculture dates from the early 5th millennium, which seems very late;

- The lithics in Trench F, Cuts 9 and 8, when the Transition is under way, are principally made up of tranchet tools with transversal cutting edges, associated with the microburin technique (Piperno M., *et al*., 1980: 59). No polished stone artefacts are mentioned;
- The faunal remains evolved as follows:
    - Domesticated herbivores and dog appear near the beginning of the period, and the four species are present by *ca*. 5800-5700 BC, and represent *ca*. 30-40% of the fauna by the end of the period. The reduction in the number of animal bones could suggest a more seasonal occupation, and the spherulites found in the archaeological levels, possibly derived from animal dung, coupled to the construction of the wall, could be indicative of animal husbandry and the seasonal shelter of flocks and herds (Mannino A., *et al*., 1999);
    - Large herbivores and other wild fauna reduce in importance to *ca*. 15-25%;
    - Avifauna continue to track at *ca*. 3%;
    - Cetaceans, present at the beginning of the period quickly disappear, but fish grow in importance to peak at 50% before initiating a decline. Bone and ivory fish-hooks also appear in the stratigraphic record (Fig. R19-11) (Costantini L., *et al*., 1987: 398-399);
    - Marine molluscs (principally *Patella sp*. and *Monodonta turbinata*) become an even more important source of food.

During the second half of the 6th millennium BC, continuing to the Middle Neolithic (Trench F, Cuts 6-1):

- The occupation became episodic as the Transition to the Neolithic advanced, and the cave appears to be used as a pen for ovicaprines;
- Stentinello pottery is present in stratigraphic contexts, as well as the later Diana Culture and Serraferlicchio Culture pottery, which are not in stratigraphic contexts (Tusa S., 1978);
- The lithics continue with a strong Mesolithic influence during the Early Neolithic (Fig R19-11);
- The faunal remains evolved as follows:
    - Domesticated herbivores grow steadily in importance to *ca*. 50% (Trench M) and 75% (Trench F);
    - Large herbivores and other wild fauna reduce in importance to *ca*. 5-10%;
    - Avifauna continue to track at *ca*. 3%;
    - Fish decline in importance to *ca*. 10% (Trench F) and 20% (Trench M);
    - Marine molluscs (principally *Patella sp*. and *Monodonta turbinata*) also decline in importance to one sixth of the quantity in the first half of the 6th millennium.

The lithic industry has not been the subject of a definitive publication (Collina C., 2009: 132). There is however a clear continuity in the lithic tradition from the Mesolithic, through the Transition into the Neolithic, even if this evolves over time (Collina C., 2009) (Fig. R19-10a). There is no mention of polished stone artefacts at this site.

There are 12 Mesolithic inhumations in 10 graves dating from the 8th and 7th millennia (5 mature males, 4 mature females, 1 child and 2 infants), which are either in a supine, crouched or flexed position, with occasional simple grave-goods (Fig. R19-10). Dental health is said to be good when only 9.5% of the teeth have either caries or wear patterns associated with non-alimentary use on materials containing abrasives (Leighton R., 1999: 37). The wear on the teeth indicates a mixed diet, and zinc content in the bones suggests a diet including marine molluscs (Mannino M., 1997: 121). The analysis of a bladder stone, as reported by A. D'Alessio, *et al.*, (2005), indicates a diet rich in vegetable matter and poor in meat and animal protein, so that there is room for some variation in the interpretation of diet (Mannino M., *et al*., 1999: 121). This information tells us nothing about the Transition and Initial Neolithic, except that there appears to be some continuity in the burial practices at Early Neolithic Sites as suggested in the introduction, and that the diet was broad-based.

The dating for the first evidence of agriculture is confusing, with claims for a date in the first half of the 6th millennium by R. Leighton (1999), in the 'Early Neolithic' by C. Malone (2003: 249), whilst L. Sadoni and B. Narcisi (2001: 669) state that the first evidence for agriculture dates from the early 5th millennium. We believe that the date of *ca*. 5650 BC quoted above is approximately correct, even if the domesticated plants are imported to the site rather than grown near the cave, which given the terrain, is improbable. If this is the case, there could be a yet-to-be-discovered settlement in the coastal plain to the south, where agriculture might have been practiced, to which much of the population had possibly moved, since the occupation of the Grotta dell'Uzzo had become episodic.

The relatively isolated location and geographical constraints of this site may have slowed its development towards implementation of the full Neolithic package once the Stentinello immigrants established settlements in Sicily (Costantini L., *et al.*, 1987: 404). The economic base of the occupants of Grotta dell'Uzzo evolved continuously over the millennia, broadening their resource base and selectively hunting large herbivores, to the point of acquiring food production when this became available, so that the importance of domesticated animals ('game in the pen') grew progressively over time; animal husbandry preceded agriculture by *ca*. 200-300 years, if we accept that it is first attested in Trench F, Cuts 9-7, notwithstanding the presence of a single cotyledon of *Triticum monococcum* dated to *ca*. 6180 BC (Marconi N., 1994), without any proxy evidence in the form of sickle inserts or querns and grinding stones. This single cotyledon could represent a cultivated product brought to the site by way of exchange, or from an incorrect stratigraphic context since there appears to be a temporal gap of *ca*. 500 years between the single cotyledon and the next evidence for agriculture. The data suggests growing sedentism with year-round occupation of the cave in the later Mesolithic and Transition, when the importance of fishing would have required heavy equipment in the form of craft and possibly nets, which were unlikely to have been left unattended.

Many authors have indicated that this site was occupied by hunter-gatherers who gradually adapted to Neolithic lifeways, through contact and exchange, without losing some of their culture and traditions as exemplified in the lithics, hunting, fishing and the collection of marine molluscs (Collina C., 2009: 341; Costantini L., 1987; Leighton R., 1999: 58-59; Mannino M., *et al*., 2006, 2007; Marconi M., 141; Piperno M., *et al*., 1980a, 1980b; Tagliacozzo A., 1997; Tusa S., 1996a, 1997: 181; Vargo B., 2003, quoting M. Piperno, 1980, S. Tusa, 1995, and A. Whittle, 1996), and we concur.

Grotta di Cala Mancina (15) – This recently discovered seashore cave is located to the west of Capo San Vito. The indications are that the occupation is limited to the Mesolithic (Colonese A., 2010 pers. com.).

Level 2 is Epigravettian with a few geometrics and some hypermicrolithic lithics (Lo Vetro D. & Martini F., 2012: 39). During the Early Mesolithic occupation, the exploitation of aquatic resources grows progressively in importance, but the site was abandoned before the Transition (Colonese A., *et al.*, 2014).

Grotta di San Teodoro (3) – This cave site is at the base of a scarp, *ca*. 100 masl, on the north coast, about half way between Messina and Palermo (Fig. R19-12). The cave has a large opening and an ample chamber. It was occupied at the end of the Pleistocene and beginning of the Holocene, but appears to have been abandoned by the Middle Mesolithic. The site was excavated in the first half of the 20th century.

The lithics in the upper levels include microlithic segments of circle and triangles similar to those found at Grotta Corruggi and Riparo del Castello di Termine Imerese (Bernabò Brea L., 1949; Natoli R., 2000).

Cervus elaphus was the most hunted species, although *sus scrofa*, *Bos primigenius* and *Equus asinus hydruntinus* were also hunted (Tagliacozzo A., 1997: 237). A large quantity of marine molluscs was also present (Natoli R., 2000).

7 inhumations (4 adult males and 3 adult females) from the Terminal Pleistocene and/or Early Mesolithic, accompanied by a few grave goods, were also found.

Grotta d'Oriente (20) – This cave site is on the Island of Favignana in the Egadi Islands off the western shore of Sicily, which was attached to the mainland until later in the Neolithic. The cavity 40 masl on the north side of the island is made up of a small, low rectangular chamber A to the left on the east side and a large wide gallery B on the west side, which extends several tens of metres (Fig. R19-13). Its archaeological potential was discovered by A. Mannino in 1969, who dug a small test trench in 1972, in which he found two Mesolithic burials denominated A and B, one of which has a date on a *Monodonta turbinata* shell of 6790-6460 BC (presumably uncorrected for the WRE) (Mannino M & Thomas K., 2004-2006). The site was subsequently excavated in 2005, when the stratigraphy was established and dates obtained. During the Mesolithic, the sea would have been some distance away.

During the new excavations, conducted in 2005 by D. Lo Vetro and F. Martini, a new inhumation C was discovered dated to the Early Mesolithic, sometime between the Epigravettian and 8600 BP uncal. (prior to ca. 7600 BC). The stratigraphy, 2 m thick, was described as follows (Fig. R19-13) (Lo Vetro D. & Martini F., 2006, 2012a, 2012b):

- Strata 1-2 and possibly 3 historical and much disturbed with few remains;
- Strata 4 and possibly 3 Metal Ages;
- After a hiatus estimated at 1600 years, Stratum 5 is broken into Levels 5a to 5c, with the single date from the topmost Level 5a Terminal Mesolithic/Transition without pottery. The faunal assemblage is dominated by *Cervus elaphus*, but six fragments of domesticated fauna in primary positions, probably dating from shortly after the appearance of the first Neolithic migrants, confirm that this is a Transition Level. The lithics contain 48 retouched tools and 2 cores; 7 of the tools are made of obsidian; two trapezes were found and the microburin technique is attested, suggesting Castelnovian elements; 18% of the tools are hypermicrolithic and 33% microlithic (Fig. R19-13). No Neolithic tool-types were found. Molluscs were collected primarily during the warmer months (*Patellae, Trochidae* and *Osilinus*), whilst their importance in the economy increases (Colonese A., *et al.*, 2014).
- Stratum 6, broken into Levels 6a to 6d, is Mesolithic. The top of Level 6a is eroded, suggesting a hiatus, confirmed by the dates below and estimated at 1600 years. The faunal assemblage based on the hunt, sees the disappearance of *Equus hydruntinus* as the forest cover increases, but also includes fishing and the collection of marine molluscs primarily during the colder months. The lithics contain 53 retouched tools, 3 cores and 2 pieces of unretouched obsidian from Levels 6B and 6D; 33% of the tools are hypermicrolithic and 30% microlithic, and the geometric armatures are hypermicrolithic with microlithic points and triangles (Fig. R19-13);
- Stratum 7, broken into Levels 7a to 7e, is Epigravettian/Final Palaeolithic and Early Mesolithic, dated between 12000-8000 BC. The economy is primarily based on the hunt, which includes *Cervus elaphus*, *Equus hydruntinus*, *Bos primigenius* and *Sus scrofa*. The climate is dry and arid, so that there is little forest cover. Fishing and the collection of marine molluscs is also attested, but with the coastline some way off at the time of occupation this activity was either limited, or consumed closer to the shoreline. The lithics contain 70 retouched tools; 25% are hypermicrolithic tools and 17% microlithic; 65.6% of the tools are blade-based and the geometric armatures are triangles (Fig. R19-13);
- Stratum 8 sterile.

The date for Level 5A is:

- LTL-877A 7040±55BP = 6020-5792 BC (OxCal 4.2 at 95.4%), Level 5a – Median 5905 BC.

This date sits in the supposed 'gap' at Grotta dell'Uzzo between the Final Mesolithic and the first level with pottery, and falls at the end of the '6200 BC event'.

The dates for the earlier Stratum 6, without laboratory references are:

- XXX 8619±65BP = 7798-7536 BC (OxCal 4.2 at 94.9%), on charcoal Level 6B – Median 7665 BC.
- XXX 8608±65BP = 7788-7531 BC (OxCal 4.2 at 95.4%), on charcoal Level 6C – Median 7660 BC.
- XXX 8699±60BP = 7939-7593 BC (OxCal 4.2 at 95.4%), on charcoal Level 6D – Median 7765 BC.

The hypotheses are that the absence of pottery is fortuitous, due to the activities at the site, or more likely, that the Terminal Mesolithic folk had obtained a few ovicaprines through contact with the first Neolithic migrants at the eastern end of the now-island (attached to the mainland until the Later Neolithic), whilst their primary economic activity was centred on the hunt and the exploitation of aquatic resources (Lo Vetro D. & Martini F., 2012: 44).

B. Vargo (2003: 30), quoting S. Tusa (1985, 1992) who also hypothesised in 1996 and 1997 that this site shows an emergence of Neolithic patterns from Late Mesolithic layers, have been proven correct in their assumptions, and whilst recognising that the evidence is limited, the author includes it in the list of Sicilian Pre-Stentinello sites. S. Tusa hypothesised that the earliest Neolithic Impressed Ware could/should have been found at this site; in this he has been proven wrong, but his assumption that this is a Transition site is justified.

Grotta Geraci (5) – This Mesolithic cave-site is near Termine Imerese and was excavated in the 19th century and reported on by M. Palumbo in 1876.

No details are available for the site, but S. Tusa (1996, 1997) believes that a Transition level could/should have been found.

Baring convincing evidence, this site must be considered to be Mesolithic.

Grotta Giovanna (35) – This cave near Syracuse has produced a date *ca*. 13500 BC.

The Late Pleistocene occupation contained a faunal assemblage in which *Equus asinus hydruntinus* was the most hunted species, with red deer and wild boar also present (Tagliacozzo A., 1997: 237).

Grotta Maiorana (21) – This cave, located near Paceco on the west coast of Sicily opposite the Egadi Island of Favignana, was excavated in the first half of the 20th century and reported on by B. Marconi (1941, 1944). During the Mesolithic it would have been *ca*. 20 km from the sea, since the island of Favignana only became detached from the mainland during the Neolithic.

Little is known about this site, but B. Vargo (2003: 30), quoting S. Tusa (1985, 1992), suggests that this site, like Grotta dei Ciaravelli, Grotta d'Oriente, Grotta Regina and Grotta della Molara, shows an emergence of Neolithic patterns from Late Mesolithic layers; whilst recognising that the evidence is limited, the author includes it in the list of Sicilian Pre-Stentinello sites. S. Tusa (1996, 1997: 182) hypothesised that the earliest Neolithic Impressed Ware could/should have been found at this site.

Unfortunately, nothing more can be said about this site.

Grotta Mangiapane/Grotta Scurati (17) – This cave is located to the west of the promontory of Cape San Vito on the north-west coast. The occupation is Final Epigravettian or Initial Mesolithic. It must have been excavated before 1950, since L. Bernabò Brea (1949: 22), compares the microlithic lunates and triangles with those from Grotta Corruggi and Riparo del Castello de Termine Imerese.

The lithics are typologically dated to the end of the Pleistocene or very beginning of the Holocene. According to M. Piperno (1997) they are similar to those from the basal layers of Grotta dell'Uzzo, for which he supplies a date *ca*. 10250 BC.

Grotta Niscemi (8) – This cave-site on the eastern side of Monte Pellegrino north of Palermo, has been dated to the Late Pleistocene with no evidence for a Mesolithic occupation (Mannino M. & Thomas K., 2004-2006: 21-22):

- R-484 12840±100BP = 13758-13097 (OxCal 4.2 at 95.4%), on *Monodonta turbinata* – Median 13430 BC.

Grotta Perciata (12) – This cave is located to the north-west of Palermo on Cape Gallo, near Terrasini (Fig. R19-14). A test excavation was conducted by E. Borzatti von Löwenstern and G. Mannino in 1970, when Palaeolithic hand impressions were discovered in a recessed chamber deep in the cave (Purpura G. & Purpura G., 2009).

The site has been dated (Mannino M. & Thomas K., 2004-2006):

- F-27 11960±330BP = 12100-10800 BC (corrected for WRE) – Median 11450 BC.

M. Piperno (1997) confirms it is a Late Pleistocene Epigravettian occupation.

Grotta Regina/Grotta della Regina (9) – Epipalaeolithic cave-site north of Palermo.

N. Marconi (1994: 137) states that molluscs were exploited, but that there was no evidence for fishing (p. 134) and that only wild fauna, including red deer and a single auroch, is reported. S. Tusa, echoed by B. Varga (2003: 30) believed that the site should/could have contained Late Mesolithic layers showing a similar emergence of Neolithic patterns as at Grotta dell'Uzzo; the author included it in the list of Pre-Stentinello sites.

The information available is very limited and is treated here as a Mesolithic site.

Grotte dell'Addaura (7) – This is a series of four limestone caves to the north of Palermo on the north side of Monte Pellegrino, two of which produced Late Palaeolithic rock art. This group of caves were not in use during the Late Mesolithic or Transition, but are important in giving an insight into possible Late Pleistocene and Mesolithic rituals which are echoed at the Grotta della Cala dei Genovesi at about the same time, and at Grotta dell'Uzzo, Grotta Kronio and Piano Vento during the Transition and into the Early Neolithic.

Addaura Grande: blocked by a massive rock-fall.

Addaura Caprara: Subject to numerous excavations commencing when it was excavated by B. Marconi and L. Bernabò Brea in 1946-1947. According to M. Mannino and K. Thomas (2009: 141) the lowest levels "*contained Mesolithic materials, although the deposit was partly mixed. A shell from the second lowermost level (spit 25) has been dated to 9130-8620 B.C., making it Early Mesolithic*". The date should be treated with caution because there is no indication that it has been corrected for the WRE. The lowest levels appear to be later than the Pleistocene-Holocene boundary, which may or may not be the date for the anthropomorphic wall engravings. This site confirms that shellfish collection commenced prior to the end of the Pleistocene (Mannino M. & Thomas K., 2004-2006).

Grotta dei Bovinee / Antro Nero: Cave with Late Palaeolithic rock engravings.

Grotta delle Incisioni: The famous Addaura engraved scene is from this cave (Fig. R19-15). The trench dug as the foundation to put a protection wall at the entrance produced Late Palaeolithic material which ended up mixed.

Isolidda/Gruppo dell'Isolidda (16) – This is a series of 5 caves on the western side of San Vito lo Capo (on the opposite side to Grotta dell'Uzzo). First discovered in the 1920s by R. Vaufrey, in 1972 Giovanni Mannino discovered rock-art, and in 2004 the University of Florence opened 3 trenches, one of which, 8 m2 in the slope below the cave complex brought to light stratified deposits in a secondary position spanning the Late Epigravettian (pre-Mesolithic) to the Early Neolithic. These deposits represent different colluvial events, which appear to have taken place shortly after each depositional event, which transported material from just outside the cave, and which form reasonably coherent

sequences, which have been labelled SU24, SU25 and SU21, and which were excavated in artificial spits of 5 cm each (Lo Vetro D., *et al.*, 2014):

- SU24 Spit 14 is the top level, undated, which contained Late Mesolithic and/or Early Neolithic/Transition hyper-microlithic and microlithic trapezes, microburins, regular blades and bladelets, some obsidian and undiagnostic sherds. It is probably a mixed level with marine molluscs;
- U25 Spit 15 Upper contained hyper-microlithic armatures, some obsidian, centripetal and bi-directional cores and marine molluscs. Mostly Early Mesolithic with intrusive Late Mesolithic and Early Neolithic/Transition material;
- SU25 Spit 15 Lower contained Early Mesolithic material with some large faunal remains. A single date was obtained:
    - OxA-18069 8685±40BP = 7739-7587 BC (OxCal 4.2 at 95.4%), on marine shell – Median 7665 BC, but may need to be corrected for the WRE.
- SU25 Spit 16 Upper and all of SU21 contained Lower Mesolithic and Final Epigravettian material.

Most of the Material appears to have accumulated during the Early Mesolithic, with the two other dates close to that shown. The uppermost levels contained Late Mesolithic and Early Neolithic material (lithics and undiagnostic sherds), suggesting that the site might have been used over the transition before being abandoned. There are no faunal remains indicated for the Late Mesolithic/Transition/Early Neolithic topmost levels.

Riparo del Castello di Termine Imerese (4) – This site was excavated between the wars and published by E. Gabrici (1930-1931).

The microlithic triangles and lunates found at this site are similar to those found at Grotta Corruggi, as well as those at Grotta Mangiapane and Grotta di San Teodoro (Bernarbò Brea L., 1949: 22). These sites date from the Late Epipalaeolithic or Early Mesolithic.

F. Nicoletti (1996: 57) believed there could have been a stratigraphic sequence attesting later stages of the Mesolithic, but there is no firm evidence for this nor for the Transition.

Riparo della Sperlinga di San Basileo (1) – This rockshelter, 600 masl, inland from Messina, near Novara in the Peloritani Mountains of North-eastern Sicily, was excavated in a short season by L. Bernarbò Brea in 1951.

The Stratigraphy is described as follows (Aranguren S. & Redevin A., 1996; Costantini L., *et al*., 1987; Dini M., *et al*., 2008; Leighton R., 1999; Natoli R., 2000; Taschini M., 1983; Vargo B., 2003):

- Level I contained Serra Ferlicchio pottery;
- Level II contained Diana, Piano Conti and Stentinello pottery associated with obsidian. The faunal assemblage is 85% wild (red deer and wild boar), and only 14% domesticated, suggesting that the occupants had their roots in the Mesolithic (Marconi N., 1994; Taschini M., 1983). The lithic industry is microlithic of Mesolithic tradition (Costantini L., *et al*., 1987) echoing that of Level III, except for the increase in trapezes and microburins (Taschini M., 1983);
- Level III contained Epipalaeolithic material. The lithics were dominated by microlithic triangles, lunates, and trapezes (Natoli R., 2000) (M. Dini, *et al*., (2008: 73) specify one trapeze only, which they consider to have migrated down). M. Taschini (1983) has supplied 3 dates *ca*. 10.000 BC;
- Level IV was sterile.

"*Grotta del Kronio and Riparo della Sperlinga express a stratigraphic sequence that begins with the Mesolithic and is identified as a pre-Stentinello Early Neolithic phase. This early Neolithic layer also includes a microlithic industry that appears to be of Mesolithic origin and a high proportion*

of wild floral and faunal species (Tusa 1985)" (Vargo B., 2003: 31). L. Costantini L., *et al*., (1987: 403) echo this sentiment when they state: "*La présence d'une séquence stratigraphique qui débute avec les niveaux mésolithiques et certains caractères propres à la période archaïque néolithique, comme l'industrie, définie par les auteurs comme «microlithique et de tradition mésolithique», et l'importance de la chasse à la Sperlinga, prouvent, à notre avis, l'existence de courants néolithiques initiaux antérieurs à la vaste diffusion de la culture du Stentinello*". S. Tinè (1987: 352) mentions pottery in association with a Mesolithic industry, and S Tusa (1996, 1997: 182) believed that the pre-Stentinello pottery could/should have been found at this site.

This medium altitude rock-shelter appears to have been used episodically as a hunting halt since the Pleistocene-Holocene boundary by hunters-gatherers, who continued to use it over the millennia of the Mesolithic, and into the Transition. There is no mention of Pre-Stentinello pottery by any of the authors, but this facies had not been recognised by L. Bernarbò Brea at the time of excavation (as was also the case at Grotta Corruggi), and the limited number of levels means that Level II possibly comprises several millennia of episodic occupation. We concur that the evidence points to use of this rockshelter by Mesolithic populations during the Transition and into the Neolithic as they acquired attributes of the Neolithic in the form of pottery, ovicaprines and obsidian.

Riparo di Perriere Sottano (26) – This collapsed rock-shelter is located at Ramacca in the Catania plain of Eastern Sicily, 25km from the sea, at the base of the 71 masl outcrop at the top of the hillock. Excavations were undertaken in 1984, 1985 and 1987 by B. Aranguren and A. Redevin. The fill from the collapsed rock-shelter, which had slipped 15 m down the slope, and the archaeologists were able to excavate an area of 2.5m^2, to a depth of 2m.

Two levels were identified, separated by a trampled compacted level, with two dates from the lower level only. The details from B. Aranguren and A. Redevin (1996) are as follows:

- The Upper Level contained a lithic assemblage (Fig. R19-16) with a similar debitage to the Lower level. The microburin technique is not attested and 40% of the tools are microlithic to hypermicrolithic and non-geometric, single or double backed, with armatures under 12 mm resembling the Sauveterrian, which find no parallel in Sicily; there are also backed blades. The exclusively wild faunal remains were in a poor state of preservation. This level also produced 3 perforated shells, one of which had striations echoing that from Grotta dell'Uzzo (Fig. R19-11), which could place this level in the second half of the 8th millennium, and this date is also suggested by D. Lo Vetro and F. Martini (2012);
- The Lower Level has produced the two following dates, whose inversion suggests stratigraphic mixing during the slippage down the slope (Iovino M., *et al*., 2008, quoting Bigazzi & Radi, 1981 and Aranguren & Redevin, 1998):
    - UtC-1424 8700±150BP = 8230-7530 BC (OxCal 4.2 at 95.4%), on charcoal, Layer IV Spit 53 – Median 7880 BC.
    - UtC-1355 8460±70BP = 7597-7422 BC (OxCal 4.2 at 86.4%), on charcoal, Layer V Spit 60 – Median 7510 BC.

The lithics from the Lower Level resemble those from the Upper level, except that there is a quasi-absence of hypermicroliths and backed tools, and there is a clear continuity of the Epigravettian traditions. Roufignac knives (Fig. R19-16 above, N° 15) are the most southerly representation of this Sauveterrian tradition although other aspects of this culture (e.g. geometrics and the microburin technique) are absent. A fragment of obsidian from Lipari was also found in the Upper Level.

Whilst this site can tell us nothing about the Transition, it supplies tantalising suggestions about navigation, contact and exchanges. Given the non-standard and Sauveterrian-like industry, it is possible that we in the presence of Mesolithic migrants from further north, who mastered navigation and who had contacts with Grotta dell'Uzzo *ca*. 200 km to the west.

Riparo Roccarazzo (29) – Epigravettian site, inland from Syracuse, reported in Sicilia Archeologica 38 in 2005.

Rocchicella di Mineo (28) – This Mesolithic site is in a cave 200 masl, created by volcanic activity in the Late Pliocene, under a Sikel sanctuary to the Divine Palikoi (Fig. R19-17). Palagonitised basaltic glass is well represented around the site.

In front of the cave are Late Pleistocene/Early Holocene levels dated to the 11th-10th millennia BC, above which are Neolithic levels (Maniscalco L. & McConnell B., 2003).

Two dates have been reported for levels where two obsidian flakes were found from Gabelotto on Lipari (M. Iovino, *et al*., 2008: 480):

- AA42635 10230±60BP = 10220-9756 BC (OxCal 4.2 at 94.0%), on bone from Level US 460, where an obsidian flake n° Don31 was found. The Stratum was below US 423 – Median 9990 BC.
- AA44284 8070±95BP = 7311-6696 BC (OxCal 4.2 at 95.4%), on bone from Level US 423, where an obsidian flake n° Don49 was found. The stratum was intact – Median 7005 BC.

It is possible that the flake from Level US 460 had migrated down from Level US 423. This would still provide a date *ca.* 7000 BC for the obtention of obsidian from Lipari.

There is no indication of Transition Levels between the Mesolithic and Neolithic occupations of the site.

Sciacca (24a) – In the region close to Sciacca there are numerous caves with prehistoric remains, the most famous of which is Grotta Kronio-Antro Fazello, with its Mesolithic strata at the base of the Neolithic sequence.

In the region surrounding Sciacca numerous site in the open-air, in caves and under rock-shelters were discovered by E. Treganza during the 1950s: on Cabo San Marco to the west, surface finds appear to date from the Mesolithic to the Neolithic; a little further west is the site of Maragani and further west still, at Eraclea Minoa the prehistoric site of Capo Bianco is not clearly defined, as is the site of Menfi; Inland to the north, there are the San Giovanni rock-shelters close to Sambuca di Sicilia as well as the site in the Tardara Canyon between Sambuca di Sicilia and Sciacca; to the east of Sciacca lies the site of Molinelli. These sites appear not to have been properly published but according to D. Gullì (2014: 11) "*The typological analysis of the lithic complex recovered from all these sites allows their attribution to two chronological phases: the oldest is characterized by the presence of scrapers, blades with invasive retouch, and truncations; the more recent phase is characterized by angled burins, truncated backs, backed points, and geometrics: This lithic complex seems coeval with the assemblages found at Contrada Bertolini di Mare and Cavarretto, near Menfi, and from Grotta Lisaredda, near Sambuca di Sicilia. From the latter site various lithic tools have been recovered: only a very small group has been studied, including some scrapers, truncations and angled burins, since the lithic complex has been dispersed in unauthorized private collections. This rich collection of lithic artefacts represents the informative basis which will be used to reconstruct the sequence of the oldest occupation of the area*".

E. Treganza identified nine Early Neolithic sites around Sciacca, five in or close to Sciacca and four inland near Caltabellota. Some of the sites close to Sciacca near Castello Nuovo appear to also contain pre-Neolithic material (Gullì D., 2014: 11).

If the situation around Sciacca appears a little confusing, it nevertheless appears clear that the territory was occupied from the Late Palaeolithic, through the Mesolithic and into the Neolithic. Migrant Neolithic herders and farmers appear to have arrived in the region, whether from North Africa and/or from points further east, and most likely interacted with the autochthonous hunter-gatherers, which they probably assimilated. Future research will hopefully clarify the situation.

Southern Italy and West Adriatic Seaboard – Sicily – Initial and Early Neolithic sites – Introduction

There are a few Initial Neolithic Pre-Stentinello sites that appear to have been established *ex nihilo* by migrants or acculturated hunter-gatherers. There are many more Early Neolithic Stentinello settlements that were clearly established by migrants who brought the full Neolithic package, including a distinctive Neolithic lithic assemblage, in areas suitable for primitive agriculture. The interest of the latter sites resides in their date of establishment, and we will only mention a small selection in the Conclusion.

Southern Italy and West Adriatic Seaboard – Sicily – Initial and Early Neolithic sites – Site details

Cala Pisana (38) – Initial Neolithic pre-Stentinello and/or Stentinello site on the island of Lampedusa. The fill from a pit hut was excavated by A. Radmilli in 1971. Access to the island requires navigation beyond sight of land. Most of the lithics are in obsidian from Pantalleria, and the large fauna is made up of ovicaprines and suids (Radi G., 1972).

This undated site appears to have been established by Early Neolithic migrants.

Grotta Kronio/Grotta del Kronio-Antro Fazello/Grotta di San Calogero (24) – The cave of San Calogero (Fig. R19-20) is located on Mount Kronio to the east of Sciacca on the south-west coast of Sicily. The earliest Neolithic date with pottery from Grotta del Kronio-Antro Fazello is (Tiné V., 2014: 47):

- LTL-211A 7410±32BP = 5989-5745 BC (OxCal 4.2 at 95.4%), Level B16-17 – Median 5865 BC.

The Sicilian pre-Stentinello or Impressed Ware was first identified at this site during the 1962 excavations. The 1986 excavations accentuated the difference between the pre-Stentinello facies and the Stentinello, when the site function changed from a cult site to a residential one. The earliest levels contain a pottery more archaic than that found on the Tavoliere and the sites of San Domino and Prato don Michele in the Tremiti Islands, north-west of the Gargano Peninsula in Apulia (Tine S. & Tine V., 1983: 133-134).

During the pre-Stentinello phase, 70% of the faunal remains consisted of young sheep, and the lithics from the earliest phase are laminar, similar to those of the Initial Neolithic on the Italian mainland (Tine S. & Tine V., 1983: 134).

Anthropomorphic cult statuettes were also found at this site (Fig. R19-2).

According to B. Varga (2003: 31), quoting S. Tusa (1985), the lithic industry includes a microlithic industry that appears to be of Mesolithic origin and a high proportion of wild floral and faunal species. D. Gullì (2014: 13) indicates that the study of the lithics is not complete, so that the association that includes the relationship between the Mesolithic and the Initial Neolithic and later Neolithic is not clear.

From the evidence, it would seem that the cult site with pre-Stentinello pottery was established by migrant Neolithic settlers who probably established one or more sites on the plains nearby, possibly attested by the lithic scatters associated with pottery around Sciacca (site 24a) found by E. Traganza (Gullì D., 2014: 11). It would also appear that these Initial Neolithic migrants arrived in Sicily at approximately the same time as in South-Eastern Italy, if not earlier. The microlithic element in the lithic industry could be explained by contact and exchange with local hunter-gatherers or by a provenance from North Africa, since E. Traganza also found pre-Neolithic lithic scatters in the vicinity of Sciacca (Gullì D., 2014: 11).

Grotta Masella (34) – Poorly published Pre-Stentinello site some 10-15 km inland from Syracuse on the east coast, which N. Marconi (1994: 117) includes in her list of Sicilian pre-Stentinello sites.

For lack of information, this site has been treated it as an Initial Neolithic site, but it has not been considered in the concluding remarks.

Muglia Bassa (25) – Initial Neolithic Pre-Stentinello site 50 km west of Catania.

According to N. Marconi (1994: 117) this site has been poorly published, but the author includes it in the list of pre-Stentinello sites.

For lack of information, this site has been treated it as an Initial Neolithic site, but it has not been considered in the concluding remarks.

Parcazzi (22) – open-air site near Poggioreale, possibly Neolithic.

S. Tusa (1996, 1997: 182) believes that this site, dug summarily and reported by Falcone (1980-1981), could/should have contained pre-Stentinello pottery.

For lack of information, this site has been treated it as an Initial Neolithic site, but it has not been considered in the concluding remarks.

Petraro di Melille (33) – This site, located west of Syracuse, was published by G. Voza (1968).

R. Leighton (1999) states that small flint and obsidian armatures are associated with Stentinello pottery, whilst F. Nicoletti (1996: 57) (Fig. R19-18) is more precise when he states that "*At this site levels characterised by Impressed pottery of cardial type have yielded an industry with highly developed geometric trapezoidal microliths with abrupt retouch (fig 1, n° 21-25) (see scan), using the microburin technique (n° 20), accompanied by other tools, such as points and backed blades (n° 27) or backed truncations (n° 19), strongly resembling Mesolithic productions*".

S. Tusa (1996: 49) adds that a burial was excavated in a natural cavity containing Impressed Ware of a Pre-Stentinello type.

This Initial Neolithic site was occupied either by acculturated Mesolithic folk or Initial Neolithic migrants who had acquired elements of the lithic tradition from the Mesolithic substrate (exchange, acculturation, population assimilation and/or partner exchange). Although there are no dates, it can probably be dated to the early 6th millennium BC.

The site has been classified as a Transition site based on the scant information available.

Pezza Mandria (27) – There is a Grotta Pezza Mandria used in the Early Bronze Age, which could be the same as this poorly published Initial Neolithic site on the east coast of Sicily on the flank of the Mount Etna Volcano.

According to N. Marconi (2009: 28), citing a personal communication from Cultraro, the site is included in the list of Pre-Stentinello sites.

For lack of information, this site has been treated it as an Initial Neolithic site, but it has not been considered in the concluding remarks.

Piano Vento (31) – This open-air fortified site is in the territory of Palma di Montechiaro, near the south coast 15 km east Agrigento, on a rolling hill. It was excavated by G. Castellana over five seasons between 1981-1985. In sectors D, E and F the excavator found five levels with circular to quadrangular structures, culminating in a stone-built structure. The lower levels contained pre-Stentinello pottery, which evolved into Stentinello (Castellana G., 1987). Figurines were also found at this site (Fig. R19-2).

R. Leighton (1996: 5) quotes the following date from Sector A10 Square IV, which he incorrectly associated with pre-Stentinello pottery. In his later publication R. Leighton (1999: 63) appears to suggest that the earliest levels are associated with Bichrome and Trichrome ware which began around the middle of the 6th millennium BC, and on p. 71 states that "*Structural features in the earlier levels are associated with incised and impressed wares*", which is followed soon after by the

painted pottery. He also describes the circular huts from the earlier phase and a Middle Neolithic hut associated with a figurine found nearby (Fig. R19-2):

- A-4474 6130±90BP = 5297-4846 BC (OxCal 4.2 at 95.4%) – Median 5070 BC.

S. Tusa (1996, 1997: 186) also believes that there was an 'Impressa' facies which continued into the Stentinellian phase with individual structures.

There can be little doubt that the site was established by Neolithic migrants, since permanent structures are not known in the Mesolithic. It is also probable that this site had an earlier undated occupational phase.

Rocca di Pietro Pallio/Rocca di Contrada Pietro Pallio (2) – Early Neolithic site to the west of Cape Milazzo, on the north-eastern coast, published by C. Genovese between 1997-1998. The site was excavated over a reduced surface, and according to C. Collina (2009: 28-29), could have contained Pre-Stentinello pottery.

For lack of information, this site has been treated it as an Initial Neolithic site, but it has not been considered in the concluding remarks.

Stentinello (32) – Eponymous open-air trenched site north of Syracuse on the east coast, partially eroded by the sea (Fig. R19-19), which was excavated by P. Orsi.

This is a fully Neolithic ditched enclosure site with wattle and daub structures set up by migrant farmers probably in the middle of the 6th millennium BC, which was occupied for over a millennium. Since Stentinello-like pottery is first attested at Piana di Curinga in Calabria prior to that date, a mid-6th millennium date is plausible.

Stretto (23) – This inland ditched enclosure Stentinello site at Partanna, in South-Central Trapani, at the western end of the island, is interesting in that it has supplied a date associated with Neolithic Trichrome Serra d'Alto pottery, although Stentinello pottery in mentioned (Leighton R., 1996):

- R-291 6630±120BP = 5749-5339 BC (OxCal 4.2 at 95.4%) – Median 5544 BC.

As R. Leighton (1996) states, since the date comes from a ditch, its association with the Serra d'Alto pottery mentioned could be ambiguous, and the date could relate to Stentinello pottery.

Vulpiglia (37) – This is an open-air Pre-Stentinello site 1 km south of Grotta Corruggi, at the south-eastern tip of Sicily.

M. Iovino (2003: 601) suggested it was important to identify the spectrum of resource exploitation at this site, to be able to compare this to the nearby site of Grotta Corruggi di Pachino, since fishing and seashell collection is attested.

It is possible that it was this site which supplied Grotta Corruggi with its pottery and to which the Mesolithic occupants of the cave relocated.

<u>Southern Italy and West Adriatic Seaboard – Sicily – Conclusions</u>

"*The island's slightly milder climate and less rugged terrain must have rendered it more hospitable than much of Apennine Italy, especially during the colder phases of the last glaciation. It was probably more populated too, especially around the coasts, which were of greater breadth prior to last marine transgression*" (Leighton R., 1999: 28). The adaptability of the Post-Glacial population, when faced with the changing environment and possible demographic pressure, is indicated by the broadened of their resource base. The large game resource depletion, possibly overhunted, led to the exploitation of smaller game and marine resources as well as plant food. Offshore fishing and the associated technical innovations are indicative of their resourcefulness and adaptability, and one possible reason for year-round sedentism or partial sedentism during the Late Mesolithic, as evidenced at Grotta dell'Uzzo. The widening maritime contacts evidenced by fishing, the obtention of obsidian

from Lipari by some Mesolithic groups and the possible/probable contacts with the Capsian Culture on the North African coast, could have predisposed the local populations to adopt elements of the Neolithic package with which they came into contact, and more especially when the first Neolithic migrants began to arrive in Sicily.

Maritime contact with the Capsian Culture in North Africa is suggested by a number of factors, such as:

- The evidence for navigation by the presence of obsidian during the Later Mesolithic at a number of sites;
- The presence of coarse pottery at the Grotta dell'Uzzo and Grotta Kronio at the beginning of the 7th millennium and possibly the previously dated clay hearth base at Grotta dell'Uzzo;
- The pressure technique of debitage and the production of bladelets used in the manufacture of trapezes using the microburin technique;
- The appearance of Impressed Ware coarser than any found in Apulia at Grotta Kronio.
- The appearance of pre-Stentinello, coarse and Impressed Ware pottery at a number of undated sites which appear to be clearly Mesolithic sites with Neolithic attributes limited to pottery and some ovicaprines;
- The DNA evidence.

Such contacts, which might have begun earlier than 7000 BC, would have predisposed the autochthonous Terminal Mesolithic population to welcome other Neolithic attributes when contact was made with Neolithic settlements on the Italian mainland and/or the first wave of Neolithic migrants who settled in Sicily. This Region appears to have a large number of Late Mesolithic sites which incorporate some Neolithic elements and the evidence from Grotta dell'Uzzo suggests that such contacts could have lasted a very long time before the Mesolithic way of life disappears from the archaeological record.

Many of the Late Mesolithic, Transition and Early Mesolithic sites are undated; A. Gob (1990) only listed Grotta dell'Uzzo, but the situation has improved in the last quarter century with a date for the Transition at Grotta d'Oriente and Grotta Kronio.

Grotta dell'Uzzo is clearly the reference site; it has been the subject of numerous partial publications and continues to fascinate, thanks to its deep and complete stratigraphies, and it has recently been the subject of a new series of ^{14}C dates. It is at this site that changes in the periods of occupation, the technical baggage and subsistence base can be seen changing over the millennia; and it is over a millennium after the first acquisition of attributes normally associated with the Neolithic that the site appears to have acquired most of the attributes, but when it is abandoned, many aspects of the Mesolithic cultural heritage are still discernible.

The evidence points to a first wave of Neolithic migrants, bringing Impressed Ware, which becomes known as Pre-Stentinello in Sicily, from the fourth quarter of the 7th millennium. This is as early if not earlier than the earliest sites known for Apulia, and the Impressed Ware is more coarse, suggesting they might not have come from Italy, but from a similar provenance as those who moved to Apulia, or else from North Africa. There are virtually no dates available for those sites established *ex nihilo* by these migrants (Grotta Kronio, Grotta Masella, Muglia Bassa, Piano Vento), but the proxy evidence available from Grotta dell'Uzzo supplies the necessary clues: Cut 12 *ca*. 6200 BC for Pre-Stentinello pottery, domesticated fauna early in the 6th millennium, agriculture in the middle of the 6th millennium and Stentinello pottery *ca*. 5000 BC or earlier. The Stentinello presence is strongest on the east coast, but it is attested at Stretto, near Partanna in South-Central Trapani in the middle of the 6th millennium with one of the few ^{14}C dates available.

Sicily has produced an impressive number sites other than Grotta dell'Uzzo where the Transition from Mesolithic to partial acceptance of the Neolithic package can be traced (Grotta Corruggi, Grotta della Cala dei Genovesi, Grotta d'Oriente, Petraro di Melille and Riparo della Sperlinga di San Basileo, as well as potentially Grotta Kronio and the region around Sciacca), with other sites which might possibly have shed light on the Transition (e.g. Grotta della Ucceria, Grotta

Maiorana and Isolidda). The region of Sciacca, with its numerous sites, also has great potential for shedding light on the Transition. The occupants of these sites tend to disappear from the archaeological record before the Transition is completed, which is not surprising, since they are in caves or rock-shelters, and not located in areas propitious for primitive agriculture. It should also be noted that no evidence has been found attesting violent confrontation before, during or after the Transition.

Many of the other sites listed above have been the subject of speculation regarding their status as possible Transition or Initial Neolithic sites, but hard evidence is lacking, as are dates.

Region 20 – Southern Italy and West Adriatic Seaboard – Molise to Romagna

(Map R20)

Southern Italy and West Adriatic Seaboard – Molise to Romagna – General introduction

This region takes in *ca*. 460 km of the Italian Adriatic, as the crow lies, from north of Apulia, via the Italian regions of Molise, Abruzzo, Marche and parts of the inland region of Umbria, to Romagna, where it enters the Paduan Plain and the Po Valley at the point of contact with the Neolithic Fiorano Culture. It excludes the Fucino Basin (Region 21), in the Abruzzo Apennines, which will be treated as a separate Region because of the particular richness of its archaeological remains covering the Transition. Umbria is included because of its affinities with the Adriatic Impressed Ware, whilst the western part of Emilia Romagna, which is not influenced by the Adriatic Impressed Ware Neolithic is not considered. We will however look at a few sites outside the Region which through light on the Transition.

At the LGM, with sea-levels over 120 m lower, a wide coastal plain stretched as far south as Ancona, north of which point the Adriatic Sea gave way to the Northern Adriatic Plain (Fig. Intro-3). By 6000 BC, with the sea-level 20-30 m below current levels, much of the coastal plain and most of the North Adriatic Plain had been drowned. It can be hypothesised that an undeterminable number of coastal sites covering the Mesolithic, Transition and Early Neolithic have disappeared if the evidence from Sicily (e.g. Grotta dell'Arco, Stentinello) and Apulia (e. g. Chianca di Palo, Grotta delle Mura di Monopoli, Scamuso and Torre Sabea) are anything to go by.

The region is cut by numerous rivers coming down from the Apennines, most with wide fertile valleys once they reached the lower altitudes, created by the deposition of the alluvium brought down from the mountains, even if the rivers flowed relatively fast towards the coastal plain which stretched all the way up the Region. By the 7th millennium BC, the thermophile forest cover was prevalent and it can be assumed that there were plenty of wetlands along the coast and up the coastal plain river valleys able to provide rich resources for a Mesolithic Population which has been difficult for archaeologists to discover.

The Neolithic movement up the coast got off to a slow start some 200-300 years after the Neolithic migrants originally settled the fertile Tavoliere in Northern Apulia, and possibly due to the availability of suitable land for the northward migrating Neolithic colonisers, it was not till *ca.* 5400 BC that this Impressed Ware Culture finally made contact with the Fiorano Culture which had already been in place for a couple of centuries in the Po Basin.

Southern Italy and West Adriatic Seaboard – Molise to Romagna – Mesolithic and Transition sites – Introduction

Surprisingly few Mesolithic sites have been discovered in this Region. Molise has one plus some lithic scatters, Abruzzo has several, if the Fucino Basin (Region 21) is included, and Marche two. We will discuss two sites in Emilia (Lama Lite and Passo della Comunella) and one in Tuscany (Petriolo III), which are outside the study area, since the first two shed light on the Late Mesolithic in the Northern Apennines, and Petriolo III has produced evidence for very early contacts with pottery manufacturing groups. In Molise, extensive area surveys have produced a few Mesolithic implements near the coast, suggesting that this is where the Mesolithic hunter-gatherers focussed much of their attention, and the Piano delle Cinquemiglia in Abruzzo, where high quality flint was procured, has a number of lithic scatters spanning an undetermined period of time.

Altopiano delle Cinque Miglia (29) – This plateau 1400 masl in the Abruzzo on the Monte Genzana Massif, some 35 km to the east and within two days of the Fucino Basin, was a source of high quality flint in the Late Pleistocene and Early Holocene, which has been found at the sites of Grotta Continenza, Grotta di Pozzo and Ortucchio Strada 28 in the Fucino Basin (Region 21) (Angeli L., *et al.*, 2011). None of the evidence appears to be datable and most of the scatters have been subject to bioturbation, other than the site of Fonte Chiarano (see below) up a side valley at 1600 masl (Lubell D., *et al*., 1999).

Capo d'Acqua/Capodacqua (25) – The site complex is made up of two sites about 100 m apart, one of which is Mesolithic and the other Initial Neolithic. They are close to the lake and village of Capodacqua in the commune of Capestrano in Abruzzo, at *ca*. 350 masl, with access to the coast down the River Pescara (Batović S., 1987: 346; Radmilli A., 1977). The Mesolithic site, which was discovered whilst civil engineering work was in progress to build a levee to channel the River Tirino near its source, was excavated in 1965 by Carlo Tozzi. The Mesolithic stratigraphy, some 20 cm thick, was found 120 cm below the surface. The faunal remains were all wild from a forest environment and included the following MNI (Radmilli A., 1977):

- 79 *Cervus elaphus*;
- 64 *Bos primigenius*;
- 8 *Capreolus capreolus*;
- 3 *Capra ibex* which would have been hunted in the hills rising to 2000 masl;
- 2 *Sus scrofa*;
- 2 *Canis lupus*.

The Mesolithic lithics (Fig. R20-1) were made up of 456 tools and 642 pieces of knapping waste. 4 of the 33 cores had prepared knapping surfaces, 1 was knapped bidirectionally and the rest multidirectionally to obtain flakes. The debitage is microlithic. 262 unretouched blades were found, half of which were broken, from 1.6 to 3.7 cm in length, with one being 4.5 cm long; all types of retouch are present; 7 backed instruments on blades were found as well as a few circular scrapers, as well as some microburins and points (Radmilli A., 1977). C. Tozzi (2012: pers. com.) considers the lithics to date from the Early Mesolithic.

The Neolithic site, excavated over 138 m^2 was found in a 20 cm stratum 40 cm below the current surface, has been extensively reported on by A. Radmilli (1997a, 1997b):

- It was not possible to determine the form of the habitation structures;
- The fauna was a mix of wild (bear, suid, deer, hare, possibly wild bovine, etc.) and domesticated (ovicaprines and possibly cattle), suggesting that the hunt must have been important whilst also attesting to a wooded and shrub-covered environment;
- The pottery consisted of almost 1000 sherds, of which a coarse Impressed Ware component was irregularly decorated by impressions and incisions suggesting archaic Impressed Ware, whilst other pottery has lines and more or less regular zigzags, suggesting a slightly later Impressed Ware, some figulina, and some finer grey-coloured pottery;
- The lithic industry is largely blade-based, most of which (93) are unretouched, with some retouched (10), beaked and notched implements (46), denticulates (10), as well as truncations, burins, points, scrapers, sickle inserts and cores.

The Neolithic site has been dated *ca*. 5850 BC on the fauna (Andersen S., *et al.*, 1990: 34), but the laboratory details were not supplied.

B. Bagolini and G. Cremonesi (1987:26), confirm that this is a transition site; R. Grifoni Cremonesi (1998: 66) and C. Malone (2003: 258) confirm that the Neolithic site produced evidence

for hunting and a traditional Mesolithic lithic industry, and C. Collina (2009: 36) that hunting and fishing continued after the acquisition of pottery.

"*L'attivita della cascia molto svilupata, l'industria litica, che, fatta eccezioni per i tre elementi di falcetto, è formata di strumenti che rientrano perfettamente nelle industrie mesolitiche, le strette analogie con l'industria della vicina stazione mesolitica di Capo d'Acqua, l'uso della stessa qualità di material prima, sono prove convincenti che si tratta di un villagio dovuto a populazioni indigene, le quali erano venute a contatto con gli agricoltori allogenici e stavano modificando il loro sistema di vita ed economic in senso agricolo (Bonucelli et Al. 1968)*" (Radmilli A., 1997a: 91).

Fonte Chiarano (30) – This open-air site in the Apennines of Abruzzo is near the Piano delle Cinquemiglia at 1572 masl. It is also within a couple of days walk from the Fucino Basin.

In 1994, a large pit feature was tested, which contained ample charcoal, exposed in an erosional cut, with flint artefacts and a few sherds. The charcoal was dated (Lubell D., *et al*., 1999):

- AEC-1996C 6360±180BP = 5636-4903 BC (OxCal 4.2 at 95.2%), on charcoal – Median 5270 BC.

In 1995 a 4 m^2 area was opened up which produced Neolithic and earlier material, including two Sauveterrian points. A second 1 m^2 area was excavated on a lower terrace near the present spring and amongst the many lithic artefacts, a Sauveterrian point was recovered as well as a single sherd. Movement appears to have been vertical and there is evidence for a Mesolithic occupation before the Neolithic one. The possibilities for the Neolithic occupation are for seasonal herders and/or hunting, and/or flint procurement. For the Mesolithic occupation, given the existence of the flint from this area at Grotta Continenza, Grotta di Pozzo and Ortucchio Strada 28 in the Fucino Basin, as well as similar Sauveterrian points, the exploitation of a high quality flint resource not available in the Fucino Basin is indicated. No faunal remains were found (Lubell D., *et al*., 1999: 469). A. Cazzella (2000) considered this site to be a pastoralist transhumance site.

There appears to be a hiatus of several millennia between the Sauveterrian and Early Neolithic presence, so that we cannot talk about continuity of occupation of this particular site. The site needs however to be placed in the context of the Piano delle Cinquemiglia (see below), which was visited for the procurement of flint. The area would therefore have been known by the neolithised hunter-gatherer population of the region, who might well have continued to visit the site in the Early Neolithic. Since no faunal remains were found, we cannot tell whether domesticated fauna were pastured, but the median date of *ca*. 5250 BC appears to be very early for such an activity at such an elevation.

Forlì, Cantiere ANAS (4) – This Mesolithic site 30 masl was discovered during civil engineering works, whilst excavating for an underpass. The site, on an alluvial fan a little above the plain further downstream, had been the subject of substantial river-borne sedimentation, so that the archaeological remains were well buried. The site, which was the subject of salvage excavations in 2008, produced evidence from the Late Mesolithic to the Bronze Age, with the evidence from the Final Sauveterrian / Early Castelnovian Mesolithic occupational level limited to charcoal remains and a microburin in a post-hole. A ^{14}C date was obtained yielding a date of 7267±65BP (Gobbo I., 2010: 163-164), which recalibrated using OxCal 4.2 gives a date range of 6247-6010 (Median 6130 BC).

A sterile level separated the Mesolithic occupational level from the next occupational level, so that there is no suggestion that the site was occupied into the Transition, but it does extend the evidence for the Mesolithic presence into Romagna, where none had previously been attested east of the Province of Bologna.

Grotta del Prete (20) – This cave site near Pianelo della Genga in Marche has an Epigravettian / Romanellian component (Broglio A., 1983: 71, quoting Alessi M., *et al*., 1970), but there is no indication it was used during the Transition.

Lama Lite (off-map to the north-west) – Whilst this site and that of Passo della Comunella are both in the North Adriatic Region 23, they are also included here as evidence for the Mesolithic presence at the same time as the Initial Neolithic.

This high altitude Terminal Mesolithic site is located at 1764 masl at Lingonchio in the Emilian Apennines, close to the border with Tuscany. The site was excavated in the 1970s in 10 cm cuts (Castelletti L., *et al*., 1976).

No evidence for structures was found, nor were there any faunal remains. 71 trapezes were found out of a total of 137 tools, of which 63% were obtained using the microburin technique; the tools included Montbani blades and other denticulates in an assemblage which is blade-based (Fig. R23-3) (Biagi P., *et al.*, 1980: 17-18; Castelletti L., *et al.*, 1976: 18-23; Franco C., 2011: 132-137).

A single date has been obtained (Ferrari A., *et al.*, 2001; Ferrari A. & Steffè G., 2006; Skeates R. 2003; Tozzi C., 2011; Tozzi C., 2012: pers. com.):

- R-1394 6620±80BP = 5710-5468 BC (OxCal 4.2 at 94.8%) – Median 5590 BC.

The site has been described as a Late Mesolithic hunting camp, which it undoubtedly was. Its special interest lies in the fact that it contains no Neolithic cultural elements and is dated at a time when the Neolithic had arrived or was arriving in both Northern Tuscany (with a Mesolithic substrate), on the plains at the head of the Adriatic, as well as on the Central Adriatic coast (Maddalena di Muccia, Riccione). There is no indication in the remains to suggest either contact with these first farmers, or any incipient Transition. A. Ferrari and G. Steffè (2006) indicate that the Neolithic sites of Fiorano Modenese and Lugo di Romagna were contemporaneous. The hunter-gatherers using the site maintained contacts across the basin of the River Po as far as the Alps, as evidenced by the presence of Alpine flint in the assemblage (Ghiretti A. & Guerreschi A., 1990: 98).

Luciano di Pievetorina/Pievetorina-Campo Sportivo (18) – This site in the Marche has produced a possible Mesolithic Castelnovian level. It was excavated in the 1970s. The site sits at 470 masl, some 60 km from the sea, close to the Umbrian border. It is located a few kilometres south of Muccia, on an alluvial terrace on the left bank of the Gelana Stream, some 4 km upstream from the confluence of the Gelana with the River Chienti, and about 3 km from the Neolithic site of Maddalena di Muccia. (Silvestrini M. & Pignocchi G., 2000; Silvestrini M., *et al*., 2005). The site is clearly in an ecotone, on the last alluvial terraces at the foot of the Apennine Mountains to the south and west, where game would probably have been plentiful.

The lithics from the Mesolithic level are mostly Sauveterrian, but include triangles and two trapezes (Fig. R20-2) (Franco C., 2011; Lollini D., 1991).

There has been some discussion as to whether the archaeological levels beneath the disturbed Neolithic levels are Early Mesolithic only, or whether they also include Late Castelnovian Mesolithic, since there are trapezes in the Neolithic assemblage. A Manfredini, *et al*., (2005: 198) propose an Early Castelnovian presence, disconnected from the Neolithic; M. Silvestrini and G. Pignocchi (2000: 342) indicate that the material is Sauveterrian; R. Grifoni Cremonesi (2003), referring to Lollini D. (1979), indicates that there could be a Castelnovian level; G. Radi (2011: pers. com.) mentions that F. Martini in 2003 stated his belief that there was a Castelnovian level, whilst she and C. Tozzi considered the trapezes to originate from the Neolithic level above and that these are similar to those found at Maddalena di Muccia.

Unfortunately, there appear to be no dates for the different levels, and no details of the faunal assemblage were found. Given the paucity of material, it would appear that the site was probably occupied episodically during the Mesolithic. The fact that there is a continuity of occupation of this site, even if there is a hiatus, suggests the possibility that the Neolithic occupation contains an element of acculturated hunter-gatherers. It should also be seen in conjunction with the site of Maddalena di Muccia, where the Neolithic faunal assemblage contains an unusually large element of hunted game, again hinting at the possible inclusion of Mesolithic elements.

Passo della Comunella (off-map to the north-west) – Whilst this site and that of Lama Lite are both in the North Adriatic Region 23, they are also included here as evidence for the Mesolithic presence at the same time as the Initial Neolithic.

This high altitude Late Mesolithic camp-site, which sits at 1619 masl in the Reggio Emilian Apennines, is close to the border with Tuscany and also close to the site of Lama Lite.

P. Biagi, *et al*. (1993: 46) have supplied a date:

- Birm-830 7060+/-130BP = 6215-5716 (OxCal 4.2 at 95.4%) – Median 5965 BC.

There is no indication that this is a transition site, although there were possibly Neolithic settlements in Liguria as well as along the southern Adriatic seaboard at the time.

Petriolo III South (5) – Although this site is outside my area, being located in Tuscany, near Siena on the River Farma, it is a key site, where pottery sherds were found in a Mesolithic context.

R. Donahue, *et al*., (1992: 328-329) supply two dates:

- OxA-1363 7610±60BP = 6595-6380 BC (OxCal 4.2 at 95.4%), on hazel charcoal – Median 6490 BC.
- OxA-2630 7480±100BP = 6500-6096 BC (OxCal 4.2 at 95.4%), on charcoal – Median 6300 BC.

Pottery sherds, mostly from a single undiagnostic pot, were found around the hearth that supplied the second date, and as R. Donahue, *et al*., (1992: 330) state, "*This site provides for Central Italy clear evidence of the use of pottery by people with a Castelnovian-type industry...The site displays none of the characteristics one associates with the specialised upland sites used by Neolithic pastoralists or hunters. The early date for the site supports the proposition of a gradual adoption by Mesolithic hunter-gatherers of aspects of Neolithic technology and economy. This evidence suggests that acculturation began some 500 years before prior to the appearance of Neolithic villages in central Italy and that the site is virtually contemporary with the earliest Neolithic village sites in Apulia*".

C. Malone (2003: 273) calls this a Neolithic site, but M. Pluciennik (1997: 135) is closer to the mark when he says of this Early Transition site "*At Petriolo III there are (so far) no domesticates or cultigens, but only possible evidence for of the emulation, adoption or acquisition of ceramics technology at an early date. Further, these ceramics are apparently of a different nature to the classic 'Cardial impressed' wares often taken to signify the earliest Neolithic of the central and western Mediterranean*".

The very early date begs the question of the provenance of the pottery. The date should probably be considered in conjunction with the even earlier date for undiagnostic pottery at the Sicilian site of Grotta dell'Uzzo (Region 19), where we have suggested it might have arrived through contacts with the North African Capsian Culture.

San Lorenzo di Civitanova del Sannio (33): Open-air site *ca*. 1200 masl at 'Lago di Civitanova' (now drained) (Fig. R20-3), in Molise. The material is partly Levallois from the Middle Palaeolithic and partly Late Mesolithic/Early Neolithic. Over 1500 lithics have been collected, partly by Sig. Bruno Paglioni (1325 lithics, of which 82 tools, 6 remains of tools and 38 cores, with the balance being debitage waste), and partly during a survey by the University of Ferrara in 2005 (210 lithics of which 6 cores and 11 retouched tools). The tools included in the first series are associated with a sherd of coarse ware, whilst several of the tools from the University of Ferrara are associated with coarse pottery sherds (Fontana F., 2006).

The lithics from B. Paglioni's collection include:

- 7 burins;
- 6 scrapers;
- 24 scrapers;
- 16 denticulates including 3 notched end-scrapers and 11 side scrapers (including a series of Montbani blades on regular trapezoidal blades);

- 3 truncations;
- 1 geometric;
- 1 point;
- 2 retouched flakes;
- 3 blade-scrapers;
- 38 cores;
- Microburins.

The second group of tools has been attributed to the Early Neolithic, although a Late Mesolithic occupation (as well) cannot be excluded. A Pessina suggested the pottery to be Impressed Ware from South-Central Italy.

The more recent lithic assemblage appears to be made up of two separate groups:

- The first, lamellar on prepared surfaces on high quality flint using either indirect percussion or the pressure technique;
- The second, more opportunistic on poorer quality material used for the extraction of blades or flakes.

The material of Castelnovian tradition includes long frontal end-scrapers, a trapeze, a few Montbani simple or denticulated retouched blades, and a few microburins.

In the concluding remarks, F. Fontana (2006: 377) refers to this recently discovered Transition and/or Early Neolithic site with characteristics reminiscent of the Castelnovian (microburins, an isosceles trapeze, scrapers and retouched blades including Montbani-type notched blades), with Neolithic elements. It is considered to be an important Transition site which needs to be further investigated.

Southern Italy and West Adriatic Seaboard – Molise to Romagna – Initial and Early Neolithic sites – Introduction

The Early Neolithic sites of the Region listed below have been selected either because they appear to supply clues regarding the Transition, or because they are key Early Neolithic sites which are important for the understanding of the Early Neolithic of the Region. The sites reviewed here appear to supply sufficient information to draw a certain number of conclusions.

Progress up the Adriatic seaboard of the Impressed Ware Culture was halting, without an indication from the available dates of a smooth progress up the coast, to reach the Po Plain sometime ca. 5400BC, where the Neolithic Fiorano Culture had already been evolving for a couple of centuries.

Southern Italy and West Adriatic Seaboard – Molise to Romagna – Initial and Early Neolithic sites – Sites details

Faenza - Fornace Cappuccini (3) – This Early Neolithic open-air site in Eastern Romagna is located in the town of Faenza, on a river terrace on the northern fringe of the Apennines, some 50 km inland from the coast in the province of Ravenna. The site was discovered in the clay extraction pit of a local tile manufacturer, and initial excavations were undertaken in 1978. The excavations were resumed in 1990, uncovering a ditch and palisade from a later period, which extends some 680m. The site went through several periods of occupation from the Initial Neolithic to the VBQ, with the earliest evidence for occupation being Archaic Impressed Ware found in pits and cavities (Antoniazzi A., *et al*., 1987; Spataro M., 2002: 137). The later excavations brought to light structures from the Early Neolithic settlement containing pottery, lithics, poorly preserved faunal remains and charcoal remains in three of the structures, which have been dated (Conati B. & Silvestrini M., 2005; Skeates R., 1999-2000: 179; Spataro M., 2002: 137, quoting Bermond Montanari G., 2000):

- Bln-3372 6320±60BP = 5472-5207 BC (OxCal 4.2 at 93.6%), on charcoal from pit – Median 5340 BC.

- R-2314 6280±80BP = 5387-5047 BC (OxCal 4.2 at 89.6%), on charcoal from pit – Median 5215 BC.
- R-2313 6100±170BP = 5385-4669 BC (OxCal 4.2 at 92.9%), on charcoal from pit – Median 5025 BC.

The calibration using OxCal 4.2 has produced a median date 65 years older than using OxCal 4.1.

The lithics (Fig. R20-4), which are mostly on good quality red flint from the Marche, originating some 80-100 km to the south (Bagolini B. & Biagi P., 1987), suggests the provenance of these settlers. The assemblage also contains 8-10% obsidian from Lipari and Palmarola, which indicates that the settlers were probably involved in the exchange and distribution of this material (Antoniazzi A., 1987: 559; Barfield L., 2000: 58; Biagi P., *et al.*, 1993: 58; Pessina A. & Radi G., 2006: 449; Spataro M., 2002: 137). The assemblage shows that the cores were fully exhausted producing microlithic blades and flakes (61% microlithic and 36% hypermicrolithic), which finds its similarities in the Mesolithic rather than the Fiorano Culture. Microburins, truncations, trapezes (including those with *piquant triêdre* and concave retouched edges which are typical of Castelnovian assemblages), as well as notched Montbani blades and denticulates which are also of Mesolithic tradition; missing are rhomboids and Ripabianca burins, but agriculture is attested through a few blades with sickle-gloss, as well as polished stone axes and remains of querns and grinders (Antoniazzi A., *et al*., 1987; Bagolini B. & Biagi P., 1987; Spataro M., 2002: 137; The folloing WWW site was also consulted 'www.archeoserver.it/space/UniMi/Comunicazione').

Whilst the faunal remains are poorly preserved, there appears to be a high incidence of wild fauna ('www.archeoserver.it/space/UniMi/Comunicazione': 106).

This site was established by Neolithic colonisers coming up from the south, who appear to have intensively occupied the coast south of Rimini as far as Cattólica, bringing with them a lithics containing important elements of the Mesolithic tradition. There is no indication that the early settlers were influenced in any way by the Fiorano Culture, which was already in place, and which only began to be felt during the later phases of the settlements, unlike the site of Ripabianca di Monterado (Antoniazzi A., *et al.*, 1987: 561-562; Ferrari A. & Steffè G., 2006: 97).

The question of the acculturation and assimilation of a Mesolithic substrate remains an open issue, which some authors have suggested as a possibility (Antoniazzi A., *et al.*, 1987: 561), with the lithics and high incidence of hunted fauna supporting the hypothesis.

Fiorano Modenese (off map to the north-west) – This Early Neolithic open-air site discovered in the 1940s in the area known as Fornaci Carani at Fiorano Modenese near Modena, has become the eponymous site for the Central Emilia Romagna and Venetian Early Neolithic culture. It is not necessarily the earliest dated site of the Fiorano Culture, which blocked the progress of the Adriatic Impressed Ware Culture in Romagna.

The dates for this site are (Skeates R. & Whitehouse R., 1992-1993, quoting Improta S. & Pessina A., 1998: 109):

- GrN-19838 6690±180BP = 5928-5316 BC (OxCal 4.2 at 93.5%), on bone from Pit 2 – Median 5620 BC.
- GrN-19839 6540±60BP = 5617-5461 BC (OxCal 4.2 at 80.0%), on bone from Pit 5 – Median 5540 BC.

This Early Neolithic site is dated between 200-300 years earlier than the Impressed Ware site of Faenza Fornace Cappuccini established some 120 km to the east.

Fontanelle di Pescara (26) – This Early Neolithic open-air site south of Pescara in Abruzzo, is a near-coastal site which was excavated in 1977 by A. Radmilli and M. Giove over a reduced surface of 4x1 m. down to a depth of 1.5 m.

The excavations produced a large quantity of daub, pottery and lithics, all devoid of stratigraphic context. Other test trenches were equally unsuccessful in establishing a stratigraphy. The pottery is Impressed Ware. The lithics are mostly flake and the blades are of poor quality, often with non-faceted striking platforms. The site has been described as more recent than that of Tricale (Ducci S. & Perazzi P., 1987).

The lithic assembly at this site has been described as microlithic with geometrics (isosceles, scalene and rectangular trapezes, sometimes with concave truncations and *piquant trièdre*, used as sickle inserts), and the microburin technique (Grifoni Cremonesi R., 2003: 129). F. Martini (1996: 45) sees in the lithic assemblage evidence for the Mesolithic substrate, although the non-standardisation of the Neolithic industry could be due to evolutionary stresses.

This is one of the numerous settlements dating from the Early Neolithic found along the coast which may have included elements of the Mesolithic population.

Grotta Bella (19) – This cave site is located 2 km from the hamlet of Santa Restituta, some 12 km from Avigliano in Umbria, at 530 masl, on the Tyrrhenian side of the Apennines. It was excavated between 1970-1974. The earliest levels are Neolithic.

The earliest date (without a laboratory ref.) is (Manfredini A., *et al*., 2005):

- XXX 6372±90BP = 5515-5206 BC (OxCal 4.2 at 92.1%) – Median 5360 BC.

Being on the western side of the Apennine water divide, this Early Neolithic site need not be considered for this study.

Grotta dei Piccioni (28) – This inland cave site in Abruzzo, close to Bolognano, was excavated between 1957-1965 by A Radmilli and R. Grifoni, who published a date in 1968 without quoting the laboratory ref. (Grifoni Cremonesi R., 1998):

- XXX 6247±132BP = 5477-4900 BC (OxCal 4.2 at 94.9%) – Median 5190 BC.

The cave was used as a pen in the Neolithic. The lithic assemblage is not microlithic and has similarities with Neolithic sites of Apulia (Guilaine J. & Cremonesi G., 2003: 296), with obsidian from both Lipari and Palmarola representing 1.4% of the lithic assemblage, which A. Pessina and G. Radi (2006: 441) believe arrived via a trans-Apennine route. Early impressed ware was found in the lowest level, and the bone tools show similarities with those from Maddalena di Muccia in the Marche, as well as Colle Santo Stefano in the Fucino Basin (Legrand A. & Radi G., 2008: 306 and Fig 1).

We appear to be in the presence of a cave site first used in the Early Neolithic by Neolithic migrants as a pen, having moving north from Apulia. There are probably indications of a trans-Apennine exchange route, possibly via the Fucino Basin, and the similarities noted with Maddalena di Muccia are possibly caused by the same migrational movement, which reached the Marche several centuries before the date indicated above for this site. There appears to nothing at this site connecting it with the Transition.

Grotta San Angelo (21) – This cave, now a sanctuary, is located at Ripe di Civitella del Tronto, in Abruzzo, close to the Marche border, at *ca*. 600 masl. It was excavated between 1965-1966, and has a stratigraphy commencing in the Impressed Ware Early Neolithic (Bagolini B., *et al*., 1991: 100; Grifoni Cremonesi R., 2003). The lithic technology is without microliths (Guilaine J. & Cremonesi G., 2003: 296), whilst containing 2.4% obsidian (Pessina A. & Radi G., 2006: 441). The faunal assemblage in the Early Neolithic, excluding aquatic, land snails and avifauna, is 92% domesticated (ovicaprines 49%, suids 33% and bovines 10%), whilst the wild fauna is mostly red deer (Rowley-Conwy P., *et al.*, 2013: 166, quoting Wilkins, 1987).

This site, for which there appear to be no dates, does not have any indication of a Mesolithic substrate.

Gubbio/San Marco di Gubbio (11) – This site, or series of sites, in the north-east corner of Umbria, on the west side of the water divide, are located at *ca*. 430 masl on terraces and colluvial deposit fans, and extend over several kilometres. The Neolithic settlements, of which that of San Marco di Gubbio (discovered in 1985 by M. Coltorti), appear to continue the Mesolithic exploitation of these prime areas, showing a marked continuity in the hunter-gatherer lithic tradition (Malone C., 2003: 281). The Impressed Ware at San Marco di Gubbio appears to be characterised by attributes of Tyrrhenian and Adriatic origin, according to S. Arrighi *et al*., in a paper presented at a Neolithic conference in Florence March 5-7, 2009.

In the Early Neolithic the faunal assemblage (excluding, aquatic, land snails and birds) is 94% domesticated (ovicaprines 42%, suids 29%, bovines 33%) and 6% wild (red deer 1%, roe deer 4%, wild boar 1%, Ibex/chamois 0%) (Rowley-Conwy P., *et al.*, 2013: 166 table 9.2 quoting Clark 1992).

The dates for this site are all quoted without laboratory references (Grifoni Cremonesi R, 1998; Manfredini A., *et al*., 2005):

- XXX 6430±80BP = 5535-5286 BC (OxCal 4.2 at 91.5%) – Median 5410 BC.
- XXX 6270±70BP = 5380-5039 BC (OxCal 4.2 at 94%) – Median 5210 BC.
- XXX 5750±70BP = 4770-4454 BC (OxCal 4.2 at 95.4%) – Median 4610 BC.

Although there is not much to go on in these brief notes, there is a strong likelihood of population continuity between the Mesolithic and Neolithic in this area. The fact that the Impressed Ware pottery has characteristics from both the western and eastern seaboards can be interpreted as the action of eclectic choice by a Mesolithic population completing the Transition, who appear to have also maintained traditional aspects of their lithic technology (Malone C., 2003: 281).

Imola Ospedale Nuovo (1) – This site in Emilia Romagna is the north-westernmost Adriatic Impressed Ware site discovered.

According to A. Antoniazzi, *et al*., (1987: 562) there are no elements of a Mesolithic tradition in the lithic assemblage.

Lugo di Romagna/Lugo di Ravenna (2) – This Early Neolithic Fiorano Culture site west of Ravenna just beyond the northern limit of this Region had already been established a couple of centuries when the Impressed Ware Culture Neolithic migrants arrived up the Adriatic coast.

R. Skeates and R. Whitehouse (1997-1998), who refer to Lugo di Ravenna, have supplied the following dates:

- R-2747 6626±110BP = 5730-5370 BC (OxCal 4.2 at 95.4%), on charcoal, US 367 – Median 5550 BC.
- R-2748 6585±87BP = 5663-5372 BC (OxCal 4.2 at 95.4%), on charcoal, US 987 – Median 5520 BC.
- R-2746 6161±39BP = 5216-5002 BC (OxCal 4.2 at 95.4%), on charcoal, US 973 – Median 5110 BC.

Maddalena di Muccia (17) – This Early Neolithic site, close to the Umbrian border in the Marche, is located some 60 km from the sea, a couple of km south of Muccia, at the foot of the 750 masl pass crossing the Apennines. The site, 460 masl, is located on an alluvial terrace of the Gelana River, which continues to the confluence with the River Chienti about 1 km further downstream on the first alluvial terrace below the pass (Fig. R20-5). 60 m^2 were excavated between 1962-1965 by D Lollini, and a further 450 m^2 were excavated between 2001-2003 by M. Silvestrini (Fig. R20-6). The first occupation of the site was in the Early Neolithic and continued into the Metal Ages (Silvestrini M, *et al*., 2005: 224). The site needs to be interpreted in conjunction with the site of Luciano of Pievetorina, 3 km further upstream, occupied episodically during the Mesolithic and Early Neolithic. The location of the site on the trans-Apennine route partly explains the presence of several tens of pieces of obsidian from

both Lipari and Palmarola discovered at the site (Manfredini A., *et al*., 2005; Pessina A. & Radi G., 2006: 441; Silvestrini M., *et al*., 2005: 227).

The earlier excavations produced a median date of *ca*. 5550 BC (Alessio M., *et al.*, 1970: 604; Biagi P., *et al*., 1993; Manfredini A., *et al*., 2005; Skeates R., 2003):

- R-643 6580±75BP = 5641-5461 BC (OxCal 4.2 at 87.7%) – Median 5550 BC.
- R-643a 6580±70BP = 5638-5464 BC (OxCal 4.2 at 90.3%) – Median 5550 BC.

Calibrating using OxCal 4.2 produces a date 50 years older than OxCal 4.1, and these newly calibrated dates are closer to the dates from the more recent excavations.

The more recent excavations produced 3 dates (with no laboratory refs.), suggesting a date closer to 5600 BC using OxCal 4.2 (Conati Barbaro C. & Silvestrini M., 2005):

- XXX 6638±75BP = 5675-5475 BC (OxCal 4.2 at 93.9%), Stratum US114 – Median 5575 BC.
- XXX 6637±83BP = 5716-5472 BC (OxCal 4.2 at 95.4%), Stratum US114 – Median 5595 BC.
- XXX 6440±50BP = 5482-5322 BC (OxCal 4.2 at 95.4%), Stratum US114 – Median 5400 BC.

The lithic assemblage is mostly on flint from Marche (Biagi P., *et al.*, >2010); that from the older excavations contains elements of the Castelnovian Mesolithic tradition, such as triangles, lunates, scalene and isosceles microlithic trapezes, notched blades and the use of the microburin technique (Fig. R20-5) (Grifoni Cremonesi R., 2003; Silvestrini M. & Pignocchi G., 2005). In analysing the lithics from the later excavation, G. Radi, *et al*., (2005: 238) identified lithics dating from the Palaeolithic, as well as from the Initial Neolithic and later periods; the geometrics include lunates, very few triangles and rhomboids, but primarily trapezes, mostly scalene, although rectangular ones are present as well as a few isosceles trapezes. Several sickle inserts with the remains of mastic and silica gloss were also found (Fig. R20-5). Two types of debitage have been identified, with one based on flake production and the other on blade production during the Initial Neolithic.

Regarding the bone tools, which include two partial fish-hooks, A. Legrand and G. Radi (2008: 306) see similarities with the Early Neolithic site of Colle Santo Stefano in the Fucino Basin.

The faunal assemblage of the earlier excavations, as reported by Wilkins (2002) comprises 69% domesticated animals with suids (44%, but the fragmentary nature of the assemblage made the attribution between domesticated and wild difficult), followed by ovicaprines (20%) and bovines; there is a relatively high incidence of wild fauna (31%, possibly excluding some suids), which is made up primarily of *Cervus elaphus*, followed by *Capriolus capriolus* and *Sus Scrofa* and small game. D. Lollini, (1991), referring to the earlier excavations gives the faunal rations as 49% suids (domesticated and wild), 15.28% ovicaprines, 6.36% bovines and *ca*. 28% wild. Given the small percentage of ovicaprines and bovines, the wild fauna probably represents over 50% of the assemblage if the suids are split 50/50 between wild and domesticated.

These ratios differ in the later excavations, and the figures reported for wild fauna are substantially lower; In the Early Neolithic the faunal assemblage (excluding, aquatic, land snails and birds) is 85% domesticated (ovicaprines 18%, suids 59%, bovines 8%) and 15% wild (red deer 12%, roe deer 3%, wild boar 0%, Ibex/chamois 0%) (Conati Barbaro C. & Silvestrini M., 2005: 214, referring to Corridi, 2005; Rowley-Conwy P., *et al.*, 2013: 166 Table 9.2 quoting Wilkins, 1987). It is unlikely that all the suids are domesticated, so that a redistribution of this species would probably confirm the approximately 30% wild fauna component reported for the earlier excavations.

Whilst this site is fully Neolithic, with clear evidence for agriculture, polished stone tools, Early Impressed Ware, bone implements including fish hooks, and a permanent settlement, the lithics, which include a strong Mesolithic content, suggests, with the high percentage of hunted fauna, that there is a strong acculturated Mesolithic element at this site, which is not only located at the foot of the Trans-Apennine route, but also in an ecotone on the last alluvial terrace at the foot of the mountains where game could be hunted. There needs to be a logical explanation for such an early Neolithic site at such a distance from the sea, when plenty of alluvial terraces were available within 10-20 km of the coast. This site can to a certain extent be compared to that of Capo d'Acqua and may possibly have been established either by the acculturated autochthonous population or by Neolithic migrants who

incorporated the local population, whose ancestors could have established the Mesolithic site of Luciano of Pievetorina, 3-4 km further upstream.

Marcianese/Marchinese (31) – This Early Neolithic Impressed Ware site is located at Marcianese, near Lanciano, province of Chieti, Abruzzo, some 20 km from the coast, at 350 masl.

The earliest date for this site is (Grifoni Cremonesi R., 1998; Skeates R., 2003):

- BM-2250R 6590±130BP = 5736-5309 BC (OxCal 4.2 at 95.4%), associated with Impressed Ware and Incised Ware – Median 5525 BC.

Although J. Guilaine and G. Cremonesi (2003: 296), quoting Moroni, Lanfredini and Ronchitelli (1997) state that this site has no microlithics, A. Barra, *et al*., (1990) indicate that the trapezes from the Early Neolithic levels 22-24 are larger than those from Grotta Continenza. Obsidian from both Palmarola and Lipari represents 0.3% of the lithic assemblage, suggesting a trans-Apennine contact (Pessina A. & Radi G., 2006: 441).

The fact that trapezes exist at this site suggests there might have been some sort of contact with the autochthonous hunter-gatherer population.

Marina di Focara (9) – Early Neolithic coastal site north-west of Cattólica in Romagna, close to the border with Marche (Manfredini A., *et al*., 2005). This is one of at least four Early Neolithic sites in close proximity south of Rimini.

This site has not been excavated and is only analysed from surface collections (Conati Barbaro C. & Silvestrini M., 2005).

Miramare di Rimini (6) – There are three Early Neolithic Impressed Ware unexcavated and undated surface finds between 3 and 5 km from the coast behind Miramare di Rimini, in South-Eastern Romagna, numbered I, II and X, of which Site I is the most important (Bagolini B., *et al.*, 1991).

Site I, discovered in 1980, is located 30 masl about 5 km from the current coastline, on the left bank of the Marano Torrent, which spills into the sea south of Miramare. Coarse Ware, Fine Ware and Impressed Ware was collected as well as 90 lithics and some faunal remains. Of the 90 lithics, almost exclusive made of flint from some 80 km to the south-east in the Marche, 30 were retouched tools, most of which were blade-based and which include 7 trapezes, 2 sickle inserts, retouched blades, but no end-scrapers. The large faunal remains include MNI of one domesticated bovine, one red deer, one roe deer and two wild boars. In addition, a few pieces of daub with the impression of split semi-circular wood on one side and smooth on the other attest to the construction of huts (Bagolini B., *et al.*, 1991: 59-65, 108-109).

There appears to be a strong element of the Mesolithic substrate in the composition of the lithics and faunal assemblage, even if the latter is based on limited data (Antoniazzi A., *et al.*, 1987: 562; Bagolini B., *et al.*, 1991: 113; Guilaine J. & Cremonesi G., 2003: 296, quoting Bagolini B. *et al*., 1989).

Sites II and X are close-by, but shed no light on the Transition (Bagolini B., *et al.*, 1991: 66-67, 75-76). Site IV could be a Fiorano Culture settlement, and might therefore be the most southerly attestation of this Early Neolithic culture (Bagolini B., *et al.*, 1991: 102), but again, it sheds no light on the Transition.

Misano Adriatico (8) – Undated Early Neolithic Impressed Ware site near the coast in Romagna. The site produced microliths and trapezes of Mesolithic tradition (Antoniazzi A., *et al.*, 1987: 562; Guilaine J. & Cremonesi G., 2003: 296, quoting Bagolini B. *et al*., 1989).

This is one of the four Early Neolithic sites known in South-Eastern Romagna, south of Rimini and as with the other sites, suggests either contact with, or the incorporation of Mesolithic elements.

Monte Capone di Jesi (14) – Early Neolithic near-coastal site in the Marche west of Ancona, mentioned by Manfredini A., *et al*., (2005).

The site has been the subject of a test dig (Conati Barbaro C. & Silvestrini M., 2005).

Monte Colombo di Sirolo (16) – Early Neolithic site in the Marche west of Ancona, mentioned by A. Manfredini, *et al*., (2005).

This coastal site was excavated by Dall'Osso in 1915, when a hut was exposed with Impressed Ware (Conati Barbaro C. & Silvestrini M., 2005).

Monte Maulo (34) – This open-air site is the earliest known Early Neolithic Impressed Ware site in Molise. It is located some 20 km up the Biferno Valley (G. Barker, 1995).

The dates given by G. Barker (1995: 105) are:

- OxA-651 6540±80BP = 5628-5357 BC (OxCal 4.2 at 95.4%), on cattle bone – Median 5495 BC.
- OxA-652 6280±70BP = 5383-5051 BC (OxCal 4.2 at 92.3%), on cattle bone – Median 5220 BC.
- OxA-653 6210±70BP = 5321-4989 BC (OxCal 4.2 at 95.4%), on cattle bone – Median 5155 BC.
- HAR-2710 5930±100BP = 5057-4546 BC (OxCal 4.2 at 95.4%), on charcoal from site – Median 4800 BC.

There is no indication that the 200 pieces of chipped stone, mostly on poor quality local chert, included elements of Mesolithic tradition. The limited excavations appear to indicate that this site on a low hill was established by a small farming community who set up a flimsy wattle and daub structure over a pit dwelling.

The faunal assemblage is 100% domesticated with 77% bovines, 14% suids and 10% ovicaprines (Rowley-Conwy P., *et al.*, 2013: 166, table 9.2 quoting Barker & Clark 1995).

G. Barker (1995: 100) makes the point that most of the Mesolithic finds in Molise were made in the lower valley during the surveys his team undertook, suggesting that the focus of settlements in the Mesolithic Early Holocene was along the coast, and as R. Grifoni Cremonesi (2003: 128) also suggests, these sites may have been drowned due to the eustatic sea rise.

There are no indications of the Transition at this site.

Monteprandone Colle Appeso (22) – This near-coastal open-air Early Neolithic site, mentioned by A. Manfredini, *et al*. (2005), is located in Marche, a few kilometres inland just north of the border with Abruzzo.

The site has been subject to a test dig (Conati Barbaro C. & Silvestrini M., 2005).

Piana di Calisti di Esanatoglia (13) – This Early Neolithic site is located inland at 380 masl in Marche, up the Esino River Valley from Maddalena di Muccia.

This site has not been excavated and is only analysed from surface collections (Conati Barbaro C. & Silvestrini M., 2005). A Ripabianca burin was found, as well as a single microburin, and the site has been considered to be a Late Impressed Ware site (Pessina A., 2000: 83; Silvestrini M. & Pignocchi G., 2000).

Portonovo di Ancona (15) – This Initial Neolithic site is located south of Ancona, in Marche, on the south side of a hill, facing the sea, about 150 masl in a naturally protected position from the winds, along a small watercourse.

A test dig was undertaken, and A. Manfredini, *et al*., (2005) supply a date without quoting the laboratory ref., which is the earliest in Marche:

- XXX 6885±50BP = 5881-5671 BC (OxCal 4.2 at 95.4%) – Median 5775 BC.

Two occupational phases have been distinguished, the earliest of which dates to the Central Adriatic Impressed Ware. The lithic assemblage is not vast, manufactured on local flint and is turned towards blades rather than flakes. The tools include a scalene trapeze, a notched blade (plus undiagnostic material) as well as an obsidian bladelet (Silvestrini M., et al., 2000: 344).

A sherd of Tyrrhenian Impressed Ware suggests contacts across the Apennines (Conati Barbaro C. & Silvestrini M., 2005: 214).

The presence of a trapeze, as well as a notched blade, could indicate contact with local hunter gatherers, or their incorporation into the settlement. The sherd of Tyrrhenian Impressed Ware and the obsidian confirm long distance contacts, so that some sort of contact with the autochthonous hunter-gatherers is quite possible.

Riccione (7) – This is an Initial Neolithic Impressed Ware site on the coast south of Rimini in Romagna, which was excavated between 2008-2009. The site, 12 masl, between Via Berlinguer and Via Flaminia, which was excavated over a surface of *ca*. 15000 m^2, is located between the sites of Miramare di Rimini and Misano Adriatico on palaeodunes. The site, which was occupied until the Bronze Age, saw some of its structures destroyed in a conflagration during the Neolithic (Gobbo I., 2000: 168-170).

At the time of initial occupation, it was close to the River Melo. The undecorated Impressed Ware pottery has been compared to that from the site of Imola-Ospedale Nuovo. The southern sector was protected by a palisade running east-west recognised from charcoal remains, which produced a date for which no laboratory ref. was supplied (Bernabò Brea M., *et al*., 2011; Gobbo I., 2000):

- XXX 6422±50BP = 5473-5344 BC (OxCal 4.2 at 95.4%), on charcoal from the palisade – Median 5410 BC.

The median date for this site is approximately two centuries later than that for Maddalena di Muccia to the south, and about half a century earlier than that for Faenza Fornace Cappuccini to the north.

Ripabianca di Monterado (12) – This Impressed Ware Early Neolithic site is located in the Marche, north of Ancona, some 10 km inland from the coast, on an alluvial terrace on the right bank the River Cesano, 40 masl (Fig. R20-7). The excavations, under D. Lollini, between 1962-1964, covered a limited surface. The pit structures have been variously interpreted (Fig. R20-7), but the remains of daub that were found attest habitations (Lollini D., 1991: 60; Spataro M., 2002).

The dates for this site are quoted below, the numbering is slightly different in the publication by M. Alessio *et al*., (1980), without invalidating the sequence (Alessio M., *et al.*, 1970: 603; Bagolini B., *et al.*, 1991; Hameau P., 1987; Manfredini A., *et al*., 2005; Skeates R., 2003):

- R-599 6260±85BP = 5383-5001 BC (OxCal 4.2 at 92.5%), on charcoal from pit – Median 5190 BC.
- R-598a 6210±75BP = 5324-4962 BC (OxCal 4.2 at 95.4%), on charcoal from pit – Median 5145 BC.
- R-598 6140±70BP = 5233-4905 BC (OxCal 4.2 at 90.9%), on charcoal from pit – Median 5070 BC.

The lithics are abundant, mostly made of local flint from Marche, and the amount of debitage suggests a knapping area. The presence of Ripabianca burins suggests contacts with the Fiorano Culture to the north in Emilia Romagna, and the trapezes, microburins, Montbani blades and backed pieces recall the Castelnovian Mesolithic (Fig. R20-7). Obsidian is more abundant than at Maddalena di Muccia, and appears to originate from Lipari, suggesting contacts across the Apennines (Conati Barbaro C. & Silvestrini M., 2005; Manfredini A., *et al*., 2005; Rosini M. & Silvestrini M., 2006; Silvestrini M. & Pinocchi G., 1998; Spataro M., 2002: 142-153).

The pottery is better quality than that found at Maddalena di Muccia, and includes a sherd of painted ware. Baked clay objects include three cylindrical heads (Conati Barbaro C. & Silvestrini M.,

2005; Silvestrini M. & Pinocchi G., 1998) which, with forms reminiscent of the Danilo and Vasi a Tulipano cultures on the eastern seaboard of the Adriatic, attest to trans-Adriatic contacts (Rosini M. & Silvestrini M., 2006).

Two inhumations in supine positions in pits, without grave goods, (one of an old man and another of a mature female) and the disturbed remains of a child burial close to the pit structures (Fig. R20-7) suggest as yet unformalised burial practices (Manfredini A., *et al*., 2005), which can be compared to the Mesolithic Sicilian burials and more generally speaking of Mesolithic tradition, since the Neolithic tradition from the Near East is for burial in a flexed lateral position.

In the Early Neolithic, the faunal assemblage (excluding, aquatic, land snails and birds) is 92% domesticated (ovicaprines 65%, suids 21%, bovines 6%) and 8% wild (red deer 5%, roe deer 3%, wild boar 0%, Ibex/chamois 0%) (Rowley-Conwy P., *et al.*, 2013: 166 table 9.2, quoting Wilkins, 1987).

Collection is attested by the presence of carbonised wild apples, and agriculture by sickle inserts and well used querns and grinding stones, confirming prolonged use.

The earliest date gives a median of 5190 BC, which is 400 years later than the earliest median date from Maddalena di Muccia. There is strong evidence for contacts across the Apennines, with the eastern seaboard of the Adriatic and to the north with the Fiorano Culture, and if we assume the Neolithic settlers came from the south, the four points of the compass are represented. The burial practices attested could harp back to the Mesolithic, as could some of the lithic assemblage, so that whilst this is a fully Neolithic site, there appear to be some transitional elements due to either contact and/or inclusion of Mesolithic elements in the population. The 400 year time gap between the earliest dates from this site and those from Maddalena di Muccia also suggest that numerous Early Neolithic and Transition sites on alluvial terraces along the many rivers coming down from the Apennines probably remain undiscovered.

San Rocco di Cantiano (10) – This Early Neolithic Impressed Ware site is located in Marche, close to the Umbrian border.

According to M. Silvestrini and G. Pignocchi (2000) it dates to an advanced stage of the Impressed Ware Culture towards the end of the 6th millennium BC. Furthermore, this site has not been excavated and has only been analysed from surface collections (Conati Barbaro C. & Silvestrini M., 2005).

Torre Sinello (32) – This Initial Neolithic Impressed Ware site is located near the coast, up a watercourse, at the southern end of Marche, close to the border with Abruzzo.

The lithic industry with its microlithic industry including blades, trapezes (some used as sickle inserts) and the microburin technique, harps back to the Mesolithic tradition (Grifoni Cremonesi R., 2003: 129), suggesting a Mesolithic component in the settlement and/or contact and exchanges with the autochthonous hunter-gatherer population.

Tricale (27) – This Initial Neolithic Impressed Ware site is located 20 km from the coast south of Pescara in Abruzzo. It appears to be undated, but could be earlier than Fontanelle di Pescara, which is also undated, with pottery from the Early Impressed Ware as well as some which is not so early (Ducci S. & Perazzi P., 1987: 652).

The lithics, which are made up of microlithics, trapezes, the microburin technique, backed pieces, a low level of laminarity, with the few blades being mostly unretouched (Barra A., *et al*., 1990; Ducci S. & Perazzi P., 1987; Grifoni Cremonesi R., 2003), could be indicative of a Mesolithic substrate, or due to Neolithic evolutionary stresses (Martini F., 1996: 45).

Villaggio Leopardi (24) – This is an Impressed Ware Early Neolithic settlement at Penne di Pescara, some 30 km inland at 410 masl, in Abruzzo.

The, date (Alessio M., *et al.*, 1970; Conati Barbaro C. & Silvestrini M., 2005; Skeates R., 2003, quoting Ferrara *et al*., 1961; Grifoni Cremonesi R., 1998; Malone C., 2003) is:

- Pi-101 6578±135BP = 5744-5296 (OxCal 4.2 at 95.1%) – Median 5520 BC.

This Early Neolithic site has sunken domestic structures, agriculture and a lithic assemblage without microliths (Malone C., 2003: 258, quoting Cremonesi G., 1966; Guilaine J. and Cremonesi G., 2003: 296).

This fact that this site produced no microliths, suggests that it was established by migrants who did not incorporate hunter-gatherers and/or their lithic technology in their assemblage, as compared to the majority of sites. The sunken habitation structures are also prevalent in the Starčevo Early Neolithic Culture of the Central Balkans (Region 10), suggesting there might have been some affiliation between this site and the eastern seaboard of the Adriatic.

Villa Laureate (23) – This Early Neolithic coastal site in Marche is located on a river near the border with Abruzzo (Manfredini A., *et al*., 2005).

The site has been subject to a test dig (Conati Barbaro C. & Silvestrini M., 2005).

Southern Italy and West Adriatic Seaboard – Molise to Romagna – Conclusions

This Region is marked by the small number of cave sites, giving the impression that it was thinly populated during the Mesolithic. Given the impermanence of the structures of mobile societies and subsequent anthropic activity, it is not surprising that Mesolithic sites should be hard to find, yet some lithic scatters have been identified near springs (Fonte Chiarano), near water courses (Capo d'Acqua and Luciano di Pievetorina), close to lakes (San Lorenzo di Civitanova del Sannio), close to sources of raw material (Piano delle Cinquemiglia) and near coastal, when prospections have been undertaken, such as that under G. Barker (1995), in the lower valley of the Biferno River in Molise. This last is important because it also suggests that, as in other Regions, the Mesolithic population spent much of their time close to the sea (e.g. Grifoni Cremonesi R., 2003: 128) to exploit the resources of the wetlands and of the sea, but that these sites on the coastal plain have either been drowned by the eustatic sea-rise or buried under subsequent sedimentation.

It is also possible that large game was either scarce or its capture unpredictable, so that base camps may have remained close to the shore, where the coastal zones (sea, wetlands and forests) assured a regular subsistence diet (plant, shoreline collecting, fishing, small and large game, fowling, etc.). We will see that in the Fucino Basin (Region 21), deep in the Abruzzo Apennines, there is a marked Mesolithic presence (almost entirely evidenced in cave-sites), which could in part be due to the possibility of exploiting of the aquatic resources in the large lake.

If many of the hunter-gatherer settlements were coastal or near-coastal during the Mesolithic, we can expect these to have come rapidly into contact with the farmers migrating north-westward up the coast over the centuries, whether on foot or via navigation. As in other Regions, the Neolithic attributes immediately attractive would have been meat protein ('game in the pen') and pottery, but with no stratified Mesolithic sites, this can only be surmised. The Neolithic site at Capo d'Acqua is a reasonably clear candidate for having been established by acculturated hunter gatherers, whose ancestors had established the Mesolithic site nearly; unfortunately, we have no dates for either site.

The move north from the Tavoliere into Molise, just north of Apulia, is only attested in that Italian region by the dated site Monte Maulo *ca*. 5500 BC and the lithic scatter of San Lorenzo di Civitanova del Sannio. This date is over half a millennium after the first appearance of Neolithic migrants in Apulia, which is an extraordinarily long pause in the Neolithic expansion, although it can be compared to that in the Transdanubia (Region 12) where the reasons are more comprehensible. In fact there are substantially earlier dates in the Fucino Basin and in Central Marche sometime between 5850 and 5600 BC, with a median of 5750 BC. The earliest median dates from south to north in the Italian regions show up as follows:

In Molise:

- 5495 BC at Monte Maulo.

In Abruzzo, (The dates exclude Region 21- the Fucino Basin, where the Initial Neolithic sites of Colle Santo Stefano and Rio Tana have earliest Median dates for the Initial Neolithic of *ca*. 5750 BC):

- 5850 BC at Capo d'Acqua;
- 5525 BC at Marcianese;
- 5520 BC at Villaggio Leopardi.

In Southern and Central Marche:

- 5775 BC at Portonovo di Ancona;
- 5495 BC at Maddalena di Muccia.

In Northern Marche:

- 5550 BC at Lugo di Romagna;
- 5200 at Ripabianca di Monterado.

In Umbria:

- 5410 BC at Gubbio.

In Romagna:

- 5410 BC at Riccione;
- 5340 BC at Faenza - Fornace Cappuccini.

What to make of this disparity in the dates? Several possibilities come to mind, but none of these will on its own supply the answer, which will no doubt be a combination of factors, including some not noted below:

- A large number of sites are undated and others are yet to be discovered;
- There was a leap-frog Neolithic migration up the coast;
- Some inland sites, many of which are on trans-Apennine routes, have substantially earlier dates than all but one coastal or near-coastal sites, and benefitted from contact with both sides of the Peninsula and with Neolithic groups installed elsewhere, so that some migrants may have arrived from the Tyrrhenian side, such as has been indicated for the site Gubbio, although the Impressed Ware styles do not appear to lend much support to this hypothesis at other sites;
- Some of the migrants came from the Eastern shore where the Istrian Peninsula had been reached by Neolithic navigators by 5800 BC. This is suggested by the presence of cult objects at Ripabianca di Monterado, similar to those found on the Eastern Adriatic shore;
- If the dates from the inland sites are ignored, as well as that from Portonovo di Ancona, then there appears to be less than 200 years between the first Neolithic evidence in the south and that in the north of the Region.

If the bulk of the median dates can be seen to be between 5550 and 5350 BC, it should be borne in mind that calibration spread can add up to 200 years on either side. There is however no question about the fact that progress up the eastern seaboard of the Adriatic was more rapid, probably due in large part to the nature of the terrain, and that when the Western Adriatic Impressed Ware culture reached Romagna sometime about 5400 BC, it came into contact with the Fiorano Culture, which had already been evolving in the River Po Basin for some 200 years.

Many of the Initial Neolithic sites of this Region show clear signs of having incorporated Mesolithic elements, as seen in the lithic assemblage and the percentage of hunted game as against domesticated species. Of the four sites that do not, two (Grotta dei Piccioni and Grotta San Angelo) are special purpose cave sites, whilst the other two (Monte Maulo and Villaggio Leopardi) are Neolithic settlements with undisputed evidence for pit-dwellings. Monte Maulo is close to Apulia, and could have been set up by fully Neolithic migrants who did not have far to move to this inland location. Villaggio Leopardi is also an inland site, 30 km from the coast in Central Abruzzo, and is exceptional in demonstrating that an Early Neolithic site in this region does not necessarily have to incorporate elements of the Mesolithic substrate, thereby possibly adding weight to the premise that the hunter-gatherer substrate was an active player in the Transition to the Neolithic. There are also a couple of

Terminal Mesolithic/Transition sites (Capo d'Acqua and San Lorenzo di Civitanova del Sannio). Trans-Apennine contact is also attested at a number of sites by the presence of pottery from the other side and/or obsidian from Lipari. With no evidence for violent confrontation visible in the few inhumations found, it can only be assumed that the transition from the Mesolithic lifeways to those of the Neolithic occurred peacefully over an extended period of time.

Two other points of interest need to be noted. One is the presence of pit structures at the Early Neolithic sites of Monte Maulo, Ripabianca di Monterado and Villaggio Leopardi, which find parallels in the Central Balkans. The second is the presence of plain undiagnostic pottery sherds at the site of Petriolo III in a clearly Mesolithic context dated between 6500-6096 BC (Median 6300 BC); how the hunter-gatherers acquired the pottery can only be surmised, but a similar situation occurred at Grotta dell'Uzzo in Sicily (Region 19) at an earlier date, and both situations could be due to navigators having either brought the pottery or the technology from North Africa.

Region 21 – Southern Italy and West Adriatic Seaboard – The Fucino Basin

(Map R21)

Southern Italy and West Adriatic Seaboard – The Fucino Basin – General introduction

The Fucino Basin, *ca*. 650-700 masl, is in the province of L'Aquila in the Apennines of the Italian region of Abruzzo. It is a tectonic basin without a natural outlet, so that until historical times, starting with the Roman Emperor Augustus (Fig. R21-1), when attempts were made to drain the lake, the centre of the depression was occupied by a lake of *ca*. 140-160 km^2, rich in aquatic resources, which fluctuated substantially in depth and surface area dependant on long-term weather patterns. It is estimated that during the LGM, the lake was *ca*. 50 m deep. The limestone hills surrounding the basin are karstic and contain numerous caves, especially to the south and west, many of which were used in prehistoric times. The post-glacial evidence for the occupation of the region is largely confined to cave sites which contain stratigraphic sequences, which in the best of cases extend into the Neolithic. Stratified open-air sites only appear with the Neolithic.

Human presence in the Fucino Basin is attested from the middle Palaeolithic. In the Early Holocene, when large game started to become scarce, anthropic stratified deposits begin to include small game, birds and fish, and the population appears to become more sedentary, compared with the mobility of the Pleistocene populations (Grifoni R. & Radmilli A., 1964: 116-118). The same authors also believe that caves were progressively abandoned during the global warming in the Early Holocene, *ca*. 8000 BC, and that the population established open-air sites near the lake, as their lithic industry became microlithic.

Pollen cores and dated peat samples indicate that between approximately 8400-7000 BC, the weather was relatively dry and moderately warm, favouring the development of transition vegetation complexes with juniper and pine forests, with the addition of thermophile species including deciduous oak (Lubell D., *et al*., 1999: 467, quoting Vernet, 1991).

The region is rich in evidence for human presence in the Post-Glacial, Mesolithic, Transition as well as the Early Neolithic, in contrast to the 450 km of coastline and its hinterland, between the northern Apulian border and the most northerly extent of the Adriatic Impressed Ware at Imola in Romagna, where little evidence has been found for the Late Mesolithic.

The Fucino Basin appears to be on a trans-Apennine trade/exchange and communication/migrational route between the Adriatic and the Tyrrhenian coasts, with more evidence for obsidian from Palmarola than has been found on the Adriatic coast (Pessina A. & Radi G., 2006: 441).

There are a number of caves in which the occupation appears to end prior to the advent of the Neolithic, but others show continuing occupation, even if in many cases a hiatus exists between the last hunter-gatherer occupation and the first occupation which includes Neolithic attributes, which often appears to be sporadic.

The earliest Neolithic open-air sites have been found on the south side of the basin, mostly close to each other (Barra A., *et al*., 1990: 73; Radi G., *et al*., 2001).

Southern Italy and West Adriatic Seaboard – The Fucino Basin – Mesolithic and Transition sites – Introduction

The key site is undoubtedly Grotta Continenza di Trasaco, which has a deep stratigraphy and been the subject of painstaking excavations over several decades, but we will list some other sites where a Post-Glacial presence has been attested.

Grotta Continenza di Trasaco (3) – This cave which sits above the small town of Trasaco, on the south side of the Fucino Basin, on the flank of Monte Labrone at the base of an escarpment at 720 masl, has a sweeping view over the Fucino Basin (Fig. R21-2). The site, with its complex stratigraphy, has been the subject of excavations under R. Grifoni Cremonesi for decades, and have recently been resumed, with a particular view to clarifying questions regarding the Transition and Initial/Early Neolithic (Figs. R21-3 & R21-3a).

The stratigraphy covering the Late Mesolithic and Initial Neolithic or Transition (Fig. R21-3) has been described by A. Barra, *et al*., (1990: 38):

- Levels 20 and above, the industry becomes more obviously a Neolithic blade industry with obsidian representing 3.8% of the assemblage. Above the Mesolithic levels are 2 m of deposits containing Impressed Ware, indicating they were put down fairly rapidly. The microburin technique continues to be present for a while;
- Levels 21-22 Initial Neolithic/Transition;
- Level 23, 15 cm thick, contained hearths and Impressed Ware;
- Level 24, 20 cm thick, contained a large hearth and few sherds;
- Levels 25-27, 20-30 cm thick, containing hearths, macrofauna, microfauna, *helix*, fish remains and Mesolithic lithics;
- Levels 28-29, 20 cm thick, contained hearths, *helix* shells, microfauna and little lithic industry;
- Level 30, 1 m thick is made up of rock fall.

In levels 20-24 there is a prevalence of microlithics with trapezes and the microburin technique (Fig. R21-2a); the faunal assemblage is predominantly wild, dominated by red deer, with only a few ovicaprines, confirming the continuing occupation of the site by hunter-gatherers during their Transition to Neolithic lifeways during which they acquired 'game in the pen'; the Impressed Ware has incised decorations. It is possible that the lithic assemblage becomes more Neolithic in levels 20-21, since the authors state that the lithics from levels 1-21 are fully Neolithic on blades of triangular and trapezoidal section. In levels 22-24, particularly near the large hearth at the point leading to the interior chamber, where chippings from debitage increase markedly (bearing in mind the paucity of material), the lithic assemblage included unretouched flakes and blades, end scrapers, denticulates, truncations and trapezes, as well as points, beaks and scrapers, with the material tending towards the microlithic, as well as evidence for the microburin technique (6 examples in Level 22); only one sickle blade with silica polish was found, and there is a quasi absence of polished stone (Barra A., *et al*., 1990). A. Giampetri (1996: 328) has pointed out that Levels 21-23, whilst containing pottery, produced only a small amount of lithic industry. The underlying levels 25-27 are fully Mesolithic, and the lithic industry is Sauveterrian, with triangles, bilaterally backed points, beaks, and the microburin technique.

The subsistence economy during the Sauveterrian includes an abundance of land gastropods (*Helix sp.*), large game (Bovines, cervids, suids, chamois and avifauna), all hunted nearby, and evidence for fishing (Barra A., *et al*., 1990). P. Rowley-Conwy *et al.* (2013: 166 table 9.2 quoting Wilkins 1987), without specifying the Levels from which the data is taken state that in the Early Neolithic the faunal assemblage (excluding, aquatic fauna, land snails and birds) is 71% domesticated (ovicaprines 40%, suids 27%, bovines 4%) and 29% wild (red deer 18%, roe deer 5%, wild boar 5%, Ibex/chamois 1%); these percentages are close to those at Colle Santo Stefano and suggest that acculturated hunter-gatherers were continuing to use the cave.

The dates for the Early Neolithic, Transition and Mesolithic are (Grifoni Cremonesi R., 1998, 2003a, 2003b; Grifoni Cremonesi R., *et al*., 2011; Skeates R., 2003; Usala M., 2011):

- R-1410 6170±75BP = 5308-4937 BC (OxCal 4.2 at 95.4%), Level 4-7. R. Skeates (2003) gives the stratigraphic Level 7 C6 Impressed Ware – Median 5125 BC.
- R-1411 6590±75BP = 5657-5464 BC (OxCal 4.2 at 90.8%), Level 20 – Median 5560 BC.

- R-2938 6570±63BP = 5630-5465 BC (OxCal 4.2 at 91.2%), Level 20 – Median 5547 BC.
- Rome-550 7150±90BP = 6221-5871 BC (OxCal 4.2 at 94%), Level 22 – Median 6046 BC.
- Rome-549 7230±90BP = 6264-5972 BC (OxCal 4.2 at 90.6%), Level 22. R. Grifoni Cremonesi, *et al*., 2011 give the standard deviation as 75 years – Median 6120 BC.
- LY 10756 7250±40BP= 6218-6034 BC (OxCal 4.2 at 95.4%), Level 23 – Median 6125 BC.
- Rome-551 7570±90BP = 6594-6243 BC (OxCal 4.2 at 95.4%), Level 23. (M. Usala gives the standard deviation as 70 years) – Median 6420 BC.
- Rome-553 9100±100BP = 8607-8171 BC (OxCal 4.2 at 88.2%), Level 26 – Median 8390 BC.
- Rome-554 9330±100BP = 8836-8296 BC (OxCal 4.2 at 94.7%), Levels 25-27 – Median 8565 BC.
- Rome-552 9490±100BP = 9196-8567 BC (OxCal 4.2 at 95.4%), Level 25. R. Skeates give the standard deviation as 110 years – Median 8880 BC.
- Rome-555 9650±100BP = 9282-8772 BC (OxCal 4.2 at 95.4%), Levels 25-27 – Median 9025 BC.

There appeared a sterile layer, indicating an occupational hiatus at the base of Level 24, which separates the Initial Neolithic/Transition/Castelnovian Mesolithic from the Sauveterrian Mesolithic (Barra A., *et al*., 1990; Grifoni Cremonesi R., 2012: pers. com.; Guilaine J. & Cremonesi G., 2003; Skeates R. & Whitehouse R., 1995-1996; Tozzi C., 1996: 57). The findings from the recent excavations suggest that the undated Level 24 is in all probability Castelnovian, contained a lithic industry with 22% made up of trapezes and 28% of denticulated blades and no Neolithic attributes present (Grifoni Cremonesi R., *et al*., 2011; Usala M., 2011).

According to R. Grifoni Cremonesi (2003a: 127-128) Level 23 contained Castelnovian elements (rare trapezes and Montbani blades), some sherds, and wild game (red and roe deer). Whilst these elements are similar to Colle Santo Stefano, they are disturbed in Grotta Continenza, so that the process of Neolithisation is not clear. During the 2003-2009 excavations, a Level 22 was found at the entrance of the cave with a hearth and faunal remains (Grifoni Cremonesi R., *et al*., 2011: 36).

The 2008-2009 excavation seasons brought to light a Neolithic Level 21 to the west of the cave, with a single pot, which is not described. Inside the cave, undifferentiated Levels 21-23 contained numerous Impressed Ware sherds as well as Guadone sherds (Grifoni Cremonesi R., *et al*., 2011: 36).

There is a possible relationship between the group occupying this cave, with a lithic assemblage and subsistence strategy recalling the Mesolithic substrate, with the open-air site of Colle Santo Stefano, 9 km to the east, particularly at the technical level of the lithics. The Initial Neolithic pottery and lithic assemblage at Grotta Continenza shows no indication of being related to Apulia, pointing to a possible trans-Adriatic connection (Barra A., *et al*., 1990). This last statement regarding the attribution of the pottery could be in contradiction with the evidence from Colle Santo Stefano (see below), although multiple provenances and contacts over the centuries involved can be expected.

There is no date from Level 24, which is Castelnovian, so that whilst there is a hiatus of probably more than two millennia between the last Sauveterrian occupation and the Castelnovian occupation, there is no indication of a hiatus in occupation between the Castelnovian Level 24 and the next Level 23 containing evidence of contact with the Neolithic. The median of the earliest date from Level 23 (Rome-551) is *ca*. 6420 BC. This is an improbably early date, which suggests that it could effectively comes from the underlying Level 24, which was probably not identified at the time, so that it is the next date (Ly-10756) which needs to be considered, with a median of 6125 BC. Even if there has been some upward migration of material from the Castelnovian Level 24, as suggested by R. Grifoni Cremonesi, *et al*., (2011: 35), it is possible or even probable that contact with the first Neolithic occupation of the Fucino Basin, which, from the evidence at Colle Santo Stefano and Rio Tana, could have occurred 3-4 centuries later than 6400 BC. The evidence from the lithic assemblage, the faunal remains, the modest use of pottery, and the use of a cave-site, all point to the site being occupied between Levels 23 up to 20 (and probably beyond), by Mesolithic hunter-gatherers who were slowly acquiring Neolithic attributes, in a Transition that could have lasted 500 years or more. We cannot

exclude the possibility however, because of the number of human remains found associated with levels 23 and above, that the site was visited by Neolithic farmers for funerary purposes – even if on an occasional basis, during the Early Neolithic.

Grotta di Ciccio Felice (2) – This cave on the west side of the Fucino Basin was test excavated by A. Radmilli in 1956-59, and found to contain Palaeolithic remains, although E. Borzatti von Löwenstern (1962: 221) states that a Mesolithic occupation appears to have been sporadic.

There is no evidence that this cave was used beyond the Mesolithic.

Grotta di Ortucchio/Grotta dei Porci (10) – This cave, 1-2 km west of Ortucchio on the south side of the Fucino Basin and 30 m above the plain (Fig. R21-4), was excavated between 1957-1960 by A. Radmilli and E. Tongiorgi. The occupation has been described as Epipalaeolithic or Mesolithic (Cremonesi, 1968 G. & Manfredini A., 1987; Martini F., 1996).

The single date is (Alessio M., *et al*., 1970):

- Pi-23 12619±410BP = 14226-11787 BC (OxCal 4.2 at 95.4%) – Median 13005 BC.

There is no evidence that this cave was used beyond the Early Mesolithic.

Grotta di Pozzo (9) – This cave, on the south-east side of the Fucino Basin, between Ortucchio and Lecce dei Marsi, faces north-east at 710-720 masl, close to the Rio Tana torrent, and was excavated between 1993-1999. The occupation of this cave appears to have been intermittent from *ca*. 15k BC to the Mesolithic and again, after a hiatus, during the Neolithic.

The Late Mesolithic is evidenced by some pits, the filling of which included a few sherds, whilst the Neolithic occupation appears to have been eroded (d'Angelo E., 2004: 67). D. Lubell, *et al.*, (1999: 468) indicate that a few sherds were found in disturbed contexts at the top of the stratigraphy.

The Mesolithic shell middens, produced as a consequence of the dietary range, included samples of marine species, evidencing long range contact or exchange networks (Lubell D, *et al*., 1999: 468-469; Lubell D., 2004a).

The dates are from the top archaeological levels which are numbered sequentially from the bottom to the top (Bietti A., 2003; Mussi M., *et al*., 2011):

- GX-27905 5940±40BP = 4911-4722 BC (OxCal 4.2 at 93.4%), on bone unit VII from disturbed surface level – Median 4815 BC.
- TO-6083 6340±140BP = 5562-4981 BC (OxCal 4.2 at 94.9%), on sediment from pit 1-4 Unit VII – Median 5270 BC.
- TO-3420 8110±90BP = 7357-6754 BC (OxCal 4.2 at 94.8%), on charcoal Unit VI pit 1 fill. Quoted by Skeates R. (2003), as coming from Lubell and Mussi (1995) – Median 7055 BC.
- TO-6084 8710±110BP = 8015-7577 BC (OxCal 4.2 at 82.6%), on charcoal Unit VI pit 1 fill – Median 7795 BC.
- TO-6082 8840±100BP = 8248-7654 BC (OxCal 4.2 at 95.4%), on charcoal Unit VI pit 1 fill – Median 7950 BC.
- TO-3421 9140±70BP = 8547-8250 BC (OxCal 4.2 at 95.4%) – Median 8400 BC.
- TO-3422 9370±80BP = 8838-8343 BC (OxCal 4.2 at 93.8%) – Median 8590 BC.

Although there appears to be a temporal gap between the latest Mesolithic date (TO-3420) with a Median of 7055 BC, and the Early Neolithic date (TO-6083) with a Median of 5270 BC, of some1800 years, this does not appear in the stratigraphy between Units VI and VII. (Mussi M., *et al*., 2011).

Unit VI, 30-50 cm thick is made up of lenses of fine sediment separating the anthropic levels, indicating discontinuous use. This level is cut into by Neolithic pits, which in some cases cut into Unit V, so that much of the Late Mesolithic material is in secondary contexts. The lithic tools of Unit VI are typologically Sauveterrian on flakes (58%) and blades (42%), and are generally microlithic, not exceeding 50 mm. 72% of the 459 pieces collected were retouched tools, of which 24% were armatures, made up of backed points, microlithic geometrics and the typical Sauveterrian point.

Unit VII is a disturbed Neolithic level, eroded by rain water and snow-melt, strongly cemented by calcite. It contained a few sherds. More dates are on the way to better define the chronology. There were also a few bones of domesticated animals dating from the Neolithic. This Neolithic Unit VII contained 16 undiagnostic sherds. There were few lithics from this level, which included a retouched obsidian bladelet and an asymmetric trapeze. The latter would indicate an EN date, in accord with the nearby site of Santo Stefano (Mussi M., *et al*., 2011), as well as that of Rio Tana and Grotta Continenza.

The evidence, pending the new dates, suggests that this site could have been used by the occupants of a nearby open-air Initial Neolithic site, such as Rio Tana (see below), with evidence for the Neolithic in the Pottery, obsidian and fauna, and the Mesolithic substrate on the basis of the trapeze.

Grotta la Punta (12) – This cave, excavated by M. Radmilli and E Tongiorgi between 1958-1959, is located between Trasaco and Ortucchio on the south side of the Fucino Basin. It sits about 50 m above the plain, close to Grotta Maritza, and is 5 m wide and 12 m deep.

The stratigraphy is as follows (Radmilli A., 1997a):

- Levels10-12, 60-90 cm thick contained Impressed Ware and Ripoli Ware;
- Levels 13-20 were sterile;
- Level 20 represents a Mesolithic occupation.

The author specifies that the Neolithic Levels 10-12 contained the remains of 360 ovicaprines, 43 wild boar, 22 Red deer, 24 indeterminate bovines, 6 roe deer, 2 bears, and smaller game.

Small quantities of Impressed Ware were found in Levels 10-12, whilst Levels 13-20 beneath were sterile, before evidence for a Mesolithic occupation occurred in Level 21, with the presence of microliths (Barra A., *et al*., 1990; Cremonesi G., 1968; Hameau P., 1987: 344; Manfredini A., 1987: 368; Radmilli A., 1997a).

The dates for the Epipalaeolithic Levels have been given as (Alessio M., *et al.*, 1970):

- Pi-153 10581±100BP = 10768-10421 BC (OxCal 4.2 at 84.6%) – Median 10595 BC.
- Pi-152 14488±800BP = 17768-13592 BC (OxCal 4.2 at 95.4%) – Median 15680 BC.

With no information on the lithics associated with the Impressed Ware, or dates for Levels 10-12, nothing can be said about any possible influence of the substrate on the occupation of this site in the Early Neolithic, except that the relatively high percentage of hunted game and the fact that only small quantities of Impressed Ware were found could mean that it was used by autochthonous hunter-gatherers undergoing the Transition.

Grotta Maritza (11) – This cave, 200 m from Grotta La Punta, on the north-west flank of Monte Praticelle, sits 50 m above the level of the plain. It was excavated by R. Grifoni and A. Radmilli between 1960-1963.

R. Grifoni and A. Radmilli (1964) reported on the excavations:

- Levels above Level 24 contain Diana Culture and later cultural levels;
- Levels 28-24 are Neolithic Ripoli Culture Levels, including the presence of Impressed Ware, which is considered to be a legacy of previous periods which lasted longer in this secluded location (p. 96). The lithics (Fig. R21-5), include a trapeze;
- Sterile Level?;
- Levels 35-30 are Early Holocene transition to the Mesolithic;
- Levels 42-35 are the basal levels with Bertonian industry (Palaeolithic).

The authors mention the uninterrupted existence of humans in the Fucino Basin for the last 20 ky (p.113), and with foresight, given the 1964 date of publication, in talking of the possible disappearance of the Final Mesolithic population when the bearers of the agriculture appeared, they make the point that "*una simile asserzione è in completo contrasto con quanto è stato riscontrato nella Grotta Maritza, dove esiste una prova della continuità etnica, per cui si deve pensare che rimangano ancora a scopire alcune stazioni, in cui forse si potranno trovare situazioni o aspetti molto simili a*

quelli di Coppa Nevigata, di Grotta Corrugi di Pachino e del Riparo della Sperlinga di S. Basilio" (Grifoni R. & Radmilli A., 1964: 119).

The evidence presented is inconclusive, but the presence of a single fragment of Impressed Ware in Level 25 (A. Barra, *et al*., 1990: 73) and a trapeze between Levels 24-28, suggests that the cave might have been used in the Initial Neolithic by a group with attributes from the hunter-gatherer substrate, although the authors suggest that the Impressed Ware sherd could be a cultural legacy from previous periods in what is essentially a Ripoli Neolithic, since the Impressed Ware culture lasted a long time in the seclusion of the Fucino Basin.

Grotta San Nicola (13) – This cave in the south-west corner of the Fucino Basin was investigated by E. Borzatti Von Löwenstern in 1960.

The stratigraphy was highly disturbed due to the extraction of humus for agricultural purposes as well as by clandestine digs. The top stratum contained material from the Metal Ages, Stratum A2, 30 cm thick, contained ovicaprines, *Bos taurus*, *Cervus elaphus*, *Capreolus capreolus*, *Sus scrofa, Lepus europeus* etc., plus fish, tortoises, wild cat and fox; Stratum B, 25 cm thick appeared to be sterile and Stratum C, containing wild fauna only, was Mesolithic. The Mesolithic occupation appears to have been sporadic with a rather large lithic industry without microliths or geometrics, which therefore appears to be more Palaeolithic than Mesolithic. The Neolithic industry contained an obsidian bladelet and blades which appear to have been extracted using the pressure technique, and according to the pottery it would appear to be Middle and Late Neolithic. The cave was also used for sepulchral purposes, but scarce remains were found due to the later disturbances (Borzatti von Löwenstern E., 1962).

According to A. Barra, *et al*., (1990: 73) there were scarce remains of Impressed Ware and trapezes, suggesting that the site was either used by the Mesolithic hunter-gatherers who had acquired some Neolithic attributes, or by a group (Possibly the same as at the nearby site of Grotta Continenza about 3 km to the north-east). There are no dates for this site.

It is possible that this site was used episodically into the Transition, but the evidence furnished by the excavator is not conclusive.

Ortucchio-Strada 28 (8) – Open-air site near Ortucchio on the south side of the Fucino Basin, where Sauveterrian Mesolithic lithics were found under a Bronze-Age occupation. It was reported on by G. Cremonesi in 1962.

The flint was largely procured from either the Altopiano delle Cinque Miglia on the Monte Genzana Massif (see Region 20), distant some 30 km or more probably from a different outcrop of the same flint over 20 km away at Forcella in the commune of Vittorio e Raiano. This provenance is the same as at Grotta Continenza, so that the occupants of this open-air site were either in close contact with those at the cave, or were the same group who were in the open-air during the warm season. The differences in the morphology and characteristics of the armatures at each site suggests that the two groups were either different, or reflect different periods of the Sauveterrian Mesolithic (Angeli L., *et al.*, 2011).

<u>Southern Italy and West Adriatic Seaboard – The Fucino Basin – Initial and Early Neolithic sites – Introduction</u>

The arrival of Neolithic migrants into the Fucino Basin, with the median for the earliest date from Rio Tana of 5760 BC, is earlier than any Adriatic Neolithic site known north of Apulia, which suggests that our information on the Initial Neolithic of the Adriatic seaboard is far from complete. A particular feature regarding the Neolithic of the Fucino Basin is that the hunt appears to represents an important part of the economic strategy, whilst that regarding the exploitation of aquatic resources is not very evident. The lithics also suggest intensive contact with the hunter-gatherers and/or

assimilation of elements of the autochthonous substrate into the permanent settlements, assuming our interpretation regarding the lithics and the hunt are correct.

Southern Italy and West Adriatic Seaboard – The Fucino Basin – Initial and Early Neolithic sites – Site details

Colle Santo Stefano/Santo Stefano di Ortucchio (6) – This open-air site is located in the south-east corner of the Fucino Basin, some 2 km east of Ortucchio, near the village of Gioia di Marsi. It was excavated between 1988-1993, and again between 1997-2006. Two other Initial Neolithic sites have been found in the vicinity, at Rio Tana and Ortucchio Laghetto.

This is an Initial Neolithic Impressed Ware site which was occupied from the Early Neolithic into the Bronze Age. Obsidian, mostly from Palmarola with some from Lipari, although not present in the two earliest Levels 17 and 18, was present from level 16, increasing to 5-10% in the more recent levels 10-3 (Fig. R21-6), confirming trans-Apennine contact and exchanges from an early date of the settlement (de Francesco A., 2011; Fabri C., *et al*., 2011; Pessina A. & Radi G., 2006). The flint is local, and from inception the site occupants seem to be aware of its source. In the earliest levels, the lithics are shorter, with a greater prevalence of flake debitage using smooth striking platforms, as against the prepared platforms for obtaining blades in the upper levels, with laminarity increasing over time (Fabri C., *et al*., 2011); some 100 trapezes were found associated with Montbani blades and a Neolithic industry (Fig. R21-6), which included sickle inserts, confirming the fully Neolithic mode of subsistance of the settlement (Guilaine J. & Cremonesi G., 2003: 382, quoting Radi & Wilkins, 1986-1987; Legrand A. & Radi G., 2008; Radi G., 1991). The Mesolithic elements contained in the lithics from the lower levels, which included microlithics, truncations and the microburin technique, are similar to the lithics from Level 23 at Grotta Continenza, the dates for which are several centuries earlier; this would appear to indicate a strong influence of the autochthonous substrate (Barra A., *et al*., 1990; Grifoni Cremonesi R., 2003a). The earliest lithics from this site in fact evolve, becoming closer to Mesolithic traditions over time (Grifoni Cremonesi R. & Radi G., 2014: 263), suggesting growing contacts and/or the incorporation of the Mesolithic peoples in their midst.

The dates available for the three earliest Neolithic phases of occupation, with the two Rome dates from the earlier excavations, are (Fabri C., *et al*., 2011; Grifoni Cremonesi R., 1998; Legrand A. & Radi G., 2008; Radi G., *et al*., 1991; Skeates R. & Whitehouse R., 1995-1996):

- LTL60A 6843±40BP = 5810-5645 BC (OxCal 4.2 at 95.4%), lowest level- cut 13 – Median 5730 BC.
- LTL526A 6823±55BP = 5813-5629 BC (OxCal 4.2 at 94.2%), lowest level – Median 5720 BC.
- LTL58A 6727±75BP = 5746-5508 BC (OxCal 4.2 at 94.8%), intermediate level – Median 5627 BC.
- LTL59A 6718±40BP = 5714-5605 BC (OxCal 4.2 at 79.8%), intermediate level – Median 5754 BC.
- Rome1411 6590±75 = 5657-5464 BC (OxCal 4.2 at 90.8%) – Median 5560 BC.
- LTL57A 6579±60BP = 5632-5467 BC (OxCal 4.2 at 94.6%), upper level cut 6 – Median 5550 BC.
- Rome468 6575±80BP = 5641-5373 BC (OxCal 4.2 at 95.4%), upper level – Median 5505 BC.

The lowest level are Cuts 18-11, so that the earliest date above, from Cut 13, (Legrand A. & Radi A., 2008) logically postdates the establishment of this site, which could be earlier than 5800 BC. Such an early date is very early and compares only to the median date of *ca*. 5775 BC at Portonovo di Ancona on the coast. A. Legrand and G. Radi (2008: 305) confirm that the site "*relates to the central Adriatic phase of the Early Neolithic ceramica impressa (impressed ware), with connections to southern Italy (Radi 1991, 1996; Radi and Danese 2003)*". R. Grifoni Cremonesi and G. Radi (2014: 263) specify that the earliest pottery is close to the Impressed Ware Guadone phase. It is possible that

it was establishes by people crossing from the eastern shore of the Adriatic, rather than moving up the coast from Apulia. Such a hypothesis was hinted at by G. Radi, *et al*., (2001: 80) when considering the two Rome ^{14}C dates above, which they correlated with Level 20 at Grotta Continenza, which has a median date *ca*. 5550 BC (an advanced stage of the Early Neolithic), and thus a *terminus ante quem*, for the establishment of the Initial Neolithic in the Fucino Basin.

There appears to be a continuation of the Initial Neolithic tradition for several centuries, since "*Both ceramics and lithics show little variation in the early and middle phases, suggesting minimal changes in life habits and economic preferences*" (Legrand A. & Radi G., 2008: 305).

Whilst the domesticated fauna (ovicaprines 43%, suids 11.5% and bovines 6.5%) is more prevalent than wild fauna (Legrand A. & Radi G., 2008), the hunt represents 39% of the faunal assemblage. P. Rowley-Conwy *et al.* (2013: 166 table 9.2, quoting Radi and Wilkins 1989) indicate that domesticated fauna is 91% domesticated (ovicaprines 64%, suids 17%, bovines 10%) and 10% wild (red deer 3%, roe deer 1%, wild boar 4%, Ibex/chamois 2%), which data is contradictory and confusing.

If the make-up of the early faunal assemblage in which 39% is wild is correct, that, in conjunction with the lithic assemblage, points to a component of the hunter-gather substrate in the population make-up, in this farming settlement established by immigrant farmers or their descendants, who could have moved from the site of Rio Tana to this new location.

Ortucchio Laghetto (4) – An Early Neolithic open-air site was discovered in 2002 when the water level was substantially lower next to the pond representing the rump of the now dried-out Fucino Lake, at the entrance to the village of Ortucchio (Angeli L. & Ventura A., 2011).

The lithics (Fig. 21-7) suggest that the site was occupied from the Early Neolithic to the Late Neolithic and into the Copper Age.

The Early Neolithic is well represented in the 656 tools, which include numerous trapezes, evidence for the microburin technique, oblique truncations and denticulates. The debitage is by direct percussion on unprepared knapping platforms. There was also an obsidian core and two artefacts from obsidian from both Palmarola and Lipari. Sickle gloss was present on some of the trapezes. Generally speaking the material could be compared with that from the site of Colle Santo Stefano (Angeli L. & Ventura A., 2011).

Being a surface collection, no dates are available, but the material has affinities with the Mesolithic with the trapezes, backed pieces, denticulates, end-scrapers, beaks, and perforators, suggesting the incorporation of a Mesolithic component, whilst agriculture is attested by the sickle-gloss.

Paterno (1) – Early Neolithic open-air site on the northern side of the Fucino Basin about 5 km north-east of Avezzano.

This solitary Early Neolithic site on the north side of the Fucino Basin produced an Impressed Ware horizon associated with a microlithic industry which included trapezes (some used as sickle inserts) and the microburin technique, as well as Neolithic blades. The trapezes have been compared to those from Levels 22-24 at Grotta Continenza (Barra A., *et al*., 1990; Grifoni Cremonesi R., 2003: 129; Guilaine J. & Cremonesi G., 2003: 46; Martini F., 1996: 46).

This site, for which we were unable to find any dates, appears to have been established by a migrant Neolithic group (or descendants of such a group), that had either been influenced in its lithic technology by the Terminal Mesolithic substrate, or incorporated some of these in the settlement.

Rio Tana/Praja Sant'Angelo/Praja, etc. (7) – This open-air site has gone through several names, but is now generally referred to as Rio Tana. It is located about two-thirds of the way from Ortucchio to Lecce nei Marsi in the south-east corner of the Fucino Basin. It is only 1.5 km from the site of Colle Santo Stefano, with which it is closely associated. The site, at 705 masl, was discovered when the

torrent cut into the bank after torrential rains during the winter of 1990-1991, showing the 60/70 cm stratigraphy some 2 m below the current ground surface.

The archaeological strata have been described by V. d'Ercole, *et al*., (2001):

- Stratum 1: colluviums 120cm;
- Stratum 2: forest colluviums of dark soil 80 cm;
- Stratum 3: Impressed Ware Neolithic stratum of unspecified thickness with pottery, lithics, daub and charcoal. In area L2, at the top of stratum 3, some 2 cm thick '*concotto*' only partially covers the underlying stratum 4 (p. 83);
- Stratum 4: colluvium deposited in 3 phases ranging from 60 cm to 4/5 m thick, incorporating pottery fragments in what is probably secondary positions;
- Stratum 5: Impressed Ware Neolithic stratum of unspecified thickness with at its top in section M3 *ca*. 5 cm thick sediments, rich in charcoal and anthropic remains. Excavated over 5 m^2 only in section M3;
- Stratum 6: Pleistocene colluviums.

This site has some of the earliest Neolithic dates in the Central Adriatic (d'Ercole V., *et al*., 2001; Grifoni Cremonesi R., 2003a; Radi G., *et al*., 2001):

- AECV-2012C 6860±60BP = 5877-5641 BC (OxCal 4.2 at 95.4%), Stratum 5 – Median 5759 BC.
- AECV-2011C 6790±90BP = 5878-5541 BC (OxCal 4.2 at 95.4%), Stratum 3 – Median 5710 BC.

The dates are comparable to the site of Portonovo di Ancona on the coast where the earliest median date is 5775 BC.

The site appears to be a habitation site, although the structures could not be identified, which might have been spatially continuous across both banks, since the river ran elsewhere at the time of occupation.

The lithics include 2.4% in obsidian (Pessina A. & Radi G., 2006: 441), and a microlithic industry with blades, geometrics (isosceles, scalene and rectangular trapezes, somewhat larger than at Grotta Continenza, sometimes with a concave truncation and *piquant trièdre*, used as sickle inserts), and the microburin technique (Grifoni Cremonesi R., 2003a: 129).

Since this site appears to be about one generation earlier than that of Colle Santo Stefano, it is possible, as evoked by G. Radi *et al*., (2001: 80), that the settlers abandoned this site, moving to new cultivatable land at Colle Santo Stefano. Given the early date of this site, it is hard to determine the origin of the settlers, who could have come from the eastern seaboard of the Adriatic, from Apulia, or some even from the Tyrrhenian coast, initiating the trade in obsidian. The fact that the lithics contain an element of the local Mesolithic substrate, suggests either friendly contact and/or the assimilation of some of the autochthonous population.

Sant'Orante (5) – This site is at the top of the hill of the small town of Ortucchio at the south-west of the Fucino Basin.

The site is located on the square in front of the church at the highest point of the hill, which might have been an island in the Early Neolithic. Excavations were conducted in 1994. No date is indicated, and it could be an Initial Neolithic site which might have had a palisade. Obsidian was found. From the description, some of the pottery appears to be Impressed Ware, which was subject to much repair as evidenced by the holes in sherds. The pottery is similar to that found at the site of Rio Tana, whilst there is also a finer black pottery, as well as a sherd of Figulina, suggesting a later date. The site may well have enjoyed a long occupation on the dominant plateau at the top of the rise, and its initial phase might have coincided with the occupation of Rio Tana (d'Ercole V., et al., 2001).

We have no details regarding the lithics or the faunal assemblage.

Of the five Initial or Early Neolithic sites the two key ones on the south side of the Fucino Basin are those of Rio Tana and Colle Santo Stefano. These two sites could represent a single community which relocated some time after *ca*. 5750 BC, after not much more than one generation, from Rio Tana, which appears to be a short occupation site, to Colle Santo Stefano, which enjoyed a long period of occupation. Whilst we have no details of the faunal assemble at Rio Tana, the lithics suggest contact with the autochthonous population and at Colle Santo Stefano this is accentuated, with a high percentage of hunted fauna, possibly as high as 40%, compared to the 'standard' for Neolithic sites which appears to hover around 10% at most. The indications are that the Terminal Mesolithic population was partly assimilated into the migrant farming communities. The evidence from Paterno, which is the only open-air Early Neolithic site from the north side of the Fucino Basin, appears to echo the findings from the southern side.

The provenance of much of the flint does not change significantly between the Mesolithic and the Neolithic in the Fucino Basin, being procured from the Altopiano delle Cinque Miglia on the Monte Genzana Massif (see Region 20), distant over 30 km, and/ork from a different outcrop of the same flint, over 25 km away at Forcella in the commune of Vittorio e Raiano (Angeli L., *et al.*, 2011). This also suggests continuity or close contacts over the Transition.

The evidence from the cave sites (principally Grotta Continenza) suggests that the hunter-gathering lifestyle could have continued in parallel with the Neolithic for many hundreds of years, whilst these people slowly acquired Neolithic attributes over many generations of the Transition starting at a date possibly earlier than 6000 BC. The cave sites with less of a stratigraphy (Grotta di Pozzo, Grotta la Punta. Grotta Maritza and Grotta San Nicola), suggest a more sporadic use of these caves by hunters who had acquired Impressed Ware pottery. We do not know of open-air Mesolithic sites other than that of Ortucchio-Strada 28, which appears to be a Sauveterrian occupation, so that the open-air life style of the Mesolithic population and how they exploited the aquatic resources is not clear. The details of how the Mesolithic and Neolithic communities interacted can only be surmised, but in the absence of any evidence for violent confrontation, the assumption is that the communities interacted and mixed peacefully.

Regions 15, 22-24 – Northern Adriatic – Introduction

(Maps MR1 and MR2)

Northern Adriatic – Regions and geography

This Macro-Region encompasses 4 Regions at the head of the Adriatic:

- On the east side, Region 15 includes the coastal and near-coastal karst regions of Slovenia and Trieste.
- To the north-east, Region 22 includes the western flank of the Julian Alps in North-Western Slovenia incorporating the Isonzo/Soča river basin and the Italian region of Friuli-Venezia Giulia.
- In the centre and to the west, Region 23 covers most of the Italian region of Veneto and the eastern part of the Italian region of Emilia-Romagna to the east of a line running south from Lake Garda to the River Po, then south-west to include the province of Parma. The north of the Region includes the foothills of the Southern Alps and the south includes the Northern Apennines up to the water divide, which also marks the boundary with the Italian regions of Tuscany and Liguria. The south of this Region runs along the Adriatic seaboard as far as the province of Ravenna, at which point it cuts inland in a line running due west. This Region will be presented in two parts, the River Po marking the boundary between the northern and southern parts.
- To the north-west, Region 24 is limited on its western boundary by Lake Garda and includes the northern part of the Venetian province of Verona and much of the Italian region of Trentino-Alto Adige.

At the inception of the Neolithic in the North Adriatic, sea levels were at least 4-5 m below current levels, so that the North Adriatic plain had to all extents disappeared and the coast-line stood close to where it is at present on the eastern side. To the north and west, the situation was somewhat different. In Friuli Venezia-Giulia and as far west as the River Piave, the rivers flowing from the Alps had cut deep river-beds, which the marine transgression invaded to form estuaries, even if the coastline was more distant than at present. There were coastal lagoons as at present, but further out, and since the northern Adriatic coastline has also been elevated a few metres due to tectonic activity since the Early Neolithic (Bagolini B., 1984: 328) the sea would have been correspondingly further out. The western shore was very different with its low gradient, so that between the River Piave and Rimini, the coast was not much different to today around the Venice lagoon, but substantially further inland to the south, where post-Neolithic sedimentation has pushed the coastline between 30 and 50 km further out to sea (Fig. Intro-4) (Fontana A., *et al.*, 2014).

The karstic Region 15 would have had a narrow coastal strip at its northern end and a wider one in Slovenia around Capodistria / Koper down to the Croatian border at the southern end, east of which the land rises steeply to 670 m in the Trieste Karst and over 1000 masl at the northern end of the Dinaric Range in Slovenia, where a pass 650 masl, currently used by the motorway between Koper and Ljubljana connects the Region to Central Slovenia. The Region is composed primarily of limestone karstic hill country pockmarked by small to gigantic dolines, with poljes and sunken river valleys, although there is also a strip of flitch a few kilometres wide which crosses the region. There are caves near the base of many of the dolines, some of which were used during the Mesolithic and Neolithic. There is very little land suitable for agriculture except in the poljes and river valleys of this Region, with a dearth of surface water and few water-courses, since most of the rain water sinks into ground.

Regions 22 and 23, which border the head of the Adriatic, are very contrasted between south and north. They are mostly made up of wide coastal plains close to the Adriatic, gently sloping up to the foothills of the Alps to the north, with numerous river valleys (Isonzo/Soča, Natisone, Cormòr, Tagliamento, Livenza, Piave, Brenta, Bacchiglioni, Adige and Tartaro/Canal Bianco being the most

important of these rivers north of the River Po), which flow directly into the Adriatic and which cut through the foothills of the Alps in a north-south direction after they exit the Alps from deep valleys, mostly finding their sources at over 2000 masl. The northern limit of these two Regions stretches into the Southern Alps to the extent that there is evidence for the Late Mesolithic, Transition and Initial Neolithic. The eastern limit is marked by the water-divide of the Julian Alps as these curl south into Slovenia. To the west, from the town of Peschiera del Garda, the River Minchio, the most easterly north of the River Po to flow as a tributary into the River Po, drains Lake Garda to the west of the River Adige, marking the western boundary of Region 23 as it flows south across the plain to Mantua/Mantova. South of the River Po, the plain leading up to the Apennines is dissected by numerous parallel rivers and watercourses, which cross wide conical alluvial fans as they exit the hills, before crossing the plain, flowing directly into the Adriatic as far as the River Reno, west of which they flow as tributaries into the River Po. The western limit includes a number of sites in the Italian province of Parma and southern limit of Region 23 follows the Northern Apennines east to Bologna, before cutting across the plain past Imola, to join the Adriatic in the Italian province of Ravenna.

Region 24 is essentially made up of the U-shaped glacial Adige Valley and its tributaries, from north of Verona, and thus includes the far west of the Italian region of Veneto and much of that of Trentino-Alto Adige. The Adige Valley floor, which had been covered by a lake 130 km long after the retreat of the glacier, had, in the Late Mesolithic, become a series of smaller lakes and wetland under the effect of colluvial sedimentation, which was rich in resources, but not propicious for agriculture.

Northern Adriatic – Climate and environment

At the LGM, the North Adriatic Plain extended half way down the Adriatic, to a line between Ancona and Zadar. By the end of the Pleistocene this plain had retreated to within a few km at best from the present coastline in the North Adriatic. Some have estimated that when the Initial Neolithic reached the Northern Adriatic, the lagoons commenced some 8 km further south than their current extension, with current sea-levels being reached sometime prior 4000 BC (Budja M., 2001; Pessina A., 2006a: 280-281); Others have estimated that the last 20-25 km^2 of the North Adriatic palaeoplain facing the Trieste Karst were drowned in the Early Holocene, thereby destroying Mesolithic sites and much of the plains hunting ground associated with the Karst Region (Biagi P., *et al*., 1993: 46; Biagi P., 1994: 58).

During the Preboreal (*ca.* 9700-8000 BC) and the Boreal (*ca.* 8000-6900 BC), as the temperatures rose, the aridity on the plains probably played against the development of forest cover, so that a steppe environment probably prevailed until the onset of the humid climatic optimum of the Early Atlantic (*ca.* 6900-4700 BC) followed by gradual cooling during the Late Atlantic (*ca.* 4700-3500 BC). During the Preboreal, the forest cover in the Alpine Adige Valley appears to have been dominated by pine, which gave way to mixed oak during the Boreal (Broglio A., 1984: 294-296). The tree-line in the Alps rose steadily during the Holocene, and would have been some 100-150 m higher than at present during the Atlantic climatic optimum, with Ibex and chamoix moving steadily to higher altitudes; this would have rendered their hunt more problematic, as attested by their progressive disappearance from the archaeological record of the valley-floor sites during the Castelnovian Mesolithic, and the virtual disappearance of high altitude hunting during during the same period (Bagolini B., Clark R., 2000: 94; Bressan F., 1984: 18; Gehlen B., 2010: 613; Voytek B., 2006: 168).

Northern Adriatic – Early human presence

There is ample evidence for a Palaeolithic presence in the Alpine foothills (Bagolini B., 1987; Peresani M., 2009: 88), the Karst Region (e.g. Grotta Pocola / Caverna del Campo Rosso / Caverna degli Orsi di Nabrežina (Boschian G., 2013)) as well as in the Apennines, and there are several hundred Mesolithic sites and lithic scatters between the Karst Region, the North Adriatic plains, the

Southern Alps stretching into Western Slovenia and the Northern Apennines, with some 10% being excavated, and fewer still dated (Biagi P., 2001: 71-74, 2003). Many of these sites are in the Alps at altitudes ranging between 1800-2300 masl and date mostly from the Sauveterrian, with a few from the Early and Middle Castelnovian; in The Trentino-Alto Adige, where intensive surveys have been undertaken a total of 174 Mesolithic sites have been identified (Fig. R24-2) (Kompatscher K. & Hrozny Kompatscher N. M., 2007; Pasquali T., 2006); by the end of the Castelnovian Mesolithic, with the ever-rising tree-line, the near-absence of high altitude sites suggests that hunting at high altitudes was largely abandoned (Gehlen B., 2010: 613; Voytek B., 2006: 168).

Some authors have suggested that there was a reduced Mesolithic occupation of the territory, or even the absence of a Mesolithic presence prior to the arrival of the Neolithic migrants, due to the lack of overlap and clear evidence for the Transition, although this could be due to deep ploughing and intensive anthropic activity on the plains (Biagi P., *et* al., 1993: 58; Pessina A., *et al*., 2006), the loss of coastal plain and the dense forest cover on the hill-slopes. Whatever the causes for this poor visibility on the plains, the Trentino-Alto Adige Region clearly runs counter to this hypothesis. Contact between Mesolithic groups across the Regions is evidenced by the uniformity of the Sauveterrian lithic assemblages and the simultaneous transition to the Castelnovian Culture; at a more specific level, contact over the Alps is attested by harpoons from north of the Alps found at four Mesolithic sites (Romagnano III, fragments at Riparo di Pradestel, Mondeval di Sora and Riparo di Biarzo), and the presence of rock-crystal from north of the Alps also being attested at numerous sites, with that found in the Adige Valley (e.g. Riparo Gaban, Mezzocorona Borgonuovo, Val Dona) possibly coming from the Aurina Valley close to the present border with Austria to the north-east of the valley of the River Isarco (Dalmeri G., 2014: pers. com.).

The Initial Neolithic of the Area is complex, with several different cultures identified, which overlap in some cases (Fig. R15-1) (Pessina A., 1998, 2000; Binder D., 2000):

- East Adriatic Impressed Ware is found at sites as far as the north coast of the Istrian Peninsula, plus up to five possible instances in the Trieste Karst *ca.* 5650-5450 BC (Improta S. & Pessina A., 1998: 113, quoting Biagi P., *et al.*, 1993).
- The Vlaška Group/Vlaška-Pettirosso/Vasi a Coppa o a Tulipano/Vasi a Coppa/Vasi a Tulipano, which derives from the Eastern Adriatic Danilo Culture which appears ca. 5700 BC. This follow-on culture from the East Adriatic Impressed Ware Culture on the central Dalmatian coast, which appears in the Late Early Neolithic or Early Middle Neolithic, appears in the Trieste Karst in the middle of the 6th millennium as the first Neolithic pottery culture of Region 15.
- The Gruppi Friulani/Gruppo di Fagnigola in Friuli appear as the first fully Neolithic culture from inception prior to the middle of the 6th millennium, possibly as early as 5700 BC (Gehlen B., 2010: 617). The Gruppi di Fagnigola sites are mostly to the west of Region 22, whilst the Facies di Sammardenchia is in the centre and east of this same Region, possibly appearing a little later. Both of these cultural facies have affinities with the Fiorano Culture to the west as well as with the Danilo or Vlaška Culture to the south-east.
- The West Adriatic Impressed Ware is found as the primary culture as far north as the site of Imola Ospedale Nuovo in South-East Emilia-Romagna. The earliest dated evidence for this facies is no earlier than *ca.* 5400 BC at Faenza - Fornace Cappuccini, when it came into contact with the Fiorano Culture, which had already been in place at least 200 years.
- The Fiorano Initial Neolithic Culture is contemporaneous with the Gruppi Friulani to the east, which again, according to B. Gehlen (2010: 617), was in place by *ca*. 5700 BC. This culture permeated all the other cultures of the North Adriatic, probably in large part because the flint resources of the Lessini Mountains, which they exploited and which were within their territory, were extensively exchanged in conjunction with Alpine metamorphic greenstones (Pessina A., 2006a: 292-293). The culture is evident in Emilia-Romagna and the Veneto; it has many affinities with the Vhò Culture further west which appeared at a later date. It is only in Liguria

and the eastern seaboard of the Adriatic that dates older than the earliest dates for the Fiorano are attested (Improta S. & Pessina A., 1998: 114).

- Within the Fiorano Culture area, a few sites show affinities with the Eastern Ligurian Facies di Pianaccia, suggesting a possible avenue for the neolithisation of the Eastern Po Basin
- The Vhò Initial Neolithic Culture, to the west of my territory, is contemporaneous or a little later than the Fiorano Culture, and at its south-western extension intersects with the Ligurian Impressed Ware Culture.
- The Gaban Culture in the Trentino-Alto Adige has affinities with the Fiorano Culture as well as the Vhò and Isolino Cultures to the south-west and west. It flourished between 5000-4500 BC, with clear indications of cultural continuity from the Castelnovian Mesolithic.
- The Isolino Initial Neolithic Culture flourished to the north-west of the Vhò Culture and is also outside my territory.

The Neolithic cultures of the plains at the head of the Adriatic all seem to have become established before the middle of the 6th millennium BC, when the Italian Impressed Ware Culture had only reached the Central Adriatic. The relative lack of homogeneity in the earliest pottery traditions of these cultures has made it difficult to clearly define their provenance, but those in Friuli-Venezia Giulia to the north-east of the Macro-Region bear characteristics strongly reminiscent of the East Adriatic Impressed Ware and Danilo Cultures (Pessina A. & Rottoli M., 2006: 89).

Several authors have confirmed that the Initial Neolithic population of the North Adriatic plains arrived as fully Neolithic, living in permanent settlements, bringing agriculture and animal husbandry, notwithstanding the high incidence of wild game and the exploitation of local resources at certain sites (Biagi P., *et al.*, 2003: 58; Castelletti L. & Rottoli M., 1998: 18). C. Malone (2003: 270-271) states that "*Hunted and gathered foods were significant in the earlier Neolithic at most sites in northern Italy, and the impact of agriculture was felt much more gradually than in southern or central Italy. Regional patterns of subsistence developed, exploiting the local environment and resources, which included chamois and wild goat, boar, badger, deer, small mammals, fish, birds, and molluscs throughout the Mesolithic. Neolithic communities in Romagna and Po plain continued to hunt, fish and gather foods, alongside domestic stock and cereals*".

Contact appears to have been tenuous with the West Adriatic Impressed Ware, as evidenced by the small amounts of obsidian found at sites at the head of the Adriatic, when this was widely exchanged within the West Adriatic Impressed Ware Culture during the second half of the 6th millennium; by the same token, the Lessini Mountains flint, extensively exchanged in the North Adriatic in the Early Neolithic, is rarely found in West Adriatic Impressed Ware sites (Pessina A., 2000: 86-87).

When the Neolithic migrants arrived in the *Caput Adriae*, they did not arrive in a land devoid of human occupation, so that interaction with the Late Castelnovian Mesolithic inhabitants had to occur. I know of no evidence for conflictual relations between the two groups, so that the adaptation and acculturation of the autochthonous population to the new mode of subsistence and settlement patterns probably occurred without undue stress over many generations, as part of the ongoing adaptations to changes in the environment, and this is particularly evident in the Trentino-Alto Adige.

Northern Adriatic – Funerary practices

There are only four Mesolithic burials known in this Area: a Sauveterrian Early Mesolithic burial at Vatte di Zambana and another at Mezzocorona-Borgonuovo which is either Late Sauveterrian or Castelnovian, both in the Trentino-Alto Adige close to the valley floor, with neither being accompanied by substantive grave-goods; the third is a Castelnovian burial with rich grave-goods at Mondeval di Sora (Belluno, Veneto), 2150 masl on a high plateau (Fig. R23-2) (Dalmeri G., *et al*., 1998; Guerreschi A., 1998a: 87-89); the last is from Piancada in the Lower Friuli Plain, dated to

*ca.*7000 BC. The first three burials follow the Mesolithic tradition of being in an extended supine position, whilst the last is indeterminate.

Even fewer Initial Neolithic burials have been discovered. One, just west of my area at Casalmoro, near Mantua, is a Vhò Culture burial, and of particular interest since the inhumation is in accordance with the Balkans Neolithic tradition with the body lying on its side in a foetal position (Bagolini B., 1984).

Northern Adriatic – Lithics

According to the typologies established by Broglio and Kozlowski (1983), the North Italian Mesolithic Sauveterrian tradition in the Adige Valley (typified by microlithic and hypermicrolithic isosceles triangular armatures and points with steep retouch) commences *ca*. 7950 BC and transitions to the Late Mesolithic Castelnovian tradition (typified by trapezoidal armatures manufactured using the microburin technique and notched 'Montbani' blades), *ca*. 6550 BC. The Castelnovian tradition lasts until the end of the Mesolithic and into the Transition. It is a powerful maker for acculturation when Neolithic attributes are present.

The lithics in the Neolithic are substantially different to those of the Mesolithic, with blade-based typologies which includes rhomboids obtained using the microburin technique, sickle inserts, straight points, burins often with transversal notched and abrupt retouch (sub-conical cores and geometrics are about the only common types, although the latter were larger in the Neolithic and used to scrape and cut, rather than as armatures). The provenance of the flint tends to be local in the Mesolithic with sources to be found within 25-40 km with a little from the Lessini Hills north of Verona at the end of the Mesolithic, where the mines were substantially exploited during the Neolithic; in the Initial Neolithic, long distance procurement is attested (Obsidian, flint, greenstone), but not in the Fiorano culture so far as obsidian is concerned (Bagolini B., Biagi P., 1987; Barfield L., 2000: 58; Biagi P., 2001, 2003; Biagi P., *et al*., 1993: 58; Ferrari A., Pessina A, 1992: 45-46)

Northern Adriatic – State of research

Notwithstanding the intensity of research throughout the Area, with numerous high quality publications, as P. Biagi (2001: 78-78) explains, some of the problems associated with a better understanding of the Terminal Mesolithic, Transition and Initial Neolithic are:

- The small number of excavated sites, many of which are seasonal high altitude hunting sites.
- No valley-floor base camps have been found dating from the Mesolithic.
- Incomplete stratigraphic records.
- Lack of understanding of the subsistence strategies during the late Mesolithic, due to the acidity of the soil which has destroyed faunal and floral remains.
- The exchanges and contacts in the Late Mesolithic are only sketchily perceived through some lithics, shell ornaments and harpoons.
- Loss of sites close to the shore.
- The sites where the Transition is evident are largely limited to the Trieste and Slovene Karst (Region 15), and the Adige Valley (Region 24).

Northern Adriatic – Mesolithic

There is ample evidence for the Mesolithic presence in this Macro Region. Within the Alpine arc their presence is attested at all altitudes, as is the case in the Northern Apennines. In Friuli their presence is particularly marked on the Tagliamento Morainic Fan which stretches in a westward arc to the north of Udine, with pockets of evidence on levees and on the hills to the north of the River Po.

The late Mesolithic is also well attested in the Trieste and Slovene Karst, where some of the hunter-gatherers of the region used a number of caves as the North Adriatic Plain shrank.

Northern Adriatic – Neolithic

The Neolithic (Fig. R15-1) arrived in this Macro Region over a number of centuries starting around the middle of the first half of the 6th millennium BC as a fully constituted cultures, probably arriving from different points of origin, whether by sea or overland, which explains the diversity of their cultural attributes. There is however no evidence that these migrants penetrated up the Adige Valley until *ca*. 4500 BC, whilst contacts with the autochthonous hunter-gatherers is attested from *ca*. 5000 BC.

Northern Adriatic – Transition

The Transition in this Macro Region is well attested in the Trieste and Slovene Karst (Region 15) and the Trentino-Alto Adige (Region 24). In Regions 22 and 23 the evidence is more tenuous, but can be surmised.

Region 15 – North Adriatic – Trieste and Slovene Karst

(Map R15)

North Adriatic – Trieste and Slovene Karst – General Introduction

The Region encompasses the karstic areas of North-Eastern Italy and Western Slovenia. Archaeological excavations in the Trieste Karst date back to the end of the 19th and early 20th centuries, when Karl Moser investigated over 30 cavities, finding Neolithic material in Grotta del Pettirosso (aka Vlaška Jama, Rotgarti or Fremdenhöle) and Grotta Moser (aka Jama na Dolech, Jama na Robiah, Grotta del Muschio, or Grotta presso Samatorza) (Barfield L. 1999; Montagnari Kokelj E., 2014). The above highlights the difficulties of properly identifying cave-names in a region initially under Austrian control, with strong linguistic and topographic affinities with Slovenia, prior to becoming Italian. The same holds true for the naming of cultural affinities, since L. Barfield initially named the Early Neolithic pottery, which has strong affinities with the Danilo Ware of Dalmatia, 'Vlaška Ware', but which B. Bagolini and P. Biagi subsequently renamed 'Vasi a Coppa', whilst the denomination 'Vasi a Tulipano' is also used.

All the Late Mesolithic and Initial Neolithic sites of the Region are in caves or rock-shelters, which most likely distorts the interpretation of the evidence, and most of the sites were used discontinuously, adding further complexity to the interpretation of their evolutionary use (Montagnari Kokelj E., 2001b); in a later article E. Montagnari Kokelj identifies 18 cavities in the Trieste Karst with attested or possible Mesolithic material, of which 8 have been excavated, plus four with possible Mesolithic levels exposed but unexcavated; of these only Grotta dell'Edera has been systematically excavated, but only partially published in occasional papers, and of the 10 sites which could contain Late Mesolithic material, only 5 have been confirmed and of those only 3 are susceptible of supplying evidence regarding the Transition (Grotta Azzurra, Grotta della Tartaruga and Grotta dell'Edera). She also lists 23 cavities with Neolithic material, some of which also contain Mesolithic levels. She concludes that the potential for studying the Transition has been poorly exploited (Montagnari Kokelj E., 2003). The same author also points out that the Early Neolithic knapped lithic industry in the Karst Region is always different to that of the Mesolithic in typology, artefact size and choice of raw material, and that stock breeding is well attested, whilst there is no evidence for agriculture, probably due to heavy terra rossa clay soils and the lack of surface water; there is also a high incidence of wild fauna and the collection of marine molluscs, which suggest a certain continuity from the Mesolithic (Montagnari Kokelj E., *et al.*, 2012, 2013: 51).

Any open-air sites on the rare agricultural land have presumably been destroyed by erosional factors and subsequent anthropic activities, and those located on the North Adriatic Plain at the foot of the Trieste Karst submerged by the eustatic sea rise.

The Region, with its dearth of surface water and specific geology and topography, was not disconnected from the wider region during the Mesolithic, as evidenced by the lithic assemblages and personal adornments, nor during the Neolithic, when the Early Neolithic appears to be an impoverished version of the Middle Neolithic Danilo Ware Culture from Dalmatia and Istria, whilst incorporating some elements of Adriatic Impressed Ware, and some imported Fiorano pottery (Bagolini B. & Bressan F., 1994). P. Biagi (2003b) sees three influences at play in the middle of the 6th millennium BC (the Castelnovian Mesolithic, the Danilo/Vasi a Coppa and Impressed Ware); he lists 5 sites as possibly containing Impressed Ware (Grotta dell'Edera, Grotta Dell'Orso, Grotta della Galleria, Grotta del Pettirosso/Vlaška Jama, Grotta Azzurra di Samatorza), whilst recognising that the Eastern Impressed Ware, as a culture, did not go beyond Istria, whilst the Western Impressed Ware culture eventually reached Romagna. The Danilo Culture flourished between the Montenegro-Croatian border and the Friuli Plain from the middle of the 6th millennium BC and P. Biagi believes that it was Danilo Neolithic Migrants who colonised and brought the Neolithic to the Trieste and Slovenian Karst and

that the last dates for the Mesolithic of Slovenia, Istria and the Trieste Karst overlap with the first Neolithic dates, so that interaction can be inferred (Biagi P., 2003b: 365).

Palaeobotanical research undertaken by M. Andrič (2001) has shown that based on research at Prapoče, lying 480 masl in North-Eastern Istria, the sub-Mediterranean landscape of the near-coastal Karst changed from primarily lime, oak and hazel at the beginning of the Holocene, to predominantly lime forest about 6900 BC. At the Mlaka site lying at 150 masl in pre-Dinaric South-Western Slovenia, small scale forest fires are evident in the Late Mesolithic *ca*. 6000 BC, which could be due to hunter-gatherers managing the environment (p. 162-163, 167), possibly to favour hazel and/or clearings for game, in a similar manner as evidenced in Hungarian Transdanubia (Region 12). In discussing the stratigraphic evidence at Grotta dell'Edera, P. Biagi *et al*., (2008: 254) note that at the inception of the Holocene in Layer 3d, *Pinus silvestris* and *Betula* dominate, indicating a cold climate; in the Sauveterrian and Early Castelnovian Layers 3b and 3c, *Quercus* and *Corylus* make their appearance, and at the end of the Castelnovian, and during the Transition and Initial Neolithic Layers 3a and 2 (ca. 5500-5000 BC) the deciduous forest dominates with vegetation similar to that of today.

North Adriatic – Trieste and Slovene Karst – Mesolithic and Transition Sites – Introduction

The discovery of the Mesolithic in the Trieste Karst goes back to the 1960s, with the excavation of Grotta Azzurra. It has since been identified in some 15 caves and to these sites needs to be added the Mesolithic sites in coastal and near-coastal Slovenia, many of which are listed below. Although treated in Region 14, the numerous Mesolithic sites in Northern Croatia, particularly on the Istrian Peninsula, Northern Italy and other parts of Slovenia prove that there was a widespread presence of hunter-gatherers before and during the neolithisation of the *Caput Adriae.* This presence need not have been particularly dense, since in the Trieste Karst, as M. Spataro (2002: 21) points out, "*Late Mesolithic Castelnovian layers is far more rare, and is restricted to Grotta Benussi (BROGLIO, 1971), Cavernetta della Trincea (ANDREOLOTTI and STRADI, 1963) and to hearth 3a of Edera Cave (BIAGI et al., 1993)*." The almost total lack of open-air sites In the Trieste Karst, in that only three lithic scatters of a few lithic implements each have been found (Fig. R15-1), can best be explained by the exiguity of the terrain, its inhospitable nature, the loss of the coastal plain and anthropic activity since the Neolithic; again, this shortfall is made up in the wider region, where polders, river valleys, wetlands, plains and high altitude camps have produced a rich crop of hunter-gatherer sites. The Mesolithic, Transition and Early Neolithic excavations have tended to be over reduced surfaces, with many of them dating back to the middle of the 20th century or earlier, with little attention to details regarding the Transition, no dates and often poorly published. The excavated areas inside and outside the caves are not representative of the space used and activities performed in a given period of frequentation (Montagnari Kokelj M., 2001: 14-15), so that interpretations and data-sets could be flawed. There is evidence at several sites for occupation straddling the Transition, with attributes of both the Mesolithic and Neolithic, so that whilst it is probable that migrant herders moved into the area, probably interbreeding with the autochthonous population, the evidence is also strong for the acculturation of the Mesolithic population during the Transition, which occurred starting around the middle of the 6th millennium BC.

With the Atlantic, a greater emphasis on marine resources is perceptible with the loss of the coastal plain and the approaching coastline, the reforestation of the upland and the retreat from the drowned plains to the Karst (Biagi P. & Voytek B., 1994: 63; Boschian G. & Montagnari Kokelj E., 2000: 349; Voytek B., 2011).

Sites at which Impressed Ware has been found are, or claimed to have been found are:

- Grotta Azzurra
- Grotta dei Ciclami
- Grotta dell'Edera/Štenaška/Štenašca
- Grotta dell'Orso

- Grotta del Pettirosso/Vlaška Jama

There is no evidence for agriculture in this Region prior to the end of the Neolithic, and some or all of the domesticated fauna could have arrived from the Region of Friuli-Venezia Giulia, but the correlation with the pottery suggests that most of it will have arrived from the south.

North Adriatic – Trieste and Slovene Karst – Mesolithic and Transition Sites – Sites details

Betalov Spodmol (3) – Mesolithic site south of Postojna in Southwestern Slovenia (Turk I., 2003).

Caverna Moser/Grotta Moser/Grotta del Muschio/Grotta presso Samatorza/Jama na Dolech/Jama na Robiah (18) – This cave east of Nabrežina in the Trieste Karst, at 206 masl, was first excavated my L. K. Moser at the end of the 19th and early 20th centuries, when a rhyton was found. The site was the subject of further excavations by E. Neumann prior to 1927 when a rhyton foot was found, and again between 1966-1968 under Renzo de Visentini, but not published (Barfield L., 1999; C.R.I.G.A.; Montagnari Kokelj E., 2014). A re-examination of the report by L. K. Moser suggests that there is probably a Mesolithic level (C.R.I.G.A), and according to the details on the electronic 'Catasto delle Grotte della Commissione Grotte E. Boegan', the lower levels would have been Mesolithic.

It would seem that there could be a Transition visible at this site, but the excavation details only allow this to be hypothesised.

Dedkov Trebež (5) – Mesolithic open-air site in the Slovenian Karst near Prestranak at approximately 650 masl where a classical Castelnovian lithic industry was found, which is comparable to the open-air site of Breg near Ljubljana (Biagi p. & Voytek B., 1994: 63; Kozlowski J. K. & Kozlowski S. K., 1984: 46; Kozlowski J. K., et al. 1994).

Grotta Ansa/Grotta dell'Ansa (9) – This cave in the Northern Trieste Karst, close to San Pelagio, is 2.5 km from the present-day coastline and 200 masl. Excavated in 1972, the lowest level 5a was Early Neolithic Vlaška, but typologically some of the lithics could possibly have been Mesolithic (C.R.I.G.A.; Montagnari Kokelj E., 1993: 73-75, 2001b: 246). Fiorano pottery was also found (Bagolini B. & Bressan F., 1994).

Grotta Azzurra di Samatorza/Pečina na Leskovcu/Pečina on Leskovec (16) – This cave-site in the Trieste Karst, at 270 masl and 2.8 km from the present-day coastline, has a wide opening and a large chamber which slopes downwards in the interior (Fig. R15-2). It was the first site at which the Mesolithic was identified in the Trieste Karst (Betic A., 2013; Biagi P., 1994: 57; Montagnari Kokelj M., 2001: 14). The cave, first excavated by K. Moser in 1892, was used as an Austrian field hospital during the Great War. It was subsequently excavated by A. Radmilli, D. Cannarella and G. Cremonesi with the University of Pisa, between 1961-1963, who extended the 1958-1960 excavations under G. Slongo (Canarella D. & Cremonesi G., 1967). The last excavations took place under G. Cremonesi in 1982 (C.R.I.G.A.).

The occupation of this site commenced in the Early Mesolithic and continues into the Late Mesolithic, Transition, Neolithic and later periods. In the Early Mesolithic, land snails prevail with fresh water fish and molluscs which are substituted over time with increasing amounts of marine molluscs in the Castelnovian, as the coastline approached (Biagi P., 1994; Voytek B., 2006: 171, 2011: 193). During the Mesolithic, the dominant flint is local, with a steady increase of non-local raw material in the later phases, and only in the Neolithic does exogenous good quality flint become progressively important (Montagnari Kokelj E. & Piano C., 2003: 95), when the site was used as a sheep pen (Montagnari Kokelj E., *et al.*, 2013: 156).

A single sherd of Impressed Ware was found on top of the Mesolithic levels during the 1961-1963 excavations (Boschian G. & Montagnari Kokelj E., 2000; Montagnari Kokelj., 1993: 75), attesting contacts to the south during the Terminal Mesolithic.

The Castelnovian was found in the outer part of the cave in the 1960s excavations. In the interior of the cave only a thin relic early horizon was found under an erosional surface in 1982, where reworked Mesolithic artefacts were found in Neolithic levels with coprolitic features in Level 3. This is the only instance in the Trieste Karst of domesticated animal dung in a Mesolithic horizon (*reworked ab antiquo by either Neolithic or Bronze Age people*) (Boschian G. & Montagnari Kokelj E., 2000: 346).

D. Cannarella and G. Cremonesi (1967) summarise the findings from the 1961-1963 excavations:

- Level G is Early Mesolithic;
- Level F is Later Mesolithic with an increasing incidence of trapezes (the term Castelnovian was not yet current), with marine molluscs increasing over time and a single Impressed Ware sherd at the top of the 60-100 cm stratigraphy;
- Level E, 60-80 cm thick, had four sherds at the base, some of which are attributable to Impressed Ware, with Vlaška Ware higher up. The land fauna is made up 60% of ovicaprines and bovines and 40% wild fauna, mainly red and roe deer, fox and pine marten (Boschian G. & Montagnari Kokelj E., 2000: 347; Rowley-Conwy P., *et al*., 2013: 167 table 9.2 quoting Canarella & Cremonesi 1967). The lithics appear to continue the Late Mesolithic tradition;

The Neolithic levels produced a total of 274 sherds (Montagnari Kokelj E. & Piano C., 2003).

G. Cremonesi *et al*. (1984), summarise the findings of the 1982 excavations which extended over 1 m^2 only, which were the subject of wet sieving using 2 and 1 mm mesh:

- Level 5 and below appear to be Sauveterrian with no marine fauna;
- Level 4 is Castelnovian in which marine molluscs appear, which become important during the Late Castelnovian (Voytek B., 2011: 193);
- Levels 3-1 contain remains of ovicaprines and 30 sherds (Montagnari Kokelj E. & Piano C., 2003), whilst the lithics are Castelnovian (Fig. R15-3) (Mlekuž D. 2003: 143). The faunal assemblage is domesticated (ovicaprines and bovines) and wild (red deer and roe deer) (Fig. R15-3a).

It is almost certain that there was continuity of occupation by the hunter-gatherer population, who acquired some Impressed Ware at the end of the Mesolithic as well as ovicaprines through contact and exchange, and who appear to have adopted pottery and herding over an extended period of time, without any evidence for the arrival of immigrant farmers with the full Neolithic package.

Grotta Benussi (11) – Cave in the Trieste Karst (Fig, R15-4), 254 masl and 4 km from the sea, discovered by B. Benussi and excavated between 1966-1972 by M. Alessio in arbitrary horizontal levels, so that Levels 3-4 are Castelnovian and Levels 5-6 Sauveterrian. There were sparse Neolithic remains above the Castelnovian (Alessio M., *et al.*, 1978: 84).

The dates for the Castelnovian levels are (Alessio M., *et al.*, 1978; Biagi P., 1994; Biagi P., *et al*., 2008, quoting Alessio *et al*., 1978):

- R.1043 7050±60BP = 6032-5789 BC (OxCal 4.1), on bone Level 3 – Median 5910 BC.
- R-1042 7230±140BP = 6408-5842 BC (OxCal 4.1), on charcoal Level 3-4 – Median 6125 BC.
- R-1044 7620±150BP = 7003-6103 BC (OxCal 4.1), on charcoal Level 4 – Median 6550 BC.

Because the excavations were conducted using arbitrary cuts and the dates obtained on bulk charcoal rather than single burning events, C. Bonsall *et al*. (2013:152) considered them to be suspect. The most recent date should however be accepted since it is on bone and the two earlier ones with large standard deviations appear to be correct for the Castelnovian with trapezoidal microliths.

The fauna is confirmed as being 100% wild, with no pottery (Chapman J. & Müller J., 1990: 127), notwithstanding the claims by M. Budja (1996, 2001: 131) quoting Riedel (1975) and G.

Cremonesi (1978-1981). D. Mlekuž (2003: 142-143) also quotes Riedel (1975), but is sceptical regarding the presence of domesticated fauna, given the date and the lack of pottery.

The site appears to have been abandoned prior to the arrival of Neolithic attributes in the Region.

Grotta Caterina/Caverna Caterina/Grotta della Fornaca (14) – This cave in the Trieste Karst, at 213 masl and 2.5 km from the present-day coastline, once had a limekiln nearby, hence the alternative name. The cave, near Aurisina, and close to the Grotta dell'Edera, has a wide opening and large esplanade (Fig. R15-5), and would have been occupied in different areas at different times. K. Moser first investigated this site, which he excavated intermittently between 1893-1907. The excavated surfaces of later excavations are however limited (Fig. R15-5) to two pits opened in the late 1970s by D. Cannarella and C. Pitti, who report that a trench AB, 3.20 X 4.80 m, was opened in the south-central section of the cave, some 10m inside the drip-line, in which the upper archaeological levels contained pottery from Roman Times through the Bronze Age, and that there was no evidence for a Neolithic occupation. Below a sterile layer, appeared a Sauveterrian industry, which according to G. Boschian and E. Montagnari Kokelj (2000: 343) was not excavated. Based on pit C, 3X5 m against the northern wall, inside the drip-line, the Mesolithic begins with Level 5 and is Sauveterrian (1984), which again, according to G. Boschian and E. Montagnari Kokelj (2000: 362-363) was below a very much eroded surface. According to E. Montagnari Kokelj *et al*., (2013: 156), the site was used as a sheep pen in the Neolithic.

This is a site with a very limited excavated surface, in which no Late Mesolithic or Transition levels have been found.

Grotta/Caverna dei Ciclami/Grotta a S del Monte Orsario/Grotta di Percedol (20) – This cave in the Trieste Karst opens on the southern slope of Mount Orsario at 323 masl and 5.5 km from the sea, close to the Slovenian border. It was poorly excavated by local amateurs between 1959-1964, although the data from the lower levels is good (C.R.I.G.A.) and again in 1972 (Alessio M., *et al.*, 1978: 85).

The Mesolithic Level ends during the Sauveterrian and there is a gap of about 1800 years before the cave is reoccupied (Forenbaher S. & Miracle P., 2005; Montagnari Kokelj E., 1993: 73). A report by E. Montagnari Kokelj (1993: 75) that a sherd of Impressed Ware was found mixed with a Mesolithic stratum in the excavations has never been confirmed.

The next date is for the Initial Neolithic Level 8B when the cave is reoccupied, and when ovicaprines associated with wild fauna (red and roe deer, fox and pine marten) and Early Neolithic Vlaška Ware appear in the stratigraphy, as well as shards of Fiorano pottery (Alessio M., *et al.*, 1978; Bagolini B. & Biagi P., 1990; Barfield L., 1999: 29; Biagi P. & Voytek B., 1994; Boschian G. & Montagnari Kokelj E., 2000; Montagnari Kokelj E., 2001b: 246; Montagnari Kokelj E., *et al*., 2013: 150):

- R-1041A 8260±60BP = 7480-7130 BC (OxCal 4.2 at 93%), on charcoal Cut 9. End of Sauveterrian/Transition to Castelnovian with a few trapezes – Median 7305 BC.
- R-1040A 6300±60BP = 5385-5203 BC (OxCal 4.2 at 81.2% probability), on charcoal Cut 8B – Median 5295 BC.

Level 7 contained Middle Neolithic Square Mouthed Pottery (VBQ) sherds, above which the levels continued up to Roman times.

The Early Neolithic occupation is similar to that of other cave sites of the region, which appear to have been used for residential as well as penning of mostly ovicaprines. There are insufficient details on the ratios of domesticated to wild fauna, or as regards the volume of pottery by type in the initial stages of occupation in the 6th millennium BC. Whilst it is possible that there was an initial contact with Impressed Ware Culture farmers to the south-east, this is not assured, but there is clearer indication of contact with the Fiorano Culture.

Whether we are dealing with migrant pastoralists and/or acculturated hunter-gatherers remains a moot point.

Grotta/Caverna dei Ladroni (10) – Little information is available on this cave site in the Trieste Karst, in which the Mesolithic levels have been destroyed (Cannarella D., 1984).

Grotta della Tartaruga (24) – This small cave is located in a small doline on a plateau, 260 masl and some 3 km from the present coastline in the Trieste Karst, close to Borgo Grotta Gigante, north of Trieste. The site was the subject of a clandestine dig in 2011 when we visited it (Fig. R15-6).

The Neolithic levels of the cave were first excavated between 1962-1967 by D. Cannarella and B. Redivo, who reported on their findings in 1978-1981. The excavations were continued between 1967-1968 by G. Cremonesi, who added 2 m^2 to the excavated surface, whilst he investigated the 1 m of Mesolithic levels, which were divided into 7-8 cm thick cuts. He reported on the excavations in 1983 and 1984, indicating that Levels 1 and 2 were attributed to the Castelnovian and Level 3 tended towards a Sauveterrian industry. He also reported that the Mesolithic tools (trapezes and Montbani blades), reported as associated with the earliest Neolithic level by Cannarella *et al*. (1978-1981), were the result of mixing artefacts in storage during the excavations. After correction of the error, the tools from the Initial Neolithic are seen to be of an entirely different manufacture on large blades, without any relationship with the Mesolithic tradition (Cremonesi G., 1983: 184), thus indicating that there was a hiatus between the Mesolithic occupation and that during the Neolithic. The faunal remains were exclusively wild throughout the Mesolithic (Cremonesi G., 1984) and whilst land snails dominate in the Early Mesolithic, these are substituted for marine molluscs in the Later Mesolithic (Voytek B., 2006: 171; 2011: 193). The substantial quantities of Vlaška Ware found, associated with the Neolithic blade-based industry, four polished stone axes of Central Balkans origin and one small obsidian flake from the Carpathian Basin, suggest a prolonged or repeated occupation (Montagnari Kokelj E., 1993: 74-75; Pessina A. & Radi G., 2006: 450; Tycot R., 1996: 54, 2011: 39). The Neolithic faunal assemblage is dominated by ovicaprines (Kozlowski J. K. & Nowak M., 2007: 107).

There are no dates for this site.

The clear-cut change in the lithic assemblage, the total reliance on domesticated fauna in the Neolithic, and the large quantities of pottery suggests that this site was probably used in the Neolithic by incoming shepherds who did not practice the hunt. There is no indication of a major discontinuity between the Mesolithic and Neolithic occupations, suggesting that the Mesolithic occupation ended shortly before the arrival of the shepherd pottery manufacturers.

Grotta della Trincea/Cavernetta della Trincea/Grotta sotto San Lorenzo (31) – This small cave, 378 masl and 5 km from the present coastline, is located east of Trieste on a steep slope overlooking the Val Rosandra. The site was visited by K. Moser in 1981 and initially excavated by R. Battaglia prior to 1926, who found a few undiagnostic lithics. The site was again excavated by R. Stradi in 1954, who noted that there were also a few faunal remains and marine molluscs; the lithic assemblage he collected from the 10 cm occupational stratum was subsequently studied by Gerdol, who reported in 1976 that the horizon was Castelnovian Mesolithic, above which there were also sparse remains of a later occupation, attributable to the Metal Ages and later, which were largely destroyed when the cave was used during hostilities in the Great War (Betic A., 2013a; C.R.I.G.A.).

A. Broglio (1983: 72) considered that there was evidence for a Mesolithic Sauveterrian occupation as well, and E. Montagnari Kokelj (1993) indicated that the single trapeze found confirmed the Castelnovian presence.

This site appears to have been used episodically during the Mesolithic, after which it was abandoned until the Bronze Age, so that there is no evidence for an occupation spanning the Transition.

Grotta dell'Edera/Štenaška/Štenašca (15) – This cave site in the Trieste Karst is the best studied and published of the Region. It is located 15 km north-west of Trieste and east of Aurisina, close to Grotta Caterina, some 3 km from the current coastline, at 238 masl. The cave faces north-east at the bottom of a doline with a level bottom in a surrounding plateau (Fig. R15-7), but given the depth of the stratigraphy, the doline would have been considerably deeper during the Transition. The site, visited by L. K. Moser in 1902, was first excavated between 1969-1975 by Marzolini, and again between 1992-2002 by the Cà Foscari University of Venice and the University of California, Berkeley, USA, under the direction of Paolo Biagi and Barbara A. Voytek, who have published several articles dealing with the excavations (Biagi P., 2001, 2003b; Biagi P., *et al*., 1993; Biagi P. & Voytek B., 1994; Biagi P., *et al*., 2001; Biagi P. & Spataro M., 2002; Biagi P., *et al*., 2008). The stratigraphy (Fig. R15-7) from the latest excavations is a s follows:

- Layer 1 is Bronze Age to Roman period;
- Layer 2 is Later Neolithic;
- Layer 2a is Vlaška Ware Early Neolithic. It consists of at least six superimposed fireplaces spanning some 300 years, and the lowermost produced fragments of a Danilo rhyton, as well as Vlaška Ware, which is of local manufacture. The fauna is primarily domesticated, consisting of ovicaprines with a small percentage of bovines, with about 25% large wild game, as well as some marine molluscs, suggesting a possible Mesolithic substrate;
- Layer 3, without hearths but with a faunal assemblage and some sherds has been considered sterile;
- Layer 3a is Late Mesolithic Castelnovian. It produced a Castelnovian lithic assemblage of 538 artefacts with trapezes, bladelets and the microburin technique (Fig. R15-8), manufactured on local raw material, as well as 17 sherds, 2 of which contained exogenous temper, plus wild and domesticated faunal remains at the top of this Layer;
- Layer 3b is a poor early Castelnovian level with trapezes, scalene triangles microburins and cores of local Komen flint (Fig. R15-8);
- Layer 3c is Early Mesolithic Sauveterrian (Fig. R15-8);
- Layer 3d is Initial Mesolithic.

The dates obtained over several years for Layers 2 and 3 are as follows (Biagi P., 2003b; Biagi P. & Spataro M., 2001; Biagi P., *et al*., 2008; Bonizzoni L., et al., 2009; Boschin F. & Riedel F., 2000; Skeates R., 2000, 2001-2003; Spataro M., 1999-2000):

- GrN-26797 5080±40BP = 3996-3787 BC (OxCal 4.2 at 95.4%), Layer 2 or 2a at 200-210 cm.
- GX-19020 5555±250BP = 5001-3913 BC (OxCal 4.2 at 93.8%), Layer 2 or 2a at 200-210 cm.
- GX-19022 6305±285BP = 5756-4581 BC (OxCal 4.2 at 95.4%), Layer 2a uppermost part of layer. (Standard deviation too large, so ignored)
- GX-19567 6445±210BP = 5759-4905 BC (OxCal 4.2 at 95.3%), Layer 2a at 310-320 cm same depth as GrN-26795 – Median 5330 BC.
- GrN-26795 6410±50 = 5476-5312 BC (OxCal 4.2 at 95.4%), Layer 2a at 310-320 cm same depth as GX-19567 – Median 5395 BC.
- GrN-23129 6590±100BP = 5676-5365 BC (OxCal 4.2 at 93.7%), on charcoal from the lowermost cut of Layer 2a, where a Danilo rhyton was found (same charcoal sample as GX-19568) – Median 5520 BC.
- GX-19568 6615±390BP = 6269-4723 BC (OxCal 4.2 at 94.4%), charcoal from the lowermost cut of Layer 2a, where a Danilo rhyton was found (same as charcoal sample as GrN-23129) – Median 5500 BC.
- GrA-19820 6390±60BP = 5479-5293 BC (OxCal 4.2 at 91.4%), on bovine Layer 3a, depth 350-360 cm, Castelnovian with pottery and domesticated cattle – Median 5385 BC.
- GrN-25474 6480±40BP = 5521-5361 BC (OxCal 4.2 at 95.4%), on *Patella*, Layer 3a depth 350-360 cm, Castelnovian with pottery. (To be ignored since not corrected for the WRE)

- GrN-27229 6510±70BP = 5569-5329 BC (OxCal 4.2 at 90.4%), on *Cervus elaphus*, Layer 3a depth 350-360 cm, Castelnovian with pottery – Median 5450 BC.
- GrA-19912 6620±60BP = 5637-5479 BC (OxCal 4.2 at 95.4%), on *Ovis*, Layer 3a at depth 350-360 cm – Median 5550 BC.
- GX-19569 6700±130BP = 5881-5463 BC (OxCal 4.2 at 92.6%), on charcoal from Layer 3a, in which wild fauna dominates, with some ovicaprines and a few sherds of Impressed Ware. This Layer is preceded and followed by sterile layers – Median 5670 BC.
- GrA-14106 8045±40BP = 7083-6818 BC (OxCal 4.2 at 94.7%), on animal bone from Layer 3b – Median 6950 BC.
- GrN-25137 8060±70BP = 7187-6700 BC (OxCal 4.2 at 94%), on charcoal from Layer 3b – Median 6945 BC.
- GrN-25138 8110±90BP = 7357-6754 BC (OxCal 4.2 at 94.8%), on charcoal Layer 3b – Median 7055 BC.
- GrA-11818 8250±50BP = 7460-7132 BC (OxCal 4.2 at 93.1%), on charred hazel nut shell Layer 3c – Median 7300 BC.
- GrN-25139 8350±120BP = 7585-7126 BC (OxCal 4.2 at 93.1%), on charcoal Layer 3c.

The site appears to have been occupied intermittently rather than on a continuing basis. There is gap in occupation between the Sauveterrian (Layer 3c) and the Early Castelnovian (Layer 3b) of some 250 years, which is followed by a prolonged gap of over 1300 years before the site is reoccupied at the end of the Castelnovian Mesolithic when the Transition is visible (Layer 3a) (Fig. R15-7). A further gap was identified by certain authors of a little less than 200 years before the site was used during the Vlaška Ware Early Neolithic (Layer 2a) (Andrič M. 2001: 135; Biagi P. 2001: 76) as a sheep pen (Montagnari Kokelj E., *et al*., 2012, 2013); this gap is evidenced by a relatively sterile Layer 3, 30-35 cm thick, which nonetheless included domesticated and wild fauna remains and some pottery sherds similar to the underlying Layer 3a (Boschin F., & Riedel A., 2000), suggesting that the site continued in use even if specific evidence for human occupation in the form of hearths was not found. The accumulation of dates adds some confusion in that the two oldest dates from Layer 2a (GrN-23129 and GX-19568), which date the same sample from the lowermost cut of Layer 2a at *ca*. 5500 BC, overlap the most recent dates from the Transition Level 3a by almost 100 years.

Layer 3a, in which an approximately 1 m diameter structured hearth was uncovered, is key to appreciating the Transition. "*The industry is composed of 538 artefacts among which are 2 trapezes, 1 denticulate bladelet, 1 short end-scraper, 2 truncations, 1 core fragment and 61 microburins. This layer yielded also 17 potsherds, two of which can be attributed to well-defined shapes*" (Spataro M., 1999-2000: 88); "*The potsherds recovered from the Castelnovian, Late Mesolithic hearth of Level 3a, are of great relevance, particularly the necked flask 3a/3 (Fig.7. no. 1). This fragment is especially important for the interpretation of the interactive relationships between the different cultures of the Trieste and Slovene Karst region around the second half of the 7th millennium BP* [uncal.] *(Müller 1994; 2000; Velušćek 1997), namely the Late Castelnovian Group and, possibly, although this is not yet demonstrated with certainty, the Impressed Ware Culture, whose northernmost sites so far known are located along the southernmost coastline of the Istrian Peninsula (Milhovilić 1994). This potsherd, which from a typological point of view is completely different from those of the Vlaška Group, shows a different minero-petrographic paste. Its texture has nothing in common with those of the other Neolithic vessels examined and the clay employed for its manufacture is not local. There is no doubt that it was produced elsewhere. As an import, it might represent the result of exchange/trade of goods or prestige items between the last hunter-foragers and the first villagers probably settled elsewhere along the coast (Barnett 1990: 846; Spataro 1999: 87)*" (Spataro M., 1999-2000: 98). The same author, who studied the pottery, also confirms that the Vlaška Ware found at the Grotta dell'Edera was of local manufacture (p. 98). The Transition Layer 3a also yielded 3 perforated non-local limestone beads ca. 1.5 mm in diameter, and non-local limestone and ochre (Voytek B., 2006: 171, 2011: 193-196). It is

now known that Impressed Ware has been found north-east of the estuary of the River Lim on the north coast of the Istrian Peninsula (Komso D., 2011: pers. com.).

The faunal assemblage spanning the Transition and Early Neolithic was analysed by F. Boschin and A. Riedel (2000) (Fig. R15-8a). This chart shows that based on the MNI, hunting of large game continued to be important throughout the Transition Layers 3a and 3 (50%) as well as the Vlaška Ware Early Neolithic Layer 2a (24-25%). Marine molluscs, which had been steadily growing in importance during the Later Mesolithic, are very important during the Transition in Level 3a, and continue to be present during the Early Neolithic (Biagi P., *et al*., 2008; Voytek B., 2006: 171, 2011: 193).

P. Biagi (2003b: 338) concluded that it was possible that the Terminal Mesolithic hunter-gatherers had both acquired pottery, whether imported or locally produced, as well as ovicaprines sometime after 5700 BC, or as P. Biagi, *et al*. (2008: 259) state, "*There is little doubt that interaction occurred between the last hunter-gatherers of the Castelnovian culture and the first Neolithic farmers that might have led to an acculturation of the former or at least reduced their visibility in the archaeological record*". This Transition and acculturation of the autochthonous population was already recognised in 1996 (Pessina A. & Rottoli M., 1996).

Grotta del Pettirosso/Vlaška Jama (12) – This cave, 120 masl and 1.5 km from the coast, is located in the Northern Trieste Karst to the north of Nabrežina. The site has been the subject of numerous clandestine digs by treasure-hunters and those seeking archaeological artefacts since the 19th century, so that the archaeological levels are highly disturbed. It was initially the subject of archaeological excavations between 1892-1908 by K. Moser, in 1926 by E. Neumann, in 1972 by G. Stakul and lastly in the mid-1970s under D. Cannarella from the University of Pisa, who opened a 50m^2 trench which stopped at the Mesolithic levels at a depth of 2 metres (Barfield L., 1999; C.R.I.G.A.), where lithics were collected, hinting at a Mesolithic presence (Montagnari Kokelj E., 1993: 73).

About a dozen sherds of Impressed Ware have been found at this site (Biagi P., 2003b: 338; Boschian G. & Montagnari Kokelj E., 2000; Montagnari Kokelj E., 2001: 14), suggesting that the local hunter-gatherers were in contact with the Neolithic further south, prior to the Vlaška Ware Early Neolithic.

It was L. Barfield, who in 1972 characterised the Early Neolithic of the Karst as the Vlaška Group, later called the Vasi a Coppa Group by B. Bagolini and P. Biagi (Barfield L., 1999: 29).

There are no dates available for this site, nor is there any indication as to whether there was a discontinuity between the Mesolithic and the Transition/Early Neolithic levels, but the presence of Impressed Ware strongly suggests that the site might have been in use during the Transition, and a detailed study could have added to the corpus of information on how the Terminal Mesolithic occupants adapted to the Neolithic lifeways.

Grotta Gialla (17) – This cave, 260 masl and 3 km from the present shoreline, is located in the Northern Trieste Karst east of Nabrežina. This site, which has been the subject of clandestine digs, was excavated by B. Benussi between 1954-1962.

It would seem that the cave contained Mesolithic and later strata much perturbed by clandestine digs (Cannarella D., 1984). The Mesolithic lithics were found in a cavity in a rock-fall and included 3 burins, 3 scrapers, a double backed point and a backed blade. The pottery included a few incised sherds, but no details are supplied regarding their typology (C.R.I.G.A.).

E. Montagnari Kokelj (1993: 73) confirms that the site was excavated in the 1950s and that the Mesolithic material was only recognised as such after the Grotta Azzurra had been excavated in 1961-1962.

There are no dates for this site and the Mesolithic material appears to be non-diagnostic as regards its attribution to a cultural horizon and since there appears to be no stratigraphy, there is no sequence for the occupational levels.

Grotta Lonza/Grotta Benedetto Lonza/Grotta della Ciotola (21) – This cave in the Trieste Karst, 300 masl and 5 km from the sea, is located north of Trieste near Monrupino. It was initially excavated by B. Lonza in 1964-1965, who uncovered the Roman to Neolithic levels, reaching the Mesolithic strata which were subsequently excavated by A. Radmilli and C. Pitti from the University of Pisa between 1974-1982 (C.R.I.G.A.; Boschian G. & Montagnari Kokelj E., 2000: 360).

B. Lonza summarised his stratigraphy in cultural levels A to F (Lonza B., 1975):

- A to D are Roman to the Neolithic;
- E with little pottery and an obsidian bladelet;
- F Mesolithic (level 11 is a contact level with the Neolithic, and level 12 is Mesolithic (Lonza B., 1975: 45).

The Mesolithic levels appear to be 11, which B. Lonza describes as transitional Meso/Neo, and 12, which is considered Mesolithic. The pottery from the earliest pottery level 10 he considered to be non-attributable (p. 40).

In the subsequent excavations, for which only the Mesolithic levels have been published (Boschian G. & Montagnari Kokelj E., 2000: 366), Neolithic levels were found outside the cave. In the interior, the uppermost level in the centre was Mesolithic at the top of which was an erosional level; at the rear of the cave, against the north wall, was found a pottery level. The Mesolithic industry is Sauveterrian with the exception of a very few instruments found in the contact zone with the Neolithic, which might possibly also be Neolithic (1 microburin, 1 rhomboid and 3 scalene triangles) (Meluzzi C., *et al*., 1984: 129). C. Meluzzi *et al*., (1984: 109) considered that Levels 11-12 of Lonza's excavations were transitional between the Mesolithic and Neolithic.

There are no dates for this site, which is regrettable, since there appears to be a Late Mesolithic horizon which transitions into the Neolithic without a hiatus, and the undiagnostic sherds from the earliest pottery bearing levels could be similar to those from the Grotta dell'Edera, attesting to contact. We could not find any details of the mammalian faunal assemblage, which might also have shed light on the Transition. As indicated in a note dating from 2011 in the C.R.I.G.A., "*Il deposito presenta dati rilevanti anche per la conoscenza dei processi di neolitizzazione nel nord Adriatico, ma attualmente sono pubblicati i materiali degli scavi Lonza 1965-66, che documentano anche la fase recente del mesolitico, mentre quelli degli interventi degli anni 1974 e 1975 non sono editi*".

Grotta Teresiana di Duino/Grotta Fioravante/Theresien Höhle/Jama Terezijna (8) – This cave close to sea near Duino at the northern end of the Trieste Karst was excavated by K. Moser at the end of the 19th century, who identified 5 m of archaeological deposits. The site was largely destroyed by the allies after the Second World War, when they occupied the nearby castle and used the cave as a refuse tip. A re-examination of the Moser reports suggests there were Mesolithic levels below those belonging to the Vlaška Ware Early Neolithic, which might still be in place (Barfield L., 1999; Boschian G. & Montagnari Kokelj E., 1984: 40; Cannarella D., 1984; C.R.I.G.A.; Montagnari Kokelj E. & Piano C., 2003: 91).

Whether a Transition level exists at this site remains hypothetical.

Grotta/Cavernetta VG 4245 di Trebiciano (27) – This small cave, in a small doline at 362 masl and 3-4 km from the present coastline, is located north-east of Trieste, close to the village of Trebiciano, on the high plateau of the Trieste Karst. The site was excavated between 1977-1980 by the archaeological services of Friuli-Venezia Giulia. The lithics are almost exclusively of the Sauveterrian Mesolithic tradition, dominated by microlithic triangular armatures, with a single trapezoidal armature (C.R.I.G.A.).

To the trapeze, suggesting continuing use of the site into the transition between the Sauveterrian and Castelnovian Mesolithic, can be added a trapeze found in the Neolithic strata, but without any significant pottery and a lithic assemblage made of non-local flint commonly associated with the Vlaška Ware culture (Montagnari Kokelj E., 1993: 73-75).

This site, which has not been dated, appears to have been abandoned towards the end of the Mesolithic and only reoccupied once the Neolithic was established in the Region.

Grotta Zingari/Grotta Degli Zingari-Sgonico (22) – This small cavity in the Trieste Karst in Borgo Grotta Gigante north of Trieste, is located at 277 masl on a plateau and approximately 5 km from the present coastline. It lies at the bottom of a small doline (Fig. R15-9) and got its name because it was used by Gypsies prior to being excavated between 1961-1966 by the Associazione XXX Ottobre (C.R.I.G.A.). Additional excavations were planned to commence in the 1990s (Montagnari Kokelj E., 1993: 73), but no one appears to have referenced them, so I must assume they never occurred.

The cave was used during the Sauveterrian and Castelnovian Mesolithic, Transition, Neolithic, Metal Ages, and historical times.

The Mesolithic Levels are below Level 5, which is Early Neolithic or Transition.

The Mesolithic Levels produced one trapezoidal armature out of 73 tools.

The Initial Neolithic Level 5 produced a trapeze, three scrapers and a backed truncation point suggesting continuity of the Mesolithic traditions, as well as a Neolithic blade-based industry (Montagnari Kokelj E., 1993: 75, quoting Marzolini, 1971-1972).

M. Bon (1996) studied the faunal assemblage of Level 5, in which domesticated species dominated with MNI of 3 bovines, 8 ovicaprines, 5 suids and 1 dog; wild fauna continue to be important however, with 3 red deer, 4 roe deer and 1 suid. The assemblage was collected in large part from the rear of the cave, which has been interpreted as a refuse area (Rowley-Conwy P., *et al*., 2013: 167 table 9.2, quoting Bon, 1996; Boschian G. & Montagnari Kokelj E., 2000: 347). Other than the continuing importance of the hunt in Level 5, the collection of marine molluscs also continues (Cremonesi G., 1983: 184; Malone C., 2003).

The first pottery in Level 5 is Vlaška Ware (C.R.I.G.A.; Mlekuž D., 2006; Montagnari Kokelj E., *et al*., 2011).

We were unable to find any dates although these supposedly exist for the Later Mesolithic. The only date found is from the Early Mesolithic:

- R-971 9570±80 = 9229-8734 BC (OxCal 4.2 at 95.4%), Level 7 – Median 8970 BC.

This site shows reasonably clear evidence of a gradual Transition (Montagnari Kokelj E., 1993: 75), with lithics in Level 5 of Mesolithic tradition and the continuing importance of the hunt. A new analysis of the stratigraphy has confirmed that the site was used in the Later Early Neolithic as a pen, occupied intensively, if discontinuously, by the shepherds and their flock, and that the fumier was cleaned on a regular basis through burning, with the kill profile of the 66 MNI ovicaprines and pottery spoon suggesting that the flock was maintained to favour milk production, even if that was not the exclusive purpose (Montagnari Kokelj E., *et al.*, 2012: 37). The continuing use of this small cave could also suggest that acculturated hunter-gatherers continued their traditional use of this site.

It is a shame that the later excavations did not occur, that more focus was not given to the Transition Level, and that there are no dates for the Late Mesolithic, Transition Level and Initial Neolithic. The continuity of Mesolithic attributes (lithics, large game and mollusc collection) suggests acculturation even if immigrant shepherds could also be present, although flock grazing far from Neolithic settlements appears to be a Later Neolithic development.

Kambrce (4) – This is Mesolithic open-air lithic scatter in the Slovenian Karst close to Postojna (Turk I., 2003).

Mala Triglavca (26) – This north-facing cave is at the bottom of a doline near Divača in Slovenia, 15 km from the coast at 435m masl (Fig. R15-10). The site was excavated from 1979-1985 under Franz Leben, who never published the excavations properly, and again under D. Mlekuž starting in 2002 to clarify Leben's stratigraphy (Fig. R15-10) and obtain additional ^{14}C dates. I. Turk wet-sieved 207 kg of sediments and discovered 56 stone artefacts (11 endscrapers, 14 trapezes, 2 blades, 9 scalene

triangles, 2 micropoints and 18 microburins). The exercise was repeated in 2001 with 1407 kg of sediments, confirming the Castelnovian Mesolithic presence in the cave indicated by F. Leben, which the author compares to Viktorjev Spodmol (Turk I., 2003: 20). The various excavations produced the largest collection of Late Mesolithic trapezes in Slovenia with 43 units, as well as Montbani blades (Franco C., 2011: 34).

The site is important in that it was occupied from the Mesolithic into the Neolithic (Turk I. 2003: 66), for which a fragment of a rhyton was found (A. Tomaž, 2006: 366) as well as other Vlaška Ware (Bonsall C., *et al.*, 2013: 156). The residues of Early Neolithic pottery were subjected to gas chromatography (GC), GC-mass spectrometry (GC-MS) and GC-combustion-isotope ratio MS (GC-C-IRM.S), to determine the origin of the residues, which were determined to originate from adipose fat as well as ruminant dairy fat (Šoberl L., *et al.*, 2008). Unfortunately, no date is available for this pottery, which would suggest an influx of herders with acquired dairying skills, acculturated indigenous hunter-gatherers in an advanced stage of Transition, or a combination of the two.

The additional dates obtained for the Early Neolithic and Terminal Mesolithic are as follows (Mlekuž D., *et al.*, 2008):

- Poz-14243 5980±40BP = 4988-4772 BC (OxCal 4.2 at 94.5%), on ungulate at 2.90-3.05 m in grid 7 – Median 4880 BC.
- OxA-15139 6451±36BP = 5483-5344 BC (OxCal 4.2 at 94.5%), on roe deer point at 3.05-3.25 m in grid 7 – Median 5415 BC.
- OxA-15134 6602±37BP = 5575- 5486 (OxCal 4.2 BC at 70.6%), on red deer at 4.10 m in grid 5 – Median 5530 BC.
- OxA-15223 6647±37BP = 5636-5511 BC (OxCal 4.2 at 94.5%), on red deer at 3.70-3.90 m in grid 4 – Median 5575 BC.
- OxA-15137 7229±38BP = 6211-6021 BC (OxCal 4.2 at 94.5%), on ungulate splinter at 3.70-3.90 m in grid 4 – Median 6115 BC.
- Poz-14232 7630±50BP = 6592-6421 BC (OxCal 4.2 at 95.4%), on red deer at 2.70 m in grid 4 – Median 6505 BC.
- Poz-16341 7950±50BP = 7041-6691 BC (OxCal 4.2 at 95.4%), on antler at 2.50-2.70 m in grid 4 – Median 6865 BC.

Other dates take the occupation of the cave back to the mid-8th millennium BC. It should also be noted that dates from F. Leben's Layers III-IV stratigraphy (Fig. R15-10) do not figure on the list of dates provided by D. Mlekuž *et al.*, (2008):

- Poz-16343 in F. Leben's Layer III.
- Poz-16342 at the junction of F. Leben's Layers III and IV.

The site has been the subject of a substantial amount of depositional movement between the centre of the cave and the edges which probably occurred during the Neolithic, displacing material from the Mesolithic and Transition, so that there is a hiatus of *ca*. 1800 years prior to 5400 BC in the centre of the cave and inversion of dates at the edges that fill the hiatus. Bioturbation and other geological/geomorphological processes have also been at play, but there does not appear to be an occupational hiatus (Mlekuž D., *et al.*, 2008: 410-412).

In the Early Neolithic, the faunal assemblage (excluding aquatic and land snails, and birds) is 31% domesticated (ovicaprines 14%, suids 11%, bovines 6%) and 69% wild (red deer 66%, roe deer 3%, wild boar 5%, Ibex/chamois 1%) (Budja M., 1996, 2001; Rowley-Conwy P., *et al.*, 2013: 167 table 9.2, quoting Budja 1996), which M. Budja (1996: 74; 2001: 132), describes as a Castelnovian context. S. Forenbaher and P. Miracle (2005: 517) further state that pottery was associated with wild taxa.

S. Petru (2004: 201) commented that over 800 tools were found for the Mesolithic, whilst only 16 were found for the Neolithic, suggesting that the time of occupation in the Neolithic was not long. The Neolithic tools all show user-wear and are made of a higher quality flint not known locally and

there is no knapping waste, suggesting they were made elsewhere and were valued. During the Mesolithic, the cave was a hunting site, whereas in the Neolithic is was a herders' stop-over.

Notwithstanding the stratigraphic issues, it is highly probable that this site, which was used during the Early Holocene by Mesolithic hunter-gatherers, continued to be used by them during the Transition whilst adopting Neolithic attributes, without there being any evidence for agriculture, which would not have been possible in the surrounding area.

Monte Stena (30) – Two lithic scatters have been found near the summit of this 441 masl hill, close to Grotta della Trincea, denominated Area 1 and Area 2. Some of the material is Castelnovian Mesolithic (Fig R15-12). The only other lithic scatter of the Trieste Karst was found in a Dolina called Velika Nive, close to Aurisina.

Otoško polje (2) – This is a Mesolithic open-air lithic scatter site in the Slovenian Karst close to Postojna (Turk I., 2003).

Pod Črmukljo (34) – This is a Mesolithic and Transition open-air site beneath a rock-wall in South-Western Slovenia near the village of Šembije, discovered by Mario de Ruiz in 1964, and excavated prior to 1986 by M. Brodar. M. Brodar (1992: 23) indicates that it is a site without stratigraphy which was excavated over a surface of about 5 m^2; he reports on the lithic industry and all the lithics tools have been drawn and included in the article. The armatures in the drawings on p. 36 include scalene triangles of Sauveterrian-type as well as trapezes of Castelnovian-type, suggesting the site might have been used over an extended period of time and into the Transition, since amongst the wild fauna were some ovicaprine remains (Brodar M., 1992: 30). This was confirmed by M. Budja (1993: 190; 1996: 73; 2001: 132) who also indicated that pottery was found. The ovicaprine remains may be limited to an incisor according to D. Mlekuž (2003: 143, quoting Pohar, 1986).

There are no dates for this site, but it is possible that it was used by Terminal Mesolithic folk into the Transition prior to its abandonment.

Podmol pri Kastelcu/Podmol/Spodmol (33) – This cave, about 400 masl, is at the base of a flat bottomed doline on the Petrinjski kras (Petrinia Karst) plateau near Kastelec in Western Slovenia (Fig. R15-11). It was excavated by I. Turk between 1989-1991, who discovered 8 m of Holocene stratigraphy covering the Final Mesolithic/Transition to Historical times, which he divided in 13 Levels (Fig. R15-11) (Turk I., *et al.*, 1993).

The lowermost strata were described as follows:

- Level 10 sub-phase L is Neolithic with ovicaprines (66%), suids and bovines, but no wild fauna. There were also 13 sherds;
- Level 11 sub-phase M is Neolithic with bovines, ovicaprines (63%) and molluscs, but no wild fauna. There were also 14 sherds;
- Level 12 sterile;
- Level 13 Mesolithic-Neolithic Transition; no wild fauna but 15 bones of ovicaprines and no pottery, in what M. Budja (2001: 131) calls a Castelnovian context.

D. Mlekuž (2005b, Table on p. 17) shows 5 ^{14}C dates for Levels 11 and 13 on a graph which summarise as follows:

- Level 11 is dated by three dates *ca*. 7430-7300 BP Cal. = 5480-5350 BC (OxCal 3.9, 2003) – Median 5415 BC.
- Level 13 is dated by two dates *ca*. 7570-7430 BP Cal. = 5620-5480 BC (OxCal 3.9, 2003) – Median 5550 BC.

There is no overlap in the spread of these dates, comforting the perceived hiatus in occupation visible in Level 12 between the Terminal Mesolithic/Transition with ovicaprines of Level 13, and the Initial Neolithic Vlaška Ware in Level 11. There is no indication of agriculture, which is only

evidenced from the Late Neolithic/Eneolithic in karst country around the site, which does not lend itself easily to this activity (Petru S., 2004: 202). Whether the returning herders visible in Level 11 were acculturated descendants of the Castelnovian Mesolithic people from Level 13, who had acquired ovicaprines, or migrant pastoralists remains a moot point, but the presence of molluscs in Level 11 could point to acculturated descendants of the Mesolithic occupants.

Riparo Monrupino/Riparo di Monrupino (23) – This small rockshelter, 2.5 m deep and 3.2 m wide, is located at 316 masl and 5.4 km from the present coastline at the base of a doline 12 m deep on a plateau in the Trieste Karst at Borgo Monrupino, north of Trieste. It was discovered in 1972 and was the subject of excavations between 1972-1976 under the Soprintendensa Archeologica di Friuli-Venezia Giulia. The 1974-1976 excavations were conducted by D. Cannarella who used a different stratigraphic numbering system than the previous excavations. The Mesolithic levels were reached but not fully excavated. Mixed Mesolithic and Neolithic lithics were also found in a secondary position, possibly caused by erosion, leaving open the possibility of contact between Mesolithic and Neolithic occupants (Bertoldi F., 1996: 138; C.R.I.G.A., quoting Radmilli, 1973-1974: 112). This information is confirmed in the statement that a few lithics hinting at the Mesolithic presence were collected, including a trapeze, below the Vlaška Ware horizon (Bertoldi F., 1996: 168; Boschian G. & Montagnari Kokelj E., 1984: 40; Montagnari Kokelj E., 1993: 73).

There are no dates from this site, which has the potential of shedding some light on the Transition of the Region.

Riparo Zaccaria (13) – This rockshelter north of Nabrežina in the Trieste Karst, just east of the E70 motorway, opens on the hill slope 130 masl at the bottom of a doline, 1.6 km from the present coastline. The excavations were conducted between 1972-1974, when sparse material was collected (C.R.I.G.A.). Calza V. *et al*., (1975) reported on the excavations in which all the material was described as Neolithic.

E. Montagnari Kokelj (1993: 73) indicated that a few of the lithics collected in the 1970s appeared to be Mesolithic, but of an undetermined date.

There are no dates for this rockshelter, which might have been used during the Mesolithic as well as the Neolithic, although given the small amount of material collected, spanning several millennia, the use of this site was probably episodic.

Roška Špilja (28) – This is a Mesolithic cave site in Slovenian Karst.

Trhlovca Cave (25) – This cave, 376 masl, is located within a kilometre of that of Mala Triglavca, in the Slovenian Karst near Divača. It was excavated between 1956-1959 by S. Brodar.

The cave was possibly in use from the Late Upper Palaeolithic and during the Mesolithic, the Neolithic and into historical periods. The Neolithic pottery was for the most part of local manufacture (Tomaž A., 2006: 366-367) and associated with a domesticated and wild faunal assemblage in which the wild fauna predominated in Levels F, G and H (Cerkvenik R. (2012: 336, quoting Leben (1988)); Petru S., 2004).

No dates are available for this cave site which, like Mala Triglavca, was probably used by the autochthonous folk who had acquired Neolithic attributes in the form of domesticated animals and pottery whilst continuing to hunt.

Viktorjev Spodmol/Podjamca (29) – This cave, with about 30 m^2 of roughly horizontal habitable space under the overhang, is located in the Reka Valley at the foot of the Vremščica Mountain (1027 m) in the Slovenian Karst. The site was discovered by Viktor Saksida, who excavated the site and divided it into an Upper Level containing sherds and a Lower Level without (Turk I. 2003). I Turk

excavated 0.2 m surface along the 2 m width of the Viktor Saksida's original excavation and divided the stratigraphy into 19 Spits, of which the top two were disturbed.

I. Turk wet-sieved the 0.35 m2 excavated and found 89 tools and over 10.000 technical pieces. The microburin technique was present and although few trapezes were found, many proximal ends of blades were, indicating that the median and distal ends were used for geometric armatures (Turk I., 2003: 32-49). A few rock-crystal tools attest to contact with the Alps or the vicinity of Cerknica and/or Idrija in Slovenia, since rock crystal is not known in the Karst (Turk I., 2003: 55).

There are three ^{14}C dates, all of which are from the Early Mesolithic or Sauveterrian:

- Beta-184796 9930±50BP = 9551-9285 BC (OxCal 4.2 at 85%), Spit 6 on premolar *Alces alces* – Median 9420 BC.
- Beta-184797 8300±50 = 7492-7184 BC (OxCal 4.2 at 95.4%), spit 15 on bone awl – Median 7340 BC.
- Beta-184798 9560±60 = 9188-8752 BC (OxCal 4.2 at 95.4%), spit 16 on bivalve uncorrected for the WRE.

The indications are therefore that the occupation of this site dates to the Sauveterrian, possibly commencing in the Pre-Boreal. The inverted dates cause a problem, since the date from Spit 6 does not make sense in relation to Spits 15 and 16. All the pottery is indicated as coming from the disturbed Spits 1 and 2 (p. 87), so that there might be a Castelnovian presence in the spits beneath, given that a few trapezes were found, but no indication is given regarding the Neolithic lithic tradition or of the Neolithic faunal assemblage. It is therefore not possible to make a determination regarding continuity of occupation during the Transition or of the possible provenance of the Initial Neolithic occupants.

Velika Nive (7) – This is a doline close to Aurisina in which one of the three Mesolithic lithic scatters in the Trieste Karst has been found.

Zemono (1) – Open-air Late Palaeolithic or Early Mesolithic site in Southwestern Slovenia, near the village of Zemono, where salvage archaeology was conducted prior to the construction of a highway.

North Adriatic – Trieste and Slovene Karst – Initial and Early Neolithic Sites – Introduction

In the Karst, the evidence points to small, possibly nomadic groups, who lived on animal husbandry, hunting and collecting. The domesticated fauna appears to be predominantly sheep or ovicaprines, with a high incidence of wild fauna, suggesting groups for whom animal husbandry was one aspect only of a subsistence strategy which included hunting, gathering, collecting (including marine molluscs) and fishing. The land was not propitious for farming, and grain only appears in the archaeological record at the end of the Neolithic. The large number of shed teeth would indicate year-round, if sporadic occupation of cave sites whilst the high number of young and neonates could be construed as either natural or disease-driven mortality, or the culling of the young so as to profit from the ewes' milk. The caves studied in the Trieste Karst (Azzurra, Edera, Zingari, Mitreo, and Tartaruga), and Slovenian coastal or near-coastal Karst for the Initial Neolithic Vlaška Period, contained little pottery or other Neolithic attributes, comforting the hypothesis of mobile groups in close touch with nature (Petrucci G., 2006: 462-463).

G. Petrucci and A. Riedel (1998: 29) have suggested that the ovicaprines found in the Karst (Grotta Zingari, Grotta Azzurra, Grotta dell'Edera, Grotta del Mitreo) are more likely to have originated in North-Eastern Italy than come up from Istria, since the dates for the Initial Neolithic match better (Petrucci G. & Riedel A., 1998: 29), but the associated Vlaška Ware suggest otherwise. The domesticated fauna is primarily ovicaprines in the Karst caves, often associated with an important element of wild species (principally red deer, roe deer, fox and pine marten), plus shellfish (Boschian G. & Montagnari Kokelj E., 2000).

Grotta delle Gallerie/Grotta delle Finestre presso Draga (32) – Cave site 6.5 km from the present coastline, 334 masl up the Val Rosandra Canyon. It was first excavated in 1890 by Carlo Marchesetti and has been the subject of eight excavations since, the last being in 1994 (Montagnari Kokelj M., 2013). The material found is mostly pottery dating from the Early Neolithic to the Iron Age (C.R.I.G.A.). P. Biagi (2003b: 338 quoting Korošec, 1960) mentions the cave as having Impressed Ware. The Neolithic layers are mixed and therefore of little use, even if the material is interesting (Montagnari Kokelj E., 2001b: 246).

There is no indication that the cave was used in the Late Mesolithic or Transition, and the presence of Impressed Ware appears to be questionable.

Grotta del Mitreo (6) – The occupation of this site in the Trieste Karst is first attested during the Neolithic Vlaška Ware Culture (Montagnari Kokelj E., 2001: 246; Montagnari Kokelj E., *et al*., 2013: 150), when the shepherds co-habited with their flock in the cave. The earliest archaeological Levels in trench AB are 6-8 (Bonsall C., *et al*., 2013: 156; Petrucci G., 1997), for which the dates are (Boschian G. & Montagnari Kokelj E., 2000: 334; Montagnari Kokelj E., 1993: 75):

- R-904 5770±60BP = 4745-4486 BC (OxCal 4.2 at 93.1%), cut 8 – Median 4615 BC.
- R-904a 5770±50BP = 4726-4492 BC (OxCal 4.2 at 95.4%), cut 8 – Median 4610 BC.

These dates appear to be late for the Vlaška Ware Culture given that it appears some 800 years earlier at Grotta dell'Edera.

The large fauna in the earliest Neolithic levels is over 90% domesticated and less than 10% wild, with the hunted proportion increasing to about 30% in the Late Neolithic and Bronze Age (Boschian G. & Montagnari- Kokelj E., 2000: 347; Petrucci G., 1997; Rowley-Conwy P., *et al*., 2013: 167).

The diet included marine molluscs during the initial occupation of the cave (Petrucci G., 1997), which could be construed as a tenuous indication that the occupants may have included acculturated descendants of the autochthonous hunter-gatherer population.

Grotta dell'Orso (19) – This cave, 4.5 km from the present coastline and 192 masl, is north of Gabrovizza in the Trieste Karst. The cave was excavated by Carlo Marchesetti in 1884, who found numerous remains of cave bear (*Ursus speleus*), and again in 1887, when he found Neolithic material. The cave was subsequently excavated on several occasions, the last being in the early 1950s. The archaeological material found has been typologically dated to the Early Neolithic through the Metal Ages (C.R.I.G.A.).

The site is mentioned by P. Biagi (2003b: 338 quoting Korošec, 1960) as having Impressed Ware, but E. Montagnari Kokelj *et al*. (2013: 150) indicate that the earliest evidence for human occupation is Vlaška Ware Early Neolithic.

There is no evidence for an occupation prior to the Early Neolithic, so that it is doubtful whether Impressed Ware was found at this site.

Sermin/Srmin (35) – This Early Neolithic site is on a hilltop near the coast above Koper/Capodistria, has been destroyed. The site was occupied from the Early Neolithic through the Middle Ages.

According to A. Tomaž (2006: 366), the excavations were poorly published. A fragment of rhyton was found as well as barbotine pottery, indicating that the site was probably established by Neolithic migrants from the Danilo Culture, who could have been in contact with the autochthonous Mesolithic population and thus involved in their acculturation. A hilltop site is a rarity in the Initial Neolithic, when there is little evidence for conflictual relations between communities.

North Adriatic – Trieste and Slovene Karst – Conclusions

This Region contains rich evidence for a Late Mesolithic presence, and the acceptance of domesticated animals, pottery and other Neolithic attributes, which can be understood in the context continuing adaptation; it is also telling that polished stone axe or adze heads have never been reported in the archaeological finds for the Transition and Initial Neolithic. There is no evidence for agriculture in the Region before the end of the Neolithic (Petru S., 2004: 201-202), and in many sites, the evidence is for episodic occupation of sites during the Transition and Early Neolithic, so that we are quite likely faced with the evidence for nomadic pastoralists, for whom hunting and the collection of marine molluscs continued to be important economic activities.

The only Early Neolithic open-air site listed here is Sermin, but there are few details on this coastal site. The closest Early Neolithic sites with the full Neolithic Package including agriculture that are known, are the Impressed Ware sites to be found at the tip of the Istrian peninsula to the South, the sites in Friuli-Venezia Giulia to the north and those inland over the water divide in Eastern Slovenia and North-Eastern Croatia. None of these sedentary groups appears to have been attracted to the Karst Region with its poor hydrography and lack of arable soil. There is evidence however for pastoralism along the eastern seaboard of the Adriatic, and it is possible that some of these folk made their way up to the Karst Region over the centuries, arriving there at the time of the Danilo Culture, after a period of contact and exchange between the autochthonous Mesolithic population and the Impressed Ware Culture, whose pottery and domesticates had reached the site of Vela Spilja on the Island of Lošinj, just south of the Istrian Peninsula sometime after 6000 BC, and Piancada in the Lower Friuli Plain around 5700 BC. Under the circumstances, it is not surprising to also find pottery and domesticated animals in the Karst Region at Grotta dell'Edera *ca*. 5700 BC.

Region 22 – North Adriatic – Friuli-Venezia Giulia

(Map R22)

North Adriatic – Friuli-Venezia Giulia – General Introduction

Although this Region is called Friuli-Venezia Giulia, it excludes the Trieste Karst (Region 14); the Region includes the area west of the River Tagliamento settled by the Neolithic Fagnigola Culture, and to the east it includes part of North-Western Slovenia, north of the Karst, thus connecting with Central and Eastern Slovenia and Hungarian Transdanubia across the Julian Alps, where the neolithisation process followed a different trajectory based on the Starčevo Culture, evolving over time into the LBK.

The geography of the region varies from the low-lying wetlands at the head of the Adriatic, which would have extended several km further out to sea at the end of the Mesolithic, to the plains of Friuli-Venezia Giulia going north, which gently sloped up to the Tagliamento morainic amphitheatre, behind which palaeolakes existed during the Mesolithic, before arriving at the foothills of the Julian Alps, penetrated by the valley of the Tagliamento to the west and that of the Isonzo/Soča to the east of the Region. The eastern part of the Region, cut by the valley of the River Isonzo/Soča is hilly to the west of the valley south of the Alps, becoming rapidly mountainous to the east, as the Julian Alps curl south to meet up with the northern extremity of the Dinaric Range, thus forming a natural barrier between the Neolithic cultures on either side of this divide, although the watershed pass near Idrija is only some 700 masl. To the north-east of the Region, deep in the Julian Alps, the Balkan Peninsula can also be accessed via a wide saddle some 900 masl known as the Tarvisio Pass, which connects with the headwaters of the River Sava on the eastern side.

During the first half of the 6th millennium BC, as the Boreal gave way to the warmer and more humid Atlantic climatic phase around 5800 BC, the vegetation cover of the plains and foothills became a mixed oak deciduous forest, and the tree-line extended upwards, as a consequence of which the ibex and chamois migrated to higher altitudes, disappearing from lower slopes where the red deer, roe deer and wild boar became the predominant large game.

During the Mesolithic, the River Tagliamento appears to have acted as an east-west barrier, as evidenced by the fact that red flint is found only on the west bank; another index is the shape of the trapezes, the short parallel side being often very short so that the trapezes resemble triangles east of the River Tagliamento, similar to those of the Karst Region, whilst west of the river this is not the case (Corazza S., *et al.*, 2010: 161). According to Paolo Biagi (2004), "*results obtained from the excavations carried out in the Plain of Friuli during the last twenty years, which clearly show that, at least at the beginning of the Neolithic, this region and the Trieste Karst were part of the Danilo cultural and ideological world (BIAGI 1996)* and that *several data would confirm that, around the middle of the same millennium, or slightly later, the Fiorano Culture, a typical aspect of the central-eastern Po Valley Early Neolithic, spread eastwards to the Friuli Plain*". This situation in the Early Neolithic is seen in the different evolutionary trends, with contact with the Fiorano Culture confirmed by the greater use of imported Alpine flint to the west of the River Tagliamento, whilst less use is made of Alpine Flint and more contact is discernible with to the Starčevo and LBK cultures to the east. Greater use of Alpine flint is also made close the coast than in the Upper Friuli Plain (Duches R., 2010: 138).

North Adriatic – Friuli-Venezia Giulia – Mesolithic and Transition Sites – Introduction

As indicated in the introduction to the North Adriatic Macro-Region, the Late Castelnovian Mesolithic hunters abandoned the high altitude sites as the tree-line rose with the higher temperatures and increased precipitation after the advent of the Atlantic weather phase (Bagolini B., Clark R., 2000:

94; Bressan F., 1984: 18; Gehlen B., 2010: 613; Voytek B., 2006: 168). There are numerous Castelnovian Mesolithic sites at mid and high altitude in the Italian part of this Region that have been identified, such as Casera Festòns, Casera Valbertad, Casera Valenis, Col Manzon, Dosso Chiesa, Dosso Confine, Dosso Rododendri and sites south of Dosso Rododendri: Matajur, Mokrine, Monte Madrizza, Passo Volaia, Pian di Lanza, Sella Biélega and Sella Cordin (Pessina A., 2006b; Turk I., 2003: 15); some of these open-air sites have been excavated, but most pre-date the Transition with no evidence for the Transition, so that they are only occasionally treated in this work (Figs. R22-1, R22-1a & R22-1b). Other high altitude sites are in North-Western Slovenia, such as Gorenji, Kuk, Pretovč Zapleč and Zaprikraj (Fig. R22-1b) (Turk I., 2003). At the northern extremity of the plain, the Region is dominated the morainic fan known as the Tagliamento Morainic Amphitheatre, so that to the east of the River Tagliamento, the Mesolithic sites are mostly to be found at the top of the morainic cordons, facing basins of glacial origin (Biagi P., *et al*., 1993: 45), and we have listed those that appear to shed light on the Transition. We have therefore ignored Mesolithic sites such as Fornaci del Mezzo, Casera Valbertad, Fagnana, Molin Nuovo and San Quirino presso Cividale, all on the Friuli Plain or the Tagliamento Morainic Amphitheatre, as well as a raft of sites west of the River Tagliamento (Fig. R22-1b) and those in North-Western Slovenia (Fig. R22-1b), such as Jamnikov spodmol, Jama za skalami, Planina Kašina and Planina Pretovč (Pessina A., 2006a, 2006b, 2006c; Turk I., 2003: 13; Voytek B., 2011). In contrast to other Regions, almost all of the Mesolithic sites in this Region are in the open-air, with the exception of Riparo di Biarzo and Grotta di Cladrecis in Italy, and Jamnikov spodmol, and Jama za skalami in North-Western Slovenia. Few of the open-air sites have been the subject of planned excavations – only surface scatters field-walking (exception are the sites of Pramolo and Taviele (Ziracco)). The Italian Late Mesolithic and Transition open-air sites at lower altitudes indicate a predilection for wetland sites and the Morainic Amphitheatre of the River Tagliamento (Guerreschi A., 1998b: 82), whilst the low-altitude ones in North-Western Slovenia, where there is no plain, are on the valley floor or in caves.

The data regarding the open-air Mesolithic sites are almost entirely based on the lithics, since osseous materials have not survived, let alone vegetable matter, but a few sites show continuity into the Neolithic and a few pottery sherds are occasionally present as well.

Rock crystal as a raw material is only known on the northern side of the Alps. The earliest attestation for the use of this material in the Region dates to the Epigravettian of Riparo di Biarzo and it has also been found at more than a dozen other sites in Italy and nearby Slovenia. The presence of rock-crystal attests to contacts with, and/or the circulation of groups originating in the north and the sites at high altitude attest to seasonal hunting camps and/or expeditions for the supply of raw material, since rock-crystal has been found at some of these sites. This contact is also suggested by the presence of harpoons, typical of north of the Alps, dating from the Mesolithic, at Riparo di Biarzo, Mondeval di Sora in the Veneto as well as from the Trentino (Region 24) (Pessina A., 2006c quoting Broglio, 2002; Pessina A., 2007).

<u>North Adriatic – Friuli-Venezia Giulia – Mesolithic and Transition Sites – Sites details</u>

Aviano – Collini di Gials (17) – Open-air Mesolithic lithic scatter on the Alpine foothills at 325 masl (Franco C., 2011).

Buttrio (15) – There is a source of local flint near this small town in the Upper Friuli Plain, which was exploited during the Palaeolithic, Mesolithic and Neolithic. R. Duches (2010) has reported extensively on this site, which was discovered in deep-ploughed fields in the 1990s. The search was subsequently extended to the nearby higher land, on a gently sloping terrace, where most of the finds were made in 2001 and 2002 (p. 126). The material, exclusively lithic, can typologically be attributed to different periods from the Mousterian Middle Palaeolithic (15 pieces) to the Neolithic (3289 pieces, made up of 879 nuclei, 13 hammer stones, 2263 pieces of knapping waste and 135 tools or fragments) (p. 126-

129). The low tool-count coupled to the fact that almost all of the siliceous stone types are from deposits of glacial origin or river-borne from sources in the Alps, indicates that this was a knapping station, using locally sourced material. Only 1.6% of the cores are of imported Alpine flint from the Venetian Alps, whilst 51% of the tools are in this material (p. 129). The tools comprise 7 microliths (3 trapezes and 4 rhomboids) which are all but one made of imported Alpine flint and 5 microburins of Alpine flint; of the 18 end-scrapers, a few are on flakes, and the 5 beaks are scarce for the Initial Neolithic. There are no examples of the Ripabianca burin, as is the case at Sammardenchia (comforting the provenance of the Initial Neolithic from the Dalmatian side of the Adriatic) (p. 135-137).

Overall, given the use of imported flint, the find of a fragment of stone ring and another of a polished greenstone axe-head, it is probable that the site was in use in the Early Neolithic, although there is a typological continuity with the Final Mesolithic, so that the site use could have straddled the Transition (p. 138).

Given the unstratified and disturbed nature of the site, it is impossible to state that it was used by acculturated Terminal Mesolithic hunter-gatherers during the Transition, so this remains a theoretical possibility.

Corno-Ripudio (9) – This is a Mesolithic lithic scatter site covering an extended surface area in the commune of San Daniele del Friuli at 160-170 masl on the Tagliamento Morainic Amphitheatre, on a fluvial terrace at the confluence of the Corno and Ripudio streams. The 4 trapezes and several Montbani blades and notched flakes place this lithic scatter in the Castelnovian (Candussio A., *et al.*, 1991: 262-267), but probably in the Early to Middle Castelnovian rather than the Late Castelnovian based on the fact that cores with prepared indirect percussion knapping surfaces are lacking (Corazza S., *et al.*, 2010).

Fornaci di Mezzo (10) – Early Mesolithic Sauveterrian lithic scatter in the commune of Rive d'Arcano at 153 masl on the Tagliamento Morainic Amphitheatre, covering an area of 600 m^2 (Candussio A., *et al*., 1991).

Gorenji Pretovč (3) – Mesolithic hunting camp at 1140 masl on saddle between the Isonzo/Soca river and Tolminka river, north of Tolmin, close to the border with Italy in Central Slovenia, on the western side of the Black Mountain.

4 m^2 were excavated in 2004, when over 500 lithic pieces were recovered of which some 10% were retouched. Several cores were found, several of which were of exogenous material of unknown provenance. The assemblage is of Sauveterrian tradition, thus Middle Mesolithic (Turk M., 2007).

Grotta di Cladrecis (14) – The cave, 220 masl, is near Prepotto close to the Slovenian border. It was excavated in the early 1980s under E. Montagnari Kokelj, who opened a trench inside the cave and another one outside.

Sedimentation appears to have been very slow at this site, so that the stratigraphy is not clear and most of the Mesolithic and Neolithic material was found in the same Level 2. The Mesolithic material includes some Sauveterrian types, but is mostly Castelnovian (trapezes, backed points, truncations, end scrapers on flakes or short and circular and small backed points, triangles), which is associated with Neolithic rhomboids and pottery, difficult to date, although some is clearly of Later Neolithic date. The faunal remains are composed of domesticated (bovines, suids and ovicaprines) as well wild (mostly red deer) species.

No hearths were found in the excavated area, so it was not possible to obtain any dates, and the excavators thought that the site might have been used episodically. There is no way of saying with any certainty whether there is any evidence of Transition at this site, since the lack of stratigraphy precludes the reconstruction of the occupational phases, but there does however appear to be a certain continuity

in the lithic tradition before the site was abandoned for almost a millennium (Ferrari A. & Pessina A., 1992; Montagnari Kokelj E., 1986; Stakul G. & Montagnari Kokelj E., 1983).

Kuk (18) – Mesolithic open-air site near Tarnovo in Slovenia, north-east of Gorizia. The material, seen by I. Turk (2003), has not been published

Mulino Ferrant/Cassacco-Mulino Ferrant (7) – This open open-air site (Fig. R22-2), 154 masl, close to the village of Conoglano in the commune of Cassacco, lies on an elevation close to the Cormor Torrent on the Tagliamento Morainic Amphitheatre. It is made up of three distinct areas, covering the Late Mesolithic, the Neolithic and the Iron Age. The site was discovered by Bruno Tullio who has repeatedly investigated this unexcavated site by field-walking, including with the author, and amassed a considerable collection of material from surface finds, which is partly in his possession, but mostly at the archaeological Museum of Udine.

The late Mesolithic material (Fig. R22-2) includes numerous bladelets, armatures which are predominantly trapezes, denticulated blades (Montbani), microburins and nuclei with prepared knapping surfaces for indirect percussion or pressure flaking, all characteristic of the Terminal Mesolithic (Candussio A., *et al.*, 1991; Corazza S., *et al.*, 2010).

The material has not been studied, but there appears to be no mixing of the lithic assemblages between the three periods of occupation, so that it appears unlikely that the site was occupied during the Transition.

Muzzana del Turgnano - Bosco Communale (30) – This lithic scatter at Muzzana del Turgnano, on the right bank of the river Muzzanella, is currently about 2 km from the sea and 2 masl. At the time the site was occupied, it would have been further inland.

The 1000s of lithics found over a vast area (Fig. R22-3) cover a long period, with some pieces dating from the Late Upper Palaeolithic, others are Late Mesolithic with trapezes, notched bladelets and the microburin technique, whilst some rhomboids, end-scrapers on blades, blades with silica gloss, Ripabianca burins and a polished stone axe are Neolithic (Bressan F., 1981a; Candussio A., *et al*., 1991: 285; Ferrari A. & Pessina A., 1992: 36; Pessina A., *et al*., 2006: 43).

Muzzana del Turgnano - La Favorita (29) – Area north of Muzzana del Turgnano and close to the Laguna of Marano, 2 masl and close to the current coastline, which would have been much further at the time of occupation.

The area, covering about five hectares, has been divided into 4 separate concentrations (LF1, LF2, LF3, STR) which can be contrasted (Pessina A., *et al.*, 2006):

- LF1, the main scatter on a river bank, covers *ca*. 1.5 ha, and can be attributed to the Late Mesolithic although later occupation is attested by a polished greenstone axe-head. 7000 lithics were collected, as well as 1000 cores of river/glacial pebbles, knapped almost exclusively from local flint probably collected at a distance of 15-20 km (Fig. R22-3). The industry is blade oriented, with some 300 end-scrapers, 70 trapezes of various shapes, some of which have very reduced narrow sides, suggesting contacts with the Karst Region (Corazza S., *et al.*, 2010), as well as Montbani blades and microburins. Some earlier material was also found. The quantity of material found appears to indicate a long term occupation of the site (p. 404-405);
- LF2, some 200 m to the west of LF1, at a slightly lower level, but still on a river bank, covers some 1200 m^2. The absence of trapezes and the Sauveterrian nature of the assemblage would indicate an Early Mesolithic date;
- The material from the other 2 locations is scant and appears to be Castelnovian, as evidenced by 2 trapezes from the STR concentration.

It is possible that the area was coincidentally occupied during both the Mesolithic and the Neolithic as suggested by A. Pessina *et al.* (2006: 401-402), given the intensity of occupation during

the Neolithic of the Lower Friuli Plain (Fig. R22-4), but certain authors (e.g. Bressan F., 1984: 48), have suggested that the site was occupied during the Transition, and this has to remain a possibility.

Orcenico (19) – This is the given name for a series of lithic scatters labelled 'A' to 'S' sandwiched between the communes of Zoppola and Casarsa, south of Castions, about 8-9 km west of the River Tagliamento (Fig. R22-5). They are part of the same group of sites as those at San Giovanni di Casarsa and San Vito al Tagliamento.

The surface scatters are spread in a north-south arc extending over 2 km, and occupied primarily from the Castelnovian Mesolithic through the Early Neolithic. Many of the lithic scatters are Mesolithic (A, B, L, N), as defined typologically and by the almost exclusive use of local raw material, with much of the Castelnovian Mesolithic material being attributed to the Early or Middle Castelnovian based on the fact that cores with prepared indirect percussion knapping surfaces are lacking. Some sites are Neolithic (C, D, F, H, Q), based primarily on the fact that the lithics are made of imported Alpine flint, whilst sites M and P, not specifically identified on Fig. R22-5 and only separated by a modern road, together produced 98 tools, most of which are Mesolithic with some elements made of Venetian Pre-Alps flint, suggesting they can be attributed to the Initial Neolithic (Corazza S., *et al.*, 2010), or Transition.

The occupation of these sites, possibly spread over more than two millennia, could have occurred over the Transition, but the lack of stratigraphy, evidence of structures and faunal assemblage, as well as the absence of dates, makes it impossible to make a more detailed assessment.

Orzano (13) – This site is an open-air lithic scatter just to the north of Orzano, east of Udine, at 109 masl.

The material collected has been typologically attributed to periods ranging from the Mesolithic to the Bronze Age. Most of the lithics however have been attributed to the Neolithic, partially based on the fact that a substantial proportion is manufactured on patinated Alpine flint, although local flint, which is of good quality and in plentiful supply, is well represented (Ferrari A. & Pessina A., 1992: 30).

Palmanova (25) – There are two open-air sites 21 masl of 1-2 ha each, to the S and SW of the walled town, which lies to the west of the lower reaches of the Isonzo River in the middle of the Friuli Plain. Much of the material was brought up by deep ploughing, which also showed up darker patches.

Thousands of flint artefacts have been collected since the 1970s and whilst much of the material is Neolithic with some undiagnostic pottery, Palaeolithic and Mesolithic material is also present. The material (Fig. R22-6) includes blades, end-scrapers on blades as well as flakes, some of which are thumbnail, truncations, Montbani blades, microliths dominated by rhomboids but with trapezes and the presence of the microburin technique. The rhomboids, which are common, are exceptionally small, which could be a hang-over from the Mesolithic, and the scarcity of pottery could also point to an Early Neolithic date. Overall, notwithstanding the absence of Ripabianca burins the lithics find their parallel in the Fagnigola, Fiorano and Vhò Cultures (Bressan F. & Candussio A., 1981: 83-86).

A. Ferrari and A. Pessina (1992) suggest an element of continuity between the Mesolithic and Neolithic, and it is quite possible that at least one of the two sites is a Transition site.

Piancada (31) – This stratified Initial to Middle Neolithic open-air site, covering a wide area on a levee of a palaeochannel of the River Stella a few km from the present-day shore of the Marano Lagoon, lies close to Palazzolo dello Stella. The site was excavated in the 1990s in two different areas, and the earliest dates that have been obtained are (Ferrari A., *et al*., 2001: Fig. 2; Perrin T., 2006: 115; Pessina A., 2000: 87):

- OZB-653 8115±92BP = 7449-6769 BC (OxCal 4.1), on bone from a Mesolithic sepulchre – Median 7110 BC.

No other information is available on the Mesolithic use of this location and there is a chronological hiatus of about 1400 years before the Neolithic occupation.

Porpetto Cembirs (26) – This lithic scatter, 12 masl in the commune of Porpetto has produced Castelnovian trapezes and Montbani blades (Candussio A., *et al.*, 1991: 275-278; Pessina A., *et al.*, 2006). There are no dates and the site appears to have been abandoned prior to the Neolithic.

Pramolo Dosso Confine (1) – At the top of this pass 1560 masl on the Italian-Austrian border, an open-air lithic scatter, at the top of a small rise on the north side of the small lake (Fig. R22-7), was excavated in 2004-2005 by A. Pessina. The site was typologically dated to the Sauveterrian, and the lithics included a fragment of rock-crystal, whose provenance is to be found to the north in the Austrian Alps (Pessina A., 2006c).

Several other locations have been identified in the area, and the author accompanied Carlo Fiappo and Bruno Tullio June 22, 2014 on the south side of the lake, between 1570-1590 masl, in an area criss-crossed by Austrian trenches dating from WW I. We discovered in secondary positions what are probably a Castelnovian bladelet and a scraper, as well as a pyramidal core (Fig. R22-7), which is comparable to the Mesolithic cores from the site of Muzzana del Turgnano - La Favorita (Fig. R22-3), and a blade (Fig. R22-7) which typologically appear to belong to the Neolithic. If the attribution to the Neolithic is correct, the finds represent one of the few instances of a Neolithic presence at such an altitude and could be interpreted as evidence that the pass, with its lake, continued to be used for communication and/or hunting expeditions.

Riparo di Biarzo (5) – This shelter in the form of a cave some 17 m deep by 5 m wide at the entrance with limited headspace, is beneath a large block detached from the escarpment above the River Natisone, close to San Pietro in Natisone in the Alpine foothills north of Udine and some 70 km from the present-day coastline, (Fig. R22-8), in an area where there are several shelters under similar blocks. The anthropic levels were sealed and thus protected by a post-depositional detachment of the roof.

The site was excavated under the direction of Antonio Guerreschi and Francesca Bressan between 1982-1984. Francesca Bressan, who studied the stratigraphy, saw an Initial Neolithic horizon above the Mesolithic in Level US 3 (Fig. R22-9). Only a strip with archaeological levels 1 m thick to the right had not been damaged by river floods or water coming through the rock-shelter, with the upper levels particulary disturbed by burrowing animals and the roof collapse (Bertolini M., *et al*., 2012; Bagolini B. & Bressan F., 1994; Bressan F., 1996; Bressan F., *et al.*, 1982; Cattani L., 1986; Guerreschi A., 1996a, 1996b):

- Level US 1 is Bronze Age;
- Level US 2 contained 35 recognisable instruments that include 3 trapezes (1 scalene, 1 isosceles and 1 elongated rectangular one with a concave base), as well as the microburin technique, 4 notched blades (Fig. R22-9), as well as a few pottery sherds. The lithic tradition is Mesolithic, and E. Christiani (2014) described this Level as Early Neolithic at the MesoLife Convention in June 2014, correcting L. Cattani (1986) who described it as Late Neolithic (Fig. R22-9);
- Level US 3a contained lithic material made up of 130 instruments and 45 fragments. They include 38 of Sauveterrian tradition (3 isosceles triangles, one segment of circle and for the most part triangles of Montclus-type) and 8 trapezes (4 with a transversal cutting-edge, 2 scalene, 1 rectangle and a single rhomboid), plus 5 denticulated blades (Fig. R22-9). There is also pottery as well as some ovicaprine bones. The pebbles with a waist chipped out from this Level are attributed to fishing activities as net weights;
- Level US 3b contained 355 lithic instruments. In the geometrics, segments of circle and triangles are present, as well as some trapezoidal examples, suggesting it is evolved Sauveterrian transitioning to Castelnovian;
- Level US 4 is Sauveterrian Mesolithic;

- Level US 5 is Epigravettian / Sauveterrian Mesolithic.
  The most recent date available is:
- R-1850 11100±125BP = 11227-10773 BC (OxCal 4.2).

The pottery from Level US 2, US 1 and the disturbed top surface is made up of 47 fragments including several Square Mouth Pottery (VBQ) sherds, whilst that from level US 3a includes 17 sherds, a few of which are described as VBQ; other fragments are decorated '*a graffite*', or incised.

P. Rowley-Conwy (1996), who studied the faunal assemblage, indicates that Level US 3a definitely contained 3% ovicaprine bones, although wild species largely dominated, and that it was not possible to determine whether the bovine (1% in Level US 3a and 8% in Level US 3b) and suid (27% in Level US 3a and 49% in Level US 3b) bones from the same level were wild or domesticated. He further considered that the site might have been used as a winter camp with the group moving to higher ground in the summer, but that due to the absence of evidence regarding the collection activities, this could not be confirmed (p. 79).

The evidence for long range contact is extensive with pierced sea shells from the south as well as rock-crystal from across the Alps in all Levels; In the Mesolithic levels the shells include the Danubian fresh water shells *Theodoxus danubialis* and *Litoglyphus naticoides*, attesting contacts either to the north of the Alps or Hungarian Transdanubia, as well as a harpoon of a type similar to those found north of the Alps (Bertolini M., *et al*., 2014; Pessina A., 2007).

The Mesolithic and Early Neolithic data is confused due to the mixed stratigraphy of the upper Levels. The Late Mesolithic Level is disturbed by that of the Early Neolithic without any evidence for discontinuity, so that whilst this might be the only stratified site in this Region, no clear conclusions can be reached regarding the Transition, even if the evidence points towards the possible occupation of the site by Late Mesolithic hunter-gatherers who had acquired a few ovicaprines and pottery, particularly since the lithic assemblages from Levels US 2 and US 3a are of Mesolithic tradition.

Rive d'Arcano (8) –This is an open-air lithic scatter Site near Corno-Ripudio on the Tagliamento morainic fan, where Castelnovian lithics have been collected. Trapezes with a much reduced narrow side are present which are only seen east of the River Tagliamento and in the Karst Region (Candussio A., *et al.*, 1991; Corazza S., *et al.*, 2010), suggesting contact between the two Regions during the Late Mesolithic.

San Giorgio di Nogaro - Bosco Sgobitta (27) – This is an undated lithic scatter 6 km from the present shore-line and 1 masl to the north of Fontanive.

The lithics are mostly Initial Neolithic (end-scrapers on blades, a rhomboid, oblique truncations and a polished stone axe), but also include 2 trapezes, attesting either a Mesolithic presence or tradition (Ferrari A. & Pessina A., 1992: 36), so that F. Bressan (1984: 48) could suggest that it was a Transition site.

San Giorgio di Nogaro – Fontanive (28) – This is an undated lithic scatter covering a wide area, 5 km from the present coastline and 7 masl, between the Corno and Promiscuo Rivers, about half way between Porpetto and S. Giorgio di Nogaro.

The material collected is a mixture of Sauveterrian Mesolithic, Early Neolithic (rhomboids, endscrapers on blades and the microburin technique, which could relate to either the Late Mesolithic or Early Neolithic) and Late Neolithic. These finds appear to indicate several discrete and discontinuous periods of occupation (Bressan F., 1981b; Ferrari A. & Pessina A., 1992; Voytek B., 2011: 192).

This site is one of the few supplying evidence for Early Mesolithic in the Friuli Plain. There is no evidence for its occupation during the Transition, since it is not possible to suggest an origin or date for the Early Neolithic occupation.

San Giovanni di Casarsa (20) – Several lithic scatters, part of the same group as the Orcenico and San Vito ones, have been found to the south-west of Casarsa on the right bank of the River Lin, between 7 and 9 km to the west of the River Tagliamento (Fig. R22-5). These have been dated on typological grounds as well as based on the provenance of the raw material, so that those in which Alpine flint was found have been attributed to the Neolithic.

Sites 5 and 7 produced Final Mesolithic lithics (Trapezes, microburins, short end-scrapers made of pink flint) as well as IN material, whilst site 6 only contained Final Mesolithic material (Corazza S., *et al.*, 2010: 142).

It is possible that sites 5 and 7 were occupied by two different groups over a short period of time between the end of the Mesolithic and Early Neolithic, or that they were occupied by hunter-gatherers during the Transition.

San Vito al Tagliamento Boscat (21) – Several lithic scatters, part of the same group as the Orcenico and San Giovanni di Casarsa ones, have been found west of San Vito, between 4-6 km west of the River Tagliamento (Fig. R22-5).

Sites 19, 20 and 21 (loc. Prodolons) contained Final Mesolithic material (Montagnari Kokelj, 2003; Corazza S., *et al.*, 2010: 147 quoting Montagnari Kokelj 2003).

Sites 39 and 40 (loc. San Petronilla) are considered to be Transition sites. The Material was collected between 1957 and 1959 at locations not clearly established. Of the 116 tools (Trapezes, rhomboids, microburins, end-scrapers, etc.), 62.3% appear to be Late Mesolithic, 22% Neolithic and the rest being earlier or later (Corazza S., *et al.*, 2010: 147). According to A. Ferrari and A. Pessina (1992: 40), many of the lithics were collected at the end of the 19th century and are Neolithic with some scalene and isosceles trapezes.

Sites 39 and 40 could have been occupied by hunter-gatherers during the Transition.

Tagliamento Morainic Amphitheatre/anfiteatro morenico del Tagliamento. Many lithic scatters have been found on this extensive morainic amphitheatre to the east of the River Tagliamento in the Upper Friuli Plain. Many of these sites are typologically dated to the Castelnovian, some to the Neolithic and a few may have been occupied during the Transition (see **Corno-Ripudio**, **Fornaci di Mezzo**, **Mulino Ferrant/Cassacco-Mulino Ferrant**, **San Vito al Tagliamento Boscat**).

Taviele (Ziracco)/Ziracco, Località Taviele (12) – This is an open-air site on an alluvial terrace of a dead arm of the Grivò Torrent north of Romanzacco.

The site was the subject of surface finds and a small excavation in 1984, which produced 35 implements out of 446 lithics, as well as a few undiagnostic sherds of coarse ware which cannot be used to attribute the site to a particular period, other than excluding the Mesolithic.

The site was probably a working area, given the number of cores, tested pebbles, debitage waste, etc., and the lack of finished tools suggesting that the debitage was 'exported' from the site for finishing elsewhere. The make-up of the lithics at this location, which include rhomboids but not trapezes, with their microlithic nature, when compared to sites in the Trentino (Vatte di Zambana, Romagnano Loc III and Colbricon), and Fiorano sites, makes it possible that the site dates from the Terminal Mesolithic. The method of debitage of the nuclei (sub-conical or pyramidal) finds its parallel during the Mesolithic of Grotta della Tartaruga and Grotta dell'Edera in the Trieste Karst, as well as in the Riparo di Biarzo, although it is also present at Fagnigola, in an Initial Neolithic context (Montagnari Kokelj E. & Vitri S., 1982-1986).

As A. Candussio *et al*., (1991) state, quoting the excavators, this site, for which there are no ^{14}C dates, dates from a "*momento avanzato del Mesolitico, al passagio con il Neolitico...*".

Zapleč & Zaprikraj (2) – Two contiguous sites near the headwaters of the Drežniške Ravne just over 1200 masl, in North-Western Slovenia, close to Friuli-Venezia Giulia. The two sites yielded some 50

lithics of which a few were retouched, including a Montclus-type armature. The site is a Mesolithic summer hunting camp (Turk M., 2007).

North Adriatic – Friuli-Venezia Giulia – Initial and Early Neolithic Sites – Introduction

The Neolithic arrived as a fully formed package in the Friuli-Venezia Giulia Region (Biagi P., *et al*., 1993: 59), with its origins most likely to be found in the Eastern Adriatic. The stratified Neolithic sites in the Friuli Plain are not continuations of Mesolithic occupations, which are represented by lithic scatters, but start with villages with the complete Neolithic package (Biagi P., 2001: 77), although they can contain elements of the local Mesolithic culture, and are complementary to the Late Mesolithic/Transition/Initial Neolithic unstratified camp sites, several of which show cultural affinities with both the Mesolithic and Early Neolithic. The southern plain, south of the Tagliamento Morainic Amphitheatre, east of the River Tagliamento, has over 30 Neolithic sites discovered due to the morphological stability of the area, but the only one to have been excavated is Piancada. The layout of the sites is similar to those of Pannonia (linear following the levees), although in the case of Friuli, the levees were fossil rather than active with good drainage and agricultural land, with rivers based on springs with slow and steady flows which would also have facilitated communications (Fontana A., 2000: 221-224; Petrucci G., 2006). In the middle plain, the sites are near springs and in the case of Sammardenchia di Pozzuolo, in an area of tectonic uplift.

The Early Neolithic of the Region, probably through a combination of population movements and via trade and exchange is recognisable as bearing influences from several areas (Danilo/Vlaška, Fiorano, Impressed Ware, Starčevo-LBK) (Bagolini B. & Bressan G., 1996: 66). This is visible through imported materials (flint, obsidian, rock-crystal, metamorphic greenstones, pottery, etc.) as well as styles (knapping technology, axe-heads, harpoons, pottery styles and decoration, figurines, etc.) so that the westernmost LBK cultural group in Croatia – Malo Korenovo – may have had an influence on the North Italian Early Neolithic, although this is not clear. A wheat variety, *Triticum timopheevi*, which is unknown on the Italian side of the Adriatic, is also grown in the Region and appears to originate in the Balkans or Eastern Europe (Petrucci G., 2006). Contact with the East Adriatic Danilo Culture, and possibly the Starčevo Culture, is visible east of the River Tagliamento, where cult objects in the form rhytons, possibly associated with the trade in salt, and anthropomorphic figurines are strongly reminiscent of the Balkans (www.archeoserver.it/space/UniMi/Comunicazione: 123-125).

The Initial Neolithic of the Region has been divided into two groups which are broadly contemporaneous, with the Fagnigola Group to the west of the River Tagliamento and the Sammardenchia Culture to the east. The differences between the two groups could be due to the provenance of the migrants, their numbers, their cultural baggage, how they adapted to their new environment and how they interfaced with the Mesolithic population and with the cultural groups with which they were in contact.

North Adriatic – Friuli-Venezia Giulia – Initial and Early Neolithic sites – Sites details

Cesena (22) – This Early Neolithic site, west of the River Tagliamento, is in an area of springs and heavy soils and close to the site of Fagnigola with which it is contemporaneous.

P. Biagi et al., (1993**:** 49), quoting B. Bagolini and P. Biagi (1990: 12) give the following dates:

- Bln-4436 6557±71BP = 5626-5375 BC (OxCal 4.1) from pit 2 – Median 5500 BC.
- Bln-4431 6504±59BP = 5610-5341 BC (OxCal 4.1), from pit 1 – Median 5475 BC.
- Bln-4432 6400±200BP = 5715-4856 BC (OxCal 4.1) from pit 1 – Median 5285 BC.

The small number of chipped stone tools seems to indicate that they were used for processing plant-grasses, but mostly on wood, and resharpened using the microburin technique (as at Fiorano). Only one tool, possibly a sickle was found, which does not constitute evidence for agriculture (p.55),

although the authors indicate that there were 4 species of wheat and 2 of barley and that the hafting of tools was practiced (p. 57). The activities seemed to have revolved around hunting, some animal husbandry, gathering and some agriculture (p. 57).

This is an Initial Neolithic site, where few lithic tools were found. It could have been established my migrants who only brought a limited number of domesticated animals, so that they had to partially rely on the hunt. Nothing in the tool-kit described suggests a Mesolithic substrate.

Fagagna (11) – This lithic scatter north of the lower plain has been described by F. Bressan (1984: 48) as a Transition site. The occupation, so far as the site survey goes appears to commence in the Initial Neolithic (Candussio A., *et al.*, 1991: 285, quoting F. Bressan, 1983), since the trapezoidal armatures found at this site are associated with rhomboids and Ripabianca burins, end-scrapers on blades and blades with silica gloss.

The site is undated and appears not to have been excavated, so that the determination is based on the lithic scatter only, which indicates that it could have been made up, at least in part of acculturated hunter-gatherers. There is no mention of pottery, of faunal or floral remains, or of habitation structures.

Fagnigola (23) – This eponymous site of the Initial Neolithic culture of Friuli lies west of the River Tagliamento near the village of Fagnigola, on heavy soil. The site was excavated first by P. Biagi commencing in 1974 and subsequently by B. Bagolini in 1979.

The dates are (Alessio M., *et al*., 1996; Biagi P., 1994: 60; Ferrari A., *et al*., 2001: Fig. 2; Perrin T., 2006: 115; Pessina A., 2000: 87; Skeates R. & Whitehouse R., 1997-1998):

- R-2551 6483±74BP = 5641-5378 BC (OxCal 4.1), charcoal from the upper part of a pit, structure 19, 25cm deep containing the remains of cereals and hazel-nuts – Median 5510 BC.
- R-2530 6570±75BP = 5635-5375 BC (OxCal 4.1), charcoal from the upper part of a pit, structure 23, 20cm deep containing much charcoal and pottery sherds – Median 5505 BC.
- R-2538 6545±70BP = 5621-5374 BC (OxCal 4.1), charcoal from the upper part of a pit, structure 21, 25cm deep, probably a silo, containing the remains of cereals and hazel-nuts – Median 5500 BC.
- R-2554 6548±85 = 5634-5344 BC (OxCal 4.1), charcoal from the upper part of a pit, structure 27, 65cm deep containing much charcoal and pottery sherds in the upper part – Median 5490 BC.
- R-2539 6540±70BP = 5621-5371 BC (OxCal 4.1), charcoal from various levels of a pit, structure 30, 50cm deep containing the remains of carbonised cereal – Median 5495 BC.
- R-1544A 6050±90BP = 5214-4729 BC (OxCal 4.1), on Charcoal.
- R-1545A 5760±160BP = 5018-4271 BC (OxCal 4.1) on Charcoal.

P. Biagi (2016: pers. com.) has pointed out that no cereal remains were found at the site, in which case the R-2539 date had to be on a different material; he has also pointed out that the last two dates (R-1544A and R-1545A) are unreliable since the charcoal samples used had been stored in paper bags for years in the wet stores of the University of Ferrara.

Given the consistency of the earlier dates, the site must have been established a little before 5500 BC at about the same time as the close-by sites of Cesena and Valer, with the occupation probably continuing into the 5th millennium BC.

The lithics (Fig. R22-10) include long blades and bladelets, end-scrapers on blades with steep retouch, trapezes and rhomboids on narrow blades with piquant trièdre points, denticulated blades and microburins; burins on a side notch are well represented (Bagolini B. & Biagi P., 1987: 437). The lithics, which show a high degree of microlithisation, contained two trapezes, which unfortunately came as surface finds and not from the excavations, so that they cannot easily be cited as evidence for a Mesolithic component for this site (Ferrari A. & Pessina A., 1992: 42, 52). The lithics are similar to those of the Fiorano and Vhò Cultures with the hafting of tools attested, characterised by bladelets and a high microlithic content and the microburin technique, with possible affinities with the Castelnovian

tradition; the flint, however, comes from the Alps, some 60 km distant, as compared to the Mesolithic groups who used local flint (Bagolini B. & Bressan F., 1994: 63). C. Malone (2003: 281) talks about continuity of Mesolithic lithic traditions, with burins, trapezes, rhomboids, scrapers, piercers, microburins and blades adapted to early Neolithic economies that still relied heavily on hunting and fishing. This last is confirmed by P. Biagi *et al.* (1993: 57), who note that as with the sites of Cesena and Sammardenchia, four species of wheat and two of barley were cultivated, which is comparable to the Fiorano Culture. The Initial Neolithic pottery includes influences from the Fiorano Culture, confirming what is visible in the lithic assemblage (Ferrari A., *et* al., 2001: 234). If in the early stages the economy appears to have been based on stock breeding, hunting and collecting, with some agriculture (Bagolini B. & Biagi P., 1987: 428, quoting Barker, 1976, 1977), C. Malone (2003) states that the site demonstrates an increasingly domesticated subsistence economy from the earliest traces of Neolithic activity in the area in the mid-6th millennium BC.

The dates for the establishment of the Fagnigola Culture coincide approximately with the presence of Vlaška pottery in the Karst Region (Montagnari Kokelj E. & Vitri E., 1982-1986), and there was clearly interaction with the Fiorano Culture to the west, at some point during the occupation of the site, as evidenced by the pottery (Ferrari A. & Pessina A., 1992: 55) and the Alpine flint.

The Early Neolithic migrants are likely to have arrived up the east coast of the Adriatic with their domesticated animals, cereal crops, Neolithic technology and sedentary lifestyle. They appear to have acquired some of their lithic technology from the local Mesolithic communities with whom they probably integrated to create a mixed farming, hunting and collecting economy, which over time became more dependent on farming, possibly associated with demographic growth.

Piancada (31) –This stratified Initial to Middle Neolithic open-air site, covering a wide area on a levee of a palaeochannel of the River Stella a few km from the present-day shore of the Marano Lagoon, lies close to Palazzolo dello Stella. The site was excavated in the 1990s in two different areas, and the earliest dates that have been obtained are (Ferrari A., *et al*., 2001: Fig. 2; Perrin T., 2006: 115; Pessina A., 2000: 87):

- OZB-653 8115±92BP = 7449-6769 BC (OxCal 4.1), on bone from a Mesolithic sepulchre – Median 7110 BC.
- R-2705 6751±108BP = 5874-5483 BC (OxCal 4.1), on charcoal from structure 1 – Median 5680 BC.
- OZB-948 6410±70BP = 5489-5224 BC (OxCal 4.1), on charcoal from square E4 – Median 5360 BC.

This is the earliest known Neolithic site of the Region and the dates suggest that the Neolithic migrants set up the site on that of a Mesolithic burial. A Neolithic burial of a 4-5 year old girl associated with three vessels was excavated in 1994, which has been dated to the Early Neolithic (Ferrari A., *et al*., 2001; Perrin T., 2006: 115; Pessina A. & Rottoli M., 1996: 87):

- OZC-211 6330±50BP = 5386-5215 (OxCal 4.2 at 85.5%), on a fragment of human bone – Median 5300 BC.

In the locality of Bosco Nogali a flint workshop with thousands of knapping flakes and hundreds of microburins were found associated with a lithic assemblage which was otherwise Neolithic, although no pottery was found. There were also a few pits and trenches, one of which, sub-circular Pit 1, produced domesticated animals and the R-2705 date above (Ferrari A., *et al*., 2001). B. Gehlen (2010: 618) also states that a date *ca.* 5700 on a domesticated bovine is the earliest for the Neolithic of the Northern Adriatic (p. 618), although the date appears to be that on the charcoal associated with the animal remains rather than on bone.

A. Pessina A. and M. Rottoli (1996: 87) indicate however that two workshops were found and that Alpine flint was used, which would exclude the workshops being as early as suggested by the domesticated animal dated from the charcoal in the sub-circular Pit 1. They further state that the early pottery was coarse and undiagnostic, which would fit in with an early pre-Danilo occupation.

The large faunal remains are 99% domesticated from inception (44% bovines, 29% suids and 26% ovicaprines), with a small presence of roe deer as well as evidence for fishing and the collection of marine molluscs (Petrucci G., 2006: 464; Petrucci G. & Riedel A., 1998: 30; Rowley-Conwy P., *et al*., 2013: 167 table 9.2 quoting Petrucci *et al*., 1996, 2000). G. Petrucci (2006: 464) further states that many ovicaprines appear to have been killed prior to maturity, whilst the bovines were killed when fully mature, suggesting they were used for milking as well as reproduction.

There is no indication of a Mesolithic substrate at this site which is fully Neolithic from inception, other than the earlier burial and possibly the evidence for the microburin technique. The migrants appear to have arrived with their domesticates *ca.* 5700 BC, which is possible, since the undiagnostic pottery echoes some of the earliest pottery found in Late Mesolithic Transition sites at approximately the same time in the Karst Region, before Impressed Ware was replaced by Danilo/Vlaška style pottery.

Lago di Ragogna 1-5/Ragogna/Palus (6) – Five open-air lithic scatters have been discovered around Lake Ragogna at about 190-200 masl near the left bank of the River Tagliamento and the northern end of the Friuli Plain. Sites 1 and 3 are on the bank of the lake, whilst Sites 2, 4 and 5 are on the first terrace, with each location covering between 1 and 3-4 hectares, suggesting lengthy and/or repeated occupations.

Some of the pottery sherds found are decorated with the thumbnail and described as being of Impressed Ware tradition (Bagolini B., *et al*., 1981: 127).

These are essentially Neolithic sites with sickle blades with sickle gloss and Ripabianca burins of Western Adriatic and Fiorano Culture tradition, but the lithics include trapezes with piquant trièdre, as well as rhomboids of small and medium dimension, backed points, end-scrapers on blades as well as thumbnail end-scrapers and Montbani blades; the microburin technique is also present. The sites have been recognised as containing evidence for the Transition (Bagolini B., *et al*., 1981: 127; Bressan F, 1984: 48; Candussio F., *et al.*, 1991: 285, quoting Bressan 1983; Ferrari A. & Pessina A., 1992: 24-25, 45).

These lithic and pottery scatters have not been dated and there is no mention of a faunal assemblage. The material could have been deposited over a period of time exceeding many centuries, so that there is no way of telling whether the material dating from the Neolithic was left by acculturated hunter-gatherers or immigrant farmers.

Sammardenchia di Pozzuolo (16) – This extensive Early Neolithic site, between 55-80 masl, 30 km from the present-day coastline and 10 km south of Udine, stretches for over 5 km^2. The site has been estimated to contain up to 5000 structures, spread over several villages (Fig. R22-11) (Ferrari A. & Pessina A., 1992, 2000; Pessina A. & Rottoli M., 1996: 78) with the principal occupation at "I Cueis" (meaning 'the hills' in the local dialect) (Alessio *et al*., 1996), which is close to one of the few springs in the area. The site, extensively surveyed, was excavated between 1985-1998 and again between 1995-2005 (Carbonetto *et al*., 2009). The site was occupied for almost a millennium with the latest date (Biagi P., 2003):

- R-2736 5684±58BP = 4686-4442 BC (OxCal 4.2 at 88%), structure 126 – Median 4565 BC.

There are numerous dates for this site, the Earliest of which are (Alessio M., *et al.*, 1996: 45-47; Ferrari A., *et* al., 2001: Fig. 2; Forenbaher S. & Miracle P., 2014; Perrin T., 2006: 115; Pessina A., 2000; 2006a):

- R-2547 6570±74BP = 5634-5376 BC (OxCal 4.1), on charcoal from structure 87, which was partially cut by structures 88 and 89 – Median 5505 BC.
- R-2545 6535±75BP = 5625-5360 BC (OxCal 4.1), on charcoal from the lower levels of structure 101, containing carbon and pottery sherds – Median 5495 BC.
- R-2549 6525±55BP = 5613-5371 BC (OxCal 4.1), on charcoal from levels 1 and 2 of a pit, structure 37, 45 cm deep containing a few pottery sherds – Median 5495 BC.

- R-2548 6513±70BP = 5615-5330 BC (OxCal 4.1), on charcoal from levels of a pit, structure 86, 80 cm deep containing a few pottery sherds and much charcoal – Median 5475 BC.

Given that these dates come from structures, it is possible that the earliest Neolithic occupation of this major site is somewhat earlier, since the area is also rich is surface scatters, for which there are no dates, many of which are attributable to the initial Neolithic. The lithic industry is more microlithic than that of the Fagnigola Culture, which could be due to the small size of the flint nuclei, many of which are of local origin. Rhomboids are present at both sites as well as a few trapezes, which are more common at Sammardenchia. "*Questi ultimo tratti potrebero indicare una piu viva presenza della tradizione mesolitica a Sammardenchia*" (Bagolini A. & Bressan F., 1994: 64). According to B. Bagolini and G. Cremonesi (1987: 22), a different microlithic Neolithic evolved out of the Mesolithic at Sammardenchia which includes a large range of scrapers, some of which are microlithic, circular or thumbnail, trapezes, microlithic rhomboids and denticulated Montbani blades.

Nothing can be said regarding the subsistence strategy (domesticated v. wild fauna), due to the acidity of the terrain which has eliminated all traces of the faunal assemblage (Carbonetto S., *et al.*, 2009: 53; Petrucci G., 2006: 463).

The early, locally manufactured somewhat coarse pottery was manufactured on-site, with shapes and decorations harping primarily back to the Danilo and Vlaška Cultures (deep restricted-mouth vessels and incised linear ornaments) as well as some to the Fiorano Culture close-by (carenated cups, beakers, conical pots and pedestalled vases), comforting the idea that the Neolithic migrants originated on the eastern seaboard of the Adriatic; this opinion is reinforced by the presence of pottery figurines which are also similar to those from the Danilo and Starčevo cultures (Biagi P., 2003b; Biagi P., *et al.*, 2008: 253; Carbonetto S., *et al.*, 2009: 54, 69; Ferrari A., *et* al., 2001: 234). Some archaeologists have however maintained that the Fiorano cultural influence antedates the Danilo cultural influence (Pessina A., 2006a), although this is hard to perceive given the comparable dates for both cultures.

We have only touched on the earliest phases of this site here, and the indications through the lithic assemblages are that whilst the settlement was established by Neolithic migrants with the full Neolithic package, Mesolithic elements were quite likely incorporated into the community, as evidenced in the lithic assemblage.

Valer (24) – This is an Initial Neolithic site to the south-east of Azzano Decimo (Pordenone), a few 100 m from the hamlet of Cesena, to the west of the Tagliamento River in an area of springs. The site was discovered subsequent to deep ploughing and was excavated in two short seasons in 1990 and 1991. Two sub-circular pits, each about 1.6 m in diameter and 1.2 metres from each other were uncovered, which produced abundant organic remains as well as a rich collection of lithics and pottery. The organic remains are attributed to the collapse of the superstructure after abandonment. There was also abundant charcoal at the base of both pit structures (Fasani L., *et al.*, 1994: 97-100).

The lithic assemblage is made of exogenous material, probably originating from the Lessini Mountains 150 km distant. The debitage is comparable to Fagnigola nearby and "*notably Neolithic*" (Fasani L., *et al.*, 1994: 102-108).

The pottery was highly fragmented but the shapes recall those of the Fiorano Culture, with similar forms and decoration found at Fagnigola and Sammardenchia, and as F. Ferrari *et al.* (2001: 234) state, the Fiorano Culture influences confirm what is visible in the lithic assemblage.

That the site was fully Neolithic from inception is attested by the evidence for two varieties on wheat and one of domesticated barley (Fasani L., *et al.*, 1994: 112).

The site has been dated (Fasani L., *et al.*, 1994: 111; Ferrari A., *et* al., 2001: Fig. 2; Perrin T., 2006: 115; Pessina A., 2006: 87; Skeates R. & Whitehouse R., 1997-1998):

- Bln-4436 6557±71BP = 5626-5375 BC (OxCal 4.1), on charcoal from pit structure 2 – Median 5500 BC.

- Bln-4431 6504±59BP = 5610-5341 BC (OxCal 4.1), on charcoal from pit structure 1 – Median 5475 BC.
- Bln-4432 6400±200BP = 5714-4906 BC (OxCal 4.2), on charcoal pit structure 1 – Median 5310 BC.

These median dates around 5500 BC dates are contemporaneous with those of Fagnigola and Sammardenchia.

Velika Jama (4) – This cave, 372 masl in the Natisone River basin, was used as a sheep pen during the Neolithic (Montagnari Kokelj E., *et al*., 2013: 157).

North Adriatic – Friuli-Venezia Giulia – Conclusions

The first Neolithic migrants to the Region began to arrive up the eastern seaboard of the Adriatic about 5700 BC, based on the evidence from Piancada, with the movement accelerating over the next two or more centuries. The earliest levels of some of these sites contain undiagnostic Coarse Ware and/or pottery characteristic of the Danilo Culture, often with Fiorano elements as well. East of the River Tagliamento, the faunal assemblage is almost exclusively domesticated from inception, with the exploitation of aquatic resources near the coast and or, as stated by C. Malone (2003: 271), "*In Venezia Giulia and Friuli in NE Italy, woodland products and vegetable foods remained important alongside precocious Neolithic trends transferred from the Balkans*". The lithics of the Early Neolithic at Sammardenchia di Pozzuolo contain an element of Mesolithic tradition, and since there are several lithic scatters typologically dated to the Initial Neolithic in the area, it is probable that the site was occupied prior to the dates suggested by the ^{14}C dates from stratified contexts and that the Neolithic settlers incorporated some of the Mesolithic population. To the west of the River Tagliamento, hunting and fishing are important, suggesting a different economic strategy, which could be due to the incorporation of elements of the Mesolithic population, and this hypothesis is substantiated by the high incidence of Mesolithic tradition in the lithic assemblage.

There is plenty of evidence for the Castelnovian Mesolithic on the plains and the Tagliamento morainic amphitheatre, and several of the open-air sites evidenced by lithic scatters continued in use into the Neolithic, suggesting that the hunter-gatherer population integrated with the Neolithic migrants and completed the Transition relatively quickly. Because few of these sites can be dated, other than typologically and there is a lack of archaeological evidence for the habitation structures or the subsistence base at these open-air sites, it is hard to confirm this hypothesis. The size and number of Early Neolithic sites could also be an indication of the completion of the Transition in the Region.

Region 23 – North Adriatic – Eastern Emilia-Romagna and the Veneto

(Map R23a) Emilia Romagna and (Map R23b) Veneto

North Adriatic – Eastern Emilia-Romagna and the Veneto – General Introduction

This Region stretches from the Alps of the Veneto in the north to the north-facing slopes of the Emilia-Romagna Apennines in the south. North of the River Po it includes all but the north-western corner of the Italian region of Veneto, which will be dealt with in Region 24, so that to the east it makes contact with the Region 21 (Friuli-Venezia Giulia) and to the west it stretches as far as a line running south from Lake Garda to the west of Mantua, where it crosses the River Po, thence to Reggio nell'Emília at the foot of the Emilian Apennines and up to the crest of the Northern Apennines some 40 km to the south. A few key sites further west, primarily in the Province of Parma, plus the site of Pianaccia di Suvero in Eastern Liguria, will however be discussed in relation to the neolithisation of the Region. The southern part of the Region incorporates Emilia-Romagna east of the north-south line. For the sake of clarity, there is an overlap with the northern part of the Italian Central Adriatic Region 21, where the Initial Neolithic Impressed Ware Culture came into contact with the Fiorano Culture.

The geography of the region varies from the low-lying wetlands at the head of the Adriatic, stretching up the river valleys and the tributaries of the River Po, with the plains rising gently up to the foothills of the Alps to the north, which rise to over 3000 masl, and the foothills of the Apennines to the south, which rise to 2000 masl. During the Tertiary the North Adriatic gulf covered the Paduan Plain, which slowly silted up, so that at the beginning of the quaternary, the plain was covered in wetlands, which continued to silt up to create the Paduan Plain, surrounded by alluvial terraces, fans and levees (Gobbo I., 2010: 40-41 quoting from Desantis P., Bigoni M., Faccenda P., Finotelli F., (ed.)., 2004). The coastline would have extended several km further out to sea in the late first half of the 6th millennium BC, when the Neolithic first reached the Region, with the wetlands and plains being cold and damp in winter. Since the Early Neolithic, the plains have been subject to substantial sedimentation and intensive agriculture, so that the discovery of sites tends to be fortuitous and dependant on chance discoveries consequent on erosion, agriculture, or the construction and extraction industries; a good example of such fortuitous finds is the site of Lugo di Romagna, buried under 14 m of sediments. The Alpine foothills, which are cut by the deep river valleys coming down from the Alps, include the Lessini Mountains to the west of the Region, where high quality flint was found and extensively exploited from the Early Neolithic. In the northern plains, the Berici Hills in the Province of Vicenza, the Euganei Hills in the Province of Padua and the Montello and Asolo Hills in the Province of Treviso, rise up out of the plain, and all contain evidence for a Mesolithic presence either in the hills themselves or on river terraces close-by. South of the River Po, the plain leading down from the Apennines is dissected by numerous parallel rivers and watercourses, which cross wide conical alluvial fans as they exit the hills, before crossing the plain in a northern or north-eastern direction; these are tributaries of the River Po as far east as the River Reno, after which they flow directly into the Adriatic Sea. The Northern Apennines run from the north-west to the south-east with the hills rising up over an average width of 40 km to the water divide between the Adriatic Sea on the northern side and the Tuscan Tyrrhenian Sea on the southern side; their geology is "*mostly composed of incoherent sediments of Mesozoic and Cenozoic age (sandstone, limestones, conglomerates, clays and sands) where rock-shelter and caves are absent*" (Fontana F., *et al.*, 2013: 91).

The climatic and vegetational evolution to the north of the River Po is the same as that of the Friuli-Venezia Giulia (Region 22), in that during the first half of the 6th millennium BC, as the Boreal gave way to the warmer and more humid Atlantic climatic phase around 5800 BC, the vegetation cover of the plains and foothills became a mixed oak deciduous forest, and the tree-line extended upwards, as a consequence of which the ibex and chamois caprids migrated upwards, disappearing from lower slopes where the red deer, roe deer and wild boar became the predominant large game. S. Ferrari (2010:

46-51) has described in some detail the climatic and vegetational evolution of Emilia-Romagna south of the River Po, for the plain (up to 100 masl), the hill country (100-800 masl), mountains (800-1500 masl) and high mountains and peaks (above 1500 masl):

- On the plain, the mixed oak forest developed during the Boreal as a mosaic of open spaces and forest of conifers and deciduous species tending over time towards the present-day forest cover. Local variations occur, so that around Modena there was a greater element of conifers, possibly over 50%. The extensive wetlands forest cover was dominated by willow and other wetland species. The open spaces contained hazel and during the transition to the Atlantic weather phase *ca.* 5800 BC, it is not excluded that some of the open spaces were maintained through anthropic interference to favour these. During the Atlantic, conifers reduced and the deciduous forest cover became more extensive.
- The hill-country saw a marked increase in mixed conifer and deciduous forest cover during the Boreal, with a reducing presence of conifers, and during the Atlantic this reduction continued as the forest-cover became more open.
- In the mountains, during the Atlantic, the mixed oak, ash, elm and lime forest associated with hazel reached its maximum extension between 1300-1500 masl on the sunny slopes and richer soil, whist conifers occupied the more exposed spaces, northern slopes and poorer soils.
- During the Atlantic optimum, the forest cover reached as high as 2000 masl, which is 150-200 higher than at present. The topmost slopes and peaks, with few above 2000 masl, tended to be barer with bush and herbaceous species due to the strong winds and rapid changes in temperature.

North Adriatic – Eastern Emilia-Romagna and the Veneto – Mesolithic and Transition Sites – Introduction

There is a dearth of stratified Mesolithic sites in this region (Corazza S., *et al.*, 2010: 56), so that the Transition is hard to see from the evidence of the Mesolithic lithic scatters of the Region.

South of the River Po, there are no Mesolithic sites signalled along the Adriatic seaboard in the provinces of Rimini, Forli-Cesena, Ravenna and Ferrara (Ferrari S., 2010: 39), other than a single find at Forli. The focus is therefore on the Provinces of Bologna, Modena and Reggio Emilia, where numerous discoveries labelled as Palaeolithic were made dating back to the 19th century at low altitudes and on the river fans, which included material subsequently identified as Mesolithic in the late 20th and early 21st centuries. The attribution between Sauveterrian and Castelnovian is based on the lithic assemblage, but also based on the debitage which focussed in the Castelnovian on the production of standardised bladelets used for the manufacture of retouched products and trapezes using the microburin technique (Ferrari S., *et al.*, 2011). These finds have been complemented by later discoveries. The distribution of the Castelnovian sites (Fig. R23-1) is more an expression of the assiduity of research than the actual distribution of the Mesolithic populations, and this is visible in the lack of Late Mesolithic sites in the Apennines of the Province of Reggio Emilia, whilst some 40 Mesolithic sites, of which 10 have been clearly attributed to the Castelnovian, were discovered during field research in the Province of Parma (Ghiretti A. & Guerreschi A., 1990). The discovery of sites is also tributary of the geomorphology, deposition and erosion, with erosion bringing to light high altitude sites, whose discovery and excavation in the 1960s and 1970s led to the recognition of the Sauveterrian and Castelnovian Mesolithic, and deposition hiding those at low altitude which have only been discovered as a consequence of channel erosion or anthropic activities. Relatively few sites have been found at mid-altitude, which should have been the preferred winter settlement zone, avoiding the particularly damp and cold valley air, and this could be due to the dense forest cover. The pollenic records suggest the possibility that the Late Mesolithic populations managed their territories to favour the growth of trees and bushes producing edible fruits and to create clearings favouring grasses for herbivores (Ferrari S., 2010: 157-162), and based on site evidence, the level of occupation appears to

increase in the Castelnovian (Ferrari S., *et al.*, 2013: 91). The Castelnovian Sites 1 to 42 at the southern edge of Emilia, listed in by S. Ferrari (Fig. R23-1) (2010), summarise as follows:

Province of Bologna

1 – Riola – Castelnovian and Neolithic lithic scatter 48 masl on terrace 4 km from hills.
2 – Stanga – Castelnovian and Neolithic lithic scatter 50 masl on terrace 2 km downstream from the Via Emilia.
3 – Pescatore Piccolo – Palaeolithic and Castelnovian lithic scatter 78 masl on an alluvial fan.
4 – Cave SAFRA – Palaeolithic and Castelnovian lithic scatter 69 masl on an alluvial fan.
5 – Villa Bignami – Castelnovian lithic scatter 78 masl on an alluvial fan.
6 – Camponi – Palaeolithic and Castelnovian lithic scatter 102 masl on an alluvial fan.
7 – Due Pozzi – Palaeolithic and Castelnovian lithic scatter 119 masl on an alluvial fan.
8 – Casetta – Castelnovian lithic scatter 93 masl on a hill.
9 – S. Antonio – Castelnovian lithic scatter 77 masl on a fluvial terrace at the foot of hills.
10 – Cava IECME – Palaeolithic and Mesolithic lithic scatter 280 masl on top of a hill.
11 – Casa La Pulce – Castelnovian lithic scatter 114 masl on a fluvial terrace at the foot of hills.
12 – Scornetta – Castelnovian lithic scatter 92 masl on a fluvial terrace at the foot of hills.
13 – S. Andrea – Castelnovian lithic scatter 161 masl on a terrace 1 km prior to the exit from the hills.
14 – Bellaria – Palaeolithic, Castelnovian and Fiorano lithic scatter 113 masl on a fluvial terrace 2 km south of Bazzano.

Province of Modena

15 – Fiume Panaro – Lithic scatter 46 masl on a Holocene alluvial fan under fluvial deposits on the plain, exposed by natural erosional processes – Excavated site with Castelnovian lithics in Areas I-VI & IX, VBQ and Chassey Lagozza in Areas I, Ib, II-IX & XV.
16 – Il Poggio – Palaeolithic and Castelnovian lithic scatter 148 masl on a fluvial deposit rise.
17 – Costa del Tizzo – Palaeolithic, Sauveterrian and Castelnovian lithic scatter 93 masl on a fluvial terrace at the foot of hills.
18 – Via della Tecnica – Castelnovian pyramidal nucleus stray find 76 masl on alluvial deposits 1 km from centre of Castelnuovo Rangone.
19 – Cave Carani – Castelnovian and VBQ deposit found below Holocene fluvial deposits in a clay extraction pit 137 masl.
20 – La Campagna – Castelnovian lithic scatter 280 masl on top of a hill.
21 – Pescale – Site covering some 15 m^2, 173 masl at the top of an escarpment overlooking the River Secchia, with evidence for a settlement occupied probably discontinuously during the Palaeolithic, Castelnovian Mesolithic, Neolithic and Metal Ages. Surface collections from the 19th and early 20th centuries and excavations between 1937-1942 under F. Malavolti.
22 – Passo del Lupo – Site on a pass 1537 masl, found by A. Ferrari in 1980, assumed to be a seasonal hunting camp used by a Castelnovian group from Emilia, based on the provenance of the lithic raw material.
23 – Lago Baccio – Lithic scatter around this small glacial lake 1560 masl used by Castelnovian hunter-gatherers coming up from the Tuscan side of the Apennines, based on the provenance of much of the lithic raw material.

Provinces of Reggio Emilia and Parma

I have included most of the sites from the Province of Emilia-Romagna as well as a couple from the Province of Parma, since they shed some light on the Late Mesolithic, Transition and/or Initial Neolithic.

24 – Lama Lite – Late Castelnovian hunting site near the top of a pass 1740 masl excavated in 1976 by M. Cremaschi and C. Tozzi, which has been dated:

- R-1394 6620±80BP = 5710-5468 BC (OxCal 4.2 at 94.8%), on charcoal – Median 5590 BC.

25 – Passo della Comunella – Castelnovian hunting site 8 km from Lama Lite at 1619 masl discovered in 1973 and excavated by M. Cremaschi in 1974, which has been dated:

- Birm-830 6960±130BP = 6057-5629 BC (OxCal 4.2 at 94.5%), on charcoal – Median 5840 BC.

26 – Monte Bagioletto Alto – Site 1725 masl with Sauveterrian and Castelnovian strata suggesting multiple periods of occupation.
27 – Monte Bagioletto Basso – Site 1660 masl with a possibly Castelnovian lithic assemblage.
28 – Corni Piccoli – Castelnovian lithic scatter 1398 masl.
29 – Sasso Fratto – Castelnovian and possibly Sauveterrian lithic scatter site based on triangles, 1756 masl.
30 – Lago del Caricatore – Castelnovian lithic scatter 1610 masl.
31 – Passo dell'Ospedalaccio – Castelnovian lithic scatter 1261 masl.
33 – Pratissolo – Castelnovian lithic scatter at 80 masl.
34 – Fogliano - Le Basse – Castelnovian lithic scatter at 80 masl.
35 – Fogliano - La Mantovana – Castelnovian lithic scatter 80 masl.
36 – Razza – Castelnovian lithic scatter 50 masl.
37 – Sant'Ilario – Castelnovian lithic scatter 65 masl.
38 – Gazzaro – Excavated Castelnovian site 70 masl close to Neolithic material.
39 – Corso dell'Enza – Various sites
40 – Cabriolini – Palaeolithic, Castelnovian and Neolithic site in a saddle 695 masl between 2 hillocks to the west of the Province of Parma, overlooking a torrent and a tributary, into which material was washed down. The site contained Alpine flint trapezes confirming long distance exchange and contact.
42 – Monte Camulara – Castelnovian site 1315 masl in the Province of Parma, with one piece of Alpine flint (0.2%)

B. Franco (2011, Map 8, p. 177) has listed all the known Sauveterrian and Castelnovian Mesolithic sites that he was aware of for the Region. Those in Emilia-Romagna below 200 masl are all close to the foothills of the Apennines, and were also identified by S. Ferrari (2010):

- **Podere Riola –** Province of Bologna, Castelnovian (listed as 1 above).
- **Podere Stanga –** Province of Bologna, Castelnovian (listed as 2 above).
- **Spilamberto - San Cesario VI –** Province of Modena (listed as 15 above).
- **Fogliano - Le Basse –** Province of Reggio nell'Emilia (listed as 34 above).
- **Pratissolo –** Province of Reggio nell'Emilia (listed as 33 above).
- **Razza di Campegine –** Province of Reggio nell'Emilia (listed as 36 above).
- **Corso dell'Enza – toponimo generico –** Province of Reggio nell'Emilia (listed as 39 above).
- **Gazzaro –** Province of Reggio nell'Emilia, Castelnovian (listed as 38 above).
- **Sant'Ilario d'Enza –** Province of Reggio nell'Emilia (listed as 37 above).

The low-lying Mesolithic sites north of the River Po in the Veneto identified by C. Franco (2011, Maps 2 & 3, p. 168-169) are with few exceptions (e.g. those close to the Venice Lagoon, and those close to the Sile Springs) in hill-country to the north of the plain or close to the foothills of the Alps:

- Asolo Hills:
  - **Cornuda - Casa Castagna** – 190 masl, Mesolithic lithic scatter on river terrace.
  - **Cornuda - La Valle** – 150 masl, Mesolithic lithic scatter on river terrace.
  - **Fornaci di Casella** – 109 masl, unpublished Mesolithic scatter found in 1984-1985.
  - **Pagnano d'Asolo** – 180 masl, Castelnovian lithic scatter.
- Berici Hills:
  - **Grottina dei Covoloni del Broion** – 120 masl, Sauveterrian and Castelnovian occupation (see below).
- Euganei Hills:
  - **Malandrina** – 10 masl, lithic scatter on palaeobend of river at the foot of the hills.
  - **Valcalaona –** 9 masl, two lithic scatters close to palaeobends of river at the foot of the hills.

- Montello:
    - **Biadene - Presa 19** – 180 masl, Mesolithic lithic scatter.
    - **Capo di Monte** – 180 masl, Mesolithic scatter found on river terrace.
    - **Falzè di Piave - Ca'Mira** – 110 masl, Mesolithic lithic scatter on river terrace.
    - **Montello Presa 21** – 182 masl, Mesolithic lithic scatter.
    - **Santa Mamma** – 150 masl, Mesolithic lithic scatter on river terrace.
- **Aviano - Loc. Collini di Giais** – 325 masl, on Alpine foothills.
- **Corbanese - San Giuseppe** – 130 masl, Mesolithic lithic scatter on river terrace.
- **Fiammoi** – 400 masl, on slope of valley in the Alpine foothills.
- **Fondo Carniellon** – 210 masl, Mesolithic lithic scatter on river terrace.
- **Morgano - Le Vallazze** – 22 masl, lithic scatter close to watercourse and the four Sorgenti del Sile sites on the plain.
- **Riparo di Lonedo - Covolo B** – 240 masl, Sauveterrian Mesolithic (Broglio A., 1983: 72).
- **Soprapiana - Fondo Bernardi** – 165 masl, Mesolithic lithic scatter on river terrace.
- **Sorgenti del Livenza - Loc. Santissima** – 30 masl, close to a spring.
- **Sorgenti del Sile** – **(4 sites)** 27-30 masl, Mesolithic lithic scatters on the plain close to springs.

Only a small number of high altitude Mesolithic sites (Biagi P., *et al.*, 1980; Ferrari S., 2010; Franco C., 2011) have been listed here, since they tell us little about the Transition. There is however a fundamental difference between the Apennines and the Alps, in that high altitude sites continued in use throughout the Mesolithic in the Apennines, whereas almost all of these had been abandoned before the end of the Mesolithic in the Alps, when sites at lower levels become more common.

It has been determined, due the poor knapping qualities of the local flint in Tuscany as compared to that from Emilia-Romagna, based on the provenance of the raw materials found in the lithic scatters, that the Sauveterrian and Castelnovian Mesolithic groups south of the River Po practiced a circulating settlement strategy between the plain-foothills and the higher Apennines and that this mobility and/or contact and exchange extended onto the south side of the Apennines. This mobility, contact and exchange also extended north to the Alps, since Alpine flint has been found at the high and mid-altitude Apennines sites of Passo del Lupo, Lama Lite, Corni Piccoli and Cabriolini, as well as at sites to the west of the study area at Camulara and Zovallo (Biagi P., *et al.*, 1980; Ferrari S., 2010: 357-358, 369; Ghiretti A. & Guerreschi A., 1990: 98).

North of the River Po, in the Alps, there are also numerous mid and high altitude Sauveterrian and Castelnovian sites. Bernardino Bagolini is credited with the discovery of some 500 Mesolithic high altitude sites at over 2000 masl, all of them hunting sites represented by lithic scatters, only a few of which have been excavated; 27 of these were discovered in 1971 on the Altipiano delle Sette Comune (Broglio A., *et al.*, 2006: 44). In the Mondeval de Sora depression at over 2000 masl, in the upper reaches on the River Piave, in the Province of Belluno, some 18 sites, including VF1 with its Castelnovian inhumation have been discovered (Fig. R23-2) (Fontana F. & Vullo N., 2000). All these sites appear however to have been abandoned in the Early Atlantic when the tree-line extended some 150-200 m higher than at present.

The number of Mesolithic sites in the plains is by contrast limited, and this can only be explained by the sedimentation and the eustatic sea-rise, which has covered or destroyed them. A few have however been found close to the Venice lagoon, which did not exist at the time (Broglio A., 1984: 200; Marsale S., 1983) at:

- **Mestre** – At beginning of causeway into Venice, but slightly to the north, from various locations in the town of the same name – Epipalaeolithic.
- **Dese** – A little north of Mestre – Epipalaeolithic (I say tending to Sauveterrian because of the scalene triangle microlithic armature and the microburin technique).
- **Altino** – North of Dese and about 2-3 km north on the west shore – Sauveterrian.
- **Meleo** – Two sites near this town have produced a classical Castelnovian industry with trapezes as well as rhomboids.

Others have been found near springs and on fluvial terraces north and south of the River Po, indicating that the plains were occupied and exploited prior to the arrival of the Neolithic migrants. For the sake of clarity, the presentation and discussion of the sites will be split between those south and those to the north of the River Po.

North Adriatic – Eastern Emilia-Romagna and the Veneto – Mesolithic and Transition sites – Sites details

Mesolithic and Transition sites south of the River Po (Map R23a)

Bologna Mesolithic lithic scatters (15) – The 14 Castelnovian lithics scatters on the plain in the Province of Bologna, listed by S. Ferrari (2010: 63-135), are as listed below. 3 of the sites are close to Ozzano east of Bologna with the others close to San Lazzaro:
1 – Riola – Castelnovian and Neolithic lithic scatter 48 masl on terrace 4 km from hills.
2 – Stanga – Castelnovian and Neolithic lithic scatter 50 masl on terrace 2 km downstream from the Via Emilia.
3 – Pescatore Piccolo – Palaeolithic and Castelnovian lithic scatter 78 masl on an alluvial fan.
4 – Cave SAFRA – Palaeolithic and Castelnovian lithic scatter 69 masl on an alluvial fan.
5 – Villa Bignami – Castelnovian lithic scatter 78 masl on an alluvial fan.
6 – Camponi – Palaeolithic and Castelnovian lithic scatter 102 masl on an alluvial fan.
7 – Due Pozzi – Palaeolithic and Castelnovian lithic scatter 119 masl on an alluvial fan.
8 – Casetta – Castelnovian lithic scatter 93 masl on a hill.
9 – S. Antonio – Castelnovian lithic scatter 77 masl on a fluvial terrace at the foot of hills.
10 – Cava IECME – Palaeolithic and Mesolithic lithic scatter 280 masl on top of a hill.
11 – Casa La Pulce – Castelnovian lithic scatter 114 masl on a fluvial terrace at the foot of hills.
12 – Scornetta – Castelnovian lithic scatter 92 masl on a fluvial terrace at the foot of hills.
13 – S. Andrea – Castelnovian lithic scatter 161 masl on a terrace 1 km prior to the exit from the hills.
14 – Bellaria – Palaeolithic, Castelnovian and Fiorano lithic scatter 113 masl on a fluvial terrace 2 km south of Bazzano.

Cabriolini (16) – This site, in a saddle 695 masl, between two hills and near the confluence of two torrents on the western side of the province of Parma. The lithic scatter, whilst primarily Castelnovian Mesolithic with a couple of Palaeolithic pieces attesting to an earlier presence, also includes Early Neolithic and Early Middle Ages material.

The Castelnovian Mesolithic material includes three trapezes out of 13 retouched tools, of which two trapezes, and 30 other flint pieces made of Alpine flint, attesting to contacts across the Po Valley. The Early Neolithic material is a Ripabianca burin and some undiagnostic sherds, with no later Neolithic material (Ferrari S., 2010: 133-134; Ghiretti A. & Guerreschi A., 1990: 75-76).

The site is important in that it is the only Terminal Mesolithic site, even if undated, where there can be a reasonable level of probability that the hunter-gatherers had acquired a few desirable Neolithic artefacts through their contacts across the valley of the River Po.

Castellarano (17) - Castelnovian site on the opposite bank of the River Secchia to the Early Neolithic site of Pescale, both of which are in dominant positions (Fontana F., *et al.*, 2013: 89).

Forlì, Cantiere ANAS (22) – This Mesolithic site 30 masl was discovered during civil engineering works, whilst excavating for an underpass. The site, on an alluvial fan a little above the plain further downstream, had been the subject of substantial river-borne sedimentation, so that the archaeological remains were well buried. The site, which was the subject of salvage excavations in 2008, produced evidence from the Late Mesolithic to the Bronze Age, with the evidence from the Final

Sauveterrian/Early Castelnovian Mesolithic occupational level limited to charcoal remains and a microburin in a post-hole. A ^{14}C date was obtained yielding a date of (Gobbo I., 2010: 163-164):

- ??? 7267±65BP = 6247-6010 BC (OxCal 4.2) on charcoal – Median 6130 BC.

A sterile level separated the Mesolithic occupational level from the next occupational level, so that there is no suggestion that the site was occupied into the Transition, but it does extend the evidence for the Mesolithic presence into Romagna, where none had previously been attested east of the Province of Bologna.

Gazzaro (4) – this site, at the foot of the Apennines in the Province of Reggio nell'Emilia, is the only excavated open-air site attributed to the Castelnovian Mesolithic on the plain (other than the site of Le Mose, west of the Region). The attribution is based on the lithics, faunal assemblage, and a horn spatula of Mesolithic tradition (Bagolini B. & Biagi P., 1987: 437; Franco C., 2011: 63), although according to F. Fontana *et al*. (2013), details of the faunal assemblage have not been published.

Lago Baccio (27) – Castelnovian lithic scatter 1560 masl below the Apennine water divide ridge in the Province of Modena used by Castelnovian hunter-gatherers coming up from the Tuscan side of the Apennines, based on the provenance of much of the lithic raw material (Fontana F., *et al*., 2013).

Lama Lite (24) – This high altitude Terminal Mesolithic site is located at 1764 masl at Lingonchio in the Emilian Apennines, close to the border with Tuscany. The site was excavated in 1976 by M. Cremaschi and C. Tozzi in 10 cm cuts (Castelletti *et al*., 1976).

No evidence for structures was found, nor were there any faunal remains. There were 71 trapezes out of a total of 137 tools, of which 63% were obtained using the microburin technique; the tools included Montbani blades and other denticulates in an assemblage which is blade-based (Fig. R23-3) (Biagi P., *et al.*, 1980: 17-18; Castelletti L., *et al.*, 1976: 18-23; Franco C., 2011: 132-137).

A single date has been obtained (Ferrari A., *et al.*, 2001; Ferrari A. & Steffè G., 2006; Skeates R. 2003; Tozzi C., 2011; Tozzi C., 2012: pers. Com.):

- R-1394 6620±80BP = 5710-5468 BC (OxCal 4.2 at 94.8%) – Median 5590 BC.

The site has been described as a Late Mesolithic hunting camp, which it undoubtedly was. Its special interest lies in the fact that it contains no Neolithic cultural elements and is dated at a time when the Neolithic had arrived in both Northern Tuscany and Liguria (with a Mesolithic substrate at Pianaccia di Suvero), on the plains at the head of the Adriatic, as well as on the Central Adriatic coast (Maddalena di Muccia, Riccione). There is no indication in the remains to suggest either contact with these first farmers, or any incipient Transition. A. Ferrari and G. Steffè (2006) indicate that the Neolithic sites of Fiorano Modenese and Lugo di Romagna were contemporaneous. The hunter-gatherers using the site also maintained contacts across the plain of the River Po as far as the Alps, as evidenced by the presence of Alpine flint in the assemblage (Ghiretti a. & Guerreschi A., 1990: 98).

Modena Mesolithic lithic scatters (11) – Of the 9 Castelnovian lithics scatters in the Province of Modena, listed by S. Ferrari (2010: 63-135), three are shown separately (Pescale (21), Passo del Lupo (22) and Lago Baccio (23)). The 6 remaining are as follows:

15 – Fiume Panaro – Lithic scatter 46 masl on a Holocene alluvial fan under fluvial deposits on the plain, exposed by natural erosional processes – Excavated site with Castelnovian lithics in Areas I-VI & IX, VBQ and Chassey Lagozza in Areas I, Ib, II-IX & XV.

16 – Il Poggio – Palaeolithic and Castelnovian lithic scatter 148 masl on a fluvial fan of the River Panaro, upstream from the Early Neolithic site of Savignano.

17 – Costa del Tizzo – Palaeolithic, Sauveterrian and Castelnovian lithic scatter 93 masl on a fluvial terrace at the foot of hills.

18 – Via della Tecnica – Castelnovian pyramidal nucleus stray find 76 masl on alluvial deposits 1 km from centre of Castelnuovo Rangone.

19 – Cave Carani – Castelnovian and VBQ deposit found below Holocene fluvial deposits in a clay extraction pit 137 masl.
20 – La Campagna – Castelnovian lithic scatter 280 masl on top of a hill.

Le Mose (north-west of map) – This site, at the confluence of the River Nure with the River Po, in the province of Piacenza, covers about 20.000 m2, and is made up of some 20 lithic scatters, most of which are Sauveterrian. There is an element of Castelnovian, but the excavations cover a very small area, so that few details are available (Fontana F., *et al.*, 2013: 89).

This site, west of the Region is important in attesting the Mesolithic occupation of the plain of the River Po.

Parma Mesolithic lithic scatters (6) – Of the 2 Castelnovian Mesolithic lithic scatters listed by S. Ferrari (2010: 63-135), that of Cabriolini (40) is listed separately. The one remaining is:
42 – Monte Camulara – Castelnovian site 1315 masl in the Province of Parma, with one piece of Alpine flint (0.2%). This suggests direct or indirect contact with the Alps during the Castelnovian Mesolithic.

Passo della Comunella (23) – This high altitude Mesolithic Site, 8 km from the site of Lama Lite in the Reggio Emilian Apennines, on the eastern side of Monte Asinaria, is located at 1619 masl. The eroded surface, discovered in 1973 and excavated by M. Cremaschi in 1974, was reported on by M. Cremaschi and L Castelletti in 1975. The lithics are a typical Castelnovian assemblage with trapezes, rectangles and isosceles triangles and the site has been dated (Biagi P., *et al.*, 1980: 17; Biagi P., *et al.*, 1993: 46):

- Birm-830 7060±130BP = 6215-5716 BC (OxCal 4.2 at 95.4%) – Median 5965 BC.

The date given by Ferrari S., (2010), in accordance with the recognition that it is 100 years more recent (e.g. Ferrari A., *et al.*, 2001) is:

- Birm-830 6960±130BP = 6057-5629 BC (OxCal 4.2 at 94.5%), on charcoal – Median 5840 BC.

The difference in dates alters little to the fact that, as with the other high altitude sites along the chain of the Northern Apennines, there was a late Mesolithic presence, with contacts extending onto the south-western flanks.

Passo del Lupo (26) – Site on a pass 1537 masl, found by A. Ferrari in 1980, assumed to be a seasonal hunting camp used by a Castelnovian group from Emilia, based on the provenance of the lithic raw material (Ferrari S., 2010).

Reggio Emilia Mesolithic lithic scatters (7) – Of the 15 Castelnovian lithics scatters in the Province of Reggio Emilia listed by S. Ferrari (2010), 2 are shown separately (Lama Lite (24) and Passo della Comunella (25)). The 13 remaining are as follows:
26 – Monte Bagioletto Alto – Site 1725 masl with Sauveterrian and Castelnovian strata suggesting multiple periods of occupation.
27 – Monte Bagioletto Basso – Site 1660 masl with a possibly Castelnovian lithic assemblage.
28 – Corni Piccoli – Castelnovian lithic scatter 1398 masl.
29 – Sasso Fratto – Castelnovian and possibly Sauveterrian lithic scatter site based on triangles, 1756 masl.
30 – Lago del Caricatore – Castelnovian lithic scatter 1610 masl.
31 – Passo dell'Ospedalaccio – Castelnovian lithic scatter 1261 masl.
33 – Pratissolo – Castelnovian lithic scatter at 80 masl.
34 – Fogliano - Le Basse – Castelnovian lithic scatter at 80 masl.
35 – Fogliano - La Mantovana – Castelnovian lithic scatter 80 masl.

36 – Razza – Castelnovian lithic scatter 50 masl.
37 – Sant'Ilario – Castelnovian lithic scatter 65 masl.
38 – Gazzaro – Excavated Castelnovian site 70 masl close to Neolithic material.
39 – Corso dell'Enza – Several sites.

Mesolithic and Transition sites north of the River Po (Map R23b)

Altino (28) – Early Mesolithic lithic scatter close to Venice lagoon.

Asolo Hills, around which several Mesolithic lithic scatters have been identified:

- **Cornuda - Casa Castagna (9) –**Mesolithic lithic scatter on river terrace, 190 masl (Franco C., 2011).
- **Cornuda - La Valle (10)** – Mesolithic lithic scatter on river terrace, 150 masl (Franco C.2011).
- **Fornaci di Casella (14) –** 109 masl, unpublished Mesolithic scatter found in 1984-1985 (Franco C., 2011).
- **Pagnano d'Asolo (13) –** 180 masl, this is an undated open-air lithic scatter site at the location known as Fondo Bavaresco near the town of Pagnano d'Asolo. It was discovered in 1972, close to a flint outcrop in the pre-Alpine hills (Marsale S., 1983). The lithics include trapezes, which allowed the assemblage to be attributed to the Castelnovian Mesolithic (Franco C., 2011).

Aviano – Collini di Gials (4) – Open-air Mesolithic lithic scatter on the Alpine foothills at 325 masl (Franco C., 2011).

Berici Hills – These pre-Alpine hills in the southern part of the Province of Vicenza have been the home of several Palaeolithic and Mesolithic settlements, many of which are in caves or rock-shelters:

- **Grotta di Paina (23) –** at 335 masl on the eastern slopes with Palaeolithic, Mesolithic and later levels. It was initially excavated in the late 1950s or early 1960s, and again between 1981-1987. Level 4 contained Mesolithic and later material (Broglio A., 1994: 63-64), but there is no material covering the Transition.
- **Grotta di San Bernardino (24) –** is another cave on the eastern slopes at 150 masl. It was originally excavated in the late 1950s or early 1960s and again in the 1980s. The material is Middle Palaeolithic (Broglio A., 1994: 64).
- **Grottina dei Covoloni del Broion (26) –** Sauveterrian and Castelnovian occupation (Fig. R23-4) (see below).
- **Soghe (25) –** At *ca*. 400 masl, close to the Fimon Lake in Vicenza, lithics were found which harp back to the Mesolithic, such as trapezes, as well as IN material of the Fiorano Culture, such as rhomboids (see below under Neolithic sites).

Colbricon (1) – This is a series of 9 Mesolithic high altitude sites near lakes above a pass, at *ca*. 2000 masl, used during the Sauveterrian and Early Castelnovian Mesolithic, but abandoned in the Late Castelnovian (Alessio M., *et al.*, 1984; Bressan F., 1984: 18; Broglio A., 1980: 15, 1983: 71).

Corbanese – San Giuseppe (6) – Mesolithic lithic scatter on a river terrace, 130 masl (Franco C., 2011).

Dese (29) – Early Mesolithic lithic scatter close to Venice lagoon.

Euganei Hills:

- **Malandrina (33)** – 10 masl, lithic scatter on the palaeobend of a river at the foot of the hills.

- **Valcalaona (34) –** 9 masl, two lithic scatters close to the palaeobends of a river at the foot of the hills.

Fiammoi (2) – Mesolithic lithic scatter on the side slope of a valley in the Pre-Alps, at 400 masl (Franco C., 2011).

Fondo Carniellon (7) – Mesolithic lithic scatter on river terrace, 210 masl (Franco C., 2011).

Grottina dei Covoloni del Broion (26) – This cave-site is to be found 120 masl in the Berici hills (Fig. R23-4), in the north of the Province of Vicenza, close to the foothills of the Alps. Sauveterrian and Castelnovian Mesolithic levels were discovered above Palaeolithic levels in 1973 (Franco C., 2011).

A single date is available for this site, placing its occupation extending into the Middle to Late Castelnovian (Alessio M., *et al.*, 1978, 1984; Bagolini B. & Biagi P., 1990: 4; Candussio A., *et al.*, 1991: 284):

- R-892 6930±60BP = 5981-5712 BC (OxCal 4.1), on charcoal – Median 5845 BC.

The lithics in level 6, above the Sauveterrian levels, are Castelnovian (Fig. R23-4), but there is no occupation during the Transition or Early Neolithic (Broglio A., 1983: 71; 1984: 288; Candussio A., *et al.*, 1991: 284; Marsale S., 1983). After the Castelnovian occupation, natural carbonates accumulated before the site was used for funerary purposes in the Copper Age (Fedele F., 2013).

The importance of this site lies in that it is a low altitude site close to the Alps, west of Friuli-Venezia Giulia, occupied shortly prior to the arrival of the Neolithic.

Meolo I & II (27) – Two open-air Castelnovian sites have been found near the town of the same name north of the Venice Lagoon, which, given the lower sea-level, did not exist at the time the sites were occupied (Broglio A., 1984: 301; 1994: 65). Both sites have produced a classical Castelnovian lithic industry with trapezes as well as rhomboids, similar to that found at Pagnano d'Asolo, Grottina dei Cavollini del Broion and Cavolo B di Lonedo (Marsale S., 1983).

The other Mesolithic sites close to the Venice Lagoon date from the Epipalaeolithic and Sauveterrian Mesolithic (Mestre (30), Dese (29) and Altino (28)).

The interest of this site lies in that it proves, with the other sites on the plain, that there was a Late Mesolithic presence in the flat-lands of the River Po Valley, with the flint for the lithics coming from the outcrops in the foothills of the Alps and the beds of the torrents (Broglio A., 1994: 65), thus confirming the movement of Late Mesolithic hunter-gatherers across the plain.

Mestre (30) – Early Mesolithic lithic scatter close to Venice lagoon.

Mondeval de Sora, site VF1 (off-map, north of Belluno) – Over a dozen sites have been located on this plateau in the High Piave River Basin. Site VF1 under the overhang of an erratic block, set in an open landscape at 2165 masl, is the only one to have been excavated (Fig. R23-2). It was repeatedly used as a summer camp during the Early and Late Mesolithic and is best known for the well preserved Late Castelnovian burial dated (Fontana F. & Vullo N., 2000; Fontana F. & Guerreschi A., 2003; Skeates R., 2001-2003):

- OxA-7468 7425±55BP = 6429-6212 BC (OxCal 4.2 at 94.7%), on human bone from Castelnovian burial – Median 6320 BC.

The supine burial was accompanied by rich grave goods, including a double-barbed antler-wood harpoon, whose provenance is probably to be found north of the Alps, and some rock-crystal implements whose raw-material also originated further north (Fontana F. & Guerreschi A., 2003; Martini F., 2006: 70-71).

The importance of this site resides in the fact that it attests to high altitude hunting in the Late Mesolithic, and the evidence for contact over the Alps to the north, also corroborated by the presence of similar harpoons at the sites of Romagnano III and Pradestel in the Trentino, and Riparo di Biarzo in Friuli-Venezia Giulia.

Montello – Several Castelnovian lithic scatters have been found on or close to this hill, in the north of the Province of Treviso:

- **Biadine - Presa 19 (17)** – Mesolithic lithic scatter, 180 masl (Franco C., 2011).
- **Capo di Monte (15)** – 180 masl, Mesolithic scatter found on river terrace (Franco C., 2011).
- **Falze di Piave - Ca'Mira (12) –** Mesolithic lithic scatter on river terrace, 110 masl (Franco C., 2011).
- **Montello Presa 21 (16)** – Mesolithic lithic scatter, 182 masl (Franco C., 2011).
- **Santa Mamma (11)** – Mesolithic lithic scatter on river terrace, 150 masl (Franco C., 2011).

Morgano – Le Vallazze (20) – This Mesolithic lithic scatter site, 22 masl, close to a watercourse, lies to the east of the 4 sites at the Sorgenti del Sile (Franco C. 2011).

Riparo di Lonedo / Cavolo B di Lonedo (18) – This rock-shelter, 240 masl, in the Venetian pre-Alps, at Pagnano d'Asolo on the edge of the Po Plain in the Province of Vicenza, produced a Late Mesolithic Castelnovian assemblage (Broglio A., 1973, 1983: 72; Franco C., 2011; Marsale S., 1983).

Riparo Tagliente (22) – This Rockshelter at Stallavena di Grezzana, 250 masl, at the foot of the Lessini Mountains, was discovered in 1958 by Francesco Tagliente. It has a long sequence covering the Palaeolithic, but ends with the Epigravettian.

Riparo Villabruna (3) – Three contiguous rockshelters, numbered A, B and C, were discovered 500 masl, at the top of a debris cone, in the Cimon Valley of the Venetian Dolomites by Aldo Villabruna, in 1987. These rock-shelters were excavated between 1998-1999 by A. Broglio.

Villabruna A contained Epigravettian to Mesolithic remains including an Epigravettian inhumation. Level 3 was Mesolithic and level 5, lower down, produced four trapezes. Villabruna B and C contained Epigravettian, Late Mesolithic and Neolithic remains (Ferrari S. & Peresani M., 2003: 92). The principle prey during the Epipalaeolithic was ibex, which was substituted by red deer during the Holocene (Angelucci D. & Bassetti M., 2009: 5).

Whilst there is no indication of continuing occupation over the Transition, this site, which appears to have been abandoned during the Early Mesolithic, was reoccupied during the Late Mesolithic, when the high altitude sites had been abandoned. There appears to have been a hiatus between the end of the Mesolithic and a Neolithic occupation.

Soprapiana – Fondo Bernardi (8) – Mesolithic lithic scatter on river terrace, 165 masl (Franco C., 2011).

Sorgenti del Sile (19) – Four open-air sites on the Po Plain west of Treviso in an area of springs, between 27-30 masl (Franco C., 2011), where thousands of lithic implements have been found since the 1980s. This is the richest and most extensive Mesolithic concentration of archaeological sites found so far in Italy. A research programme starting in 1992 suggests that the river banks were extensively occupied during the Early Holocene into the Castelnovian Mesolithic (Fig. R23-5) (Fontana A., *et al.*, 2014). There is however no evidence for continuity into the Transition and Early Neolithic (Fontana A., 2014: pers. com.).

Sorgenti di Livenza – Loc. Santissima (5) – Mesolithic lithic scatter close to a spring, 30 masl (Franco C., 2011).

North Adriatic – Eastern Emilia-Romagna and the Veneto – Initial and Early Neolithic Sites – Introduction

The first evidence for the Fiorano Culture, in the late first half of the 6th millennium BC could be earlier or concurrent with the Fagnigola Culture in Friuli-Venezia Giulia (Biagi P., 2004) if the site of Piancada, dated *ca*. 5700 BC is excluded, and two to three centuries earlier than the Vhò Culture to the west of the Region (Biagi P., 2004). The provenance of the Initial Neolithic Fiorano Culture of this Region is not clearly established, so that we need to look at some of the possible avenues for its arrival prior to 5500 BC (Fig. R15-1).

The Ligurian Impressed Ware Neolithic, in the north of the Gulf of Genoa, which is first attested *ca*. 5900-5800 BC, with a lithic industry evidencing Mesolithic influences, spread to the upper reaches of River Po valley in Piedmont and Western Lombardy to the north of the Ligurian Apennines. The Western Liguria influence can be seen as far east as the site of Benefizio where the pottery from Early Neolithic levels bears strong similarities to the much older pottery from Impressed Ware levels 27-25 at the Ligurian site of Arene Candide (Bernarbò Brea M., *et al.*, 2006). The Northern Liguria Impressed Ware Neolithic does not appear to have exerted much influence further east in the Po Valley, where the Fiorano Initial Neolithic Culture developed followed by the Vhò Culture between the Ligurian Impressed Ware and Fiorano Cultures, a few centuries later, under the primary influence of the Fiorano Culture.

On the eastern side of the Gulf of Genoa, the Initial Neolithic, known as the Pianaccia Facies or Pianaccia di Suvero Culture, is attested prior to 5600 BC in Eastern Liguria, north of La Spezzia. This culture appears to have stretched as far south as Northern Tuscany. The settlements of this culture are on arable land and several authors have noted that much of the lithic assemblage has striking similarities with that of the Castelnovian (e.g. Bonato M., *et al.*, 2000; Ferrari S., 2010); S. Ferrari (2010: 370) states that "*La facies della Pianaccia è stata interpretata come un "Mesolitico totalmente acculturato" (Ferrari & Steffè 2006, secondo il modello proposto da Gallay 1995*)". A. Ferrari and G. Steffè (2006) further suggest that the Pianaccia di Suvero Culture originated from trans-Apennine contacts with the mid-Adriatic Impressed Ware in the Marche. The lithic industry, whilst including Neolithic traits, such as burins on truncations and the use of obsidian, includes the following Castelnovian traits (Ferrari S., 2010: 370-371):

- Locally sourced raw material;
- Debitage aimed at producing standardised bladelets;
- Indirect percussion and pressure flaking;
- Systematic faceting of the striking platform;
- The microburin technique;
- High incidence of microlithic and hypermicrolithic tools;
- Trapezes, small and circular end-scrapers and denticulated blades.

The Western Adriatic Impressed Ware Culture is first attested in the Marche at the site of Portonovo di Ancona between 5882-5671 BC (Median 5775 BC), where a sherd of Tyrrhenian Impressed Ware was found, attesting to contacts across the Apennines. The earliest date for Maddalena di Muccia in the Marche, at the foot of a pass leading over the Apennines, where evidence for contact with the western seaboard was also found, is *ca*. 5600 BC. The dates from these two sites make it possible for the contact to have existed over the range of the Apennines for the Pianaccia di Suvero Facies to have developed out of such contacts prior to 5600 BC, and for this culture to have played a part in the neolithisation of Emilia-Romagna and the development of the Fiorano Culture, since there is clear evidence for contact and exchange across the Northern Apennines during the entire Mesolithic,

as well as evidence for contact during the Early Neolithic at the sites of Bazzarola, Benefizio, Bologna - via Andrea Costa (area ex ICO) and Copezzato di San Secondo.

The West Adriatic Impressed Ware Culture is present at Faenza Fornace Cappuccini at Riccione, south of Rimini in Romagna *ca.* 5350 BC, when the Fiorano Culture had already been established some 50 km to the north at Lugo di Romagna for about 200 years. The site of Imola Ospedale Nuovo is at present the most northerly and westerly site recognised as being an Adriatic Impressed Ware Culture site, although the earliest occupation at the site of Bazzarola further west could belong to this Culture. Elements of the Adriatic Impressed Ware Culture have been found at several sites further west and north, at sites otherwise considered to belong to the Fiorano Culture sites, such as Cesario sul Panaro to the south-east of Modena, Ca' Bissara in the Province of Vicenza, north of the River Po, as well as Lugo di Grezzana in the Monte Lessini Alpine foothills north of Verona (Cavulli F. & Pedrotti A., 2001), attesting to the fluidity of contacts and cultural influences across the Region during the Early Neolithic.

The Eastern Adriatic Impressed Ware is attested at Vižula-Medulin, at the tip of the Istrian Peninsula, *ca*. 5800-5650, and some 200 km further south in the region of Zadar, somewhat earlier (Region 14). The Danilo/Vlaška Ware Culture, which follows the East Adriatic Impressed Ware Culture, reached the head of the Adriatic prior to 5500 BC. These cultures probably migrated by navigating up the coast, so that their dispersal to the north-western shores at the head of the Adriatic cannot be discounted. Whilst the Danilo/Vlaška culture appears to have been determinant in the development of the Initial Neolithic of the Friuli-Venezia Giulia Region, it is less evident further west, although this could be due to the multiplicity of influences at play in the development of the Fiorano Culture between *ca.* 5600-5400 BC (Pianaccia di Suvero Culture, West Adriatic Impressed Ware Culture, Danilo/Vlaška and Fagnigola cultures, plus the Castelnovian Mesolithic).

Several authors have pointed out that there is a pronounced Castelnovian influence in the make-up of the Fiorano Culture lithic assemblage (blade-based debitage, the use of indirect percussion and pressure debitage, the microburin technique, the appearance of trapezes and the microlithic nature of some of the lithic assemblage), as well as in the subsistence base and the fact there was a temporal overlap between the Terminal Mesolithic and the Fiorano Initial Neolithic (Ferrari S., 2010: 371, quoting Bagolini & Biagi, 1988; 'www.archeoserver.it/space/UniMi/Comunicazione': 101-102; Degasperi L., *et al*., 1996; Improta S. & Pessina A., 1998; Pessina A., 1998).

If the Fiorano Culture initially evolved north of the Apennines in the lower reaches of the Po Valley, it later expanded to include the Northern Apennines as far as the Gulf of Genoa and the shores of Romagna in the North Adriatic (Fig R15-1), which is suggestive of continuing cultural contacts back and forth over the centuries.

The presentation and discussion of the Neolithic sites will be split between those south and those north of the River Po, in a similar manner to the way in which the Mesolithic sites have been presented.

<u>North Adriatic – Eastern Emilia-Romagna and the Veneto – Initial and Early Neolithic sites – Sites details</u>

<u>Initial and Early Neolithic sites south of the River Po</u> (Map R23a)

Bazzarola (5) – This site, 2 km south-east of Reggio Emilia was discovered in 1980 during work on a construction site and excavated by J. Tirabassi. Material belonging to three separate periods of occupation was compacted on the palaeosol without a stratigraphic context, since there were no alluvial deposits in the area during the Neolithic. The first period of occupation was Impressed Ware, followed possibly by a hiatus after which there appears to have been an occupation with Fiorano Ware, which appears to be Late Fiorano, followed by a VBQ occupation. It was not clear whether the Impressed Ware occupation related to the Pianaccia Facies, or with the Adriatic (Bernabò Brea M., 2014: pers.

com.; Tirabassi J., 1987). Further excavations took place in 2000 and 2001 during the construction of a railway line on another part of the site; if Adriatic-type Impressed Ware was found in 1980, there was less during the 2000-2001 excavations, leading to the conclusion that the Impressed Ware occupation was to the north-west of the later excavations, but a sherd with a handle of a type found in the Ligurian Impressed Ware came to light suggesting contact across the Apennines (Tirabassi J., 2002).

The site is unfortunately undated and needs to be viewed in conjunction with the sites of Benefizio, Bologna - via Andrea Costa (area ex ICO), Copezzato di San Secondo and the Pianaccia di Suvero Facies in Eastern Liguria.

Benefizio/Il Benefizio (2) – This site, which lies on the south-western outskirts of Parma along the road to La Spezia, was discovered whilst constructing the ring road at the beginning of the 21st century, and was excavated between 2001-2004. Whilst it lies a little west of the Region, it is of interest because Impressed Ware was found below a VBQ level at this site, which appears to look both south-west towards the Ligurian Sea and east towards the Adriatic (Figs. R23-7 &R23-7a). A date for this site has been obtained (Bernabò Brea M., 2014 draft):

- LTL 5037A 6394±45BP = 5473-5310 BC (OxCal 4.2 at 95.4%), on grain from structure 68 – Median 5390 BC.

Over 80% of the pottery has affinities with the Late Tyrrhenian Impressed Ware, comparable to that from Levels 27-25 at the site of Arene Candide, from which it takes a few elements which are continuously repeated. The closest parallels are the sites of Bologna-Via Andrea Costa (Area ex ICO) and that of Pianaccia di Suvero in Eastern Liguria (as well as the Lower Piedmonte). About 10% of the remaining pottery has affinities with the Adriatic Impressed Ware at Ripabianca di Monterado, Imola Ospedale Nuovo, Grotta Sant'Angelo, Grotta dei Piccioni di Bolognano, Faenza-Fornace Cappuccini and Grotta dei Piccioni in particular, although notably, there is no Figulina Pottery (Bernabò Brea M., *et al.*, 2006: 409-414; Bernabò Brea M., *et al.*, 2014 draft; Bernabò Brea M., 2014: pers. com.).

The provenance of the flint is in part local from various sources, the Marche on the Adriatic side of the Apennines, Tuscany (probably from the Valley of the River Serchio) on the Ligurian side of the Apennines, as well as Alpine, which suggests contacts with the Fiorano Culture. Some of the blades have sickle-gloss, and there are 11 pieces of obsidian, at least some of which came from Lipari, confirming long-range exchange contacts. Amongst the tools are blades with silica gloss, as well as trapezes and evidence for the Microburin technique, suggesting an element of Mesolithic traditions (Bernabò Brea M., *et al.*, 2006: 415; Bernabò Brea M., *et al.*, 2014 draft).

It is possible that the people who established this site originated from the Ligurian side of the Apennines, where elements of the Adriatic Impressed Ware appear to have mixed with those from the Tyrrhenian and Ligurian Impressed Ware and the Mesolithic substrate to form the Pianaccia di Suvero Facies. This Neolithic site finds parallels with the Emilia Romagna sites of Bazzarola, Bologna-Via Andrea Costa (area ex ICO), and Copezzato di San Secondo.

Bologna - via Andrea Costa (area ex ICO) (14) – This undated Neolithic site, 2-3 km to the east of the site of Casalecchio di Reno in the Province of Bologna, has a lithic assemblage which is non-standard (Ferrari A. & Steffè G., 2006: 82-84), and which has affinities with Bazzarola, Benefizio, Copezzato di San Secondo and the Pianaccia di Suvero Facies in Northern Tuscany and Eastern Liguria (Bernabò Brea M., *et al.,* 2014 draft):

- The flint comes from the Apennines, including the Tuscan side, as well as the Marche, but not from the Lessini Mountains in the Alpine foothills;
- The blades are 1/3 smaller than those found at the nearby Fiorano site of Casalecchio di Reno;
- The tool-kit did not include many items normally found at Fiorano Culture sites (Trapezes, the microburin technique, notched blades and abrupt retouch);

- Obsidian is present.

A. Ferrari and G. Steffè (2006: 86) point out the many similarities with the Tuscan sites of Cerreto (*ca.* 5600 BC) and Muraccio (*ca.* 5145 BC), although these two sites also produced trapezes, missing at Bologna - via Andrea Costa (area ex ICO). The pottery also appears to bear characteristics of the Mid-Adriatic Impressed Ware as well as western influences and Fiorano influences (p. 88).

This is an interesting site in that it is probably indicative of the multiple influences that went into the genesis of the Early Neolithic of the Po Valley.

Casalecchio di Reno (13) – This Fiorano Early Neolithic settlement was established on top of, or in close proximity to, a Sauveterrian Mesolithic site in which 1000s of microliths were found. The sites are located near the River Reno, some 60 masl, with smaller watercourses nearby. The salvage excavations took place in the late 1990s during the construction of a through road, in 8 trenches over an area of 30.000 m^2. The faunal remains of the Fiorano site were mostly domesticated, with a preponderance of ovicaprines over bovines, followed by suids (Gobbo I., 2010: 150).

There is a hiatus of at least one millennium, if not two, between the two phases of occupation at this location on the river fan, after the River Reno has exited the Northern Apennines.

Cava V. Macchioni, Spilamberto/Cava di Ponte Rio, via Macchioni, Rio Secco/La Cava di Ponte Rio (9) – This is one of the Early Neolithic Fiorano sites under 'Panaro' below. It is located close to the River Panaro at 69 masl and was excavated in 2002 with the earliest levels evidenced by post-holes and a palisade (Gobbo I., 2010: 177-178).

Copezzato di San Secondo (1) – A small quantity of sherds and lithics were recovered from a pit in the gulley of the River Taro in the Province of Parma. The material is now in the Archaeological Museum at Parma (Figs. R23-7 & R23-7a).

The lithics are entirely made up of Alpine flint and include a trapeze manufactured using the microburin technique, and the debitage recalls that of the Vhò and Fiorano Cultures. The pottery is comparable to that found at the site Benefizio, although the indications are that this undated site is later (Bernabò Brea M., *et al.*, 2014 draft; Bernabò Brea M., 2014: pers. com.).

As with the Emilian sites of Bazzarola, Benefizio and Bologna-via Andrea Costa (area ex CIO), this site is not a Fiorano site, but has affinities with the Pianaccia di Suvero Facies in Northern Tuscany and Eastern Liguria.

It is possible that the undiscovered site associated with this pit was established by a group or descendants of folk who had crossed over the Apennines from Liguria or Tuscany, bearing a culture reminiscent of the Impressed Ware traditions, and lithics incorporating Mesolithic traditions. The site clearly had contacts with the Fiorano culture, since the flint, which could have arrived as ready-made blades, originates from the Southern Alps.

Faenza - Fornace Cappuccini (21) – This Early Neolithic open-air site in Eastern Emilia-Romagna is located in the town of Faenza, on a river terrace on the northern fringe of the Apennines, some 40 km inland from the coast in the Province of Ravenna. The site was fortuitously discovered in the clay extraction pit of Fornace Cappuccini. Excavations, first undertaken in 1978, were resumed in 1990. They uncovered a ditch and palisade from a later period, which extends some 680m. The site went through several periods of occupation from the Initial Neolithic to the VBQ, with the earliest evidence for occupation being Archaic Impressed Ware found in pits and cavities (A Antoniazzi, *et al*., 1987; Spataro M., 2002: 137). The later excavations brought to light structures from the Early Neolithic settlement containing pottery, lithics, poorly preserved faunal remains as well as charcoal in three of the structures, which have been dated (Conati B. & Silvestrini M., 2005; Ferrari A., *et al.*, 2001; Skeates R., 1999-2000: 179; Spataro M., 2002: 137, quoting Bermond Montanari G., 2000):

- Bln-3372 6320±60BP = 5472-5207 BC (OxCal 4.2 at 93.6%), on charcoal from pit – Median 5340 BC.
- R-2314 6280±80BP = 5387-5047 BC (OxCal 4.2 at 89.6%), on charcoal from pit – Median 5215 BC.
- R-2313 6100±170BP = 5385-4669 BC (OxCal 4.2 at 92.9%), on charcoal from pit – Median 5025 BC.

The calibration using OxCal 4.2 has produced a median date 65 years older than using OxCal 4.1, with the earliest median date being some 200 years later than the earliest date from the Fiorano Culture site of Lugo di Romagna 50 km to the north, and some 300 years later than the eponymous site of Fiorano Modenese.

The lithics (Fig. R23-8) are mostly on good quality red flint from the Marche, originating some 80-100 km to the south, suggesting the provenance of these settlers. The lithics also contain 8-10% obsidian from Lipari and Palmarola, which indicates that the settlers were probably involved in the exchange and distribution of this material (Antoniazzi A., 1987: 559; Bagolini B., *et al.*, 1991: 108; Barfield L., 2000: 58; Biagi P., *et al.*, 1993: 58; Pessina A. & Radi G., 2006: 449; Spataro M., 2002: 137). The assemblage shows that the cores were fully exhausted producing microlithic blades and flakes (61% microlithic and 36% hypermicrolithic), which finds its parallels in the Mesolithic rather than the Fiorano Culture; the assemble includes microburins, truncations, trapezes (including those with *piquant triêdre* and concave retouched edges, which are typical of Castelnovian assemblages), notched Montbani-type blades and denticulates, all of which are of Mesolithic tradition. Rhomboids and Ripabianca burins are missing, but agriculture is attested through a few blades with sickle-gloss, as well as polished stone axes and remains of querns and grinders ('www.archeoserver.it/space/UniMi/Comunicazione'; Antoniazzi A., *et al*., 1987; Bagolini B. & Biagi P., 1987; Spataro M., 2002: 137).

Whilst the faunal remains are poorly preserved, there appears to be a high incidence of wild fauna ('www.archeoserver.it/space/UniMi/Comunicazione': 106).

This site was established by Neolithic colonisers coming up from the south, who appear to have intensively occupied the coast south of Rimini as far as Cattólica, bringing with them a lithic tradition containing important elements of Mesolithic tradition. There is no indication that the early settlers were influenced in any way by the Fiorano Culture, which was already in place, and which only began to be felt during the later phases of the settlements, unlike the site of Ripabianca di Monterado (Antoniazzi A., *et al.*, 1987: 561-562; Ferrari A. & Steffè G., 2006: 97).

The question of the acculturation and assimilation of a Mesolithic substrate remains an open issue, which some authors have suggested as a possibility (Antoniazzi A., *et al.*, 1987: 561), with the lithics and high incidence of hunted fauna supporting the hypothesis.

Fiorano Modenese (8) – This Early Neolithic open-air site excavated by Malavolti in the 1940s at Fiorano Modenese, south of Modena, in a location known as 'Fornace Carini' (Fig. R23-9) has become the eponymous site for the Central Emilia-Romagna and the Veneto Early Neolithic Fiorano Culture. It is not necessarily the earliest dated site of the Fiorano Culture, which was already in place when the West Adriatic Impressed Ware Culture made its way up the coast to Romagna.

The dates for this site are (Ferrari A., *et al.*, 2001: 258 Fig. 2; Skeates R. & Whitehouse R., 1992-1993, quoting S. Improta & A. Pessina, 1998: 109):

- GrN-19838 6690±180BP = 5928-5316 BC (OxCal 4.2 at 93.5%), on bone from Pit 2 – Median 5620 BC.
- GrN-19839 6540±60BP = 5617-5461 BC (OxCal 4.2 at 80%), on bone from Pit 5 – Median 5540 BC.

This Early Neolithic site is thus dated *ca*. 300 years earlier than the Impressed Ware site of Faenza-Fornace Cappuccini, established some 120 km to the east, and *ca*. 200 years earlier than the site of Riccione on the coast south of Rimini.

The flint used is primarily from Alpine sources (Bagolini B. & Biagi P., 1987: 433), which appear to have been extensively exploited in the Neolithic, rather than from the Northern Apennines, which was the primary source of flint in the Late Mesolithic south of the River Po. The lithics contain elements recalling the Mesolithic traditions with burins, trapezes, rhomboids, scrapers, piercers, microburins and blades (Fig. R23-9a) adapted to an Early Neolithic economy that still relied heavily on hunting, fishing and collecting, with some animal husbandry and agriculture (Bagolini B. & Biagi P., 1987: 431; Biagi P., *et al.*, 1993: 51-57; Malone C., 2003: 281).

A curiosity from this site is a cylindrical anthropomorphic figurine (Fig. R23-9a), suggesting possible contacts with the Eastern Adriatic.

If the Alpine flint was used from the earliest levels, it would suggest that the Neolithic had arrived in the broader region at an earlier date and that the Alpine flint sources were already being exploited and the material distributed.

Imola Ospedale Nuovo (20) – This site in Emilia-Romagna is the north-westernmost Adriatic Impressed Ware site discovered.

According to A. Antoniazzi, et al., (1987: 562) there are no elements of a Mesolithic tradition in the lithic assemblage.

Lugo di Romagna (19) – This Fiorano Culture site was discovered in 1982 almost 14 m below the present-day ground level, in a clay extraction pit exploited by Fornaci Gattelli at Lugo di Romagna in the Province of Ravenna. The site was rapidly covered by sedimentation after it was abandoned, so that organic remains were exceptionally well preserved. The excavations, which began in 1983, brought to light a settlement surrounded by a ditch and palisade with a narrow entrance, which was constructed during a later phase of the settlement, similar to that found at Lugo di Grezzana (Cavulli F. & Pedrotti A., 2001: 21; Degasperi N., *et* al., 1996, 1998; Pessina A. & Rottoli M., 1996; Pessina A., 2000: 88). The earliest dates for the site are (Ferrari A., *et al.*, 2001: 258 Fig. 2):

- R-2747 6626±110BP = 5730-5370 BC (OxCal 4.2 at 95.4% – Median 5550 BC.
- R-2748 6585±87BP = 5663-5372 BC (OxCal 4.2 at 95.4% – Median 5520 BC.

The faunal remains are domesticated (ovicaprines and bovines) with the presence of wild game (red and roe deer, wild boar and smaller game), with fishing also practiced (Degasperi N., *et al.*, 1996; Rottoli M., 2000; "www.archeoserver.it/space/UniMi/Comunicazione": 102, 110-112, quoting Castelletti & Rottoli, 1998).

Shellfish were collected as well as wild fruit (apples, hazel, acorns, grape, blackberry and plums), and agriculture was practiced. The lithic industry is laminar and includes Ripabianca burins, end scrapers, rhomboids, a few trapezes, perforators, truncations, and the microburin technique is well represented (Degasperi N., *et al*., 1996).

The site, which is the south-easternmost of the Early Fiorano Culture, appears to have been fully Neolithic from inception with some indications in the lithics and the faunal assemblage suggesting the incorporation of a Mesolithic substrate. This site could have been set up by a Neolithic group from another location on the plain of the River Po, where sites are rarely found, since, as with this site, they are mostly buried under sedimentation.

Miramare di Rimini (30) – There are three Early Neolithic Impressed Ware unexcavated and undated surface finds between 3 and 5 km from the coast behind Miramare di Rimini, in South-Eastern Romagna, numbered I, II and X, of which Site I is the most important (Bagolini B., *et al.*, 1991).

Site I, discovered in 1980, is located 30 masl about 5 km from the current coastline, on the left bank of the Marano Torrent, which spills into the sea south of Miramare. Coarse Ware, Fine Ware and Impressed Ware was collected as well as 90 lithics and some faunal remains. Of the 90 lithics, almost exclusive made of flint from some 80 km to the south-east in the Marche, 30 were retouched tools, most of which were blade-based and which include 7 trapezes, 2 sickle inserts, retouched blades, but

no end-scrapers. The large faunal remains include MNI of one domesticated bovine, one red deer, one roe deer and two wild boar. In addition, a few pieces of daub with the impression of split semi-circular wood on one side and smooth on the other attest to the construction of huts (Bagolini B., *et al.*, 1991: 59-65, 108-109).

There appears to be a strong element of the Mesolithic substrate in the composition of the lithics and faunal assemblage, even if the latter is based on limited and possibly unrepresentative data (Antoniazzi A., *et al.*, 1987: 562; Bagolini B., *et al.*, 1991: 113; Guilaine J. & Cremonesi G., 2003: 296, quoting B. Bagolini *et al*., 1989).

Sites II and X are close-by, but shed no light on the Transition (Bagolini B., *et al.*, 1991: 66-67, 75-76). Site IV could be a Fiorano Culture settlement, and might therefore be the most southerly attestation of this Early Neolithic culture, but again, it sheds no light on the Transition (Bagolini B., *et al.*, 1991: 102).

Misano Adriatico (29) – Undated Early Neolithic Impressed Ware site near the coast in Romagna. The site produced microliths and trapezes of Mesolithic tradition (Antoniazzi A., *et al.*, 1987: 562; Guilaine J. & Cremonesi G., 2003: 296, quoting B. Bagolini *et al*., 1989).

This is one of the four Early Neolithic sites known in South-Eastern Romagna, south of Rimini and as with the other sites, suggests either contact with, or the incorporation of Mesolithic elements.

Panaro/Siti di San Cesario sul Panaro (10) – A number of undated Fiorano Culture sites, numbered I-IV, along 100m of the River Panaro close to San Cesario sul Panaro in the province of Modena have been investigated. The presence of Impressed Ware pottery at this site has been considered to be imports, possibly for their contents (Information from www site of San Cesario sul Panaro, in which are quoted: Ferrari, Mazzieri, Steffè (2006); Ferrari, Mazzieri (1998); Ferrari, Pessina, Steffè (2002); Ferrari, Steffè (2006).

Pescale/Stazione del Pescale (18) – This Fiorano site covering *ca*. 15 m^2, on a ridge overlooking the River Secchia at about 170 masl in the Province of Modena, was known at the end of the 19th century and excavated by Fernando Malavolti between 1937-1942 (he later excavated the site the Fiorano Modenese).

Andrea Pessina (2000: 83) has suggested that some of the pottery (carenated cups) could be a bridge with the Impressed Ware.

There was also evidence for a prior occupation during the Castelnovian Mesolithic (possibly a hunting halt and/or a halt on passage to higher altitudes), but there is no indication of continuity of occupation of the site. The site is on the opposite bank to the Castelnovian site of Castellarano (Ferrari S., 2010).

Pianaccia di Suvero (25) – This site in South-eastern Liguria is well outside the Region, but is included here because of its possible connection with the Neolithisation of the eastern half of Po Valley.

This undated site, excavated in 1981, after some 10 years of surface collections by amateurs who had discovered it, is located at *ca.* 600 masl, on a terrace between the Suvero Canal and the Casserole Torrent, north of La Spezzia. The pottery shows several influences (Ripoli, impoverished Impressed Ware, Fiorano as well as that from the south Tyrrhenian Gruppo di Sartenao e Sasso). The lithics include trapezes, isosceles trapezes, rectangles, truncations, Notched blades (Montbani-type), sickle inserts with silica gloss and thumbnail scrapers (Fig. R23-6) (Maggi R., 1983).

The provenance of the occupants of this site is hard to determine, but it is thought that they could have included Early Neolithic elements from the Adriatic side of the Apennines, who incorporated elements of the local Castelnovian population, for which numerous sites are known in Eastern Liguria, and assimilated pottery cultural elements from diverse sources including Fiorano

ones. The site has given rise to the 'Pianaccia di Suvero Facies', which finds close parallels north of the Apennines in Emilia, as evidenced at the sites of Bazzarola, Benefizio, Copezzato di San Secondo and Bologna-via Andrea Costa (area ex ICO).

Razza di Campegine (3) – Very large VBQ site with a palisade excavated over a length of 300 m (Bernarbò Brea M., *et al*., 2003), which according to C. Malone (2003), quoting Sala (1976) maintained an economy based on red deer and pig.

Riccione (28) – This is an Initial Neolithic Impressed Ware site on the coast south of Rimini in Romagna, which was excavated between 2008-2009. The site, 12 masl, between Via Berlinguer and Via Flaminia, which was excavated over a surface of *ca*. 15000 m^2, is located between the sites of Miramare di Rimini and Misano Adriatico on palaeodunes. The site, which was occupied until the Bronze Age, saw some of its structures destroyed in a conflagration during the Neolithic (Gobbo I., 2000: 168-170).

At the time of initial occupation, it was close to the River Melo. The undecorated Impressed Ware pottery has been compared to that from the site of Imola-Ospedale Nuovo. The southern sector was protected by a palisade running east-west recognised from charcoal remains, which produced a date for which no laboratory ref. was supplied (Bernabò Brea M., *et al*., 2011; Gobbo I., 2000):

- XXX 6422±50BP = 5473-5344 BC (OxCal 4.2 at 95.4%), on charcoal from the palisade – Median 5410 BC.

The median date for this site is approximately two centuries later than that for Maddalena di Muccia to the south, and about half a century earlier than that for Faenza Fornace Cappuccini to the north.

Savignano (12) – This Fiorano Early Neolithic site, on the River Panaro in the Province of Modena, was established on a river fan close to the Castelnovian Mesolithic lithic scatter site of Il Poggio.

F. Cavulli (2008a: 93) indicates that there is not much evidence for agriculture at the site although there are pits, and the site was occupied over a prolonged period. Obsidian was also found, attesting to long-range contacts (Pessina A., 2000: 85).

<u>Initial and Early Neolithic sites north of the River Po</u> (Map R23b)

Ca' Bissara (32) – Fiorano site on the plain of the River Adige at Poiana Maggiore in the province of Vicenza, where a few sherds of Adriatic Impressed and Figulina Ware were found, attesting to contacts with the south (Bagolini B., 1984: 375; Improta S. & Pessina A., 1998: 112).

Le Basse di Valcalaona (31) – The lithics at this Fiorano Culture site in the Colli Euganei, which contain rhomboids and microburins as well as Ripabianca Burins (Fig. R23-10), have been compared to Level T4 of Romagnano III, in which Fiorano pottery was found, suggesting that the lithics at this site contained marked Mesolithic elements whilst being less laminar than at Romagnano III (Bagolini B., 1971: 121-122; Broglio A., 1973). M. Taschini (1983), quoting Barfield and Broglio (1965) includes trapezes in the assemblage.

Lugo di Grezzana (21) – This Early Fiorano flint workshop site north of Verona, was discovered and excavated in the 1990s. It sits on a fluvial terrace of the River Progno, 300 masl at the foot of the Lessini Mountains, which were extensively exploited for their flint during the Early Neolithic.

There is a single date for the site, which was occupied from the mid-6th to the early 5th millennia BC (Cavulli F. & Pedroti A., 2001: 13; Improta S. & Pessina A., 1998; Skeates R. & Whitehouse R., 1997-1998):

- R-2745 6524±76BP = 5620-5344 BC (OxCal 4.2 at 95.4%), on charcoal – Median 5480 BC.

Although there is evidence of contact with different groups, including the Adriatic Impressed Ware, as seen in some of the pottery decorations (Cavulli F. & Pedroti A., 2001; Moser L., 2000: 125-126), there is no indication from the lithics of any Castelnovian influence (Moser L., 2000: 141).

This northerly outpost of the Fiorano Culture was possibly established a century or more after the initial arrival of culture in the Po Valley, specifically to exploit the high quality flint from the Lessini Mountains, which was extensively exchanged or traded during the Early Neolithic of the Region.

Soghe (25) – This undated Fiorano open-air site on the right bank of the River Fimon, 400 masl close to the Lake in the Berici Hills in the Province of Vicenza, is estimated to date from *ca.* 5000 BC. The site contained trapezes in the lithic assemblage, harking back to the Mesolithic (Bagolini B., 1984: 376; Vicenza Province >2002, quoting Barfield L. & Broglio A., 1966 and Pedrotti A in Barfield L., in Broglio A., (ed.), 1986: 46). The rhomboids are more typical of the Fiorano Culture, but the long ones are similar to those found in the Transition Levels T3 and T4 at the Romagnano III rockshelter in the Trentino-Alto Adige Region (Bagolini B., 1971: 125).

There are no dates for this site, but it appears to contain lithic material suggesting that Mesolithic elements could have been incorporated into the settlement.

North Adriatic – Eastern Emilia-Romagna and the Veneto – Conclusions

The Castelnovian Mesolithic is well attested in the Region, with numerous sites at all altitudes along the Emilian Apennines and on the plain, but virtually none in Romagna; north of the River Po, sites are attested on the plain, on the foothills of the Alps and a few at higher altitudes. None of the sites contains Neolithic elements suggesting contact with the Neolithic migrants, with the possible exception of the mid-altitude site of Cabriolini in the Apennines. This situation need not mean that there was no contact, since the Region of Trentino-Alto Adige contains several Mesolithic sites with clear evidence for the Transition, and future research could change our perspective. The possible reasons why there is a dearth of evidence for the Transition in the Mesolithic sites can be summarised as follows:

- Many of the sites are special purpose sites;
- and/or the sites are not in locations propitious for agriculture;
- and/or the sites predate the arrival of the Neolithic;
- and/or the hunter-gatherers rapidly integrated the Neolithic lifeways;
- and/or the fact that Terminal Mesolithic sites attesting contact with the Neolithic have not been discovered.

The Mesolithic population was mobile with extensive contacts across the Apennines, between the Alps and the Apennines as well as across the Alps, so that we can assume that the arrival of Neolithic migrants would have been rapidly known across the Region.

The earliest Neolithic settlements (e.g. Bologna - via Andrea Costa (area ex ICO), Fiorano Modenese, Le Basse di Valcalaona and Soghe) contain elements recalling the Mesolithic. The Impressed Ware sites on the Adriatic seaboard contain a lithic technology with clear affinities with Castelnovian traditions, notwithstanding the lack of evidence for the Mesolithic presence in the Marche and Romagna, which could be in part due to the eustatic sea rise and sedimentation near the current coastline.

The lack of direct archaeological evidence for the incorporation of the Mesolithic population of this Region into the Neolithic lifeways can probably be comforted by the genetic evidence and the lack of evidence for violent confrontation. The presence of palisades (Faenza – Fornace Cappuccini, Lugo di Grezzana, Riccione), appear to date from later phases of the Early Neolithic, when the Neolithic was already established, and a time when there is no more evidence for the Terminal Mesolithic.

Region 24 – North Adriatic – Trentino-Alto Adige

(Map R24)

North Adriatic – Trentino-Alto Adige – General Introduction

This Region encompasses a small north-western part of the Italian province of Verona, and much of the Italian region of Trentino-Alto Adige. The valley of the River Adige is one of the major valleys dissecting the Alpine chain from north to south and constitutes one of the easiest pathways across the Alps. The valley, formed by glacial under-scouring during the Pleistocene glacial advances interfering with the tectonic uplift, is bordered by steep and vertical walls. "*As glacial retreat progressed, fluvial erosion dissected the glacial and fluvioglacial deposits. However, frost shattering and gravitational processes continued to operate during the Late Glacial and the beginning of the Holocene, creating a series of talus and debris cones that hosted various Mesolithic sites*" (Coltorti M., *et al*., 2009: 151).

Near Trento, bedrock is reached some 620 m below the current land surface and 435 mbsl, indicative of the scouring effect of the numerous Glacial Periods. At Trento, the LGM surface is however only 200 m below the current land surface, the top 150 m of which is lacustrine and fluvial sediments, which sit on top of 50 m of glacial deposits. At the LGM, the glacier was *ca*. 1500 m thick at Trento and extended down to the plain of the River Po (Fig. R24-1) (Cremaschi M., 1994). During the Post-Glacial, as the glacier retreated, sedimentation was intense, reaching as much as 134 mm a year during the Early Dryas (Angelucci D. & Bassetti M., 2009: 3-4, 9). The valley floor of the River Adige during the Allerød interstadial was some 130 m below that of today and as the Alpine glaciers melted and retreated, a lake formed, with a maximum depth of 267 m, which extended 130 km, covering the valley floor from Ceraino in the province of Verona, as far as Bolzano in the province of Trentino-Alto Adige. Sedimentation continued at a high rate during the Late Pleistocene and Early Holocene, so that by the beginning of the Holocene, the lake began to break up into smaller units, wetlands and marshes, which became a rich habitat for fauna (Alessio M., *et al.*, 1984: 246; Angelucci D. & Bassetti M., 2009: 9; Broglio A., 1984; Dalmeri G & Lanzinger M., 2001: 16-17; Gazzoni V., 2010: 52). This largely explains the attraction of the Adige valley during the Late Mesolithic and Transition, as against the Valley of the Brenta further east, with its rapid water-flow.

During the Pre-Boreal, Boreal and Early Atlantic, the mixed oak forest expanded to mid altitudes and the tree-line rose above the present-day level during the Boreal (Angelucci D. & Bassetti M., 2009: 11), to reach some 150-200 m above that presently prevailing during the Early Atlantic. This rising tree-line substantially reduced the upland prairies so that the Castelnovian Mesolithic hunters progressively abandoned hunting camps at altitudes above *ca*. 1800 masl, where their Sauveterrian forebears had set up numerous camps from which to hunt the Ibex, which was one of their preys of predilection. The high altitude hunting camps thus tend to disappear by the Early Atlantic Mesolithic, as the hunters-gatherers focussed on woodland species and the resources from the valleys, and there are few high altitude sites in the Alps for the Transition or Early Neolithic.

The wealth of resources available in this Region attracted the hunter-gatherers from the Late Pleistocene, and the sites in the Adige Valley, which between them attest to an uninterrupted occupation of the territory into the Neolithic, unless it be for a period during the '6200 BC event' (Gehlen B., 2010: 613), have produced remains of large game (red and roe deer, chamois, ibex and wild boar), birds, fish, water turtle and fresh water molluscs (Broglio A., 1980: 13).

In the Early Atlantic, the number of known sites in the Pre-Alpine hill areas and on the plains of the Veneto and Friuli increases, whilst few are known for the Boreal and fewer for the Pre-Boreal (Dalmeri G & Lanzinger M., 2001: 18), and it is these Terminal Mesolithic hunter-gatherers of the Southern Alps, as well as those living in the Adige Valley who came into contact with the Neolithic immigrants.

North Adriatic – Trentino-Alto Adige – Mesolithic and Transition Sites – Introduction

The Region was occupied from the end of the Pleistocene. For the Sauveterrian Mesolithic, well over 100 sites have been found at high altitude, almost all of which are open-air sites, as well as several at low altitude, close to the valley-floor (Ala Le Corone, Acquaviva di Besenello, Dos de la Forca, Doss Trento, La Vela di Trento, Riparo Pradestel, Riparo Gaban, Riparo Soman, Romagnano III and Vatte di Zambana) (Fig. R24-2). Most of the Castelnovian Mesolithic sites are at mid altitude or close to the valley floor at altitudes varying between 150-300 masl south of Bolzano, in rock-shelters at the top of detrical deposit cones under the rock-walls, along the edge of the main valley or its tributaries, with many of these low-altitude sites continuing to be occupied into the Transition. The sites north of Bolzano are virtually all open-air at low and mid-altitude, with a few at higher altitudes.

The low-altitude sites in the Adige Valley which continued in use into the Transition gave rise to the particular Transition (or Early Neolithic as it is often called) culture known as the Gaban Culture, which was first defined by B. Bagolini and P. Biagi in 1987, after the eponymous site of Riparo Gaban close to Trento.

The Castelnovian lithics of the Region are characterised by (Broglio A., 1980: 21; Broglio A. & Lanzinger M., 1987):

- Trapezes and rhomboids as well as a few triangular armatures harping back to the Sauveterrian, with a marked reduction in the number of armatures compared to the Sauveterrian, attributed to fewer armatures being hafted;
- An increase in size from the hypermicrolithic of the Sauveterrian Mesolithic;
- A higher frequency of blades and bladelets;
- Increased number of truncations;
- More retouched blades including denticulated and Montbani blades;
- Scrapers on blades predominate over those on flakes.

During the five centuries of the Transition, which commenced starting *ca.* 5000 BC, until the advent of the VBQ Culture, there is a clear continuity of the Castelnovian Mesolithic tradition, although the trapezes tend to get larger, longer and more asymmetrical; there is an increase in the number of rhomboids, and new tool-types typical of the Neolithic appear such as the Ripabianca burin. There is also substantial homogeneity in the lithic assemblages and faunal remains between the various Gaban Culture Transition sites (Bisi F., *et al*., 1987: 404; Broglio A. & Lanzinger M., 1987).

The striking features of the Late Mesolithic sites which continue in use into the Gaban Culture Transition are:

- The late arrival of Neolithic attributes in the Region based on the few available dates;
- The slow-take-up of selected Neolithic attributes by the autochthonous population (pottery, followed by animal husbandry), to the almost total exclusion of polished stone artefacts and the slow take-up of agriculture;
- The clear continuity of Mesolithic traditions such as hunting, bone and antler objects and personal adornments;
- The dearth of Gaban Culture open-air sites, as compared to those in rock-shelters, south of Bolzano;
- The extended duration of the Transition which appears to last over 500 years and which continues until the advent of the VBQ culture *ca*. 4500 BC.

Several authors have concluded that the Gaban Transition/Early Neolithic culture of this Region emanated in large part from the gradual acculturation of the Castelnovian Mesolithic population, who first acquired pottery and some domesticated fauna (primarily ovicaprines), whilst retaining their lithic technology and lifeways based on the hunt (Bazzanella M., *et al.*, 2000: 160-161). All the Gaban Culture sites have been classified as Mesolithic/Transition on the site distribution Map R24.

Fiorano pottery has been found at several sites (e.g. Ala Le Corone, La Vela, Riparo Gaban) (Bagolini B., 1984; Nicolis F., *et al.,* 2007: 89), suggesting the provenance of at least some of the Neolithic influence into the Region.

North Adriatic – Trentino-Alto Adige – Mesolithic and Transition Sites – Sites details

Acquaviva di Besenello (23) – This undated site is located on a rocky terrace some 15 m above the valley-floor and 240 masl on the left bank of the River Adige near the town of Besenello, some 10 km downstream from Trento. The site was discovered in 1977 and excavated in 1980, when 4 m of archaeological deposits were found stretching from the Sauveterrian and Castelnovian Mesolithic to the Neolithic and Copper Age (Dalmeri G. & Nicolodi F., 2005; Pedrotti A., 1998).

This is one of a dozen sites north and south of the city of Trento, in which the Mesolithic can be seen transitioning to the Neolithic.

Aica di Fiè (7) – This is an undated open-air Gaban Culture site 850 masl east of Bolzano, on the left bank of the Isarco River, at which terracing and agriculture are attested (Biagi P., et al., >2000: 122; Pedrotti A., 1998: 125, 2001: 20-21; WWW/UniMi/neoliticoIV: 120-122).

Ala Le Corone (28) – This Valley bottom site 250 masl in the Southern Trentino is a rock-shelter at the top of an alluvial fan formed by a torrent. Because the site was threatened by clandestine digs, archaeological excavations commenced in 2002 and were continuing in 2009. The preliminary excavation report (Nicolis F., *et al.,* 2007) indicates that the excavations were conducted over 25 m^2 and contained occupation levels from the 19th century to prior to the Gaban Culture; at the time of writing, the Levels beneath those of the Gaban Culture had not yet been excavated (Fig. R24-3), but one date had been obtained from the top of the Mesolithic Castelnovian Level US14, beneath a sterile Level, as well as three for the Gaban Culture Levels (Angelucci D. & Bassetti M., 2009: p. 13; Nicolis F., *et al.,* 2007: 83):

- KIA-30570 6627±33BP = 5625-5509 BC (OxCal 4.2 at 93.6%), on charcoal Level US14 – Median 5570 BC.
- KIA-30572 5966±33BP = 4944-4769 BC (OxCal 4.2 at 94.5%), on charcoal Level US96 – Median 4855 BC.
- KIA-30574 5889±33BP = 4837-4701 BC (OxCal 4.2 at 94.5%), on charcoal Level US104 – Median 4770 BC.
- KIA-30571 5843±36BP = 4796-4601 BC (OxCal 4.2 at 95.4%), on charcoal Level US105 – Median 4700 BC.

As with Riparo Gaban, there appears to be a hiatus in occupation between the last Castelnovian occupation (Level US14) and the beginning of the Transition Gaban Culture occupation of over half a millennium. At the base of Level US96 was found a stratum of limestone plaques attributed to cryostatic action, sealing the underlying anthropic deposits of Level US14, which contained no pottery but which was rich in faunal remains (Nicolis F., *et al.,* 2007: 86).

The Gaban Culture occupation includes Fiorano Culture artefacts, including a sherd from a carenated incised mug, suggesting the direction of the cultural contacts and/or the origin of some of the Early Neolithic migrants into the Region (Nicolis F., *et al.,* 2007: 91).

The Gaban Culture Levels US96, US104 and US105 contained a higher percentage of wild fauna than in the subsequent VBQ Culture Levels, with lithics typical of the Gaban Culture with a high incidence of trapezes, comparable to Riparo Gaban, Romagnano III, Mezzocorona-Doss de La Forca, Mezzocorona-Borgonuovo and La Vela, and include Ripabianca burins, rhomboids and the microburin technique, some of which bear comparison with the Neolithic of the Po Valley (Nicolis F., *et al.,* 2007: 89).

Castel Juvale (1) – Possible Gaban Culture mid-altitude open-air site, 870 masl, on a ridge on the left bank of the Adige River north-west of Bolzano.

Coel di Tarces (2) – Possible Gaban Culture mid-altitude open air site, 1075 masl, in the upper reaches of the Adige Valley.

Colbricon (10) – This is a series of 9 Mesolithic high altitude sites near lakes above a pass, at *ca*. 2000 masl, used during the Sauveterrian and Early Castelnovian Mesolithic, but abandoned in the Late Castelnovian (Alessio M., *et al.*, 1984; Bressan F., 1984: 18; Broglio A., 1980: 15, 1983: 71).

Dos de la Forca/Galgenbühel (11) – This rockshelter, close to the valley floor at *ca*. 250 masl, which was originally buried under 12 m of detrical sediments, was discovered whilst quarrying for gravel, which partially damaged the site. The site, located some 30 km south of Bolzano to the west of the town of Salorno, on the left bank of the Adige River, became the subject of clandestine digs and was therefore excavated between 1999-2002 by M. Bazzanella and U. Wierer, who opened 18 m^2 in half metre units. The archaeological deposits, originally some 4 m thick, were only 2.5 m thick at the time of these excavations.

This site was occupied for some 1000 years during the Sauveterrian Mesolithic, when the valley floor was made up of wetlands and the meandering Adige River. The most recent date at the top of the excavation is 8560±65BP = 7732-7511 BC (OxCal 4.2 at 95.4%), and it is thought the rockshelter was abandoned prior to the Castelnovian Mesolithic, when the talus grew to impede its use (Coltorti M., *et al.*, 2009; Wierer U. & Boscato P., 2006).

Doss Trento (21) – The remains of a detrical cone, 308 masl on the right bank of the Adige south of the open-air site of La Vela, was discovered in 1982 and excavated in 1983. There were 4 m of chaotic stratigraphy, with scarce material covering the Mesolithic, followed by VBQ material, and, after a sterile Level, Late Neolithic, Metal Ages, to Modern material (Bagolini B., *et al.*, 1985: 216; Pedrotti A., 1998).

There was no evidence for continuity of occupation during the Transition at this site.

Fontana de La Teia (29) – This is a Mesolithic Castelnovian open-air site 1200 masl, near Ferrara di Monte Baldo, and close to flint outcrops on Monte Baldo, overlooking the Adige Valley. The site was discovered in 1977 and excavated by B. Bagolini and D. Nisi who reported on the excavations in the Notizziaro in 1980. Numerous trapezes, microburins and Montbani blades were found at this undated site which appears to have been set up to exploit the locally available flint (Franco C., 2003: 30-31).

Lago delle Buse (15) – The high altitude lake at over 2000 masl, east of the Adige Valley, was used during the Mesolithic for some two millennia. The most recent of four dates suggests that it was used in the Castelnovian Mesolithic (Skeates R. & Whitehouse R., 1997-1998):

- Gd-6156 7500±150BP = 6640-6063 BC (OxCal 4.2 at 95.4%), on charcoal – Median 6350 BC.

The site and date are important, since the location proves that high altitude hunting sites existed in the Castelnovian Mesolithic, and the date partially bridges the ^{14}C hiatus in dates for the Adige valley-floor sites.

La Vela/La Vela di Trento (19) – Open-air site, 204 masl, on the alluvial fan of La Vela Torrent on the right bank of the Adige River in a north-western suburb of Trento (Fig. R24-4).

The excavations took place between 1960-2003 over several areas totalling a little less than 1000 m^2 (Fig. R24-4) (Bazzanella M., *et al*., 2000; 2001: 127; Degasperi N., *et al.*, 2006: 147, 155):

- In 1960 L. Barfield excavated Area I;
- Between 1975-1977 B. Bagolini excavated Areas II, III and IV;

- Between 1987-1988 G. Ciurletti with B. Bagolini excavated Areas V, VI and VII;
- In 2003 E. Mottes excavated Area VIII (Basement of an unauthorised construction).

Below Late Neolithic and VBQ Levels, there was evidence of a late phase of the Transition Gaban Culture occupation in Areas I, II, III and VII.

Evidence for Early and Late Mesolithic occupations were found in Areas VII and VIII.

The Late Mesolithic fauna found during the 1987-1988 excavations in the US234 Late Mesolithic Level was dominated by red deer, followed by chamoix and ibex, which are poorly documented (Bazzanella M., *et al.*, 1997). According to M. Bazzanella (1998) the Early Neolithic faunal assemblage from the 1975-1976 excavations contained a preponderance of wild game, which could be due to the fact that the excavations uncovered an earlier occupation than the sectors excavated in 1987-1988, when domesticated cattle and ovicaprine remains were more numerous than the wild fauna, which was dominated by red deer. The study of the faunal remains from the later excavations did not however take into consideration the suid remains, which were not separated between wild and domesticated. By contrast, A. Pedrotti (2001: 20) states that in the earliest Neolithic levels, the ovicaprine, followed by bovine and suid remains, were slightly more numerous than wild fauna. The indication is nonetheless that stock-breeding was an important activity at this open-air site, whilst hunting also continued to be important.

The Early Neolithic/Transition Gaban Culture pottery is comparable to that of Riparo Gaban and Mezzocorona-Borgonuovo and includes Fiorano Pottery (Bagolini B., 1984; Bazzanella M., *et al.*, 2000: 153), with the assemblage being made up of 23 decorated sherds. Incision is the predominant technique (46%), followed by scratched (27%), impressed (18%) and plastic decoration (9%) (Pedrotti A., *et al.*, 1997). M. Bazzanella *et al.* (2001: 127) state that "*from a typological point of view, the few ceramic materials originating from the 1975 and 1976 excavation campaigns would seem attributable to a recent phase of the local Early Neolithic. The cultural findings of the 1987-88 excavations are unpublished*".

The Early Neolithic/Transition lithics contain a strong Castelnovian element (Bazzanella M., *et al.*, 2000: 156).

Agriculture is attested during the Gaban Early Neolithic/Transition (Biagi P., *et al.*, >2000: 122; Gehlen B., 2010: 617; Pedrotti A., 2001: 20 quoting Castelletti & Rottoli, 2001), with two *Triticum* species, *Hordeum vulgare* and *Pisum* (Mottes E. & Rottoli M., 2006: 136). C. Malone (2003) states that "*The site had an economy based on wild deer until late in the fifth millennium B.C. when domestic animals and cereals eventually became significant, together with querns and grindstones*" (p. 271). Red and roe deer were the predominant species in the Early Neolithic/Transition, although one third of the bones were from domesticated species. The domesticated species gradually increased and by the early VBQ 25% were cattle, 23% caprines, 14.5% pigs and only 10.4 % deer (p. 271-272). R. Nisbet (2008: 100) specifies that emmer wheat was grown in both the Early and Middle Neolithic.

The dates for this site are from the VBQ inhumations, the oldest of which is (Mottes E. & Rottoli M., 2006: 159 Tab. 3):

- Utc-5054 5710±50BP = 4689-4454 BC (OxCal 4.2 at 95.4%), human bone Area I – Median 4570 BC.

The data from this important site is confusing, since there is no clear periodisation of the cultural evolution during the lengthy Transition from the Terminal Mesolithic to the Neolithic. It would seem however that the occupation of the site was discontinuous within the Mesolithic and into the Early Neolithic, since the Early Neolithic relates to a recent phase prior to the VBQ Culture. Further, if agriculture is only attested towards the end of the 5th millennium, this would coincide with the VBQ Culture.

Malga Romeno (9) – This high altitude open-air site, 1773 masl, overlooks the right bank of the Adige Valley between Trento and Bolzano. The material collected as surface scatters and test pits, mostly in

disturbed locations, dates from the Sauveterrian, Castelnovian, Neolithic and Metal Ages, and is still awaiting study (Dalmeri G. & Nicolodi F., 2005: 72).

Mezzocorona-Borgonuovo (12) – This rockshelter 20 km north of Trento is located at the edge of the Piana Rotaliana on the right bank of the River Adige, up the left bank of the Noce Torrent. The site, discovered in 1991 in a damaged condition, caused by extraction work undertaken with mechanical diggers, is 250 masl at the top of a detrical cone at the base of the Mezzocorona Mountain. The site was the subject of salvage archaeology commencing in 1991, and only some 10 m^2 were exploitable. Material covering the Early and Late Mesolithic, Gaban Culture, Late Neolithic and Bronze Age was found. Further excavations in 1996 brought to light a Mesolithic burial for which the four dates give a range between 5475-4713 BC (760 years) and medians from 5385-4895 (490 years), with two dates suggesting *ca*. 5150 BC. (Bassetti M., *et al.*, 2004; Skeates R., 2001-2003), although G. Dalmeri *et al*. (1998) believe it to date from an earlier period, possibly due to red deer cranium found nearby being dated to the Sauveterrian (Martini F., 2006):

- UtC-7201 6380±50BP = 5475-5231 BC (OxCal 4.2 at 93.1%), on human collagen burial Level US 145 – Median 5355 BC.
- UtC-202 6210±60BP = 5310-5010 BC (OxCal 4.2 at 95.4%), on human collagen burial Level US 145 – Median 5160 BC.
- ETH-15981 6170±70BP = 5301-4947 BC (OxCal 4.2 at 95.4%), on human collagen burial Level US 145 – Median 5125 BC.
- ETH-15980 6005±75BP = 5075-4713 BC (OxCal 4.2 at 93.2%), on human collagen burial Level US 145 – Median 4895 BC.

Two readings were also obtained on animal bones outside the grave pit, but considered to be in association with funerary rites, the youngest of which is in correlation with dates obtained on the human remains (Bassetti M., *et al.*, 2004):

- ETH-15984 6410±75BP = 5491-5225 BC (OxCal 4.2 at 95.4%) on animal bone – Median 5360 BC.
- KIA-12446 7797±43BP = 6701-6501 BC (OxCal 4.2 at 94.8%) on animal bone – Median 6600 BC.

The Late Castelnovian Level is followed by a Transition Gaban Culture Level which was cut into by VBQ levels, which produced evidence for the flattening of the surface for the construction of habitation structures (Bazzanella M., *et al.*, 2000: 152; 2001). The Gaban Culture Levels are undated, but believed to represent a late phase, based on the pottery, which is comparable to that of La Vela, Riparo Gaban, San Giacomo and Villandro-Plunacker (Bazzanella M., *et al*., 2000: 153; 2001: 214, 216). M. Bassetti *et al.* (2004) have indicated that the sherds, which are comparable to those found at Riparo Gaban, find affinities with the Vhò Culture and present a mixture of various shapes, qualities of manufacture and decorative syntaxes, with some of the sherd showing signs of repair holes. This could be interpreted as suggesting valuable exchange items rather than pottery manufactured on-site.

The lithics (Fig. R24-5) from the Gaban Culture Levels show characteristics of the Castelnovian Culture "*Elements of Castelnovian tradition are also present, such as trapezes (Fig.2: 15-19), notched blades (Fig.2: 10- 11) , long and short endscrapers (Fig.2: 3-8), truncations, borers (Fig.2 :9), burins, microburins (Fig.2: 20-22), retouched blades and also burins on a side notch (Ripabianca burins) (Fig.2: 1-2) and rhomboids (Fig.2: 12- 14) typical of the Early Neolithic of the Po Plain*" (Bazzanella M., *et al*., 2001: 215). Some of the lithics are made of Lessini flint, suggesting contact with the Fiorano Culture; in addition, contacts across the Alps are attested by 2 pieces in rock-crystal, one of which is a trapeze in process of being shaped, and a polished stone axe made of eclogite from the Western Alps was also found, the only other for the Gaban Culture having been found at Villandro-Plunacker north of Bolzano (Bassetti M., *et al.*, 2004: 324; Bazzanella M., *et al*., 2000: 156; Bazzanella M., *et al*., 2001: 215).

The faunal assemblage is dominated by wild game, notably red deer, but including some chamois and ibex attesting to high altitude hunting. The four domesticated species are present as well, although the fragmentary nature of the remains makes their attribution delicate (Bazzanella M., *et al*., 2000: 157; Bazzanella M., *et al*., 2001: 216; WWW/UniMi/neoliticoIV). As C. Malone (2003: 271) states, "*The site had an economy based on wild deer until late in the fifth millennium B.C. when domestic animals and cereals eventually became significant, together with querns and grindstones*".

This Gaban Culture site attests to a later phase of the Transition, based on the pottery styles, yet clear elements of the Castelnovian Culture continued as evidenced in the economic base and the lithic tradition. The sources of raw material for the lithics and pottery attest to the wide-ranging contacts, whilst the cultural homogeneity of the Gaban Culture, in process of acculturation, is maintained, with agriculture only attested after the middle of the 5th millennium BC with the VBQ Culture.

Mezzocorona-Doss de la Forca (13) – This undated site is located 235 masl at the base of a large quadrangular 52 m in circumference and 8 m high sandstone block, on the left bank of the Noce Torrent in the Piana Rotaliana and the right bank of the River Adige (Fig. R24-6). It was originally excavated in the 1880s, was 'rediscovered' during quarrying work and re-excavated between 1983-1985. The occupation covers the Castelnovian Mesolithic and Gaban Culture (Bagolini B., *et* al., 1985; Dalmeri G. & Nicolodi F., 2005; Pedrotti A., 1998).

The Gaban levels contained lithics with a strong Castelnovian element (Bazzanella M., *et al*., 2000: 156) as well as ovicaprines and domesticated bovines, and Gaban-style pottery (Gehlen B., 2010: 617).

This is yet another Gaban Culture Transition site, but in the absence of dates, it is not possible to state whether there was a possible hiatus between the Final Mesolithic and the Transition. The site also needs to be seen in conjunction with the nearby site Mezzocorona-Borgonuovo.

Nogarole (14) – This rockshelter 300 masl, on the southern side of the Piana Rotaliana and the right bank of the Adige River, was used during the Gaban Culture Transition, without there being any evidence for a prior occupation (Pedrotti A., 1998).

Paludei (25) – During quarrying works in 1978 at this location on the left bank of the Adige River some 20 km south of Trento, Late Neolithic material was found with Castelnovian Mesolithic material at a lower level against the rock-face (Dalmeri G. & Nicolodi F., 2005: 72).

The site is undated, but the evidence points to it not being occupied during the Gaban Culture Transition.

Plan de Frea IV (6) – Several Mesolithic sites have been discovered around the erratic block 'Sas di Moro', a little below the Val Gardena Pass in the Italian Dolomites at 1930 masl. Most of the sites are Sauveterrian, but Plan de Frea IV is a Castelnovian site, on which preliminary work was undertaken between 1979-1982 and more extensively excavated in 1994 (Angelucci D., *et al.*, 2001; Broglio A., 1980: 13; Broglio A. & Lunz R., >1981) The Castelnovian occupation of this site has been dated (Skeates R. & Whitehouse R., 1997-1998), with earlier Sauveterrian dates supplied by D. Angelucci *et al.* (2001: 107, Fig. 3):

- R-2567 7112±121BP = 6223-5745 BC (OxCal 4.2 at 95.4%), Layer 3 – Median 5985 BC.
- R-1497 7000±200BP = 6255-5536 BC (OxCal 4.2 at 94.9%), Layer 3 – Median 5895 BC.

Based on the dates, this high altitude site occupied around 6000 BC confirms the existence of Late Castelnovian Mesolithic hunter-gatherers, who continued to hunt at high altitudes.

Prè Alta (27) – The central (N° 2) of three glacial holes, located 190 masl in the commune of Nago-Terbole in the valley of the River Sarca, about 1 km north of Lake Garda, and in the valley west of the

River Adige, was excavated in a short excavation season in 1992 by a joint Anglo-Italian team. The hollow, 6 m in diameter with a rear wall rising 5 m has a narrow overhand of 1.5 m.

Over 2000 typically Castelnovian lithic pieces were found, of which 74% was debitage as well as 40 sherds which appear to date from the Later Neolithic or Early Bronze Age to the Middle Ages, so that no conclusion regarding the Transition can be drawn regarding their presence. The faunal assemblage is in poor condition, with red deer present as well as 'sheep-sized animals' more likely to be roe deer and/or chamoix, with the phalanges absent, so that it would seem that these were cut off elsewhere (Clark R., *et al.*, 1992).

The site appears to have been function specific and probably visited a number of times between the Late Mesolithic and Early Neolithic, but post-depositional disturbance makes it impossible to be precise about occupation after the Late Mesolithic and possibly the Early Neolithic. The excavators suggest that it is possible that Hollow N° 3 contains richer archaeological remains beneath post-depositional rock-falls (Clark R., *et al.*, 1992: 261).

Dalmeri G. & Nicolodi F., (2005: 72) confirm that no Gaban Culture or Transition material was found at this site.

Riparo di Moletta Patone di Arco (24) – This rockshelter, 95 masl and some 15 km north of the head of Lake Garda on the left bank of the River Sarca, was discovered during quarrying work in 1979 and promptly became the subject of excavations between 1979-1981 (Fig. R24-7). The esplanade in front of the rockshelter had already been destroyed, so that only 25m2 under the rockshelter were excavated, which produced a continuous stratigraphy above a silty loam level, possibly representing a palaeolake. The stratigraphy probably represents discontinuous use of the site, from the Mesolithic, through the Gaban Early Neolithic/Transition to the Early VBQ in Stratum C1, which was somewhat disturbed (Fig. R24-7). Later occupations were separated by a Sterile Stratum C. The fauna in Stratum C1 is about 50% domesticated with the 4 main species represented, without differentiating between the periods, with red and roe deer representing 16% based on the MNI. The lithics from Stratum C1 contain some Sauveterrian elements, with a strong element of Castelnovian with some from the Early VBQ Culture (Fig. R24-7), whilst the pottery is Fiorano-Vho and Early VBQ Culture (Bagolini B., *et al*., 1984).

Without dates it is not possible to determine whether the site was regularly used during the Late Mesolithic and the Gaban Culture, but the lack of stratigraphic discontinuity suggests that local groups returned to the rockshelter over an extended period of time, transitioning into the Neolithic in a similar manner as the Gaban Culture in the Adige Valley to the east.

Riparo di Pradestel (17) – This rockshelter is 6 km to the north of Trento on the right bank of the Adige River, 225-250 masl and some 20 m above the valley floor in a locality called Ischia Podetti (Fig. R24-8). The site was discovered in 1972 and excavated by B. Bagolini in 1973 and By A. Broglio from 1975. The occupation of the site, whilst not continuous, spans some three millennia as evidenced by the 4 m of deposits, of which the lower 2.8 m contained anthropic remains dating from the Sauveterrian, Castelnovian and the beginning of the Gaban Culture (Fig. R24-8). The occupation of the site ends with Early Gaban Culture pottery in a Mesolithic context (Dalmeri G. & Nicolodi F., 2005: 71).

The stratigraphy (Fig. R24-8) has been described as follows:

- Levels A and B are Early Neolithic/Transition Gaban, but there are no dates. The faunal assemblage is hunted and the lithic assemblage, whilst not as numerous as in the levels beneath, is of Castelnovian tradition (Fig. R24-8) (Bisi F., *et al.*, 1987: 382; Dalmeri G., *et al.*, 2008). Level A included a few sherds and wild fauna and is attributed to the Early Gaban Culture, after which the site is abandoned (Alessio M., *et al*., 1984; Biagi P., 2001: 7);

- Levels C is Late Castelnovian and Level D, Middle Castelnovian. A date from Level D1-D3, dominated by wild fauna, including ibex, red deer and roe deer (Alessio M., *et al*., 1978, 1984; Andersen S. H., *et al.*, 1990: 35; Bisi F., *et al.*, 1987; Dalmeri G., *et al.*, 2009):
    - R-1148 6870±50BP = 5877-5661 BC (OxCal 4.2 at 95.4%), on charcoal Level D1-3 – Median 5770 BC.
- Level E is Early Castelnovian, and levels below Level E are Sauveterrian Mesolithic.

G. Dalmeri, who did his doctoral thesis on this site, confirmed that the top levels contained insufficient material to make a proper evaluation of their attribution, although a single trapeze was found (Dalmeri G., 2014: pers. com.) as well as a few sherds from the Early Neolithic, but that the Level AA was not dated (Dalmeri G., *et al.*, 2008).

Fragmentary harpoons were found dating from the Middle and Late Mesolithic, which could suggest contact with the north of the Alps (Cristiani E., 2009).

Unfortunately, there are no dates for the more recent levels, and it is known from the sterile levels that the site was not continuously occupied. It is not possible to state whether the site was in occupation during the Terminal Mesolithic and into the Gaban Transition. It is however clear that as with other sites, the Gaban Transition levels represent an occupation by hunter-gatherers who had acquired pottery.

Riparo Gaban (18) – This rockshelter, which is eponymous of the Transition/Early Neolithic Culture of the Region, is some 3 km north of the centre of Trento on the left bank of the Adige River, in a glade up a small parallel valley (Fig. R24-9), which would have been deeper during the earlier occupations. The eastward facing rockshelter, 270 masl and 80m above the valley floor, is 30 m wide, 6 m high and 4 m deep; it was discovered in 1970, and the 7 m of anthropic deposits were excavated between 1971-1985, initially under B. Bagolini between 1971-1979 over a surface of 15 m^2, of which 12 m^2 were undisturbed. Further excavations took place subsequently between 1982-1983 involving B. Bagolini, A. Broglio, S. K. Kozlowski, with G. Dalmeri, M. Lanzinger and others working in different sectors. The excavations were made difficult by subduction, erosional levels and anthropic pits dug during the Mesolithic, Neolithic and Middle Ages/Renaissance (Kozlowski S. K. & Dalmeri G., 2002).

B. Bagolini established the cultural stratigraphy as follows:

- Layer 26 (about 30-50 cm) Early Neolithic;
- Layers 27 and 28 (each 25-40 cm) Castelnovian;
- Layers 29-30 (each 25-40 cm) Sauveterrian.

Each of these 'Layers' therefore represented the sum of several periods of occupation (Kozlowski S. K. & Dalmeri G., 2002).

A. Broglio and S. K. Kozlowski, working in separate sectors, were joined from 1982 by G. Dalmeri. The excavations were undertaken in five sectors numbered II, I, IV, III and V from north to south, mostly in artificial spits of 5-10 cm, with the stratigraphies numbered differently by the various excavators for the two Sauveterrian, two Castelnovian and the Gaban Culture Levels (Fig. R24-9) (Clark R. H., 2000; Perrin T. 2006: 98-99). The site, which helped define the Gaban Transition Culture, was further investigated in the mid 2000-2010 period, to further clarify the site formation processes (Angelucci D & Bassetti M., 2009: 12).

The occupation commenced in the Early Mesolithic and continued beyond the Neolithic into the Bronze Age (Bagolini B., 1984: 330). The Early Neolithic Gaban Culture transitions to the VBQ Culture at a depth of 4.5 m (*ca.* 4500 BC), below which the Gaban Culture and Mesolithic deposits dating from *ca.* 8000-4500 BC stretch for a further 3 m. (Dalmeri G. & Nicolodi F., 2005: 70).

The dates summarise as follows for the Castelnovian and Gaban Culture (Angelucci D. E., *et al.*, 2009; Kozlowski S. K. & Dalmeri G., 2002; Perrin T. 2006: 116; Skeates R., 2001-2003):

- KIA-10364 7971±42BP = 7047-6747 BC (OxCal 4.2 at 91.4%), on charcoal Layer FA Early Castelnovian – Median 6900 BC.

- KIA-10367 7902±55BP = 6866-6644 BC (OxCal 4.2 at 66.5%), Layer FA Early Castelnovian – Median 6755 BC.
- KIA-10366 7725±49BP = 6641-6471 BC (OxCal 4.2 at 95.4%), on charcoal Layer FA Early Castelnovian – Median 6555 BC.
- KIA-10363 6968±41BP = 5921-5745 BC (OxCal 4.2 at 86.9%), Layer E Castelnovian – Median 5835 BC.
- KIA-10362 7283±38BP = 6225-6066 BC (OxCal 4.2 at 95.4%), on charcoal Layer D9 Castelnovian date out of context – Median 6145 BC. (S. Kozlowski and G. Dalmeri (2002: 12, Tab. 2) label this date as Early Neolithic).
- Bin-1778 5990±45BP = 5000-4771 BC (OxCal 4.2 at 95.4%), on charcoal Layer D8-2 Gaban Group – Median 4885 BC.
- Gif-3766 5650±150BP = 4851-4228 BC (OxCal 4.2 at 93.8%), on charcoal Layer D8 Gaban Group – Median 4540 BC.
- Bin-1777 6030±45BP = 5043-4825 BC (OxCal 4.2 at 93.2%), on charcoal Layer D2 Gaban Group – Median 4935 BC.
- Bin-1777A 5750±60BP = 4722-4461 BC (OxCal 4.2 at 95.4%), on charcoal Layer D2 Gaban Group – Median 4590 BC.

There are long hiatuses in the dates, first during the '6200 BC event' and again between the last Castelnovian Mesolithic dates and the first Gaban Culture dates, which several authors have noted (Angelucci D. E. & Bassetti M., 2009: 12), added to which the deposits were substantially disturbed with pits and post holes from later occupational levels (Fig. R24-9), rendering their chronological interpretation problematical (Biagi P., 2001: 73; Broglio A., 1984: 294; Cristiani E., *et al.*, 2009: 193). Furthermore, the horizontal spits cut across the natural north-south incline in the shelter, so that spits contained material from different periods, and as D. Perrin (2006: 102), who undertook a study of the lithics available for each of the square metres of the 14 m2 of Sector IV, noted, a single spit could include Early as well as Late Mesolithic material, which is an aberration.

Whilst the Mesolithic Levels were rich in material, the Neolithic levels were less so. If the lithic industry of Gaban Culture levels is suffused with the Castelnovian tradition (Fig. R24-11), the presence of 4 Ripabianca burins in Sector IV Level D9, dating from the Early Gaban Culture, testifies to Neolithic contacts. T. Perrin (2006: 117) in his study of the lithics noted the points of convergence between the two periods:

- Sourcing of flint from the same location at Biancone, which is the closest accessible source;
- Blade-based technology using indirect percussion on unipolar cores;
- Almost systematic faceting of the striking platform;
- The use of flakes for the manufacture of common tools;
- Use of the microburin technique to obtain trapezes.

There are differences however:

- The Gaban group used only one side of the nuclei;
- There is an evolution towards larger and more asymmetrical trapezes;
- The appearance of new tools such as the Ripabianca burin and rhomboids.

"*The lithic evidence indicates that the early Neolithic tradition grew directly out of the previous Mesolithic periods, and the faunal remains support this conclusion*". Without the pottery the material would have been considered Mesolithic (Clark R., 2000: 103; Pessina A, 2007: 23).

The identified fauna from the Late Castelnovian levels is dominated by red deer, followed by roe deer and wild boar (Fig. R24-11). The Early Gaban Transition levels contain a majority of wild game with possibly some ovicaprines, although the faunal remains are highly fragmented, with only 7.6% identifiable to a species (Clark R. 2000: 109-110); they also include remains of ibex, suggesting that some high altitude hunting continued (WWW/UniMi/neoliticoIV). The domesticated fauna would seem to appear in the Later Early Transition and contain evidence for ovicaprines as well as domesticated pig (Gehlen B., 2010: 617), whilst according to C. Malone (2003: 271) "*The site had an*

economy based on wild deer until late in the fifth millennium B.C. when domestic animals and cereals eventually became significant, together with querns and grindstones".

The bone industry in the Gaban Culture levels also shows continuity from the Castelnovian in the manufacturing of antler blade axes rather than polished stone ones (Cristiani E., *et al.*, 2009: 195; Pedrotti A., 2009: 41).

The earliest pottery is of Impressed Ware tradition, after which Vhò and Fiorano pottery appears (Pedrotti A., 2001).

This site is exceptional in having produced a number of items of mobiliary 'art' and personal adornment found in the Transition Gaban levels, clearly imbued with symbolic meaning (Fig. R24-10), whose conception and method of manufacture hark back as far as Epipalaeolithic influences, whilst also incorporating Neolithic influences:

- Female figurine carved out of a bone plaque, with vulva highlighted and decorated with ochre from the waist down. The figurine was found in 'Neolithic Level' dated 4900-4700 BC, and if the cultural reference can be found in the Early Neolithic of the *Caput Adriae*, the execution on hard animal matter rather than baked clay harps back to the Mesolithic and periods prior to the Holocene (Pedrotti A., 2009: 41) (Fig. R24-10);
- Deer head carved out of cervid bone, perforated at one end (Fig. R24-10);
- Oblong bone plaquette engraved as a fish, perforated at the eye (Fig. R24-10);
- Ball-end of wild boar humerus, engraved on the shaft and with the representation at the ball-end of a figure who appears to be an orant (Fig. R24-10);
- Female figurine carved in the third molar of *Sus scrofa*;
- Human diaphysis bone cut at both ends, engraved with a human face in the top third with a perforated eyes for fixation, and geometric patterns in the lower part;
- Rectangular bone plaquette perforated at both ends, with engraved geometric decoration;
- Perforated sea-shells;
- Engraved pebbles.

The female figurine (Fig. R24-10) in particular has caused a fair amount of ink to be spilled. P. Biagi et al., (>2000: 122) sees "*L'avvenuta "conversione" all'agricoltura della comunità residente al Riparo Gaban sarebbe in, particolar modo, indiziata dalla statuetta femminile ricavata da una placchetta d'osso, i cui genital sono sormontati da un motivo fitomorfo: questa iconografia è stata interpretata da J. Guilaine come rappresentazione della rinascita e della crescita del mondo vegetale attraverso la Terra Madre, personificata nella statuetta, il cui carattere rituale è sottolineato dalla spalmatura in ocra delle parti inferiori (Guilaine 1998).*", and Cristiani E. *et al*., (2009: 195-196) see this 'Gaban Venus' as suggestive of Neolithic fertility and the method of abrading during its manufacture as also being Neolithic. The choice of material on a *Cervus elaphus* metatarsal and the use of ochre is however more suggestive of the Mesolithic, as is the manner in which the limestone and ochre are applied (similar to the decorated Epigravettian stones found at Riparo Dalmeri). The use of decorative materials (ochre) on the trapeze armatures and body adornments (shells and teeth) goes back to the Upper Palaeolithic, and their continuing use into the Transition is yet another indication of the autochthonous population adapting to new lifeways over the centuries. Such decorative techniques were not used at the Early Neolithic site of Lugo di Grezzana in the Lessini Mountains close-by, which was established by Neolithic migrants intent on exploiting the high quality flint sources of the area (Cristiani E., *et al.*, 2009: 202).

There is no indication of a sterile layer evidencing a stratigraphic hiatus in occupation between the Final Castelnovian Mesolithic and the Gaban Culture Transition Levels, so the ^{14}C 'gap' may be a present-day problem. It should be noted that the date for Level D-9 (KIA-10362 with a median date of 6145 BC) can hardly be Early Neolithic, since the first evidence for the Neolithic in the *Caput Adriae* dates from the first half of the 6th millennium BC.

A proposal for new 'excavations' and dates was submitted in 2007 by S. Grimaldi for Riparo Gaban and the site of La Vela di Trento, to try to clarify some of the lacunae in understanding the Transition of the Region, but this appears not to have occurred.

Riparo Madonna Bianca (20) – This rock-shelter, south of Trento on the left bank of the Adige River at 235 masl, was discovered in 1985 and became the subject of a restricted excavation the following year. Evidence was found for the Sauveterrian, Castelnovian, Early Neolithic (Gaban?) and later periods. The Early Neolithic and later levels were however disturbed by modern construction work (Angelini B., *et al.*, 2001; Dalmeri G. & Nicolodi F., 2005: 73).

The site remains unpublished to date, since no one accepted the challenge of doing a doctoral thesis on the excavations. The material is in the MUSE at Trento (Dalmeri G., 2014: pers. com.).

Riparo Monte Terlago (30) – This rock-shelter, 900 masl above the plain/plateau of Prada and just north of Dos Camosciara, was discovered in 2009 by S. Neri and excavated in 2010. A presumed Recent Mesolithic Castelnovian Level U.S. 14 is followed by sterile levels until the site was reoccupied in the Bronze Age (Dalmeri G., *et al.*, 2011).

Riparo Soman (31) – This valley-floor rockshelter, 110 masl and 10 m above the present-day valley floor, is about 1 km north of the Ceraino gorge on the left bank of the Adige River in the Province of Verona, between Ceraino and Dolcè. The site was excavated by A. Broglio and M. Lanzinger from 1984-1988 and is one of only two valley floor sites with evidence for an Epipalaeolithic occupation, the other being Riparo Tagliente (Dalmeri G. & Lanzinger M., 2001; Ferrari S. & Peresani M., 2003: 92).

"*The site consists of a large rock shelter situated on the left-hand side of the Adige valley (110m), at about 10m above the level of the actual river and about 1 km upstream from the Ceraino gorge (Dolcè, province of Verona). It was excavated in 1984/86 (BROGLIO and LANZINGER, 1986). Different stratigraphic levels were identified at the base of the shelter. The lower consisted of a flood formation of the Adige. Above this there was a cryoclastic breccia with abundant anthropogenic traces in the upper levels. Within the cryoclastic breccia there were: two lithic assemblages characterized by the grouping of backed points, backed bladelets, truncations, segments and triangles dated to the last phase of the Epigravettian; a lithic assemblage distinguished by the association of segments, triangles and double backed points, ascribed to the middle phase of the Sauveterrian; an assemblage of trapezes of Castelnovian period, an assemblage of trapezes with a fragment of pottery characteristic of the Early Neolithic of the Adige valley; and finally, Bronze age and historical artefacts*" (Broglio A., 1994: 62-63).

The large faunal remains do not include any domesticated animals and at the end of the Mesolithic sequence, caprids (ibex and chamoix) make up 20% of the identified assemblage whilst cervids and suids are 40% each (Fig. R24-11) (Tagliacozzo A. & Cassoli P. F., 1992: 188).

The pottery sherd is a fragment from the rim of a pot, decorated with incised decorations, which is typologically similar to Early Gaban pottery found at other sites, and appears to be in a stratum which continues from the Late Mesolithic strata, as evidenced from the lithics, which are distinctly Castelnovian, although the trapezes appear to be more evolved than those from the underlying Castelnovian Levels (Fig. R24-11) (Broglio A. & Lanzinger M., 1985-1986: 23-24).

There are no dates for this site, and no assurance that there was continuity of occupation from the Terminal Castelnovian into the Gaban Transition / Initial Neolithic. According to G. Dalmeri (2014: pers. com.) the site was abandoned at the end of the Mesolithic, although the single sherd associated with a Castelnovian lithic assemblage does suggests an Early Gaban Culture occupation of short duration at some point of the Transition.

Romagnano III/Romagnano Loc III (22) – Three separate rockshelters in close proximity were found against the vertical rock-face on the right bank the lateral valley of the river Bondone close to its confluence on the right bank of the Adige River, south of the village of Romagnano Loc, and approximately 6 km to the south of Trento (Fig. R24-12). The rockshelter furthest upstream, Romagnano III, which came to light at the end of the 1960s, lies ca. 200 masl, at the top of a detrical scree, which was in the process of being mechanically removed to create an orchard. The 8 m of stratigraphy covered the Mesolithic to the Metal Ages, with the stratigraphy of the upper anthropic levels having been pillaged by clandestine digs (*scavi abusive*), so that few diagnostic lithics were found (Broglio A., 1971: 137). The Late Mesolithic and Transition/Early Neolithic Gaban Culture levels, covering some 200-250 cm of stratigraphy, were excavated in the early 1970s by A. Broglio with P. Biagi, G. Bartolomei, A. Guerreschi, C. Peretto and B. Sala (Fig. R24-12) (Alessio M., *et al.*, 1984; Dalmeri G. & Nicolodi F., 2005: 69).

The stratigraphy (Fig. R24-12) covering the Mesolithic and Transition/Early Neolithic is as follows (Alessio M., *et al.*, 1978; 1984; Bisi F., *et al*., 1987: 382; Boscato P., *et al.*, 1994; Broglio A., 1971: 136; Dalmeri G., *et al.*, 2009):

- Level AB3 is Sauveterrian transitioning to the Castelnovian and includes a few trapeze armatures;
- Level AB2 and AB1 are Castelnovian with structured hearths and evidence for habitation structures;
- Level AA2 and AA1 are Late Castelnovian with evidence for habitation structures and a few sherds of Impressed-type Ware near the top, which probably migrated down, since some sherds could be refitted with those from the level above;
- Level T4 is a later phase of the Gaban Transition/Early Neolithic with Impressed Ware with Fiorano pottery;
- Level T3 marks the end of the Gaban Transition/Early Neolithic Fiorano Culture before it transitions into the VBQ Middle Neolithic Culture;
- Levels T2 and T1 are Middle Neolithic.

The dates, which are not numerous for the various levels (Fig. R24-13), are as follows (Alessio M., *et al.*, 1978, 1984; Biagi P. & Spataro M., 2001: 41; Bisi F., *et al.*, 1987; Flor E., 2010: MESO 2010 com.; Gob A., 1990: 149):

- R-1137 7850±60BP = 6859-6568 BC (OxCal 4.2 at 82.1%), on charcoal Levels AB1-2 – Median 6715 BC.
- R-1137B 7800±80BP = 6839-6464 BC (OxCal 4.2 at 89.4%), on charcoal Levels AB1-2 – Median 6650 BC.
- R-1137A 7500±160BP = 6651-6031 BC (OxCal 4.2 at 95.4%), on charcoal Levels AB1-2 – Median 6340 BC.
- R-1136 6480±50BP = 5529-5331 BC (OxCal 4.2 at 95.4%), on charcoal Levels AA1-2 – Median 5430 BC.
- R-718A 6060±50BP = 5080-4828 BC (OxCal 4.2 at 89.6%), on charcoal Level T4 – Median 4955 BC.
- R-718 5810±50BP = 4785-4544 BC (OxCal 4.2 at 95.4%), on charcoal Level T4 – Median 4665 BC.

The R-1136 date for Level AA1-2 in the mid-6th millennium BC ties in with dates for the Early Neolithic of the Po Basin (Bazzanella M., *et al.*, 2000: 165; Dalmeri G., *et al.*, 2008), but P. Biagi (2001: 72-74), who points out that the site was excavated in 10 cm artificial spits, maintains that the pottery found in Levels AA1-2 belongs to the overlying Levels T3-4, since some sherds have been refitted.

The faunal remains suggest a population that practiced the hunt, fishing and the collection of molluscs, turtles and bird eggs. The hunt included smaller mammals at all levels. The large ungulate fauna sees the progressive disappearance of ibex, which was represented by up to 53% of the faunal

remains during the Sauveterrian, during the course of the Castelnovian. During the Late Castelnovian, the faunal assemblage was made up of cervids (75%), chamoix (19%) and suids (6%), with a progressive increase in the amount of smaller game (Alessio M., *et al.*, 1984; Boscato P. & Sala B., 1994: 279). Levels AA1-2, whilst containing a few sherds with Impressed Ware decorations which might have migrated downwards, one of which with a horizontal cordon with impressed decorations on it (Broglio A., 1971: 185-186), did not contain any domesticated fauna (Bazzanella M., *et al.*, 2000: 165; Bazzanella M-, *et al*., 2001; Taschini M., 1983: 120-121).

The lithics (Fig. R24-13) show a continuous evolution between the Early Castelnovian and the Transition/Early Neolithic, with the appearance of blade-based debitage with faceted knapping core platforms, increasing laminarity, increasing size of the tools and increasing number of trapezes, which reach their maximum in the Gaban Transition/Initial Neolithic Levels T3-T4 (Bisi F., *et al.*, 1987: 403; Broglio A., 1983; 1994b). The Gaban Transition/Early Neolithic with Fiorano Pottery Level T4 included numerous Mesolithic elements (microburins, trapezes, microlithic rhomboids, thumbnail scrapers), as well as similarities with the lithics of the Fiorano Culture sites of the Po River Basin (rhomboid plus rectangular armatures becoming more asymmetrical and Ripabianca Burins) (Bazzanella M., *et al.*, 2001: 217; Bisi F., *et al.*, 1987: 403; Broglio A., 1971). A. Broglio notes that the Fiorano lithic complex represents a later development, with rhomboids, reducing quantities/disappearance of trapezes, and a marked increase of Ripabianca burins. The links between the Castelnovian ccomplex and the Early Neolithic of the Po Valley are evident, and not subject to doubt (Broglio A., 1983: 83-86). B. Bagolini (1971: 121) specifically saw similarities with the lithics from the site of Le Basse di Valcalaona in the Euganei Hills southeast of Padua (Region 23), recognising that the trapezes with transverse cutting edges could be the result of contacts with the LBK on the north side of the Alps (p. 123-124).

Such contact across the Alps is probably attested in the Early Castelnovian by the occurrence of a double-barbed harpoon, which finds many parallels north of the Alps in Switzerland (Broglio A., 1971: 161, 196; 1984: 305; 1994b), and which is similar to those found at Mondeval de Sora and Riparo di Biarzo.

The site appears to have been occupied on a regular basis from the Castelnovian Mesolithic into the Gaban Transition/Initial Neolithic without a depositional hiatus, notwithstanding the gap in the few ^{14}C dates between the Castelnovian and the Gaban Transition/Early Neolithic. As with several other valley-bottom sites, the sparse earliest pottery is mostly of Impressed Ware type, followed by Fiorano Pottery, but the continuity of the Castelnovian lithic tradition and the absence of polished stone artefacts strongly suggests acculturated hunter-gatherers, which supposition is endorsed by a number of archaeologists (e.g. Montagnari Kokelj E., 1993, quoting Broglio & Lanzinger, 1984).

San Giacomo (8) – This is an open air site, 300 masl, close to San Giacomo to the south of Bolzano. According to A. Pedrotti (1998), this site was occupied over the Transition from the Castelnovian Mesolithic to the Gaban Early Neolithic. The Gaban Pottery found at this site finds its parallels at Villandro-Plunacker, La Vela and Mezzocorona-Portonovo (Bazzanella M., *et al.*, 2001: 214).

Terlano Meitingerhof (4) – This Gaban Transition/Early Neolithic open-air site, 330 masl, is on the left bank of the Adige River to the north-west of Bolzano.

Val Dona (5) – This high valley directly east of Bolzano lies at *ca*. 2200 masl. M. Avanzini (1994), reports that several sites, designated 3TJE, CLM (Camerloi) and S. Dos, have been found on this region. S. Dos is a modest rocky outcrop on the right hand flank of the valley. The material is predominantly Sauveterrian, but a number of trapezes and microburins support the hypothesis that the region was used for hunting in the Early Castelnovian at the transition from the Sauveterrian. The 3TJE location appears to have been used in a later phase of the Castelnovian Mesolithic, with Montbani

blades and evolved forms of trapezes in the lithics. The locations also produced small quantities of rock-crystal attesting to contacts north of the Alps.

Vatte di Zambana (16) – This rockshelter (Fig. R24-14), on the left bank of the Adige River, 20 m above the present-day valley floor and 220 masl, is about 10 km north of Trento, close to Zambana. The site was excavated by A. Broglio, G. Bartolomei and P. Leonardi between 1967-1968.

The uppermost levels produced a Castelnovian assemblage and have been dated (Alessio M., *et al.*, 1984):

- R-487 7250±110BP = 6381-5913 BC (OxCal 4.1), on charcoal cuts 2-3 – Median 6150 BC.
- R-488 7540±75BP = 6560-6233 BC (OxCal 4.1), on charcoal cut 5 – Median 6395 BC.
- R-488a 7585±75BP = 6595-6255 BC (OxCal 4.1), on charcoal cut 5 – Median 6425 BC.
- R-489 7860±75BP = 7038-6532 BC (OxCal 4.1) on charcoal cut 7 – Median 6785 BC.

According to P. Biagi (2001: 72), the upper Castelnovian levels had been almost totally eroded when the site was discovered.

The site is noted for the discovery of a Mesolithic burial in a typical Mesolithic supine position (Fig. R24-14), without grave-goods, which has been dated by charcoal above the inhumation (Broglio A., 1984; Newell R. R., *et al.*, 1979: 141-142):

- R-491 7000±110BP = 6065-5673 BC (OxCal 4.1), on charcoal – Median 5870 BC.
- R-491a 7740±150BP = 7050-6269 BC (OxCal 4.1), on charcoal – Median 6660 BC.

The first of these two dates appears to be too recent given the stratigraphic dates above. Furthermore, the lithic assemblage at the level of the inhumation was Sauveterrian, although the grave-pit was probably dug down to this level. B. Gehlen (2010) has noted that debitage at this site was conservative, continuing Early Mesolithic traditions, as compared to the more innovative sites nearby, which also suggests there were several separate groups in the area. Without directly dating the skeletal remains, there must remain doubts as to the age of the Mesolithic burial.

The occupation of the site appears to have ended prior to the end of Mesolithic.

Villandro-Plunacker (3) – This open-air site is on a fluvial terrace between two streams on the western right-hand side of the Isarco Valley in the village of Villandro, north-east of Bolzano, at *ca*. 730 masl (Fig. R24-15). The site, discovered in 1979, was excavated by L. Dal Ri starting in 1987 in three trenches designated A, B and C.

Phase 9 represents the earliest occupation of the site by a Late Castelnovian Mesolithic group, which has not been dated. "*According to charcoal and seed assemblage, the Mesolithic camp was placed where the morphology of the slope and the vegetal environment were most suitable for hunting. The site lay between the lower limit of the coniferous forest (mainly Scots pine and Dwarf mountain-pine.) and the upper margin of the broad-leaved forest (mainly deciduous oak), probably with clearings favourable to heliophilous trees, like Betula (birch)*" (Nisbet R., 2008: 80). There does not appear to be continuity of occupation between the Mesolithic and the Phase 8 Gaban Culture occupation.

Phase 8 is Transition/Neolithic with two distinct occupations, the earliest being Early Gaban Culture (in the Levels designated US 30 tg 9 and US 30 tg 8) and the later one Middle VBQ (in the Levels designated US 30 tg 1 to 5) (Nisbet R., 2008: 80). The dates for the Gaban Culture occupation produced the earliest evidence for agriculture in the Region (Nisbet R., 2008: 80):

- ETH-30058 6050±60BP = 5081-4793 BC (OxCal 4.2 at 89.0%), US30 tg 8 Sector 42 – Median 4935 BC.

This date for US 30 tg 8, which is more recent than tg 9 suggests that agriculture was practiced *ca*. 5000 BC. "*The first Neolithic settlers used the site for a longer period of time, as shown by the presence of small huts during Early Neolithic, with well-structured functional areas, both indoor and outdoor (Rizzi and Larcher Rizzi, 2002). Agriculture was certainly practised onsite, as already demonstrated by the presence of flint sickles with their characteristic polish. Crops were possibly*

cultivated in pre-existent clearings, or by the swidden cultivation (slash and burn) technique. This latter seems to be a real possibility, as indicated by the presence of weed seeds, not specific of cereal crop.

Us 30 tg 9, with the oldest date of the Neolithic stratigraphy, demonstrates that the first settlers here grew Barley and naked Wheat, maybe using the surrounding environment for the collection of wild fruits like Strawberry and Elderberries." (Nisbet R., 2008: 80).

As with the other Gaban Culture sites, the Early Neolithic lithics are strongly influenced by the Castelnovian tradition (Bazzanella M., *et al.*, 2000: 157). There are no polished stone objects, but the preform for an axe was discovered.

The VBQ Culture was found in Levels US 30 tg 1-5, so that tg 6 and tg 7 appear to represent a gap between the VBQ Culture and Gaban Culture occupations, although cereal grains were found in tg 7 which also produced a Mesolithic date, which probably needs to be discounted as an aberration. The date for this occupation, obtained from an area where the land was artificially levelled and a semi-circular structure put up with the curved end into the slope, is given as (Rizzi G., & Larcher Rizzi G., 1997; Skeates R., 2001-2003, quoting from Rizzi & Larcher Rizzi (1997: 19):

- Rome-600 5555±75BP = 4546-4260 BC (OxCal 4.2 at 95.4%), on charcoal from hut stated as Early Neolithic – Median 4400 BC.

The stratigraphy and dates for this site suggest that farmers, carrying a mixture of Mesolithic traditions in their lithic assemblage and Neolithic attributes in their agriculture and mode of settlement, established themselves here around 5000 BC, or as stated by R. Nisbet (2008: 115): *"The radiocarbon dates show that since the end of the 6th millennium BC groups of farmers spread deep into the alpine chain, where they could adapt to mountain environment and resources. These small communities fit chronologically in the Gaban Group, with radiocarbon dates (Bagolini and Biagi, 1990) well matching those from the deepest layers of Trench C at Villandro*".

North Adriatic – Trentino-Alto Adige – Initial and Early Neolithic Sites – Introduction

There are very few Gaban Initial Neolithic sites established *ex nihilo* in the Region, and all of these are open-air sites in the Alto Adige (Bolzano). To these however can be added the open-air sites previously occupied during the Late Mesolithic, without there necessarily being any continuity of occupation during the Transition, and which have been incorporated in the section on 'Mesolithic and Transition sites' above (La Vela in the Trentino and Villandro-Plunacker in the Alto Adige).

North Adriatic – Trentino-Alto Adige – Initial and Early Neolithic sites – Sites details

Isera-Torbiera (26) – Cores were bored in the late 1900s in this peat-bog near Isera to obtain pollen samples. A grain of cereal (barley according to S. Grimaldi (2007: 3) and A. Pedrotti (2001); *Hordeum* wheat according to 'www.archeoserver.it/space/UniMi/Comunicazione' and A. Pedrotti (1998)), was found 150-160 cm below the current surface, in a level dated 5520-5340 BC (Median 5430 BC). This unique find pushes back the possible date for the earliest agriculture in the Region by approximately four centuries, although it need not imply agriculture in the Adige River Basin of the Trentino-Alto Adige.

North Adriatic – Trentino-Alto Adige – Conclusions

The valley-floor Castelnovian/Gaban Culture sites of the Trentino, other than the open-air site of La Vela, are under rock-shelters, mostly at the top of detrical cones at the base of rock-faces, above the wet valley floor. They are occupied through the Gaban Culture Transition when small quantities of pottery of Impressed Ware, Fiorano or Vhò characteristics make their appearance in otherwise Castelnovian contexts starting *ca.* 5000 BC, often supplying evidence for animal husbandry ('game in

the pen') several centuries later, towards the end of the first half of the 5th millennium. Most of these sites are abandoned without evidence for agriculture. Upstream in the Alto Adige the sites are mostly open-air and settlements. If the known high altitude sites are mostly abandoned before the end of the Mesolithic, the presence of ibex at sites such as Riparo Gaban and Mezzocorona-Borgonuovo in the Gaban Culture Transition levels would indicates that high altitude hunting occasionally occurred (Pedrotti A. 1998: 125).

Several authors have stressed that the Gaban Transition/Early Neolithic Culture of the Region, which developed and flourished between *ca.* 5000-4500 BC, as a gradual process involving diffusion, interaction, exchange and acculturation, occurring as a result of the active participation of the local Mesolithic population in the process of acculturation, with the influence coming from the plains to the south (e.g. Bazzanella M., *et al.*, 2000: 167; Bisi F., *et al.*, 1987; Broglio A., 1984: 311; Cristiani E., *et al.*, 2009, quoting B. Bagolini, P. Biagi, A. Broglio, F. Bisi, A. Pedrotti, T. Perrin, *inter alia*; Gehlen B., 2010: 617; Nisbet R., 2008). There is homogeneity and concordance between all the sites as regards the dates, where and when these are available, for the first appearance of Neolithic cultural elements, namely pottery; the appearance of domesticated animals comes later, and polished stone implements are virtually non-existent. The apparent ^{14}C chronological gap, between the Final Mesolithic and the first appearance of Neolithic attributes, is belied in many cases by the stratigraphic and cultural continuity (e.g. Doss de la Forca, Pradestel, Riparo Gaban, Romagnano III), with a slow uptake of Neolithic attributes over many centuries by the autochthonous population, so that the 'gap' may be a modern research issue, rather than an existential one 7000 years ago.

Only in open-air sites has there been evidence for agriculture and a sedentary life-style. "*In the Adige, the transformation to full agriculture was completed by the mid-later Neolithic*" (Malone C., 2003: 271), or as B. Bagolini (1987) states it, the Neolithic of the Region is confirmed along the valley floors between 4500-4000 BC, when the VBQ Culture appears. The single cereal grain found at Isera la Torbiera in a level dated *ca*. 5400 BC means that evidence for agriculture could yet be found several centuries earlier than 5000 BC, closer to the dates from the Po Valley.

Evidence for the onset of the Transition is only confirmed half-millennium or more later than the appearance of the Initial Neolithic of the Po Valley plain to the south or the plains of Friuli-Venezia Giulia to the east. The Transition to the full Neolithic appears to take another half millennium and is only completed with the appearance of the VBQ Culture *ca*., 4500 BC, when attributes of the Gaban Culture (lithics, hunting) disappear with seamless continuity at sites such as Riparo Gaban, Villandro Fondo Plunacker, La Vela, Moletta Patone, Romagnano and Dos Trento (Pedrotti A., 2001: 20). The Transition to the full Neolithic of the Region can thus be stated as occurring over a period of up to one millennium.

Conclusions

Several authors have put forward theories or models regarding the several ways in which the Neolithic agriculturalists progressively invested the landscape, and how they interacted with the hunter-gatherers they encountered. I have not tried to fit the evidence to any theories, models, or academic constructs, nor will I expound any generalisation regarding the interactions and speed of assimilation. My objective has been to set forward as simply and as clearly as I could the large volume of archaeological and scientific evidence regarding each site, Region and Macro-Region that I have come across. I have not been shy about expressing an opinion regards many of the sites or Regions, but this has hopefully been without preconceptions. No one model will fit the complex tapestry the archaeological evidence displays, unless it be ALBOT & ALBOT, so that any discussion must needs be site or Region specific.

In this study I have therefore tried to elucidate how the autochthonous populations of hunter-gatherers in the Study Area (Map MR1) responded to the arrival of the Neolithic in their broader region. The initial contact can have been direct if the Neolithic migrants settled close-by or indirect, if at a distance. Each of the 24 Regions (grouped into 6 Macro-Regions – Map MR2) is unique and each Region can show up as a palimpsest, so that trying to determine a common thread is not possible other than to state that the Mesolithic hunter-gatherers eventually disappear and/or become integrated with the Neolithic agro-pastoralists. Numerous DNA studies have clearly demonstrated that hunter-gatherers integrated Neolithic communities in a south-eastern to north-western cline. We know of no instance in which the DNA study of a post-Transition Neolithic burial has suggested that the deceased was descended directly from Terminal Mesolithic hunter gatherers who became fully Neolithic in their own right.

Other than the genetic evidence for integration, which the south-east to north-west cline suggests, the evidence can be seen in the occurrence of Mesolithic attributes (often hypothetised) in an otherwise immigrant Neolithic context or show up as Neolithic attributes in otherwise Mesolithic contexts. In this last case, the volume and variety of Neolithic attributes almost invariably increases over variable time-spans, which we have labelled ‘Transition’, since neither ‘Mesolithic’ nor ‘Neolithic’ are appropriate designations to define this period of acculturation.

We will present the conclusions in the following order:

- General traits
- Time-lines
- Climate and RCC events
- Navigation
- Agression
- Regional summaries
- Final words

General traits

There is nothing radically new that this study has identified or confirmed, but the general traits regarding the Transition that run as a common thread through this study are as follows:

- The Transition was not an event but a process, which occurred in most recorded instances over centuries rather than decades, consequently involving many generations of hunter gatherers in a slow process of adaptation, initially involving the acquisition of desirable Neolithic material attributes, and rarely domesticated fauna during the earliest stages of contact. Domesticated fauna mostly appears later than initial contact as ‘game in the pen’, seldom, if ever, representing more than 50% of a site’s faunal remains. Caring for domesticated animals therefore appears to have represented a major shift in lifeways and value-systems for the autochthonous populations undergoing the Transition, but a much easier step than the practice of agriculture, which involves a radical change in value systems and lifeways (sedentism, social organisation,

social discipline, planning, hard work, storage, belief systems, etc.). It would seem that when the hunter-gatherers undergoing the Transition were ready to practice agriculture, they almost invariably disappear from the archaeological record; the exceptions (e.g. Franchthi Cave in Region 8, Grotta dell'Uzzo in Region 19, Terragne in Region 17, and potentially Girmeler Cave in Region 2) are not numerous.

- There are few open-air Mesolithic sites where elements of the Transition can be seen, which is not surprising, given the mobile nature of hunter-gatherers' life-style and the consequent lack of stratigraphic depth when Mesolithic open-air sites are found. Given also the often short-term occupation of Mesolithic open-air sites, there must have been a very large number of these during the Mesolithic, with a very small fraction occupied during the Transition, and fewer still archaeologically visible. Sites repeatedly visited close to prized raw materials, such as the Szentgál radiolarite mine (Region 12) stand out, as do sites occupied for an extended period of time, such as the Aegean site of Maroulas (Region 5) and the Iron Gates sites (Region 11), where the Mesolithic population often occupied the same sites for several millennia; some shorter occupation open-air sites do however exist, such as that at Terragne in the Salento (Region 17), Vlusha in Albania (Region 13) and possibly Sidari in North-Western Greece (Region 13).
- There is a clear trend down to the water's edge during the Mesolithic and Transition to exploit wetland, riverine, lacustrine, shoreline or marine resources as part of the 'broad spectrum revolution'; this trend can have been result of several factors, including the disappearance of large ungulated herds due to reforestation, the more unpredictable nature of the hunt in a forest environment, overexploitation, demographic gowth, etc. Numerous sites can be presumed to have been lost to the eustatic sea rise, sedimentation or erosion. Examples of sites currently below sea level exist at Yenikapi in central Istambul and a Neolithic site off the Sea of Marmara island of Avşa (Region 3), Franchthi Neolithic settlement (Region 8), Chianca di Palo (Region 17), Grotta del Arco (Region 19); others are currently partially submerged or lapped by the waves, such as Maroulas on the island of Kythnos (Region 5), Agios Petros (Region 7), Sidari (Region 13), Sušac Island and Kargadur (Region 14), Scamuso (Region 16), Grotta delle Mura di Monopoli, Grotta Romanelli and Torre Sabea (Region 17), Stentinello (Region 19) and several sites between 2 and 5 masl north of the Marano Lagoon (Region 22). This list supports the conclusion that numerous sites will have been lost to the eustatic sea-rise as well as the rise in the level of the Black Sea, particularly where there were extensive coastal plains during the Mesolithic (Figs. Intro 1 to 4).
- Cave sites or rock-shelters located at higher elevations or in locations not propitious for agriculture, occupied prior to and/or during the Transition, with few exceptions (e.g. Odmut Cave in Region 13), tend to be abandoned shortly after the appearance of selected Neolithic attributes – mostly material attributes, followed by domesticated animals ('game in the pen'); if they are reoccupied, it is often after a hiatus, to be used by shepherds in the Later Neolithic or Metal Ages.
- Mesolithic cave sites at low altitudes and close to the shore, occupied during the Mesolithic and Transition, tend to be occupied for an extended period of time beyond the beginning of the Transition. If agricultural land is available close-by they may even continue in use well into the Neolithic and beyond (e.g. Girmeler Cave in Region 2, Franchthi Cave in Region 7, Grotta delle Prazziche in Region 17, and Grotta dell'Uzzo in Region 19 in conjunction with a probable settlement at the head of the bay).
- It was clearly culturally easier for hunter-gatherer communities to adopt and care for domesticated animals as 'game in the pen', than to become agriculturalists, without making light of the cultural changes that may have been required to adapt from a sharing culture to one in which ownership and care for the domesticated animals prevails. Evidence for agriculture at Mesolithic Transition sites is a rarity, and where this exists, such as at Franchthi Cave in Region

7 or Grotta dell'Uzzo in Region 19, it is because the site, which continued to be used, is on the edge of, or close to a coastal plain where a Neolithic settlement (now underwater or not found) was established, whether by descendants of the hunter-gatherers or Neolithic migrants, or a combination of the two.

- The Initial Neolithic open-air sites in Regions with a well attested Late Mesolithic/Transition hunter-gatherer presence often contain Mesolithic attributes in their lithic assemblage and more rarely a faunal assemblage containing an unusually high percentage of wild fauna (Greater than 5-10%) (e.g. the Fikirtepe Early Neolithic Culture in Region 3); sometimes this can occur in Regions where the Terminal Mesolithic presence is poorly attested archaeologically (e.g. the West Adriatic Molise to Romagna Region 20). Preferred and densely colonised locations for Early Neolithic Migrants (Thessaly in Region 7, the Central Balkans in Regions 9 and10, and the Tavoliere in Region 16) have produced limited evidence for the existence of the Mesolithic and consequently for contact with an autochthonous population, although evidence may exist in the form of Mesolithic attributes (e.g. lithics, hunting, burial practices, or body ornaments of Mesolithic tradition); this could be due to the low density of the autochthonous presence using ephemeral campsites in comparison with the substantial Neolithic migrational flux, the dense forest cover having pushed the autochthonous population to settle close to the sea or wetlands, and/or the rapid assimilation of the autochthonous population. In Transdanubia, the Starčevo Neolithic made a halting appearance *ca*. 5600 BC, and there is clear evidence that they integrated with a well-attested autochthonous population, and that from this merger emanated the LBK. The North Adriatic Plain, which was rapidly colonised after 5600 BC has often been considered to have incorporated the Terminal Mesolithic population, which is well attested prior to the arrival of the agriculturalists. As D. Binder (2013: 351) states "*Les similitudes déjà relevées entre les industries lithiques de ces différents horizons mésolithique et néolithique, confortent l'idée d'un syncrétisme*".
- Regions where the last hunter-gatherers have shown resistance to the full Transition are in enclaves where a relatively dense autochthonous population had developed a stable, well-defined and rich cultural heritage (e.g. the Iron Gates Region 11 and the Trentino-Alto Adige Region 24). In these two regions the Transition took place over a period of time exceeding 500 years. Individual sites in isolated locations such as Odmut Cave deep in the Dinaric Alps, between Regions 10 and 13, were also able to maintain their traditional lifeways for many centuries after first contact with the Neolithic.
- The trade in raw materials, personal ornaments, and other desirable objects, such as pottery and domesticated animals, played an important role in fostering contacts between autochthonous hunter gatherers and Neolithic migrants. Obsidian from Hungary (north-east of Region 12) or the island of Melos (Region 5) was initially exploited and distributed by the autochthonous hunter-gatherers; with the advent of the Neolithic it is not clear whether the extraction and distribution remained in the hands of their descendants or whether this was shared with the Neolithic migrants, or taken over by them. The obsidian from Lipari (Region 19) only became available after a volcanic eruption at about the time of the Transition, so whilst there is some limited evidence for its use during the Terminal Mesolithic in Sicily, its exploitation and wide distribution only began in the Early Neolithic, as was also the case for obsidian from the Island of Palmarola (Region 19). The extraction of radiolarite from the Transdanubian Bakony Mountains (Region 13) remained in the hands of the autochthonous hunter-gatherers for a considerable time after the arrival in the broader region of Lake Balaton of Starčevo migrants, who prized this raw material, so that it was exchanged over distances of hundreds of kilometres. The wide distribution of Bulgarian honey flint (Region 9) is first attested in the Early Neolithic and the supposition is that Neolithic migrants exploited and distributed this material, largely in the form of blades. Monte Lessini flint (Region 23) was rarely used by the Mesolithic inhabitants of the Po Plain or those occupying the foothills of the Southern Alps or the

Apennines, and it is known to have been exploited and distributed by the Neolithic inhabitants of the Po Basin shortly after their arrival, and a similar situation existed with the exploitation of flint from the Gargano Peninsula in Puglia (Region 16). S. Rigaud (2011), who has made a Europe-wide in depth statistical study of personal ornaments during the Late Mesolithic, the Transition and the Initial Neolithic, has recognised that, whilst there is ample evidence of long distance exchange of sea-shells in the Mesolithic between the Mediterranean and inland sites as far north as Southern Germany, there is a lack of evidence for Mesolithic cultural continuity into the Transition and Early Neolithic in the Southern and Central Balkans, and that the Early Neolithic migrants in Macro Regions 2 and 3 appear to have brought their own variety of personal ornaments with them; this has been partly attributed to the dearth of Late Mesolithic sites with personal ornaments in these two Macro Regions; it is also probably due to the flood of first generation Neolithic migrant into the region, bearing a strong cultural baggage from their points of origin in the Formative Zones of the Neolithic, swamping out any Mesolithic cultural heritage they might have encountered. This situation is clearly different in Transdanubia, Region 12, where the evolution of personal ornaments argues for a merging of the Late Mesolithic and Early Neolithic communities. West of the Aegean Basin, S. Rigaud (pp. 320-321) sees that the Early Neolithic personal ornaments, whilst replicating those from the Aegean Early Neolithic, appear to include new elements, possibly introduced directly from the Formative Zones, comforting the idea that at least some of the migrants, bearers of the Impressed Ware Culture, largely bypassed the Aegean Basin; S. Rigaud also notes that west of the Aegean there are no points of similarity between the Late Mesolithic and Initial Neolithic body ornaments, but over time there is a restructuring of personal ornaments to include typical Mesolithic elements (perforated shells and teeth), supplying evidence of contact and probably integration; finally, S. Rigaud notes that many of the long-distance exchange networks for body ornaments evidenced in the Late Mesolithic can be seen to continue in the Early Neolithic, thus fostering contacts and presumably the dissemination of Neolithic attributes (pp. 333-334).

- The question regarding the input of the autochthonous populations in the evolution of new pottery styles remains an open issue, particularly where new pottery styles seem to appear *ex nihilo*, such as that of the Fiorano Culture in the lower valley of the River Po at the head of the Adriatic.
- The acquisition by the Late Mesolithic hunter-gatherers of Neolithic attributes, primarily pottery and domesticated animals, but also ornaments, as well as the Neolithic animal husbandry and manufacturing skills, through the acquisition of Neolithic partners will possibly have played a major part in facilitating the Transition, and this appears to have been proven for the Iron Gates site of Lepenski Vir in Region 11.
- There are few known burials straddling the Transition, but where these exist, such as at Lepenski Vir and Ajmana (Region 11), some inhumations follow the Neolithic traditions of crouched inhumations. The fact that all but one of such burials appear to be females and that the chemistry of their bones and tooth enamel points to an origin outside of the Iron Gates, is quasi-conclusive evidence for their arrival as partner exchanges. This hard evidence appears to be reinforced by the local acquisition of new skills (pottery manufacturing and body ornaments) after first contact with Neolithic migrants.

Time-lines

The first evidence for the incipient Neolithic in the Study Area (Map MR3), is visible on the Island of Kythnos in the Aegean *ca.* 9000 BC, when Southern Anatolian, Cypriot or Levantine navigators established a permanent settlement with circular pit-huts at Maroulas (Region 5), bringing with them wild boar or suids in process of domestication. A millennium later we find settlers with a comparable lithic tradition at the Cave of Cyclops (Region 7) with similarly imported suids which they later replaced with caprids, whose descendants continue to roam free to this day. At the other end of

the Study Area, the hunter-gatherers of the Trentino-Alto Adige (Region 24) began to accept selected Neolithic attributes *ca.* 5000 BC, between 600-700 years after the first appearance of Neolithic settlements on the North Adriatic Plain and the River Po Basin (Regions 22 and 23), and only completed their Transition after 4500 BC with the advent of the VBQ Neolithic Culture. It can therefore be postulated that the neolithisation of the Study Area lasted some 4500 years, or a little over 2500 years if the Aegean island sites are excluded.

Early contact between the core areas of primary neolithisation with autochthonous hunter-gatherers outside these core areas is possibly attested at the site of Girmeler (Region 2) near the south-western tip of Anatolia, where local hunter gatherers (or maritime migrants from a region of initial neolithisation) erected wattle and daub constructions with lime plaster floors *ca.* 8000 BC at the exterior of a cave close to a valley floor, which lay up a valley 15 km from the sea, with no evidence for either animal husbandry or agriculture; the site continued to be occupied for an extended period of time as evidenced by a destroyed 6 m high tell (bulldozed to create a parking lot), so that the eventual neolithisation of the site occupants can be assumed to have occurred, if not proved. Another overland migrational route from the Konya Plain is currently being investgigated in the area of Eskişehir (Region3), where a number of sites have been found.

With regards to the neolithisation process in the Levant, O. Bar-Yosef (2014: 298) has explained that '*The earliest villages emerged in the natural habitats of the plants. Cultivation with intense gathering assisted the emergent plant economy by the initial farmers who brought new seed supplies to their fields from where wild cereals grew. It is not surprising that foragers who already had knowledge of the plants and their annual cycle, chose during the first millennium of the Holocene to practice intensive cultivation. This option allowed them to stay in their territories. Options for mobility were reduced as the Mediterranean and Irano-Turanian belts were already fully occupied by 'others'. But we should not make the mistake of believing that the first farmers survived only on plants. They continued to hunt and gather…*". Thus agriculture developed out of low-level control of the natural environment, which is a phenomenon known in other contexts, such as forest burning to favour the creation of clearings where wild game could browse or hazel prosper, such as during the Mesolithic in Transdanubia (Region 12). As the population density in the Formative Zones of neolithisation (Eastern Anatolia, the Levant, the Fertile Crescent and a little later Central Anatolia and Cyprus) grew under the effect of the carbohydrate-rich diet and sedentarisation, facilitated by the increased warmth and pluviosity after the Yonger Dryas, so their ability to successfully face climatic and population density stresses whilst maintaining their lifeways was eroded. Mankind's natural ability to adapt came into play and a combination of several solutions were employed to overcome the stresses, amongst which we can number the intensification of the control over nature by increasing the levels of agriculture and the domestication of animals, storage, pastoralism, broadening the diet breadth, the growth of settlement sites close to water, changes in social structures, hierarchies and social inequalities, the organisation of labour, new belief systems, changes in the material culture, conflicts, returning to a mobile hunter-gatherer mode of existence and moving elsewhere. It is this last which resulted in the spread of the agro-pastoral life into Europe.

Climate and RCC events

The evolution of the Neolithic was punctuated by periods of climatic stress (RCC events), with cold dry and windy conditions:

- The first RCC event with which we are concerned was the Younger Dryas, which lasted *ca.* 1300 years between 11000-9700 BC. This was caused by the breaching of the Laurentide ice-barrier and the outpouring of the ice-cold fresh waters from Lake Agassiz into the North Atlantic, which disturbed the THC, resulting in a period of dry cold weather in the Levant lasting some 1300 years until *ca*. 9700 BC. It was subsequent to this RCC event that the 'Göbekli Tepe' hierarchical sedentary hunter-gatherer culture developed in the Upper Euphrates Basin;

- The next RCC event occurred between *ca*. 8300-8100 BC, concurrent with the start of the breakdown of 'Göbekli Tepe' hierarchical culture;
- The last RCC event with which we are concerned began *ca.* 6600 BC and was compounded by the '6200 BC event', which resulted from the final breaching of the ice barrier retaining the ice-cold waters of Lake Agassiz, ending between 6000-5900 BC. It was at this time that the mass migration towards South-Eastern Europe occurred.

Navigation

Navigation is attested throughout the Study Area from the late Pleistocene, ensuring the movement of people, trade and exchange, and cultural contacts:

- The earliest evidence from the Middle Palaeolithic is from the Island of Gavdos south of Crete (Region 6) and from the island of Naxos in the Aegean (Region 5).
- During the Late Palaeolithic Sicily was colonised and in the millennia prior to the Holocene, Cyprus was visited and subsequently colonised; the trade in Melian obsidian, transported to Franchthi Cave where the inhabitants were involved in open-water fishing, was initiated (Region 8), and contacts across the Southern Adriatic are evidenced by similarities in the Romanellian lithic tradition on the opposing shores of the Adriatic and possibly as far as South-West Anatolia.
- During the Mesolithic the evidence increases, with the colonisation of Aegean islands (Regions 3, 4, 5, 6 and 7); the similarities in the lithic tradition between the Bay of Antalya and sites in the Aegean Basin (Maroulas, Cave of Cyclops, Franchthi Cave); material from the Gargano peninsula in Southern Italy (Region 16) found on the eastern shore of the Adriatic (Region 14); the probable contacts at Grotta dell'Uzzo (Region 19) with the Capsian Culture in North Africa, and evidence for open water fishing from the Aegean Islands, Franchthi Cave (Region 8) and Grotta dell'Uzzo (region 19). Evidence for cultural contacts along the northern shore of the Mediterranean between the regions of initial neolithisation and Sicily is suggested by burials in the typically Neolithic flexed lateral / foetal position during the Mesolithic at the sites of Girmeler (Region 2), Maroulas (Region 5), Franchthi Cave (Region 8), Theopetra Cave (Region 9), and Grotta della Molara and Grotta dell'Uzzo (Region 19), when inland, the Mesolithic tradition is primarily for burials in an extended dorsal position. Evidence for contact with North Africa can be postulated by the baked clay hearth dated 9000-8500 BC and plain, poorly fired pottery dated *ca.* 6700 BC at Grotta dell'Uzzo (Region 19) and the Impressed Ware at Grotta Kronio (Region 19), more primitive than that found in Apulia.

Agression

Interestingly, whilst a few Initial Neolithic sites have produced evidence for defensive walls (e.g. Hoca Çeşme in Region 4), there is little evidence for conflictual relations between the last hunter-gatherers and the first Neolithic herders or farmers in the Study Area (exceptions exist at Ostrovu Corbului in Region 11), although such evidence has been found in Northern Europe and recently near Strasbourg in France in an LBK context (Jeunesse C., 2015 communication), and cannot be excluded in Regions where there are few skeletal remains covering the Transition and Initial Neolithic compared to the Iron Gates (Region 11) and to a lesser extent the Fikirtepe Culture sites (Region 3). This probable 'peaceful Transition' could be due to several factors:

- Low population densities;
- The attraction of Neolithic attributes which were peacefully exchanged;
- Long-range networks would have forwarned the autochthonous populations of the pending arrival of Neolithic migrants;
- Mesolithic groups would have exploited different ecological zones compared to the Neolithic migrants;

- The reliance of Initial Neolithic migrants on Mesolithic knowledge and materials (e.g. Transdanubia in Region 12);
- Early integration of populations and partner exchange;
- Avoidance of densely populated Mesolithic areas by Neolithic migrants (e.g. Iron Gates Region 11 and the Trentino-Alto Adige Region 24).

Regional summaries

The movement out of the Formative Zones of the Neolithic towards the Lake District began before the end of the 8th millennium BC and reached the eastern seaboard of the Aegean at the beginning of the 7th millennium, with many important Levantine PPNA and PPNB sites being abandoned during the end-phase of the PPNC (7400-7000 BC). As H. Parzinger (2014: 389) states, "*the dissemination of the Neolithic occurred by means of a complex and widely branched communication network, extending from Asia Minor to Southeast Europe*". It has not been our purpose to explore this process in detail, but rather to see how it impacted the Terminal Mesolithic populations with whom this process came into contact in our chosen Study Area.

Why some of the Neolithic population in the core areas of neolithisation migrated to the more verdant and fertile lands west of their homelands, can be attributed to a combination of factors, with at the top of the list, the drought-driven famine resulting from the effects of the 6600-5900 BC RCC event, and the collapse of the hierarchical societies. As is often the case (*viz*. the 19th century Irish famine driven migrations to the US and the subsequent late 19th early 20th centuries Italian and Greek migrations), it was probably not the elites who migrated, but the poor and desperate, which would explain why the hierarchical attributes of the Levantine society (monumental buildings, sculptures, and social hierarchies) were left behind. The migration out of Central and South-Eastern Anatolia and the Levant was multidirectional, but the focus in this study has been exclusively on the neolithisation of the Study Area.

On present evidence, the first fully Neolithic migrants probably made their way overland to the Pisidian Lake District prior to 7000 BC (Region 1); Neolithic navigators are thought to have established the site at Knossos (Region 6) no later than 6900 BC, but probably initially settled elsewhere on the island, so that we are faced with a *terminus ante quem*; Neolithic migrants are also found on the Anatolian Aegean seaboard of Region 3 *ca*. 6900 BC at Ulucak Höyük, arriving overland and/or via navigation; the region of Eskişehir, Lake Manyas and the Troad (Region 3) were probably reached by 6800 BC; the Archaic Fikirtepe Culture is attested *ca.* 6600 BC in Region 3 close to the Sea of Marmara, more or less concurrent with the first colonisation of Thessaly (Region 7) by navigators, although Neolithic attributes are known to have reached Franchthi Cave (Region 8) a couple of centuries earlier.

These first Neolithic migrants did not invest a land devoid of hunter-gatherers, although to the best of our knowledge certain regions appear in the archaeological record to have been more densely or thinly populated by Mesolithic hunter-gatherers:

In Western Anatolia, Marmara and Southern Thrace, Region 1 has produced a few Mesolithic settlements near the Bay of Antalya, but virtually none in the Pisidian Lake District. The Initial Neolithic sites in the Pisidian Lake District are fully Neolithic tell sites and cannot be said to incorporate Mesolithic attributes. Close to the coast the undated cave sites of Belbaşi and Belbidi are essentially Mesolithic in their upper levels with a Mesolithic lithic assemblage resembling that of Aegean sites (Maroulas, Cave of Cyclops and Franchthi Cave), with the addition of pottery and other Neolithic attributes prior to being abandoned. There are no known Initial Neolithic sites at the head of the Bay of Antalya, so that the supposition that the cave occupants became fully Neolithic locally has to remain a hypothesis. Further inland, Öküzini Cave may have been used by occupants of Mesolithic lithic tradition who acquired Neolithic attributes including pottery and ovicaprines prior to abandoning

the cave after burying one of their number with Neolithic attributes between 7000- 6500 BC, at a point in time when the Neolithic had arrived in the Pisidian Lake District.

Region 2 appears to be almost devoid of Mesolithic sites other than Girmeler, probably established by migrants from Eastern Anatolia or the Levant prior to *ca*. 8100 BC, and by 7000 BC they had acquired pottery and cultigens. The Neolithic sites on the Aegean Seaboard were clearly created *ex- nihilo* by Neolithic migrants, so that nothing can be said about the Transition.

Region 3 is home to the Ağaçli Mesolithic Culture, which is evidenced primarily from undated open-air sites between the Sea of Marmara and the Black Sea, although there are a few sites to the south and on the Gallipoli Peninsula, with other Late Palaeolithic / Early Mesolithic sites on the now-islands of Gökçeada / Imbros and Limnos which are discussed in Region 4. This Region is also home to the Neolithic Fikirtepe Culture, which is first attested *ca*. 6600-6500 BC. M. Özdoğan has deduced that the Ağaçli Mesolithic population merged with migrant population north of the Sea of Marmara, since whilst the pottery, bone, and lithic assemblages are identical both to the north and south , those to the south have rectangular mudbrick architecture and are strictly dependent on farming, with very little evidence for hunting, whereas those to the north have round wattle-and-daub structures and a mixed subsistence pattern, with extensive indications of hunting, fishing, and mollusc collecting along with some domesticated animals. Likewise, querns and grind-stones, and other polished stone artefacts, though present, are scarcer to the north. Yet another significant difference is in the burial customs: to the south, as found at basal Ilipinar and Aktopraklik, the cemeteries are extra-mural, whereas the sites around Istanbul have intramural burials below the floors of the huts. The site of Mentese to the south, in the archaic Fikirtepe levels dated *ca*. 6500 BC, did however produce some wattle and daub constructions as well as mud-brick, with hunted fauna representing 20% of the faunal assemblage, so that some Mesolithic elements may have been incorporated there, although the earliest inhumations dated *ca*. 6400 are in the classic Neolithic crouched lateral (foetal) position.

Region 4 was first colonised overland by Neolithic migrants *ca*. 6500 BC by Fikirtepe Culture folk who appear not to have incorporated any local Mesolithic elements, and migrants who arrived by sea at about the same date and founded Hoca Çeşme. There is no indication that either group incorporated any Mesolithic elements.

In the southern part of the Aegean Basin (Region 5), Neolithic attributes are first encountered on the Island of Kithnos *ca*. 9000 BC with wild boar or suids in process of domestication, circular semi-sunken habitation structures and burials according to Neolithic traditions in a foetal/crouched position. Whilst these navigators practiced fishing and traded in Melian obsidian they appear not to have evolved much over time, and the site is abandoned in the mid-6th millennium. The Cave of Cyclops 'sister site' in Region 7 on the island of Youra was occupied from *ca*. 8000 BC and used as a base for fishing and processing the catch; the occupants initially imported suids and later caprids, which were let loose, and the site continued in use as a special purpose site into the Neolithic, when sheep were imported and pottery used similar to that found at Neolithic site of Agios Petros on the close-by Island of Kyra Panagia, which was established early in the 6th millennium BC. It is possible that a constituent part of the settlement was made up of neolithised descendants of the earlier occupants of the Cave of Cyclops, whose home-base would not necessarily have been on the Island of Youra.

In Crete (Region 6), several Mesolithic sites have been identified on the southern coast in the past two decades, where none were previously known. Neolithic migrants established the site of Knossos at the end of the 8th millennium, which is unlikely to have been the first Neolithic settlement on the island, given its inland location, but to date it is the only Initial Neolithic site known and there is no indication that it incorporated any autochthonous hunter-gatherers.

Region 7 has produced a number of caves used in the Late Mesolithic into the Transition with evidence of pottery, ovicaprines and Neolithic lithics, as well as evidence for earlier contacts across the Aegean Sea in the form of burial customs (Theopetra Cave), obsidian (Anonymous Cave of Schisto, Cave of Cyclops, Sarakenos Cave), lithic technology (Anonymous Cave of Schisto, Cave of Cyclops, as well as possibly Sarakenos and Theopetra Caves), and imported suids and caprines (Cave of Cyclops); The Anonymous Cave of Schisto is under excavation, but might not have been occupied during the Transition; The cave of Cyclops is discussed above; Sarakenos cave, up a steep incline in Boeotia with lake Kopais lapping the base, saw limited use in the Early Neolithic after evidence for acculturation; Theopetra Cave in Western Thessaly, again up a steep incline, saw the Late Mesolithic occupants acquiring Neolithic attributes, but what happened subsequently has been rendered confusing by the indigenist tendencies of the excavator, compounded by severe bioturbation.

Argissa Magoula appears to be the earliest known Neolithic settlement in Thessaly, possibly established *ca*. 6700 BC; the lithic debitage, which includes obsidian, and the relatively high incidence of wild game suggests that either these were acquired through exchange, or autochthonous elements were incorporated into the settlement. Sesklo appears to have been established within a century at most after Argissa Magoula, and Nea Nikomedeia is the earliest-known fully Neolithic settlement established in Western Greek Macedonia *ca*. 6400 BC with Dikili Tash being established at about the same time in Eastern Greek Macedonia.

In Region 8, Franchthi Cave was occupied from the Palaeolithic through the Mesolithic, Transition and Neolithic, acquiring Neolithic attributes sometime after 6900 BC and completing the Transition into the Neolithic over the centuries, probably incorporating Neolithic migrants from regions different to those that colonised Thessaly. In the Klisoura Gorge, Mesolithic hunter-gatherers acquired small quantities of exogenous Balkan flint, obsidian and pottery during the Transition prior to abandoning the area which was not suitable for agriculture. In the same Region, the 'lost' Zaimis Cave may have been occupied during the Transition, since some pottery and ovicaprine remains are reported prior to the site's abandonment, probably also due to its unsuitability for Neolithic occupation.

In the Central Balkans Region 9, the only Mesolithic site known in Bulgaria and the Republic of Macedonia is the 50 km^2 area of Dekilitazh near the Black Sea coast, which was used as a knapping area in the Mesolithic and again, after a hiatus, in the Neolithic. A number of coastal or near-coastal Mesolithic sites are however known further north in the Ukraine, and there are several Ağacli Group Mesolithic sites near the Black Sea coast on either side of the Bosphorous. The Neolithic migrants appear to have penetrated this Region from the east sometime *after* 6500 BC and moved up the river valleys in the west starting between 6400-6300 BC. The site of Poljanitsa Plateau in Bulgaria where the earliest level is dated *ca*. 6400 BC contained microliths, which could suggest a Mesolithic elements or that the immigrant farmers came from the Archaic Fikirtepe Culture near the Sea of Marmara.

Region 10 is devoid of Mesolithic sites in Serbia, except along the Danube on the eastern side, with some in the Dinaric Alps in Montenegro on the western side, and some in Croatia and Slovenia in the far north. Odmut Cave in Montenegro, now under the waters of Piva dam reservoir, is a fine example of a cave-site in a gorge, with no agricultural land within many kilometres, occupied from *ca.* 8200 BC; the occupants, initially of Romanellian lithic tradition which evolved to include trapezes *ca.* 6200 BC, acquired Starčevo pottery probably after 5900 BC and by *ca.* 5700 BC, Impressed Ware as well, plus domesticated fauna as 'game in the pen' and Balkan flint; through the end of the occupation *ca*. 5200 BC, the debitage is consistently Mesolithic and the economy essentially based on the hunt, so that this group maintained its traditional lifeways for approximately 700 years after first direct or indirect contact with Neolithic migrants both to their east and west.

A number of open-air Mesolithic sites have been discovered in the north of the Region, with some of sites in or close to the wetlands near Ljubljana; the site of Breg being occupied for some 3 millennia and abandoned *ca.* 5600 BC, when Neolithic settlers were arriving in the area. The Starčevo Neolithic Culture, which lasted some 700 years, is first attested between 6400-6300 BC in the south and centre of the Region, with Blagotin in the south dating from 6400-6300 BC; Divostin and Grivac further north dating from *ca.* 6200 BC; Donja Branjevina in Northern Serbia and Obre in Bosnia and Herzegovina between 6100-6000 BC; Starčevo-Grad close to Belgrade between 5900-5800 BC, and Galovo-Slovenski Brod in Croatia 6000-5900 BC. Because pit-houses are ubiquitous in Mesolithic, Transition and Early Neolithic contexts across the Study Area, their systematic presence in the Starčevo culture cannot be construed as indicating acculturation; the irregular orientation of the pit-huts in the earliest levels of Donja Branjevina, and the appearance of figures only in the second phase of the site could however be indicative of an autochthonous presence; the presence of wild faunal remains of 20% at Obre 1, 25% at Starčevo-Grad and the lithics at the site of Tečić could also be indices that support the DNA evidence that Mesolithic folk joined up with the Neolithic migrants.

In the Iron Gates (Region 11), the Mesolithic and Transition sites on the banks of the Danube between Romania and Serbia are a unique attestation of sedentary Mesolithic communities who developed a particular culture commencing in the 10th millennium BC, which they were essentially able to maintain and develop after first contact with the Neolithic migrants, who skirted round this populous region, before eventually integrating the Neolithic lifeways during the 6th millennium BC. The Mesolithic settlements maintained long distance contacts as evidenced by the procurement of Hungarian obsidian and radiolarite, as well as sea-shell body ornaments; in the same vein they acquired pottery between 6300-6200 BC at Alibeg, Icoana, Kula, Lepenski Vir, Padina, Vlasac and several other undated sites; polished stone and Neolithic flint artefacts appears at about the same date at many of the sites; domesticated animals however appear only some three centuries later between 6000-5900 BC and soon all four domesticated species are present, but seldom exceed 25% of the faunal remains; agricultural produce is also attested after 6000 BC, without there being any evidence for agriculture; finally, strontium isotope analysis indicates that non-local females begin to arrive after 6200 BC and a few Neolithic-style crouched inhumations of female individuals, who consumed a different diet, appear after 6000 BC at Lepenski Vir, confirming the incorporation of Neolithic female migrants, probably as partner exchanges, into the Iron Gates Transition communities.

Transdanubia, Region 12 is another Region in which the Transition can be tracked. Small groups of Starčevo migrants reached the southern shores of Lake Balaton, which forms part of the CEB AEB, between 5700-5600 BC. The northward progression of the Neolithic marked a pause lasting 300-400 years, whilst the domesticated plants and animals adapted to the northern European environment. During the pause, the migrants appear to have integrate peacefully with the regional Mesolithic communities, who may already have practiced land management and some form of primitive horticulture. From this union the Formative LBK evolved, and by 5300 BC the Classical LBK was in place, ready to move out of our Study Area, possibly in part due to demographic pressure.

In Region 13, on the eastern seaboard of the Ionian and Adriatic seas, the Mesolithic is present north of the Bay of Ambrakia, becoming particularly dense in Albania, with some of the sites potentially occupied during the Transition (Alonaki Beach, Blazi, Katundas, Loutsa, Shën Marinë, Vlushë). The occupants of the open-air coastal site of Sidari on the Island of Corfu, first occupied *ca.* 7000 BC, has no apparent stratigraphic hiatus between the Final Mesolithic and the Initial Neolithic Transition Level with wattle and daub habitations and plain burnished pottery devoid of mica temper acquired possibly as early as 6500 BC, with some ovicaprines. The lithic technology is similar to that of Franchthi Cave, so it is probable that the autochthonous site occupants adopted Neolithic attributes; after a hiatus, Impressed Ware appears *ca.* 6200 BC. The Mesolithic cave-site of Konispol on the

mainland, 40 km distant and 400 masl up a karstic hill with a view towards Corfu, was occupied from the Late Palaeolithic; during the Late Mesolithic, the occupants, who had different lithic and cultural traditions to the site of Sidari, became involved in a slow and progressive Transition starting as early as 6500 BC, with ever increasing domesticated fauna, particularly during the '6200 BC event', so that by 5900 BC the cave appears to be used as a pen rather than a residential site. Asfaka, north of Lake Ioannina in Epirus could be a precursor ditched enclosure site as later found in the Early Neolithic on the Apulian Tavoliere (Region 16). In Albania, as in Epirus, there are few Initial Impressed Ware Neolithic sites known near the coast and none can tell us anything about the Transition, whilst in Korçë District in Eastern Albania near Lakes Ochrida and Grand Prespa on the water divide, the Early Neolithic sites were established by migrants arriving overland from Greece from as early as 6500 BC.

In Montenegro (Region 14), Crvena Stijena, 700 masl, is a rock-shelter high up near the top of a deep gorge in land totally unsuitable for agriculture; at the top of its 24 m of stratigraphy stretching well back into the Palaeolithic, the Late Mesolithic Castelnovian appears, followed by a Transition with Impressed Ware and ovicaprines, possibly as early as *ca*. 6400 BC, before the site is abandoned. The undated site of Vruća Pećina, north of the Montenegrin capital Podgorica, is also reported to have impressed Ware in an otherwise Mesolithic context. Gudnja Cave, 400 masl, at the base of the Pelješac Peninsula in Southern Croatia, is located in an area totally unsuited for agriculture; Late Mesolithic people used the site episodically and acquiring archaic Impressed Ware and ovicaprines between 6200-6000 BC. The Island of Korčula would have been attached to the Pelješac peninsula during the Transition, so that that the Late Mesolithic occupants of Vela Špilja, 130 masl overlooking the bay at the northern end of the now-island, were competent off-shore fishermen by choice and obtained chert from Palagruža Island in the middle of the Adriatic; a sherd similar to the monochrome pottery from Sidari in an otherwise Mesolithic context was probably obtained prior to 6200 BC with some ovicaprines; Impressed Ware is present and the full Neolithic package appears between 5900-5800 BC, so that the autochthonous Mesolithic occupants can be seen to have transitioned to the Neolithic over a period of 300-400 years. On the Island of Hvar, Markova Špilja contained Impressed Ware in a Mesolithic context in its basal levels as well as a Gargano flint bell-axe, adding confirmation of Mesolithic trans-Adriatic navigation using the islands as stepping stones, with the waterless Palagruža Island in the centre of the Adriatic having produced evidence for stop-overs. Inland in Bosnia & Herzegovina, at some 700 masl, in a location propitious for communication and animal husbandry, Zelena Pećina has produced Impressed Ware in a Mesolithic context. Zemunica Pećina, north of Split, has produced evidence of Neolithic attributes in a Mesolithic context *ca.* 6000 BC, earlier than the evidence for Neolithic settlements in the Area. The undated Vaganačka Pećina, 500 masl on the Velebit Massif north of Zadar, has also produced evidence of Impressed Ware and ovicaprines in a Mesolithic context, with continuing use of the site. South of the Istrian Peninsula, Vela Špilja Lošinj, sitting 275 masl on an island which was probably attached to the mainland at the time, has produced evidence for Impressed Ware and ovicaprines prior to 6000 BC in a Mesolithic context, no doubt transported there by Mesolithic navigators, with the site continued in use with domesticated animals increasing in numbers during the Middle and Late Neolithic; the nearby sister-site of Jami na Sredi produced similar evidence, suggesting that the Mesolithic occupants completed the Transition to the Neolithic. Vorganska Pećina on the now-island of Krk has produced Impressed Ware in a Mesolithic context, whilst the question as to whether domesticated animals were present remains open. Podosojna Pećina, 335 masl on a steep slope dropping into the sea on the south side of the Istrian Peninsula, has a Mesolithic occupation dated earlier than 5400 BC, suggesting that Mesolithic lifeways continued several centuries after the first appearance of the Neolithic on the Istrian Peninsula. Nakovana Špilja, some 300 masl near the top of a limestone hill near the tip of the Pelješac Peninsula, in an area with no agricultural land within several kilometres, was first occupied after 6000 BC, when Impressed Ware and ovicaprines are present; the lithic context appears not to have been published, so that no determination can be made regarding the occupants. Susac Island was used by Neolithic navigators

sometime before 5800 BC with evidence of contact with Palagruža Island and the western seaboard of the Adriatic. The region around Šibenik was first colonised by Neolithic migrants *ca.* 6000 BC, the Ravni Kotari Plain near Zadar *ca.* 5900 BC, and the Istrian Peninsula *ca.* 5800 BC; whilst these Early Neolithic open-air Impressed Ware settlements include all the trappings of the Neolithic, they show different adaptations to their environment, with tenuous indications of possible contact with, or the incorporation of, local Mesolithic peoples: at Tinj-Podlivade and Smiljčić near Zadar, this is suggested by some Mesolithic traditions in the lithics; at Medulin-Vižula there is a relatively high percentage of wild fauna, whilst at Kargadur, at the tip the Istrian Peninsula, the lithic tradition also appears to contain Mesolithic elements.

On the western shore of the Ionian Sea and the Adriatic, the earliest attestation of Neolithic migrants dates from *ca.* 6300 BC (Regions 16 and 17), with most of the Early Neolithic sites dating from after 6000 BC. There are however two sites with earlier dates: Grotta dell'Uzzo (Region 19) produced some coarse pottery from a Level dated *ca.* 7000 BC, and at the site of Petriolo III near Siena in Tuscany (outside the Study Area), *ca.* 6300 BC, which could be the result of contacts with North Africa. In the case of Grotta dell'Uzzo the pottery is unlikely to have been imported from further east given its coarse nature. Consideration should be given to the hypothesis that the Sicilian pre-Stentinellian pottery, which appeared *ca.* 6200 BC originated from North Africa.

In Northern Apulia (Region 16), the undated site of Grotta Disiglia, near the tip on the north side of the Gargano Peninsula, in an area not particularly propitious for agriculture, is the only Mesolithic site with pottery evidencing the Transition, before the site was abandoned; it is in view of the Tremiti Islands where the open-air site of Prato don Michele has produced Archaic Impressed Ware and a few ovicaprine remains, but no evidence for agriculture, in a context with Mesolithic lithics similar to those found at Grotta Disiglia, so that it can be assumed that the Late Mesolithic / Transition occupants of both sites were in contact with Initial Neolithic migrants, and that given the presence of pottery with Dalmatian affinities at a later date, were involved in trans-Adriatic trade and exchange. The undated site of Malerba could also represent a settlement of acculturated hunter-gathers in the later stages of the Transition. Other Early Neolithic sites with basal levels containing Mesolithic elements are: Rendina, established *ca.* 6000 BC (lithics and 20-25% wild fauna); Ripa Tetta, established *ca.* 5800 BC (lithics); Scamuso, established *ca.* 6200 BC (lithics), and Trasano, probably established prior to 5900 BC (lithics).

The Salento Peninsula of Apulia (Region 17) is home to the eponymous sites defining the Uluzzian Late Palaeolithic Culture as well as the Romanellian Early Mesolithic Culture, which last evolved over some 3000 years into the Epiromanellian. There are numerous Mesolithic lithic scatters and cave sites along the Ionian Sea coast (Le Macchie; Grotta delle Mura di Monopoli; Grotta Morelli; Porto Fetente; Torre Testa; Santa Foca; Alimini Lakes; Grotta Romanelli; Grotta delle Prazziche and Grotta delle Cipolliane C), confirming the tendency to exploit marine resources in a Region which appears to have been well populated and where large game must have been in short supply. Probable Late Mesolithic Transition sites exist at Alimini C, Alimini Campo Belmonte Cesario, Grotta delle Cipolliane C, Grotta delle Mura di Monopoli, Grotta delle Prazziche, Grotta Marisa (possible), Grotta Morelli (possible) and Terragne. Terragne is an important dated open-air site where the Transition can be seen to occur between *ca*. 6150-5800 BC with a Mesolithic lithic tradition and a continuing high incidence of wild fauna. The Early Neolithic sites which possibly contain Mesolithic elements are Cimino (lithics), Costante di Campo Latini (lithics), Fontanelle (lithics), Forcatella (lithics), Grotta del Fico (fauna and lithics), which could have been occupied by Mesolithic / Transition community, Montedoro (fauna and lithics), Sant' Anna (lithics), Torre Bianca (lithics), Torre Canne (lithics), dated *ca.* 5850 but possibly earlier, and Torre Sabea (lithics) established between 5900-5800 BC.

In Region 18, the Grotta della Madonna was continuously occupied with some possible hiatuses from the Late Palaeolithic through the Neolithic and beyond; only a small area has been excavated, but there are clear indications of continuing occupation by the autochthonous population over the Transition. Latronico 3 is clearly a Mesolithic Transition site, notwithstanding the confused stratigraphy, with strata in which Impressed Ware and ovicaprines appear is a layer containing a Castelnovian lithic tradition with a high incidence of wild fauna. The Neolithic arrives fully constituted with migrants *ca*. 5900 BC at Favella di Sibari and prior to 5800 BC at Piana di Curinga.

Sicily (Region 19) enjoys a high density of Mesolithic sites on the north-western coast between east of Palermo and the Egadi islands of Levanzo and Favignana, which were attached to the mainland at the time, and the same can be said for the south coast around Sciacca. The Transition can be seen at a number of sites: Grotta Corruggi di Pachino in the south-eastern corner is undated and produced pre-Stentinellian Impressed Ware in a Mesolithic context with possibly Stentinellian pottery in higher levels; the poorly excavated site of Grotta della Cala dei Genovesi on the Island of Levanzo has produced pottery and domesticated fauna in a Mesolithic context at dates commencing 6800-6450 BC on a *Monodonta turbinata* (presumably uncorrected for the WRE which would probably give a date 400-500 years later), with the quantities of domesticated fauna increasing over time; Grotta dell'Uzzo is one of the key Transition sites in the Study Area, with a baked clay hearth dating from 7500-8000 BC, archaic coarse pottery (possibly from North Africa) dating from shortly after 7000 BC; pre-Stentinello pottery appears *ca.* 6200 BC; during the first half of the 6th millennium, when the site is occupied year-round, domesticated fauna makes a discreet appearance *ca*. 5900, increasing over time, and agricultural products, probably brought-in, are attested from *ca.* 5650 BC, all within a Mesolithic / Transition context with a high incidence of hunting and fishing; early in the second half of the 6th millennium the occupation becomes sporadic with the site probably used as an animal pen, with the lithics continuing to contain a strong element of the Mesolithic traditions; 12 inhumations dating from the 8th and 7th millennia are in a mixture of supine and foetal positions, the latter suggesting maritime contact with regions further east; the assumption is that the permanent settlement moved onto the plain at the head of the bay, where agriculture could be practiced, around the middle of the 6th millennium. Grotta d'Oriente was abandoned shortly after the Transition occupants acquired ovicaprines *ca*. 5900 BC. The group of caves at Isolidda have produced evidence for pottery in a Late Mesolithic context. The Riparo della Sperlinga di San Basileo produced Stentinellian Pottery in a Mesolithic lithic tradition in which 85% of the fauna is wild, suggesting the occupants' past was rooted in the Mesolithic. Other Mesolithic sites which could possibly have Transition levels are Grotta Dei Ciavarelli, Grotta della Ucceria, Grotta dei Puntali, Grotta Geraci, Grotta Maiorana, Grotta Regina. Grotta Kronio and the region around Sciacca, where work on the Transition is still supposedly in progress, was first occupied by Neolithic colonisers whose pottery is more archaic than any found in Apulia, who brought ovicaprines and whose lithic assemblage contained Mesolithic element, and who may conceivably have crossed from North Africa. The Early Neolithic site of Petraro di Melille also produced pre-Stentinello pottery associated with a lithic technology with a high Mesolithic content.

The Italian Adriatic coast (Region 20) has produced very few Mesolithic sites, yet many Initial Neolithic sites contain elements of the Mesolithic lithic tradition in their early levels. In Molise, at 1200 masl, the open-air site of San Lorenzo di Civitanova del Sannio has produced lithic material that spans the Late Mesolithic and Initial Neolithic. In Abruzzo, the Altopiano delle Cinque Miglia, at 1400-1600 masl, was used during the Mesolithic and Neolithic for the obtention of good quality flint. Also in Abruzzo, the Mesolithic and Neolithic sites at Capo d'Acqua are 100 m apart and a temporal hiatus exists between the two sites, but the Neolithic site, dated *ca.* 5850 BC, contained archaic Impressed Ware, a high percentage of hunted fauna and Mesolithic lithics, so that it is considered to be a Transition site. In Marche, the Neolithic site of Maddalena di Muccia on the first fluvial terraces at the base of a pass through the Apennines sits in an ecotone; the initial occupation, dated *ca.* 5600

BC, has a lithic assemblage with a strong Mesolithic component and over 30% wild fauna; a Sauveterrian and Castelnovian Mesolithic site was found nearby at Luciano di Pievetorina, 3-4 km up a tributary, adding credence to the incorporation of the hunter-gatherers in the Initial Neolithic settlement. Beyond Marche there are no sites in this Region which suggest the Transition, but two high-altitude Castelnovian sites in the Northern Apennines at Lama Lite, dated *ca.* 5600 BC, and Passo della Comunella close-by, dated *ca.* 5950 BC, attest to a Late Mesolithic presence. At Petriolo III South, close to Siena in Tuscany, a Castelnovian camp-site, dated *ca.* 6300 BC, was found with a broken pot, which appears to attest to long distance contacts and exchange. In Abruzzo, the Early Neolithic site of Fontanelle di Pescara may have a Mesolithic component in the lithic assemblage; The Umbrian sites at Gubbio, dating from *ca.* 5400 BC, appear to continue the Mesolithic exploitation of the region with a marked continuity in the lithic tradition; At Marcianese, dating from prior to 5500 BC, there is tenuous evidence for a Mesolithic tradition in the lithics; Villaggio Leopardi, dating from *ca.* 5500 BC, has sunken habitation structures, the only indication interpretable as possibly Mesolithic; The undated Early Neolithic site of Tricale has a lithic tradition reminiscent of the Castelnovian. In Marche, the Early Neolithic site of Portonovo di Ancona has been dated from shortly after 5800 BC, with tenuous evidence for contact with the autochthonous hunter gatherers and a sherd of Tyrrhenian Impressed Ware; Ripabianca di Monterado, established *ca.* 5200 BC has a lithic tradition strongly reminiscent of the Castelnovian, pit structures and burials in a supine position possibly harping back to the Mesolithic and evidence for trans-Apennine contacts as well as contacts with the Fiorano Culture of the Po Valley; The open-air undated Early Neolithic site of Torre Sinello also has a Mesolithic lithic tradition. In Romagna, the Initial Neolithic coastal site of Riccione was established prior to 5400 BC with a palisade, and little evidence for local contact; Faenza–Fornace Cappuccini, dated *ca*. 5350 BC, contained a lithic tradition emanating from a Castelnovian tradition, and poorly preserved faunal remains which appear to have included a high percentage of hunted fauna; at Miramare di Rimini, the surface find lithics contain Mesolithic elements and the sparse faunal assemblage is largely made up of wild fauna, and at Misano Adriatico, the undated Early Neolithic site also produced lithics of Mesolithic tradition.

In the Fucino Basin (Region 21), the key Mesolithic and Transition site is Grotta Continenza di Trasaco, where the first sherds appear in a Level, probably incorrectly dated *ca*. 6400 BC, with the same Level dated *ca.* 6125, which is more credible; the Transition is seen continuing to 5600-5500 BC. Other Mesolithic cave-sites with possible evidence for the Transition are Grotta di Pozzo, which could have been occasionally used as an animal pen in the Early Neolithic, Grotta La Punta, Grotta Maritza and Grotta San Nicola. The earliest Neolithic settlements at Rio Tana and Colle Santo Stefano are dated between 5800-5700 BC, but since undated stratigraphies exist below those dated at the latter site, a date earlier than 5800 BC is possible; at Colle Santo Stefano, the lithics are more Mesolithic above the lowest Levels, before slowly becoming more Neolithic during the site's occupation, with knowledge of the distant flint sources attested from inception; the fauna is close to 40% wild in the lower levels according to the excavators, all of which strongly suggest the incorporation of autochthonous hunter-gatherers in the settlement. Other Initial Neolithic sites with evidence for Mesolithic attributes are Ortucchio Laghetto, Paterno and Sant'Orante.

At the head of the Adriatic, some Castelnovian Mesolithic hunter-gatherers moved into the Karst caves as the North Adriatic Plain shrank, with some acquiring Neolithic attributes during the Transition. The Northern Apennines have produced evidence for late hunter-gatherers and some of the earliest Neolithic sites south of the River Po may have been established by acculturated Mesolithic migrants, known as Facies di Pianaccia, who came over from Northern Tuscany or Eastern Liguria. North of the River Po, there is plenty of evidence for the Late Mesolithic in the Friuli Plain, the northern part of the River Po Plain and all along the Alps, with a particularly rich manifestation in the Trentino-Alto Adige, where the Transition Gaban Culture flourished between approximately 5000-4500 BC.

The Trieste and Slovene Karst (Region 15), was shunned by agriculturalists before the Late Neolithic, and no polished stone artefacts have been found prior to then. The key sites for the Transition are all Mesolithic with the best investigated site being Grotta dell'Edera, which was occupied during the Castelnovian Mesolithic, and produced sherds of Impressed Ware and a few remains of ovicaprines in Level 3a, dated after 5700 BC, in a Mesolithic context with a preponderance of wild fauna; there appears to have been a short hiatus in the site occupation before Danilo / Vlaška Ware appears in the middle of the 6th millennium as the Transition progresses. Grotta Azzurra, undated, produced a few sherds of Impressed Ware at the top of the Castelnovian sequence with ovicaprines, suids and cattle growing in importance to over 60% and eventually 80% as the Transition progresses to include Vlaška Ware in an otherwise Mesolithic context. The undated Grotta del Pettirosso produced a few sherds of Impressed Ware at the top of the Castelnovian Mesolithic prior to the Vlaška Ware Early Neolithic; there are however no details of the faunal assemblage. Grotta Zingari has a Transition Level 5 between the Castelnovian and the Early Neolithic, with the cave used quite intensely as an animal pen in the Later Early Neolithic. Mala Triglavca, notwithstanding the depositional movement post 5400 BC, clearly has a Transition with pottery and increasing quantities of the four domesticated species. Pod Črmukljo is an undated Slovene open-air site which enjoyed a long discontinuous use, from the Early Mesolithic through the late Mesolithic, Transition and Neolithic. Podmol pri Kastelcu has a Transition Level dated *ca*. 5550 BC before a short period of abandonment before being occupied again, possibly by descendants of the acculturated hunter-gatherers. Other Mesolithic sites at which the Transition can be seen are Grotta Gialla, Grotta Lonza and Trhlovca Cave. Sites which might have had Transition levels are Caverna Moser, Grotta Ansa, Grotta dei Ciclami, Grotta Teresiana di Duino, Riparo Monrupino and Viktorjev Spodmol.

Friuli-Venezia Giulia (Region 22) has an Early Neolithic settlement at Piancada on a levee near the Marano Lagoon dated *ca*. 5700 BC, possibly established by migrants coming up from the Eastern Adriatic, in an area rich in Mesolithic settlements. Riparo di Biarzo, upcountry, was occupied during the Sauveterrian and Castelnovian Mesolithic, through the Transition, the Early Neolithic and into the VBQ Neolithic, with Levels US-3a and US-2 covering the Transition and Early Neolithic; the volume of incised pottery is not large, and in the earlier level only a small proportion of the fauna was domesticated, in conjunction with a Mesolithic lithic tradition, so that their acquisition by hunter-gatherers is almost certain. Faunal assemblages from open-air sites have not survived, rendering delicate the interpretation of sites such as Buttrio, Grotta di Cladrecis, Mulino Ferrant, Muzzana del Turgnano - Bosco Communale, Muzzana del Turgnano - La Favorita, Orcenico, Orzano, Palmanova, San Giorgio di Nogaro - Bosco Sgobitta, San Giovanni di Casarsa, San Vito al Tagliamento Boscat, and Taviele (Ziracco); these sites are all but one open-air, mostly surface scatters and undated, so that determining how or why Mesolithic and Neolithic material became associated is hard to determine. The Neolithic arrived as a fully formed package, but the Mesolithic lithic tradition can be discerned at the eponymous site of Fagnigola east of the Tagliamento River, established prior to 5500 BC, as were the nearby sites of Cesena and Valer. The Lago di Ragogna lithic scatter sites with Impressed Ware-type pottery have lithics of clearly Castelnovian tradition, as well as Neolithic lithics, so that they have been recognised as Transition sites. Lastly, Sammardenchia di Pozzuolo, established prior to 5500 BC by Neolithic migrants coming from the East Adriatic, probably incorporated local hunter-gatherers as can be seen in the lithic tradition, but there are also influences over time from the Fiorano Culture to the west and the Starčevo Culture to the east, during the 1000 years of occupation.

To the south of the River Po (Region 23) there is a dearth of stratified Mesolithic sites, although there are numerous sites in the upper plain and the foothills of the Apennines. A single Castelnovian site at Cabriolini has produced Neolithic lithics and sherds attesting the Transition. The Initial Neolithic of the Region, the Fiorano Culture, is a conundrum, in that there is no consensus regarding its provenance, but it does contain numerous Castelnovian characteristics in its lithic assemblage

making it difficult to determine whether individual sites might have incorporated Castelnovian hunter-gatherers; If the Ligurian Impressed Ware is attested between 5900-5800 BC, it did not spread down the Po Valley to this Region, and its influence is only found at the site of Benefizzio *ca*. 5400 BC. In fact the Vhò Culture, derived from the Fiorano Culture, evolved to the west of the Region *ca*. 5400 BC, a century or two after the first manifestations of the Fiorano Culture, which developed between 5600-5400 BC. Of greater interest is the Pianaccia di Suvero Culture, which appeared prior to 5600 BC to the east of the Gulf of Genoa and which has been described as being comprised of fully neolithised Castelnovian hunter-gatherers with a lithic assemblage rooted in the Mesolithic; migrants from the culture appear to have come over the hills into Emilia-Romagna to play a part in the neolithisation of Emilia-Romagna and the development of the Fiorano Culture, which contains numerous Mesolithic elements in its lithic assemblage. There is clear evidence for contact and exchange across the Northern Apennines during the entire Mesolithic, as well as evidence for contact during the Early Neolithic at the undated sites of Bazzarola, Bologna - via Andrea Costa (area ex ICO), Copezzato di San Secondo and the site of Benefizzio, established *ca.* 5400 BC. Early Neolithic sites that probably incorporated hunter-gatherers are Faenza - Fornace Cappuccini (lithics and fauna) established between 5400-5300 BC and Lugo di Romagna (lithics and fauna) established between 5600-5500 BC.

To the north of the River Po (region 23), there are probably between 500-1000 Mesolithic sites in the Alps, only a handful of which are Castelnovian. The Castelnovian sites are mostly in the foothills and on the upper plain. The Mesolithic sites that contain elements of the Transition are Soghe (lithics) and Riparo Villabruna which was probably re-occupied in the Early Neolithic. The only Early Neolithic sites to contain reasonably clear Mesolithic lithics elements is that of Le Basse di Valcalaona.

The Trentino-Alto Adige (Region 24) is an exceptional Region in that it was relatively well populated by hunter-gatherers during the Castelnovian Mesolithic, when they largely forsook the higher altitudes and settled close to the valley floor, rich in aquatic resources, mostly in rockshelters or up alluvial fans. The valley-floor itself would have been made up of wetlands, and if there were any settlements, these have not been found. The Initial Neolithic had been established on the plains to the south for half a millennium before the Terminal Mesolithic Gaban Culture began to acquire some pottery and a few domesticated animals *ca.* 5000 BC, and so the situation continued until *ca.* 4500 BC, when the VBQ Culture appeared and the Gaban Culture disappeared to give way to the Neolithic.

Final words

This study comes to a temporal end in the Southern Alps *ca.* 4500 BC with the assimilation of the hunter-gatherers of the Trentino-Alto Adige into the productive society, heralding the demographic expansion, the anthropisation of the land, the ever-accelerating cultural changes and ever increasing social stresses. Between the initial penetration into Europe *ca*. 9000 BC, of navigators who established a settled community in semi-subterranean huts, bringing with them suids, when these were in the early process of domestication in the Levant, and the disappearance of last hunter-gatherers from the archaeological record in the Study Area, 4500 years will have elapsed. Their integration into the Neolithic life-ways was clearly multi-faceted, so that no individual model can account for all the variety, unless it be ALBOT & ALBOT.

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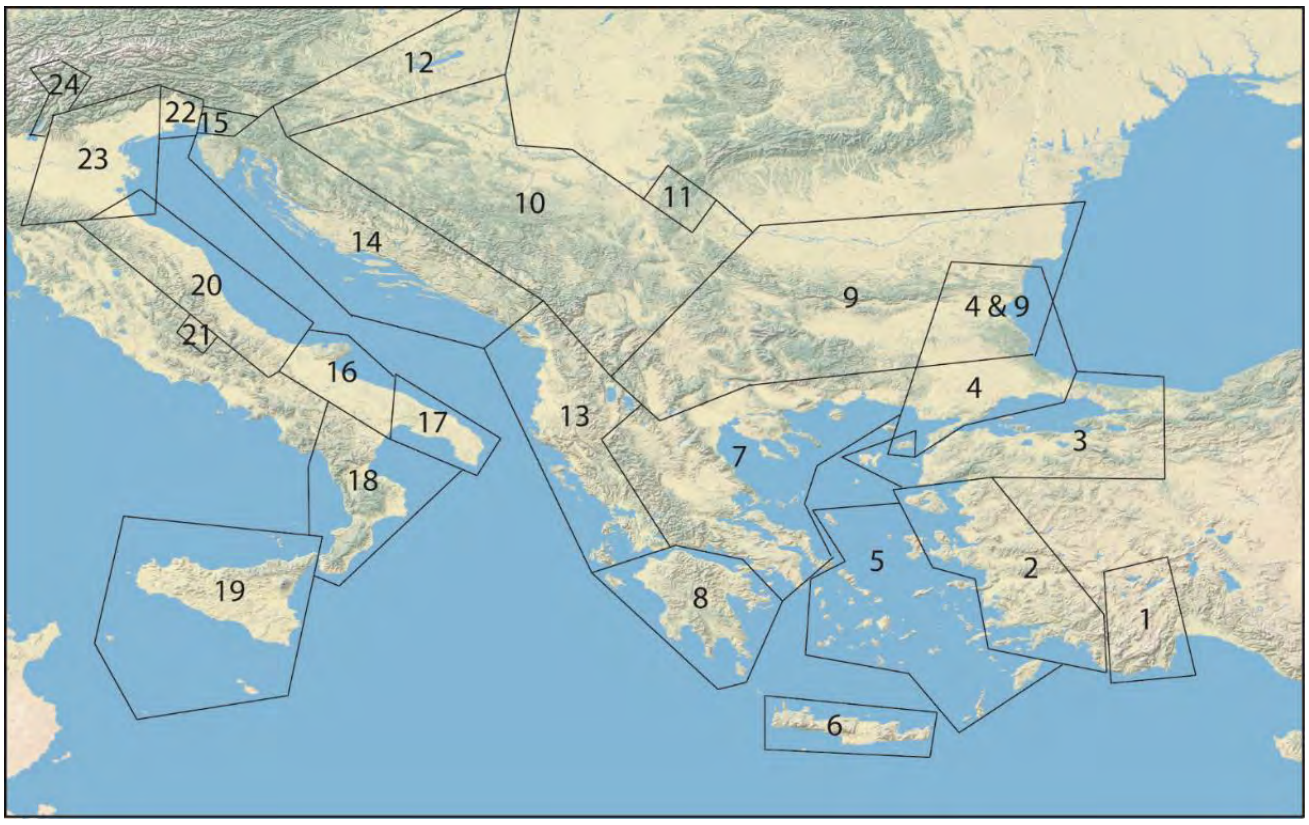
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Faculté des lettres et sciences humaines, Institut d'archéologie

What Happened to the Southern European Hunter-Gatherers at the Advent of Farming, between Western Anatolia and the Head of the Adriatic Sea (9000-4500 BC)?
A narrative description based on the archaeological record

Doctoral Thesis
Michael Templer



Study Area and Regions

Volume 2 – Maps and Figures

Doctoral thesis under the direction of Prof. M. Honegger
Jury: Prof P. Biagi (Ca'Foscari University, Venice)
Prof. D. Borić (Cardiff University, Wales)
Prof. N. Efstratiou (Aristotle University of Thessaloniki, Greece)
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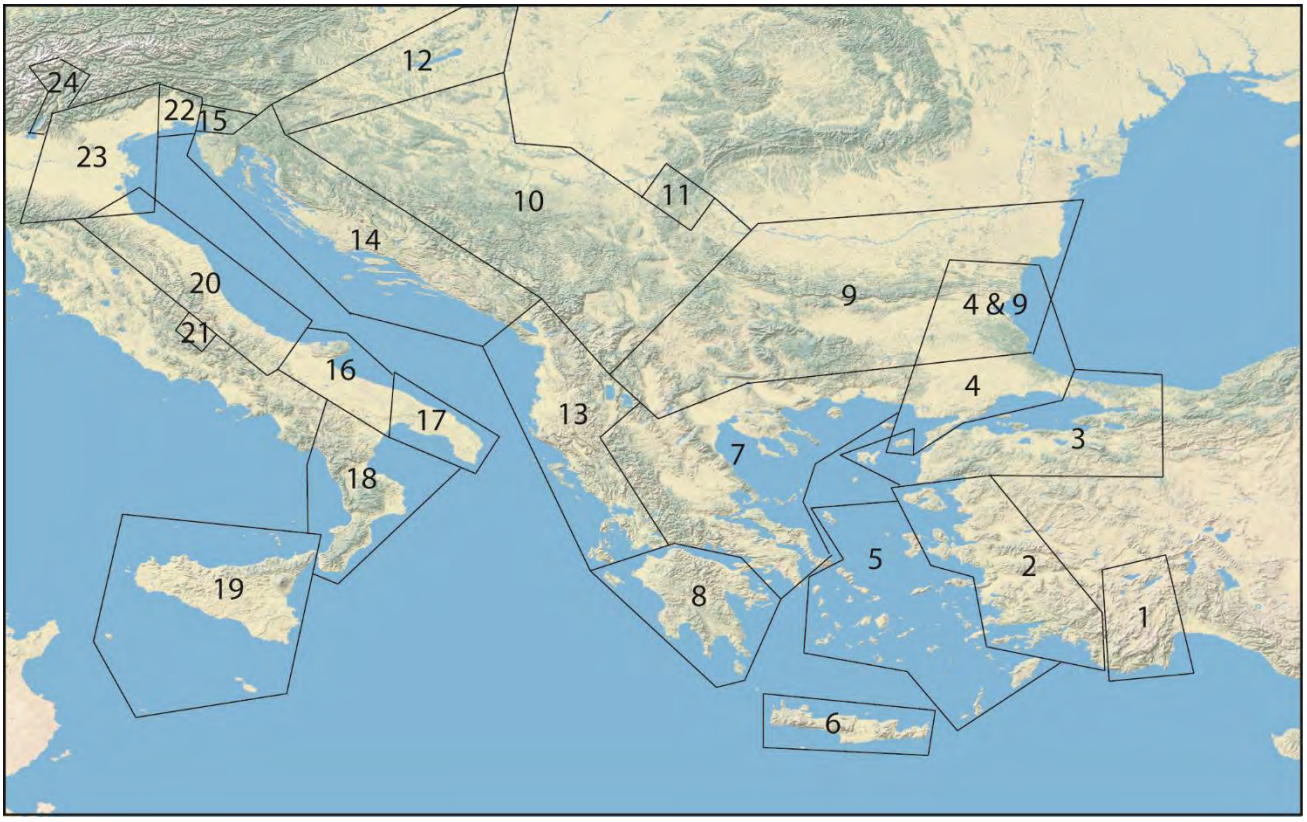
Neuchâtel, September 15, 2016

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Map MR1

Study Area and Regions of Thesis

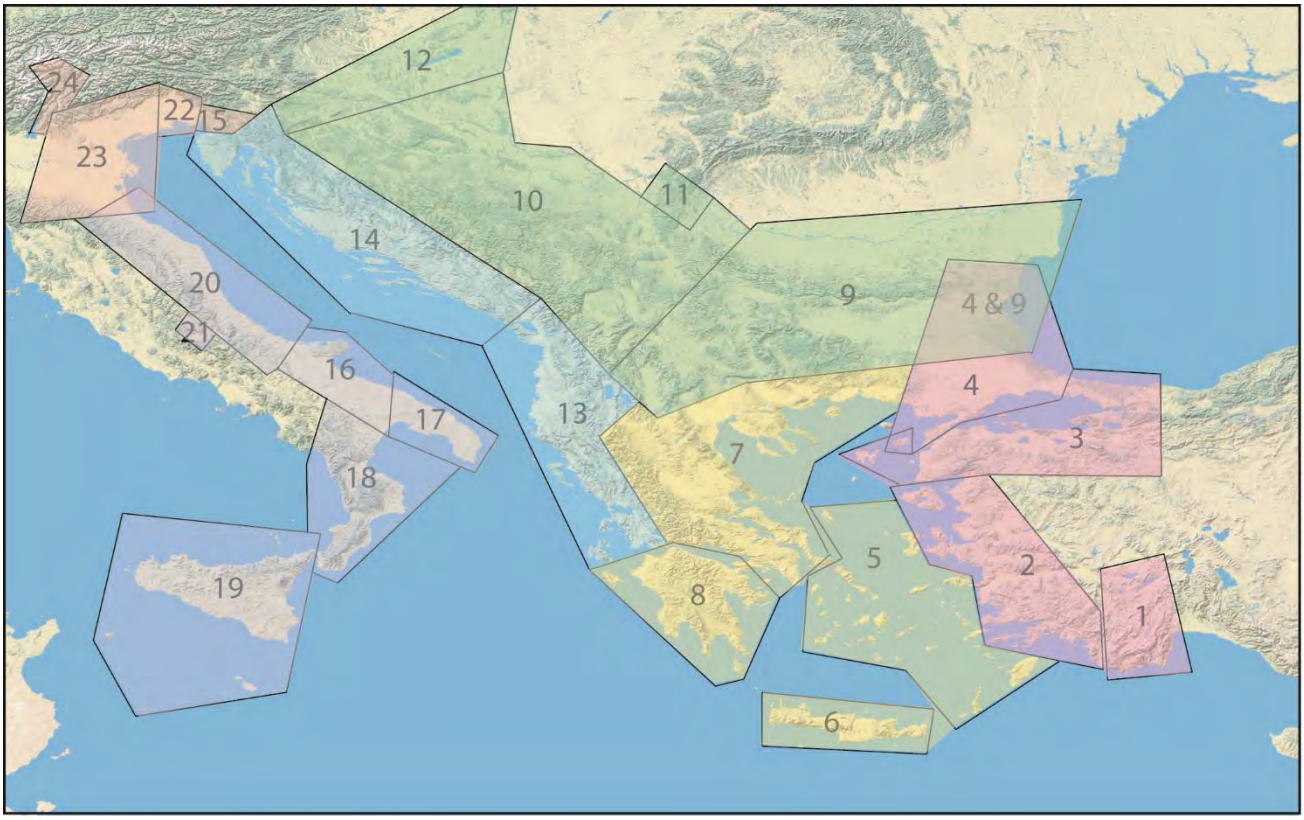


Map MR 1

The Regions are:
1. Bay of Antalya and Lake District; 2. Eastern Aegean; 3. Sea of Marmara and Eskişehir; 4. Thrace; 5. Aegean Islands; 6. Crete; 7. Eastern Greece and the Sporades Island; 8. The Peloponnese and Megara; 9. Bulgaria and Rep. of Macedonia; 10. Serbia to Slovenia east of the Dinaric Alps; 11. The Iron Gates; 12. Hungarian Transdanubia and Eastern Slovenia; 13. Western Greece and Albania; 14. Western Montenegro, Croatia and Bosnia & Herzegovina; 15. Trieste and Slovene Karst; 16. Northern Apulia and Eastern Basilicata; 17. The Salento Peninsula; 18. Calabria and Western Basilicata; 19. Sicily; 20. Molise to Romagna; 21. The Fucino Basin; 22. Friuli-Venezia Giulia; 23. Eastern Emilia-Romagna and the Veneto; 24. Trentino-Alto Adige.

Map MR2

Macro Regions for Thesis



Macro Region 1 - Western Anatolia, Marmara and Thrace

Macro Region 2 - Southern Balkans

Macro Region 3 - Eastern Central Balkans

Macro Region 4 - Eastern Adriatic

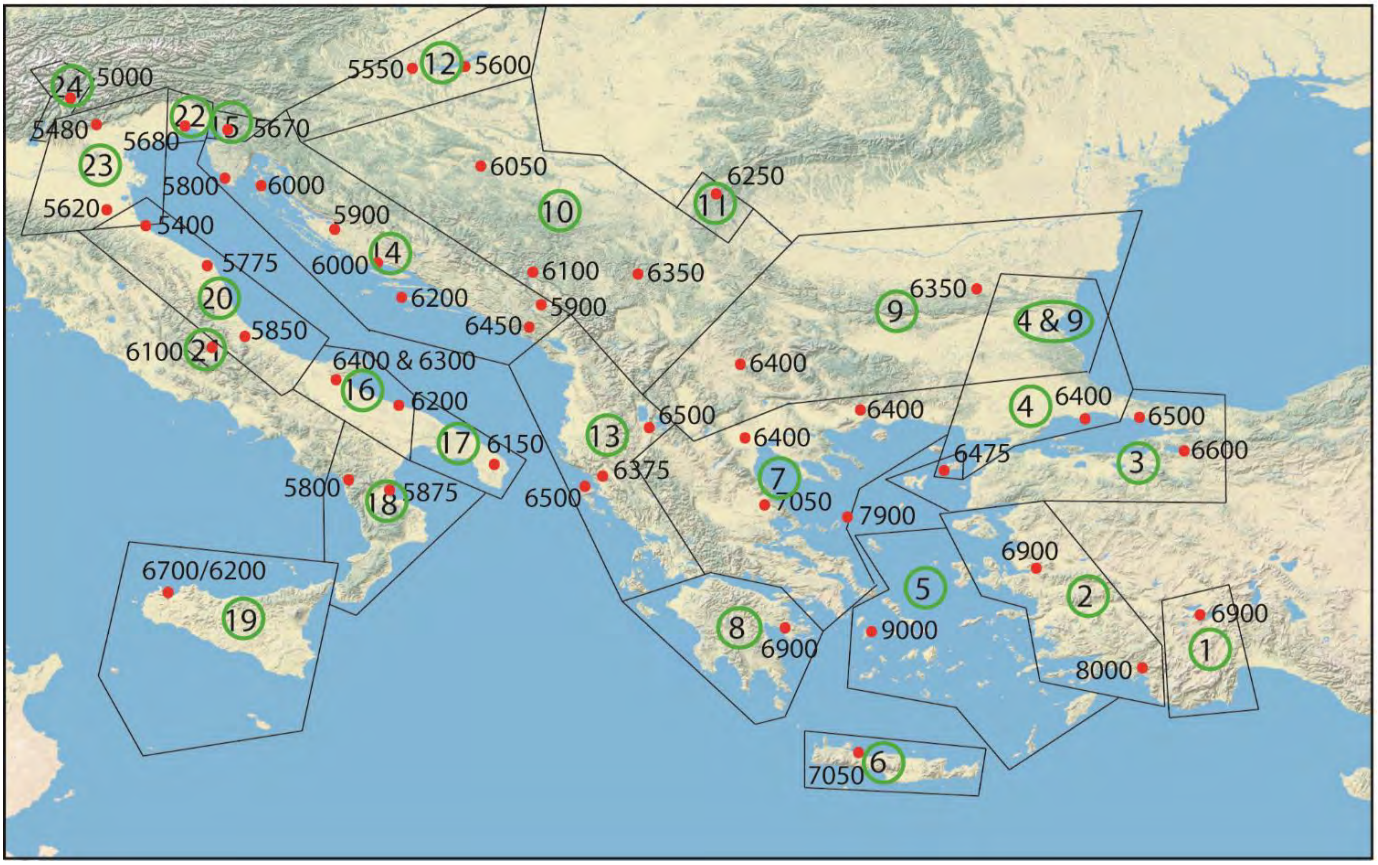
Macro Region 5 - Southern Italy and West Adriatic Seaboard

Macro Region 6 - Northern Adriatic

Map MR2

Map MR3

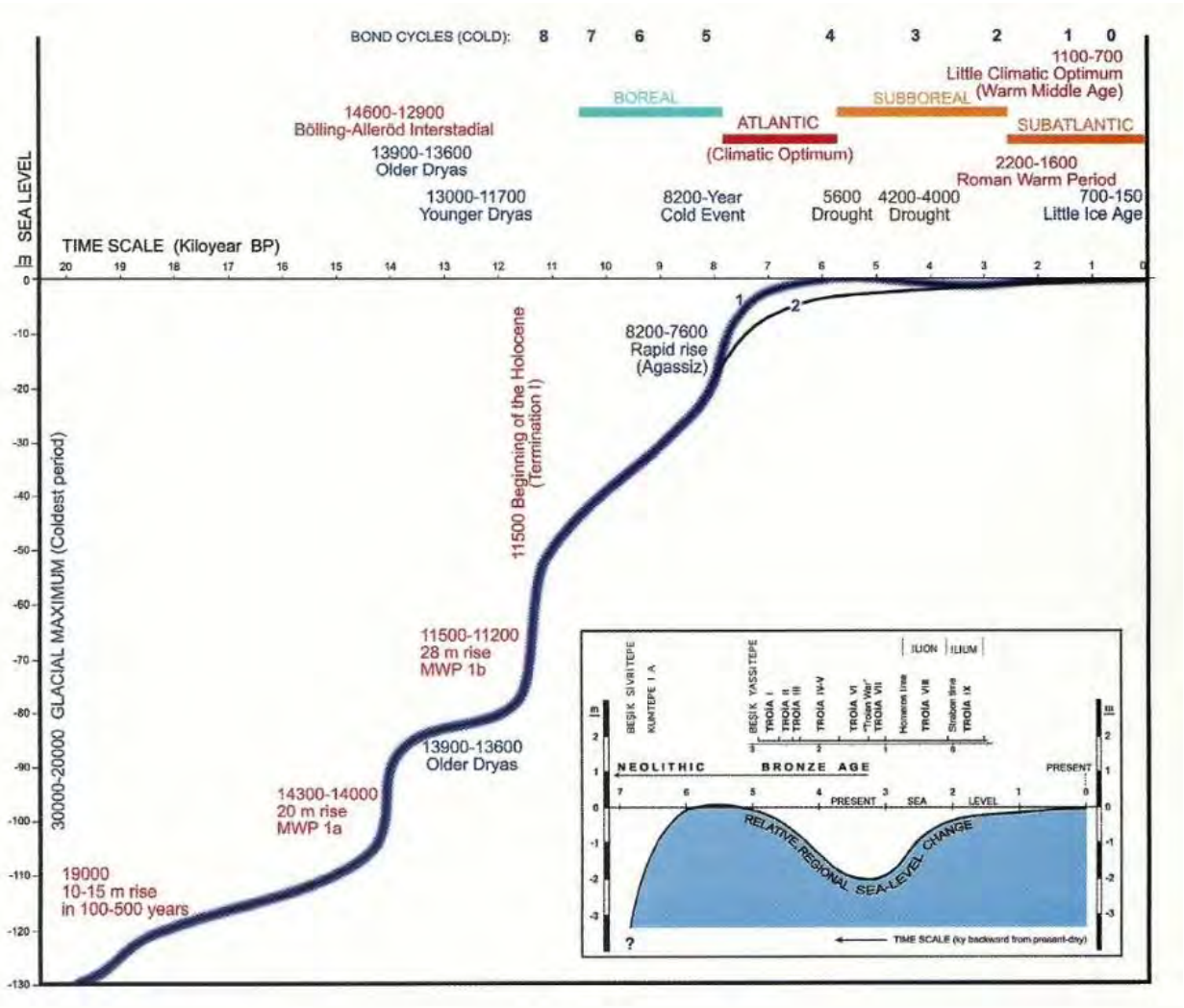
Map of first presence of Neolithic attributes



Map MR3

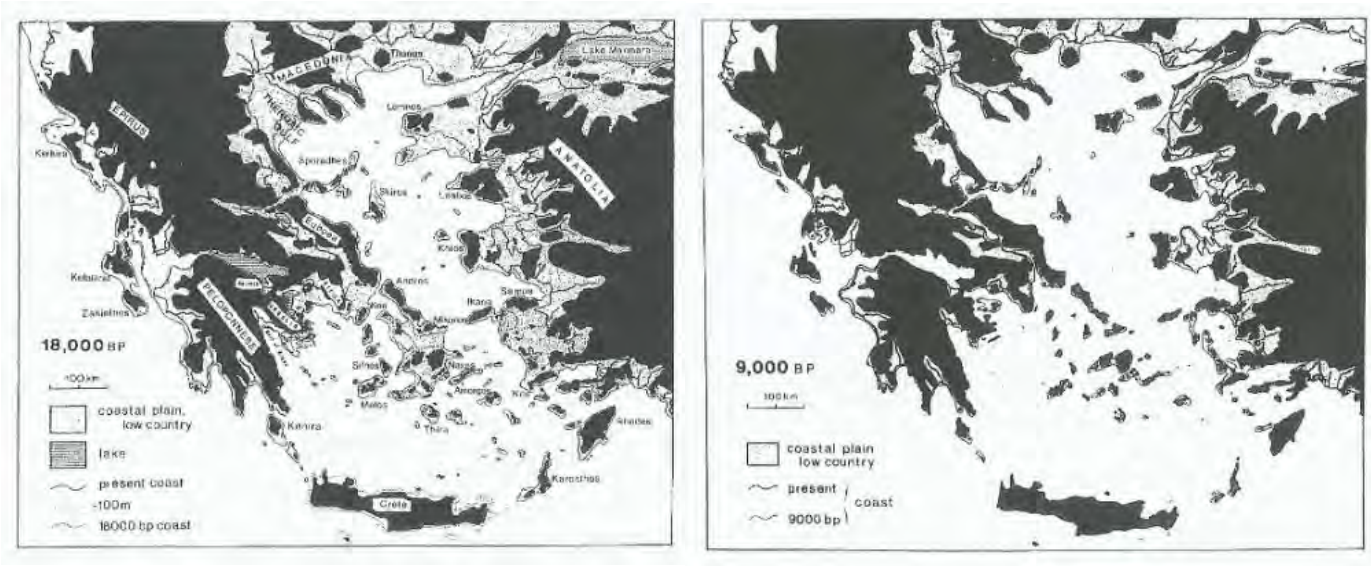
Region 1: 6900 BC, Hacilar. Region 2: 8000 BC, Girmeler Cave; 6900 BC, Ulucak Höyük.
Region 3: 6600 BC, Mentese; 6500 BC, Yenikapi Settlement; 6475 BC, Uğurlu-Zeytinlik Mevkii.
Region 4: 6400 BC, Hoca Çeşme. Region 5: 9000 BC, Maroulas. Region 6: 7050 BC, Knossos
Region 7: 7900 BC, Cave of Cyclops; 7050 BC, Argissa Magoula; 6400 BC, Dikili Tash; 6400 BC, Nea Nikomedeia. Region 8: 6900 BC, Franchthi Cave.
Region 9: 6400 BC, Anzabegovo; 6350 BC, Poljanitsa Plateau.
Region 10: 6350 BC, Blagotin; 6100 BC: Obre I; 6050 BC, Donja Branjevina.
Region 11: 6250 BC, Lepenski Vir and Padina.
Region 12: 5600 BC, Starčevo sites; 5550 BC, Szentgyörgyvölgy Pityerdomb.
Region 13: 6500 BC, Sidari; 6375 BC, Konispol Cave.
Region 14: 6450 BC, Crvena Stijena; 6200 Vela Špilja, Korčula; 6000 BC, Pokrovnik 1; 6000 BC, Vela Špilja, Lošinj; 5900 BC, Odmut Cave; 5900 BC, Crno Vrilo; 5800 BC, Medulin Vižula.
Region 15: 5670 BC, Grotta dell'Edera.
Region 16: 6400 BC, Masseria Santa Tecchia; 6300 BC, Scamuso; 6200 BC, Coppa Nevigata.
Region 17: 6150 BC, Terragne.
Region 18: 5875 BC, Favella di Sibari; 5800 BC, Grotta della Madonna, Latronico 3 & Piana di Curinga.
Region 19: 6700/6200 BC: Grotta dell'Uzzo.
Region 20: 5850 BC, Capo d'Acqua; 5775, Portonovo di Ancona; 5400 BC, Riccione.
Region 21: 6100 BC, Grotta Continenza. Region 22: 5680 BC, Piancada.
Region 23: 5620 BC, Fiorano Modenese; 5480 BC, Lugo di Grezzana.
Region 24: 5000 BC, Romagnano III.

Figures – Introduction



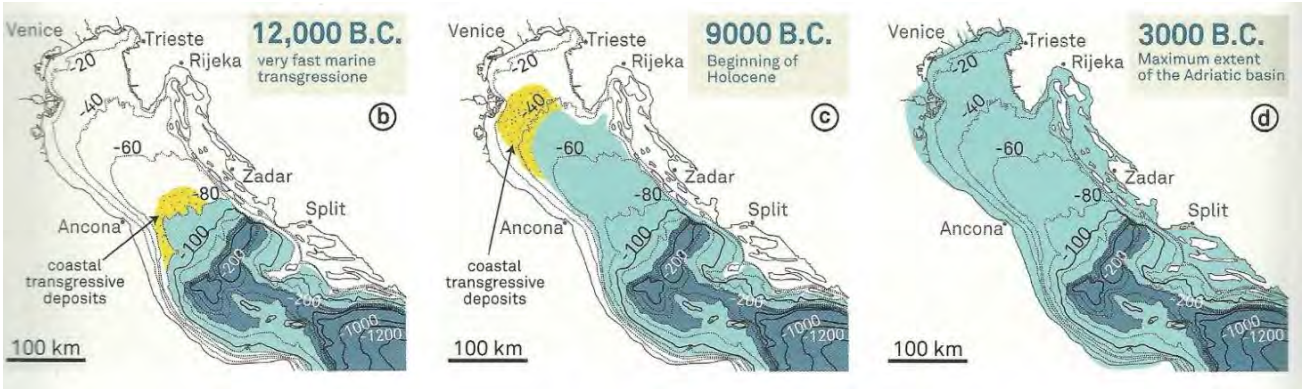
From: Kayan I., 2014

Fig. Intro-1 Eustatic sea level rise from the LGM to the present.



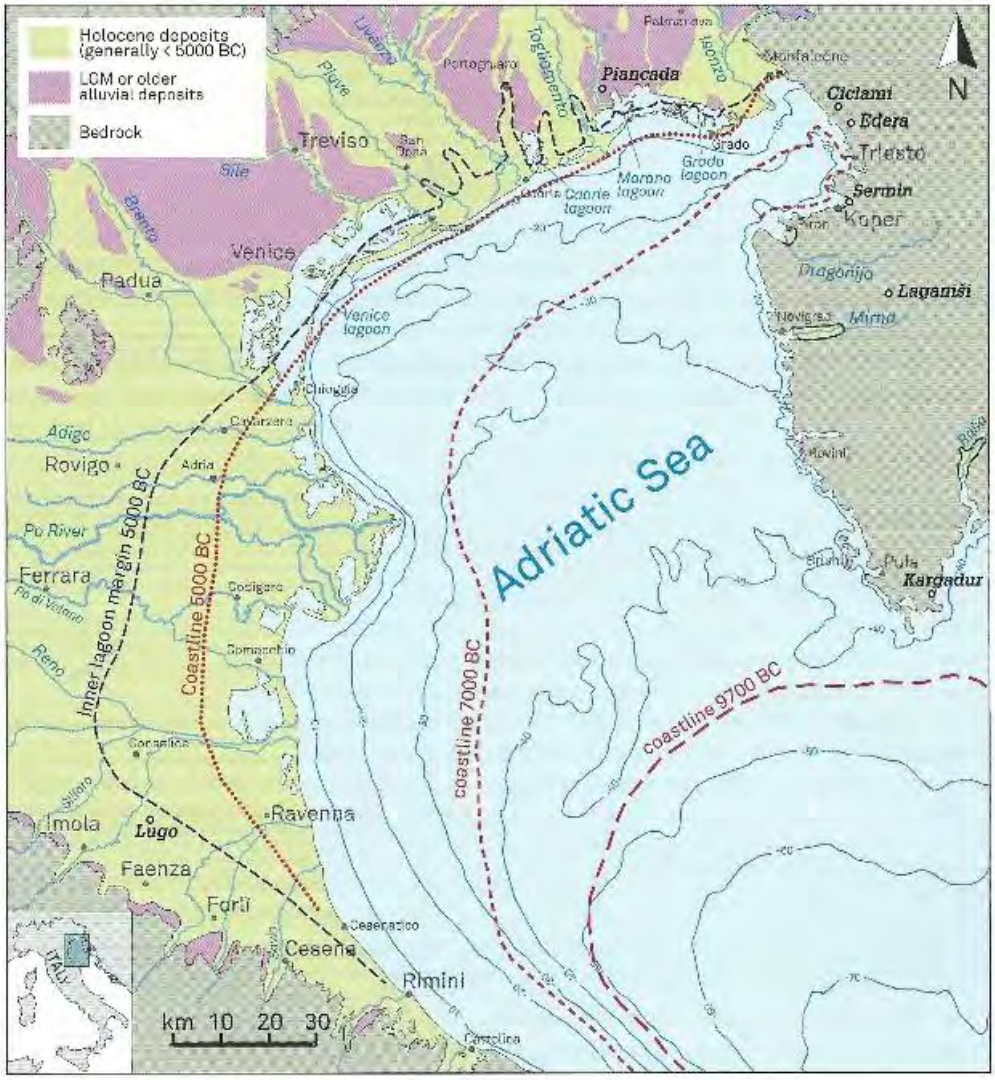
From: Van Andel T. J. & Schakleton J. C., 1982

Fig. Intro-2 Sea Level in the Aegean Basin at the LGM and *ca.* 8250 BC. At 7000-6000 BC, with sea levels *ca*. 30-20 m lower than at present, almost all the islands would have been disconnected as at present.



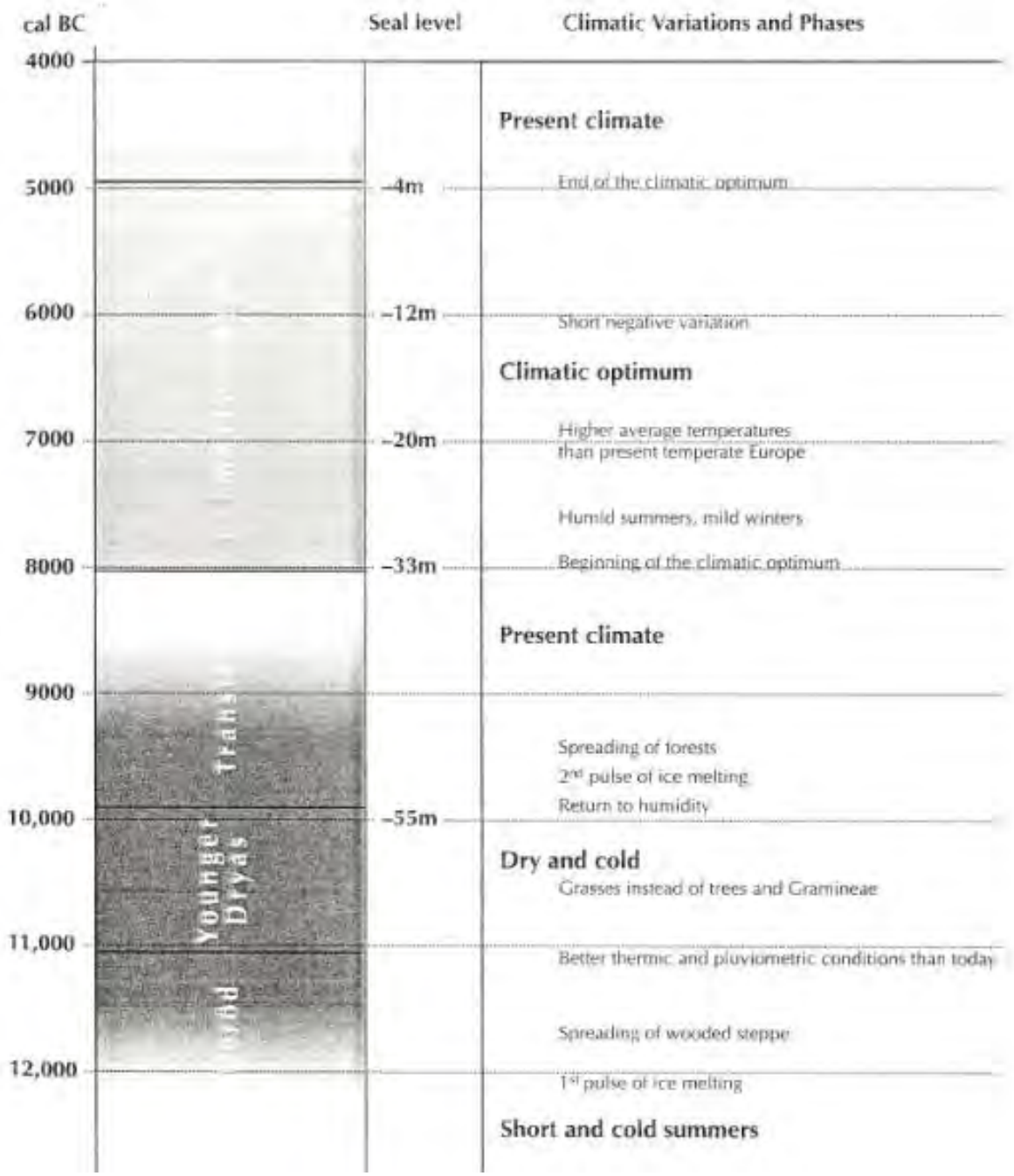
From Fontana A., *et al.*, 2014

Fig. Intro-3 Between 7000-6000 BC, with sea levels about 30-20 m lower than at present, many of the Adriatic islands would have been disconnected as at present, and the Great North Adriatic plain reduced to an area around Trieste, Friuli Venezia-Giulia and Venice, the Italian coast north of Ancona as far as the River Po and around the Cargano Peninsula.



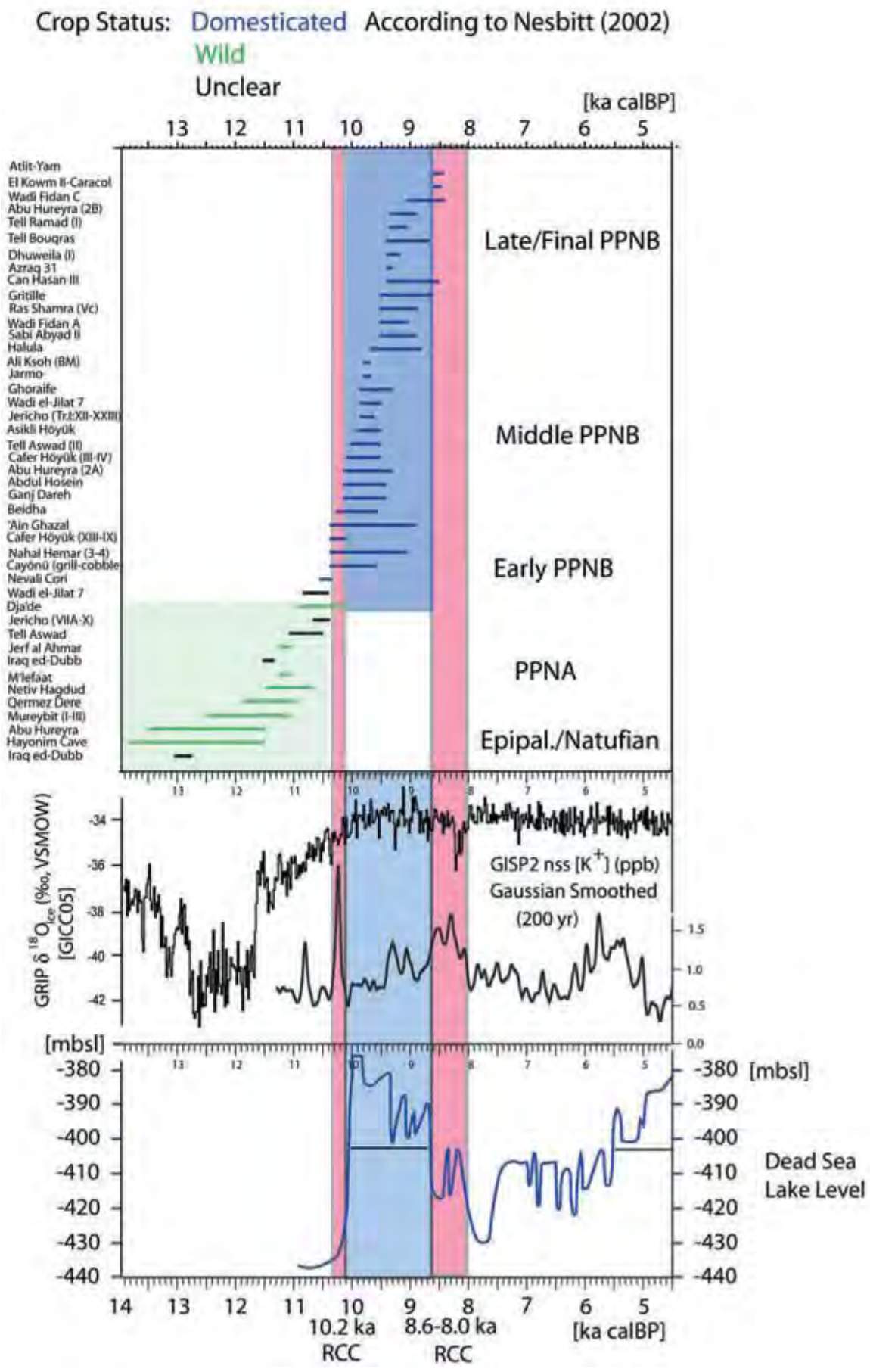
From Fontana A., *et al.*, 2014

Fig. Intro-4 Changes in North Adriatic coastline showing how the coastline has moved out to sea since 5000 BC



From: CANeW project, 1998

Fig. Intro-5 Climatic phases betwee 15000 BC to beyond 5000 BC. The Holocene commences *ca.* 9700 BC at the end of the Younger Dryas and the Atlantic climatic optimum begins *ca.* 6000 BC.



From: Weninger B., *et al.*, 2009

Fig. Intro-6 The Rapid Climate Change (RCC) episodes in the Near East are highlighted in pink. The first *ca.* 8300 BC is one of increased pluviosity, with the rapid rise in the level of Dead Sea by 60 m, which dropped rapidly again *ca.*6600 BC, with the onset of a dry period during the 6600-6000 BC RCC, which was compounded by the '6200 BC event'.



Photo H. Tzalas

Fig. Intro-7 Reproduction of a Greek papyrella which was rowed between Cape Sumion and the Island of Melos in 1988.



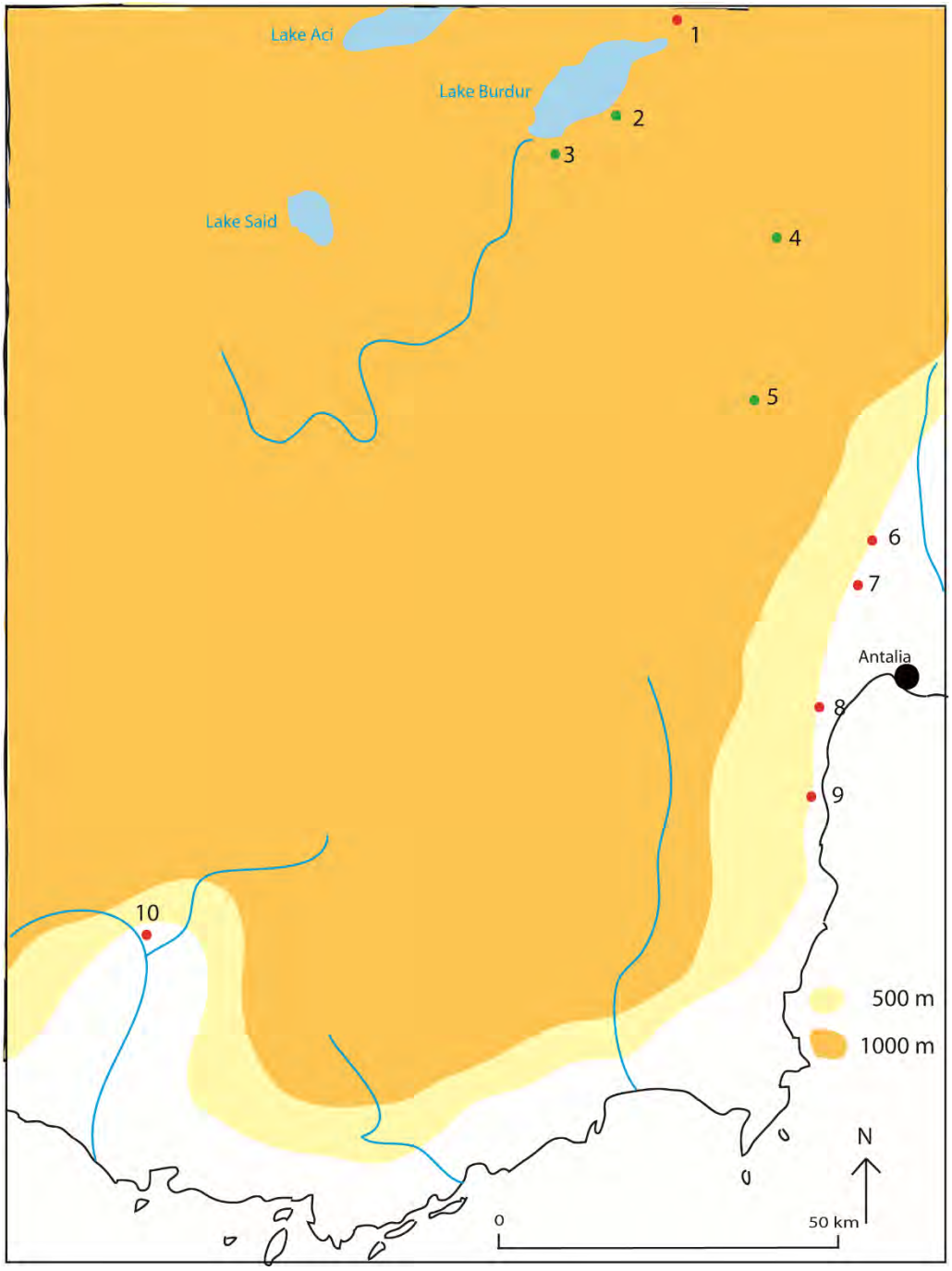
Distribuzione dei siti con ceramica impressa (carta base da LIVERANI 1986).

From: Balossi F. & Frangipani M., 2002

Fig. Intro-8 Levantine sites in which Impressed Ware has been found.

Map R01

Region 1 – Western Anatolia, Marmara and Southern Thrace – Bay of Antalya and Lake District



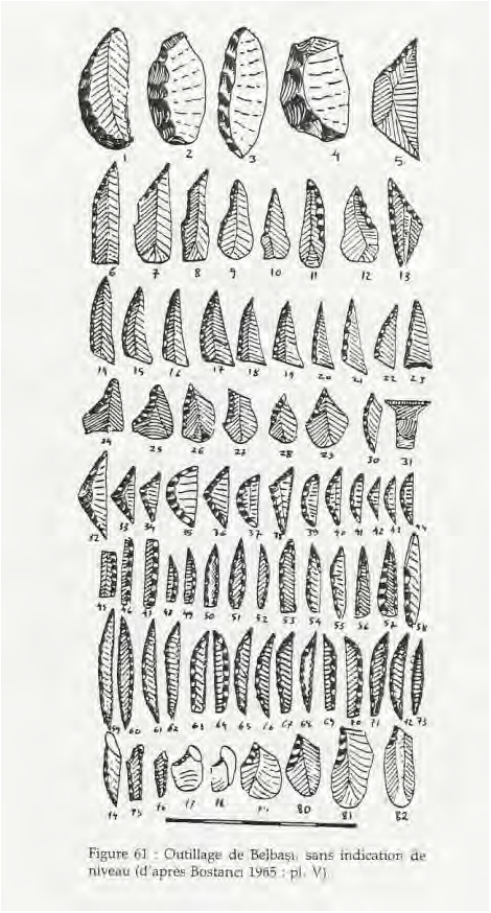
Map R01

Notes:
● = Mesolithic / Transition sites
● = Neolithic / Transition sites

Site names:

1. Baradiz; 2. Kuruçay; 3. Hacilar; 4. Höyücek; 5. Bademağaci; 6. Öküzini Cave; 7. Karain B Cave and Çarkini Cave; 8. Belbaşi Cave; 9. Beldibi Cave; 10. Girmeler Cave (treated with Region 2 - Eastern Aegean).

Figures – Region 1 – Bay of Antalya and Lake District



From: Perlès C., 1987b

Fig. R01-1 Belbaşi lithics without the Stratigraphic level being indicated.



From: Perlès C., 1987b

Fig R01-2 Beldibi lithics from the Mesolithic Level C1.



Photos M. Templer

Fig. R01-3 View towards Antalia from Karain Cave; Entrance to cave; View of excavations in progress in 2014.



Photo N. Efstratiou

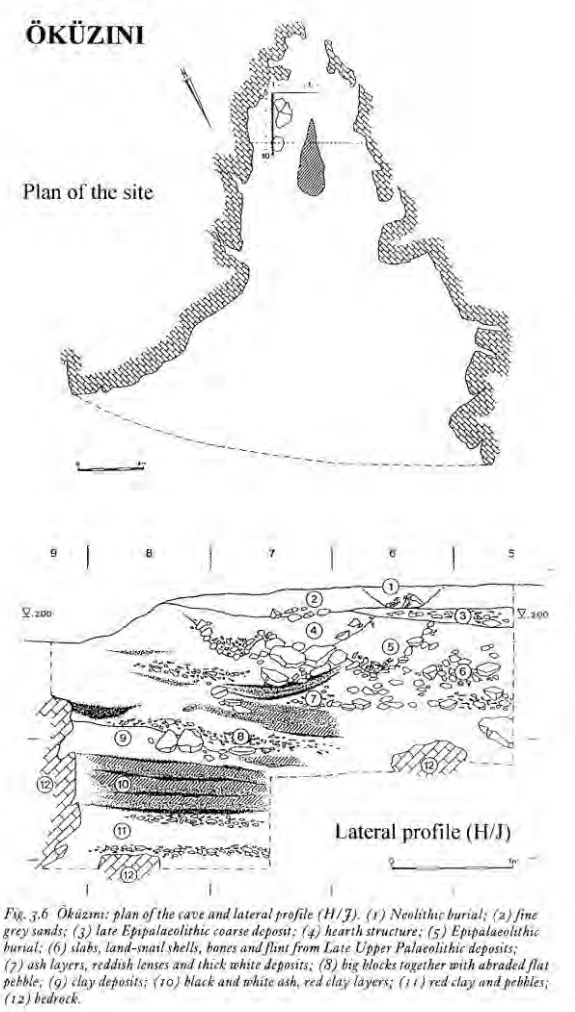
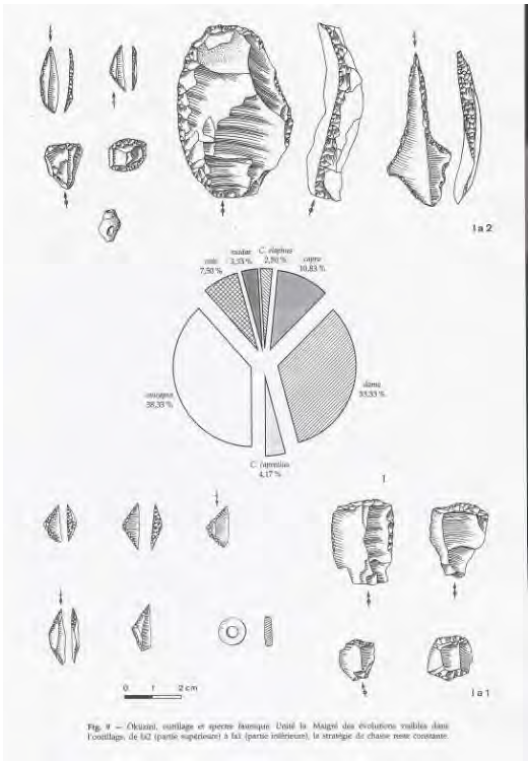


Fig. 3.6 Öküzini: plan of the cave and lateral profile (H/J). (1) Neolithic burial; (2) fine grey sands; (3) late Epipalaeolithic coarse deposit; (4) hearth structure; (5) Epipalaeolithic burial; (6) slabs, land-snail shells, bones and flint from Late Upper Palaeolithic deposits; (7) ash layers, reddish lenses and thick white deposits; (8) big blocks together with abraded flat pebble; (9) clay deposits; (10) black and white ash, red clay layers; (11) red clay and pebbles; (12) bedrock.

From: Otte M., *et* al., 1999

Fig. R01-4 Öküzini Cave; Cave plan and stratigraphy showing position of Neolithic/Transition and Mesolithic inhumations.



From: Léotard J.-M., *et al.,* 1996

Fig. R01-4a Öküzini Cave Lithics of Mesolithic tradition from topmost level with *ca.* 50% of hunted fauna.

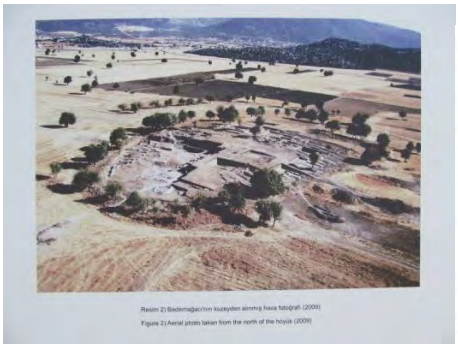


Photo R. Duru



Photo R. Duru, 2012



Photo M. Templer

Fig. R01-5 Bademağaci Höyük towards the end of excavations in 1999, with the Early Neolithic settlement at lower left; Deep trench I Level EN9 with Early Neolithic terrazzo floor in Level EN8; 2014 clandestine excavations at top of mound in palaeochurch.



Fig. 1 - Hacılar in its environmental setting. The settlement site is approx. 100 m behind the large pile of earth (The photograph was taken during the 1986 excavations).

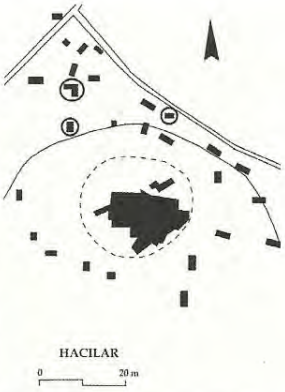


Fig. 2 - Plan of Hacılar Höyük showing the location of the trenches.



From: Duru R., 2012

Fig. R01-6 Hacilar location during Mellaart excavations; Site plan of trenches; Early Neolithic terrazzo floor.

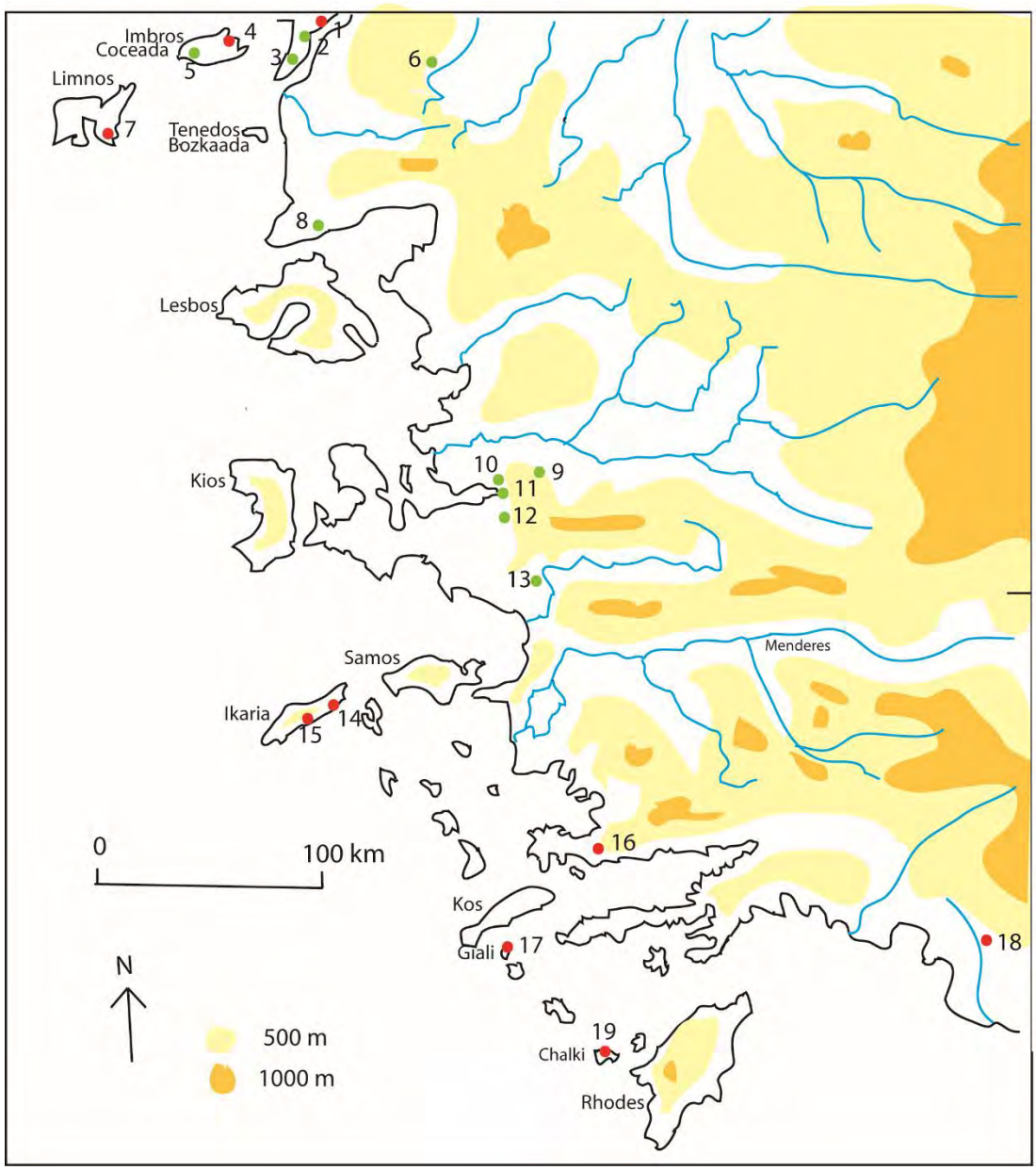




Photos M. Templer

Fig. R01-7 Spur on which the site of Kuruçay is located

Region 2 – Western Anatolia, Marmara and Southern Thrace – Eastern Aegean



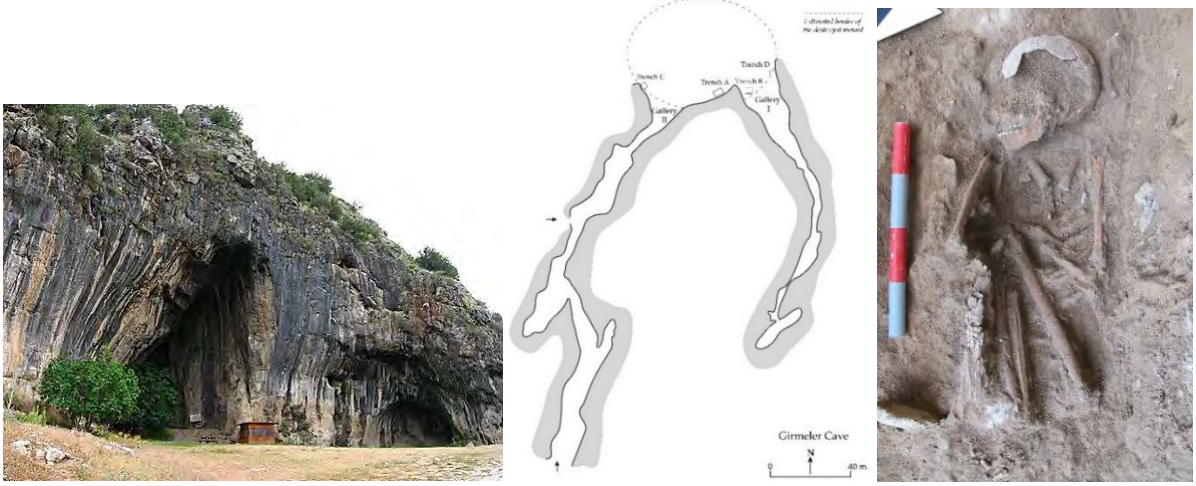
Map R02

Notes:
● = Mesolithic / Transition sites
● = Neolithic / Transition sites
The map includes sites treated in other regions, but shown here for information:

1. Sites 1-5 are treated in Region 4 (Thrace) using different reference numbers.
2. Sites 4-8 are treated in Region 3 (Sea of Marmara) using different reference numbers.
3. Sites 14, 15, 17 and 19 are treated in Region 5 (Aegean Islands) using different reference numbers.

Site names:
9. Ulucak Höyük; 10. Ege Gübre; 11. Yeşilova Höyük; 12. Dedecik-Heybelitepe; 13. Çukuriçi Höyük and Çine-Tepecik; 16. Bodrum; 18. Girmeler Cave.

Figures – Region 2 – Eastern Aegean



Photos and site plan: B. Erdoğu

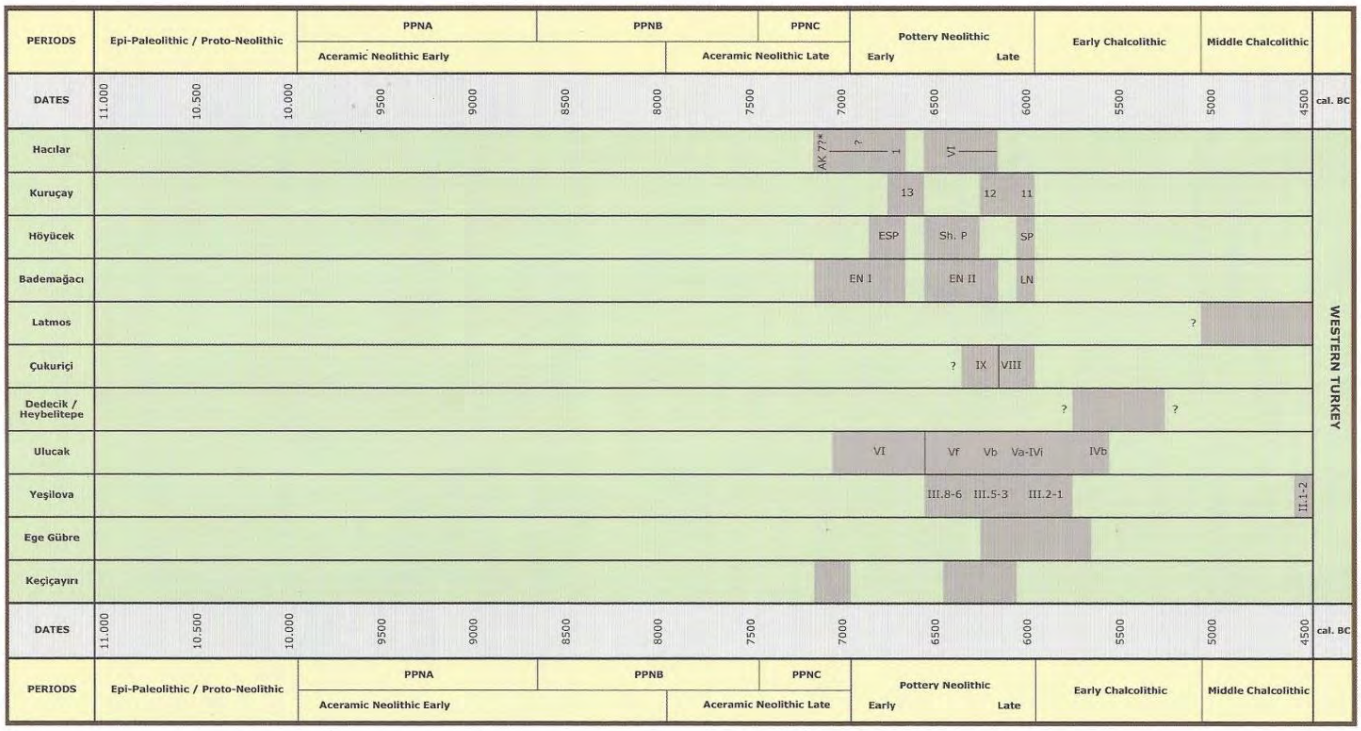
Fig. R02-1 Girmeler Cave entrance with esplanade; Site plan with location of trenches excavated and approximate extent of bulldozed tell; Mesolithic burial in crouched position.



Major Neolithic sites in Western Turkey.

From: Özdoğan M., *et al.*, 2012

Fig. R02-2 Location of sites in South-Eastern Anatolia.



The chronological table has been put together according to the assesments of the authors of the individual papers.

From: Özdoğan M., *et al.*, 2012

Fig R02-2a Suggested dates of occupation based on available ^{14}C dates.

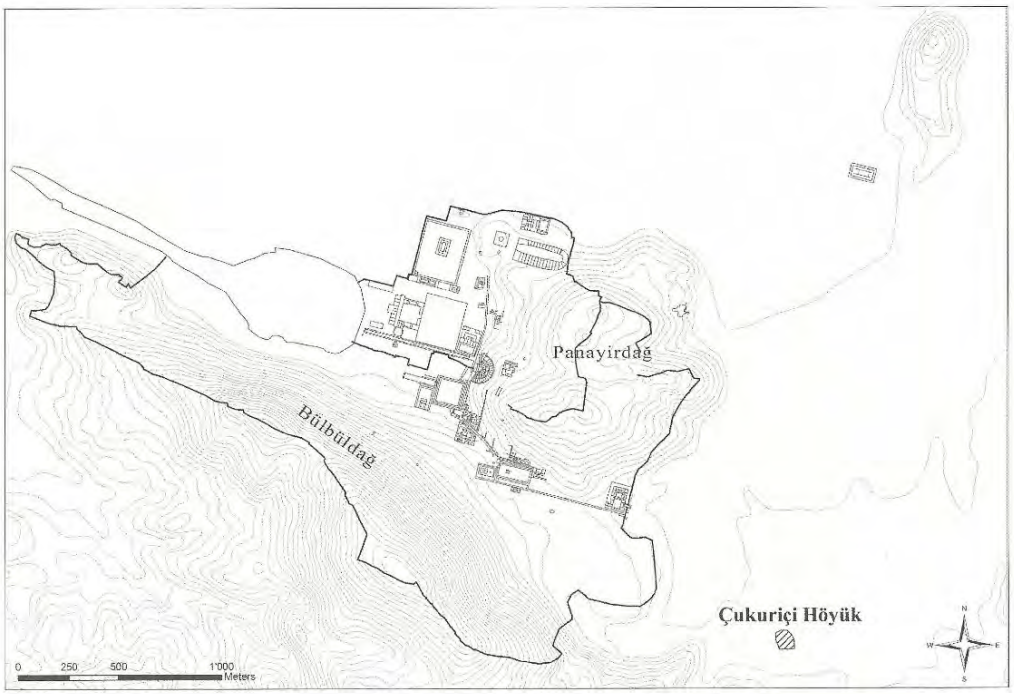


Fig. 1 - The area of the antique city of Ephesos with the location of the Çukuriçi Höyük (map by Ch. Kurtze).

From: Horejs B., 2012

Fig. R02-3 Çukuriçi Höyük site location near Ephesus.



Fig. 1a - Neolithic settlement of Ege Gübre, aerial photo.

Photo H. Sağlamtimur, 2012

Fig. R02-4 Ege Gübre seen from the air.



Photos M. Templer

Fig. R02-5 Ulucak Höyük in 2014; Excavations in 2014 with Level VIa painted terrazzo floor at lower right; Detail of three times replastered terrazzo floor from Level VIa.

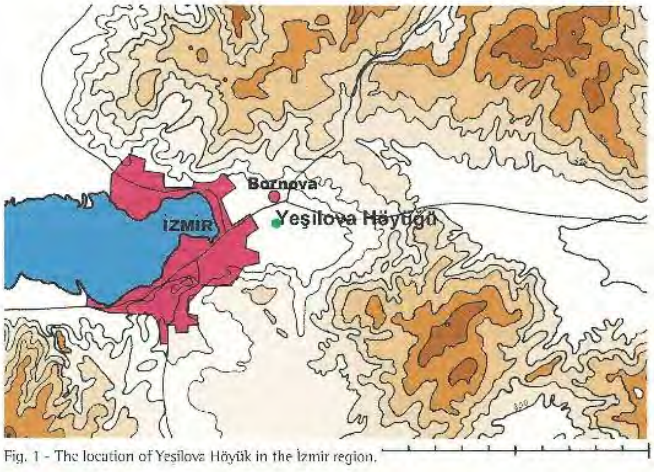


Fig. 1 - The location of Yeşilova Höyük in the İzmir region.



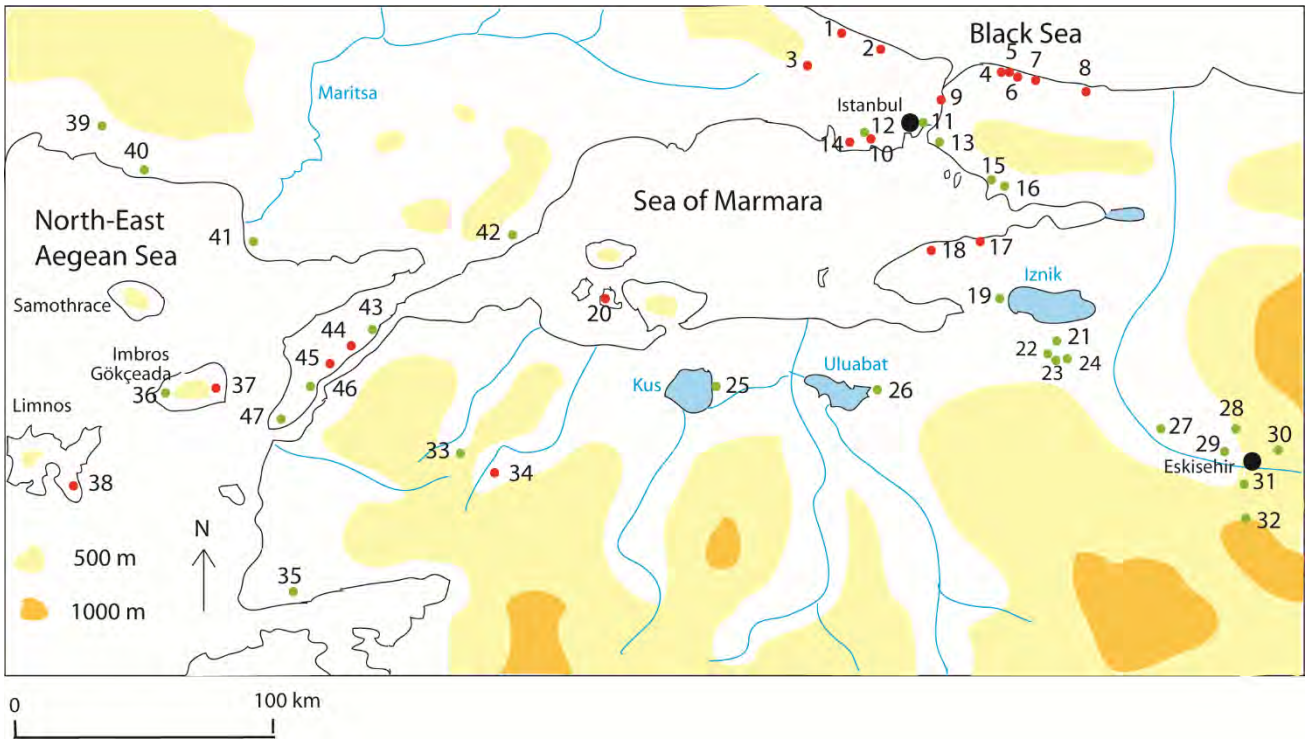
Fig. 2 Aerial view of the location of Yeşilova Höyük.

Map and photo: Derin Z., 2012

Fig. R02-6 Yeşilova Höyük location.

Map R03

Region 3 – Western Anatolia, Marmara and Southern Thrace – Sea of Marmara and Eskişehir



Map R03

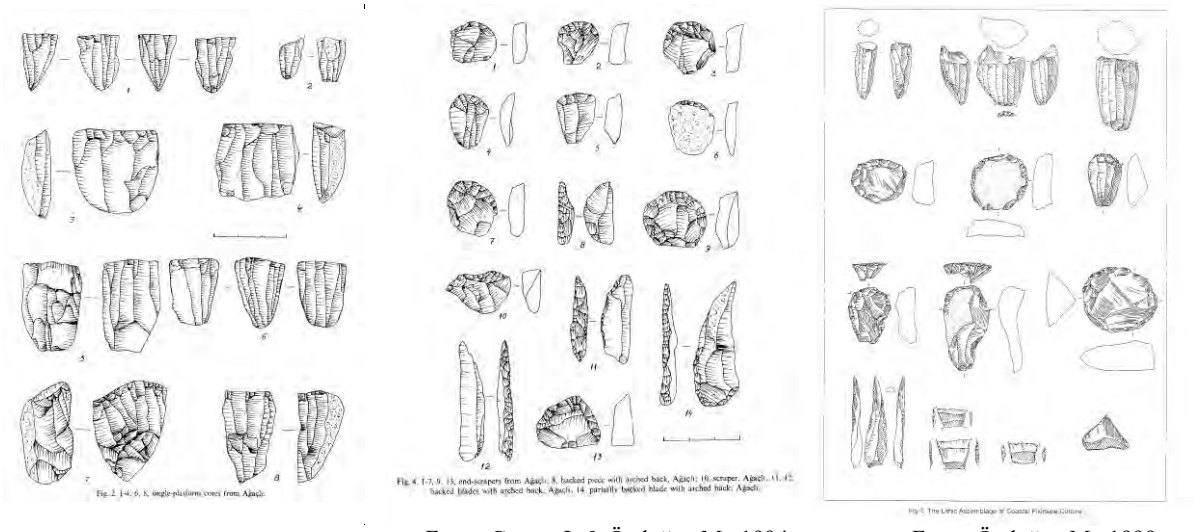
Notes:
● = Mesolithic / Transition sites
● = Neolithic / Transition sites

The map includes sites 39-47 treated in Region 4 (Thrace) using different reference numbers, but shown here for information.

Site names:

1. Ağaçli; 2. Gümuşdere; 3. Paşaalani; 4. Domali; 5. Doğançali; 6. Mürsellibaba; 7. Alaçali; 8. Kefken; 9. Göksu; 10. Yarimburgaz; 11. Yenikapi settlement; 12. Istanbul Tarihönceci Arastirmari (ITA) project; 13. Fikirtepe; 14. Haramidere; 15. Pendik; 16. Tuzla; 17. Göstepe; 18. Ibo nun Rampasi; 19. Ilipinar; 20. Manastir; 21. Menteşe; 22. Marmaracik; 23. Barçin Höyük; 24. Yenisesehir II; 25. Musluçeşme; 26. Aktopraklik; 27. Demircihöyük; 28. Kabakli; 29. Orman Fidanğili; 30. Asarkaya; 31. Kalkanli; 32. Keçiçayiri; 33. Çalca; 34. Yenice & Pazarköy; 35. Coşkuntepe; 36. Gelibolu; 37. Eksino; 38. Ouriakos.

Figures – Region 3 – Sea of Marmara and Eskişehir



From: Gatsov I. & Özdoğan M., 1994 From: Özdoğan M., 1999

Fig. R03-1 Plates 1and 2, Ağaçli Culture sub-conical bladelet cores and lithics showing cultural similarities with the Mesolithic tradition emanating from the North Pontic region; Plate 3, Fikirtepe Culture lithics showing cultural continuity with the Ağaçli Group Mesolithic tradition.



Photos N. Efstratiou

Fig. R03-2 Ouriakos site location on Island of Limnos; Ouriakos lithics.

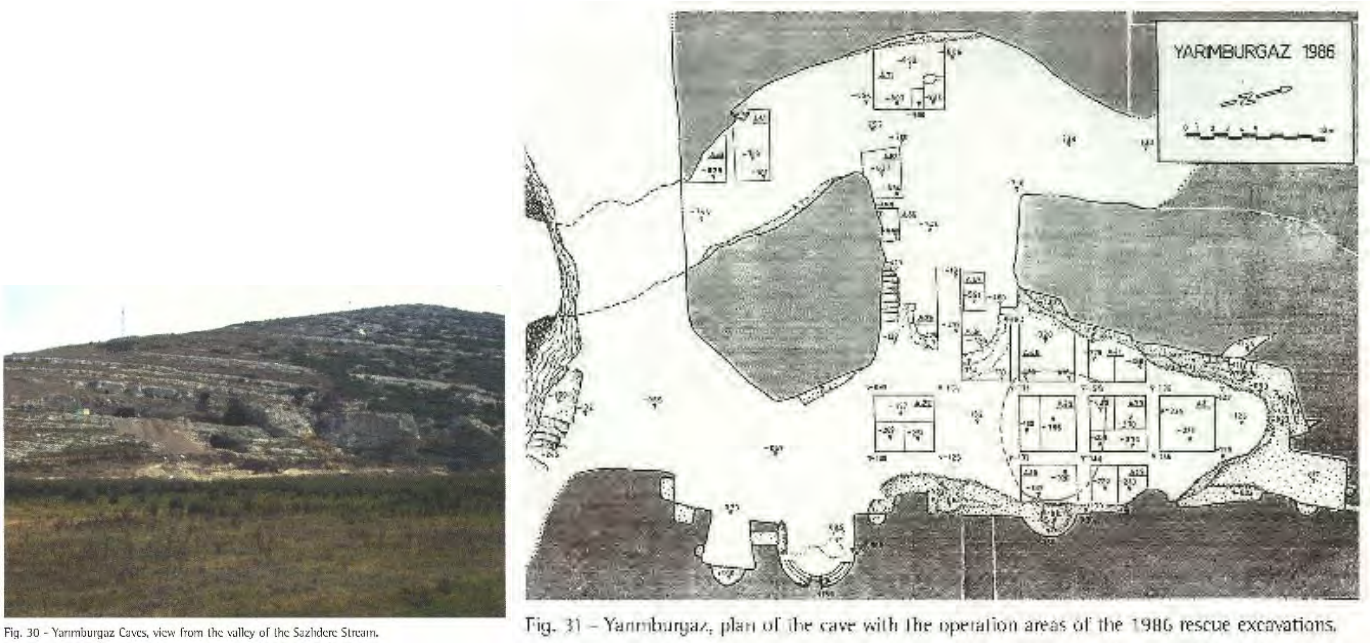


Fig. 30 - Yarımburgaz Caves, view from the valley of the Sazlıdere Stream.

Fig. 31 – Yarımburgaz, plan of the cave with the operation areas of the 1986 rescue excavations.

From: Özdoğan M., 2013

Fig. R03-3 Yarimburgaz Cave and excavated areas.

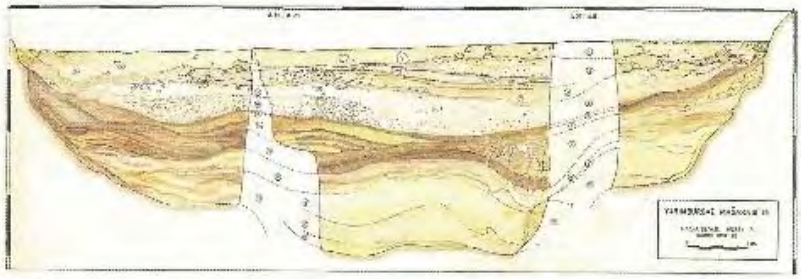


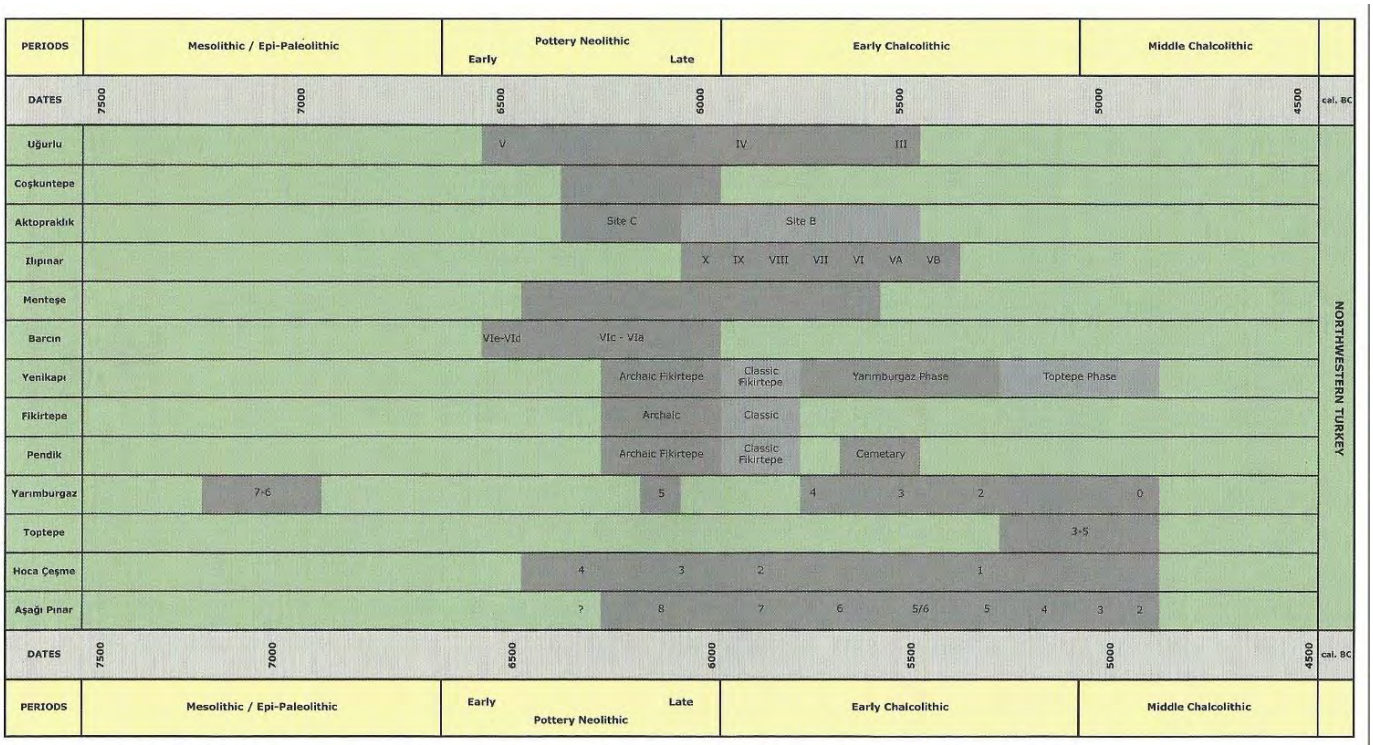
Fig. 33 - Yarımburgaz, section through trenches A18-A29-A40, drawing of the profile along the sinkhole.



Fig. 34 - Yarımburgaz, section through trenches A18-A29-A40, with the layers marked on the profile along the sinkhole.

From: Özdoğan M., 2013

Fig. R03-3a Yarimburgaz Cave stratigraphy.



The chronological table has been put together according to the assesments of the authors of the individual papers.

From: Özdoğan M., 2013

Fig. R03-4 Marmara Region chronological table of principal Neolithic sites.

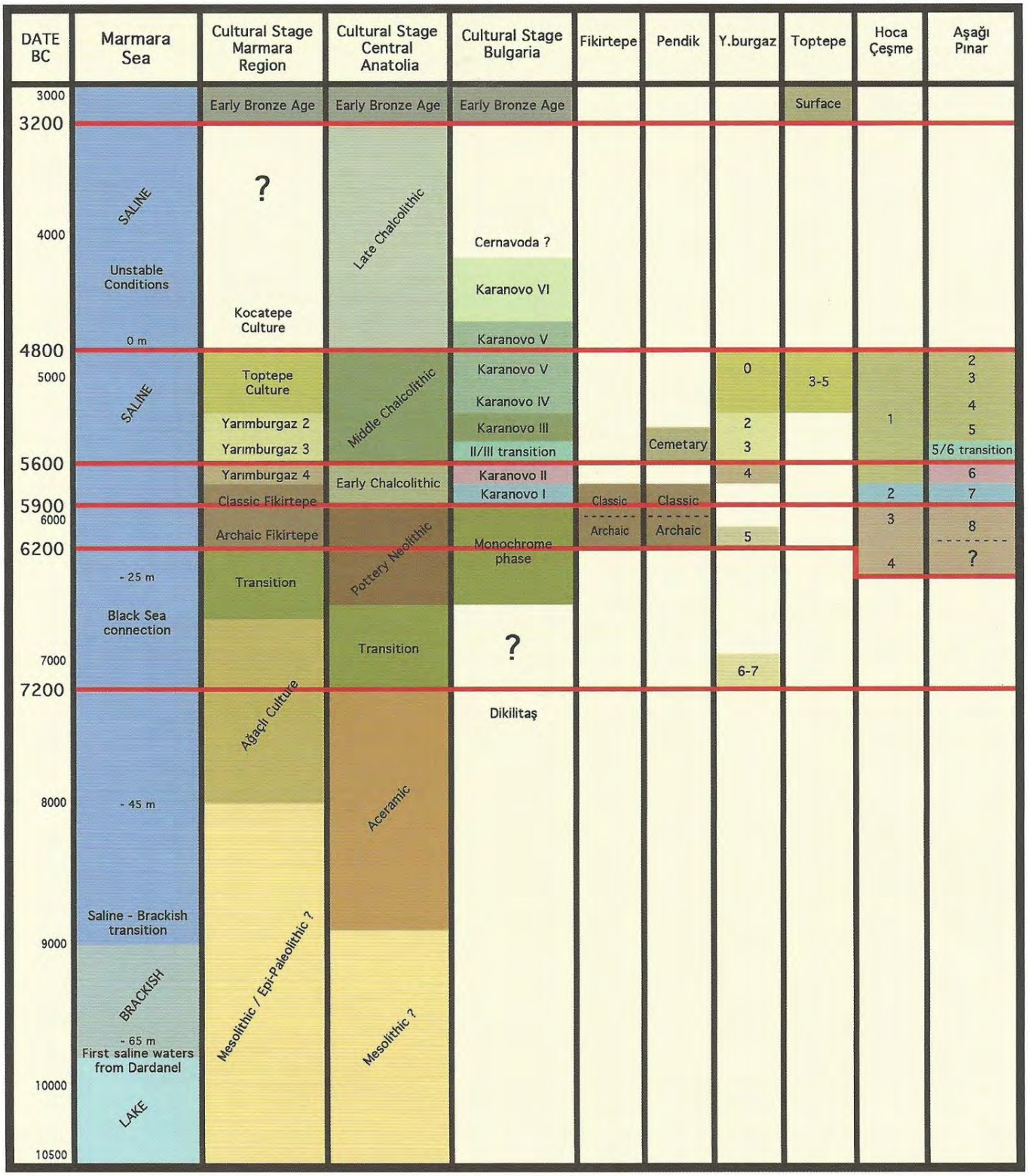


Fig. 171 - A tentative synchronization chart of the Marmara Region.

From: Özdoğan M., 2013

Fig. R03-4a Tentative synchronisation chart of Marmara Region.



Fig. 1 - Site C, with exposures among the plantations.



Fig. 2 - Site C. Neolithic pottery, some with crescentic lugs.

From: Karul N. & Avci M. B., 2013

Fig. R03-5 Aktopraklik mound C excavations and pottery



Fig. 1 - The Yenişehir and İznik valleys in the Southeastern Marmara region, showing the locations of Barcın Höyük, Menteşe, and Ilıpınar.

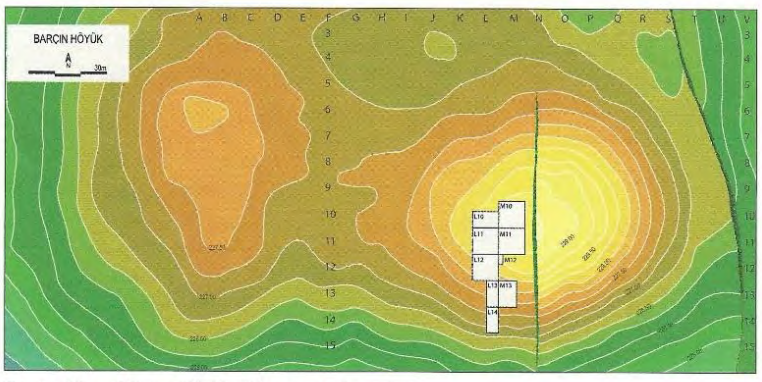
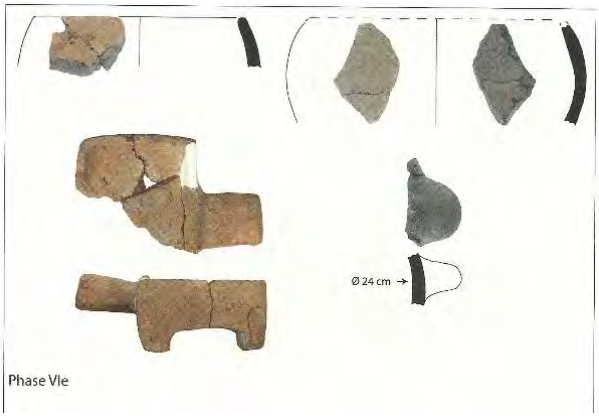


Fig. 2 - Plan of Barcın Höyük with excavated trenches.



From: Gerritsen F., *et al.*, 2013

Fig. R03-6 Barcin Höyük location; Excavated area; Pottery including a four-legged square box-vessel with low sides and a handle from Level VIe.



From: Takaoğlu T. & Özdemir A., 2013

Fig. R03-7 Site of Coşkuntepe on spur overlooking the Island of Lesbos



Fig. 3 - Fikirtepe from southwest during the Bittel-Çambel excavations with trenches H IV and V.

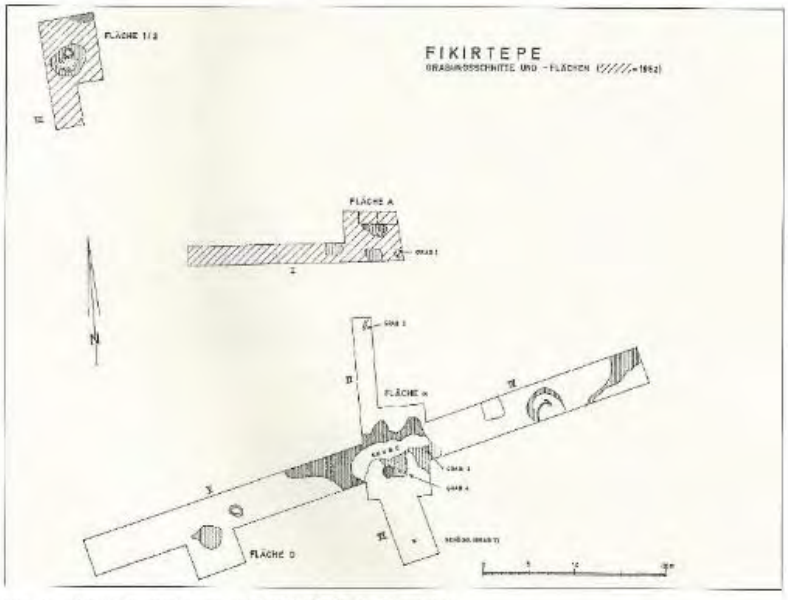


Fig. 4 - Fikirtepe, the layout of the Bittel-Çambel trenches.

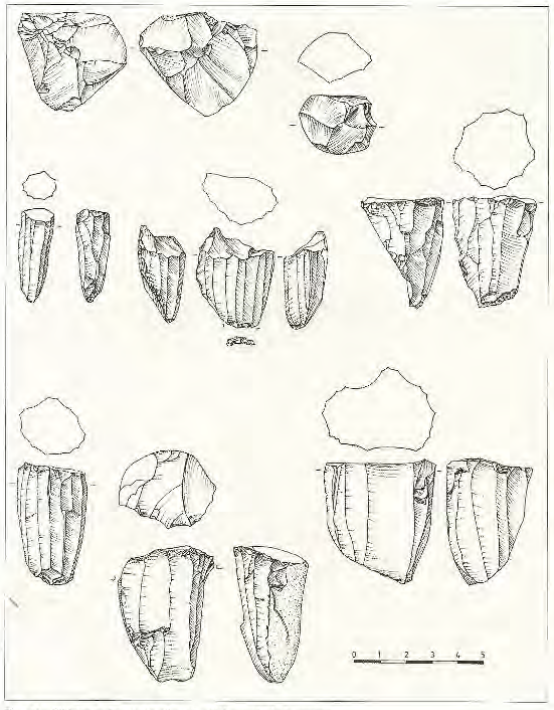


Fig. 15 -Fikirtepe, drawings of major flake and blade cores.

From: Özdoğan M., 2013

Fig. R03-8 Fikirtepe excavations in the 1950s; Cores similar to those of the Mesolithic Ağaçli Group.

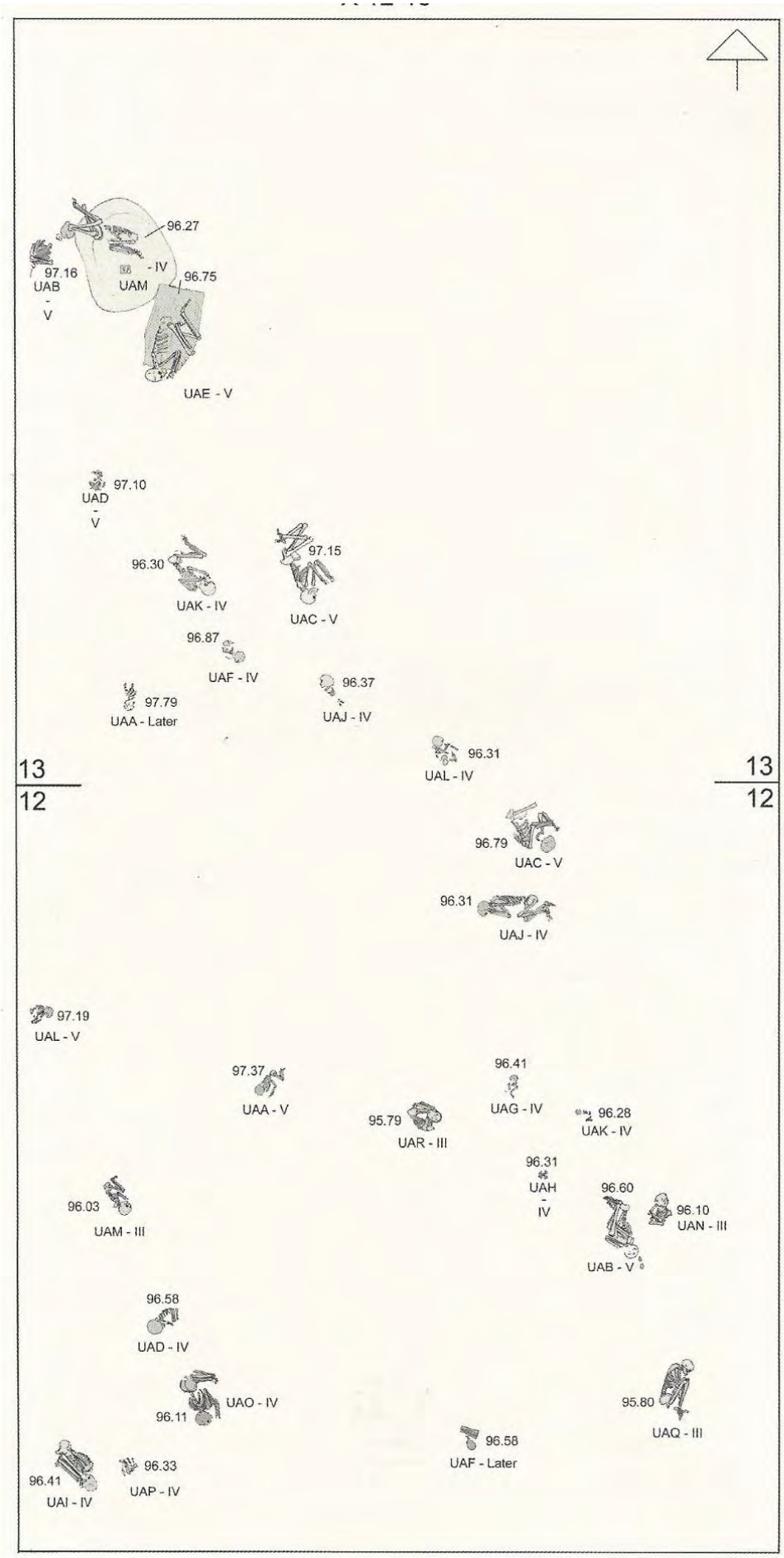


Fig. 11 - Burials in the right half of the "Big Square" belonging to Ilıpınar X and IX. The number of infants and children is very high.

From: Roodenberg T. & Alspaslan-Roodenberg S., 2008

Fig. R03-9 Ilipinar Early Neolithic burials from Levels IX and X.

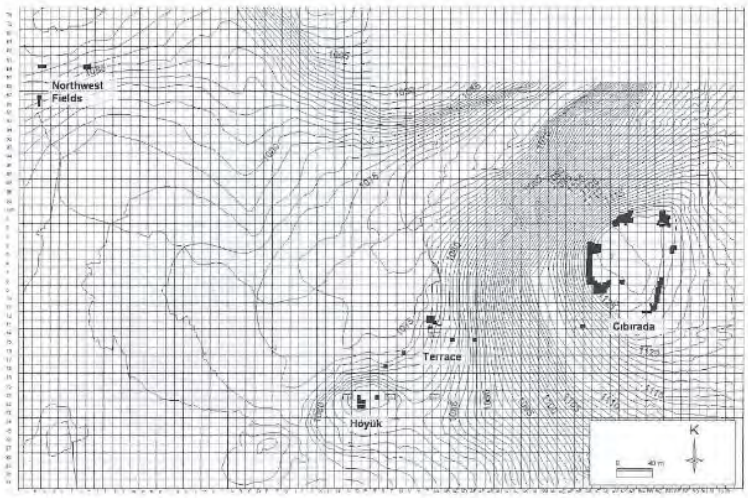


Fig. 1 - Topographic plan and the areas investigated.



Fig. 2 - Cıbırada from the west.

From: Efe T. *et al*., 2012



Fig. 9 The flint scrapers and points from Keçiçayırı.

From: Efe T., 2005

Fig. R03-10 Keçiçayiri sites and lithics.

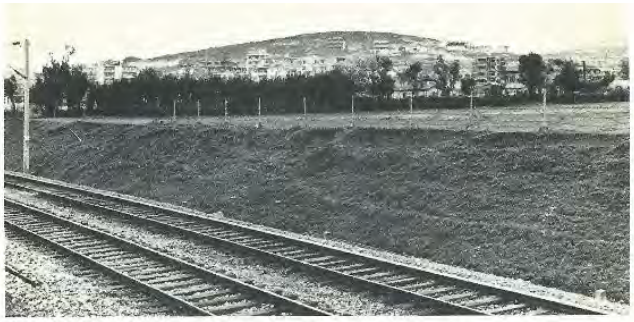


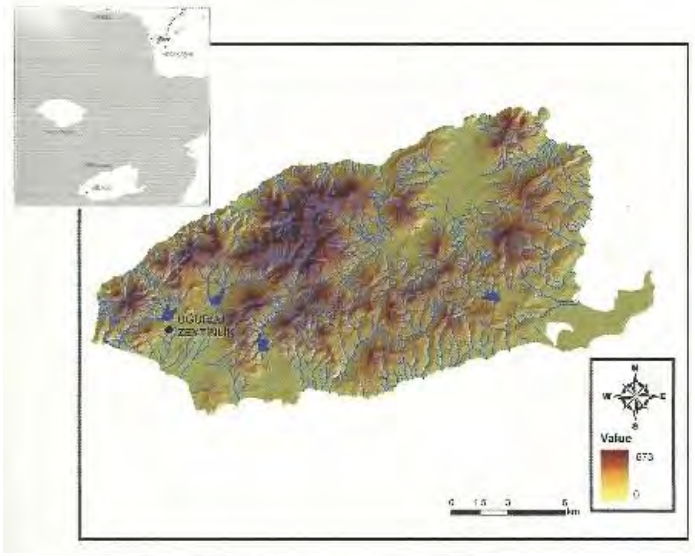
Fig. 19 – Pendik, the site in 1981, looking north from the railway trench.



Fig. 20 - Pendik, the site in 1981, looking south towards the coast.

From: Özdoğan M., 2013

Fig. R03-11 Site of Pendik in 1981.



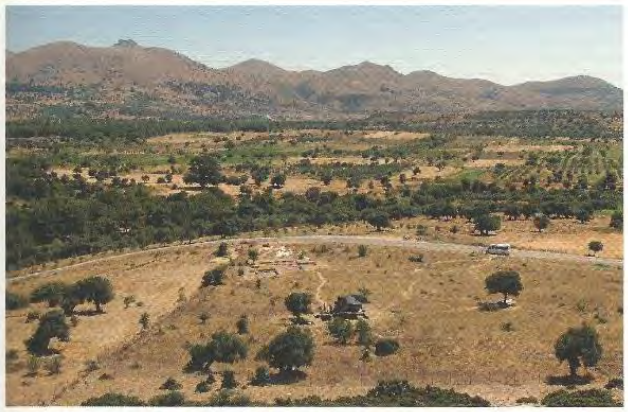
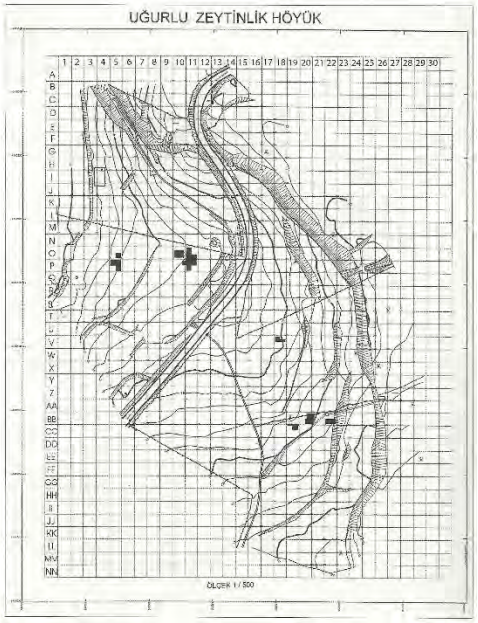
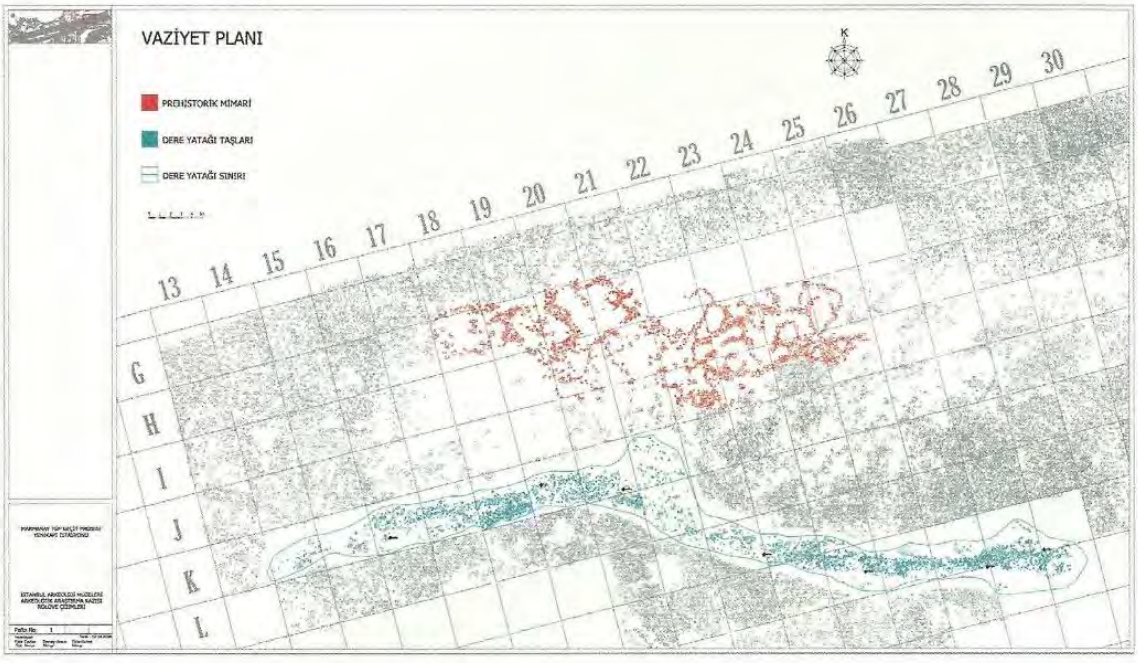


Fig. 2 - Uğurlu from west (photo by N. Yüce).



From: Erdoğu B., 2013

Fig. R03-12 Uğurlu-Zeytinlik Mevkii site location at western end of island and plan of excavated surfaces.



From: Kokabas, 2012

Fig. R03-13 Yenikapi excavated surface, with structures in red and Lykos stream in blue.



Figure 3. *Aerial view of the Yenikapı coastline and excavation area from the east.*
© Istanbul University Yenikapı Shipwrecks Project Archive.

From: Kiziltan Z. & Ali Polat M., 2013



Fig. 3 Illustration of wattle-daub architecture from the Marmara Seacoast (Karul 2010).

From: Karul N., 2011

Fig. R03-13a Site location of Yenikapi in downtown Istanbul; Hypothetical reconstruction of wattle & daub circular huts and successful fishing.





From: Istanbul National Museum

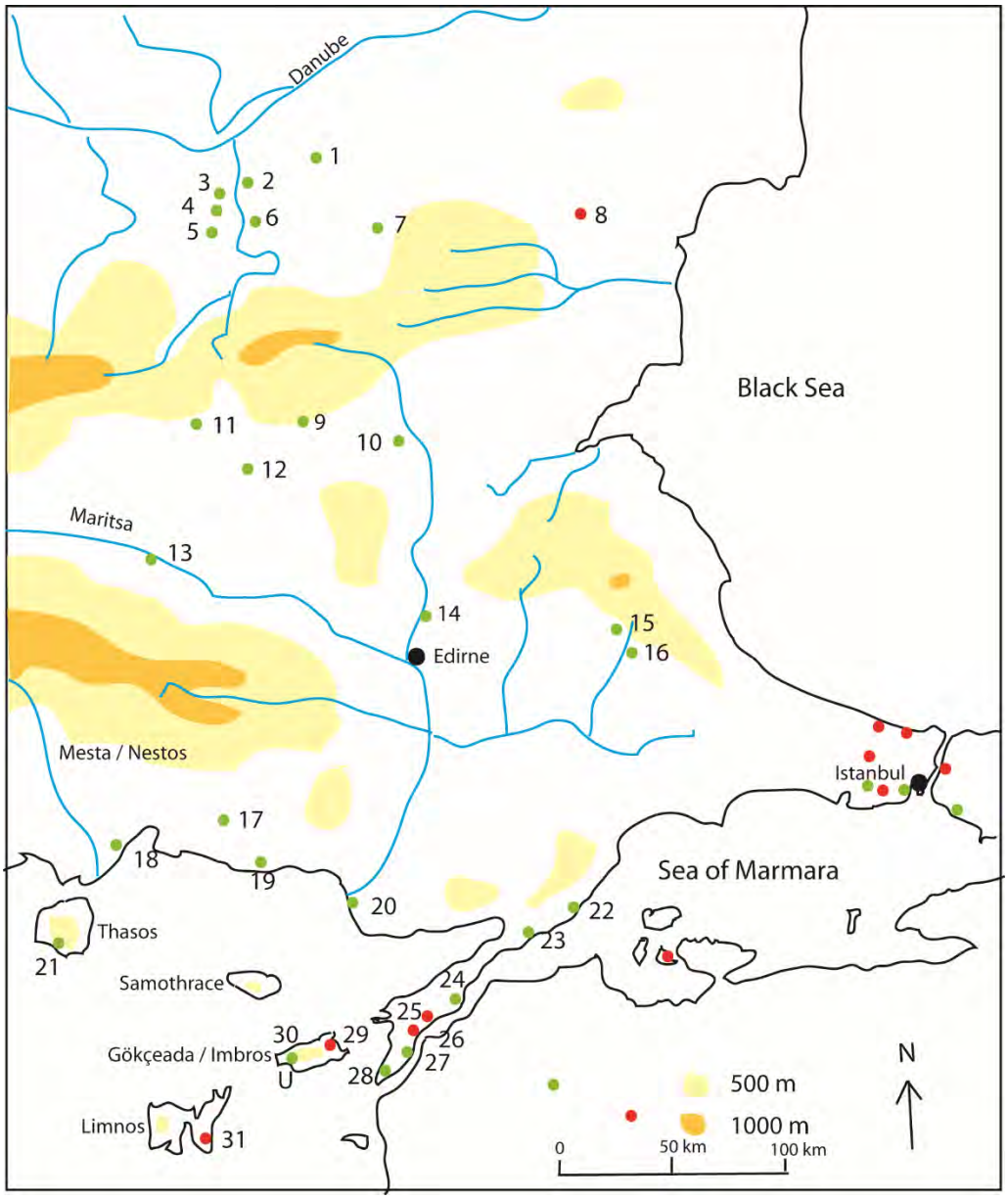


Fig. 47 - A pot-burial covered with a stone (photo by Bekir Kösker).

From: Kiziltan Z. & Ali Polat M., 2013

Fig. R03-14 Yenikapi Neolithic burials in a flexed lateral position and infant burial in a pot.

Region 4 – Western Anatolia, Marmara and Southern Thrace – Thrace



Map R04

Notes:
● = Mesolithic / Transition sites
● = Neolithic / Transition sites

The map includes unnumbered sites treated in Region 3 (Sea of Marmara and Eskişehir) and shown here for information.

Site names:

1. Pomoshtitsa; 2. Koprivets; 3. Orlovets; 4. Pločite; 5. Kachitza; 6. Dzhuljunitsa; 7. Poljanitsa Plateau; 8. Dekilitazh; 9. Azmak; 10. Karanovo; 11. Kazanlak; 12. Stara Zagora; 13. Yabalkovo; 14. Drama; 15. Bulgar Kaynaği; 16. Aşaği Pinar; 17. Krovili; 18. Lafrouda; 19. Makri; 20. Hoca Çeşme; 21. Limenaria; 22; Buruneren; 23. Hamaylitara; 24. Kaynarka Mevkii; 25. Değirmenlik Mevkii; 26. Tepecik; 27. Kilisetepe; 28. Karaağaçtepe; 29. Eksino; 30. Uğurlu-Zeytinlik Mevkii; 30. Kilisetepe; 31. Ouriakos.

Figures – Region 4 – Thrace



Fig. 101 - Aşağı Pinar, the roadside exposure.



Fig. 102 - Aşağı Pinar, the northern exposure.

From: Özdoğan M., 2013

Fig. R04-1 Aşağı Pinar excavations.

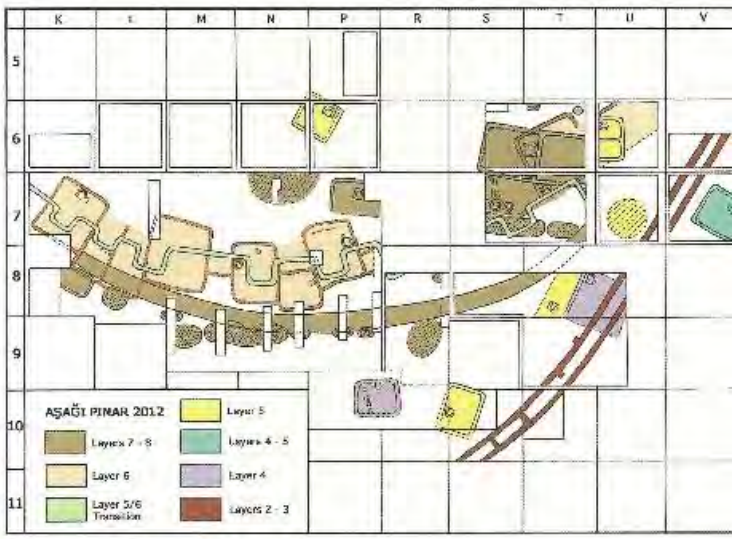


Fig. 103 Aşağı Pınar, plan of the northern section.

From: Özdoğan M., 2013

Fig. R04-1a Aşağı Pinar site plan.

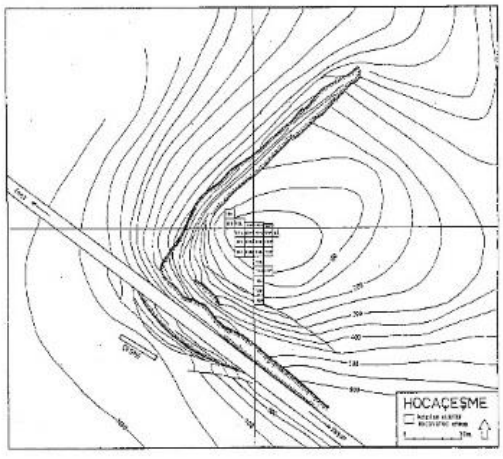


Fig. 1. Topographical map of Hoca Çeşme.



Fig. 63 - Hoca Çeşme, plan of main architectural features including the enclosure wall in Phase IV; yellow marking the enclosure wall, gray the round structures cut into the bedrock.

From: Özdoğan M., 1998, 2013

Fig. R04-2 Hoca Çeşme site plan and plan of Level IV excavations.





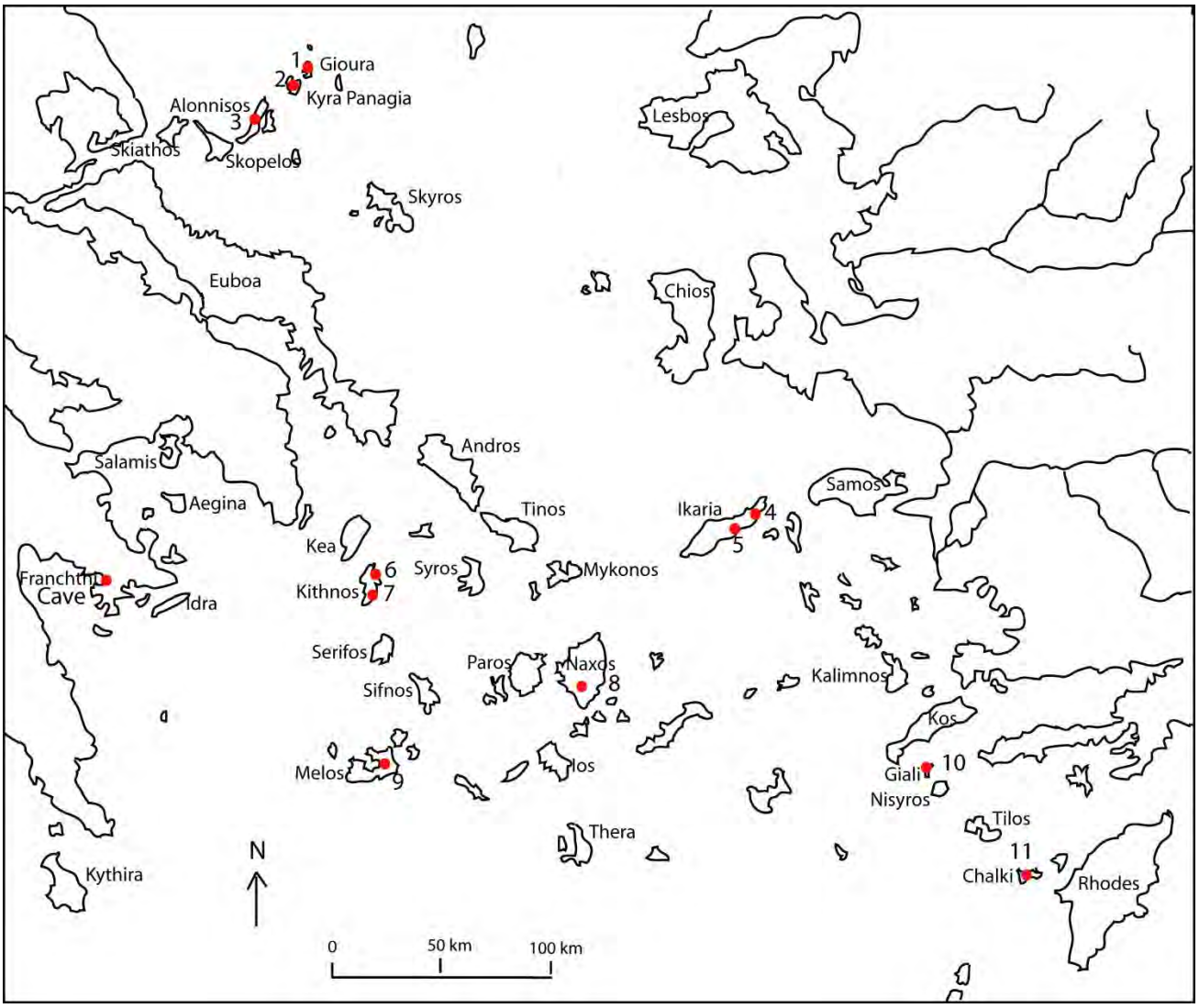
Fig. 64 - Hoca Çeşme, the enclosure wall in Phase IV.

From: Özdoğan M., 1998, 2013

Fig. R04-2a Hoca Çeşme site cut through by road; Excavations showing Phase IV protective wall.

Map R05

Region 5 – Southern Balkans – Aegean Islands



Map R05

Notes:
● = Mesolithic / Transition sites
● = Neolithic / Transition sites

Site names:

1. Cave of Cyclops (Region 7); 2. Kyra Panagia (Region 7); 3. Sfika (Region 7); 4. Ikaria 4 lithic scatters; 5. Kerame; 6. Maroulas; 7. Kythnos; 8. Naxos; 9. Melos; 10. Giali; 11. Chalki.

Figures – Region 5 – The Aegean Islands

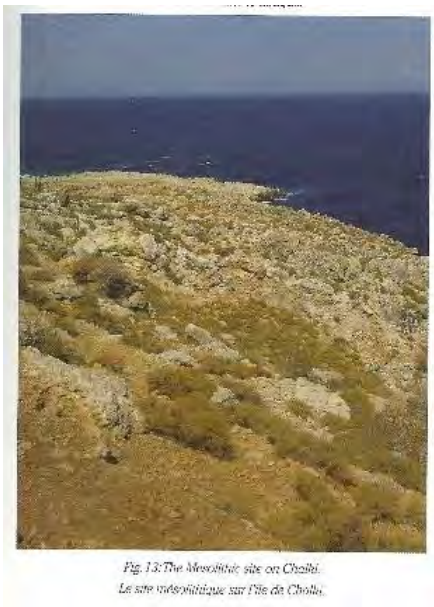


Fig. 13:The Mesolithic site on Chalki.
Le site mésolithique sur l'île de Chalki.

From: Sampson A., 2014

Fig. R05-1 Location on Chalki where a Mesolithic lithic scatter was discovered.





Εικ. 68 Κεραμέ Μεσολιθικά τέχνεργα (ξέστρα, οπείς και υπερμικρολιθικά εργαλεία)

Εικ. 69 Κεραμέ. Μεσολιθικά τέχνεργα (Μικρολεπίδες με ράχη, τραπεζοειδή, οδοντωτά, κολοβώσεις)

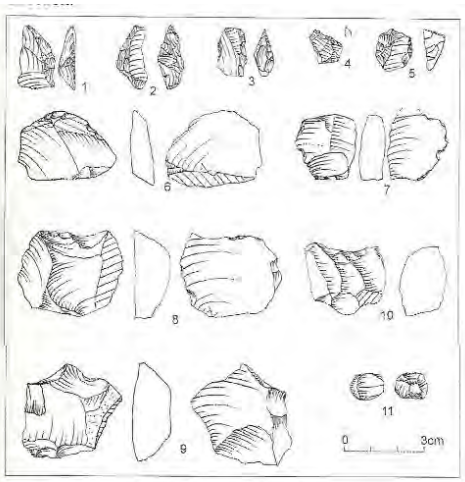
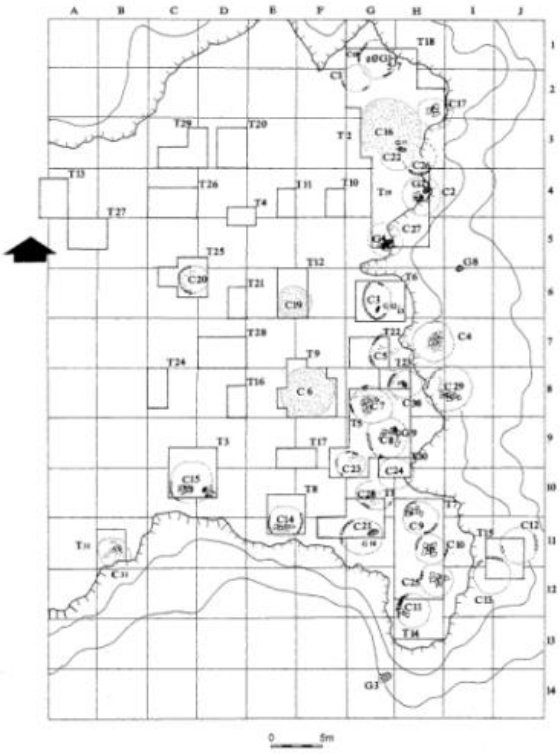


Fig. 12: Kerame 1. Lithic industry.
Kerame 1. Industrie lithique.

From: Sampson A., 2014

Fig. R05-2 Location of the Mesolithic site of Kerame 1 on the Island of Ikaria; Lithics from the site.







From: Sampson A., 2014 From: Sampson A., 2010 From: Sampson A., 2014

Fig. R05-3 Location of Mesolithic sites on the Island of Kithnos; Plan of excavations of Maroulas; Flexed Mesolithic burial.



FIG. 1. General view of Maroula site looking northeast



From: Honea K., 1975 From: Sampson A., 2014

Fig. R05-4 Maroulas rocky spur, now lapped by the sea; Excavations in progress.



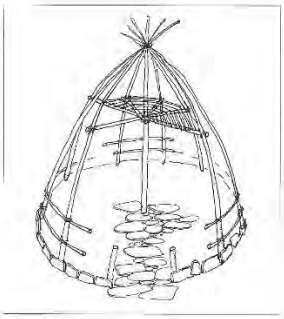




FIG. 3. Close-up of flexed burial; note flat rock wedged between chin and knee; right hand under right leg; burial treated and covered with foil and rock cairn for later removal

From: Sampson A., 2014 From: Sampson A., 2010 From: Honea K., 1975

Fig. R05-5 Maroulas circular pit-hut structure; Hypothetical reconstruction of circular hut over pit; Flexed burial.



Fig. 3. Les armatures lithiques de Maroulas,Kythnos : 1-6 : pièces à dos azqué, 7-13 : troncatures, 14-16 : [illegible] troncatures trapézoïdales, 17-21 & 23 : troncatures microlithiques, 22-24 : armatures à trois bords retouchés, 27-37 : pièces à dos rectiligne ou tronqué.

From: Kaczanowska M., *et al*., 2008

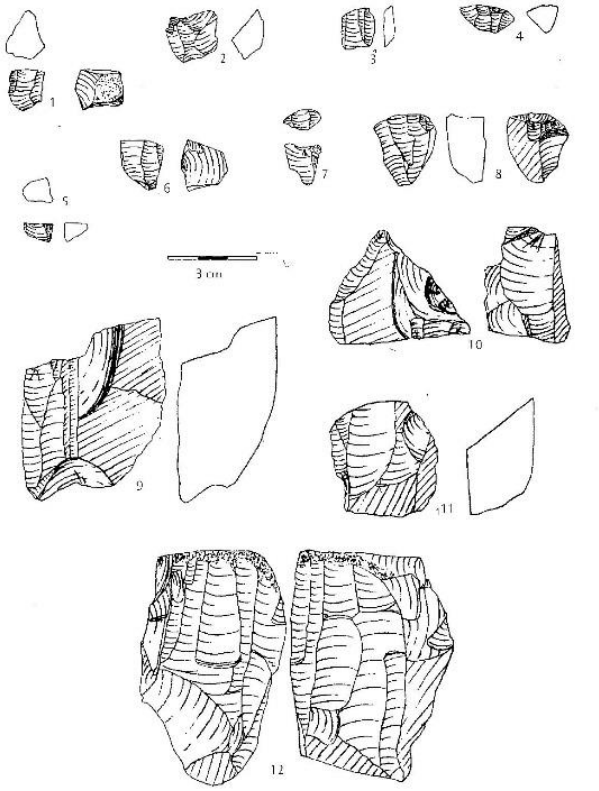


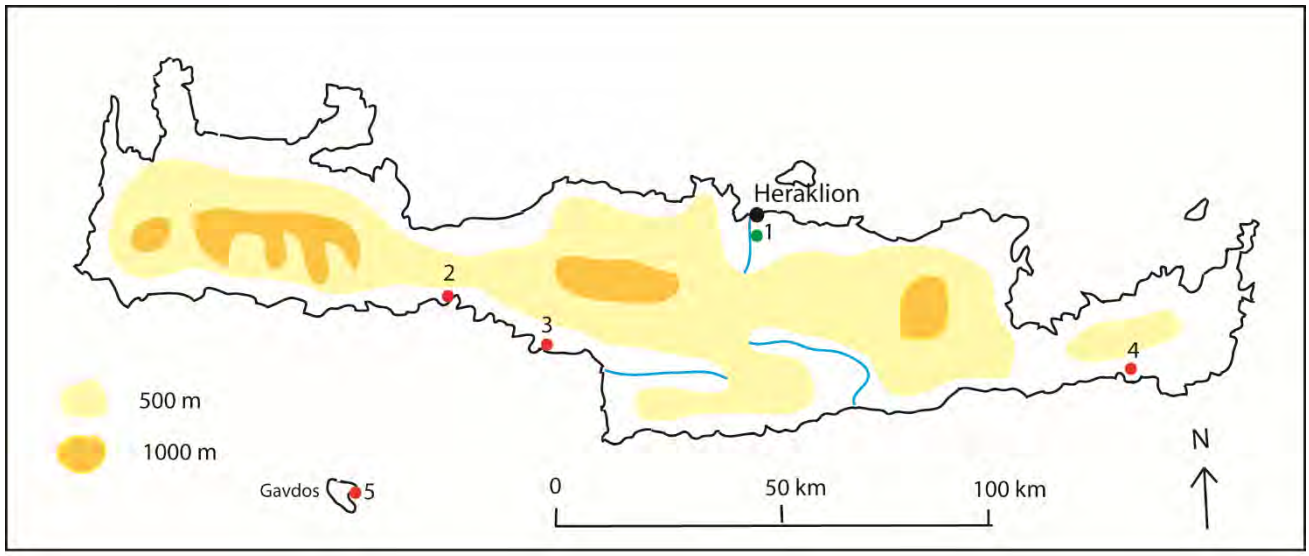
Figure 16.4. Lithic artifacts from Maroulas (Kythnos): 1–8, microcores; 9, 12, blade cores (with preparation of flaking face); 10, 11, flake cores. Raw materials: 1, 2, white flint; 3–8, obsidian; 9, 11, 12, quartzite; 10, quartz.

From: Kozlowski J. K. & Kaczanowska M., 2009

Fig. R05-6 Maroulas lithics.

Map R06

Region 6 – Southern Balkans – Crete



Map R06

Note:
● = Mesolithic / Transition sites
● = Neolithic / Transition sites

Site names:
1. Knossos; 2. Plakias and Agios Pavlov Survey; 3. Plakias and Agios Pavlov Survey; 4. Mount Kapsa; 5. Gavdos.

Figures – Region 6 – Crete



From: Kopaka K. & Matzanas C., 2009

Fig. R06-1 Gavdos double backed point, crescent microlith and transversal arrowhead.

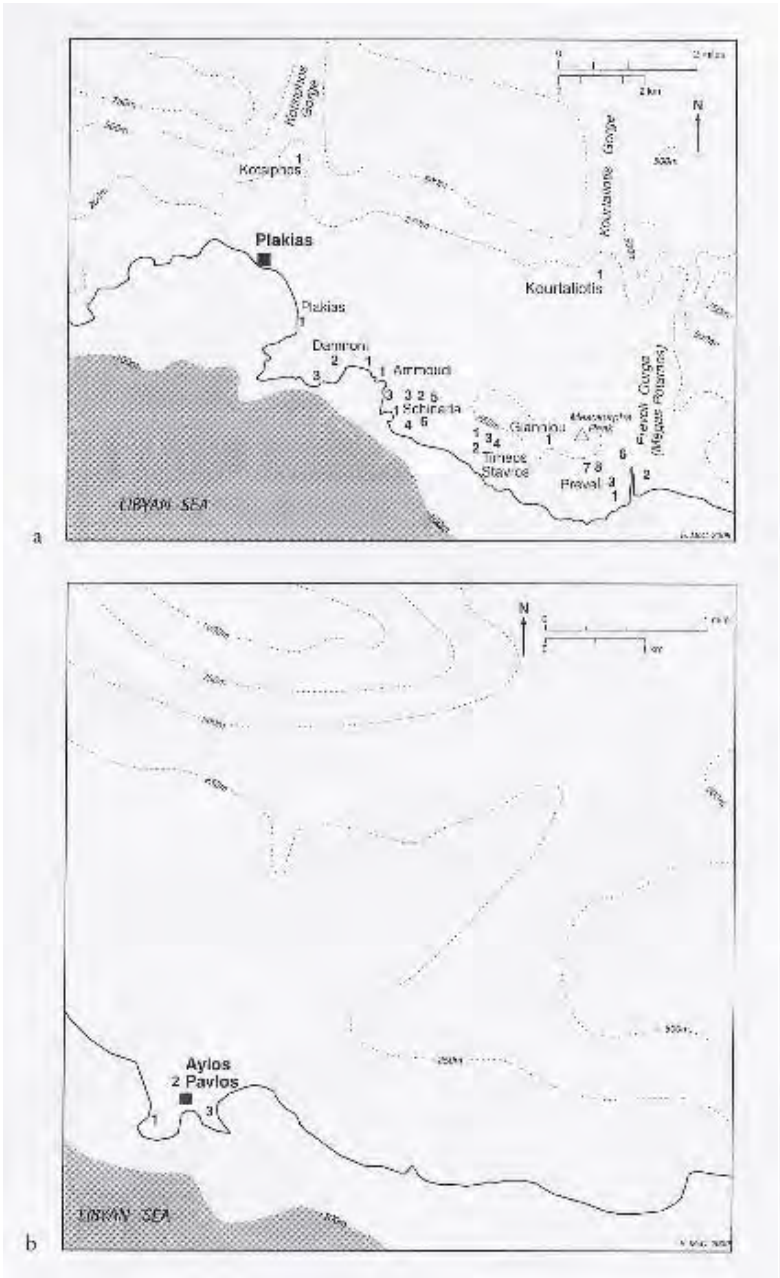
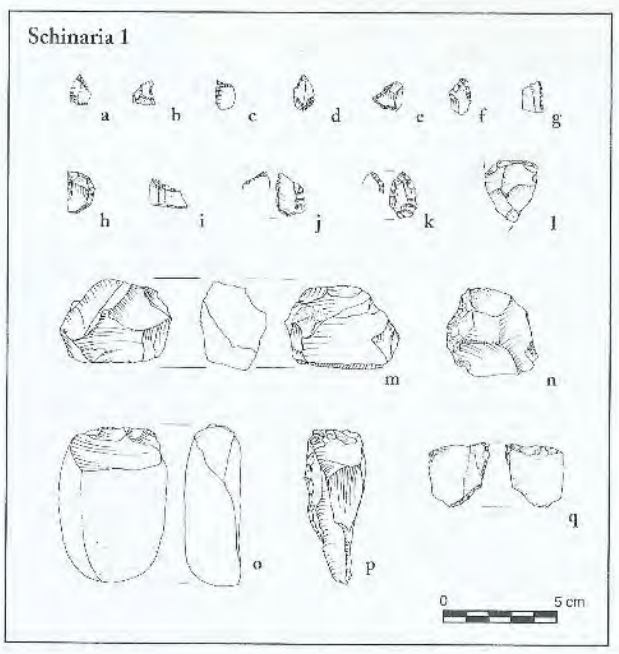


TABLE 1. CHRONOLOGY OF THE SITES

Sites	*Palaeolithic*	*Mesolithic*	*Other*
Damnoni 1	—	×	—
Damnoni 2	—	×	—
Damnoni 3	—	×	—
Ammoudi 1	—	×	—
Ammoudi 3	—	×	—
Ayios Pavlos 1	—	×	—
Ayios Pavlos 2	—	×	×
Ayios Pavlos 3	—	×	—
Schinaria 1	—	×	—
Schinaria 2	—	×	—
Schinaria 3	—	×	—
Schinaria 4	—	×	×
Schinaria 5	×	—	—
Schinaria 6	—	×	—
Preveli 1	—	×	—
Preveli 2	×	×	—
Preveli 3	×	×	—
Preveli 6	—	×	—
Preveli 7	×	—	—
Preveli 8	×	×	—
Kourtaliotis 1	—	—	×
Kotsiphos 1	×	—	—
Plakias 1	—	—	×
Timeos Stavros 1	×	—	—
Timeos Stavros 2	—	×	—
Timeos Stavros 3	—	×	—
Timeos Stavros 4	×	—	×
Gianniou 1	×	—	—

From: Strasser T., *et al.*, 2010

Fig. R06-2 Plakias and Agios Pavlov survey sites in Southern Crete; Listing of sites and typological periodisation.



From: Strasser T., *et al.*, 2010

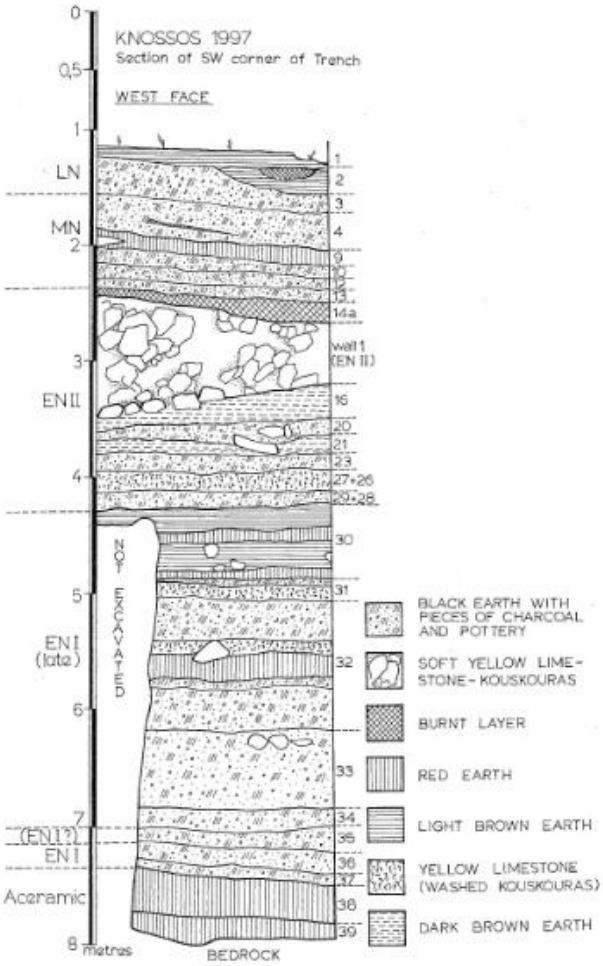
Fig. R06-2a Mesolithic lithics from Schinaria 1 find-spot.



From: Google



From: Efstratiou N., 2004



From: Kozlowski J. & Kaczanowska M., 2009

Fig. R06-3 Plan of Minoan Palace of Knossos and 6 m^2 area in north-eastern corner of the central square excavated in 1997; 1997 8 m stratigraphy.

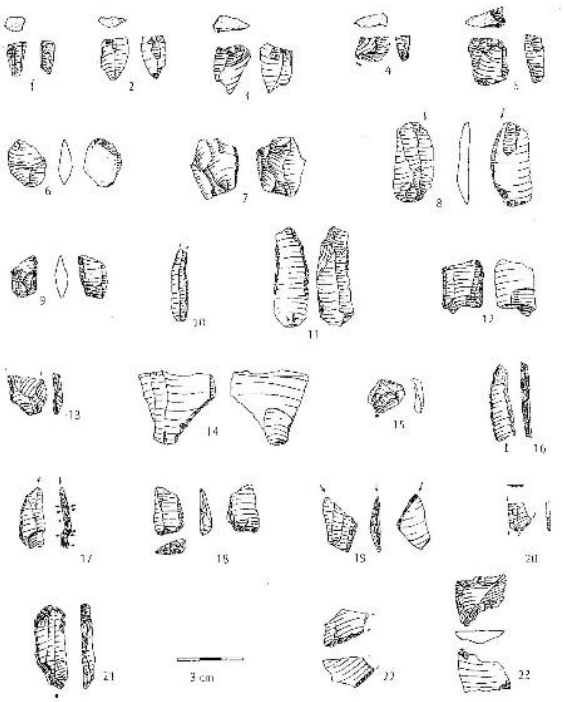


Figure 16.6. Lithic debitage from aceramic layer X (trench X) from Knossos (Crete). Excavations by J. D. Evans: 1, 3, 4, hyperm-crolithic cores; 5, flake detached from microcore; 2, 6–9, splintered pieces; 10–12, retouched blades; 13–15, retouched flakes; 16–19, backed pieces; 20, microlithic truncation; 21, endscraper/backed blade; 22, 23, atypical tanged. Raw materials: 1–3, 5, 7–16, 19–22, obsidian; 4, 17, grey radiolarite; 6, quartz; 18, 23, red radiolarite.

From: Kozlowski J. & Kaczanowska M., 2009

Fig. R06-3a Aceramic Stratum X lithics from A. Evans excavations.

New Cretan Neolithic Phases	Revised Knossos Sequence	Traditional Cretan Neolithic Phases	Greece	W/SW Anatolian and East Aegean	Syria	Approx. Dates (cal. BC)
Initial Neolithic	Stratum X	Aceramic	Aceramic/Initial	Aceramic/ Early Neolithic	Final PPNB or PPNC/ Early Neolithic	*c.*7000–*c.*6500/6400
Early Neolithic	Stratum IX–VIII	Early Neolithic I (Furness 1953)	Early Neolithic Franchthi FCP1	Late Neolithic Hacilar IX–VI Ulucak IV–V Kuruçay 13–11	Late Neolithic (Pre-Halaf and 'Transitional' Samarra)	*c.*6500/6400–*c.*5900
Middle Neolithic	Strata VII–VIB; Stratum P		Middle Neolithic Franchthi FCP2–3	Early Chalcolithic Hacilar V–I Kuruçay 10–7	Early Chalcolithic (Halaf)	*c.*5900–*c.*5300
Late Neolithic I	Strata VIB–V; Strata N, M, L		Late Neolithic I Saliagos Franchthi FCP4	Middle Chalcolithic Emporio X–VIII Kum Tepe IA Beşiktepe Kizilbel/ Lower Bagbasi	(Late Ubaid)	*c.*5300–*c.*4900
Late Neolithic II	Stratum IV; Strata K, H, G	Early Neolithic II (Furness 1953; Evans 1964)	Late Neolithic II Saliagos		(Late Ubaid)	*c.*4900–*c.*4500/4400
Final Neolithic IA	Stratum IIIB; Strata F, E, D	Middle Neolithic (Furness 1953; Evans 1964)	Final Neolithic	? Middle Chalcolithic ?	Late Chalcolithic 1	*c.*4500/4400–*c.*4200
Final Neolithic IB	Stratum IIIA; Strata C, B	Middle-Late Neolithic 'Transition' (Evans 1964)	Franchthi FCP5	Late Chalcolithic 1 Beycesultan XL–XXXV Kum Tepe IB1	Late Chalcolithic 2	*c.*4200–*c.*3900
Final Neolithic II	Stratum IIB	Late Neolithic I (Evans 1964; Manteli 1993)		Late Chalcolithic 2 Beycesultan XXXIV–XXIX Kum Tepe IB2 Tigani I	Late Chalcolithic 3	*c.*3900–*c.*3600
Final Neolithic III	Stratum IIA	Final Neolithic (Vagnetti 1973; Vagnetti and Belli 1978)	Kephala	Late Chalcolithic 3 Beycesultan XXVIII–XXV Kuruçay 6 Kum Tepe IB3 Emporio VII Tigani II	Late Chalcolithic 4	*c.*3600–*c.*3300
Final Neolithic IV	Stratum IC	Final Neolithic (Vagnetti 1973; Vagnetti and Belli 1978)	Ayia Irini I	Late Chalcolithic 4 Beycesultan XXIV–XX Kum Tepe IB4 Emporio VI Tigani III	Late Chalcolithic 5	*c.*3300–*c.*3000

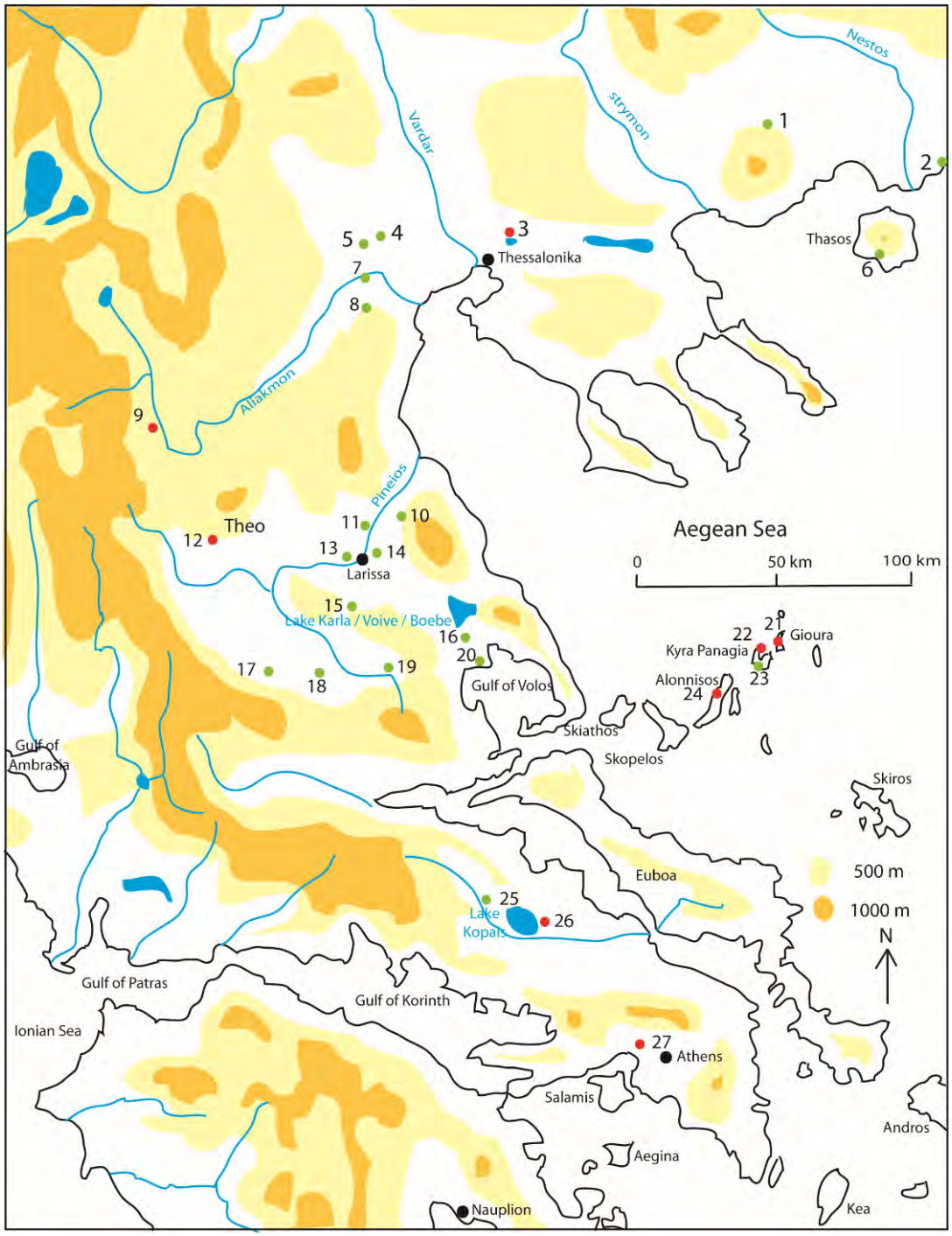
Table 3.1. The relationship between traditional and new Cretan chronological schemata and other Aegean and East Mediterranean regional chronologies (after Tomkins 2007b: 12, table 1.1).

From: Tomkins P., 2008

Fig. R06-4 Cretan periodisation.

Map R07

Region 7 – Southern Balkans – Eastern Greece and the Sporades Island



Map R07

Notes:
● = Mesolithic / Transition sites
● = Neolithic / Transition sites

Site names:

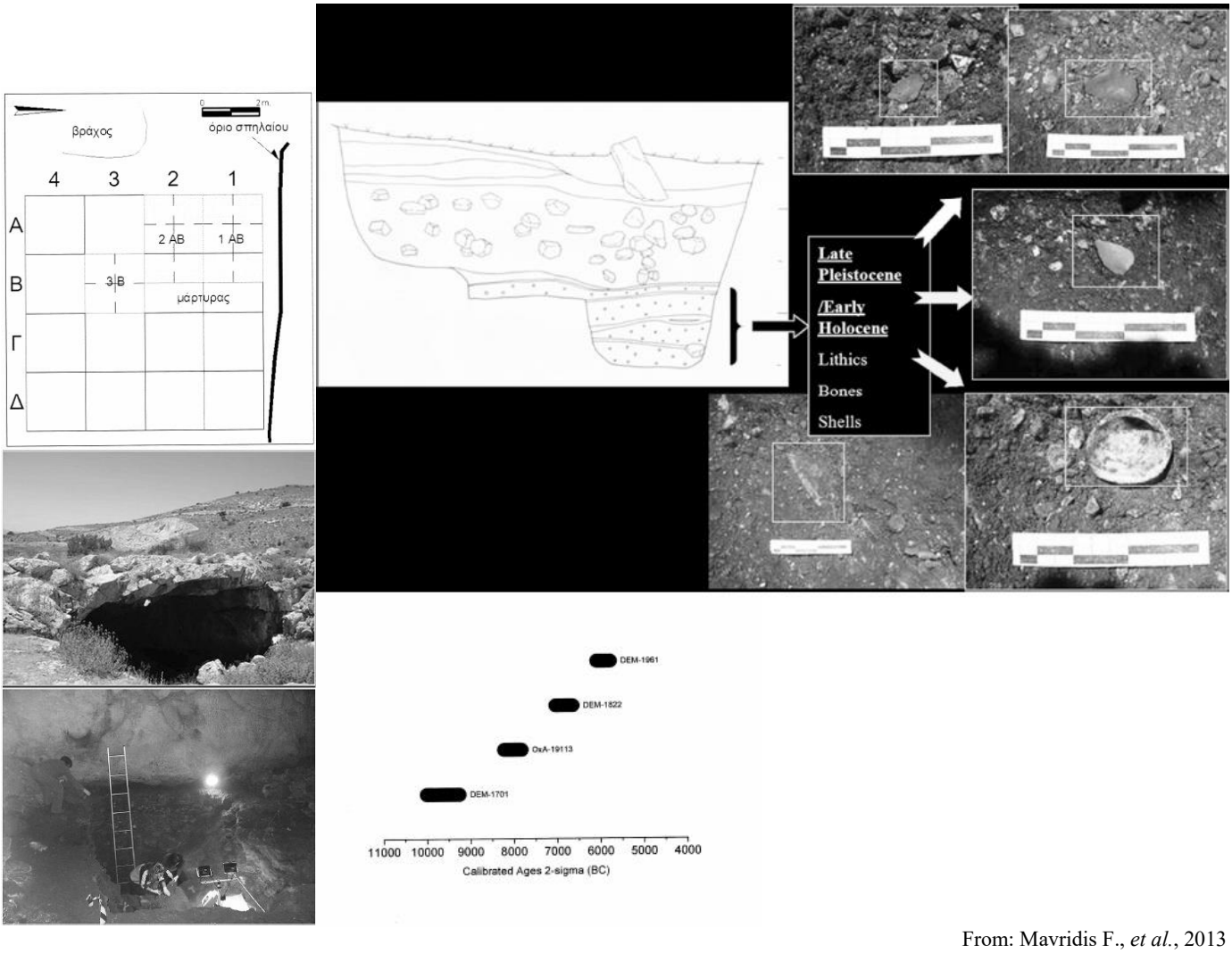
1. Dikili Tash; 2. Lafrouda; 3. Langada; 4. Axos; 5. Giannitsa B; 6. Limenaria; 7. Nea Nikomedeia; 8. Servia; 9. Grevena; 10. Gendiki; 11. Soufli Magoula; 12. Theopetra Cave; 13. Otzaki Magoula; 14. Argissa Magoula; 15. Nessonis; 16. Sesklo; 17. Magoulitsa; 18. Prodromos; 19. Achilleion; 20. Pyracos; 21. Cave of Cyclops; 22. Kyra Panagia; 23. Agios Petros; 24. Alonnisos Island; 25. Elateia; 26. Sarakenos Cave; 27. Anonymous Cave of Schisto.

Figures – Region 7 – Eastern Greece and the Sporades Islands



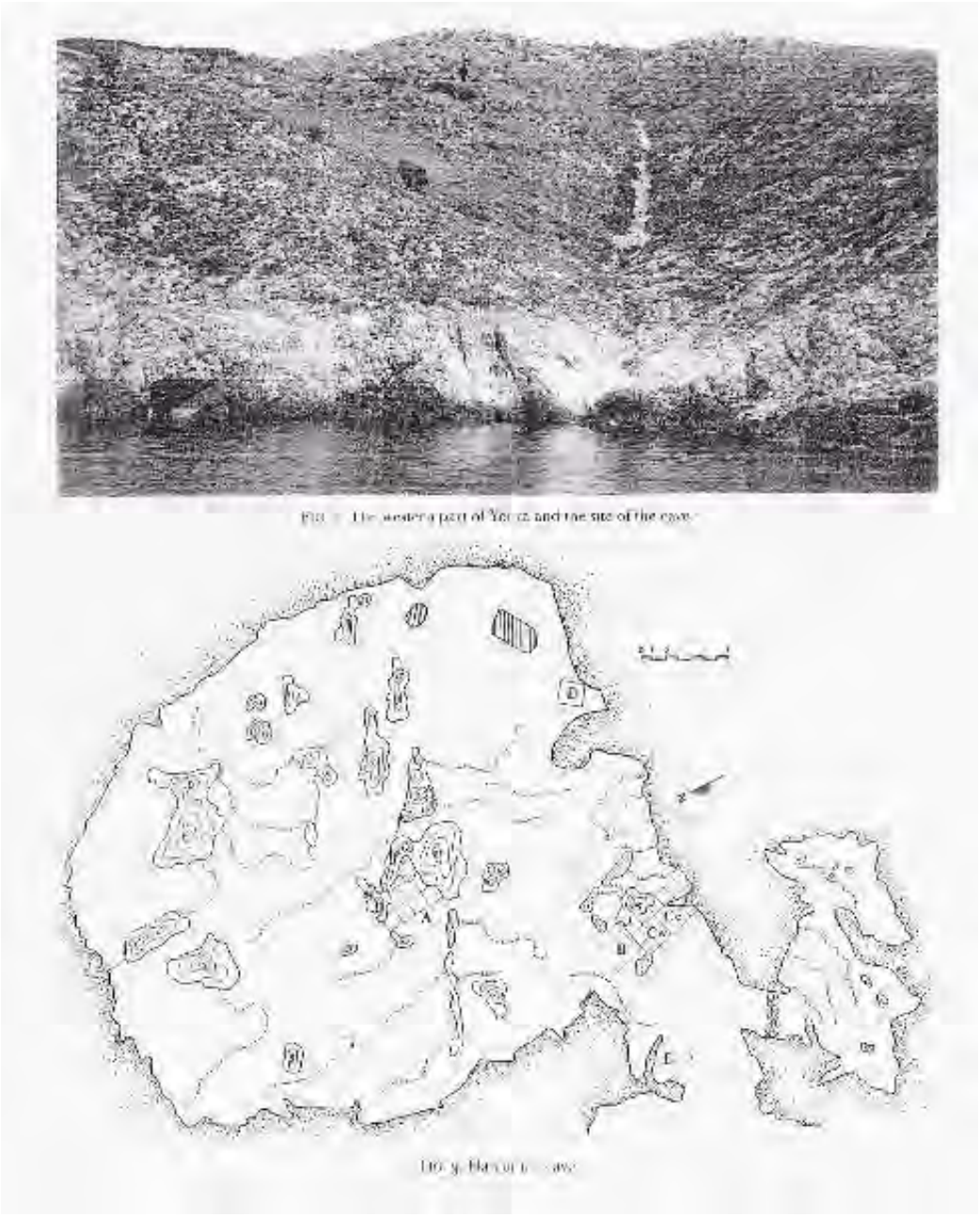
From: Sampson A., 1998

Fig. R07-1 Northern Sporades Survey pre-Neolithic find-spots.



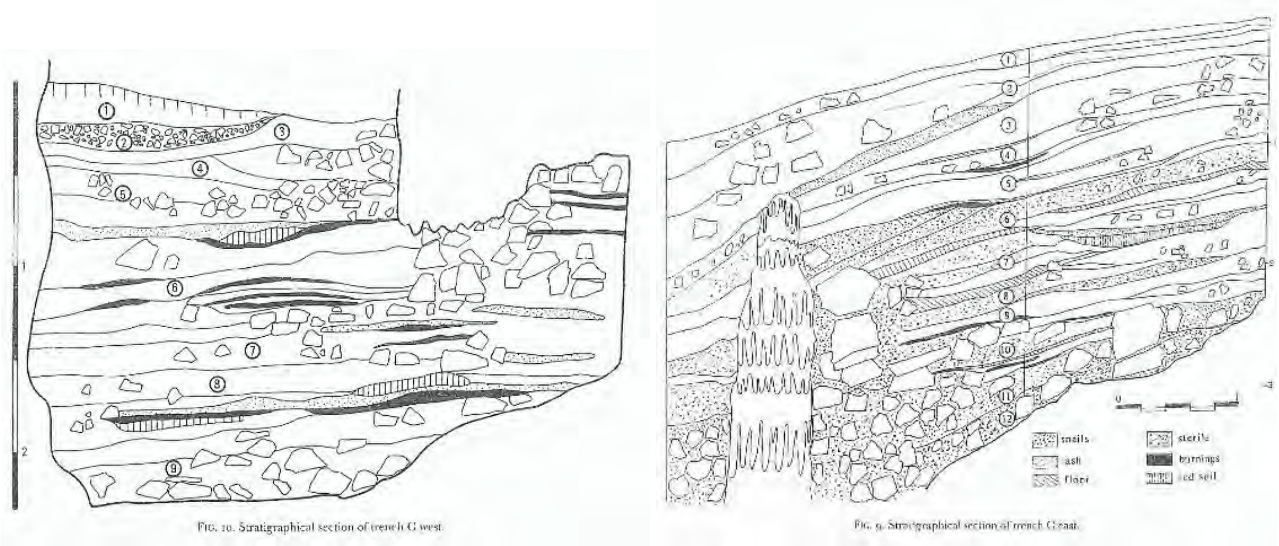
From: Mavridis F., *et al.*, 2013

Fig. R07-2 Anonymous Cave of Schisto; Excavations; Excavated area and stratigraphic profile and dates spread.



From: Sampson A., 2003

Fig. R07-3 Location of the Cave of Cyclops (near top, left of centre); Plan of cave and excavated surfaces.



From: Sampson A., *et al.*, 2003

Fig. R07-3a Cave of Cyclops stratigraphies of trenches C east and C west close to cave entrance.

TABLE 9.4: Cave of Cyclope, Youra: tools in the Mesolithic, Early/Middle Neolithic (EN + MN) and Late Neolithic (LN) layers.

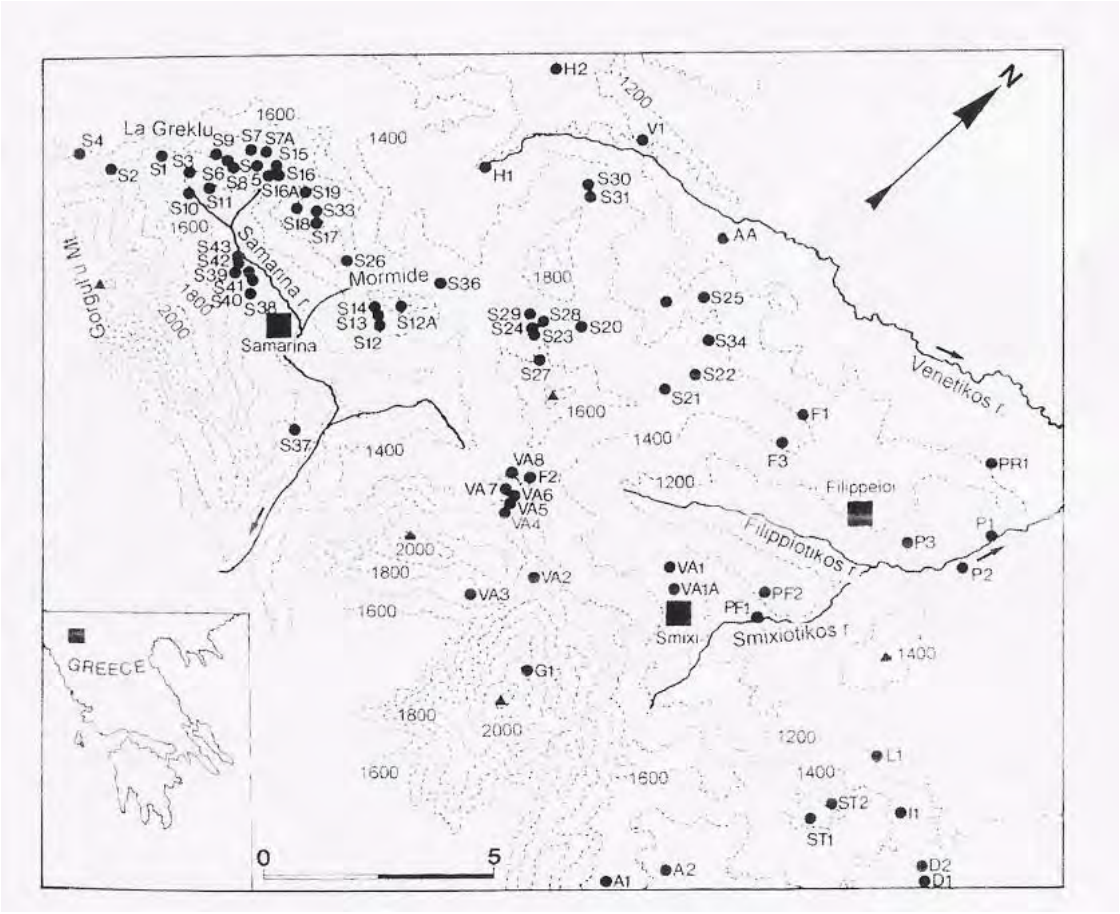
	Mesolithic		*EN+MN*		*LN*	
	O	SR	O	SR	O	SR
Crescents	2				44	
Trapezes	1	–	1	–	9	–
Triangles	–		3		4	
Backed blades	1	2	6	–	3	
Truncations	2	1	2	–	15	–
Double truncations	–				1	
Retouched blades	1	–	3	1	14	3
Burins		1	2		2	–
Splintered pieces	–	11	9	–	15	2
Retouched flakes		6	–	–	1	2
Bees	–	1	–	–	1	
Microretouched blades					2	–
End-scrapers	–	8	–	–	2	
Denticulated	1	–	–	–	–	1
Notched	–	2	1		4	–
Sickle blades	–	–	–	–	–	
Bifacially worked tools and arrowheads	–				3	3
Tanged points (blades)		–	–	1	3	3
Burin spalls	–	2	–	–	–	–
Scrapers	–		–	–		
Microburins	–	2	–	–	1	–
Fragments	–	2	–	–	7	–
TOTAL	8	38	27	2	131	14

O = obsidian
SR = siliceous rocks



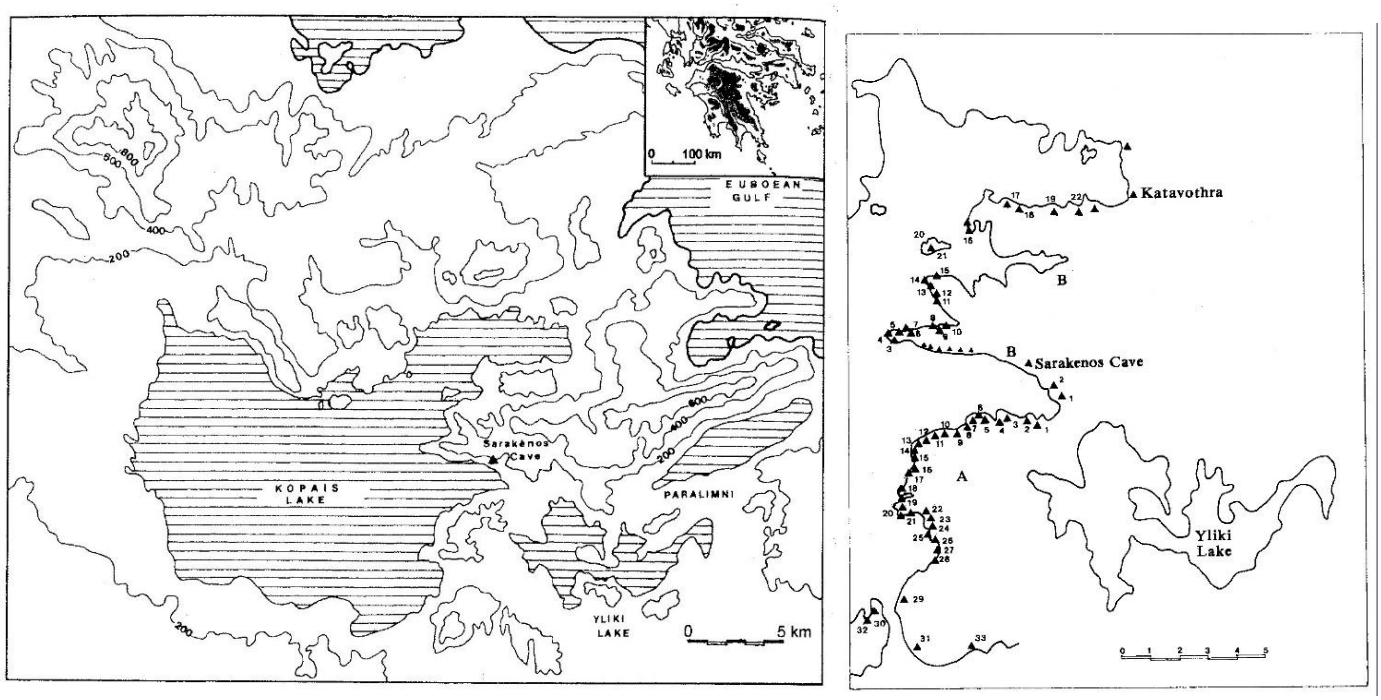
From: Sampson A., *et al.*, 2003

Fig R07-4 Cave of Cyclops chart with tool-types for the Mesolithic, Early and Middle Neolithic, and Late Neolithic; Mesolithic lithics.



From: Efstratiou N., *et al.*, 2006

Fig. R07-5 Grevena highland zones archaeological findspots during the 2002-2005 survey of the watershed region.

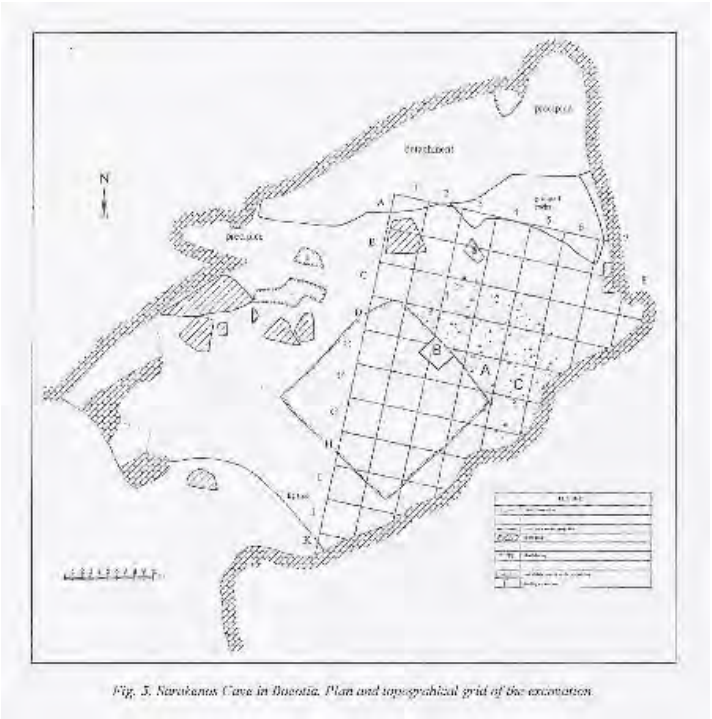


From: Sampson A., 2009

Fig. R07-6 Location of Sarakenos Cave to the east of Lake Kopais and map of caves on the east side of Lake Kopais.



Photos M. Templer



From: Sampson A., 2009

Fig. R07-7 Sarakenos Cave entrance with present-day sheep pen wall to the left of the entrance; Looking out over dried out Lake Kopais Basin over sheep pen wall; Cave plan showing excavated area.

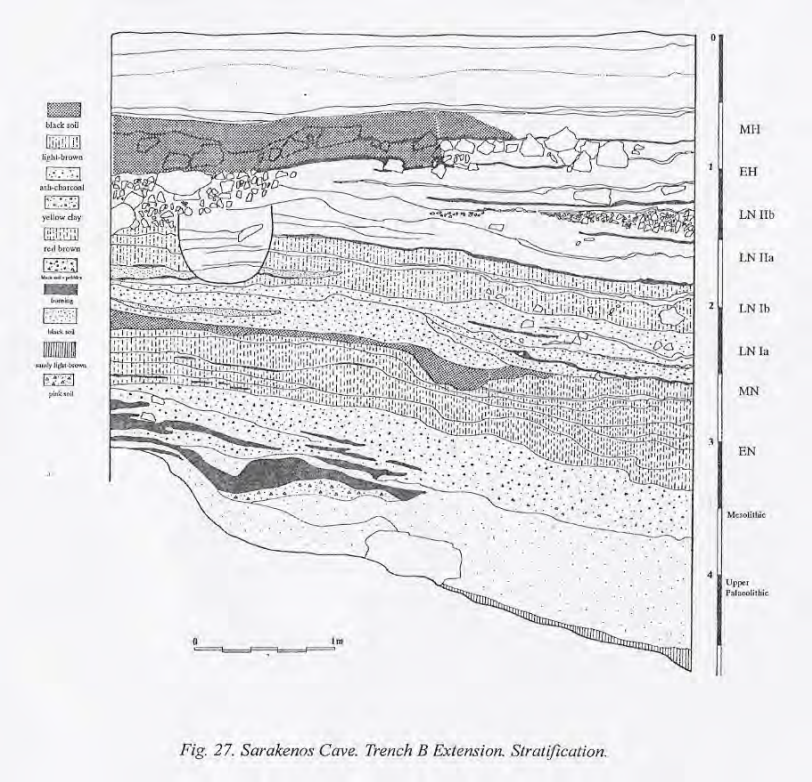


Fig. 27. Sarakenos Cave. Trench B Extension. Stratification.



From: Sampson A., 2009

Fig. R07a Sarakenos Cave Trench B stratigraphic drawing of profile and photo of same.







Photos M. Templer

Fig. R07-8 Mount Theopetra with cave left of centre showing as black hole in the shade at the base of scarp; View looking south from Theopetra Cave; Excavations made scenically accessible to tourists in 2013.

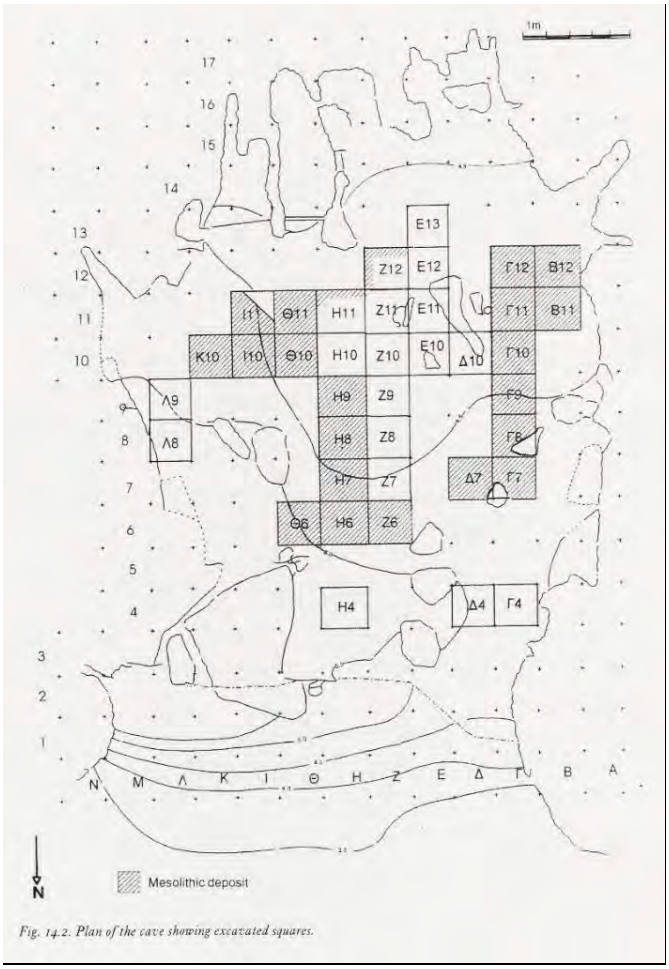
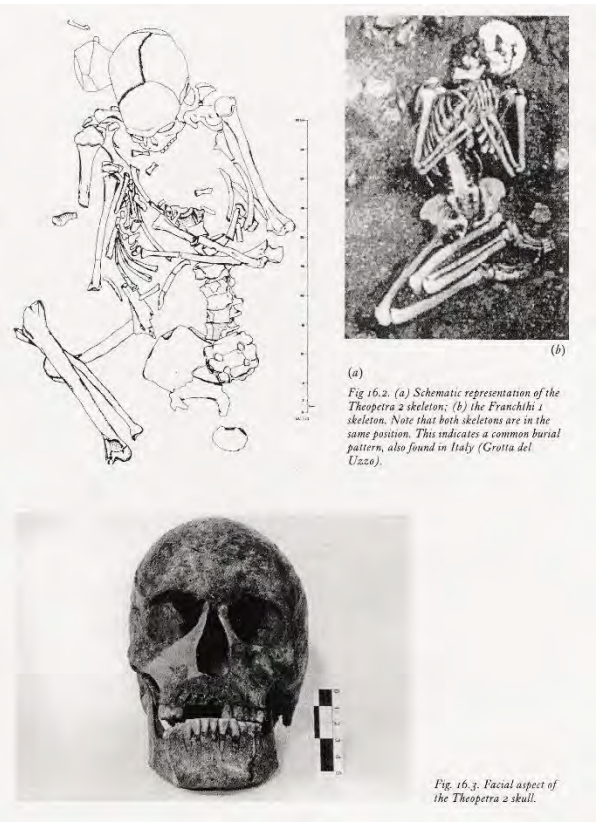


Fig. 14.2. Plan of the cave showing excavated squares.

From: Kyripassi-Apostolika N., 2003



(b)

(a)

Fig 16.2. (a) Schematic representation of the Theopetra 2 skeleton; (b) the Franchthi 1 skeleton. Note that both skeletons are in the same position. This indicates a common burial pattern, also found in Italy (Grotta del Uzzo).

Fig. 16.3. Facial aspect of the Theopetra 2 skull.

From: Manolis S. & Stravopodi H., 2003

Fig. R07-9 Plan of Theopetra Cave showing excavation grid; Photo of Theopetra Cave Mesolithic inhumation (left) and skull, compared to the drawing of a Franchthi Cave burial (right) (Region 8).

TABLE 15.1: Theopetra Cave: species NISP by depth. The Mesolithic sample is derived from trenches Z6, H6, Γ8, Δ7 and an upper sample of A8. All other samples are from trenches A8 and M9.

	Mesolithic	*Palaeolithic*				
		1.2–1.90 m	1.92–2.75 m	2.62–3.04 m	3.04–3.89 m	Totals
Capra (c.f *C. ibex*)		13	17	22	6	58
Capra/ovis	27	3	11	12	7	60
Equus sp.			3	5	5	13
Equus/Bos		1			1	2
Cervus elaphus	1	10	6	6	2	25
Dama dama				1		1
Cervus/Dama		3				3
Capreolus		1	3	7		11
Sus scrofa	2		2	1	4	9
Sus sp.	1					1
Ursus sp.			5	8	31	44
Crocuta sp.				1	1	2
Felis sp. (large)	1	1		1		3
Felis sylvestris	1			1		2
Lupus		10	1	1		12
Canis sp.	1					1
Vulpes vulpes	1	1	2		2	6
Meles meles		2	1	1	1	5
Martes sp.			1	1		2
Lepus sp.	7	1	5	14		27
Castor			1			1
Corvids (small)	2	8	12	9	4	35
Corvids (medium)		1				1
Pigeon	11	1	5	1	3	21
Partridge			5	5	7	17
Aquatic birds	1	3	1	2	2	9
Birds of prey	1	1	1	2		5
Reptiles	3	1	8	47	1	60
Totals	**60**	**61**	**90**	**148**	**77**	**436**

From: Newton S., 2003

Fig. R07-9a Theopetra Cave fauna.

Table 3.3. Dates of Architectural Features

Phase	Feature	Calibrated Dates BC
Ia	Pit house in square B Earliest settlement in test pit east	 6380 ± 50
Ib	Pit house with plastered floor; pisé and stone construction	 6300 ± 200
IIa	Small post house with wattle-and-daub walls, plastered floor	 6250 ± 150
IIb	Small post house as in Phase IIa	6150 ± 150
IIIb	Large post house Cult place, fire platforms	6100 ± 100 6000 ± 200
IVa	Two-room shrine, early IVa Two-room shrine, middle IVa Houses built on stone foundations: IVa, latest post hole; trench around settlement	5800 ± 150 5900 ± 200 5700 ± 200 5700 ± 120

From: Gimbutas M., 1989

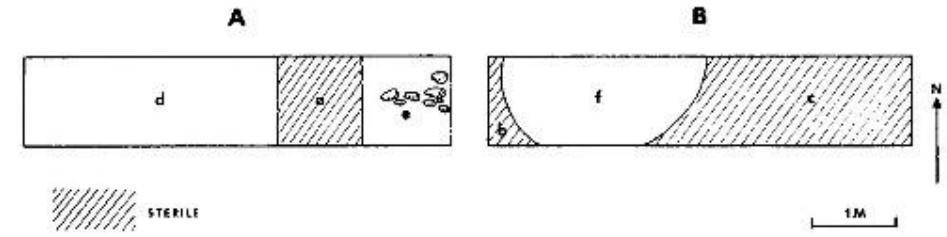


Figure 4.2. Phase Ia. Plans of squares A and B. *(a)* Sterile earth reached at 4.10 m below datum point (BDP). *(b)* Sterile earth reached at 4.25 m BDP. *(c)* Early ceramic levels below Phase early Ib floor; sterile earth reached. *(d)* Early ceramic levels below early Ib floor; sterile earth not reached. *(e)* Stone feature overlying sterile earth. *(f)* Pit house or storage pit used principally in early Ib but perhaps dating to Ia.

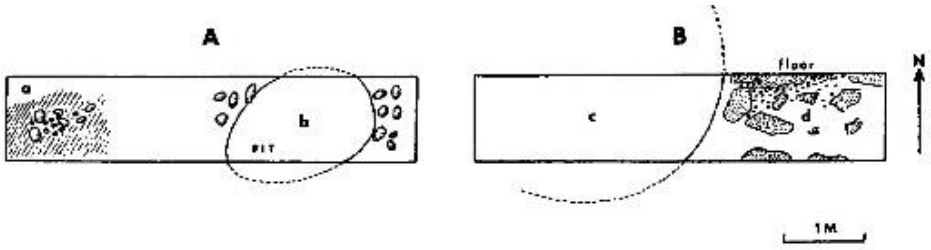


Figure 4.3. Phase early Ib. Plans of squares A and B. *(a)* Food preparation area and equipment on hardened floor surface. *(b)* Shallow pit containing black stone figurine. *(c)* Pit house/storage area. *(d)* White plaster floor with kitchen implements.

From Winn S. & Shimabuku D., 1989

Fig. R07-10 Achilleion dates for pit structures and later post houses, found at lowest levels of excavations; Excavated areas with outline of pit-structures.



From: Efstratiou N., 1985

Fig. R07-11 Agios Petros excavations under D. Theocharis between 1969-1971.

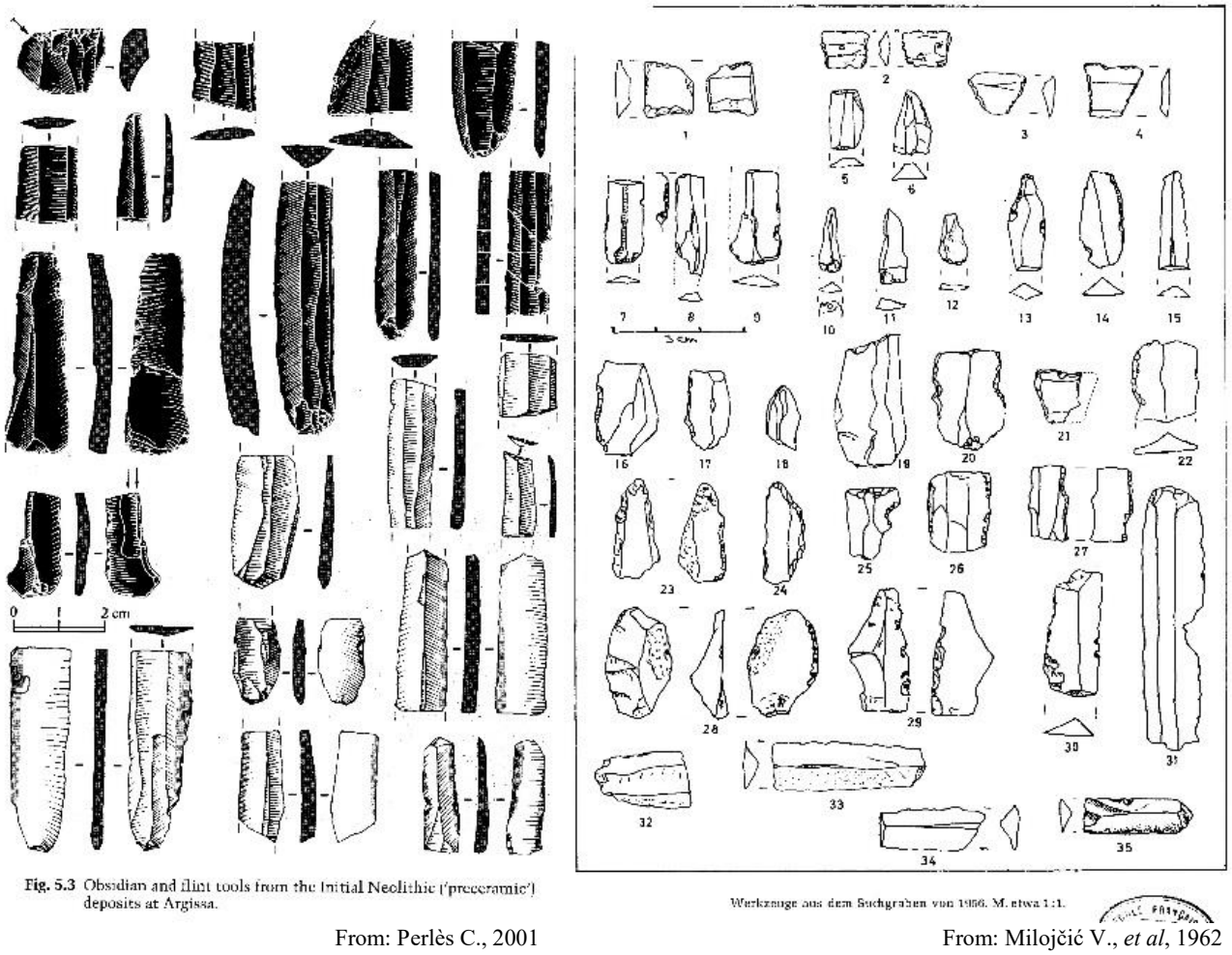


Fig. 5.3 Obsidian and flint tools from the Initial Neolithic ('preceramic') deposits at Argissa.

From: Perlès C., 2001

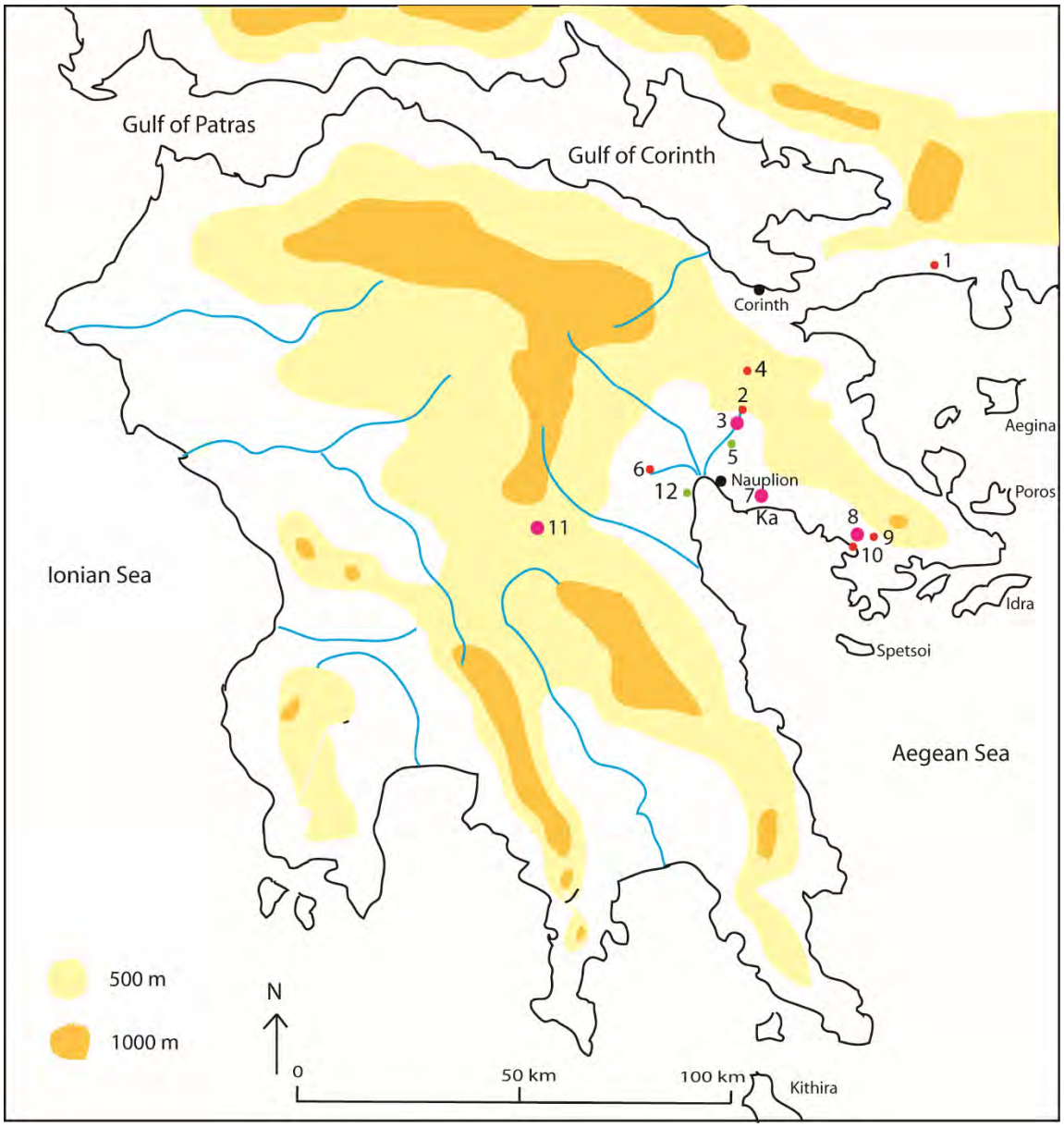
Werkzeuge aus dem Suchgraben von 1956. M. etwa 1:1.

From: Milojčić V., *et al*, 1962

Fig. R07-12 Argissa Magoula Neolithic blade industry lithics from the 'Preceramic' Neolithic Level and other lithics.

Map R08

Region 8 – Southern Balkans – The Peloponnese and Megara



Map R08

Notes:

● = Mesolithic / Transition sites
● = Neolithic / Transition sites
● = Surveys

Site names:

1. Zaïmas; 2. Klisoura Caves 1, 2, 4 and 7; 3. Berbati-Limnes Survey; 4. Ulbricht Cave; 5. Dendra; 6. Kephalari Cave; 7. Kandia Survey; 8. Southern Argolid Survey; 9. Koukou Cave; 10. Franchthi Cave; 11. Asea Valley Survey; 12. Lerna.

Map R08a

Region 8 – Southern Balkans – The Peloponnese and Megara – Berbati-Limnes Survey

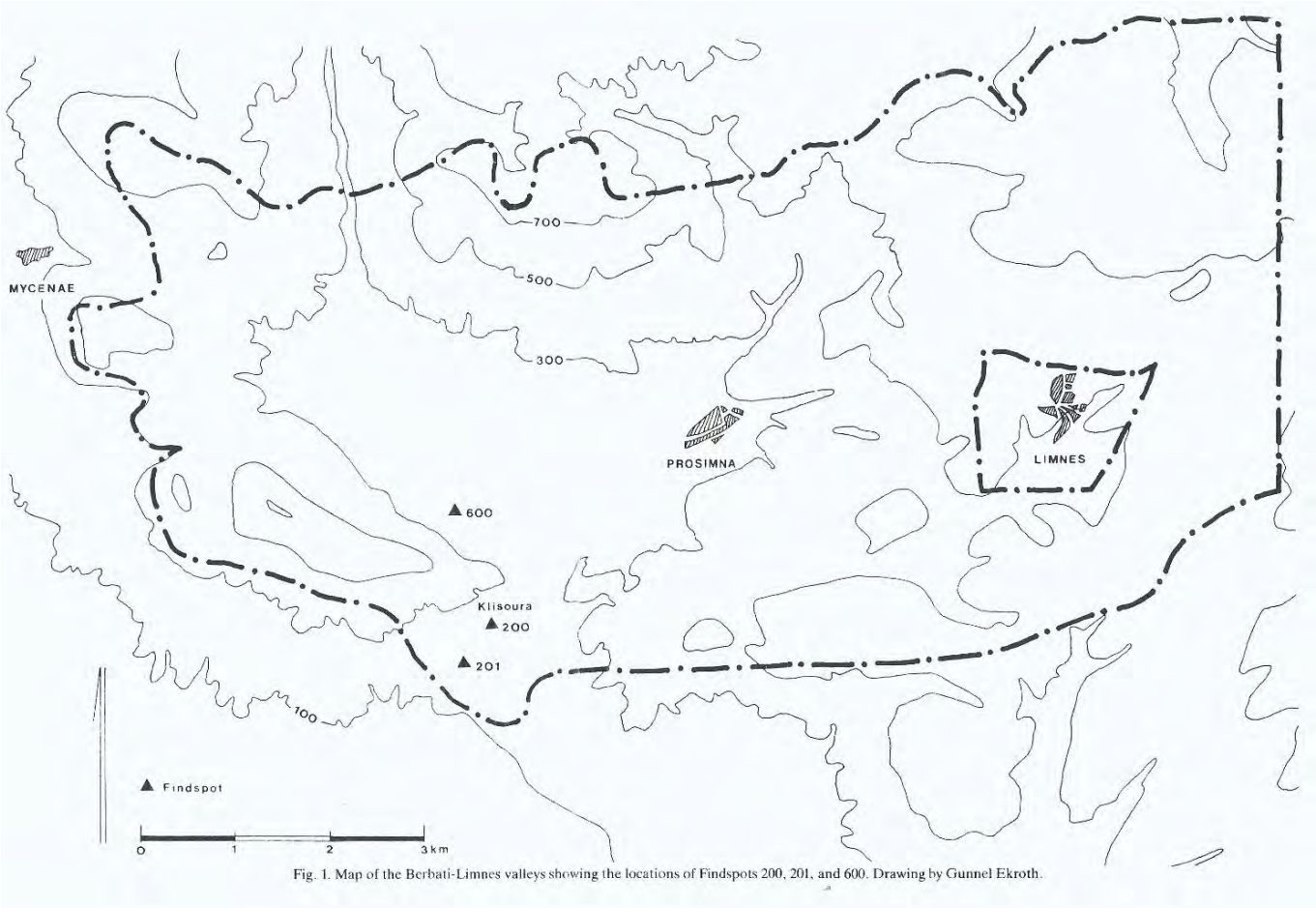


Fig. 1. Map of the Berbati-Limnes valleys showing the locations of Findspots 200, 201, and 600. Drawing by Gunnel Ekroth.

From: Runnels C., 1996

Region 8 – Southern Balkans – The Peloponnese and Megara – Kandia & South Argolid Surveys

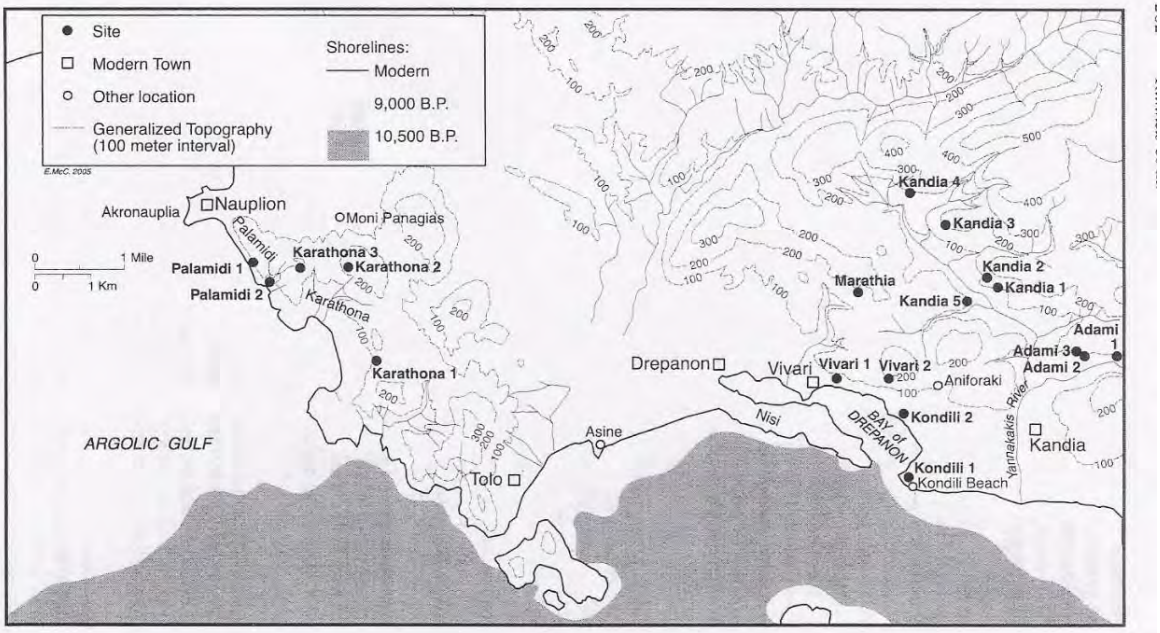


Figure 2. The Kandia survey area showing conjectural early Holocene shorelines and the sites mentioned in the text. The present shoreline is marked with a heavy black line with a light pattern showing the present sea level. The sea at 9,000 Cal BP is indicated by a medium pattern, and the 10,500 Cal BP sea by a darker pattern.

Kandia Survey — From: Runnels C., *et al*., 1995

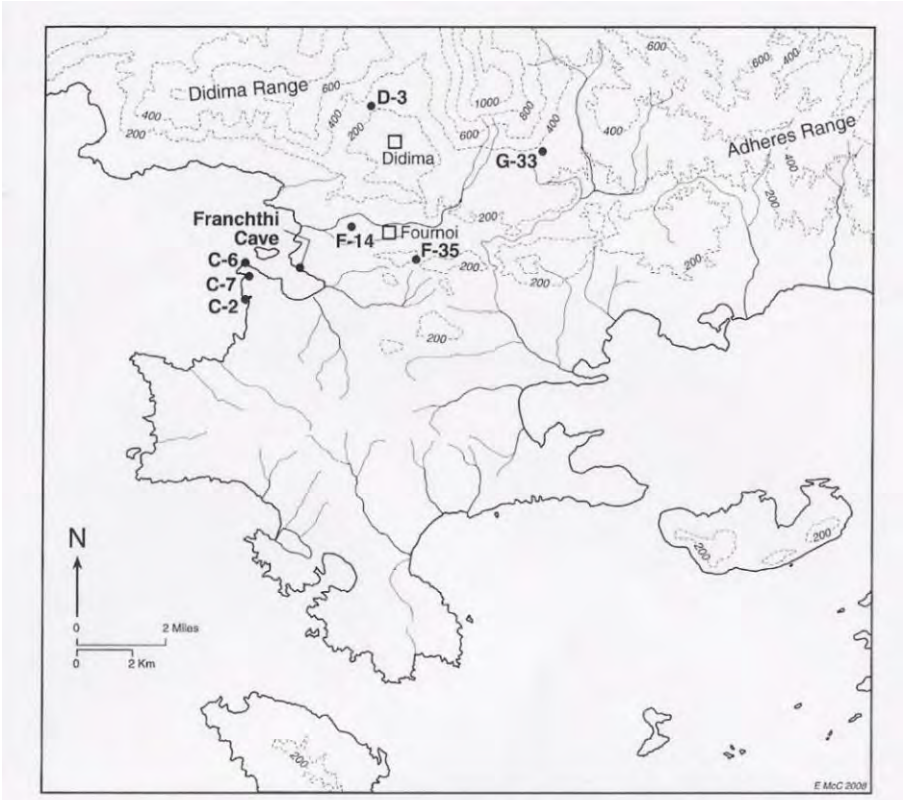
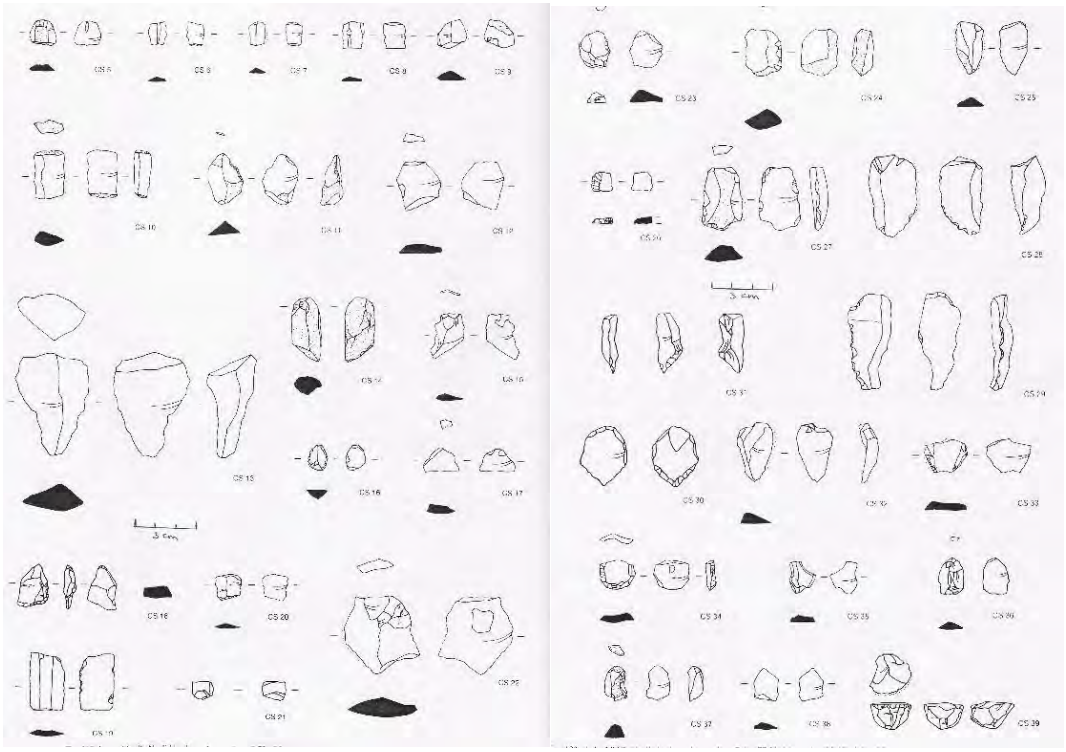


Figure 2. Probable Mesolithic sites (filled circles) in the Southern Argolid discussed in the text. Open squares are modern towns. Map by Eliza McClennen.

South Argolid Survey — From: Runnels C., *et al*., 1999

Figures – Region 8 – The Peloponnese and Megara



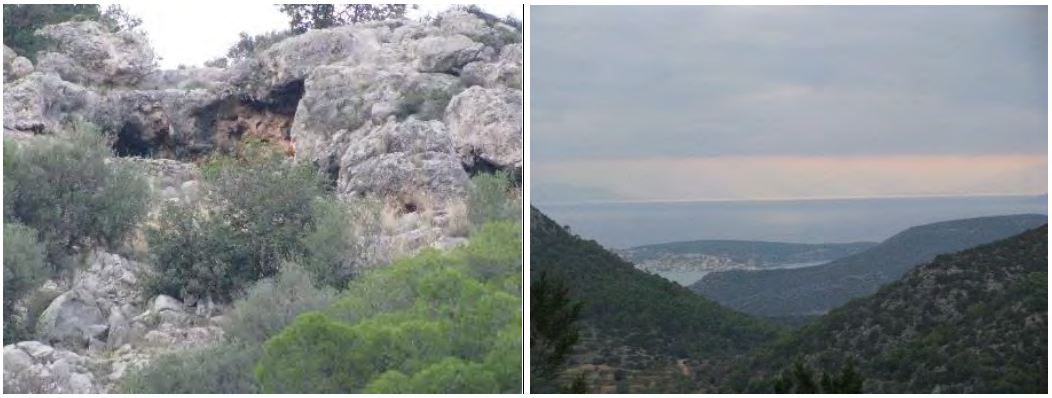
From: Carter T., 2003

Fig. R08-1 Lithics from the ASEA Survey in Arcadia.



Photos M. Templer

Fig. R08-2 Kandia Survey locations: Eastern shore of Bay of Depranon, which would not have been drowned during the Mesolithic, with the site of Kondili 1 Cave near the point at the end of the beach and Kondili 2 to the left of the spur separating the two beaches; Kondili 2 Cave on the present-day beach; Looking up the valley with the sites of Kandia 1, 2, 3 and 4 on the flank of the hill to the right (not identifiable).



Photos M. Templer

Fig. R08-3 Southern Argolid Survey: Site F-35 Koukou Cave, now a sheep-pen with a dry-stone wall in front; View from below Koukou Cave looking down towards the coast where Franchthi Cave is located.

	Site						
	C-2	C-6	C-7	F-14	F-35	G-33	D-3
Core	23	12	44	9	9		11
Flake	53	20	76	17	33	2	25
Blade	1					1	
Scraper	9		4	3			3
Notch/denticulate	12	3	7	14	9	1	9
Combination tool			1		1	1	2
Backed piece	3	2	1	1	2	1	1
Microlith	7	1		5	1		
Truncation	3	1	1	2	1	1	
Perçoir/bec	3			2			2
Retouched piece	27	2	8	6			7
Other	22	11		96	14		18
Total	163	52	142	155	70	7	78

Note: 'Scraper' includes end-scrapers and side-scrapers; 'combination tools' have two or more retouched edges forming typologically distinct tool types; 'backed piece' includes blades, flakes, and pieces with abrupt backing retouch; 'retouched piece' includes burins, *pièces esquillées*, and pieces with marginal lateral retouch or irregular retouch; 'other' includes fragmentary cores, blanks, and debitage.

Table 2. Basic composition of the Mesolithic assemblages. Of 1,615 lithics collected from 13 sites, 667 from seven sites were classified as Mesolithic. The totals for these sites are lower than those given in Table 1, because some objects were too fragmentary for classification.

From: Runnels C., 2009

Fig. R08-3a Lithics from the various Southern Argolid Survey locations.



Photos M. Templer

Fig. R08-4 Franchthi Cave in 2001, with the 'Paralia' to the right, now mostly under the Bay of Koilada, which would have been an alluvial plain during the Mesolithic and Transition; View into cave with collapsed brow rock fall to the front left, window at the rear and Trench G under the cave wall on the right; Trenches H looking back towards entrance, with the Neolithic brow-collapse behind.

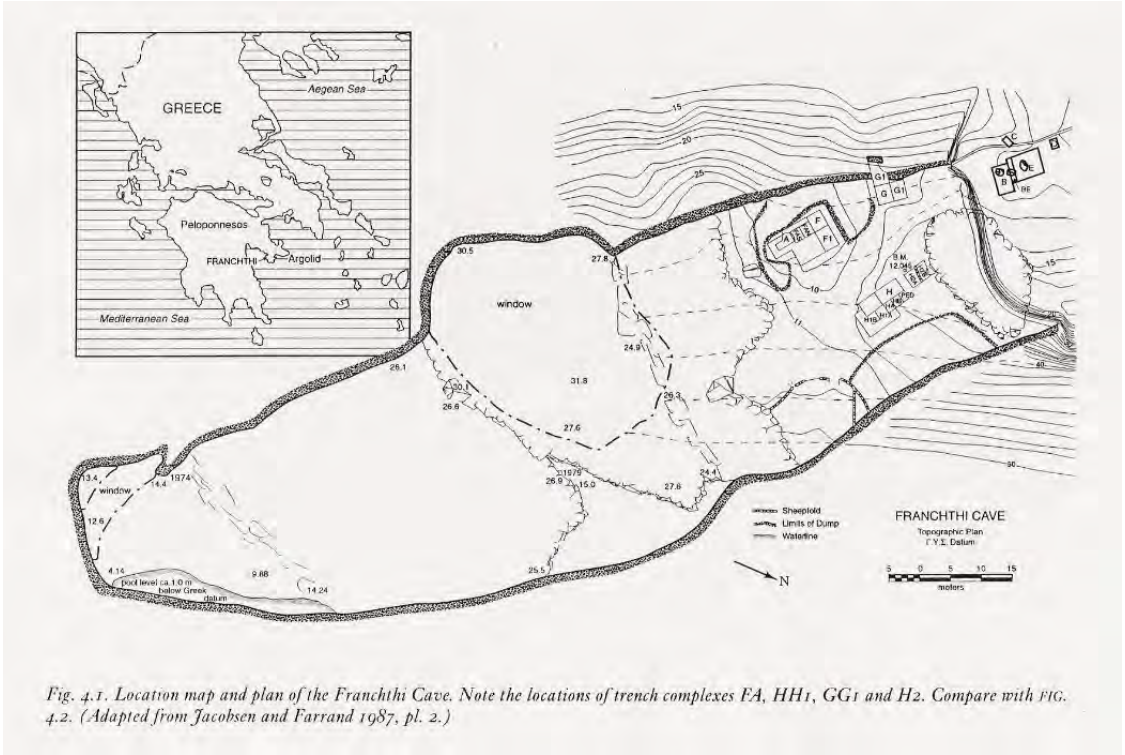


Fig. 4.1. Location map and plan of the Franchthi Cave. Note the locations of trench complexes FA, HH1, GG1 and H2. Compare with FIG. 4.2. (Adapted from Jacobsen and Farrand 1987, pl. 2.)

From: Farrand W., 2000

Fig. R08-5 Franchthi Cave plan showing excavated surfaces inside and outside the cave.

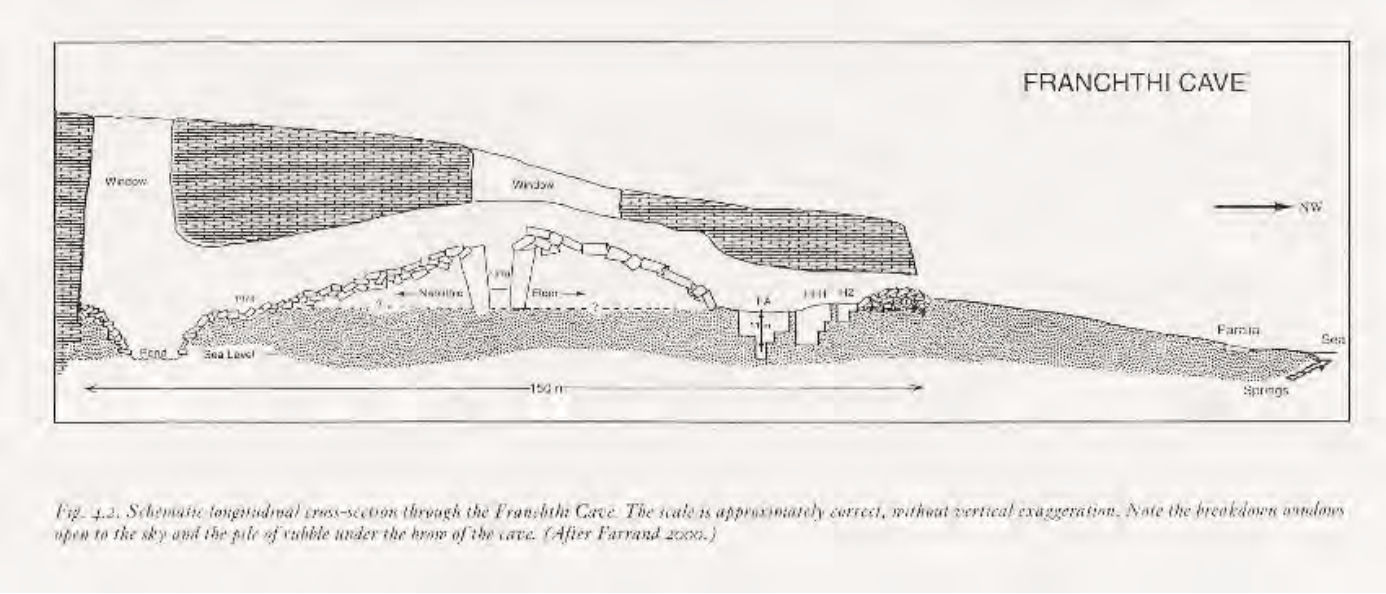


Fig. 4.2. Schematic longitudinal cross-section through the Franchthi Cave. The scale is approximately correct, without vertical exaggeration. Note the breakdown windows open to the sky and the pile of rubble under the brow of the cave. (After Farrand 2000.)

From: Farrand W., 2000

Fig. R08-5b Franchthi Cave Schematic cut, showing excavation pits on the Paralia and inside the cave, the various rock falls and windows.

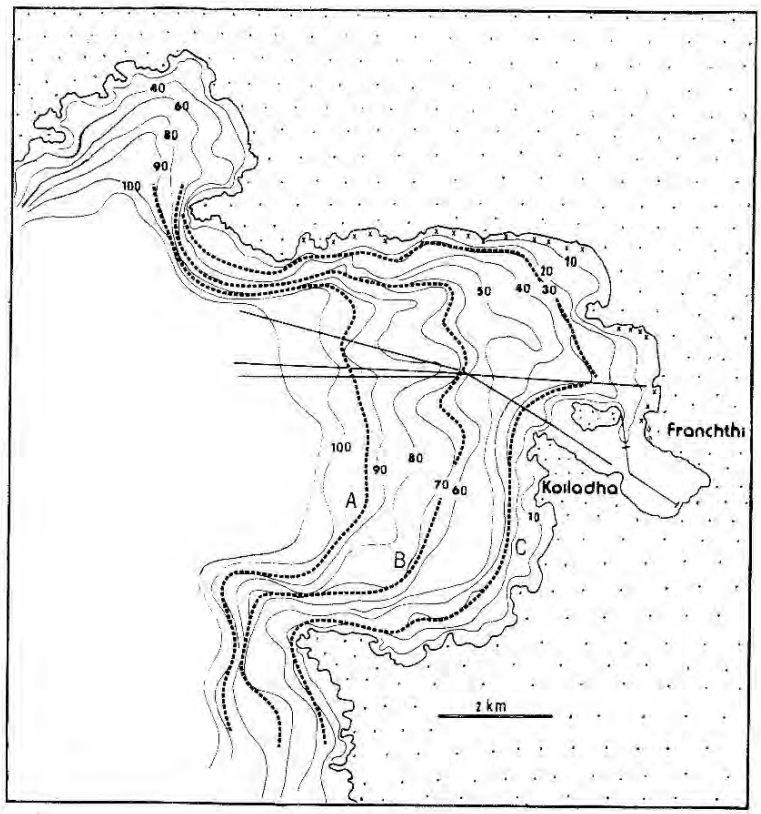


Figure 6 : Contours bathymétriques au large de la baie de Koilada. Les courbes de profondeur sont indiquées en mètres, et les lignes de rivage anciennes figurées en tiretés :

- A : XVIIème millénaire B.P.
- B : XIIème millénaire B.P.
- C : VIIIème millénaire B.P.

Les tracés rectilignes indiquent l'emplacement des transects sismiques effectués et les petites croix le long du rivage marquent l'emplacement de sources d'eau douce (d'après van Andel *et al.* 1980).

From: Perlès C., 1987

Fig. R08-5c Franchthi Cave in relation to the eustatic sea-rise.

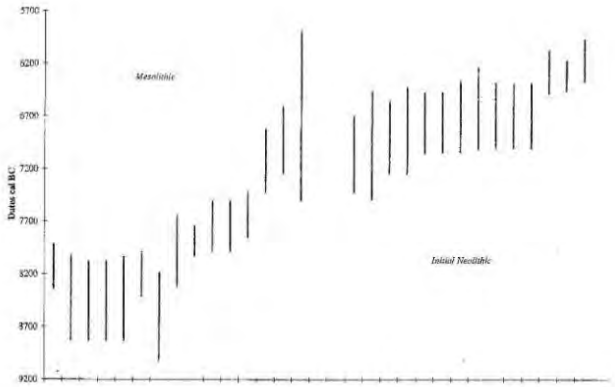


Fig. 5.7 Calibrated radiocarbon dates assigned to Mesolithic and Initial Neolithic levels.

From: Perlès C., 2001



FIGURE 3. Lower Mesolithic inhumation (Pr 1), with rocks covering part of the body.

From: Cullen T., 1995

Fig. R08-6 Franchthi Cave spread of ^{14}C dates over the Mesolithic and Neolithic occupation; Flexed Early Mesolithic burial.

Franchthi Cave Sequencing

Lithics Phases	Lithostratigraphic Phases	Ceramic Phases / Botanical Zones	Period	Dates	Details
	U				*Patella* & *Monodonta*
Phase VII	V		Mesolithic		*Patella* & *Monodonta*, *Equus*, *Bos* & *Capra* have disappeared. The sea is -38 m, the coast at 2 km & coastal plain reduced by 50% to 39 sq. km. Fishing for Tuna & grouper. Discrete presence of obsidian
	W1		Mesolithic		*Cyclope* & *Cerethium* due to sea level rise
	W2		Mesolithic		Thicker forest, less game. Reduced occupation of cave.
Phase VIII	W3	N/A - Bot. Zone V	Late Mesolithic		70% of land vertebrates red deer. Tuna 95% of fish bones & 50% of total fauna. Greater density of retouched tools with microliths (related to fishing?). Increased diversity & volume of botanical remains incl. *Hordeum sp.* & *Avena sp.* Andesite quernstone fragment. Sea -27 m. Non-standard chipped stone industry is flake-based on local poor quality stone and has a large component of microliths presumed relating to fishing activities with 1 sickle blade; obsidian 2.8%-3.5% of assemblage without nuclei
Phase VIII/IX	X1 / X2?	N/A - Bot. Zone V	Terminal Mesolithic	To *ca*. 6800 BC? & median of 2 dates *ca*. 6900 BC	deteriorating ceiling & éboulis. Evidence for reduced occupation, defined as hiatus. Reduced land snail but continued sea shell volume. Scarce megafauna with high percentage of fish remains. Large drop in botanical remains. Sea at -17 m. 90% fewer retouched tools; only 1 piece of obsidian
Phase IX/X	X2	Interphase 0/1 - Bot. Zone VI	Transition / Initial neolithic	To *ca*. 6500 BC. Medians of 3 dates fall between 6826-6740 BC	Very reduced human presence in this moist grey clay stratum. First limited appearance of pottery, ovicaprine bones and charred domesticated cereals. Twice vol. of retouched tools v. X1. Land snails virtually disappear & reduced seashells. Deer dominate large fauna & fish abundant at 20% of fauna. Imported obsidian reappears at 12% + honey flint of Neolithic technology, but bulk of lithics of Meso tradition comparable to Phase IX.
Phase X	Y1	Phase 1 - Bot. Zone VI	Early neolithic	*post ca*. 6500 BC. Median of earliest date 6554 BC.	Short unconformity ca. 100 years at the beginning. Climatic unconformity (6200 BC event). Abundant pottery. Ovicaprines appear & grow progressively to represent 80%-90% of megafauna. High botanical remains with emmer, einkorn, barley & lentils. Disappearance of wild oats, rye & lentils. Fishing declines as does red deer & pig. Structures on Paralia appear. Settlement near estuary? 70% of lithics of Meso tradition, 28% obsidian & 2% honey flint. A full full panoly of Neolithic attributes is present (polished stone axes, bone tools, weaving, ornaments, solid constructions)
	Y2?		E/Mid. Neo. Transition		Lithics 53% local rocks, 40% obsidian and 6% honey flint
	Y2		Middle Neo		Cave brow breakdown. Lithics 27% local, 52% obsidian, 19% honey flint
	Y3		Late Neolithic	*ca*. 4000 BC	Window at rear appears at end of Neolithic

M. Templer

Fig. R08-7 Franchthi Cave correlation and principal events during the Terminal Mesolithic, Transition and Neolithic.

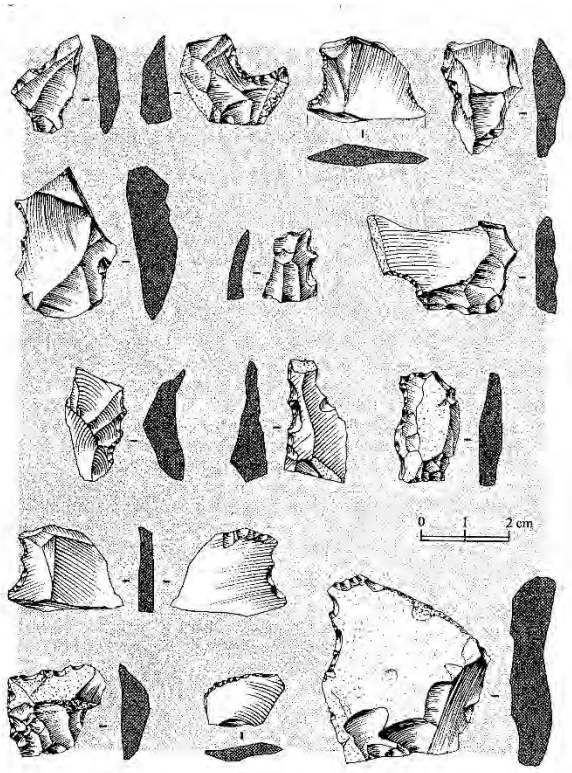


Fig. 2.4 Stone tools from the Upper Mesolithic of Franchthi (after Perlès 1990a).

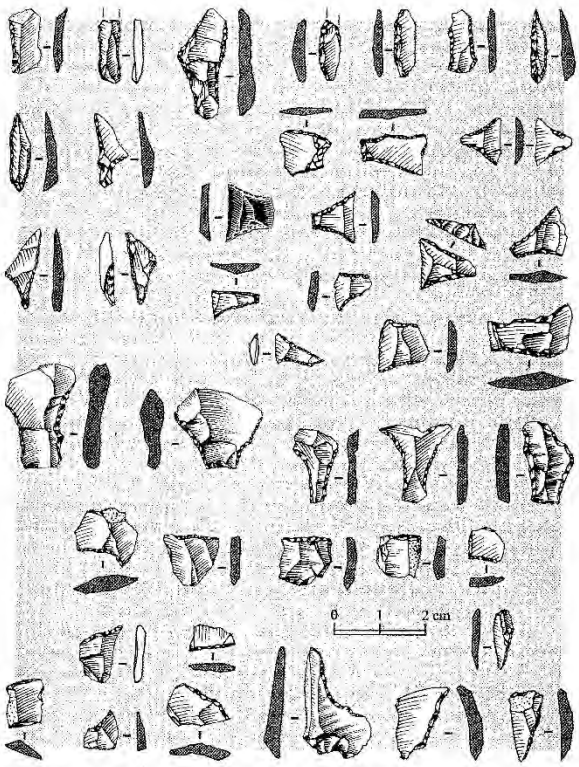


Fig. 2.5 Microlithic tools from the Upper Mesolithic of Franchthi (after Perlès 1990a).

From: Perlès C., 2001

Fig. R08-8 Franchthi Cave Lithics: Terminal Mesolithic tools and microliths.

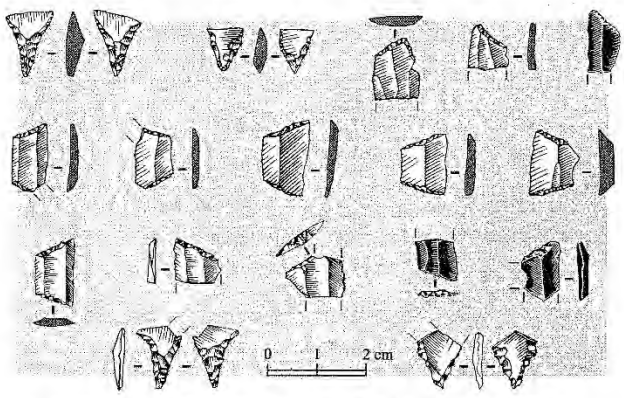


Fig. 3.2 Final Mesolithic transverse arrow-heads and Initial Neolithic trapezes from Franchthi.

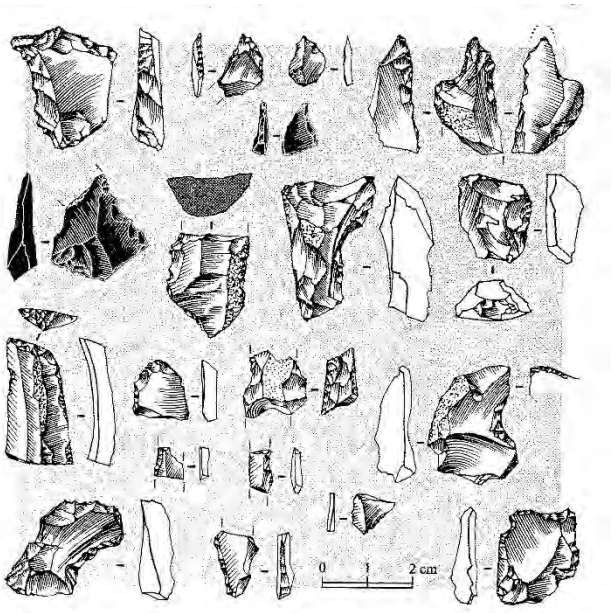


Fig. 3.1 Lithic tools of Mesolithic tradition, from the Initial Neolithic at Franchthi (after Perlès 1990a).

From: Perlès C., 2001

Fig. R08-8a Franchthi Cave Lithics: Early Neolithic tools and microliths of Mesolithic tradition.



Photos M. Templer

Fig. R08-9 Kephalari Cave entrances and remainder of cave fill behind concrete wall.



Photos M. Templer

Fig. R08-10 Klisoura Cave 1 site is right of centre under the dark rock-face; Cave site in 2012.

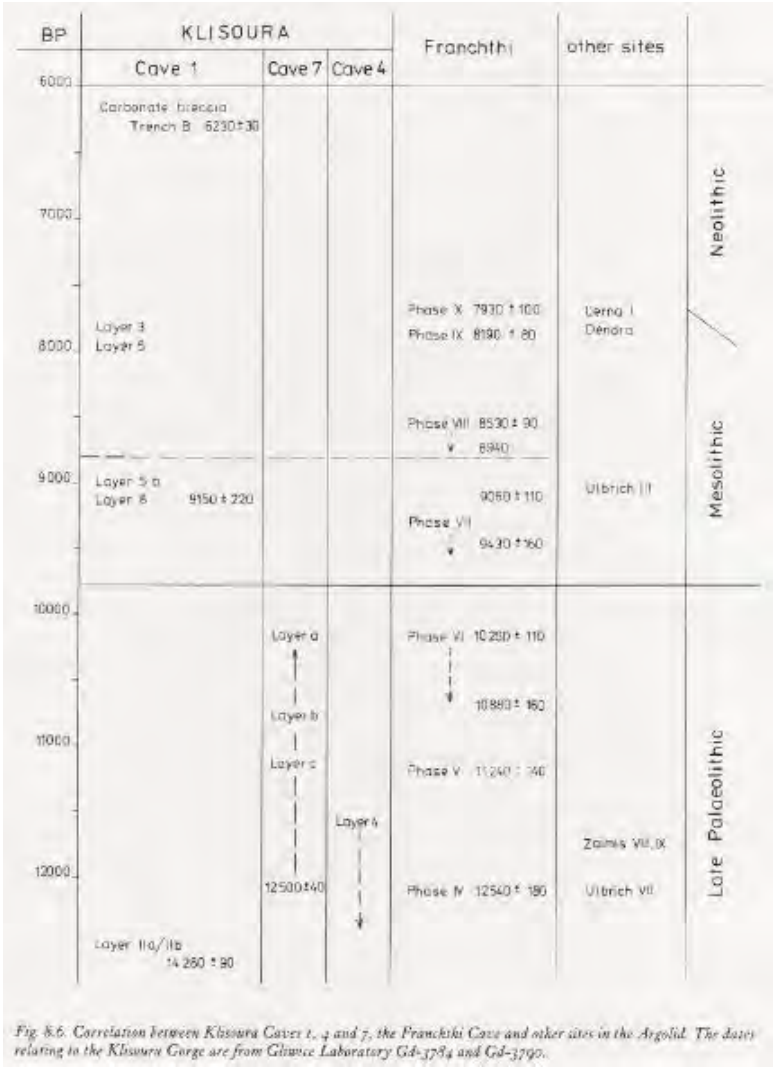


Fig. 8.6. Correlation between Klisoura Caves 1, 4 and 7, the Franchthi Cave and other sites in the Argolid. The dates relating to the Klisoura Gorge are from Gliwice Laboratory Gd-3784 and Gd-3790.

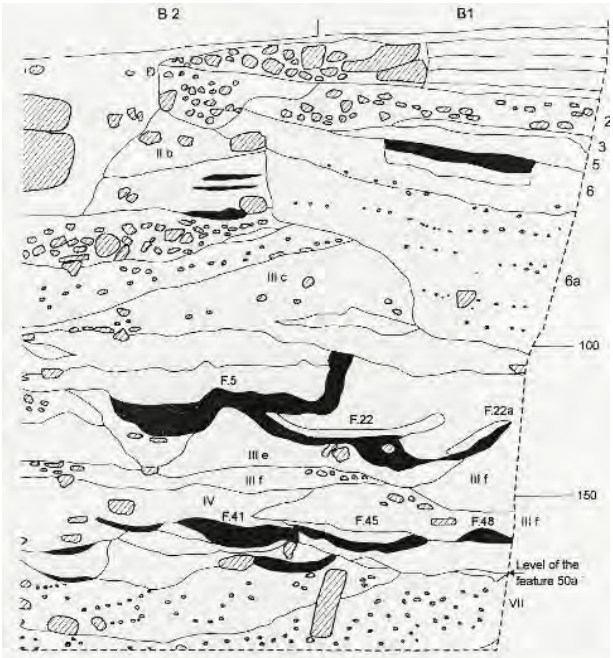


Fig. 8.3. Part of the western section of trench 1 with Mesolithic layers 3, 5 and 6. (layers 4 and 5a are not represented in this section).

From: Koumouzelis M., *et al.*, 2003

Fig. R08-11 Klisoura Cave 1 stratigraphic sequence compared to Franchthi Cave; Stratigraphic cut with Mesolithic Layers 3,5,6 near top (Layers 4 and 5a not represented on this cut).

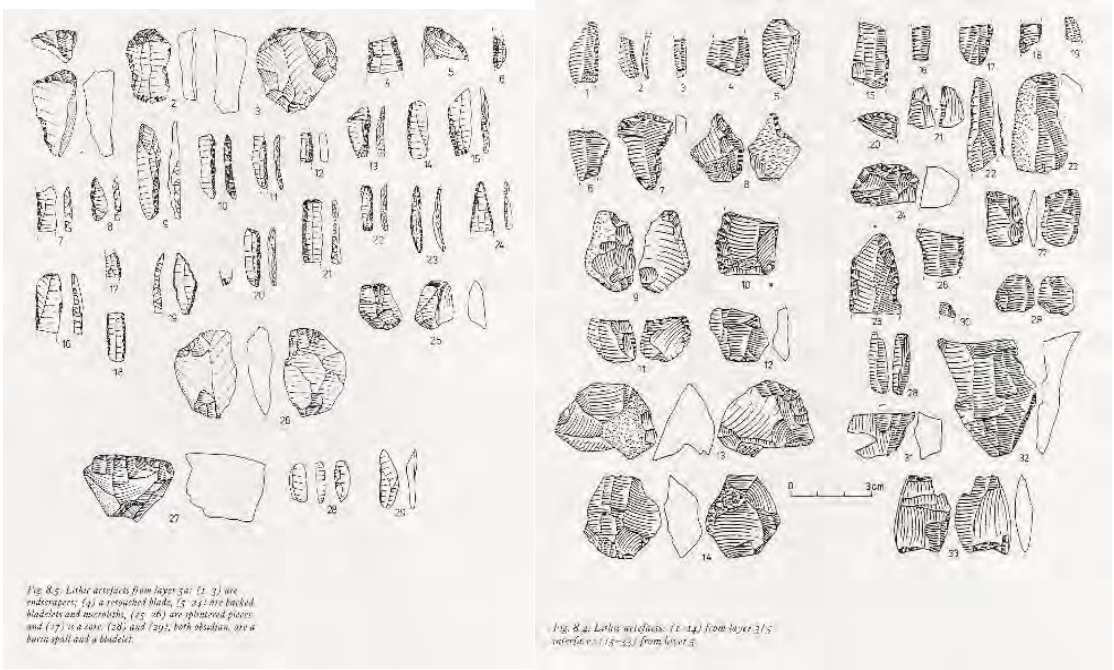


Fig. 8.5. Lithic artefacts from layer 5a: (1–3) are endscrapers; (4) a retouched blade, (5–24) are backed bladelets and microliths, (25–26) are splintered pieces and (27) is a core. (28) and (29), both obsidian, are a burin spall and a bladelet.

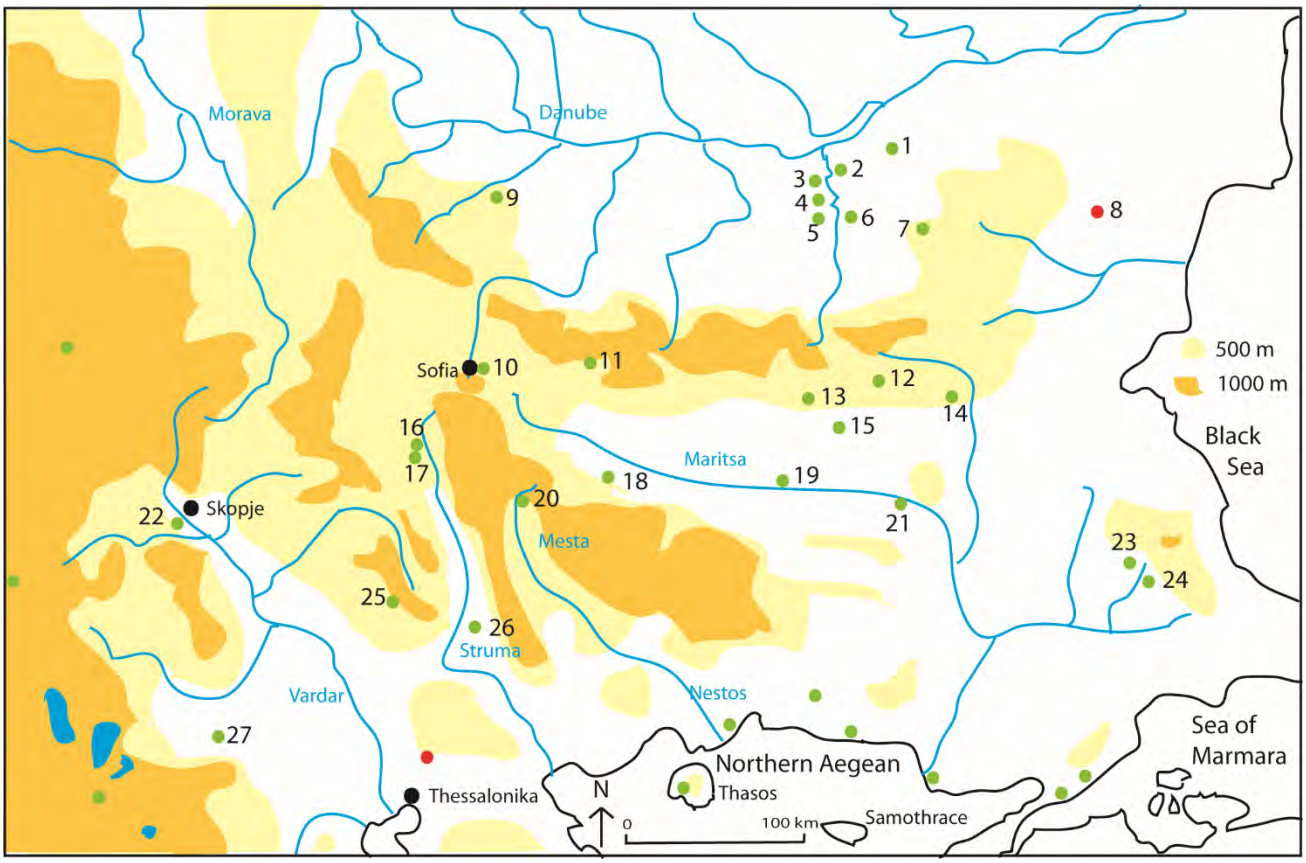
Fig. 8.4. Lithic artefacts: (1–14) from layer 3/5 interface; (15–33) from layer 5.

From: Koumouzelis M., *et al.*, 2003

Fig. R08-12 Klisoura Cave 1 Mesolithic lithics from Level 5a, with items 28 and 29 in obsidian; Mesolithic and Transition lithics from Level 3-5 (1-14) and Level 5 (15-32).

Map R09

Region 9 – Eastern Central Balkans – Bulgaria and Rep. of Macedonia



Map R09

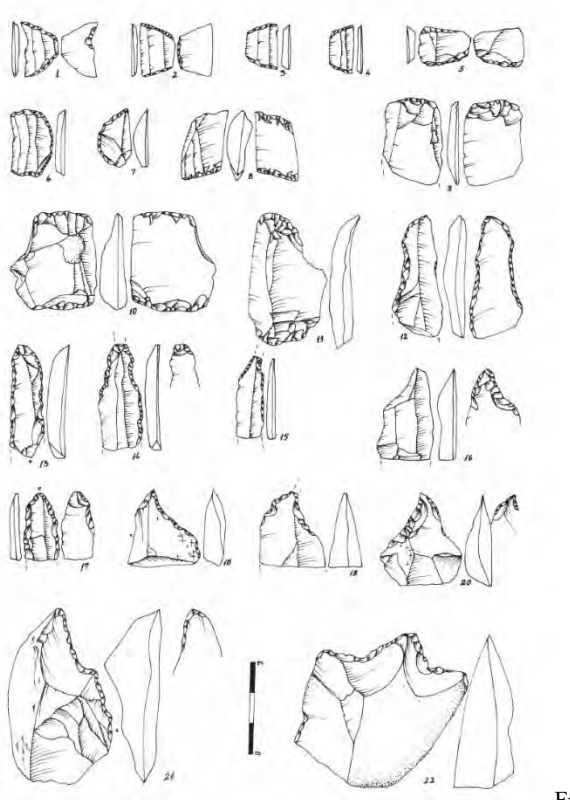
Notes:
● = Mesolithic / Transition sites
● = Neolithic / Transition sites

The map includes sites shown here for information to the south and west of the Region, which are dealt with in Region 4 (Thrace), Region 8 (Eastern Greece and the Sporades Islands) and Region 13 (Western Greece and Albania).

Site names:

1. Pomoshtitsa; 2. Koprivets; 3. Orlovets; 4. Pločite; 5. Kachitza; 6. Dzhuljunitsa; 7. Poljanitsa Plateau; 8. Dekilitazh; 9. Ohoden-Valoga and Ohoden-Zaeshkoto; 10. Slatina and Slatina-Gradini; 11. Čavdar; 12. Azmak; 13. Kazanlak; 14. Karanovo; 15. Stara Zagora; 16. Galaknik; 17. Kraïnitsi; 18. Kapitan Dimitrievo; 19. Yabalkovo; 20. Elešnica; 21. Drama; 22. Cerje-Govrlevo; 23. Bulgar Kaynaği; 24. Aşaği Pinar; 25. Vršnik; 26. Kovačevo; 27. Anzabegovo.

Figures – Region 9 – Bulgaria and Rep. of Macedonia

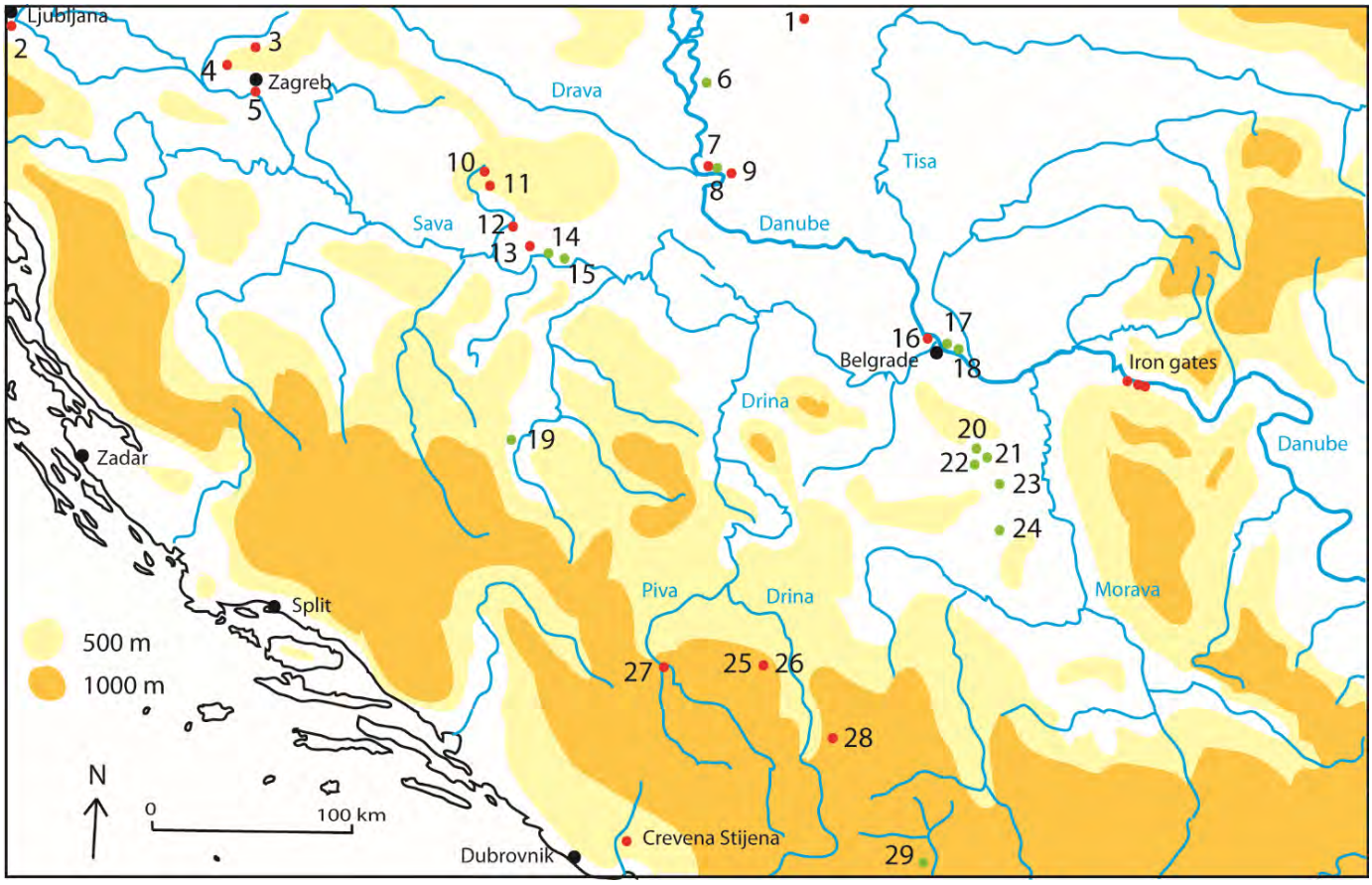


From: Zlateva-Uzunova R., 2009

Fig. R09-1 Ohoden-Valoga lithics from early pit-hut occupation.

Map R10

Region 10 – Eastern Central Balkans – Serbia to Slovenia east of Dinaric Alps



Map R10

Notes:
● = Mesolithic / Transition sites
● = Neolithic / Transition sites

Site names:

1. Noszja Pörös.; 2. Breg; 3. Veternica Pećina; 4. Travni vrh; 5. Šupljata Pećina; 6. Donja Branjevina; 7. Bačka Palanka; 8. Golokut-Visič; 9. Topole-Bać; 10. Lakušija; 11. Papuk Mountain; 12. Brodski Drenovak; 13. Bíc River boat; 14. Galovo-Slovenski Brod; 15. Zadubravlje; 16. Economija 13. Maj; 17. Starčevo-Grad; 18. Vinča-Belo Brdo; 19. Obre 1; 20. Banja; 21. Divostin; 22. Grivac; 23. Blagotin; 24. Tečić; 25. Medena stijena; 26. Mališina stijena; 27. Odmut Cave; 28. Trebacki Krs; 29. Rudnik Kosovski.

Figures – Region 10 – Serbia to Slovenia east of the Dinaric Alps



From: Biró K., *et al.*, 2005

Fig. R10-1 Carpathian Basin wetlands in the 18th century AD.



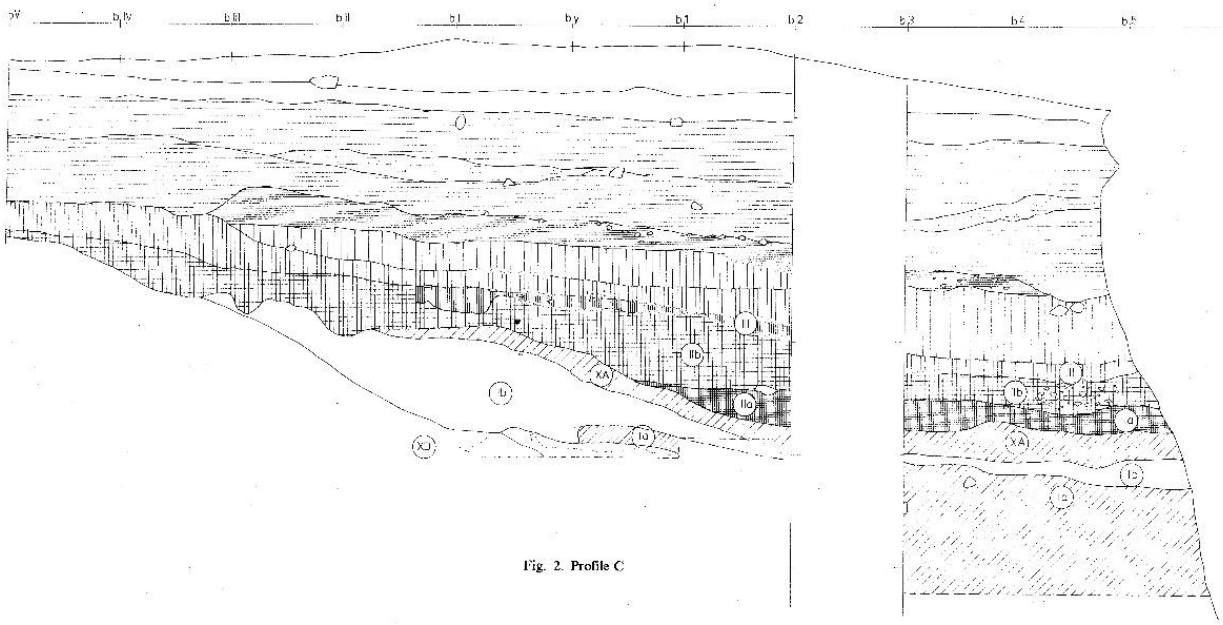
Photo Davor H. & Family

Fig. R10-2 Betalov Spodmol entrance beneath rock-shelter.



Photo M. Templer

Fig. R10-3 River Piva Canyon downstream from Odmut Cave.



From: Kozlowski J., *et al*., 1994

Fig. R10-4 Odmut Cave Stratigraphic Levels.

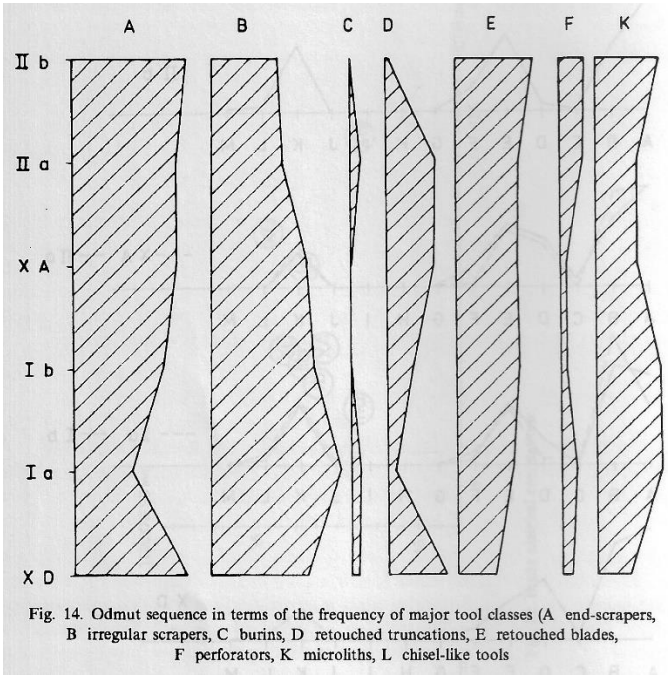


Fig. 14. Odmut sequence in terms of the frequency of major tool classes (A end-scrapers, B irregular scrapers, C burins, D retouched truncations, E retouched blades, F perforators, K microliths, L chisel-like tools

From: Kozlowski J., *et al*., 1994

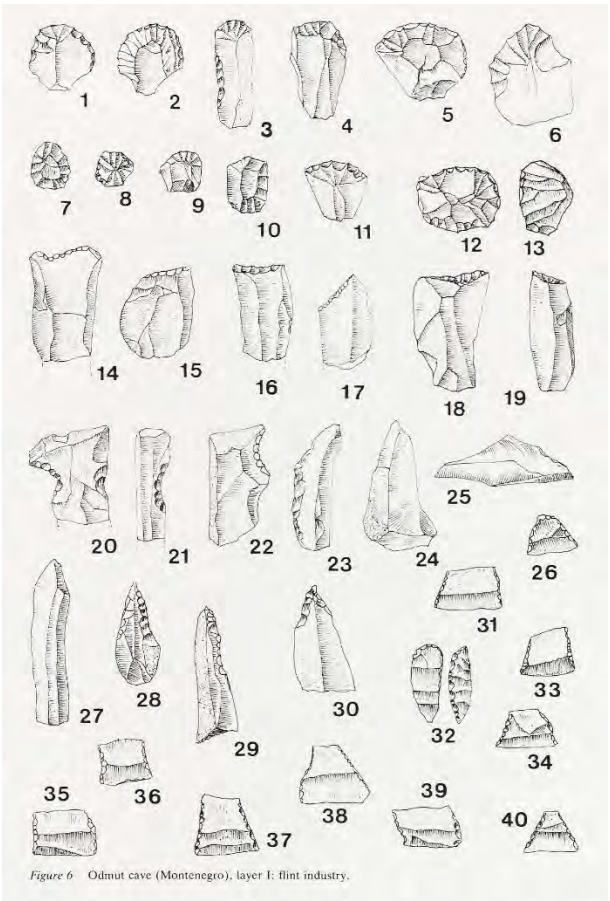
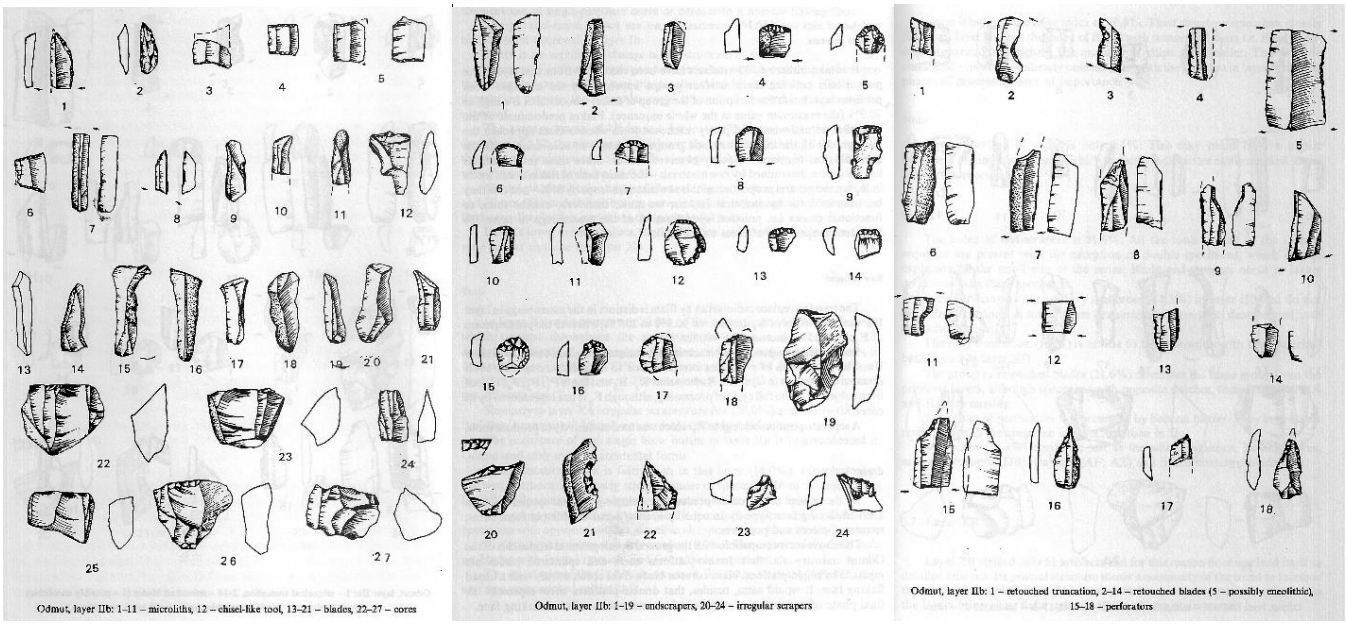


Figure 6 Odmut cave (Montenegro), layer I: flint industry.

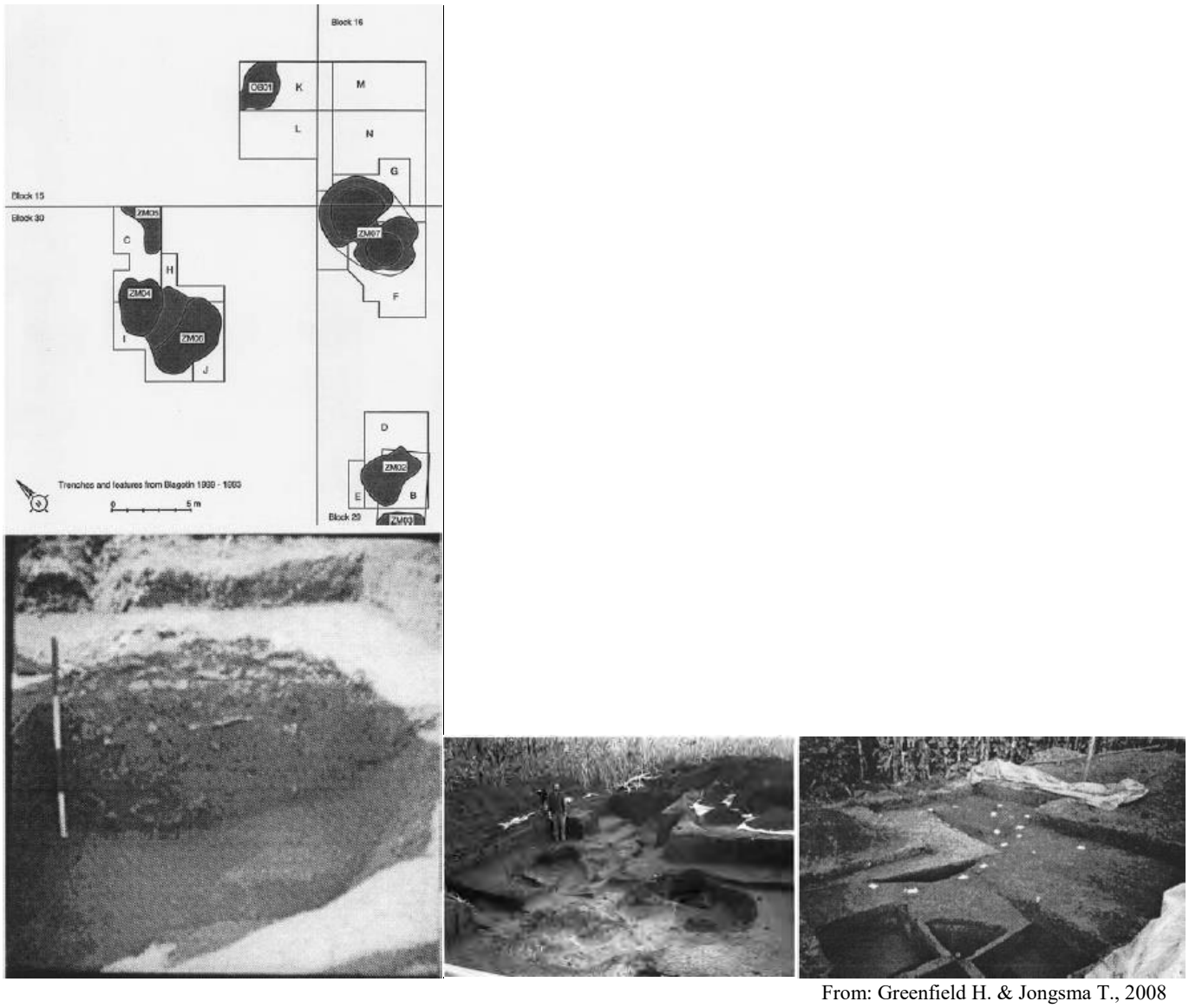
From: Srejović D., 1989

Fig.R10-4a Odmut Cave principal tool types between the Mesolithic and Transition by stratigraphic level (7000-5000 BC); Lithics from Mesolithic Level I showing Romanellian influence, particularly in thumbnail scrapers.



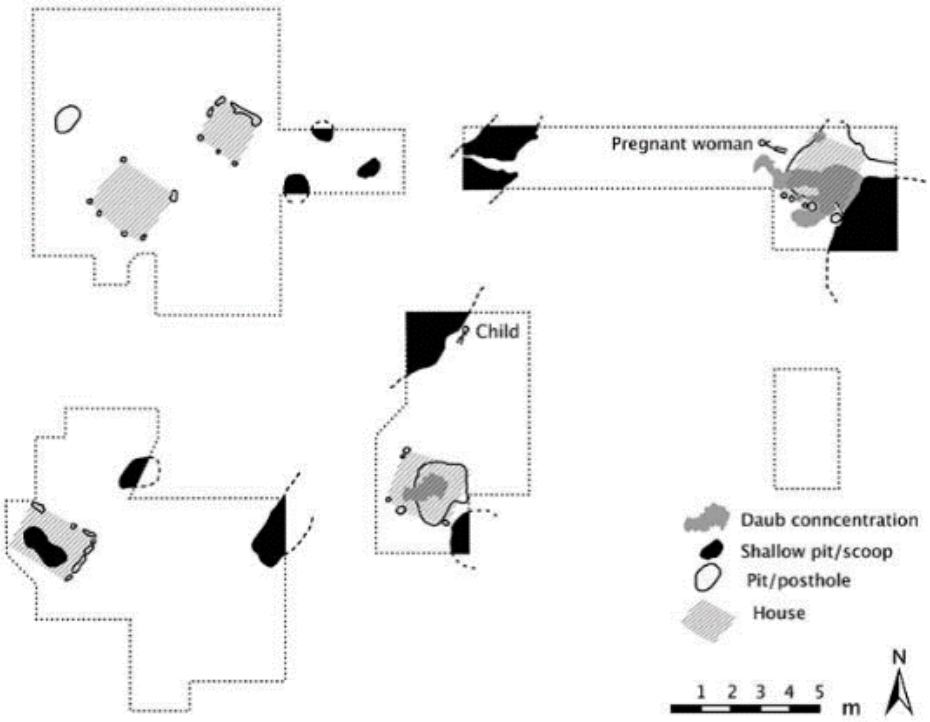
From: Kozlowski J., *et al*., 1994

Fig. R10-4b Odmut Cave lithics from Mesolithic Level IIb



From: Greenfield H. & Jongsma T., 2008

Fig. R10-5 Blagotin excavations of pit structures.



From: Bogdanović M., 1988

Fig. R10-6 Divostin excavated surface in which the earlier Starčevo Culture pit-huts and later Vinča Culture quadrangular above-ground structures can be seen.

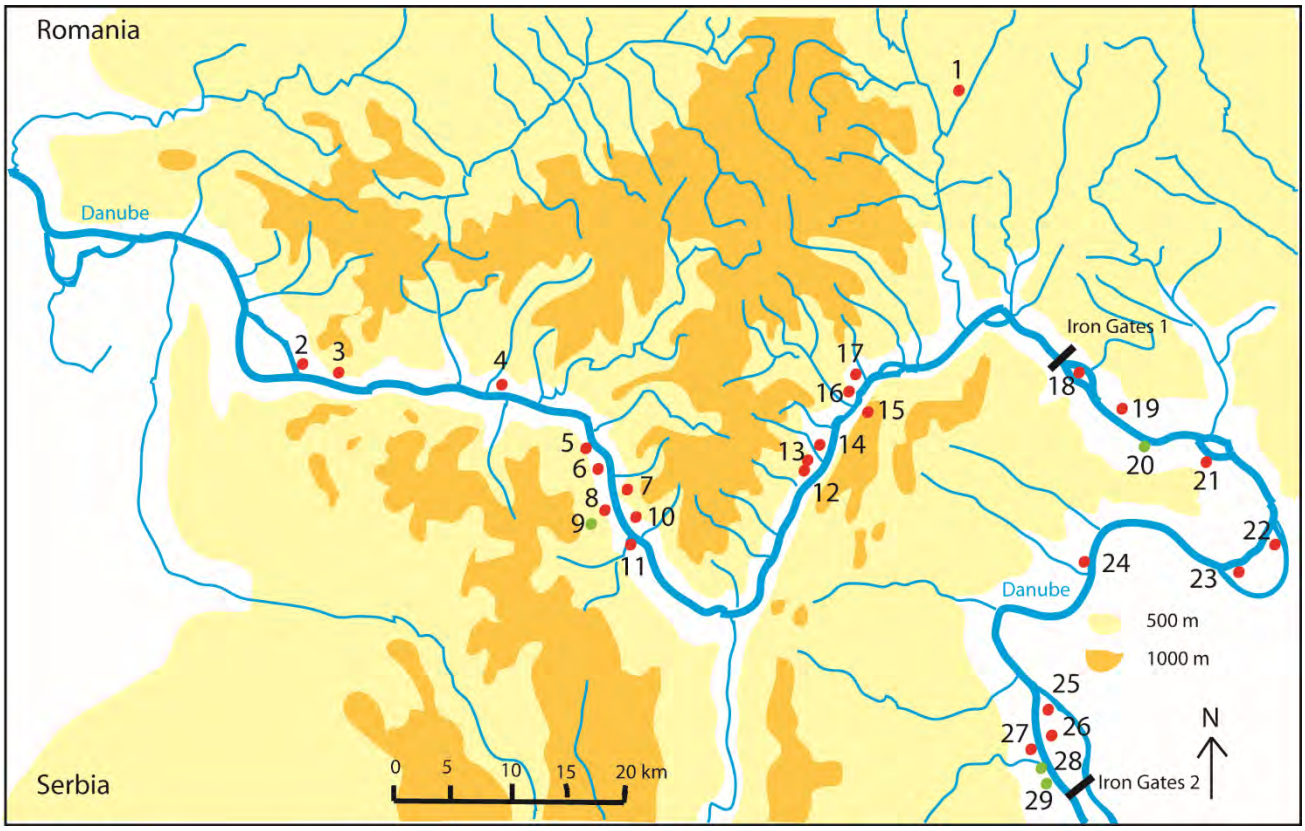


Photo Hucaljuk M.

Fig. R10-7 Galovo-Slovenski Brod excavated surface.

Map R11

Region 11 – Eastern Central Balkans – The Iron Gates



Map R11

Notes:
● = Mesolithic / Transition sites
● = Neolithic / Transition sites

Site names:

1. Băile Herculane; 2. Privod; 3. Alibeg; 4. Vodneac; 5. Padina; 6. Stubica; 7. Ilişova; 8. Lepenski Vir; 9. Aria Babi; 10. Izlaz; 11. Vlasac; 12. Cuina Turcului; 13. Climente I and Climente II; 14. Veterani Cave and Veterani Terrace; 15. Hajdučka Vodenica; 16. Icoana; 17. Răzvrăta; 18. Ostrovu Banului; 19. Schela Cladovei; 20. Donje Butorke; 21. Ajmana; 22. Ostrovu Corbului - north; 23. Ostrovu Corbului- south; 24. Velesnica; 25. Ostrovu Mare km 875; 26. Ostrovu Mare km 873; 27. Kula; 28. Knjepište; 29. Kamenički Potok.

Figures – Region 11 – The Iron Gates



Photo M. Templer

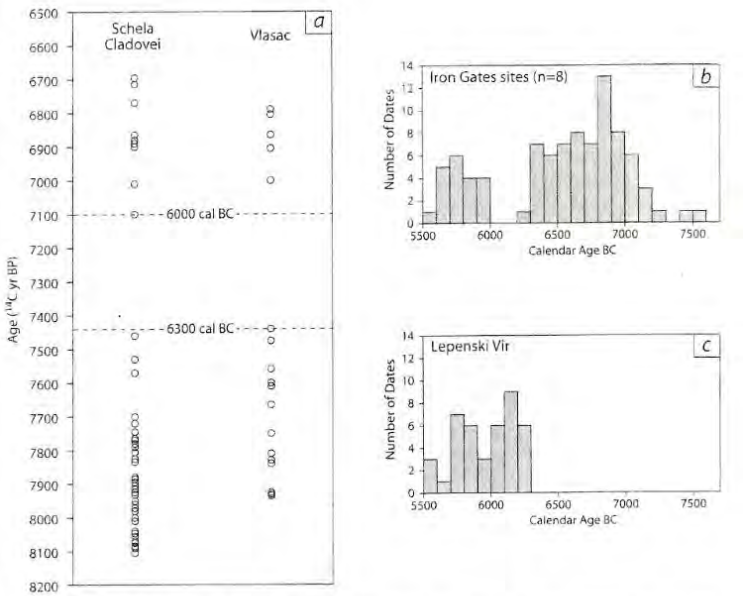


Figure 10.6. The radiocarbon 'gap' in the Iron Gates: *a*. ^{14}C mean ages for Schela Cladovei and Vlasac; *b*. Calibrated (median probability) ages per 100-year period between 5500 and 7700 BC from Hajducka Vodenica, Icoana, Ostrovu Banului, Ostrovu Corbului, Padina, Razvrata, Schela Cladovei, and Vlasac; *c*. Calibrated (median probability) ages per 100-year period between 5500 and 7700 BC from Lepenski Vir. The radiocarbon dates listed in Table 10.4 have been excluded.

From: Bonsall C., 2008

Fig. R11-1 Treskavac Mountain facing the site of Lepenski Vir; The abandonment of numerous Iron Gates sites at the time of the '6200 BC event' as evidenced by the ^{14}C dates.

Table 3. *Faunal remains from central Balkan Early Neolithic sites. The 'number of taxa' column includes all bones identified to a class or finer taxonomic level. Unidentified ovicaprines (i.e. those that are not identified to either Ovis or Capra) are not counted if* Ovis *or* Capra *are present. If* Ovis *or* Capra *are not present, then unidentified ovicaprines would be counted only once. All invertebrates, bird, and fish remains, respectively, are each treated as a single taxon owing to the low level of analysis accorded their remains (Bökönyi 1970, 1974, 1976, 1988; Clason 1980; Lazić 1988; Moskalewska 1986; Schwartz 1976; Greenfield n.d. a, b).*

Site	Figure abbreviations	Number of taxa	Wild		Domestic		NISP	Notes
Anza I–III	A	14	138	4.25%	3112	95.75%	3250	*a*
Blagotin	B	18	719	8.29%	7959	91.71%	8678	*a*
Bukovačka Česma	BC	11	166	61.48%	104	38.52%	270	
Divostin I	D	14	203	8.45%	2198	91.55%	2401	
Foeni-Salaș	F	17	416	19.87%	1678	80.13%	2094	
Golukot	G	10	893	68.38%	413	31.62%	1306	
Hajdučka Vodenica	H	11	211	84.40%	39	15.60%	250	
Lepenski Vir III	L	21	1765	74.50%	640	27.02%	2369	
Ludoš-Budžak	LB	18	572	20.91%	2163	79.09%	2735	
Madžari	M	17	185	6.44%	2689	93.56%	2874	
Nosa	N	16	736	71.88%	229	22.36%	1024	
Obre I	O	19	1700	20.75%	6491	79.25%	8191	
Padina B	P	19	2656	92.64%	211	7.36%	2867	
Rug Bair	R	9	13	1.88%	680	98.12%	693	*b*
Starčevo	S	19	1029	25.91%	2943	74.09%	3972	

a. Sieved and unsieved samples were not separated during analysis.
b. Sieved fauna from the American excavations.

From: Greenfield H., 2008a

Fig. R11-1a Faunal assemblage of sites in the Balkans.

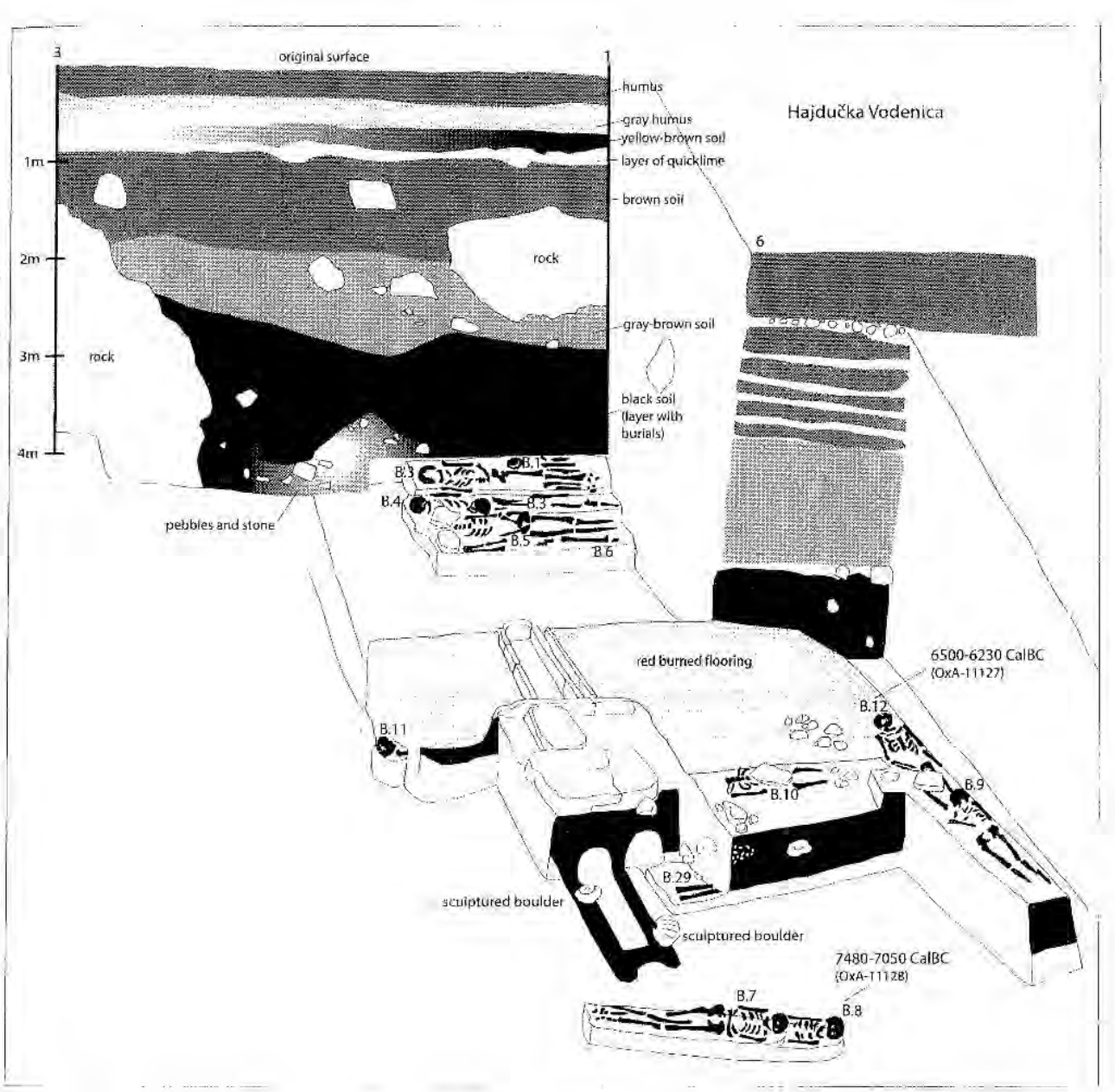


Figure 12
Isometric view of the 'sacrificial hearth' area, front part of the 'grave chamber', and Section 3-1, Hajdučka Vodenica (adopted after Jovanović 1969c, 68 and 1967, fig. 2).

From: Borić D. & Miracle P., 2004

Fig. R11-2 Hajdučka Vodenica sacrificial burial area stratigraphy and some burials, showing ^{14}C dates corrected for the WRE in the text.

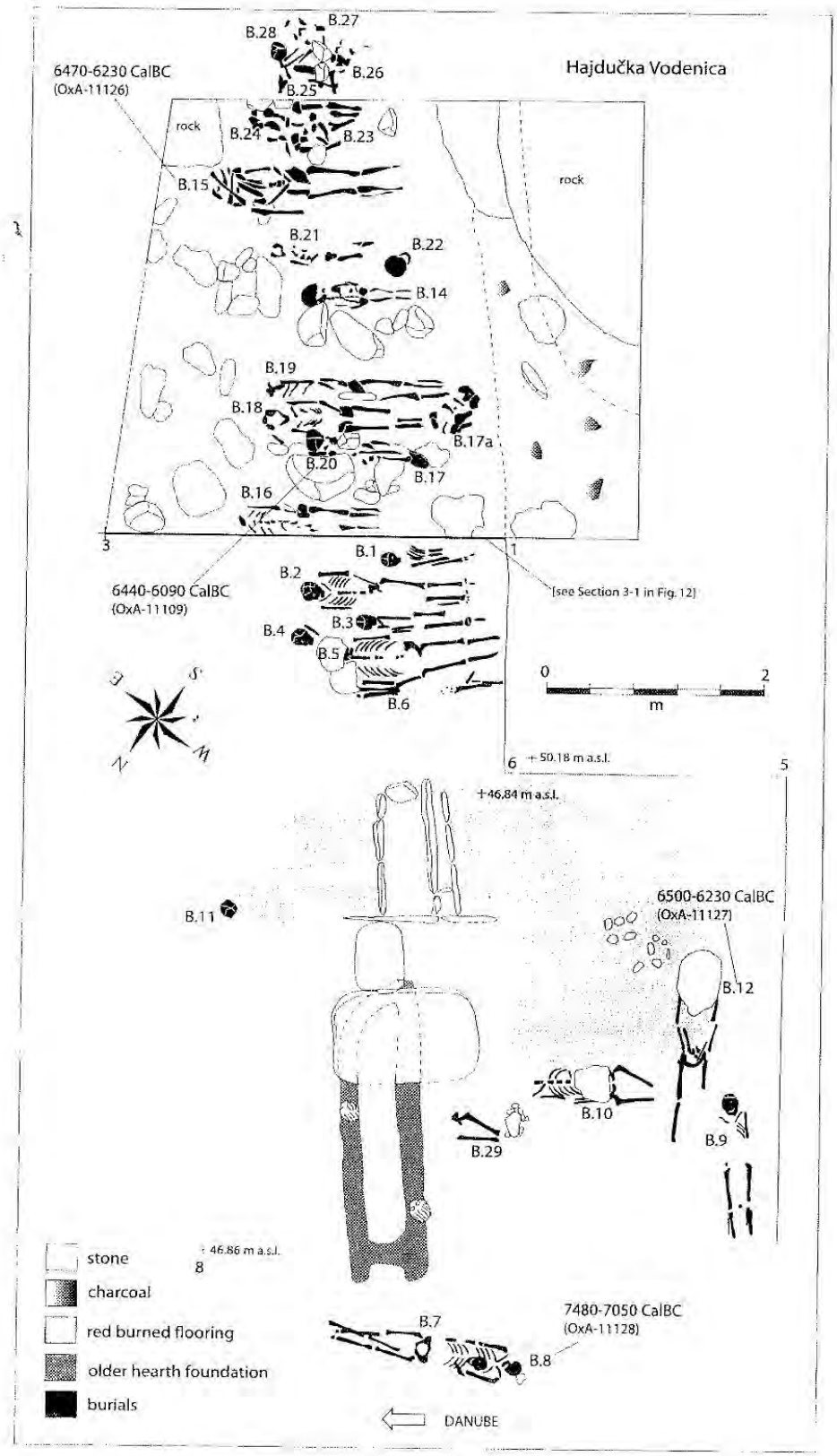
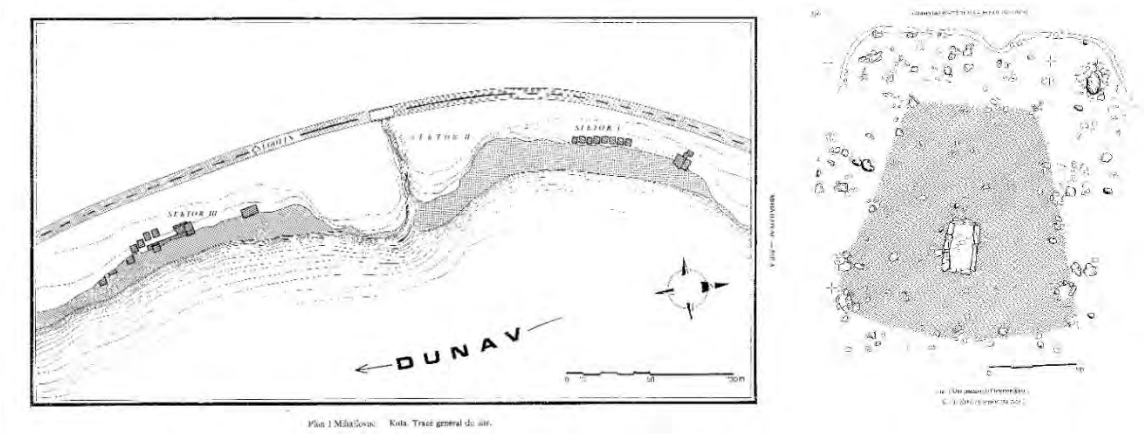


Figure 11
Architectural features and burials, Hajdučka Vodenica; dated burials marked (plan: courtesy B. Jovanović).

From: Borić D. & Miracle P., 2004

Fig. R11-2a Hajdučka Vodenica sacrificial burial area and burials, showing ^{14}C dates corrected for the WRE in the text.



From: Sladić M., 1986

Fig. R11-3 Kula excavated area; trapezoidal structure with rectangular hearth from occupational Phase I.

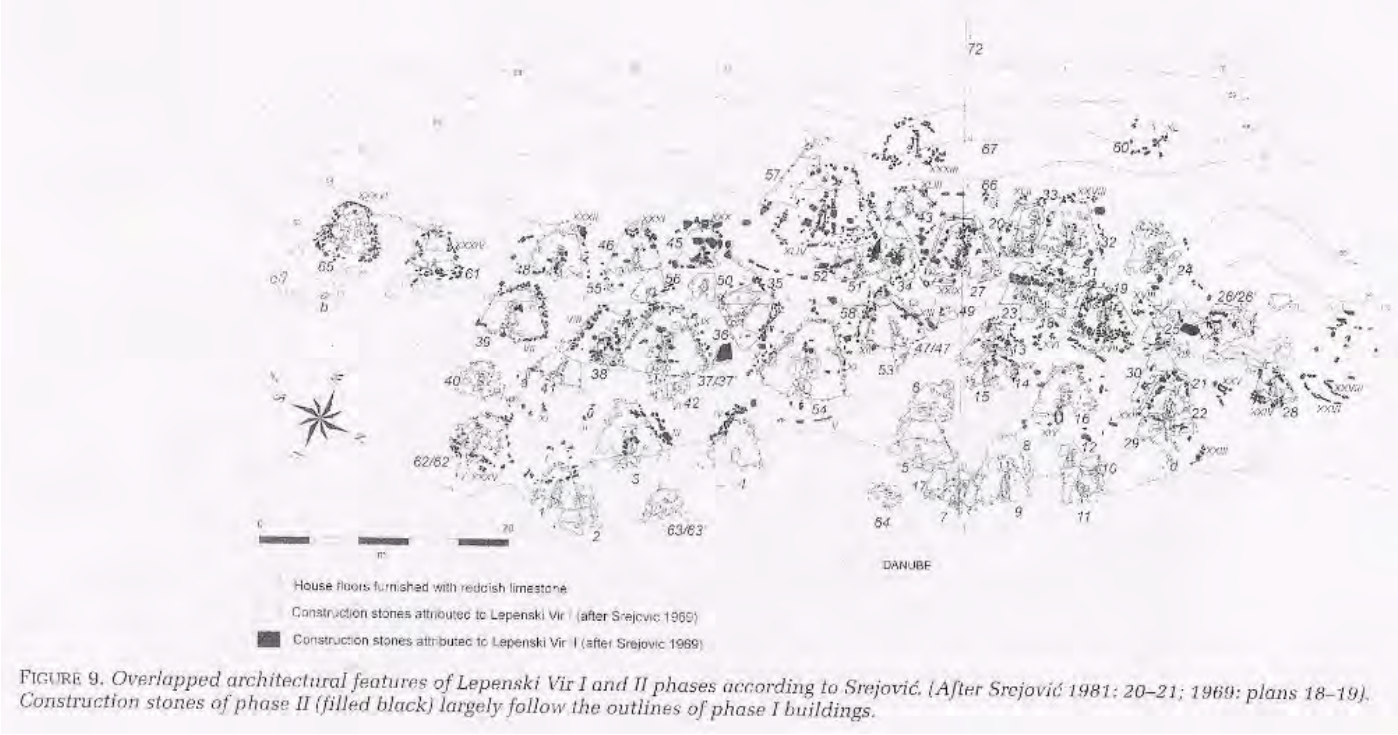


FIGURE 9. *Overlapped architectural features of Lepenski Vir I and II phases according to Srejović. (After Srejović 1981: 20–21; 1969: plans 18–19). Construction stones of phase II (filled black) largely follow the outlines of phase I buildings.*

From: Boric D., 2002

Fig. R11-4 Lepenski Vir plan of Phases I and II excavated surface.



Photo M. Templer

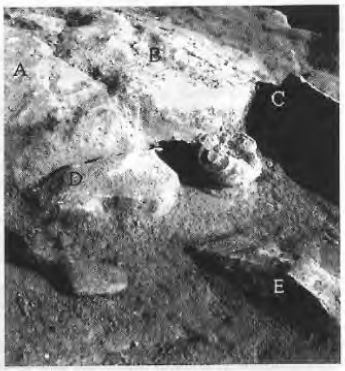


FIGURE 1. *A pot* in situ, *house 54, Lepenski Vir I/2. (Photo Institute of Archaeology, Belgrade.)*

From: Garašanin M. & Radovanović I., 2001



Figure 10.12. Trapezoidal buildings with carefully laid plaster floors, stone-bordered 'hearths', and other stone fixtures are a conspicuous feature of Lepenski Vir. In this example so-called altars – large tabular stones with artificially ground hollows in the upper surface – can be seen set into the floor behind the hearth and adjacent to the near side of the building. Such buildings began to be erected on the site during the Final Mesolithic around 6300 cal BC, but their construction continued throughout the Early Neolithic between 6000 and 5500 cal BC when pottery and farming were introduced to the region (© Archaeological Institute, Beograd).

From: Bonsall C., 2001

Fig. R11-5 Photo of excavated surface moved up to museum; Photo of pot from Lepenski Vir Phase I/2 withheld by D. Srejović; Trapezoidal building at time of excavation with lime-plastered floor, hearth, and 'alters'.



Photos M. Templer

Fig. R11-6 Lepenski Vir examples of 'boulder art'.

Table 3 Correcting human bone dates from Lepenski Vir for the aquatic reservoir age using the $\delta^{15}N$ value to determine percentage aquatic diet

Lab nr (OxA-)	Sample context	^{14}C age (BP)	$\delta^{13}C$ (‰)	$\delta^{15}N$ (‰)	Aquatic diet (%)	Corrected ^{14}C age (BP)
5827	Phase IIIb, sk 31a	7770 ± 90	−18.7	15.7	86	7310 ± 108
5830	Phase IIIb, sk 44	7590 ± 90	−18.9	15.3	81	7150 ± 106
5828	Phase IIIb, sk 32	7270 ± 90	−19.5	11.9	43	7040 ± 95
5831	Phase IIIa, sk 88	7130 ± 90	−20.2	10.9	32	6960 ± 93
5829	Phase IIIb, sk 35	6910 ± 90	−19.7	11.2	36	6720 ± 93

From: Cook G., *et al.*, 2001

Table 1. *AMS radiocarbon ages and stable isotope values for human burials from Lepenski Vir. Body position: Es – extended supine; Dd – dorsal decubitus; C – crouched; D - disarticulated; ? – uncertain*

Burial No.	Body position	Skeletal element	Lab ID	^{14}C age BP	$\delta^{13}C$ ‰	$\delta^{15}N$ ‰	Reservoir-corrected ^{14}C age BP	Calibrated age range (2σ) BC/AD	Median probability BC/AD
60	Es	R or L femur	OxA-11715	9470±55	-18.9	15.5	9020±80	8445–7953	8226
61	Es	R femur	OxA-11698	7860±50	-18.8	16.1	7374±80	6406–6071	6247
14	Es	R femur	OxA-11704	7830±45	-18.6	15.7	7368±75	6396–6072	6239
54c	Es	L femur	OxA-11696	7610±45	-19.6	12.4	7346±57	6365–6074	6205
26	Es	R tibia	OxA-11693	7380±45	-20.1	9.6	7284±47	6233–6056	6148
54e	Es	L femur	OxA-11697	7550±45	-19.1	13.0	7250±59	6227–6017	6126
7/I	Es	R femur[1]	OxA-12979	7697±38	-17.5	16.6	7183±77	6225–5907	6056
7/I	Es	R femur[2]	OxA-11692	7710±50	-18.1	16.2	7218±81	6243–5917	6094
62	Es	R femur or R tibia	OxA-11718	445±63	-18.5	9.3	—	*AD 1327–1635*	*AD 1465*
29	Es	L femur	OxA-11706	445±31	-18.4	9.4	—	*AD 1415–1606*	*AD 1445*
30	Es	R humerus	OxA-11717	477±34	-18.4	10.3	—	*AD 1404–1463*	*AD 1432*
69	Dd	L femur	OxA-11703	9180±50	-19.0	14.6	8784±72	8202–7609	7869
32a	C	L femur	OxA-5828	7270±90	-19.6	11.9	7036±95	6066–5728	5911
9	C	L femur	OxA-11695	7150±45	-19.4	10.8	6982±50	5983–5747	5866
88	C	Femur or L tibia	OxA-5831	7130±90	-20.2	10.5	6980±92	6023–5677	5862
8	C	L femur	OxA-11694	7050±45	-19.7	9.8	6942±47	5972–5729	5821
2	C	R femur	OxA-11719	5425±50	-19.5	10.6	5269±54	4236–3974	4108
4	C	L fibula	OxA-11699	485±31	-18.2	9.2	—	*AD 1405–1451*	*AD 1430*
54d	D	L femur	OxA-11700	7785±45	-17.7	15.2	7353±72	6385–6067	6219
45b	D	L femur	OxA-11701	7805±50	-18.5	15.8	7337±79	6388–6053	6198
39a	D	Scapula	OxA-11705	7780±50	-18.6	15.8	7312±79	6366–6029	6172
32a	D	L humerus	OxA-5827	7770±90	-18.7	15.7	7308±108	6401–5997	6177
44	D	R humerus	OxA-5830	7590±90	-18.9	15.3	7152±106	6233–5797	6027
89a	D	Tibia	OxA-11702	7595±45	-18.1	15.7	7133±75	6208–5845	6008
16	?	L ulna	OxA-11716	1874±40	-18.4	10.5	1724±44	*AD 219–420*	*AD 316*
35	?	Long bone	OxA-5829	6910±90	-19.7	11.2	6730±93	5792–5483	5643

Sample collected in 2000

Sample collected in 1989

From: Bonsall C., *et al.*, 2008

Fig. R11-7 Lepenski Vir ^{14}C dates corrected for the WRE.



Photos M. Templer

Fig. R11-8 Lepenski Vir inhumations: the first '*à la turque*' and the second in an extended supine position are Mesolithic. The third, in a foetal/crouched/hocker position, is typical of the Starčevo Early Neolithic.



Photo M. Templer

Fig. R11-9 Ostrovu Banului Island just below the Iron Gates 1 dam at the exit of the Iron Gates Gorges.



Photo M. Templer

Fig. R11-10 Looking out to the southern tip of the Romanian island of Ostrovu Corbului in the Ključ, where the site of Ostrovu Corbului – South is located. The land in the Ključ is suitable for agriculture.



Photo M. Templer

Fig. R11-11 Looking down on Mihajlovac where the site of Kula is located on a river terrace close to the river in the Ključ, with the island of Ostrovu Mare in the distance, on which the sites of Ostrovu Mare km 873 and Ostrovu Mare km 875 are located.

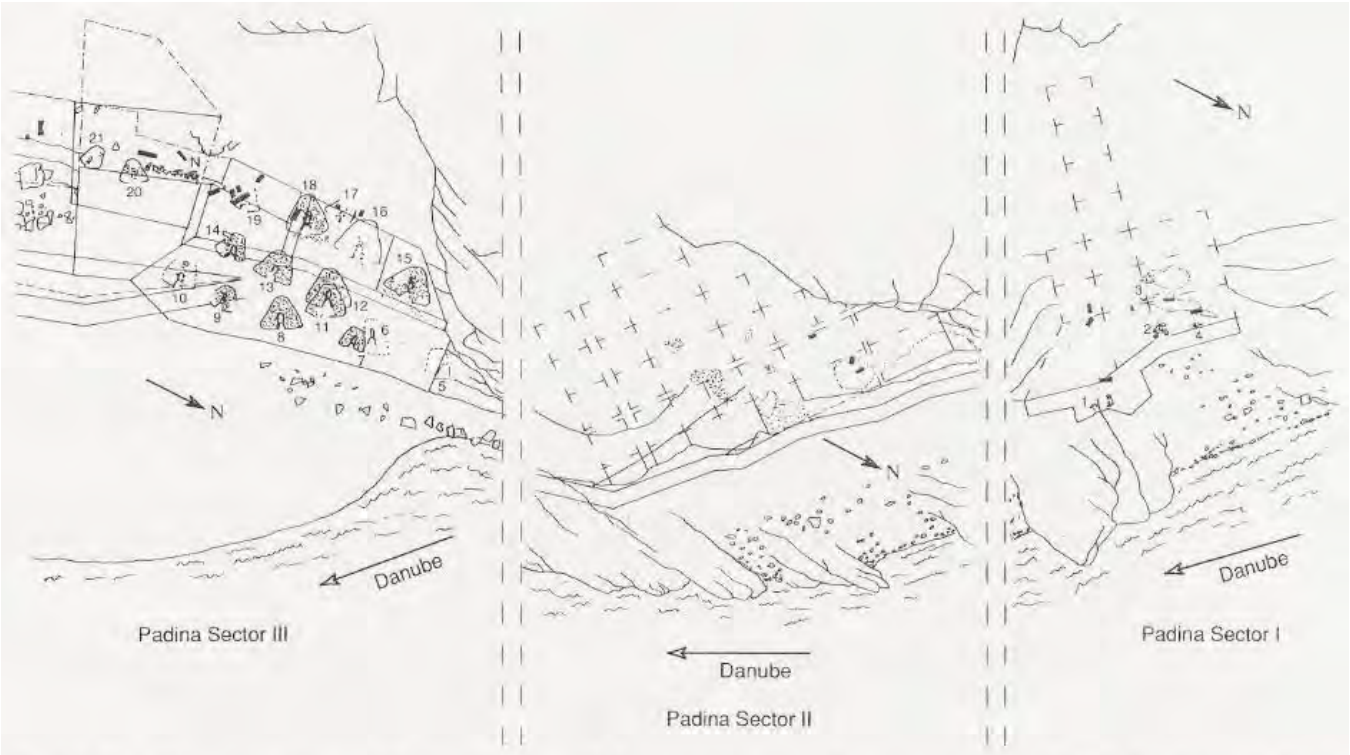


Fig. 3.1. Plan of the general situation of the site of Padina, with three sectors, showing the stone construction ("N," Padina A), burials (black rectangles, Padina A, Padina B) along the site axis, and the habitations (Padina B) (after Jovanović 1971).

From: Radovanović I., 1996

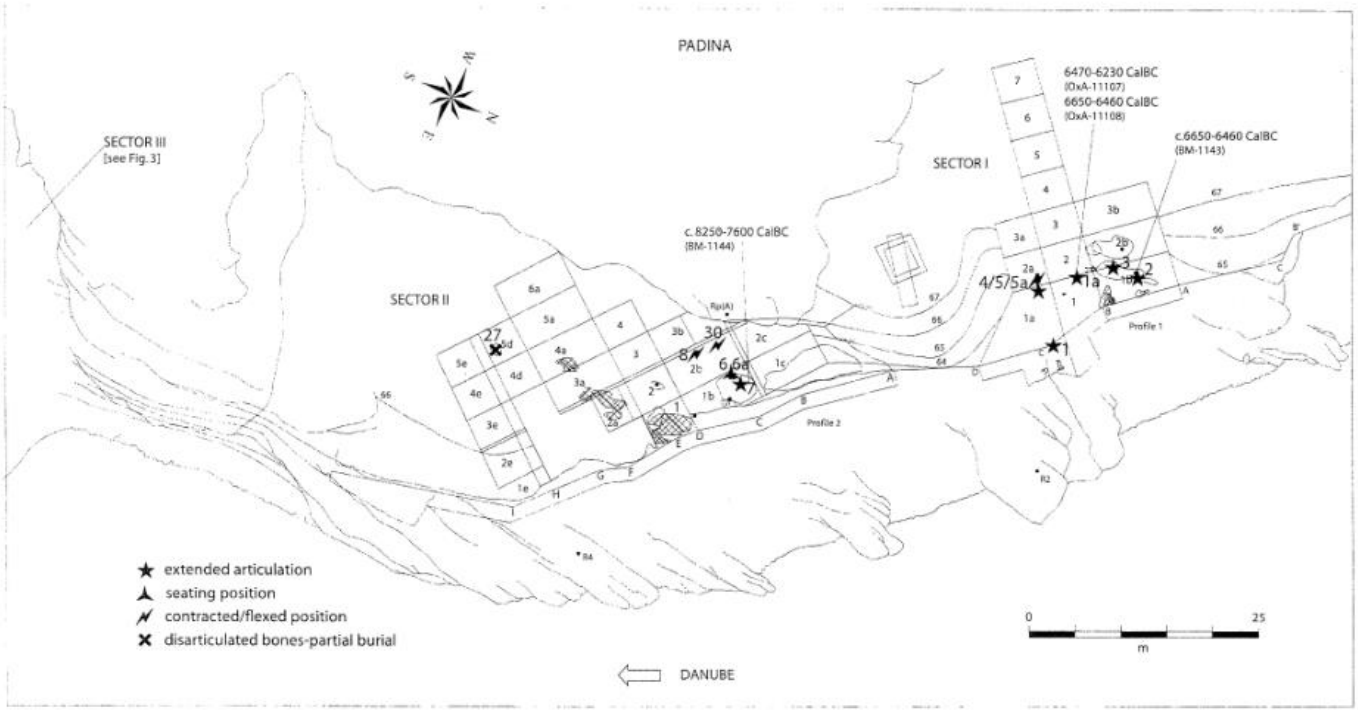


Figure 2
Architectural features and burials, Sectors I–II, Padina; provenance of dated samples marked (plan: courtesy B. Jovanović).

From: Boric D., 2004

Fig. R11-12 Padina Sectors I, II and III; architectural features, burials and dates in Sector II

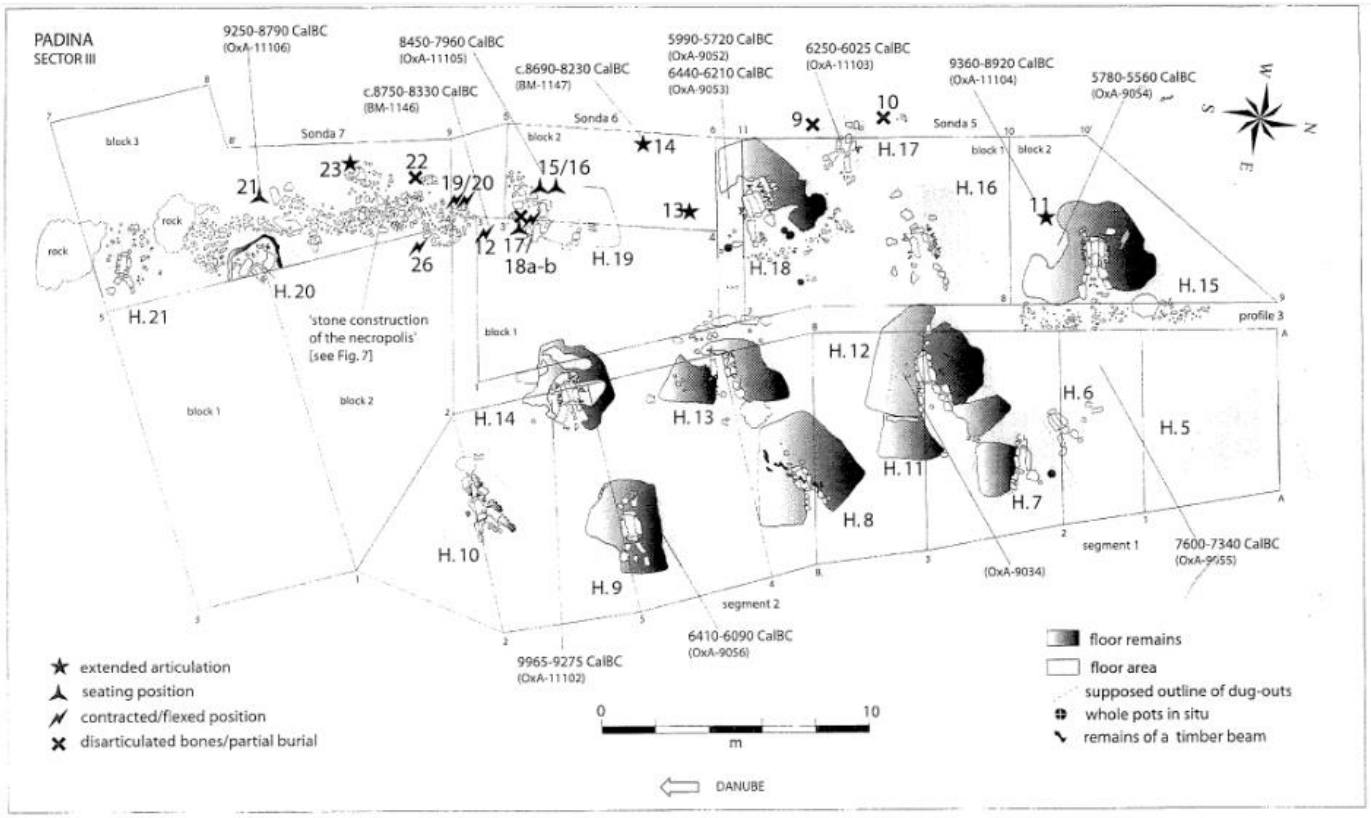


Figure 3
Architectural features and burials, Sector III, Padina; provenience of dated samples marked (plan: courtesy B. Jovanović).

From: Boric D., 2004

Fig. R11-12a Padina Sector III showing architectural features, burials and dates.



Fig. 3.5. A view of the Padina B habitations in Sector III of the Padina site. Photograph courtesy of B. Jovanović.

From: Radovanović I, 1996



FIGURE 2. *House 18 from Padina with in situ pottery. (Photo courtesy B. Jovanović).*

From: Borić D., 2002

Fig. R11-13 View of Padina B Sector III excavations; Padina B, Sector III trapezoidal house 18 with hearth and *in-situ* pottery.

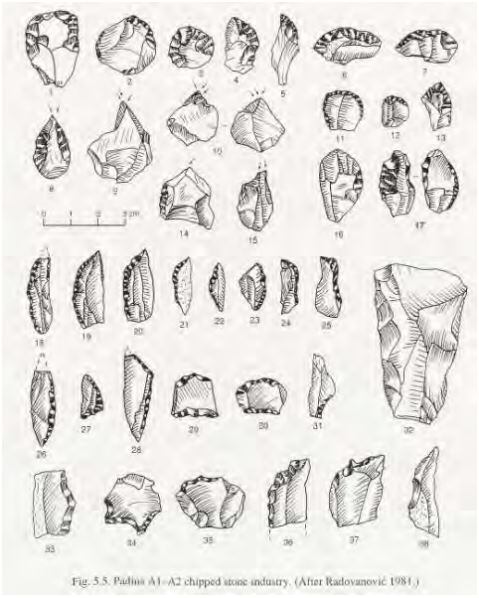


Fig. 5.5. Padina A1–A2 chipped stone industry. (After Radovanović 1981.)

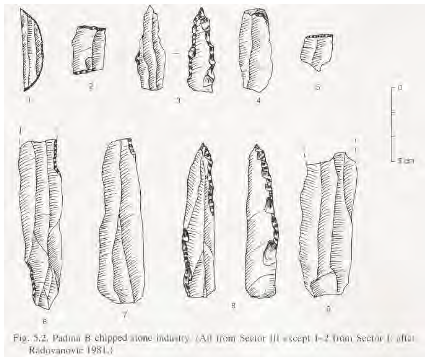


Fig. 5.2. Padina B chipped stone industry. (All from Sector III except 1–2 from Sector I; after Radovanović 1981.)

From: Radovanović I, 1996

Fig. R11-13a Padina A1 and A2 Mesolithic lithics; Padina B Transition lithics.

human bone samples	associated terrestrial (ungulate) bone samples
1.1 bone sample from skeleton, excavated in 1967	1.2 bone point **embedded** in thoracic vertebra of skeleton
2.1 bone sample from skeleton, excavated in 1967	2.2 bone point **embedded** in lumbar vertebra of skeleton
3.1 bone sample from skeleton, excavated in 1991	3.2 bone point **embedded** in thoracic vertebra of skeleton
4.1 bone sample from skeleton, excavated in 1995	4.2 bone point **embedded** in left innominate of skeleton 4.3 bone point found **adjacent** to skull of skeleton
5.1 bone sample from skeleton, excavated in 1996	5.2 bone point found **adjacent** to proximal end of femur of skeleton 5.3 bone point found **between** lowermost vertebra and left innominate of skeleton

TABLE 2. *Samples from Schela Cladovei for ^{14}C analysis: human bones from single inhumation burials and artefacts made from terrestrial mammal (ungulate) bone found in direct association with the skeletons.*

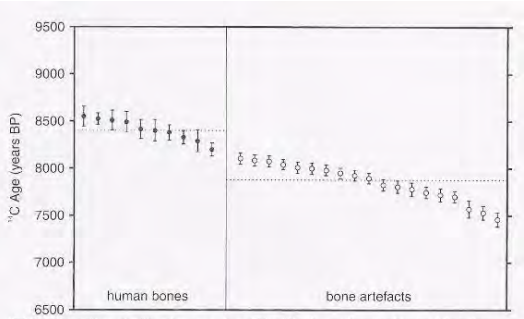


FIGURE 3. *Comparison of radiocarbon age ranges of Mesolithic human bones and bone artefacts from Schela Cladovei, Romania. Errors are shown at one standard deviation. The dashed lines represent the weighted means of the radiocarbon ages in each series.*

lab ID	sample ID	bone type	$\delta^{13}C$ (‰)	$\delta^{15}N$ (‰)	^{14}C age	age offset
OxA-8502	IG(D)1.1	human	−18·6	13·2	8300±60	
OxA-8579	IG(D)1.2	ungulate	−20·6	5·0	7790±100	510±117
OxA-8547	IG(D)2.1	human	−19·3	13·9	8240±60	
OxA-8580	IG(D)2.2	ungulate	−20·8	6·1	7770±240	470±247
OxA-8581	IG(D)3.1	human	−19·5	15·1	8330±75	
OxA-8582	IG(D)3.2	ungulate	−22·0	9·4	7880±290	450±300
OxA-8583	IG(D)4.1	human	−18·5	15·0	8380±80	
OxA-8584	IG(D)4.2	ungulate	−21·5	4·7	7915±65	465±103
OxA-8585	IG(D)4.3	ungulate	−20·9	4·5	7780±75	600±110
OxA-8548	IG(D)5.1	human	−18·2	15·3	8200±70	
OxA-8549	IG(D)5.2	ungulate	−20·4	7·7	7905±60	295±92
OxA-8550	IG(D)5.3	ungulate	−21·2	4·7	7805±70	395±99

TABLE 3. *$\delta^{13}C$ and $\delta^{15}N$ measurements. ^{14}C ages and ^{14}C age offsets in human bone and associated ungulate bone samples from Schela Cladovei. All ^{14}C ages and age offsets are expressed in conventional radiocarbon years BP (before 1950). The errors are expressed at the one sigma level of confidence.*

From: Cook G., *et al.*, 2002

Fig. R11-14 Schela Cladovei inhumations with evidence for violent death in the form of projectile points, used to calculate the WRE derived from an aquatic diet which gives an older ^{14}C date. In this case the correction to be applied on the human bone is about 500 radiocarbon years.

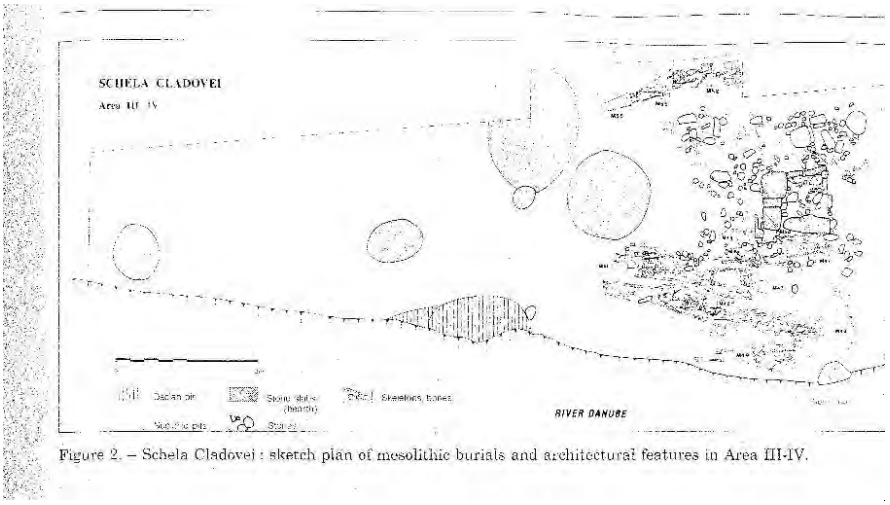


Figure 2. – Schela Cladovei : sketch plan of mesolithic burials and architectural features in Area III-IV.

From: Boroneanţ V., *et al.*, 1999



Figure 10.9. New forms of bone tools appeared in the Iron Gates from approximately 6000 cal BC. These examples from Schela Cladovei (Romania), comprising fragments of spoons (1–3) and an awl with a distinctive worked base (4), can be paralleled in sites of the Early Neolithic Starčevo-Körös-Criş complex throughout the central and northern Balkans (© Clive Bonsall).

From: Bonsall C., 2008

Fig. R11-15 Schela Cladovei burials in Area III-IV; Typical FTN bone implements dated ca. 6000 BC at Schela Cladovei, as well as at several Iron Gates sites after the '6200 BC event', during the Transition.

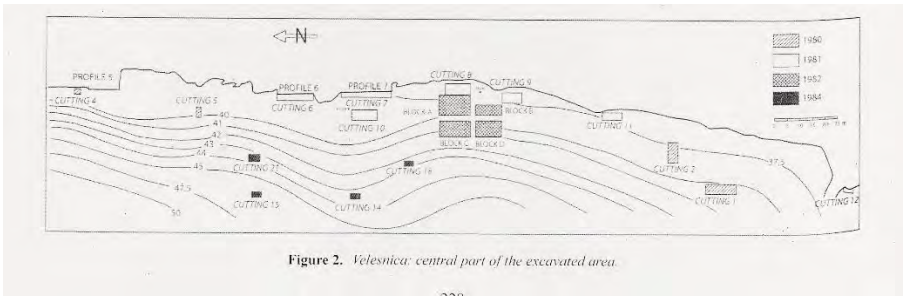


Figure 2. *Velesnica: central part of the excavated area.*



From: Vasić R., 2008 Photo M. Templer

Fig. R11-16 Plan of central part of excavations at Velesnica and present-day terrace above the Danube at Velesnica.

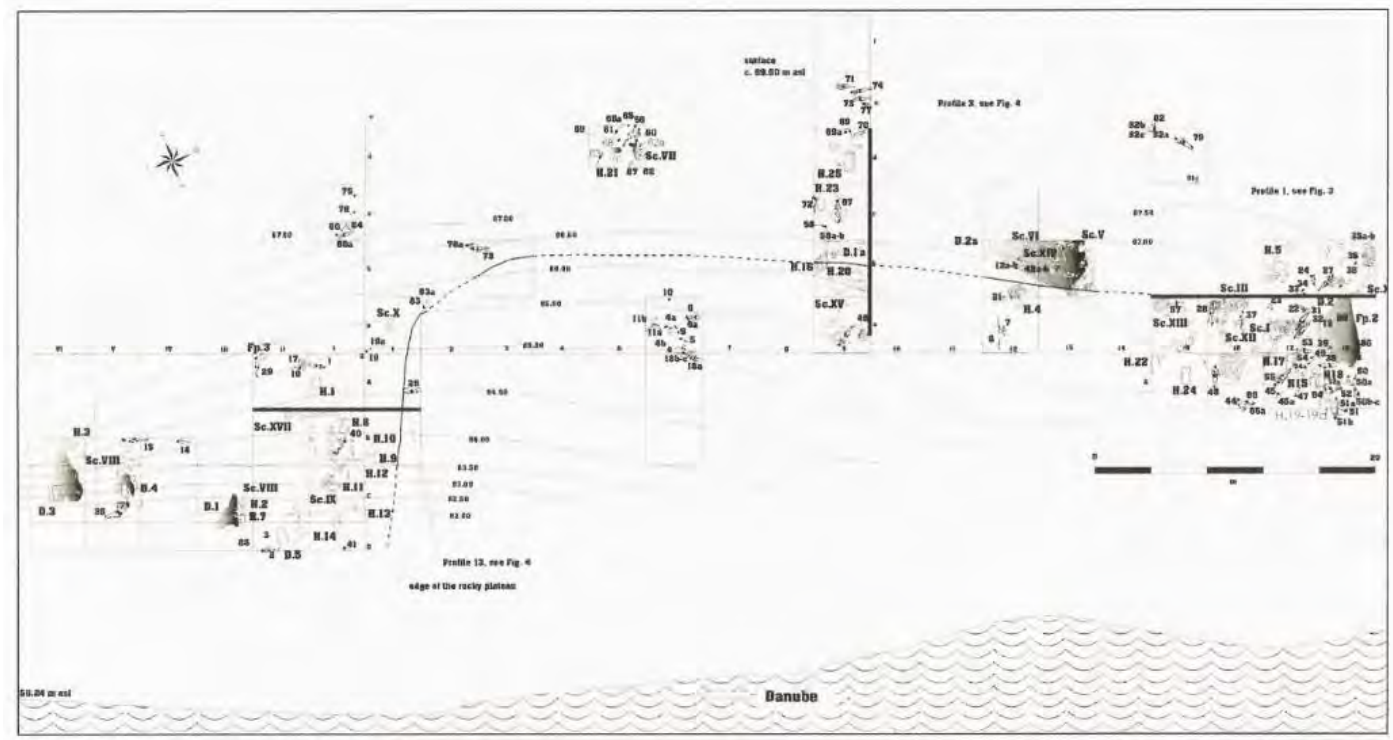


***Fig. 2. Areas excavated in 1970–1971 at Vlasac with the location of some section drawings marked (adopted after* Srejović and Letica 1979).**

From: Borić D., 2008

Fig. R11-17 Vlasac 1970-1971 plan of excavations under D. Srejović and Z. Letica.

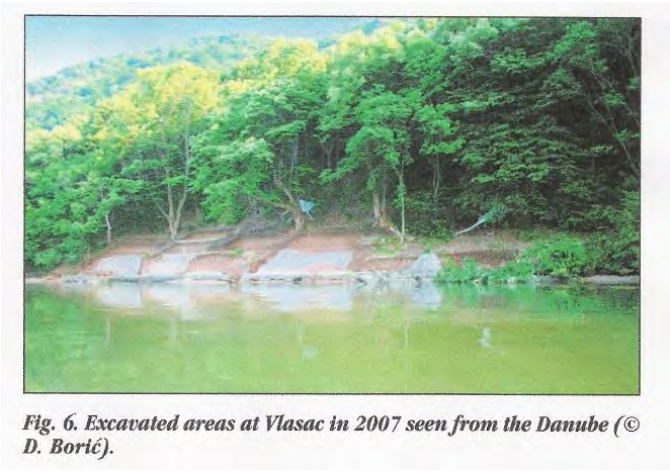


Fig. 6. Excavated areas at Vlasac in 2007 seen from the Danube (© D. Borić).

From: Borić D., 2008

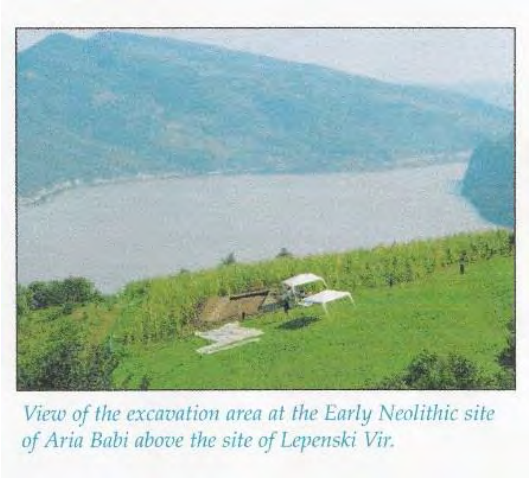
Fig. R11-17a Site of excavations at the rear of Vlasac in 2006-2007 under D. Borić (the site is now beneath the waters of the reservoir in the foreground).



Fig. 3.3. Satellite image of north-east Serbia; sites with Mesolithic-Early Neolithic stratigraphies in the Danube Gorges shown as stars and Early Neolithic sites outside of the Danube Gorges shown as squares (site distribution supplemented after Srejović 1988: 49). 1 – Privod; 2 – Alibeg; 3 – Padina; 4 – Stubica; 5 – Aria Babi; 6 – Lepenski Vir; 7 – Vlasac; 8 – Cuina Turcului; 9 – Razvrata; 10 – Icoana; 11 – Hajdučka Vodenica; 12 – Baile Herculane; 13 – Ostrovul Banului; 14 – Schela Cladovei; 15 – Velesnica; 16 – Kameničkí Potok-Mihajlovac; 17 – Knjepište-Mihajlovac; 18 – Kučajna-Bor; 19 – Slatina, Turska Česma-Drenovac; 20 – Slatina-Paračin; 21 – Kraljevo Polje-Ivankovac; 22 – Kraljevo Polje-Čuprija; 23 – Damjanov Kladenac-Vinorača; 24 – Tečići-Rekovac; 25 – Paljevina and Grobnice-Žunc; 26 – Trnati Laz-Lukar; 27 – Bunar-Jagodina; 28 – Bukovačka Česma-Bukovče; 29 – Velika Reka-Topola; 30 – Česta-Dobrovodica; 31 – Divostin-Kragujevac; 32 – Grivac; 33 – Brdo-Kusovac; 34 – Anište-Bresnica; 35 – Ostri; 36 – Trsine-Čačak; 37 – Banja-Aranjđelovac; 38 – Kloke-Majdan; 39 – Cerovac-Zmajevac; 40 – Medvednjak-Smederevska Palanka; 41 – Staro Selo-Selevac; 42 – Dubočaj-Grocka; 43 – Rančićeva Kuća-Grocka; 44 – Manastirište-Kovin; 45 – Orašje-Dubravica; 46 – Lugovi-Drmno; 47 – Beletinci-Pavliš; 48 – At-Vršac; 49 – Belo Brdo-Vinča; 50 - Grad-Starčevo; 51 – Vatrogasni Dom-Pančevo; 52 – Ciglana-Dobanovci; 53 – Jabuka-Pančevo; 54 – Kubik-Farkaždin; 55 – Batka-Perlez.

From: Borić D., 2007

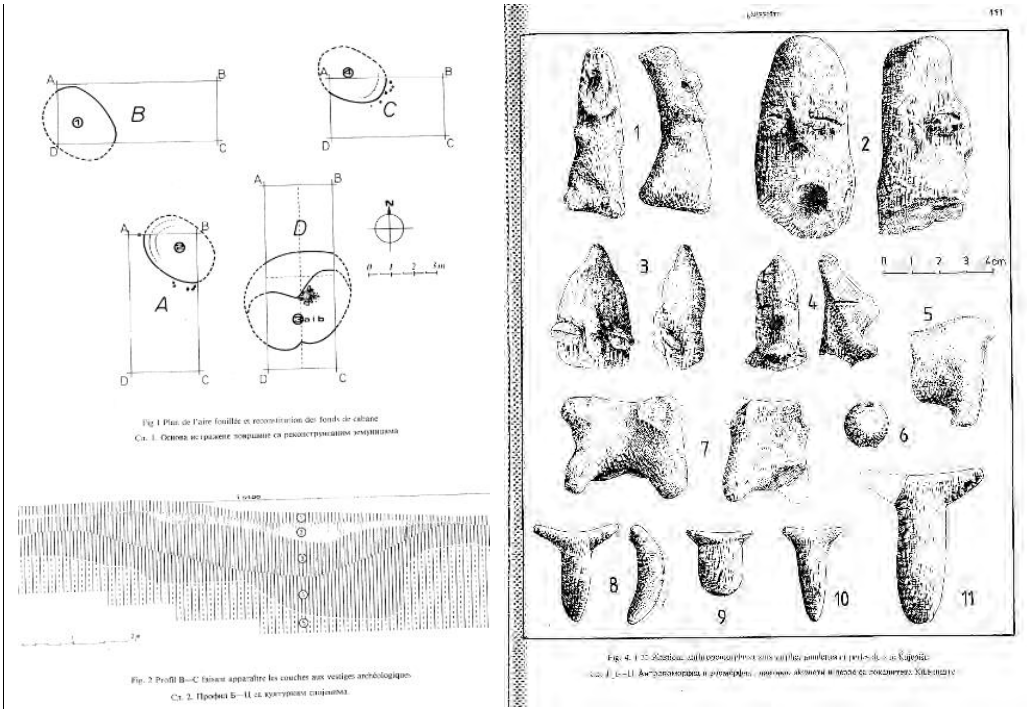
Fig. R11-18 Map of the broader Iron Gates region showing the Transition Iron Gates sites (stars) and FTN sites (squares). I would contend that Aria Baba, site n° 5 was probably occupied by acculturated hunter-gatherer-fishers.



View of the excavation area at the Early Neolithic site of Aria Babi above the site of Lepenski Vir.

From: Borić D., 2007

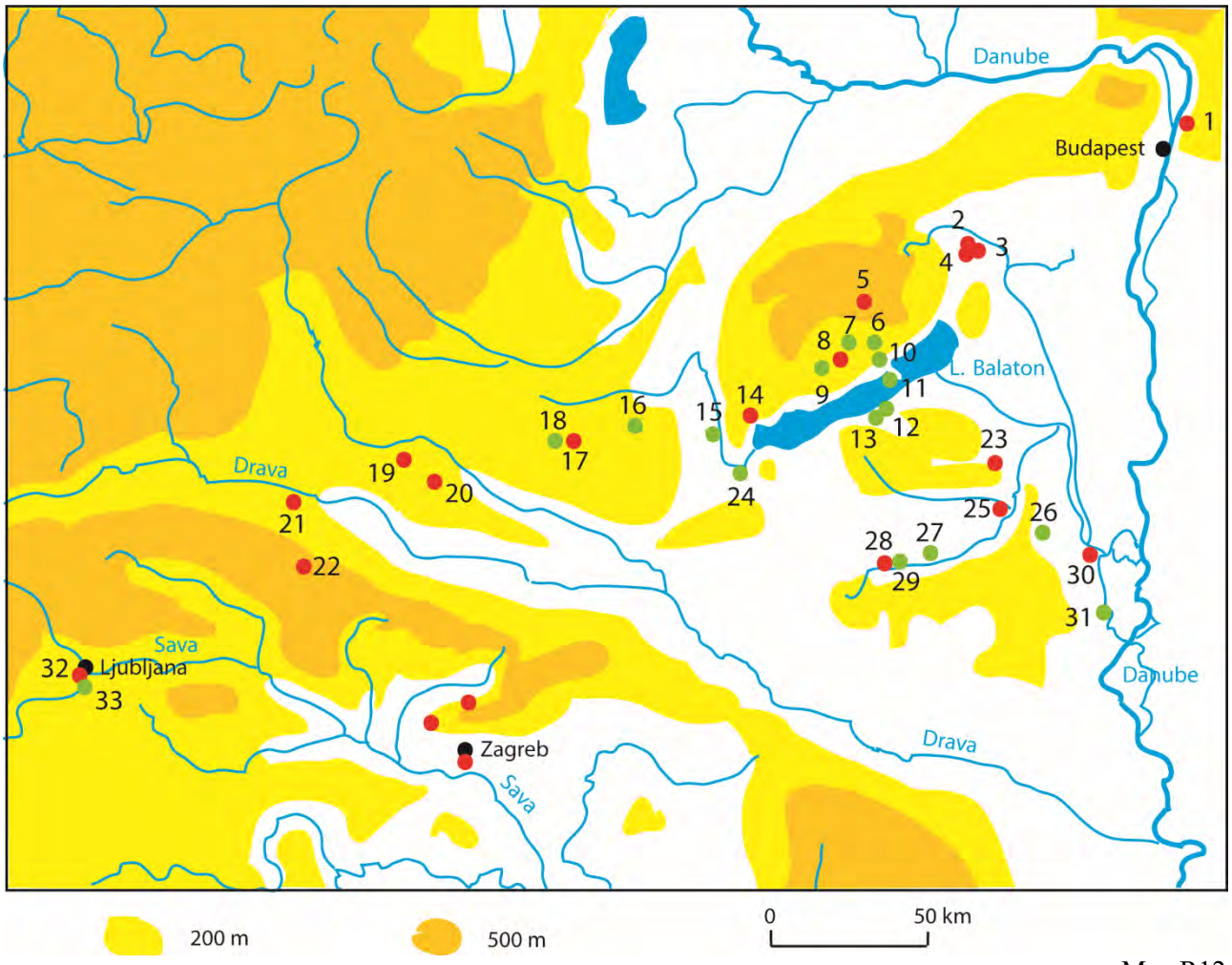
Fig. R11-19 Aria Baba site during excavations.



From: Stanković S., 1986b

Fig. R11-20 Knjepište FTN Starčevo site excavation plan and stratigraphy; Figurines and 'ear studs' from the site.

Region 12 – Eastern Central Balkans – Transdanubia and Eastern Slovenia

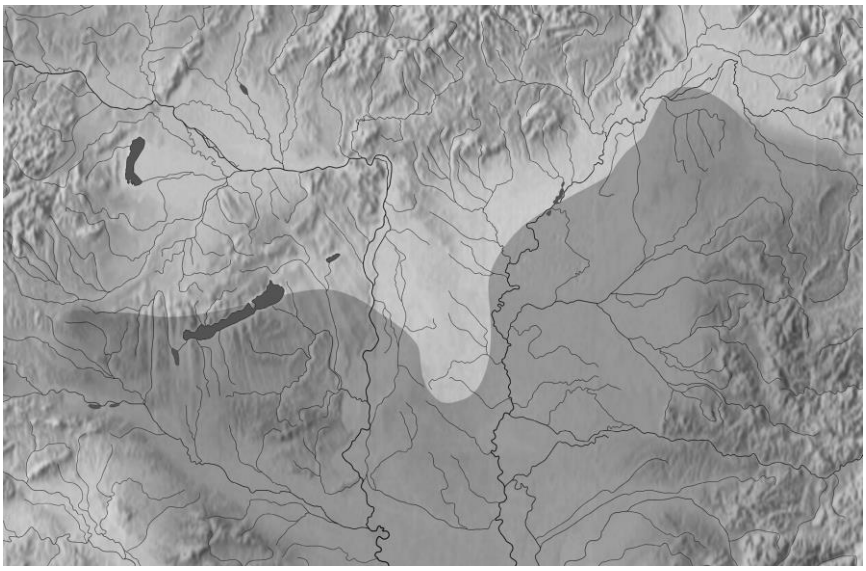


Map R12

Notes:
● = Mesolithic / Transition sites
● = Neolithic / Transition sites
The Mesolithic sites around Zagreb are dealt with in Region 11.

Site names:
1. Sződliget-Pec & Sződliget-Vác; 2. Nádasdladány; 3. Csór-Meritöpuszta; 4. Sárrét Basin; 5. Szentgál Mine; 6. Balatonfüred-Arács; 7. Vöröstó; 8. Vázsony Basin; 9. Mencshely; 10. Aszófő; 11. Tihany-Apáti; 12. Balatonszárszó-Kis-erdei-dűlő; 13. Balatonlelle; 14. Keszthely; 15. Sármellék I & II; 16. Gellénháza-Városrét; 17. Szentgyörgyvölgy; 18. Szentgyörgyvölgy-Pityerdomb; 19. Velika Pećina; 20. Vindija Pećina; 21. Špehovka; 22. Apnarjeva Jama; 23. Belecska; 24. Vörs-Máriaasszony-Sziget; 25. Regöly-2; 26. Medina; 27. Dombóvár-Kapospart; 28. Kaposhomok; 29. Regöly-1; 30. Szekszárd-Palánk; 31. Alsónyék-Bátaszék; 32. Breg; 33. Resnik Canal.

Figures – Region 12 – Hungarian Transdanubia and Eastern Slovenia



From: Bánffy E., 2013

Fig. R12-1 Approximate limit of expansion of the FTN cultures and the Central European-Balkanic Agro-Ecological Barrier (CEB AEB).

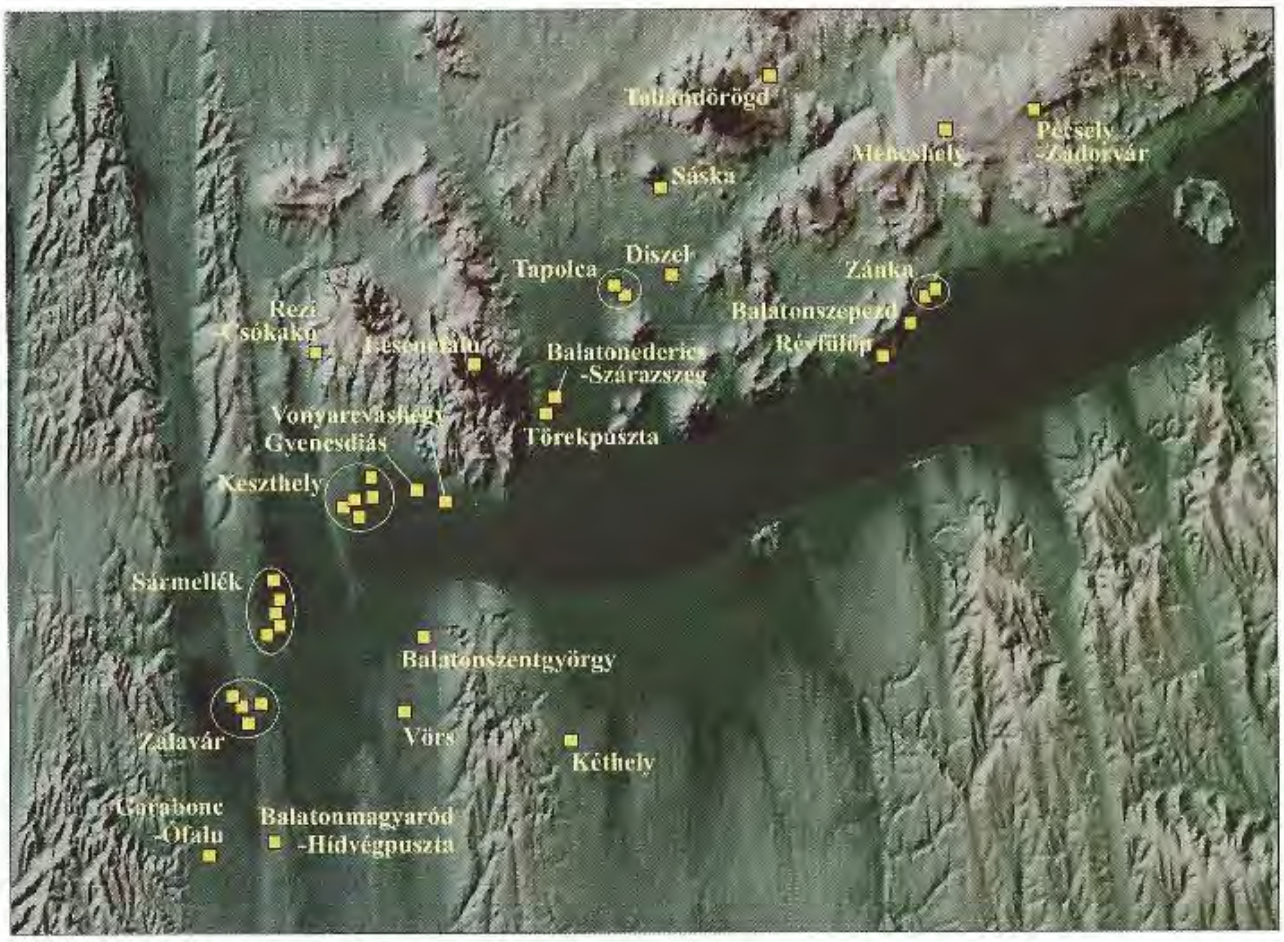


Figure 11.3: The earliest LBK settlement pattern: lakeshore sites in the western Balaton region.

From: Bánffy E. & Sümegi P., 2011

Fig. R12-2 Western end of Lake Balaton during the Early Neolithic showing the higher water levels that prevailed at that time, and the Earliest LBK settlements.

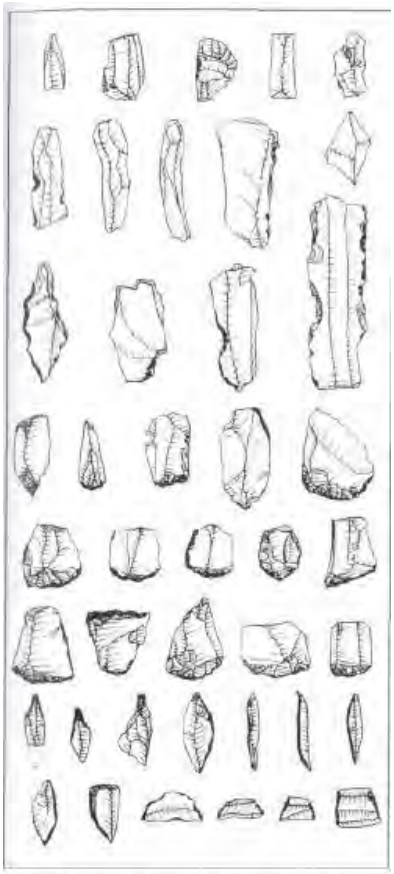
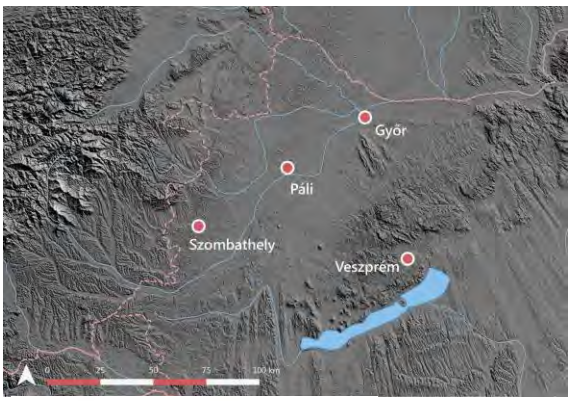


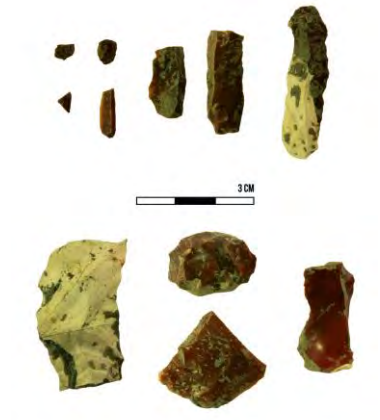
Fig. 2. Kaposhomok – lithic finds (after R. Pusztai, re-drawn by T. Marton).

From: Bánffy E., 2000

Fig. R12-3 Kaposhomok Mesolithic surface lithic scatter finds.







From: Mester Z., *et al*., 2014

Fig. R12-4 Páli-Dombok Early Mesolithic site location north of the western end of Lake Balaton; Occupation surface 2 m below ground; Bakony Mountains radiolarite artefacts recovered.

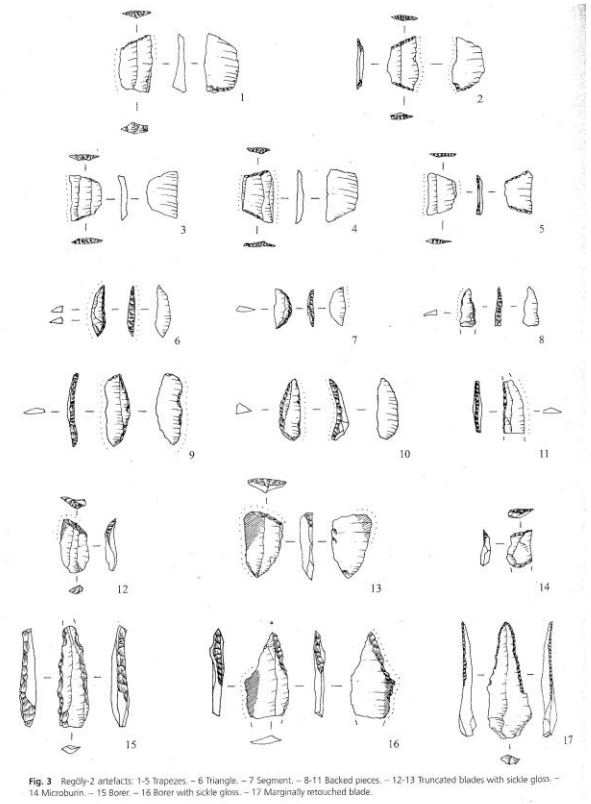


Fig. 3 Regöly-2 artefacts: 1-5 Trapezes. – 6 Triangle. – 7 Segment. – 8-11 Backed pieces. – 12-13 Truncated blades with sickle gloss. – 14 Microburin. – 15 Borer. – 16 Borer with sickle gloss. – 17 Marginally retouched blade.

From: Eichmann W., *et al*., 2010

Fig. R12-5 Regöly-2 lithics.

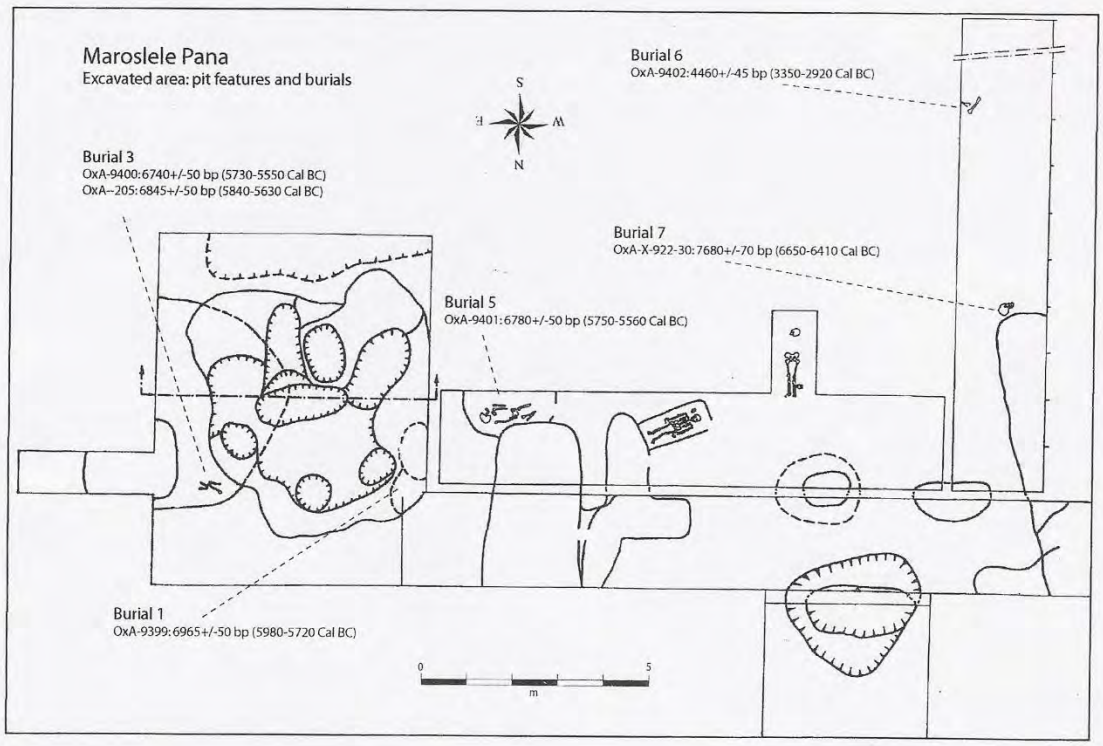


Figure 3.6. Early Neolithic features and the AMS dated burials at Maroslele Pana (adopted from Trogmayer 1964, fig. 1; dates after Whittle et al. *2002).*

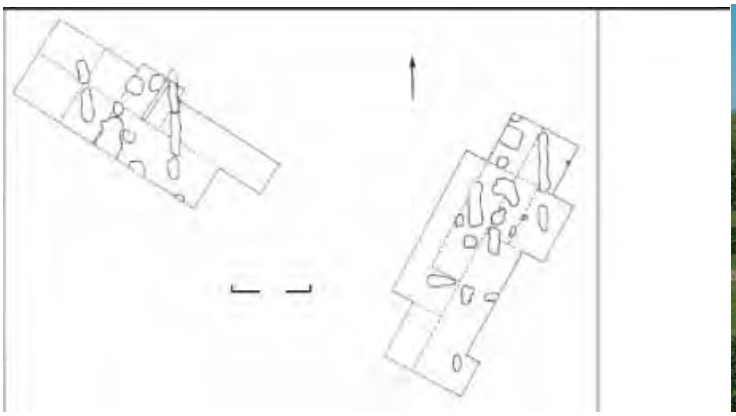
From: Borić D., 2005

Fig. R12-6 Maroslele Pana plan of excavated area, showing inhumation and associated dates.



From: Regenye J., 2000

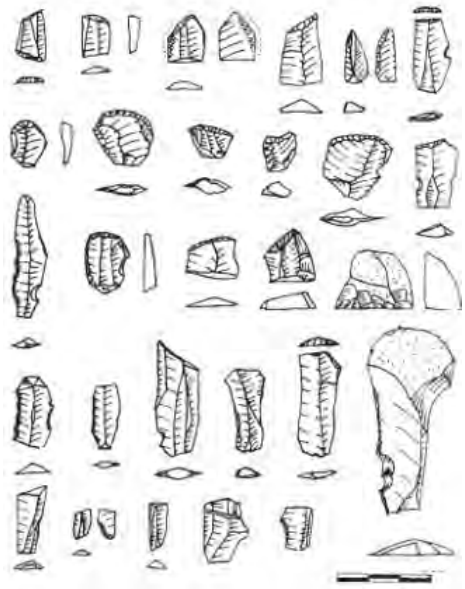
Fig. R12-7 Mencshely lithics



From: Bánffy E., 2008



From: Oross K. & Bánffy E., 2009



From: Bánffy E., 2008



From: Oross K. & Bánffy E., 2009

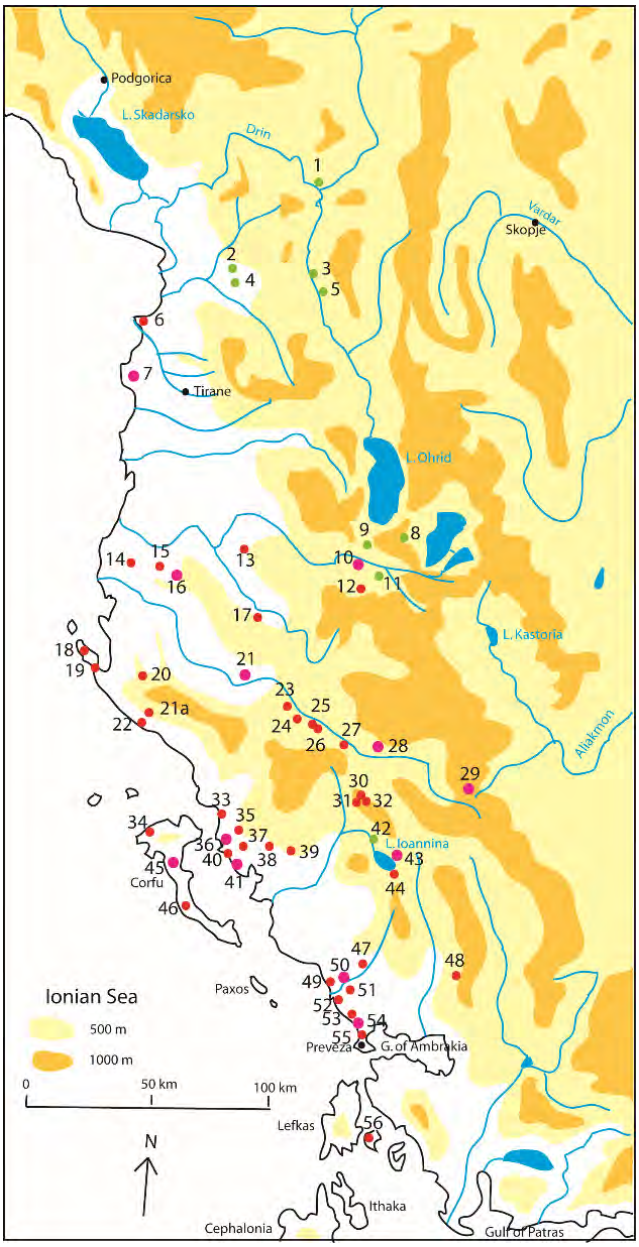
Fig. R12-8 Plan of Szentgyörgyvölgy-Pityerdomb excavated area; Hypothetical reconstruction of the site; Lithics of Mesolithic tradition from the site, and zoomorphic figurine of Starčevo tradition.



From: Regenye J., 2000

Fig. R12-9 Tihany-Apáti site location and excavation of Medieval cellar and Neolithic feature on near-side of cellar walls.

Region 13 – Eastern Adriatic – North-Western Greece and Albania



Map R13

Notes:

● = Mesolithic / Transition sites

● = Neolithic / Transition sites

● = Surveys

Site names:

1. Kolsh; 2. Nezir; 3. Cetush; 4. Blazi Cave; 5. Burim; 6. Bisht Pallë; 7. Durrës Regional Archaeological Project; 8. Podgorje; 9. Barçi; 10. The Korçë Basin Archaeological Survey; 11. Vashtëmi; 12. Kamenicë; 13. Katundas; 14. Kryegjata B; 15. Rusinja; 16. The Mallakastër Regional Archaeological Project; 17. Vlushë / Armenia; 18. Himarë Cave; 19. Rrëza e Kanalit Rockshelter; 20. Lepenicë; 21. The Vjola River Valley Survey; 21a. Çorraj; 22. Flimarë Cave; 23. Lazarat; 24. Derviçan; 25. Goranxi Cave; 26. Vanistër; 27. Jorgucat; 28. Drinos Valley Survey 29. The Grevena Survey Project; 30. Boïla Rockshelter; 31. Klithi Cave; 32. Megalakkos Rock Shelter; 33. Ksamil; 34. Sidari; 35. Butrint; 36. The Sarandë District Survey; 37. Xarë; 38. Shën Marinë; 39. Konispol Cave; 40. Shëndëlli; 41. The Byzantine Butrint Project; 42. Asfaka; 43. The Higgs Palaeolithic Survey of Epirus and the Epirus Palaeolithic Survey; 44. Kastritsa Cave; 45. The Corfu Prehistoric Survey; 46. Grava Rockshelter; 47. Thesprotia / Kokytus River; 48. Asprochaliko Rockshelter; 49. Ammoudia; 50. The Acheron Valley Survey; 51. Tsouknida; 52. Loutsa; 53. Tsarlambas; 54. The Preveza Regional Survey; 55. Alonaki Beach; 56. Maganisi Island.

Figures – Region 13 – North-Western Greece and Albania





Photos M. Templer

Fig. R13-1 Acheron wetlands from the south with the Ionian Sea in the background; Kalodiki wetland further north seen from the south with the coastal range on the left.

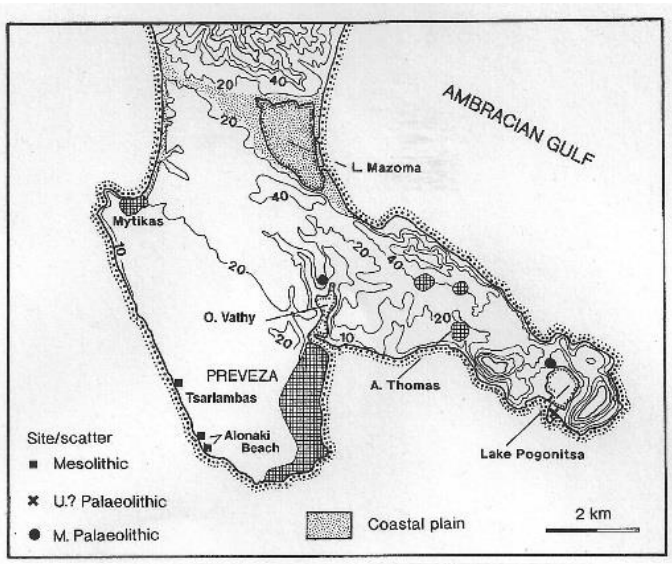


Figure 3.51. Palaeolithic and Mesolithic site/scatters in the Preveza area. Palaeolithic materials are found throughout this area, but recent erosion makes it difficult to identify specific sites. The Middle Palaeolithic symbols mark areas where materials are most abundant. One small findspot near Lake Pogonitsa (T93-12; W93-2) may be Upper Palaeolithic in age. Three Mesolithic sites (Tsarlambas and two Alonaki Beach sites) are located on the coast west of Preveza. Hatched areas are modern settlements.

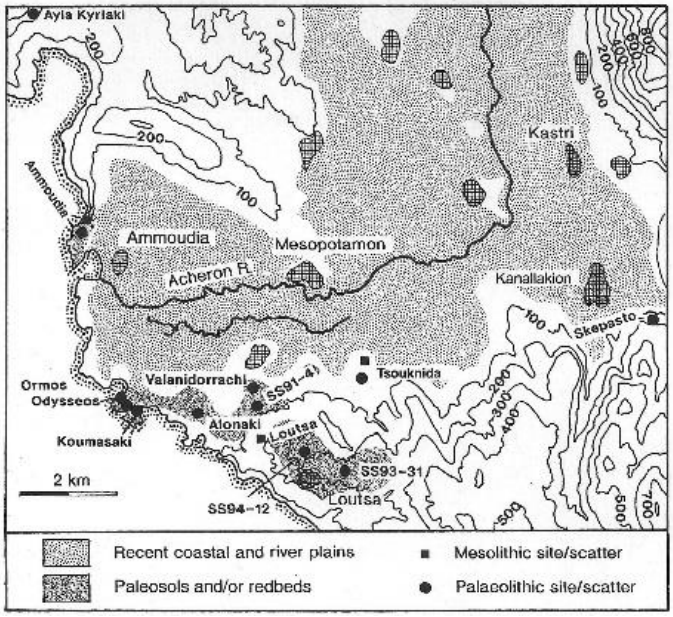
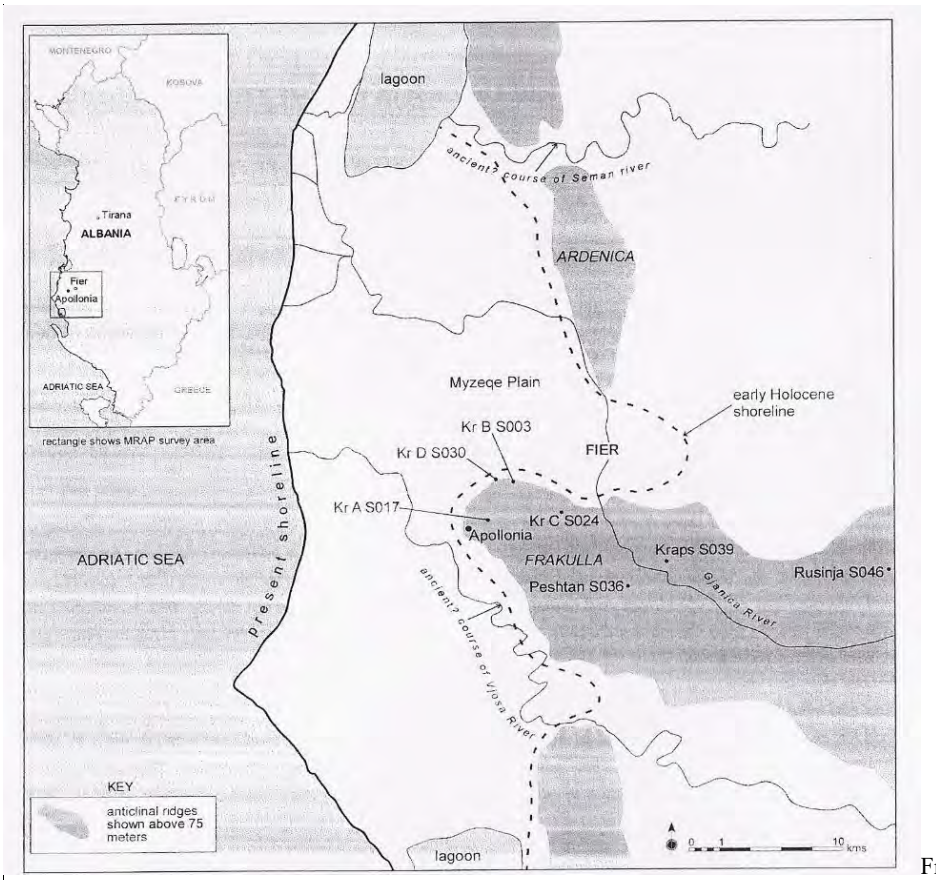


Figure 3.32. Palaeolithic and Mesolithic site/scatters in the Acheron valley. Alonaki is a major site. Smaller findspots (e.g., Skepasto, Loutsa, and Valanidorrachi) are specialized activity sites. Other findspots (e.g., Ayia Kyriaki, Tsouknida, Ammoudia), perhaps temporary camps, are located on the edge of the valley. Two Mesolithic sites (Ammoudia, Loutsa) are found near the coast, and Tsouknida was located on the edge of an ancient lake or embayment. Hatched areas are modern settlements.

From Runnels C. & van Andel T., 2003

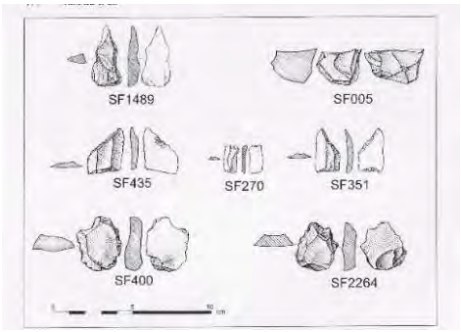
Fig. R13-2 Survey sites from the Preveza Regional Survey and the Acheron Valley Survey.



From: Runnels C., *et al.*, 2009

Fig. R13-3 Mallakastër Regional Archaeological Project survey in Fier District and sites distribution. Kryegjata B (Site Kr B S003) and Rusinja (Site Kr B S046) are Mesolithic.

Type	LP	MP	UP	M	N	BA
Core		53	13	83		
Core, Levallois		16				
Chopper		8				
Biface	3	1		1		
Flake	4	90	6	419	3	
Flake, Levallois		53				
Blade		2	9	17	7	
Scraper	3	68				
End scraper		6	33	71	1	
Burin		4	18	18		
Perçoir		6	4	51		
Naturally-backed knife	1	13	1	1		
Backed blade			4			
Arched backed blade			1			
Truncation		1	2	20	3	
Notch		36	3	215	2	
Denticulate	2	19	2	34	4	1
Retouched piece		15	10	131	3	
Rabot			6			
Bifacial foliate		2				
Combination tool			1	18		
Microlith				18		
Microburin				1		
Pièce esquillée			1	1		
Point			2			1
Point, Levallois		5				
Point, pseudo-Levallois		3				
Point, Mousterian		1				
Sickle Element					1	
Debris/debitage		4		73		
TOTAL	13	406	116	1172	24	2



From Runnels C., et *al*., 2009

Fig. R13-4 Mallakastër Regional Archaeological Project lithics analysed between the Palaeolithic, Mesolithic, Neolithic and Bronze Age; sample Mesolithic lithics.



Photos M. Templer

Fig. R13-5 Villages of Derviçan and Goranxi in the Drinos Valley in Albania. The Mesolithic sites in the Drinos Valley are above the villages located on the lower slopes of the western hills.

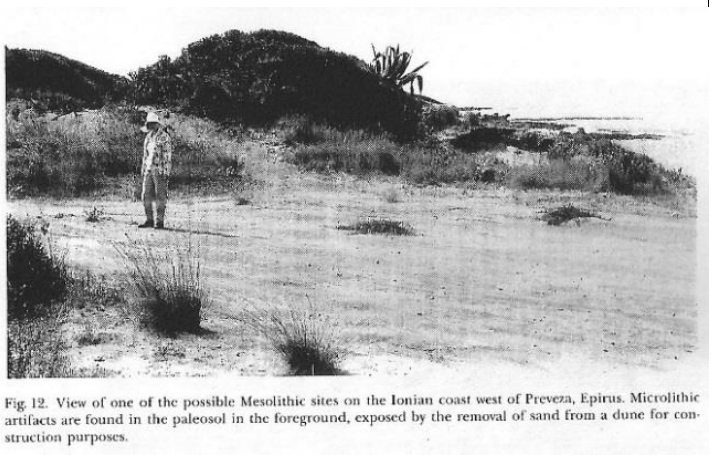
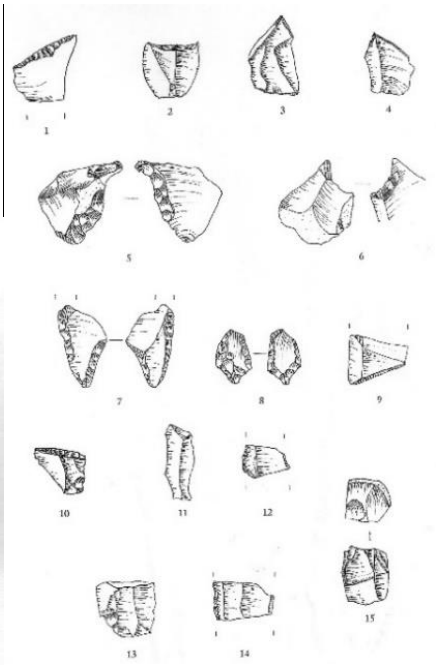


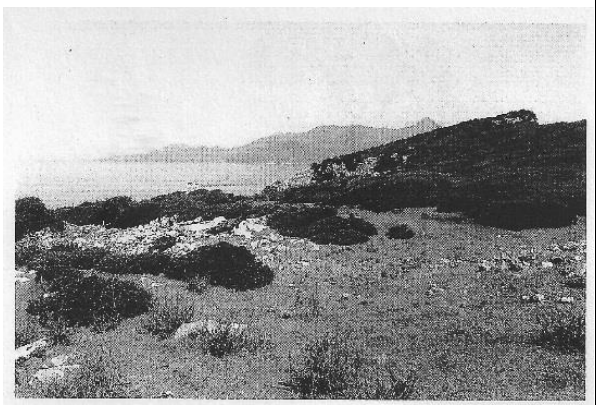
Fig. 12. View of one of the possible Mesolithic sites on the Ionian coast west of Preveza, Epirus. Microlithic artifacts are found in the paleosol in the foreground, exposed by the removal of sand from a dune for construction purposes.

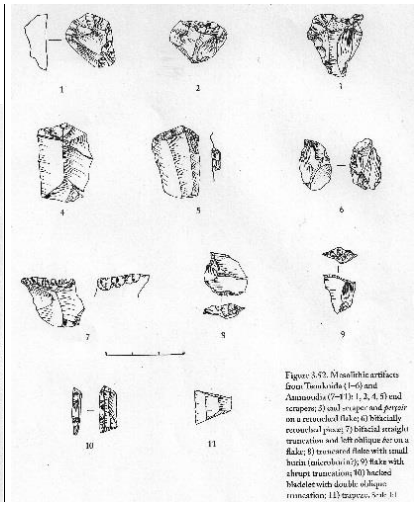
From: Runnels C., 2004

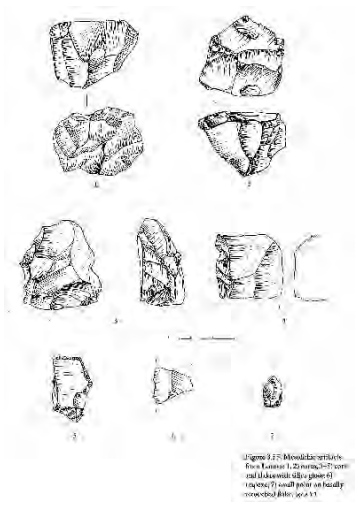


From: Runnels C. & van Andel T., 2003

Fig. R13-6 Alonaki Beach north of Preveza; Mesolithic lithics from Alonaki Beach - N° 15 is made of obsidian of unknown provenance.







From: Runnels C. & van Andel T., 2003

Fig. R13-7 Acheron Valley Survey - Ammoudia Mesolithic site with stone feature left of centre; Tsouknida lithics are N° 1-6, Ammoudia lithics are N° 7-11; Loutsa Mesolithic lithics.

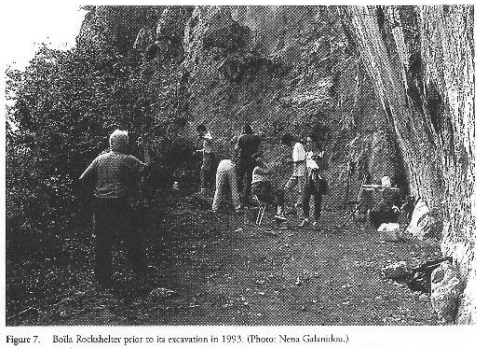


Figure 7. Boïla Rockshelter prior to its excavation in 1993. (Photo: Nena Galanidou.)

From: Galadinou N., 2011

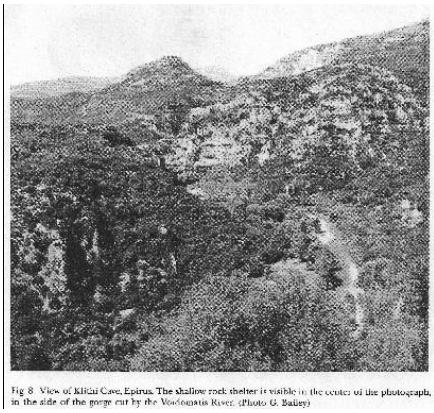


Fig 8 View of Klithi Cave, Epirus. The shallow rock shelter is visible in the centre of the photograph, in the side of the gorge cut by the Voïdomatis River. (Photo G. Bailey)

From: Runnels C., 2001



Megalakkos Rockshelter in 1994. (Photo: Geoff Bailey.)

From: Galadinou N., 2011

Fig. R13-8 Boïla Rockshelter prior to excavations in 1993 in the Voïdomatis Gorge; Klithi Cave above the Voïdomatis Gorge in the centre of the photo; Megalakkos Rockshelter upstream from Klithi Cave.

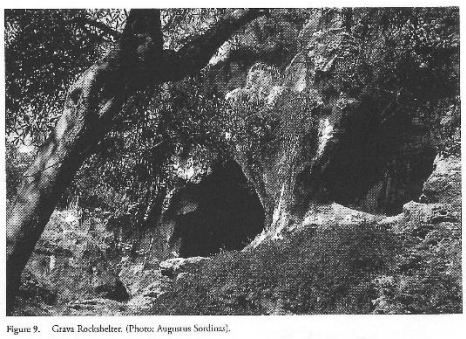


Figure 9. Grava Rockshelter. (Photo: Augustus Sordinas).

From: Galadinou N., 2011

Fig. R13-9 Grava Rockshelter on the Island of Corfu.



Photo Wikipedia





Photos M. Templer

Fig. R13-10 Konispol Cave entrance; the cave is left of centre above the village of Konispol in limestone terrain in the middle photo; view looking out towards the Island of Corfu from close to Konispol Cave.

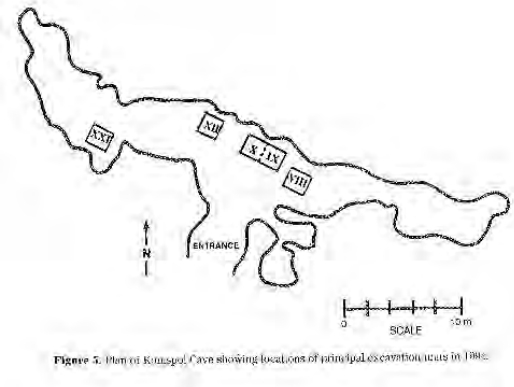


Figure 5. Plan of Konispol Cave showing locations of principal excavation units in 1998.

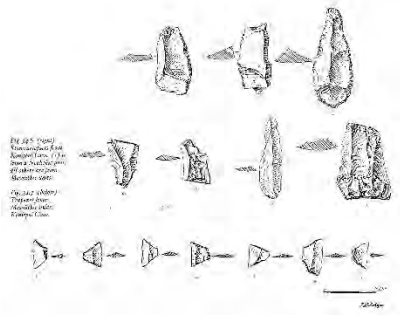
From: Schuldenrein J., 1998

Table 5. Tentative period assignments, trenches VIII, IX, X and XXI

Period	Trench VIII Units	Trench IX Units	Trench X Units	Trench XXI Units
Upper Paleolithic	32-42	30-42	26-31	(47-49)
Mesolithic	23-31	28-29	20-25	38-46
Transitional	19-21	21-27		36-37
Early Neolithic	16-18	17-20		32-35
Middle Neolithic	11-14	14-16	16-19	27-31, 33-34
Late Neolithic	8-9	11-13		19-22
Eneolithic	6	6-8	15	13-17
Bronze Age	1-3	1-5	13	8-12
Iron Age/Antique			1-12	1-7

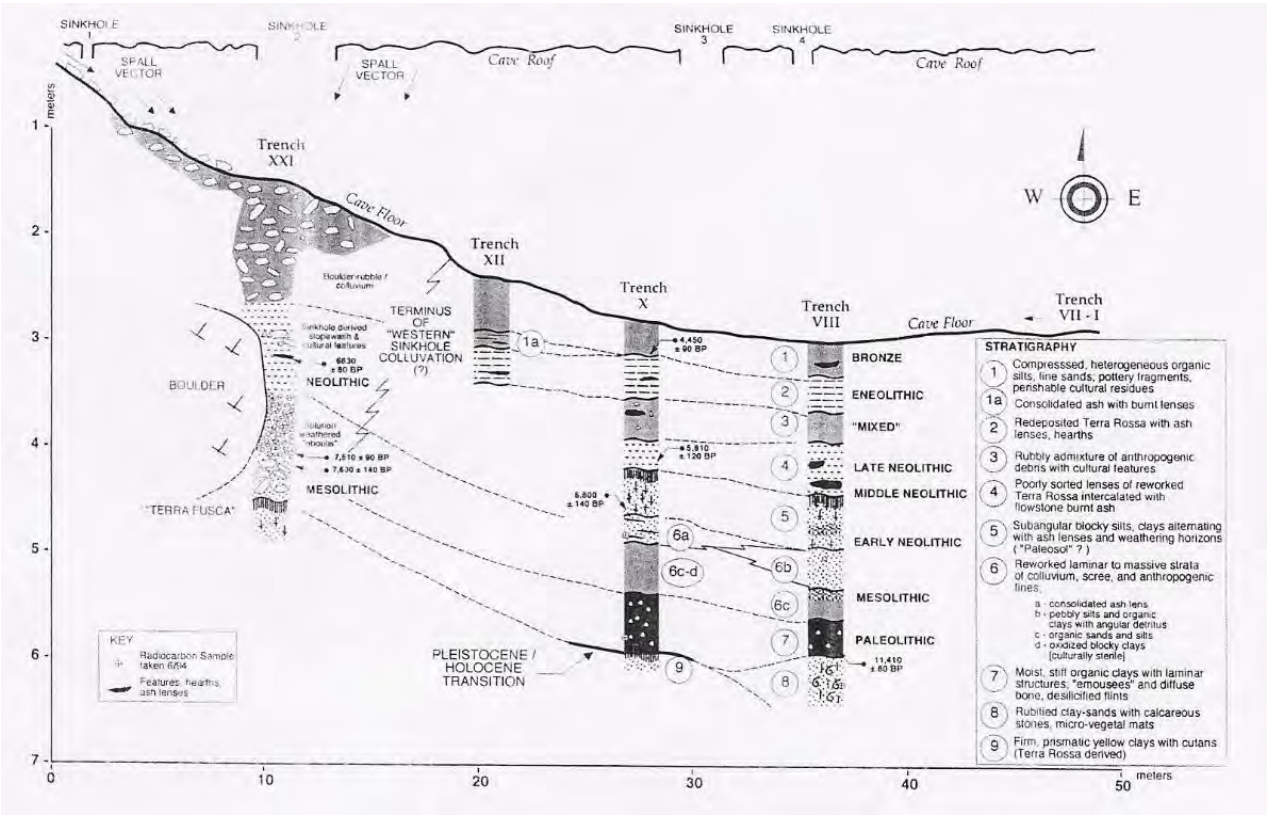
From: Russell N., 1999-2000

Fig. R13-11 Konispol Cave interior plan with excavated trenches; Synchronisation of the stratigraphies from Trenches VIII, IX, X and XXI.



From: Harrold F., *et al*., 1999

Fig. R13-11a Konispol Cave Mesolithic lithics excepting first item which is Neolithic.



Sediment Complex	Stratum	Mean Thickness (cm)	Description of Sediment	Cultural Chronology	Radiocarbon Dates (yr B.P.)
III	1	50	10YR4/3 compressed, heterogeneous organic sites, fine sands; powdery and crushed pottery fragments, perishable cultural residues	Bronze	3770 ± 70 (XII); 4450 ± 90 (IX)
III	2	65	7.5YR4/4 moderately sorted silts and sands interspersed with well-rounded, limestone detritus (> 20%); ash and hearth features (10YR 4/2)	Eneolithic	N/A
III	3	140	7.5YR4/2 (4/4) loose rubble interdigited with weakly bedded organic silts, clays, and sands; high concentrations (> 40%) of larger clasts (>2 mm)	"Mixed"	N/A
III	4	50	7.5YR4/3(4/4) redeposited terra rossa disrupted by concave hearths, well-stratified flowstone beds, brecciated, and calcified ash lenses	Late Neolithic	5810 ± 120 (IX); 5200 ± 80 (XII)
III	5	70	10YR4/4(4/3) subangular blocky clays and slits with limonitic streaks; sub-parallel ashen horizons; alternately dense to diffuse cultural micro-strata; burnt and ash lenses, bone fragments, microorganics	Middle Neolithic	6470 ± 70 (XII)
II	6a–d	100	Series of laminar to massive subhorizons (10YR) of colluvium, scree, and anthropogenic fines: (a) consolidated ash lens; (b) pebbly silts and organic clays with angular detritus; (c) organic sands and silts; (d) oxidized blocky clays	Early Neolithic (6a, 6b); Mesolithic (6c, 6d)	6800 ± 140 (IX); 7060 ± 110 (IX)
I	7/7a	60	10YR2/1 organic, reduced, and moderately aggregrated to stiff clay with microvegetal remains and clasts; laminar horizons in 7a; "émousées" and diffuse calcined bone, desilicified flints	Mesolithic?? Paleolithic	11,410 ± 80 (VIII)
I	8	>85	7.5 YR3/3 weakly consolidated, redeposited and oxidized clayey sand, weak to moderately calcified	Undetermined	N/A
I	9	>110	7.5YR3/2 Redeposited terra rossa; stiff, deeply weathered yellow clay with uniform consistence and abundant cutans (clay skins); upper boundary truncated	Undetermined	20,600 ± 310 (IX); 26,370 ± 180 (VIII)

From: Schuldenrein J., 2001

Fig. R13-12 Schematic drawing of the Konispol Cave stratigraphy and its description

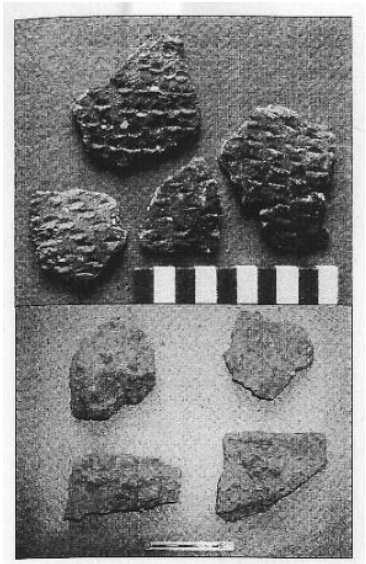


Fig. 2 - Impressed Wares from Konispol Cave (top) and Burim (bottom).

From: Korkuti M., 2007

Fig. R13-13 Impressed Ware from Konispol Cave (top) and the Early Neolithic site of Burim (bottom).

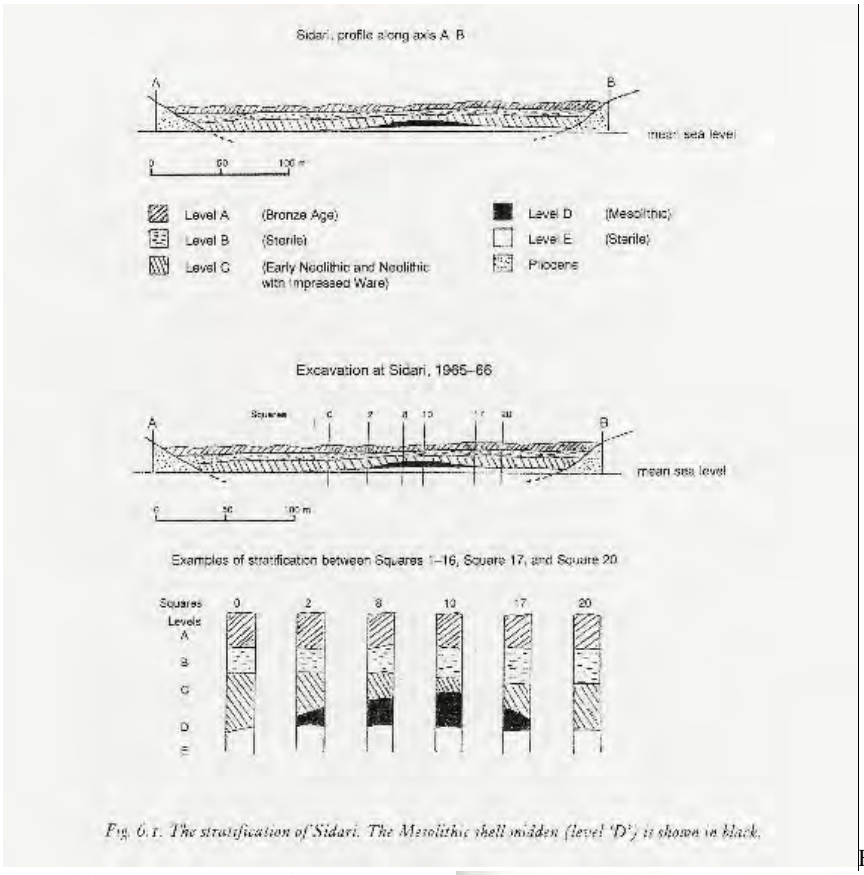


Fig. 6.1. The stratification of Sidari. The Mesolithic shell midden (level 'D') is shown in black.

From: Sordinas A., 2003

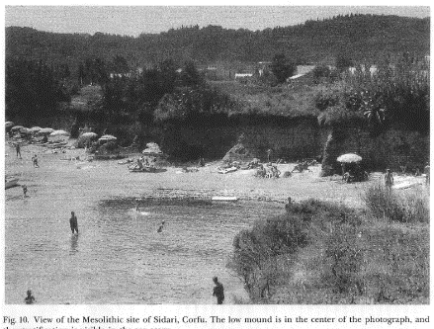


Fig 10. View of the Mesolithic site of Sidari, Corfu. The low mound is in the center of the photograph, and the stratification is visible in the sea scarp.

From: Runnels C., 1995



From: Berger J.-F., *et al*., 2014

Fig. R13-14 Sidari stratigraphy according to the Sordinas 1964-1965 excavations; Site at time of Sordinas excavations; Site erosion between the 1960s and *ca.* 2010.

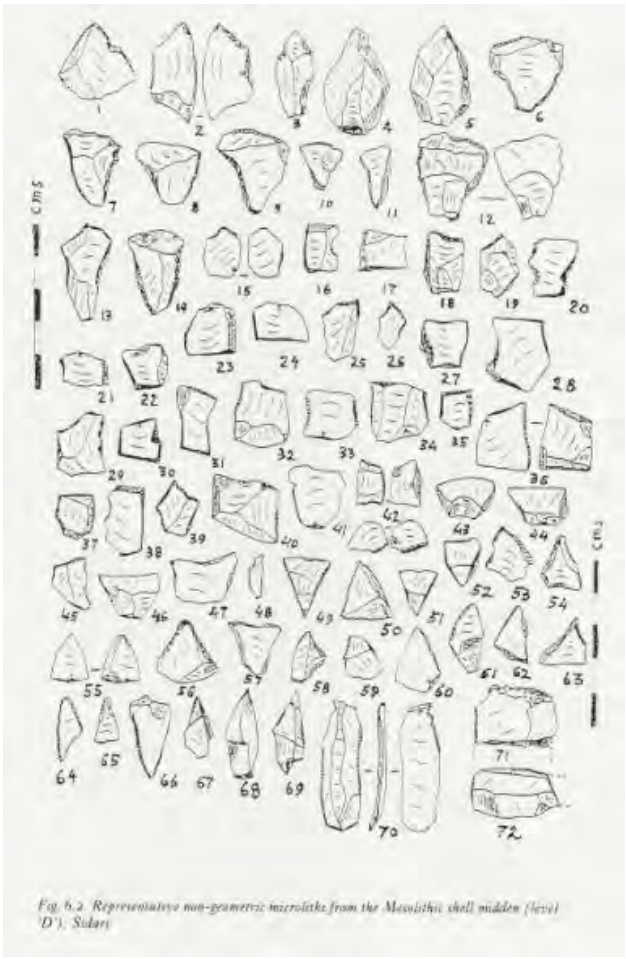


Fig. 6.2. Representative non-geometric microliths from the Mesolithic shell midden (level 'D'), Sidari.

From: Sordinas A., 2003

Fig. R13-15 Sidari lithics from the Mesolithic Level D of the Sordinas 1964-1965 excavations.

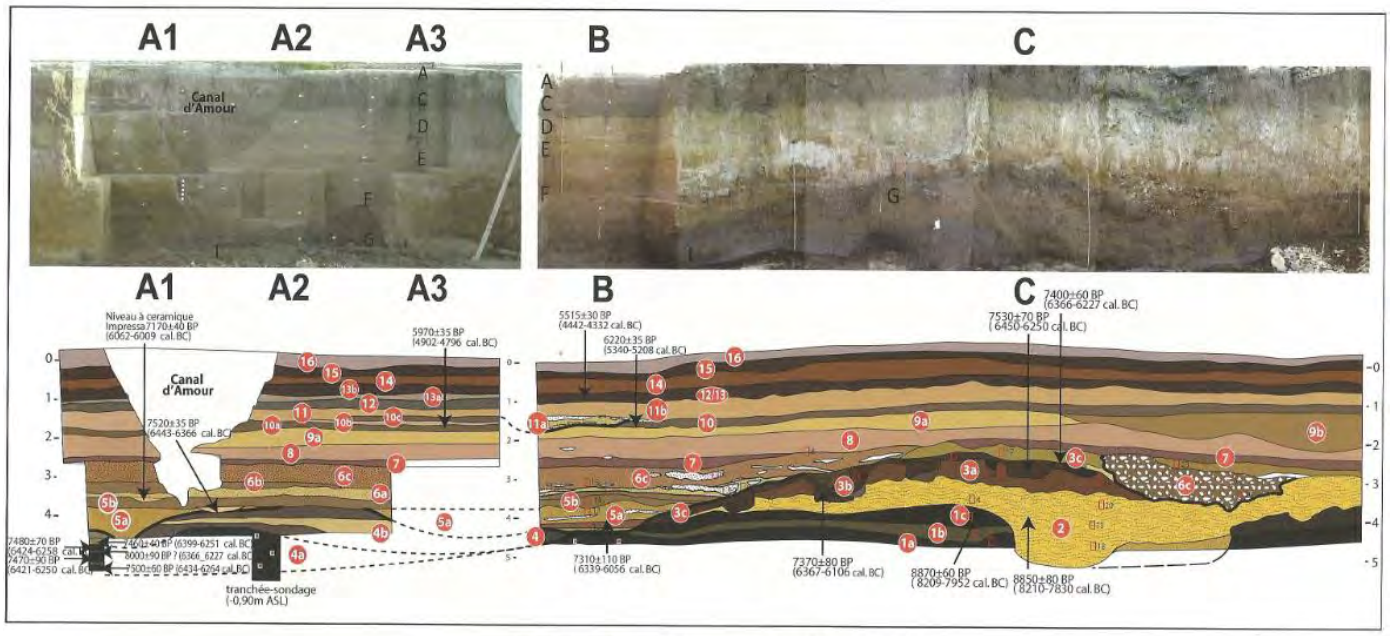
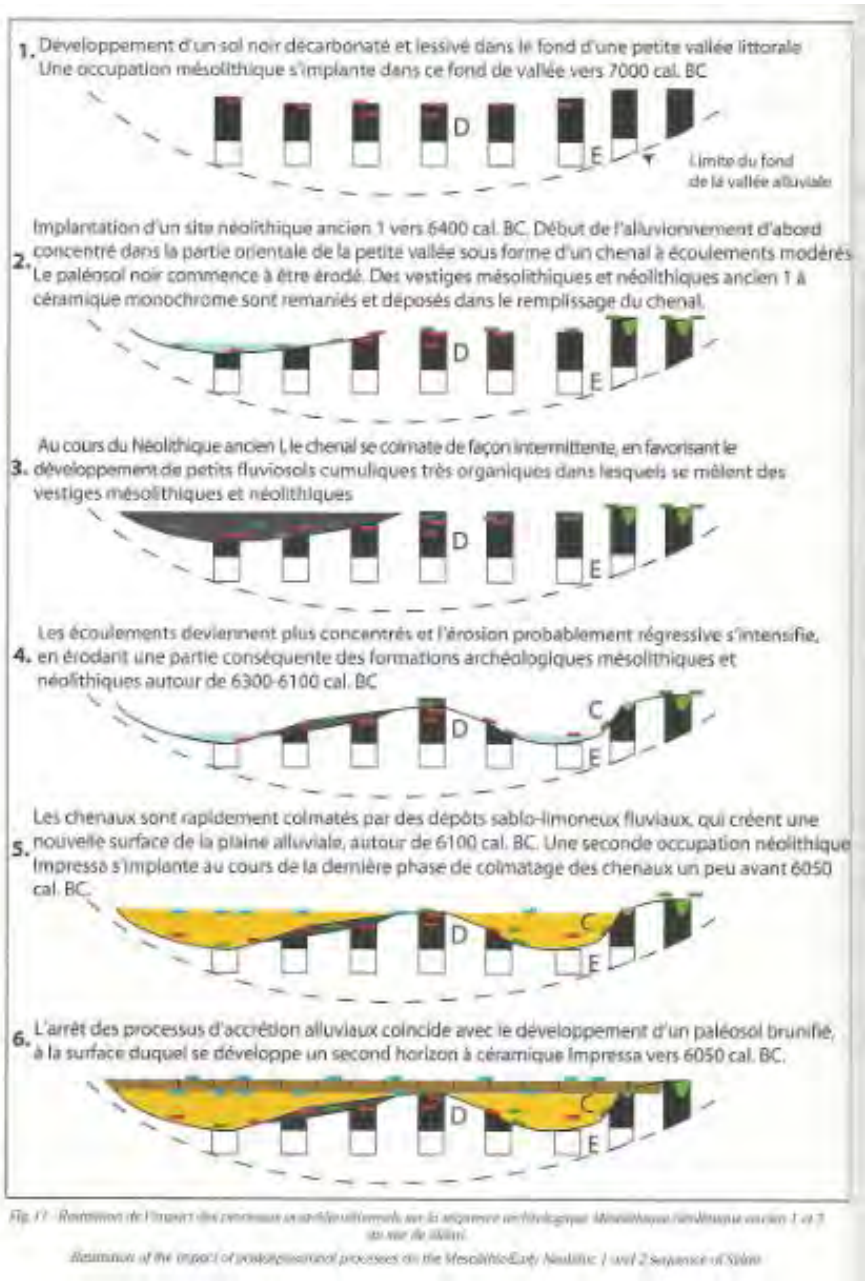


Fig. 4 : Coupe et phasage chronostratigraphique de la fouille de 2004.
Section and chronostratigraphical phasing of the excavation undertaken in 2004.

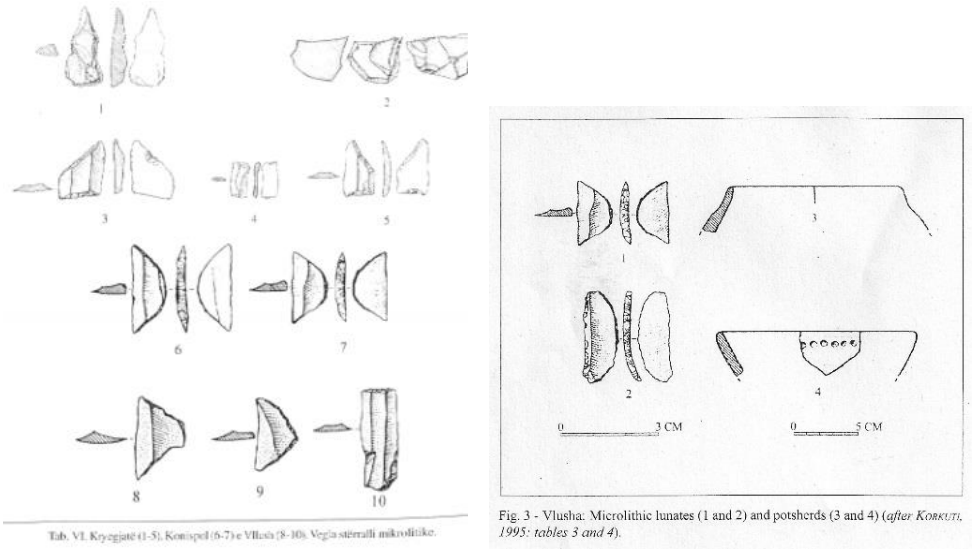
From: Berger J.-F., *et al.*, 2014

Fig. R13-15a Sidari 2004 excavations stratigraphy showing ^{14}C dates.



From: Berger J.-F., *et al*., 2014

Fig. R13-15b Sidari site evolution due to taphonomic factors.



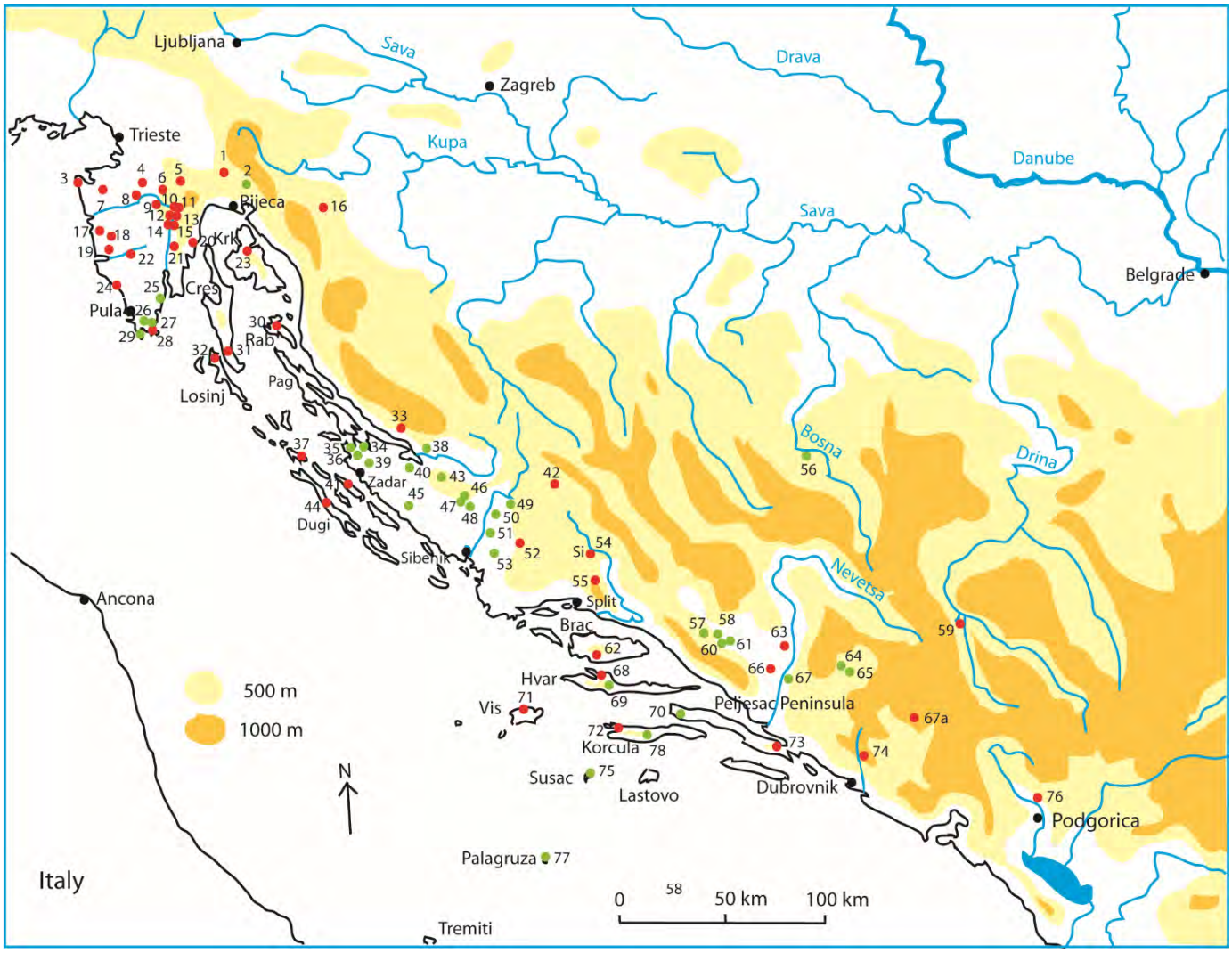
Tab. VI. Kryegjatë (1-5), Konispol (6-7) e Vlushë (8-10). Vegla stërrallë mikrolitike.

Fig. 3 - Vlusha: Microlithic lunates (1 and 2) and potsherds (3 and 4) (*after* KORKUTI, *1995: tables 3 and 4*).

From: Korkuti M., 1993

Fig. R13-16 Microliths from Kryegjata (1-5), Vlushë (6-7) and Konispol Cave (8-10); Vlushë microlithic lunates and sherds from the Early Neolithic.

Region 14 - Eastern Adriatic – Western Montenegro, Croatia and Bosnia & Herzegovina



Map R14

Notes:

● = Mesolithic / Transition sites

● = Neolithic / Transition sites

Site names:

Southern Sector: 56. Obre I; 57. Ravlića Pećina; 58. Žukovička Pećina; 59. Odmut Cave; 60. Vukove Njive; 61. Ilčinova Lazina; 62. Kopačina Špilja; 63. Zelena Pećina; 64. Jejinovača Pećina; 65. Hateljska Pećina; 66. Badanj; 67. Čairi (Stolac); 67a. Vrbička Pećina; 68. Markova Špilja; 69. Grapčeva Špilja; 70. Nakovana Špilja; 71. Krajicina Špilja; 72. Vela Špilja; 73. Gudnja Pećina; 74. Crvena Stijena; 75. Sušac Island 76. Vruća Pećina; 77. Palagruža Island; 78. Smokvica.

Central Sector: 33. Vaganačka Pećina; 34. Vrsi Janesici; 35. Nin; 36. Vrsi; 37. Molat Island; 38. Ždrilo; 39. Crno Vrilo; 40. Smiljčić; 41. Ugljan Island; 42. Gospodska Pećina; 43. Benkovac; 44. Vlakno Špilja; 45. Tinj-Podlivade; 46. Krivače; 47. Vrbica kod Bribir; 48. Rašinovac; 49. Škarin Samograd; 50. Pokrovnik I; 51. Konjevrate; 52. Unešić; 53. Danilo; 54. Sinj; 55. Zemunica Pećina.

Northern Sector: 1. Podpribeniš; 2. Brgujčeva Loza 1; 3. Savudrija; 4. Jačmica Pećina; 5. Lokve; 6. Nugljanska Peć; 7. Valenari; 8. Sveti Stjepan I & Sveti Stjepan II; 9. Kotle; 10. Šebrn Abri; 11. Klanjčeva Pećina; 12. Pupićina Pećina; 13. Vela Pećina; 14. Sklepova Pećina; 15. Ovčja Pećina; 16. Zala Pećina; 17. Vergotinova Pećina; 18. Dančeva Peć; 19. Lim 001; 20. Podosojna Pećina; 21. Čepićko Poljer, Frankoli, Kostadini, Kralji, Marišće and Žiganti; 22. Abri Šeraja; 23. Vorganska Pećina; 24. Rovinjsko Selo 1 Pećina; 25. Vela Gromača; 26. Medulin-Vižula; 27. Kargadur; 28. Šandalja II; 29. Debeljak; 30. Lopar; 31. Jami na Sredi; 32. Vela Špilja Lošinj.

Figures – Region 14 – Western Montenegro, Western Bosnia and Herzegovina, and Western Croatia



From: Čečuk B. & Radić D., 2005

Fig. R14-1 Southern Sector coastline at Pleistocene-Holocene boundary *ca.* 9700 BC, with Palagruža Island at the bottom.



Photos M. Templer

Fig. R14-2 Crvena Stijena with Croatia on the other side of the Canyon (now with a reservoir at the bottom); Close-up of rock-shelter with esplanade and excavated material tip in front; Looking down the over 20 m of stratigraphy.

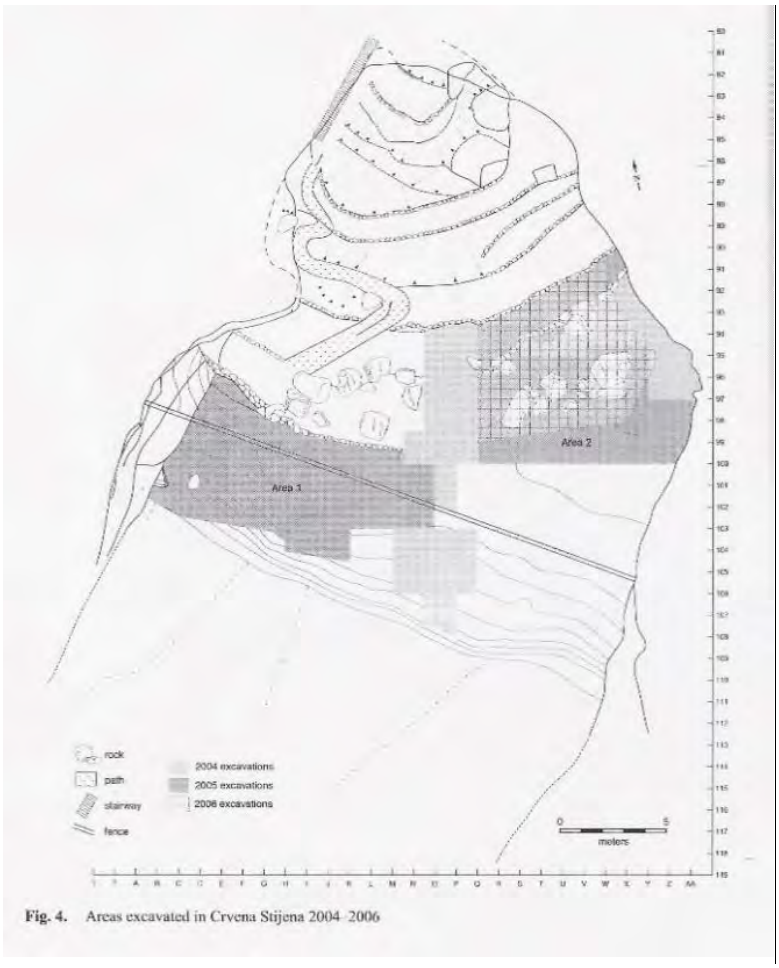


Fig. 4. Areas excavated in Crvena Stijena 2004–2006

From: Baković M., *et al*., 2009

Fig. R14-3 Crvena Stijena plan of 2004-2006 excavations. The winding path on the left leads down to the ladder descending some 20 m to the base of the stratigraphy.

Major strata, archaeological periods and cultures at Crvena Stijena (modified from Basler 1975)

Stratum	Depth (m)	Archaeological period[1]	Geological context[2]
I	0–0.40	Bronze Age	
II–III	0.40–1.80	Neolithic	Postglacial
IV	1.80–2.90	Mesolithic	
V–VII	2.90–3.50	Late Upper Paleolithic (Epipaleolithic)	
VIII–IX	3.50–4.90	Local UP based on Aurignacian	
X	4.90–7.60	Aurignacian	
XI–XII	7.60–8.30	Late Mousterian	
XIII	8.30–9.10	Denticulate Mousterian	Würm
XIV–XVII	9.10–10.40	Mousterian	
XVIII	10.40–10.70	Pontinian	
XIX–XX	10.70–11.40	Mousterian with triangular points	
XXI–XXII	11.40–12.10	Pontinian	
XXIII–XXIV	12.10–15.40	Mousterian	R/W
XXV–XXVIII	15.40–17.80	Protomousterian	Riss
XXIX–XXXI	17.80–20.30	Premousterian	

[1] Basler's (1975) determinations
[2] From Brunnacker 1975

From: Baković M., *et al*., 2009

Fig. R14-3a Crvena Stijena periodisation of the strata with Stratum IV being Mesolithic and Strata III-II Transition/Neolithic.

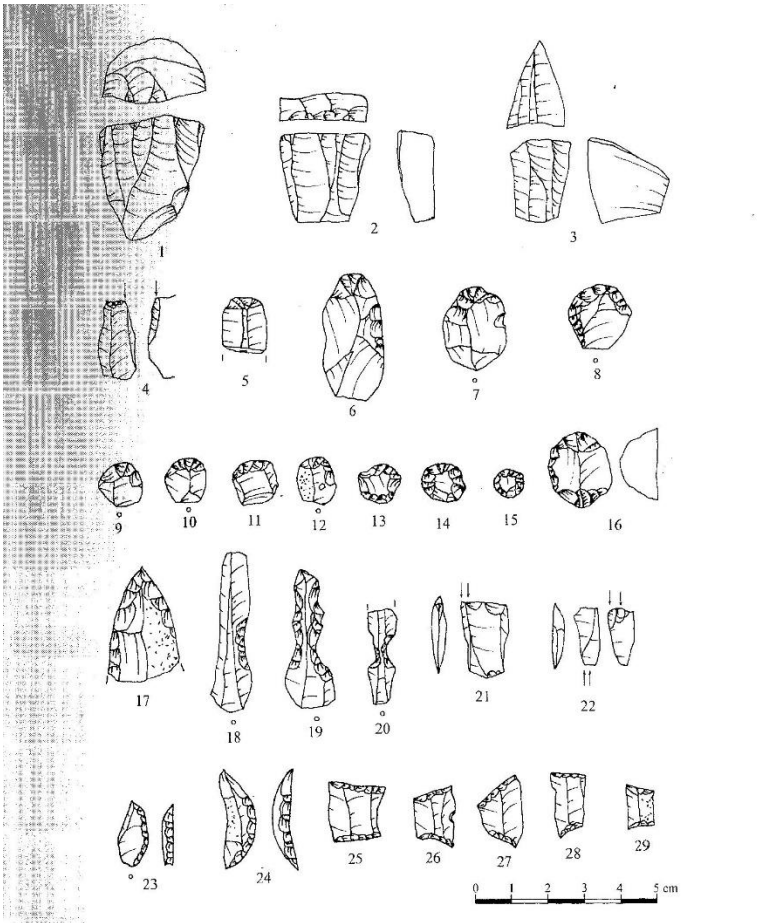


Fig. 19. Selected lithic artifacts from probable Mesolithic–Neolithic context, 2005 excavations at Crvena Stijena

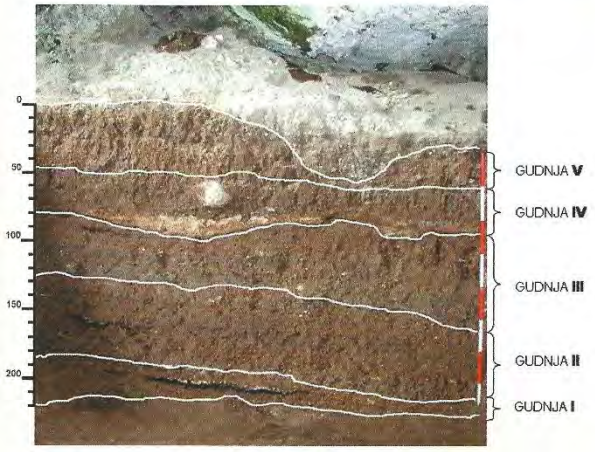
From: Baković M., *et al*., 2009

Fig. R14-4 Crvena Stijena lithics from the Late Mesolithic/Transition.



Sl. 15a





T. III

T. I



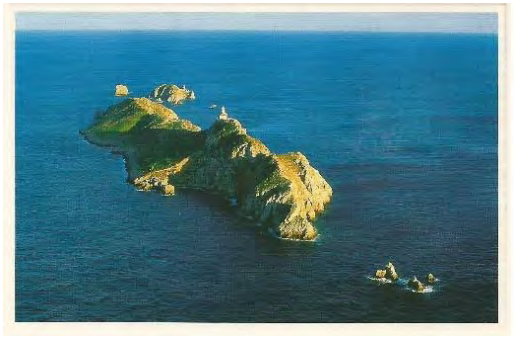
From: Marijanović C., 2005

Fig. R14-5 Gudnja Pećina; Stratigraphy; Possibly pre-Neolithic lithics and bone tools; Archaic Impressed Ware from the site.



From: WWW Brač Tourist board

Fig. R14-6 Kopačina Pećina.



Postcard photo C. Mari'c





From: Forenbaher S., 2014

Fig. R14-7 Palagruža Island; 1993 excavations; One of several Early Impressed Ware sherds found on the island.

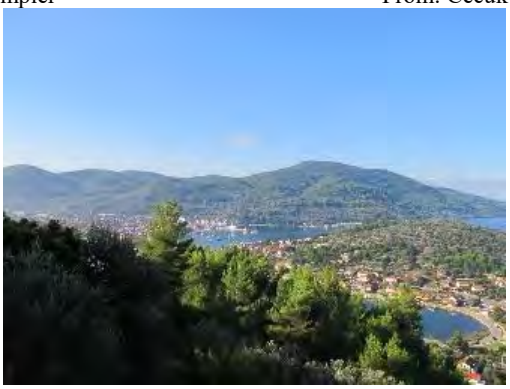


Photo M. Templer



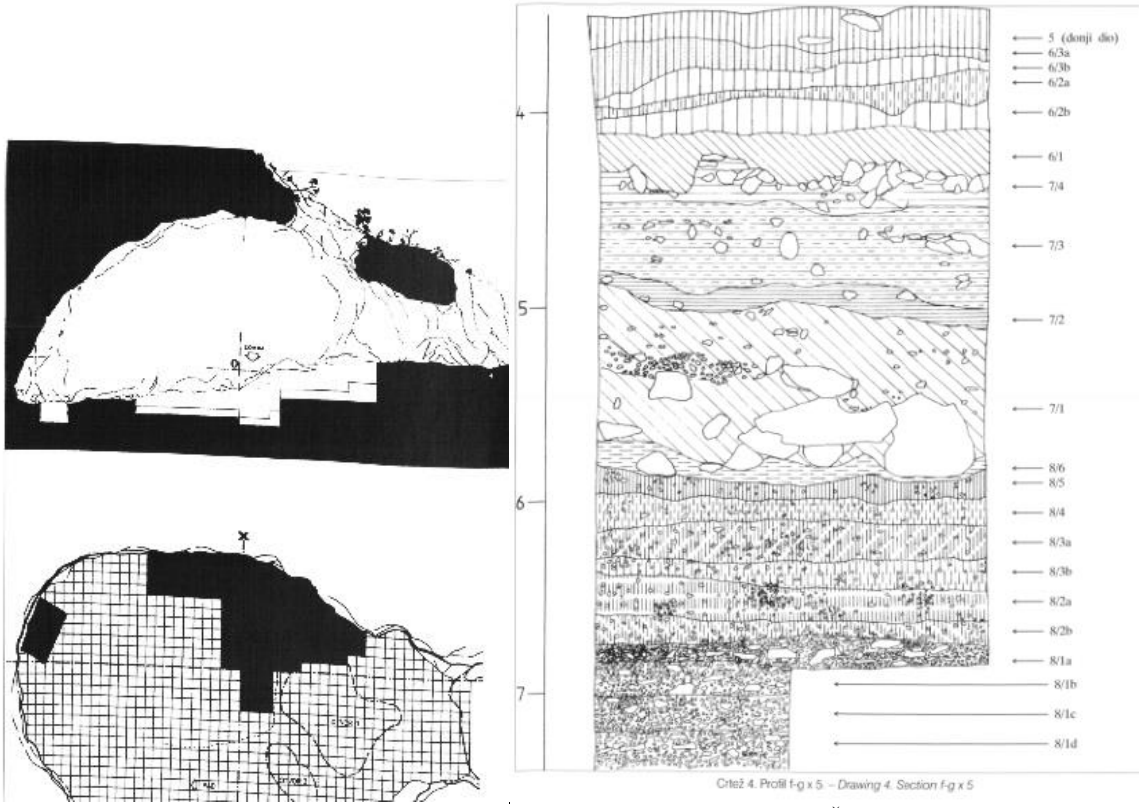
From: Čečuk B. & Radić D., 2005





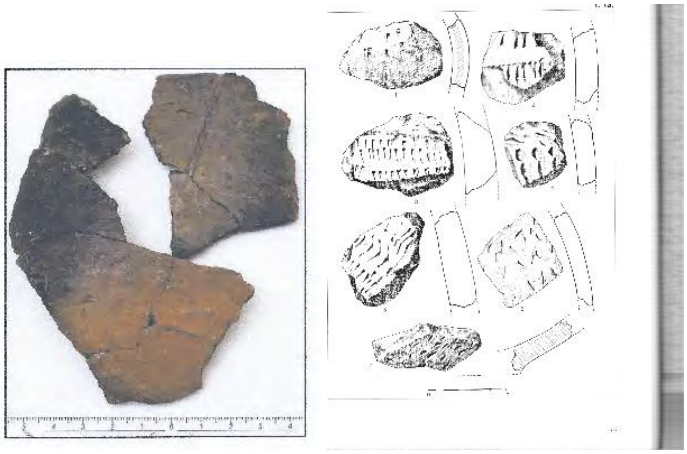
M. Templer

Fig. R14-8 Vela Spila Korčula cave entrance; Looking from interior towards entrance with the two windows above; View of excavated area from above larger window; View from esplanade in front of cave over Vela Luka bay.



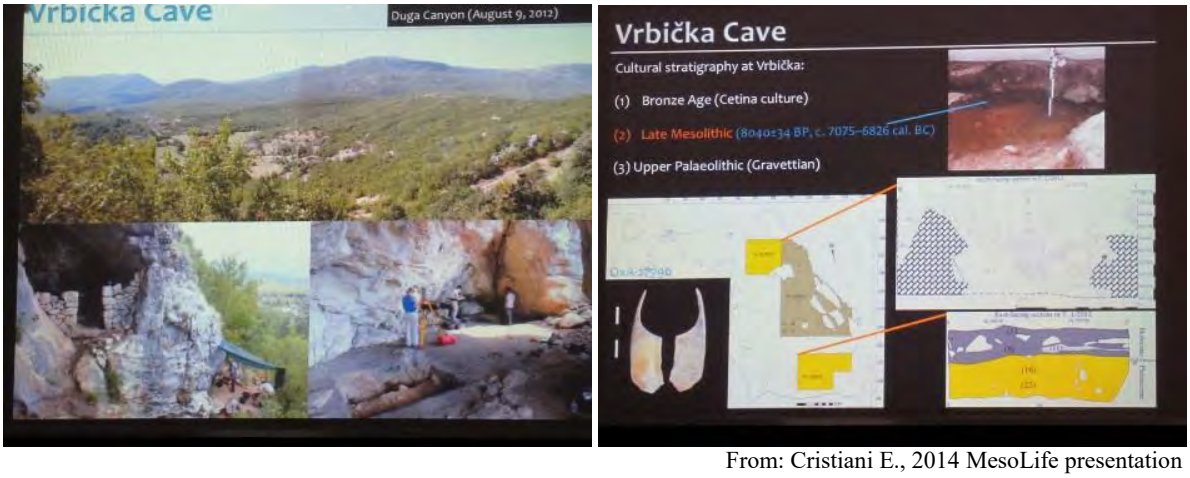
From: Čečuk B. & Radić D., 2005

Fig. R14-9 Vela Spila Korčula cave profile and excavated surface; Stratigraphy.



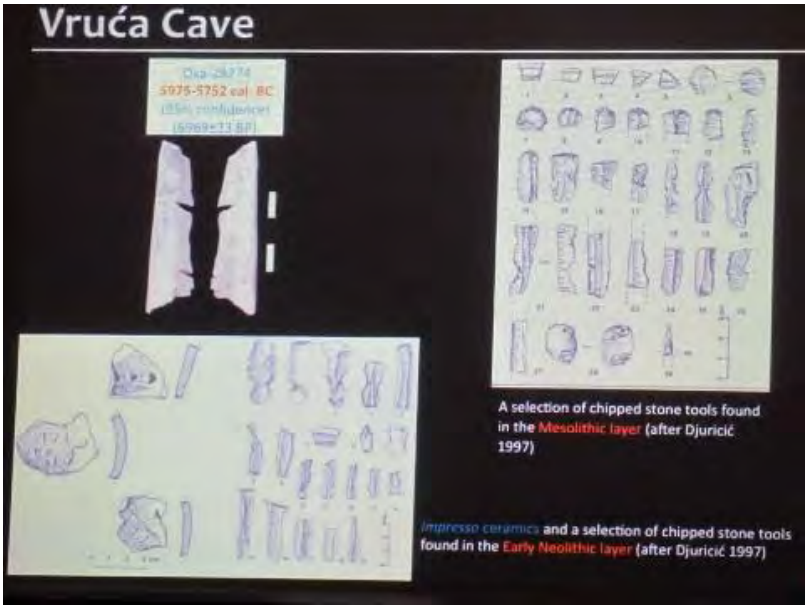
From: Radić D., 2005 From: Čečuk B. & Radić D., 2005

Fig. R14-9a Monochrome pottery from the Transition similar to that found at Sidari; Early Impressed Ware.



From: Cristiani E., 2014 MesoLife presentation

Fig. R14-10 Vrbička Pećina and rockshelter under excavation in 2012; stratigraphy.

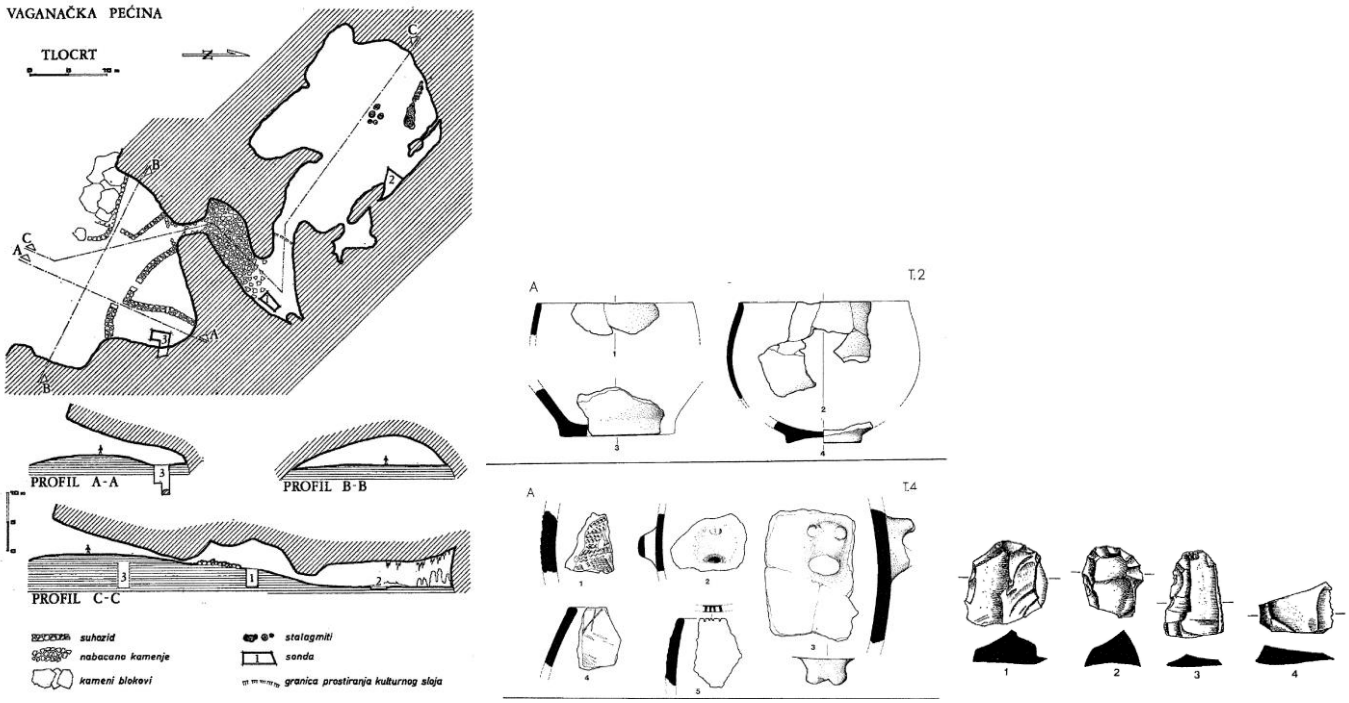


From: Cristiani E., 2014 MesoLife presentation

Fig. R14-10a Vruća Pećina Mesolithic lithics which show continuity with levels with Impressed Ware.


From: WWW

Fig. R14-11 Zelena Pećina location.



From: Forenbaher S. & Vranjican P., 1985

Fig. R14-12 Vaganačka Pećina site plan with the two excavation trenches indicated, the first under the overhang near the entrance and the other in the interior; Early Neolithic Impressed Ware; Mesolithic lithic industry.



Photos M. Templer

Fig. R14-13 Abri Šeraja is at the bottom of the sunken karstic channel; Site through the undergrowth; Test excavation.



Photos M. Templer

Fig. R14-14 Lim 001 Rockshelter with D. Komšo; Test excavation pit; View from esplanade over River Limski (now a long narrow estuary).



Photos M. Templer

Fig. R14-15 Pupićina Pećina from interior; Excavation pit.



Photos M. Templer

Fig. R14-16 Sveti Stjepan I Cave and Sveti Stjepan II Cave.

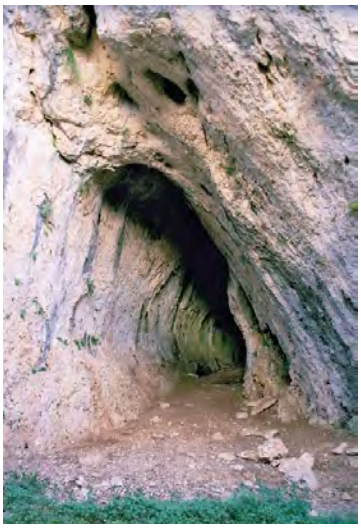
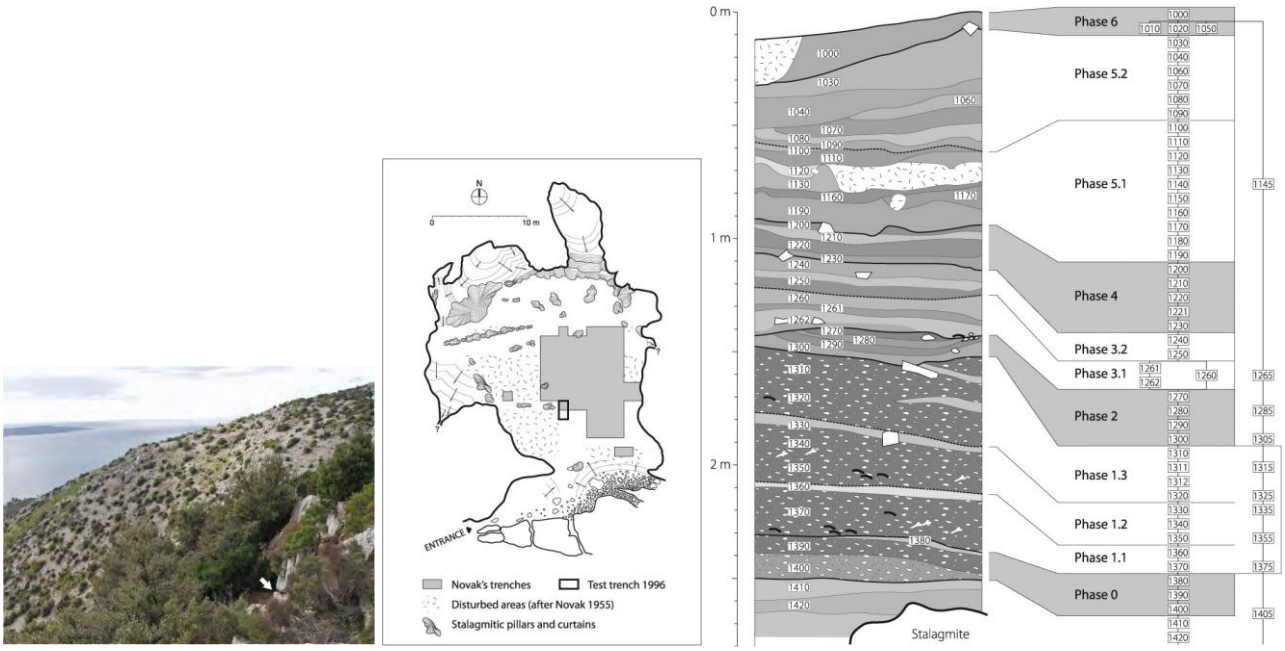


Photo D. Komšo

Fig. R14-17 Vela Špilja Lošinj



From: Forenbaher S., et al., 2010

Fig. R14-18 Grapčeva Špilja location; Site plan with 1996 test pit indicated with dark rectangle; 1996 stratigraphy.



Photos M. Templer

Fig. R14-19 Nakovana Špilja is near the top of the hill right of centre; Entrance to cave across the esplanade; The excavated surface is at the far end under the brow; View looking down the excavation pit.



From: Marijanović B., 2009 Photo M. Templer

Fig. R14-20 Crno Vrilo lithics; Crno Vrilo artefacts at the Udine 2014 exhibition 'Adriatico Senza confine', including the fish-hook.





From: Moore A., et al., 2007

Fig. R14-21 Pokrovnik I location is inside hashed-line circle drawn on the photo; Female figurine found in Impressed Ware level.





From: Komšo D. & Čuka M., 2014

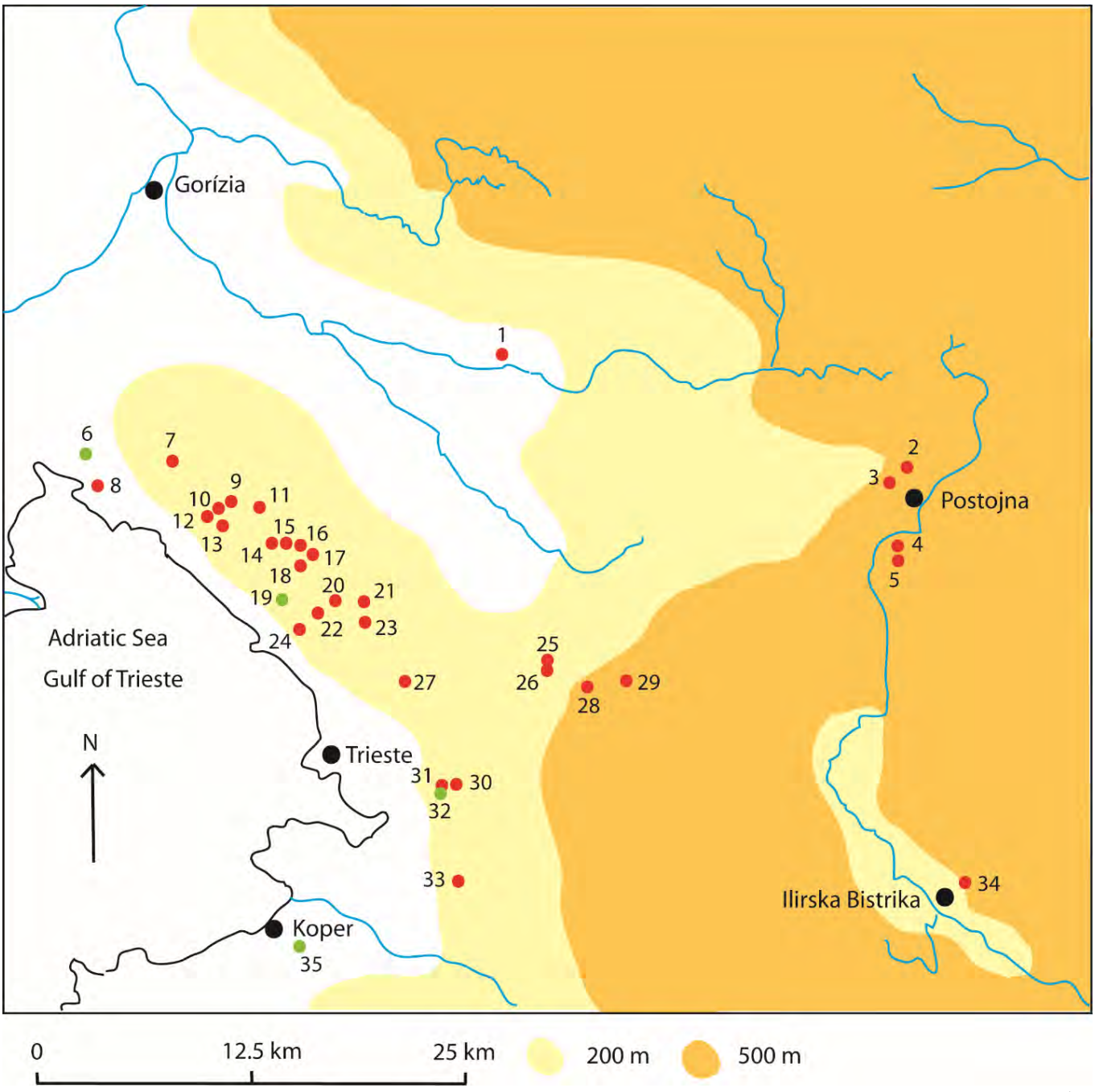


Photo M. Templer

Fig. R14-22 Kargadur location on the coast showing extension of eroded site; Pottery, Lipari obsidian and fish hooks from Kargadur at 'Adriatico Senza Confine' 2014 exhibition at Udine, Italy.

Map R15

Region 15 – North Adriatic – Trieste and Slovene Karst



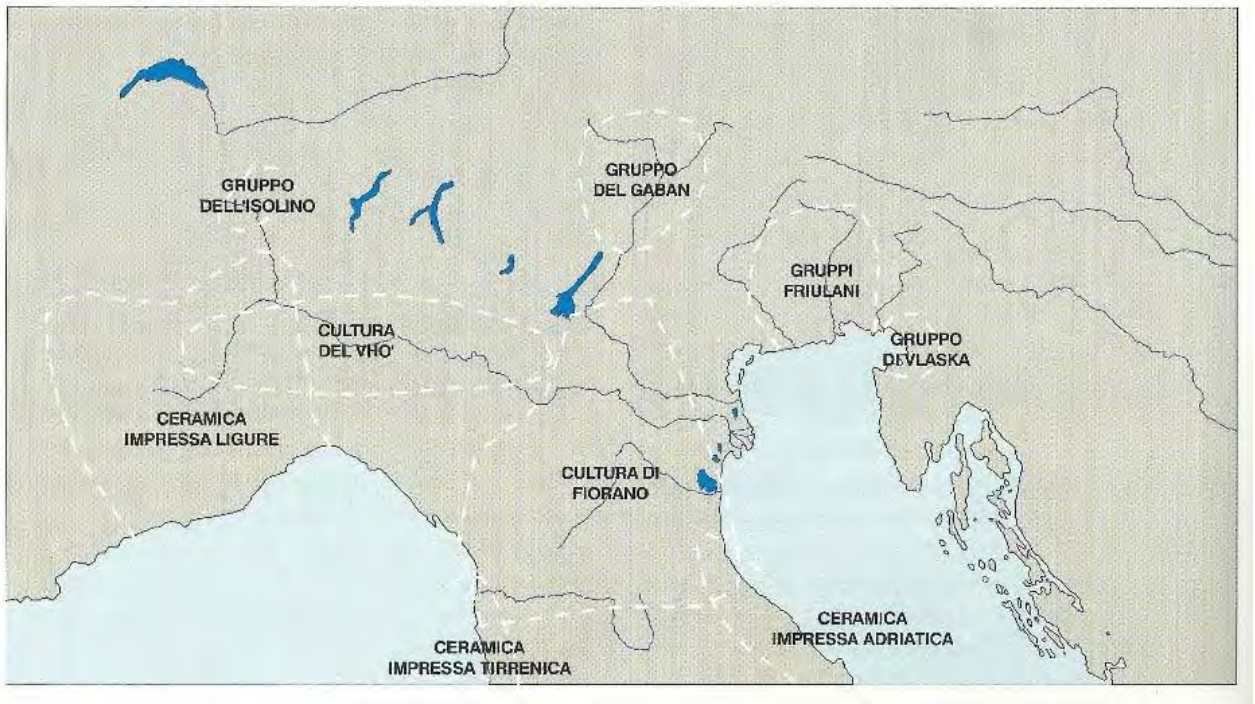
Map R15

Notes:
● = Mesolithic / Transition sites
● = Neolithic / Transition sites

Site names:

1. Zemono; 2. Otoško polje; 3. Betalov Spodmol; 4. Kambrce; 5. Dedkov Trebež; 6. Grotta del Mitreo; 7. Velika Nive; 8. Grotta Teresiana di Duino; 9. Grotta Ansa; 10. Grotta dei Ladroni; 11. Grotta Benussi; 12. Grotta del Pettirosso; 13. Riparo Zaccaria; 14. Grotta Caterina; 15. Grotta dell'Edera; 16. Grotta Azzurra di Samatorza; 17. Grotta Gialla; 18. Caverna Moser; 19. Grotta dell'Orso; 20. Grotta dei Ciclami; 21. Grotta Lonza; 22. Grotta Zingari; 23. Riparo Monrupino; 24. Grotta della Tartaruga; 25. Trhlovca Cave; 26. Mala Triglavca; 27. Grotta VG 4245 di Trebiciano; 28. Roška Špilja; 29. Viktorjev Spodmol; 30. Monte Stena; 31. Grotta della Trincea; 32. Grotta delle Gallerie; 33. Podmol pri Kastelcu; 34. Pod Črmukljo; 35. Sermin.

Figures – Region 15 – Trieste and Slovene Karst

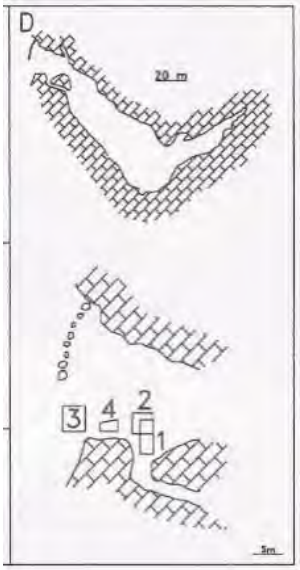


From: Pessina A., 1998

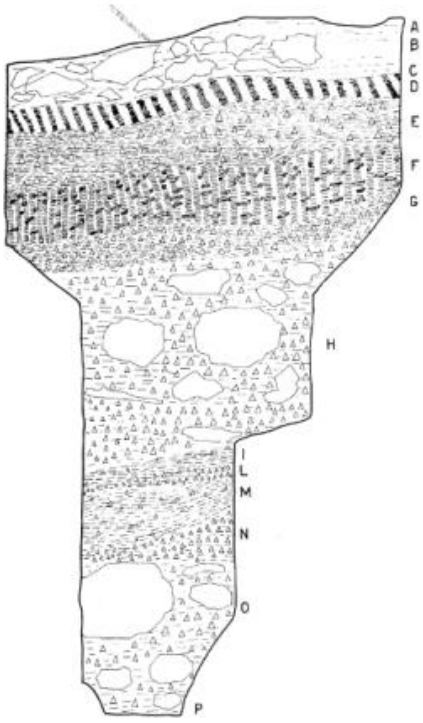
Fig. R15-1 Approximate extent of the Early Neolithic Cultures at the head of the Adriatic.



Photo M. Templer

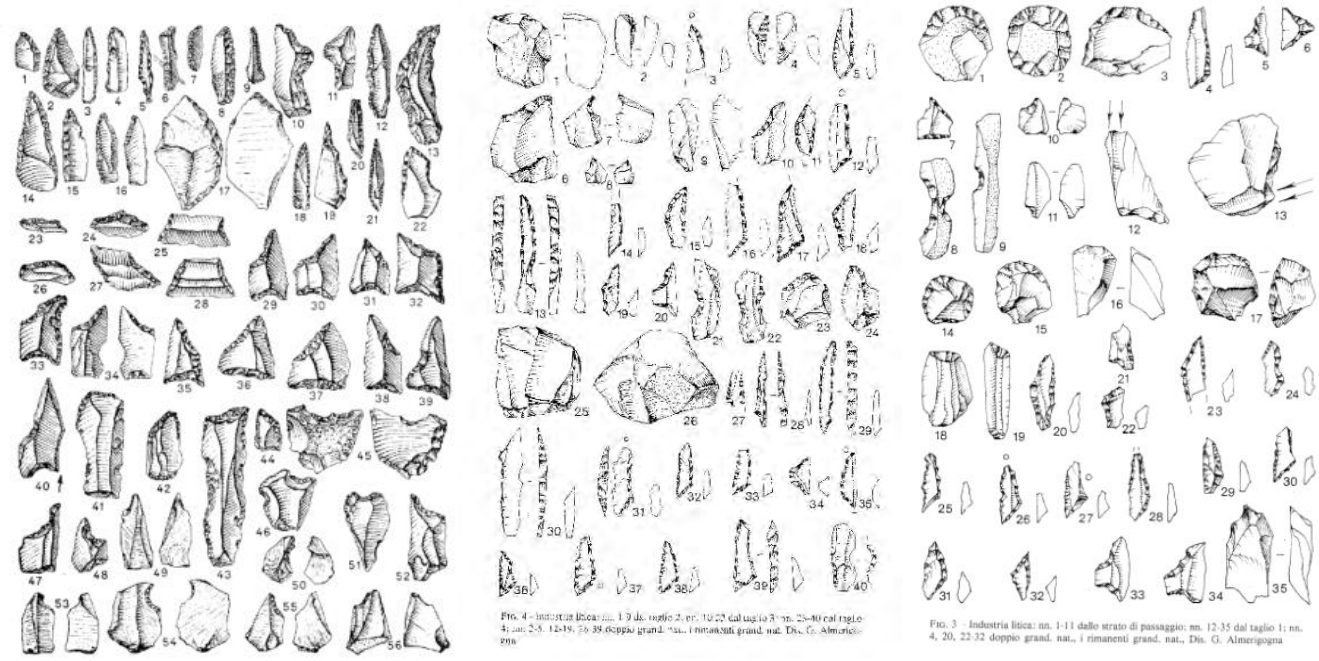


From: Boschian G., *et al*., 2000



From: Cannarella D., *et al*., 1968

Fig. R15-2 Grotta Azzurra porch at the base of doline; Plan of cave with enlargement of porch area showing excavated surfaces; Stratigraphy of early 1960s excavations.



From: Cannarella D., *et al*., 1968 From: Cremonesi G., *et al*., 1984

Fig. R15- 3 Grotta Azzurra Mesolithic lithics from D. Cannarella; Late Mesolithic / Early Transition Levels 2, 3 and 4; lithics from Levels 'Pass' (Later Transition) and 1 (Transition).

GROTTA AZZURRA
Fauna

Specie	Pass.	t. 1	t. 2	t. 3	t. 4	t. 5	t. 6	t. 7	t. 8	t. 9	t. 10	t. 11	t. 12	t. 13	t. 14	t. 15	t. 16-17
Ursus arctos				1	1												
Vulpes vulpes		1		1						1							
Meles meles	3	3			3				1	1	2	3	2	2			
Lutra lutra								1									
Martes sp.			1	1	1											1	
Felis silvestris	2										1			1			
Oryctolagus cuniculus								1									
Lepus europaeus	2		1	2					1		1	1				1	1
Glis glis													1				
Castor fiber										1							
Sus scrofa	5	1	2	4	4					4	11	12	3	3	2	4	1
Cervus elaphus	34	12	4	9	6		2	1	2	2	12	12	11	14	2	16	20
Cervus/Sus	1			1			1				2	2	1				3
Capreolus capreolus	7	6	3	4	1	1	1	1		2	8	6	5	5		4	3
Bos sp.	2	4			2												
Ovis aries	6	4	3	1													
Ovis vel Capra	6	4															
Grandi ruminanti	3	4		1	5							1				2	1
Piccoli ruminanti	11	9	11	5	2		1		1	3	2	2		3		2	
Totale	78	48	25	30	25	1	5	4	5	14	39	39	24	28	4	30	29

From: Cremonesi G., *et al*., 1984

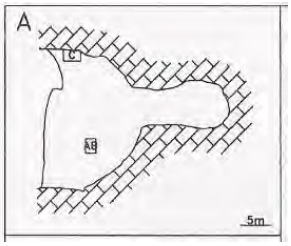
Fig. R15-3a Faunal assemblages by Levels with the earliest manifestation of domesticated species in Level 3, increasing in Levels 2, 1 and Pass (Transition).

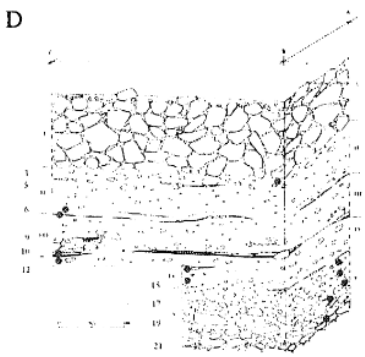


From: Catasto delle Grotte

Fig. R15-4 Porch of Grotta Benussi.







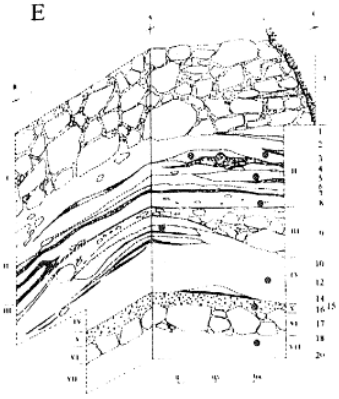


Photo M. Templer From: Boschian G., *et al*., 2000 From: Canarella D. & Pitti C., 1984

Fig. R15-5 Grotta Caterina with porch some 8m high; Plan of cave and excavated surfaces; Stratigraphy.





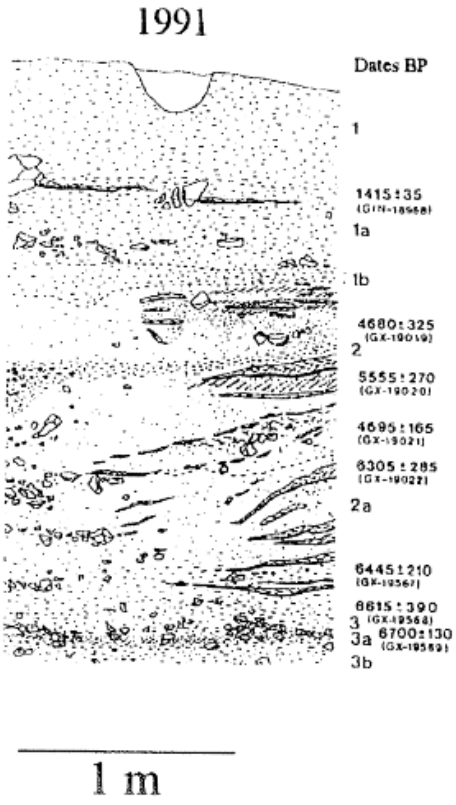
Photos M. Templer

Fig. R15-6 Entrance to Grotta della Tartaruga and evidence of clandestine excavations in 2011.



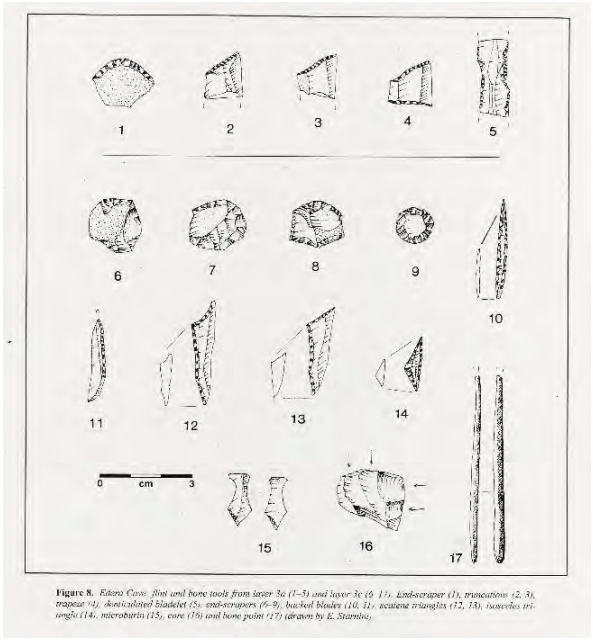


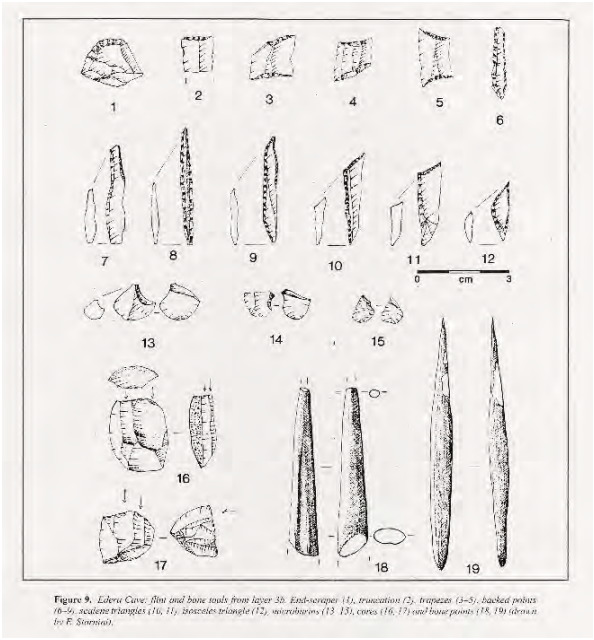
Photos M. Templer



From: Boschian G., *et al*., 2000

Fig. R15-7 Grotta dell'Edera at the bottom of the doline; view of excavations in 2011; Stratigraphy of Levels 1 to 3b from 1991 excavations.





From: Biagi P., *et al*., 2008

Fig. R15-8 Grotta dell'Edera Lithics from Level 3a (1-5) and Level 3c (6-16); Lithics from Level 3b.

Layers	2			2a			3			3a		
	MNI	%	%	MNI	%	%	MNI	%	%	MNI	%	%
Caprines	10	38.5	47.6	24	53.3	66.7	4	26.7	33.3	6	40.0	42.9
Cattle	3	11.5	14.3	2	4.4	5.5	1	6.7	8.3	1	6.7	7.1
Catle/Red deer	-	-	-	-	-	-	-	-	-	-	-	-
Red deer	2	7.7	9.5	5	11.1	13.9	2	13.3	16.7	3	20.0	21.4
Domestic Pig	2	7.7	9.5	1	2.2	2.8	1	6.7	8.3	-	-	-
Domestic Pig/Boar	-	-	-	-	-	-	-	-	-	1	6.7	7.1
Boar	2	7.7	9.5	2	4.4	5.5	2	13.3	16.7	1	6.7	7.1
Roe deer	1	3.8	4.8	2	4.4	5.5	2	13.3	16.7	2	13.3	14.1
Dog	1	3.8	4.8	-	-	-	-	-	-	-	-	-
Wolf	-	-		1	2.2		-	-		-	-	
Fox	1	3.8		2	4.4		-	-		-	-	
Wild cat	1	3.8		1	2.2		-	-		-	-	
Martes sp.	-	-		1	2.2		1	6.7		-	-	
Badger	1	3.8		3	6.7		1	6.7		1	6.7	
Hare	1	3.8		1	2.2		1	6.7		-	-	
Hedgehog	1	3.8		-	-		-	-		-	-	

Table 2 - Minimum number of individuals.

From: Boschian G., *et al*., 2000

Fig. R15-8a Grotta dell'Edera MNI faunal assemblage for Levels 2 to 3a



Photo M. Templer

Fig. R15-9 Grotta Zingari in 2011.

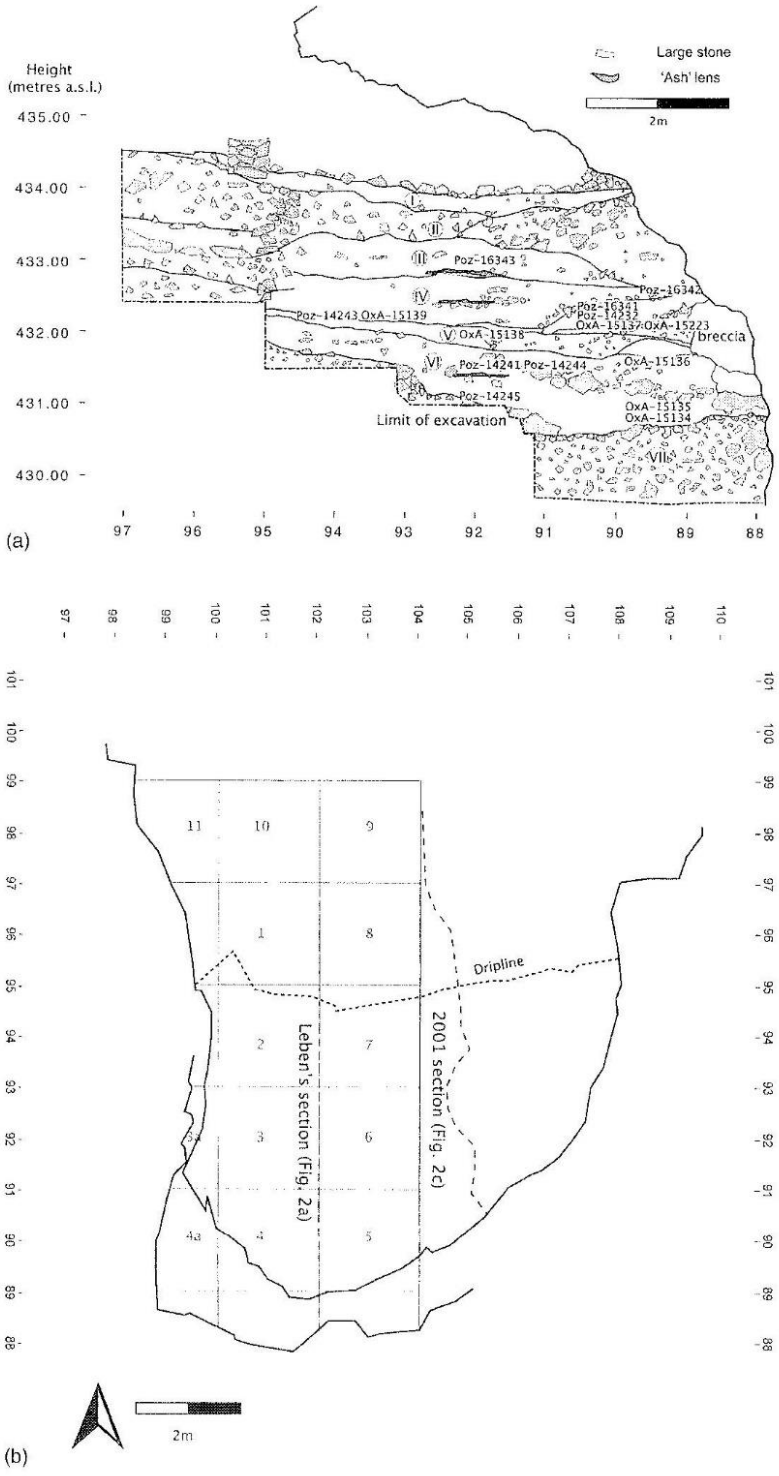


Figure 2. (a) Leben's main axial section drawing; (b) Leben's excavation grid; (c) (on next page) section corresponding to west wall of Leben's trench, recorded in 2001.



Photo M. Templer

From: Mlekuž D., *et al*., 2008

Fig. R15-10 Mala Triglavca cave at the bottom of a doline near Divača; Stratigraphy and excavated surface.

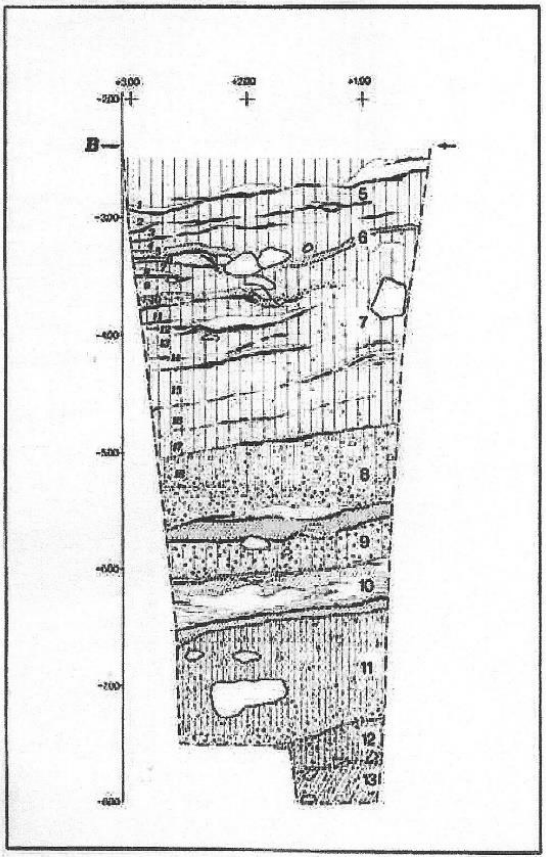


Photo M. Templer

Fig. 6: Podmol near Kastelec, part of section x = +3.00 (A) from layers 1 to 7. The remains of the burnt layers in layers 5 and 7 can be seen. Photo: C. Narobe.

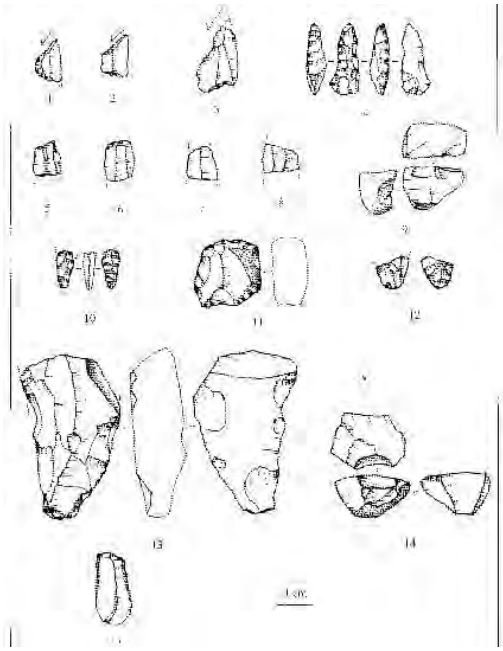


Fig. 7: Podmol near Kastelec, section y = +5.00 (B). Key: 5-13 layers, 1-18 excavations by anthropogenic levels.



From: Turk I., *et al*., 1993

Fig. R15-11 Podmol pri Kastelcu in 2011; Photograph and drawing of stratigraphy.

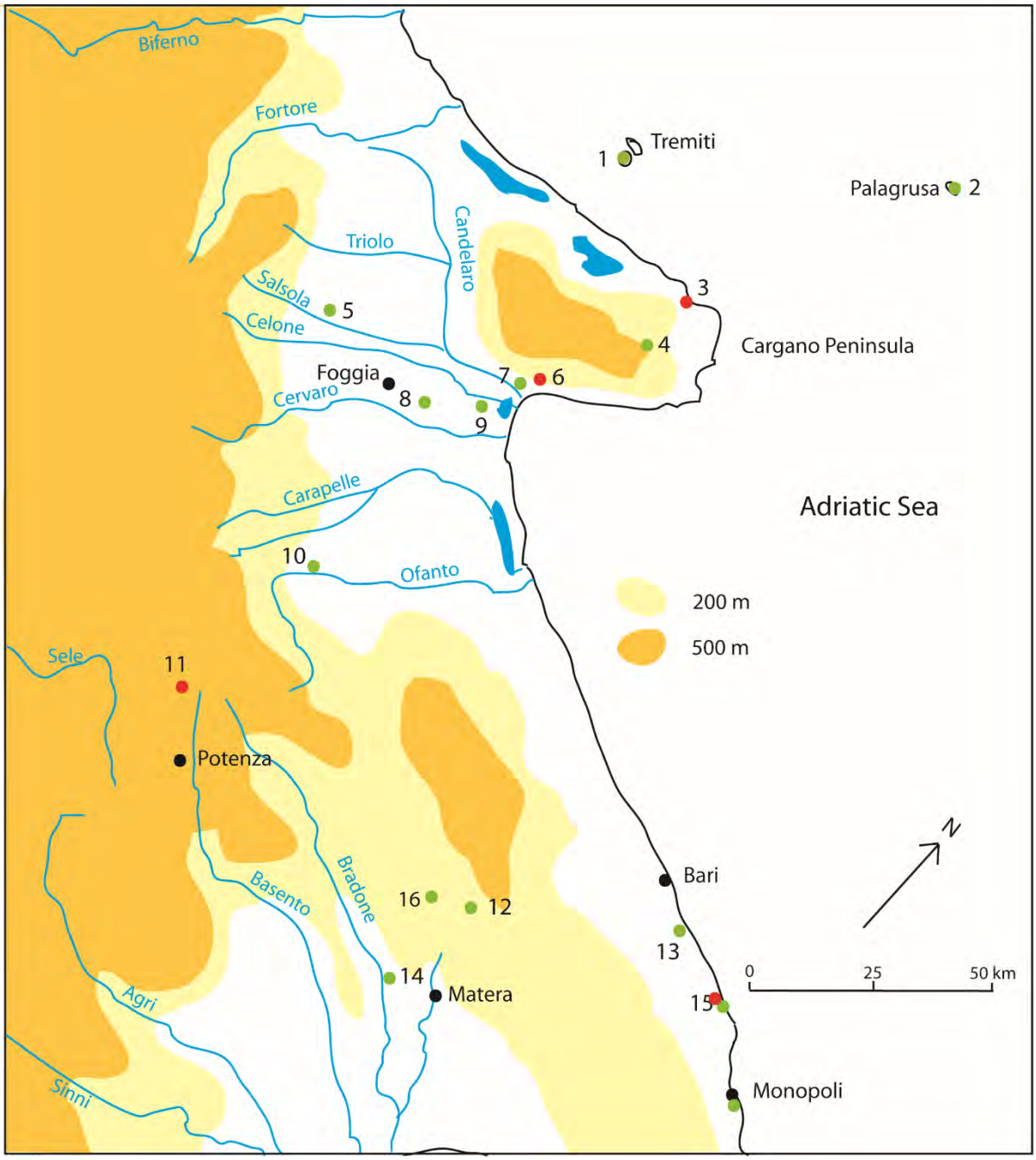


From: Bernardini F., 2007

Fig. R15-12 Trieste Karst Castelnovian lithic scatter finds from Monte Stenna.

Map R16

Region 16 – Southern Italy and West Adriatic Seaboard – Northern Apulia and Eastern Basilicata



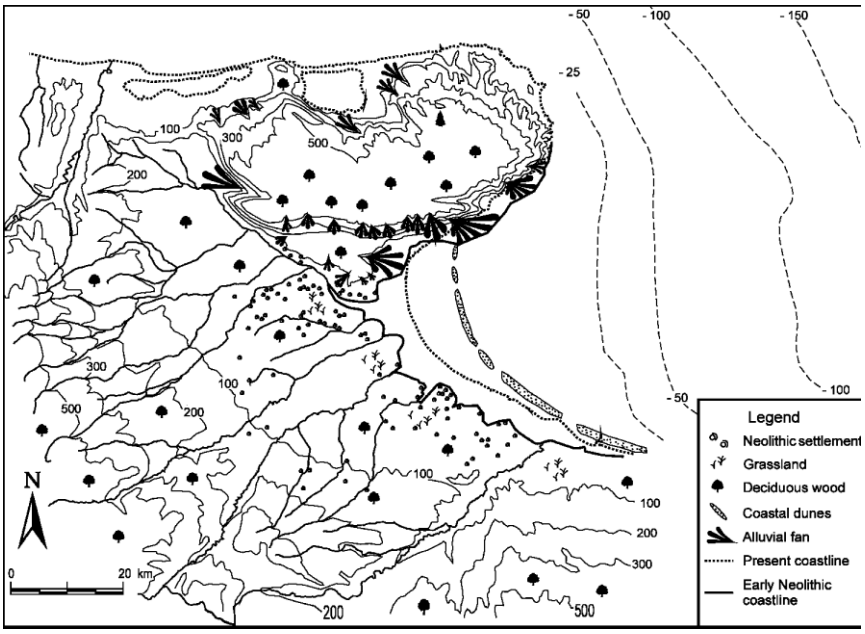
Map R16

Notes:
● = Mesolithic / Transition sites
● = Neolithic / Transition sites

Site names:

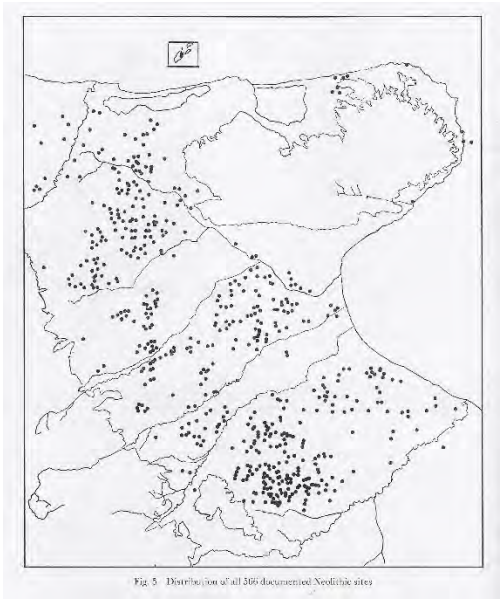
1. Prato Don Michele; 2. Palagruža; 3. Grotta Disiglia; 4. Defensola flint mines; 5. Ripa Tetta; 6. Grotta Scaloria; 7. Coppa Nevigata; 8. Masseria Giuffreda; 9. Masseria Santa Tecchia; 10. Rendina; 11. Tuppo dei Sassi; 12. Casa san Paolo; 13. Scamuso; 14. Trasano; 15. Le Macchie; 16. Malerba.

Figures – Region 16 – Northern Apulia and Eastern Basilicata



From: Caldara M. *et al*., 2002

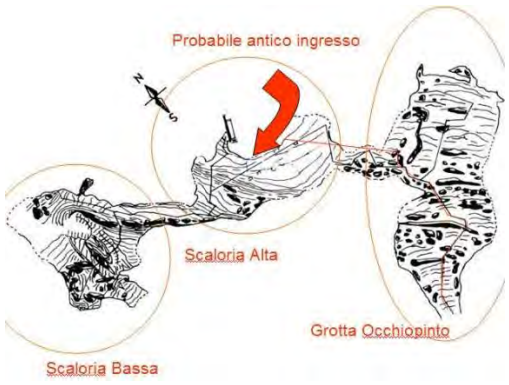
Fig R16-1 During the Early Neolithic the coastal lagoon was open to the sea through wide tidal inlets. The Gargano alluvial fans were truncated at their base by the wave action of the rising sea. The vegetation was rich and diversified; mixed woods mantled the higher areas.



From: Brown K., 2002-2003

Fig. R16-2 Distribution of the 566 documented Neolithic sites on the Tavoliere Plain and vicinity.





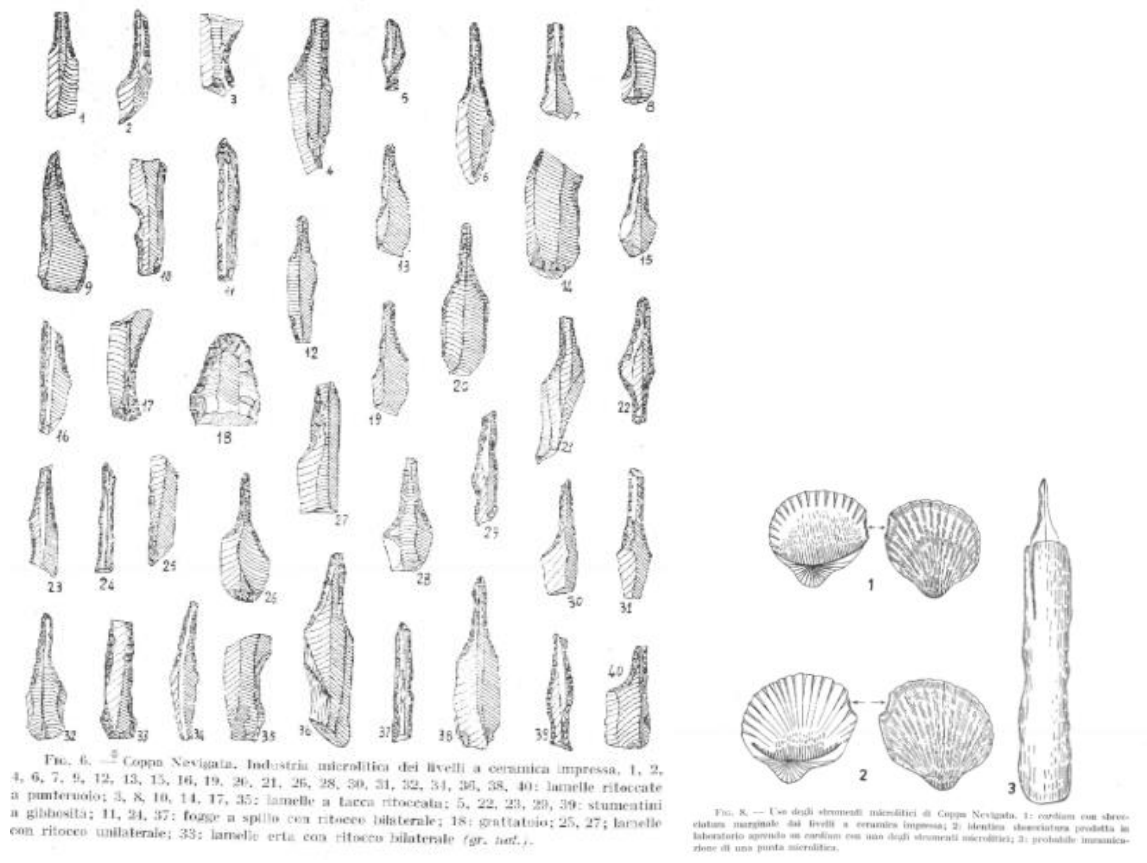
From: IIAS Web Site

Fig. R16-3 Location of Grotta Scaloria and plan of cave.



From: WWW

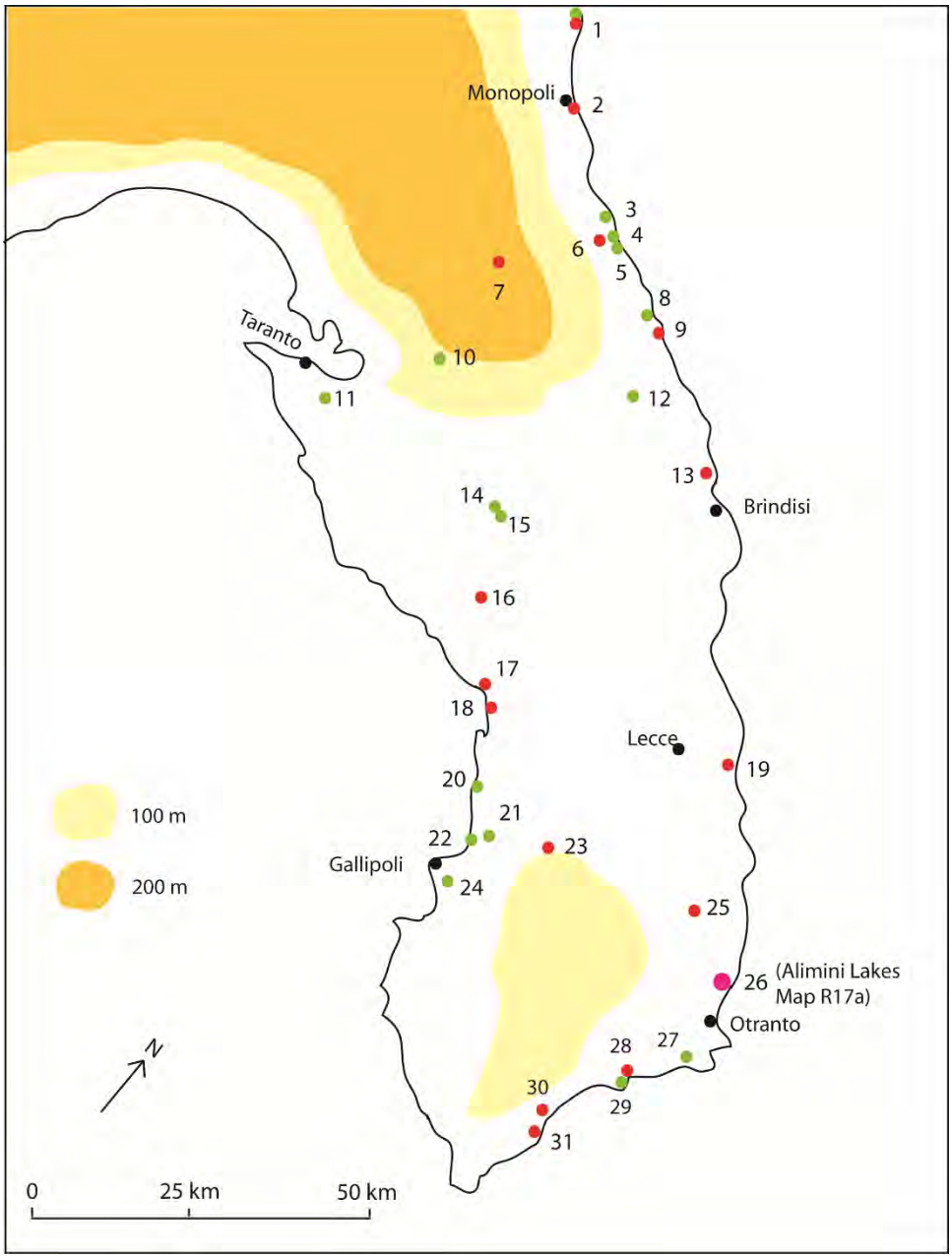
Fig. R16-4 Tuppo dei Sassi wall-paintings.



From: Puglisi S., 1955

Fig. R16-5 Coppa Nevigata microliths with ‘Sipontian Points’; Cardium shells showing stigmata of having been forced open and suggested use of ‘Sipontian Points’.

Region 17 – Southern Italy and West Adriatic Seaboard – The Salento Peninsula



Map R17

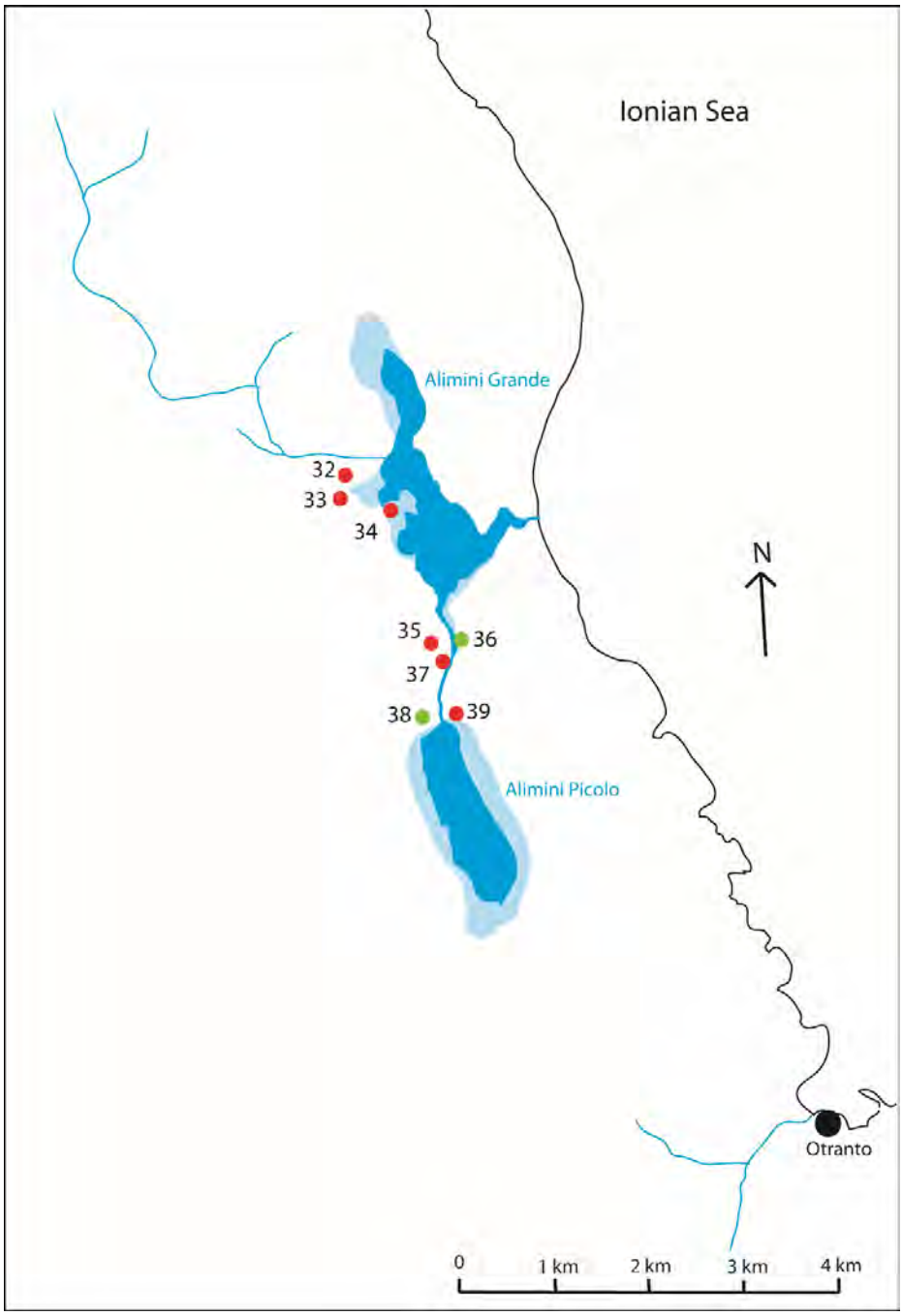
Notes:
● = Mesolithic / Transition sites
● = Neolithic / Transition sites
● = Surveys

Site names:

1. Le Macchie; 2. Grotta delle Mura di Monopoli; 3. Forcatella; 4. Torre Bianca; 5. Torre Canne; 6. Grotta Morelli; 7. Monticello; 8. Chianca di Palo; 9. Porto Fetente; 10. Montedoro; 11. Cimino; 12. Fontanelle; 13. Torre Testa; 14. Sant' Anna; 15. Pappada; 16. Terragne; 17. Grotta di Uluzzo; 18. Grotta del Cavallo; 19. Santa Foca; 20. Grotta del Fico; 21. Costante di Campo Latini; 22. Torre Sabea; 23. Grotta delle Veneri; 24. Canale Samari; 25. Masseria Malapezza; 26. Alimini Lakes (Map R17a); 27. Grotta di Porto Badisco; 28. Grotta Romanelli; 29. Grotta Zinzulusa; 30. Grotta delle Prazziche; 31. Grotta delle Cipolliane C.

Map R17a

Region 17 – Southern Italy and West Adriatic Seaboard – The Salento Peninsula (Alimini Lakes)



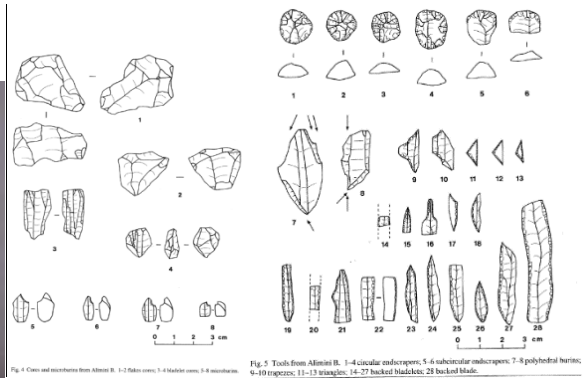
Map R17a

Notes:
● = Mesolithic / Transition sites
● = Neolithic / Transition sites

Site names:
32. Alimini C; 33. Alimini Campo Casetta; 34. Alimini Masseria Pagliarone; 35. Alimini Masseria Paiarone / Alimini A; 36. Grotta Sacara; 37. Grotta Marisa; 38. Alimini Campo Belmonte Domenico; 39. Alimini Campo Belmonte Cesario.

Figures – Region 17 – The Salento Peninsula



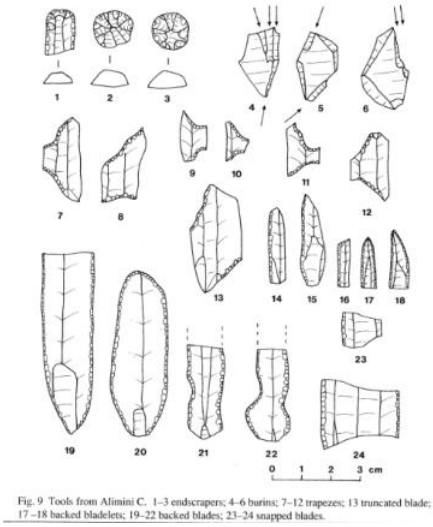


Photos M. Templer From: Milliken S. & Skeates R., 1989

Fig. R17-1 Alimini B site; surface collection in 2011; Lithics include microburin spalls, Romanellian thumbnail scrapers, geometric microliths, a 'Sipontian point' and bladelets.







Photos M. Templer From: Milliken S. & Skeates R., 1989

Fig. R17-2 Alimini C site; Surface collection in 2011including a Palaeolithic side-scraper; Lithics include Romanellian thumbnail scrapers, microburins, trapezes and notched bladelets and blades.





Photos M. Templer

Fig. R17-3 Alimini Campo Casetta site; Surface collection in 2011.





Photo M. Templer

Fig. R17-4 Bay of Uluzzo and Grotta del Cavallo in the centre of the photo above the farther inlet; Interior of cave in 2011.



Fig. 2 – Bird's eye-view of Grotte Cipolliane (photo courtesy G. Negro). From left to right, the three rock shelters A, B and C are identifiable.
Fig. 2 – Grotte Cipolliane. Veduta aerea obliqua (foto: G. Negro). Da sinistra verso destra i tre ripari A, B e C.

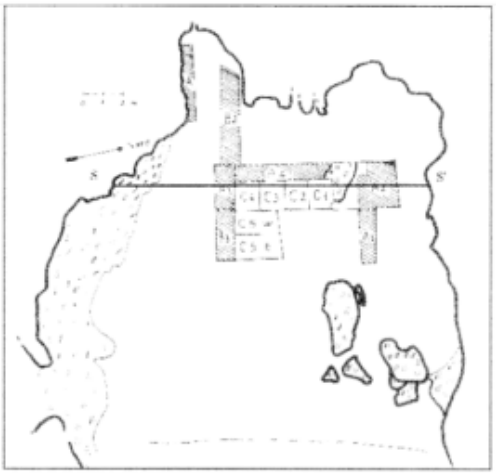
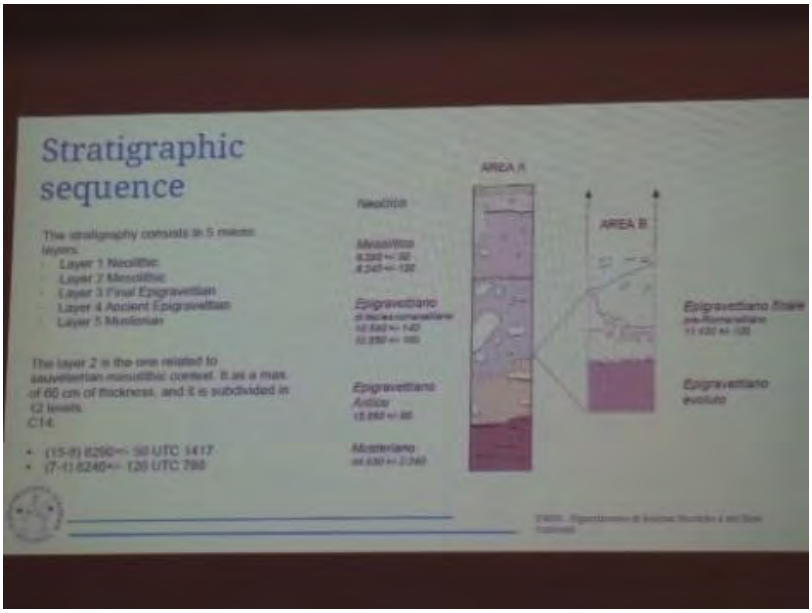


Fig. 8 – Plan of rock shelter C, showing the excavations of the archaeological campaigns (modified after GAMBASSINI, 1970). Trace of the profile of figure 9 is also shown.
Fig. 8 – Pianta del riparo C, con gli scavi delle campagne archeologiche (modificato, da GAMBASSINI, 1970) e la traccia della sezione illustrata nella figura 9.

From: Sammarco M. & Parise M., 2005

Fig. R17-5 Grotta delle Cipolliane C is on the right of the photo on the cliff-face; Plan of excavated area.





From: Calattini M. & Tessaro M., 2014

Fig. R17-6 Grotta delle Mura di Monopoli at the rear of the beach; Stratigraphic sequence.

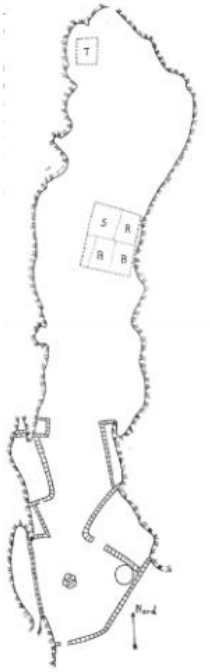
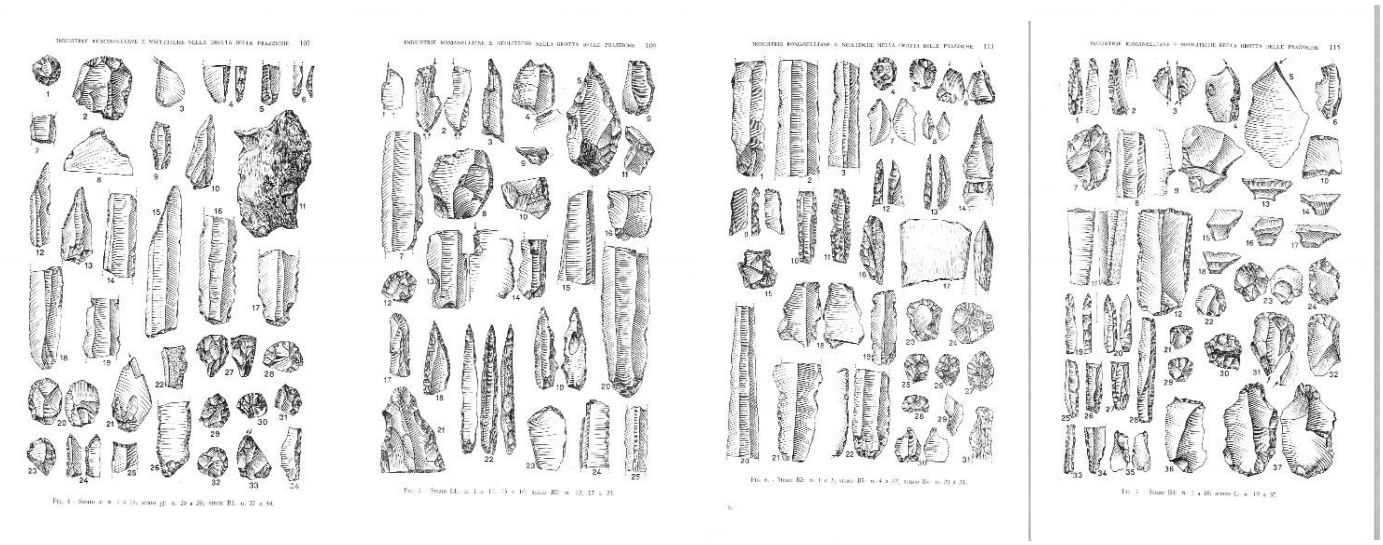


TABELLA N. 1 *Percentuali dei resti ossei*

	A alto	A basso	β	B1	B2	B3	B4	C
Equus asinus hydruntinus	—	—	—	1,8	0,7	2,3	0,5	8,1
Bos sp.	0,8	13,4	14,8	13,4	11,4	6,2	5,3	31,7
Sus scrofa	39,5	23,0	11,9	15,2	10,3	7,8	2,6	1,6
Cervus elaphus e *Dama dama*	5,4	—	2,8	19,7	12,7	20,6	11,3	33,2
Capreolus capreolus	—	—	—	0,5	1,5	0,6	2,0	1,5
Ovis aries e *Capra hircus*	51,9	56,8	51,7	26,8	50,3	37,1	30,2	—
Vulpes vulpes	—	2,4	8,7	13,3	6,0	18,2	23,9	14,4
Meles meles	—	—	—	—	—	—	0,2	4,2
Felis sylvestris	—	—	2,1	0,5	0,2	—	1,0	—
Canis familiaris	—	—	1,1	0,7	3,0	0,8	0,2	—
Canis lupus	—	—	—	—	0,3	—	—	1,2
Lepus europaeus	—	—	—	0,5	—	—	0,2	—
Testudo hermanni	2,4	4,4	7,0	7,5	3,3	16,2	22,4	4,1
N.° molluschi marini per 100 schegge ossee	37,2	58,9	117,8	137,9	67,0	144,7	231,5	6,6
Percentuale *Trochus* sul totale dei molluschi	17,1	18,2	8,8	7,8	9,4	10,7	11,3	25,6

From: Borzatti von Löwenstern E., 1969

Fig. R17-7 Plan of Grotta delle Prazziche; Faunal assemblage by stratigraphic Level.



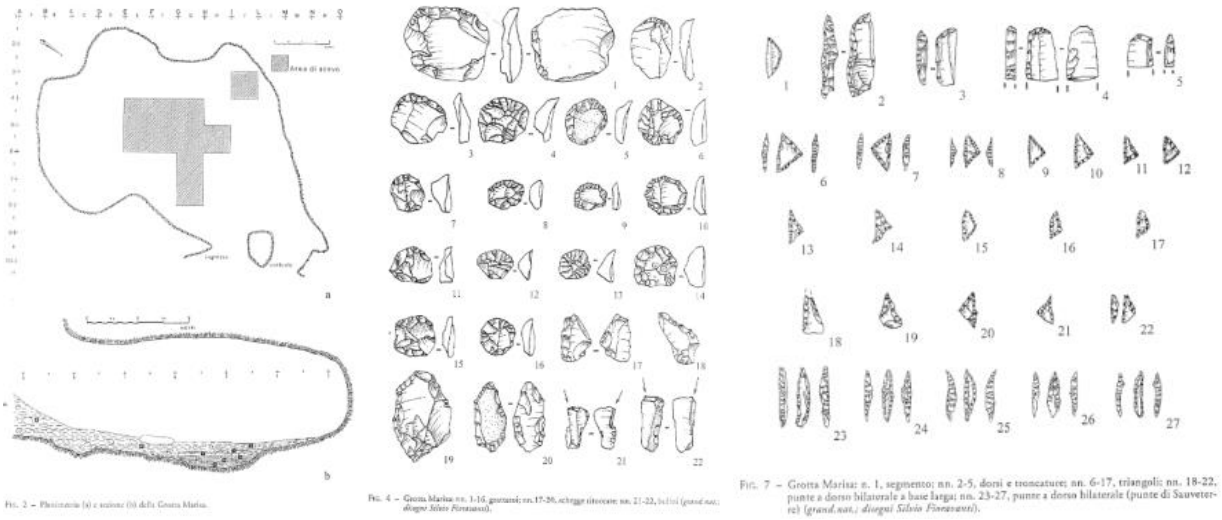
From: Borzatti von Löwenstern E., 1969

Fig. R17-8 Grotta delle Prazziche Neolithic lithic assemblage by stratigraphic Level (from left to right: A to B1; B1 to B2; B2, B3 & B4; B4).



Photos M. Templer

Fig. R17-9 Grotta Marisa porch; interior view looking back to left entrance.



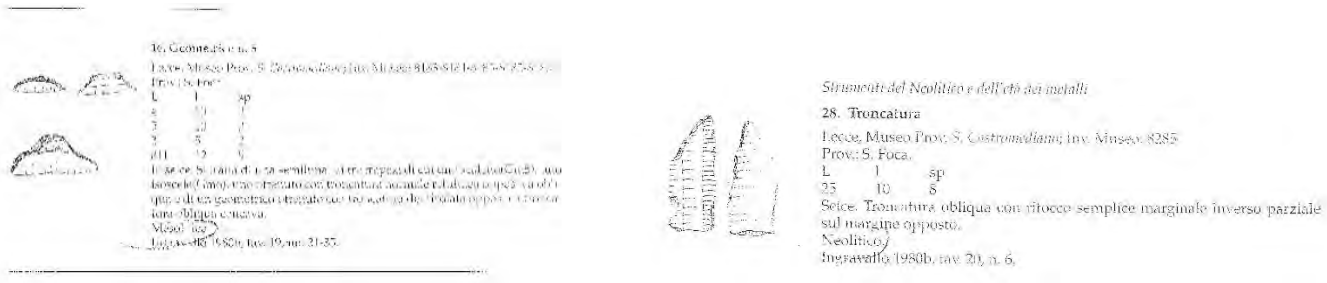
From: Astuti P., *et al*., 2005

Fig. R17-9a Grotta Marisa cave plan of excavated surface; Romanellian scrapers and armatures.



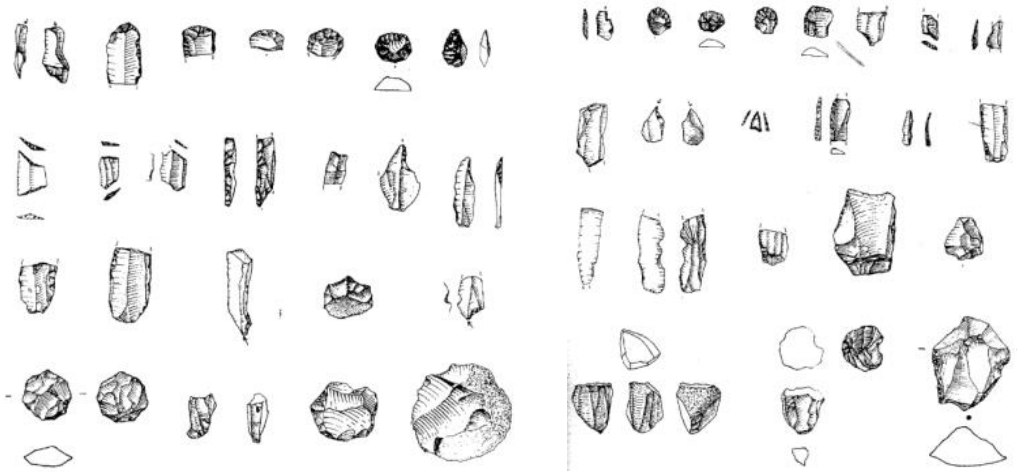
Photo from Google

Fig. R17-10 Grotta Romanelli is behind the boulder in the water at the head of the bay.



From: Ingravallo E., 1997a

Fig. R17-11 San Foca Mesolithic geometric microliths and a Neolithic truncation.

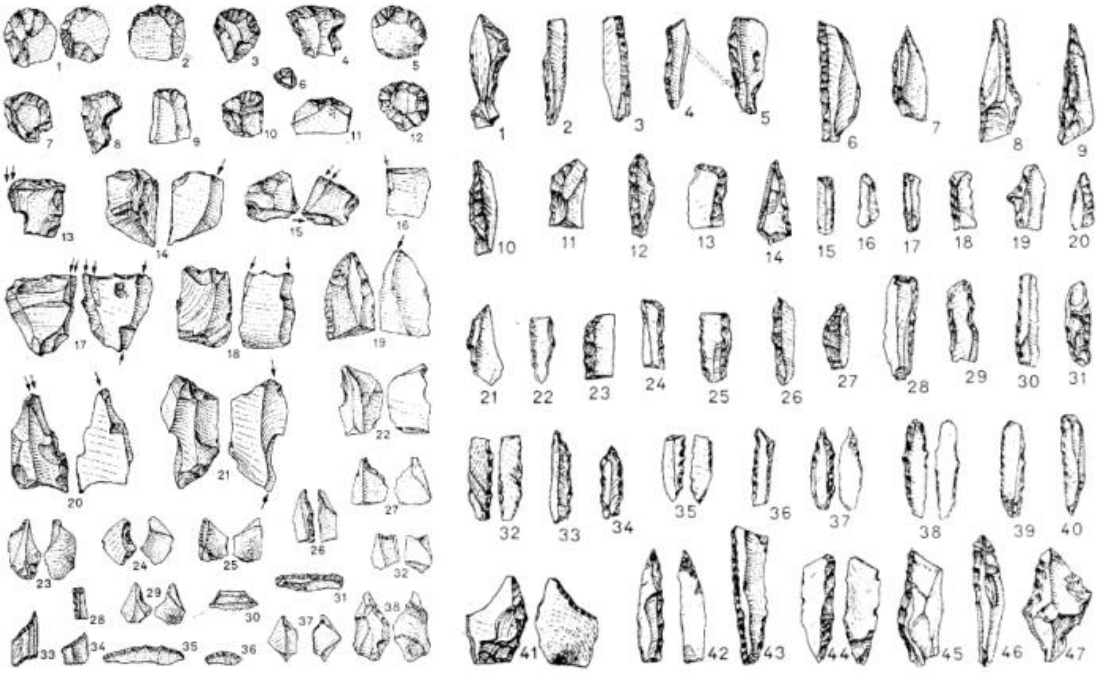


From: Tine V., 2004

Fig. R17-12 Terragne lithics from Levels US 3 (left) and US 5 (right), showing little change.

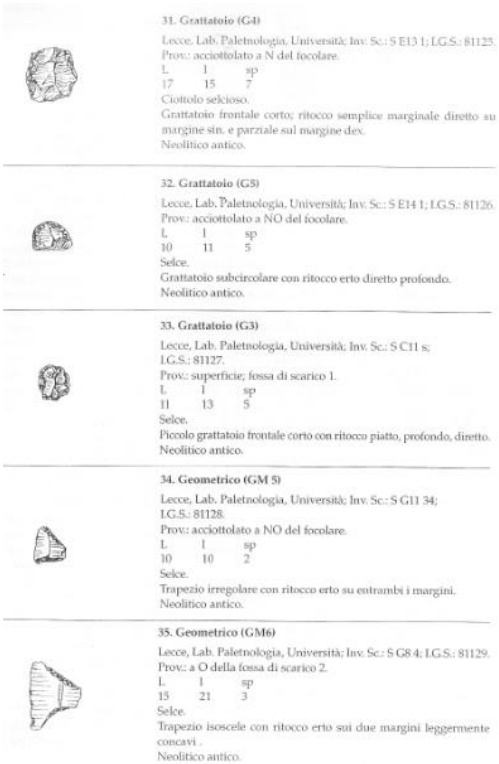


Photos M. Templer



From: Cremonesi G., 1967

Fig. R17-13 Torre Testa Site in 2011; Lithics collected in 2011; Microliths.



31. Grattatoio (G4)
Lecce, Lab. Paletnologia, Università; Inv. Sc.: S E13 1; I.G.S.: 81125.
Prov.: acciottolato a N del focolare.
L. l. sp.
17 15 7
Ciottolo selcioso.
Grattatoio frontale corto; ritocco semplice marginale diretto su margine sin. e parziale sul margine dex.
Neolitico antico.

32. Grattatoio (G5)
Lecce, Lab. Paletnologia, Università; Inv. Sc.: S E14 1; I.G.S.: 81126.
Prov.: acciottolato a NO del focolare.
L. l. sp.
10 11 5
Selce.
Grattatoio subcircolare con ritocco erto diretto profondo.
Neolitico antico.

33. Grattatoio (G3)
Lecce, Lab. Paletnologia, Università; Inv. Sc.: S C11 s;
I.G.S.: 81127.
Prov.: superficie; fossa di scarico 1.
L. l. sp.
11 13 5
Selce.
Piccolo grattatoio frontale corto con ritocco piatto, profondo, diretto.
Neolitico antico.

34. Geometrico (GM 5)
Lecce, Lab. Paletnologia, Università; Inv. Sc.: S G11 34;
I.G.S.: 81128.
Prov.: acciottolato a NO del focolare.
L. l. sp.
10 10 2
Selce.
Trapezio irregolare con ritocco erto su entrambi i margini.
Neolitico antico.

35. Geometrico (GM6)
Lecce, Lab. Paletnologia, Università; Inv. Sc.: S G8 4; I.G.S.: 81129.
Prov.: a O della fossa di scarico 2.
L. l. sp.
15 21 3
Selce.
Trapezio isoscele con ritocco erto sui due margini leggermente concavi.
Neolitico antico.

From: Orlando M., 1997

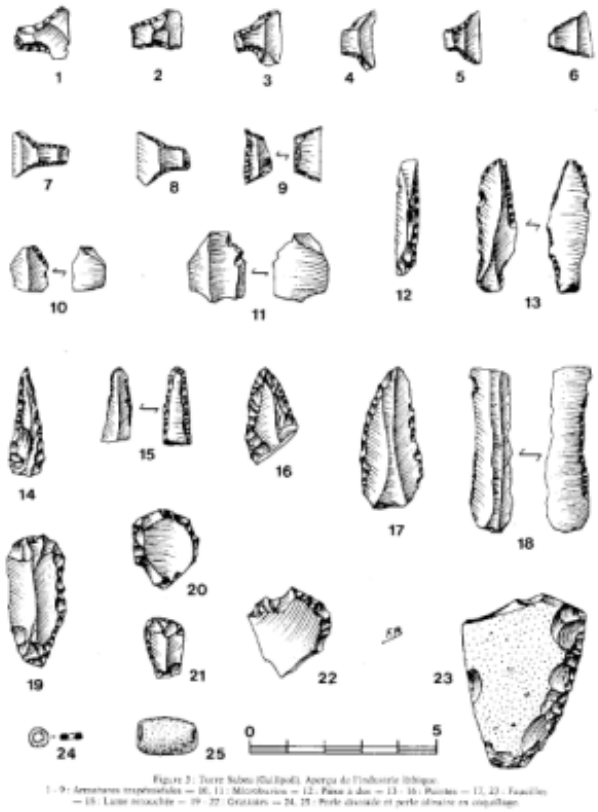
Fig. R17-14 Canale Samari Initial Neolithic lithics of Mesolithic tradition.

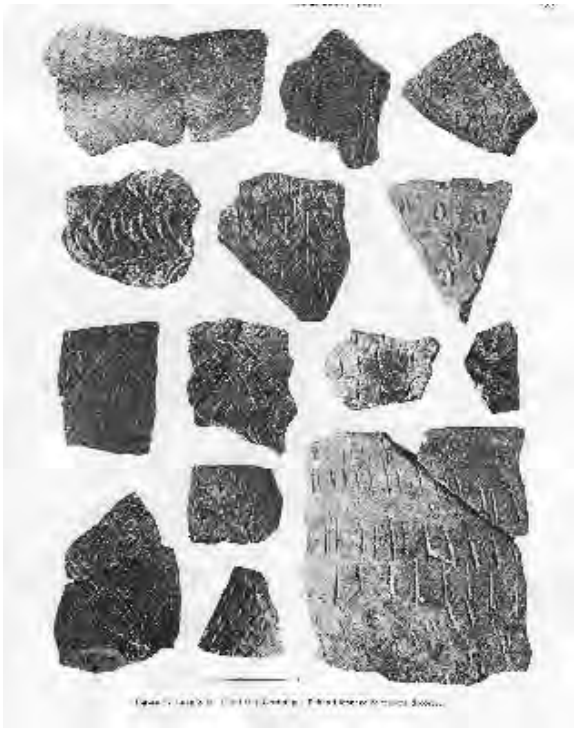


Photo M. Templer



From: Guillaine J. & Cremonesi G., 2003

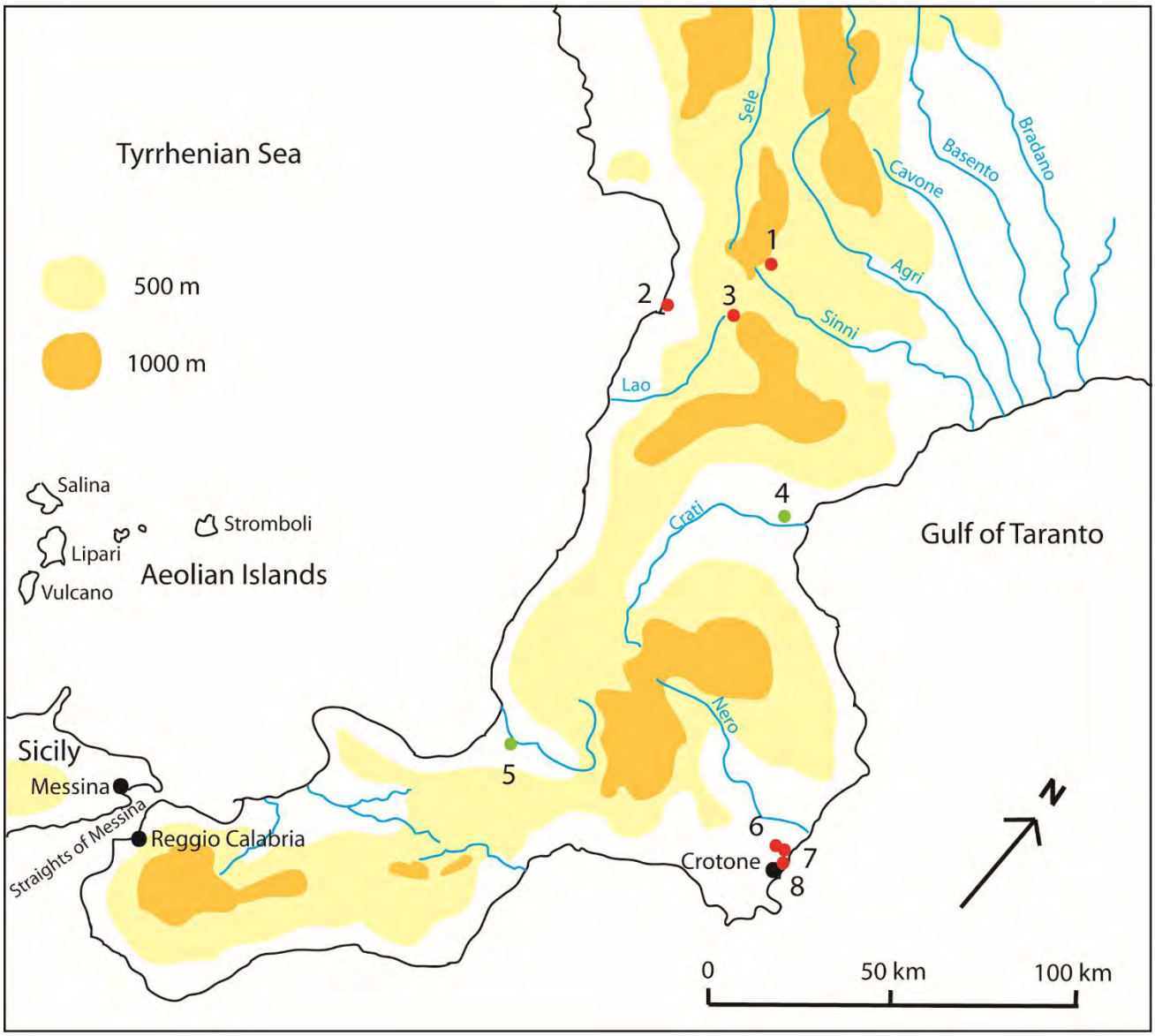




From: Guillaine J. & Cremonesi G., 2003

Fig. R17-15 Torre Sabea site with tidal pools looking from the shore-line towards the stream to the north in 2011; Site during excavations looking south from buildings beyond the stream; Early Neolithic lithics; Impressed Ware.

Region 18 – Southern Italy and West Adriatic Seaboard – Calabria and Western Basilicata

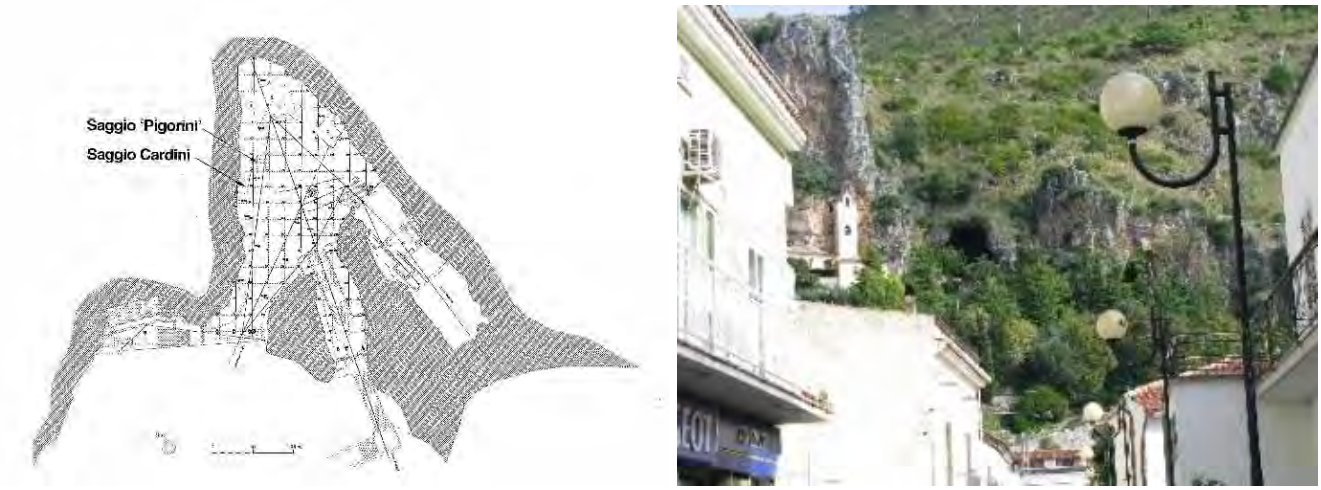


Map R18

Notes:
● = Mesolithic / Transition sites
● = Neolithic / Transition sites

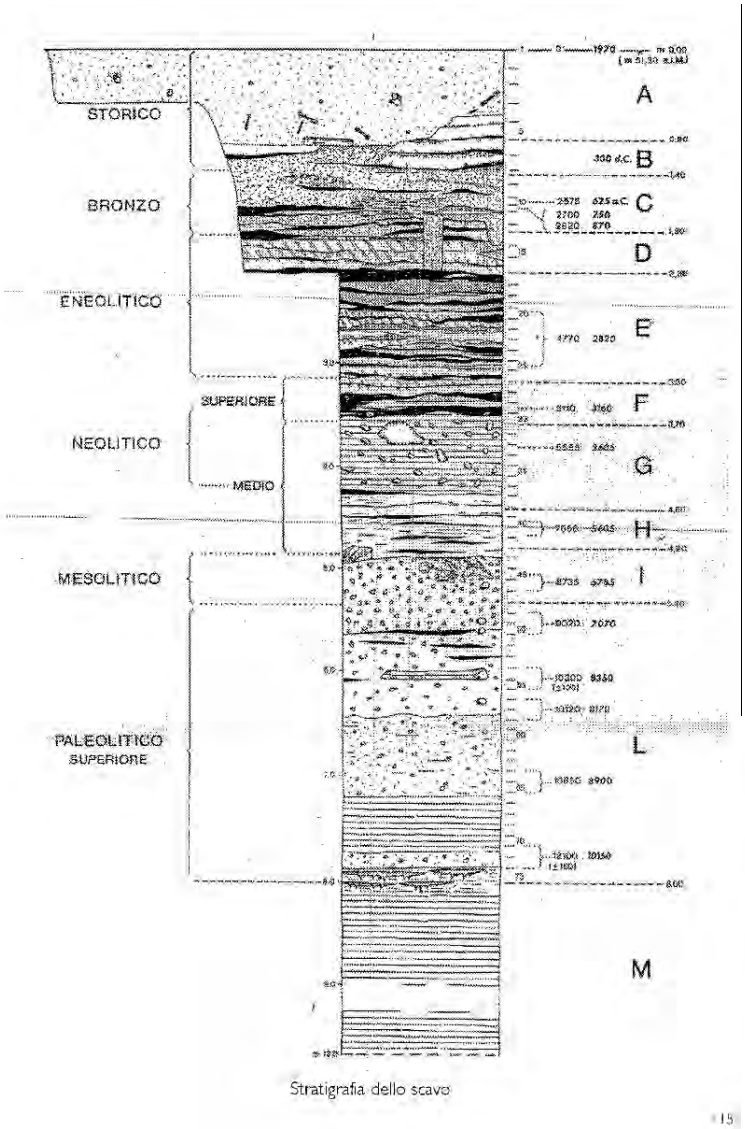
Site names:
1. Latronico 3; 2. Grotta della Madonna; 3. Grotta/Riparo del Romito; 4. Favella di Sibari; 5. Piana di Curinga; 6. Crotone – Semaforo di Campione; 7. Crotone - Castello; 8. Crotone – Gravina.

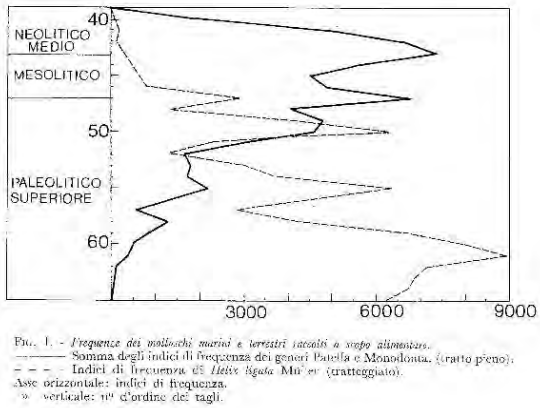
Figures – Region 18 – Calabria and Western Basilicata



From: Candia F., 2002 Photo M. Templer

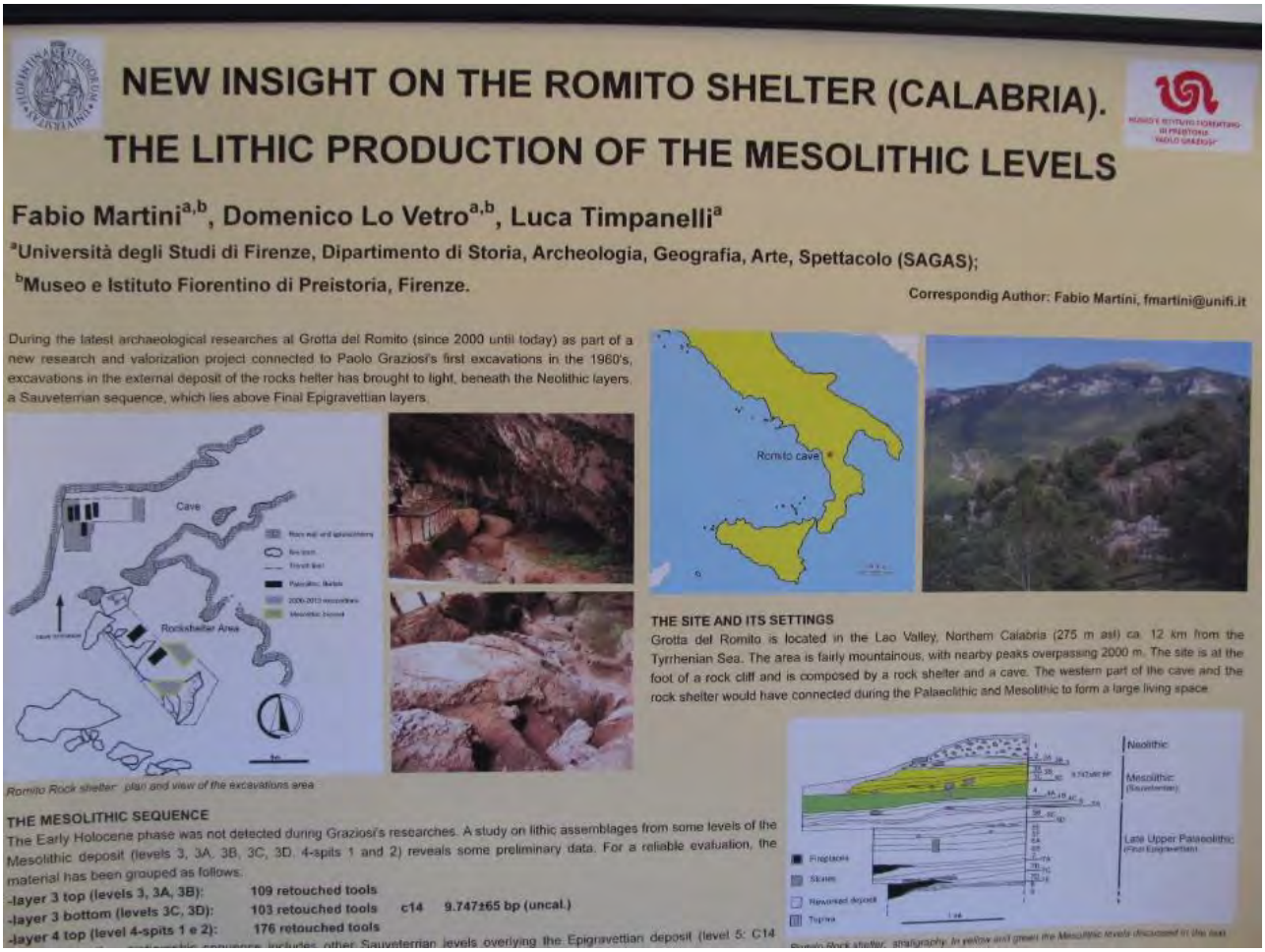
Fig. R18-1 Plan of Grotta della Madonna at Praia a Mare showing location of excavation pit against the left wall in line with the main cave entrance; photo of main cave porch with the sanctuary church to the left.





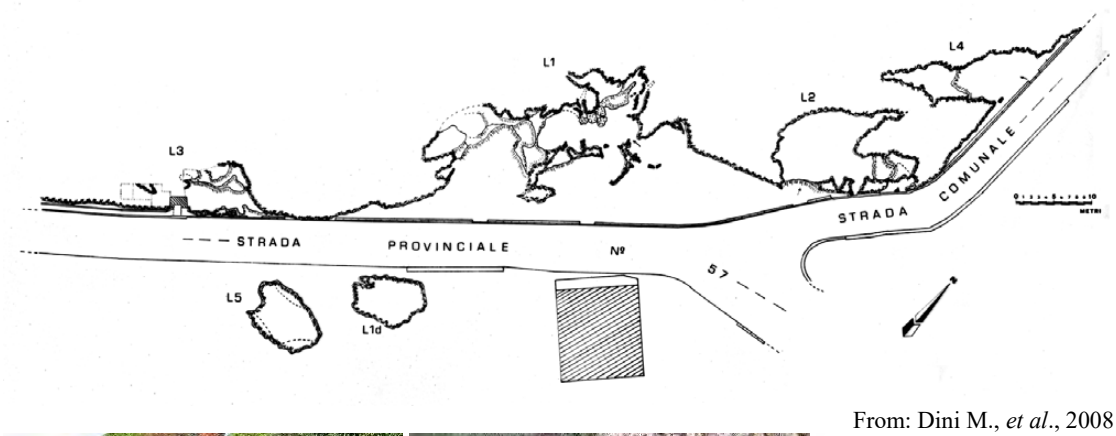
From: Cardini L., 1970 From: Durante S. & Settepassi F., 1972

Fig. R18-2 Grotta della Madonna Stratigraphy with the Transition demarcation line through Layer H between the Mesolithic and Neolithic; Incidence of marine molluscs which decline rapidly in the Neolithic with solid line representing *Patella* and *Monodonta*, and hashed line *Helix*.

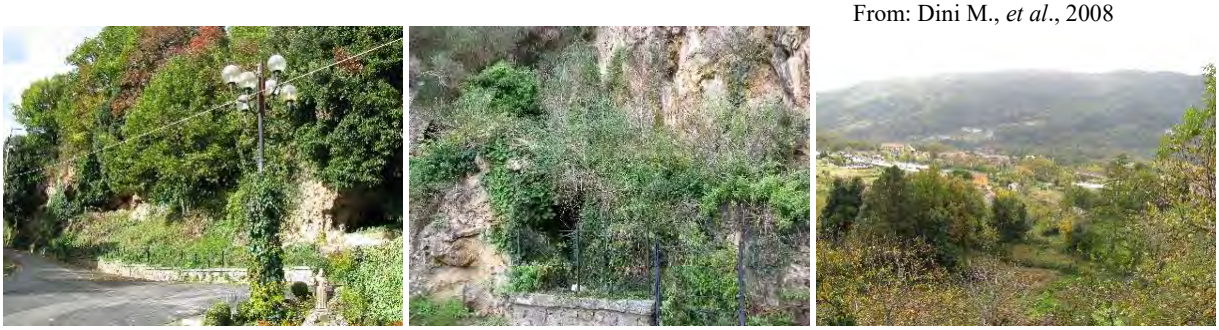


From: Martini F., *et al*., 2014

Fig. R18-3 Grotta del Romito poster at MesoLife Convention showing site location, site plan and stratigraphy.



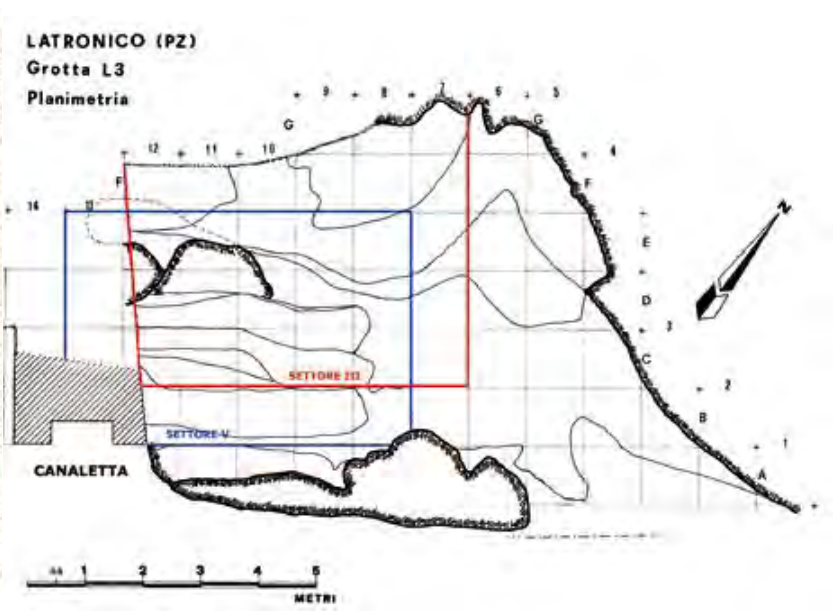
From: Dini M., *et al*., 2008



Photos M. Templer

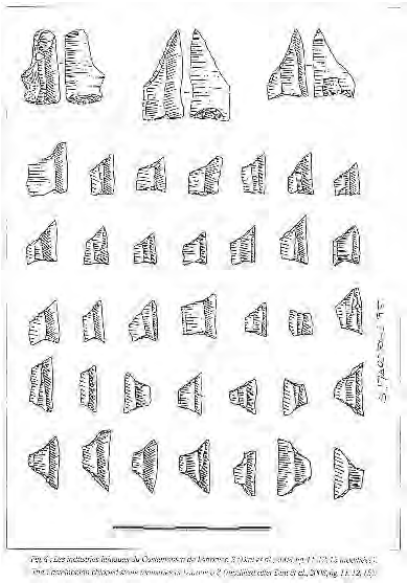
Fig. R18-4 Grotta Latronico 3, cut through by 'strada provinciale', which largely destroyed the site, is at left on the north-east side of the road; Looking up from road junction towards Latronico 3 with Latronico 2 at right; Latronico 3 in 2009; View from caves over the Upper Sini Valley.

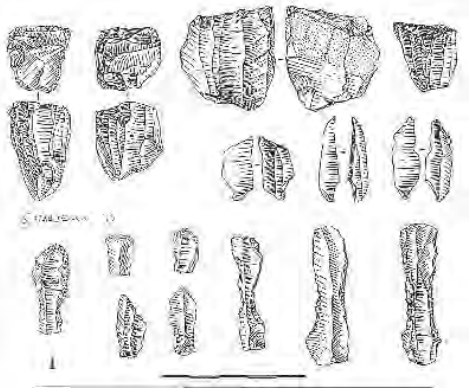


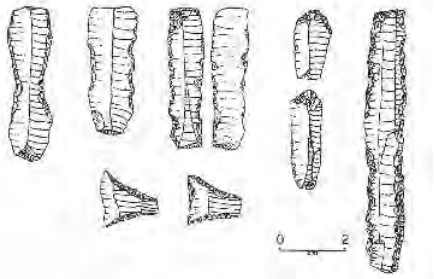


From: Grifoni Cremonesi R., 1998 From: Dini M., *et al*., 2008

Fig. R18-5 Latronico 3 during excavations; plan of excavated areas.

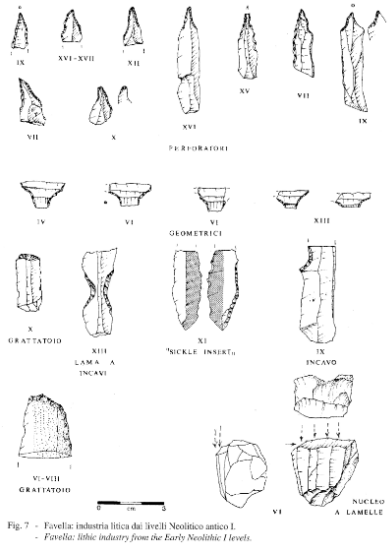






From: Grifoni-Cremonesi R., 2014

Fig. R18-6 Latronico 3 Castelnovian trapezes; Castelnovian cores and 'Montbani' blades; Early Neolithic lithics.



From: Tinè V., *et al*., 2000

Fig. R18-7 Favella di Sibari Early Neolithic lithics with Sipontian points and trapezes.





Photos M. Templer

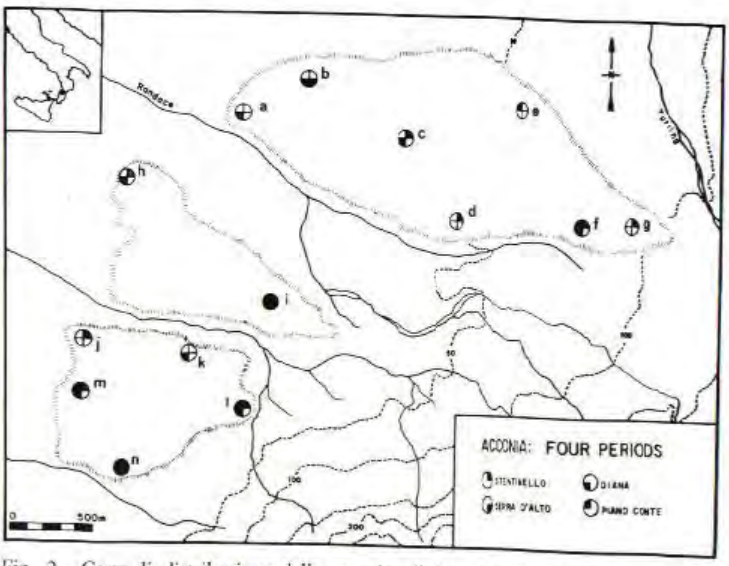


Fig. 2 - Carta di distribuzione delle aree insediative ad Acconia, relative a quattro periodi: Stentinello, Serra d'Alto, Diana e Piano Conte.

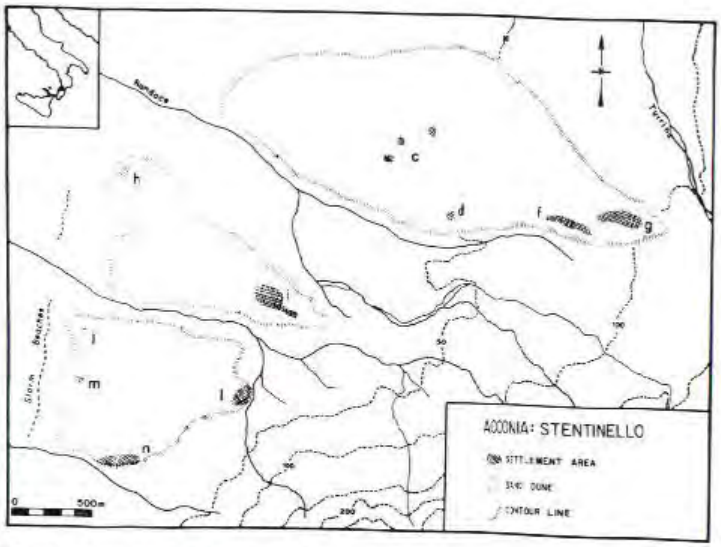
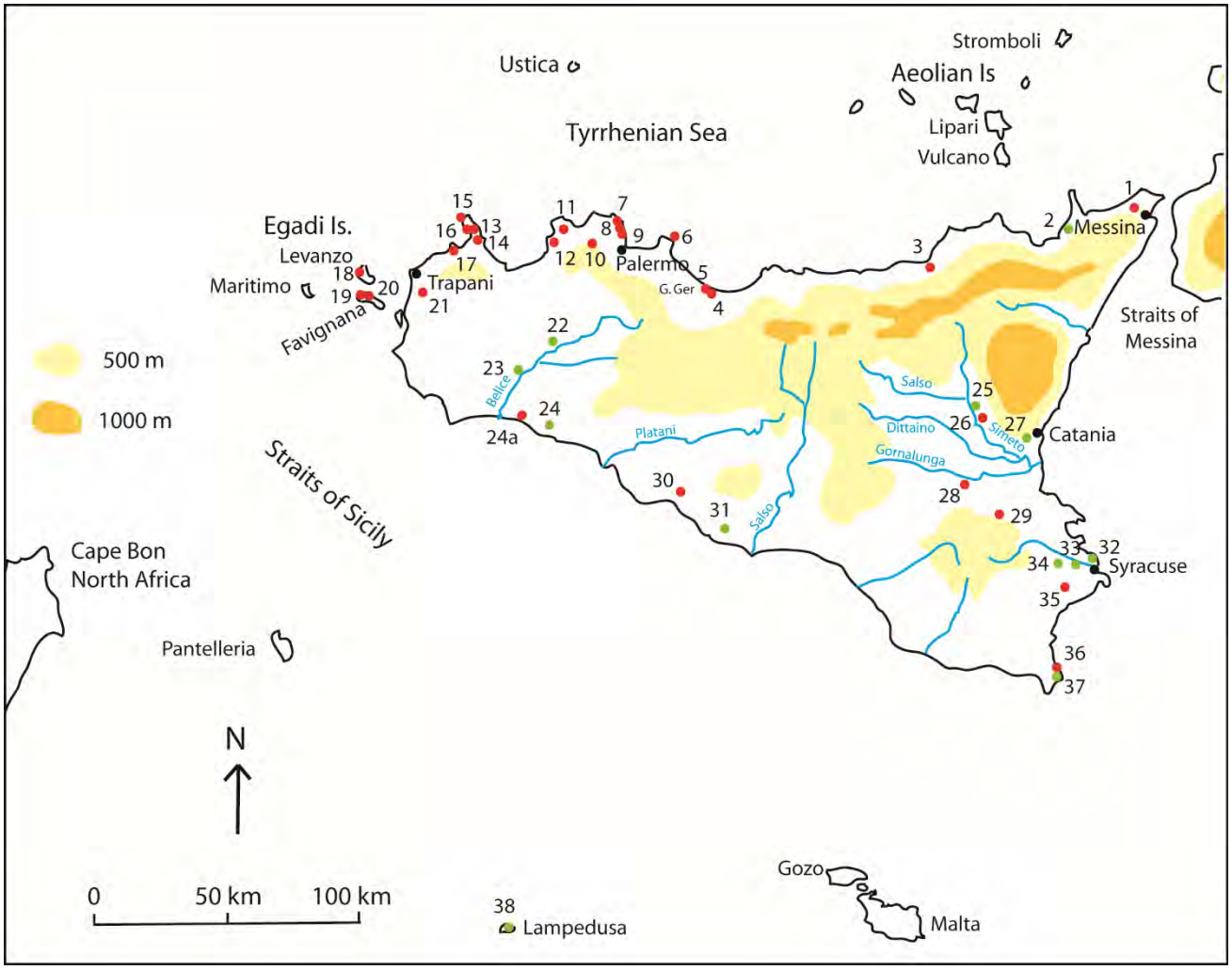


Fig. 3 - Carta di distribuzione delle aree insediative ad Acconia occupate durante il periodo di Stentinello.

From: Ammerman A., 1987a

Fig. R18-8 Piana di Curinga palaeodunes with the sea 8 km distant in the background; Palaeodune archaeological site in 2009; Location of Neolithic sites on palaeodunes.

Region 19 – Southern Italy and West Adriatic Seaboard – Sicily



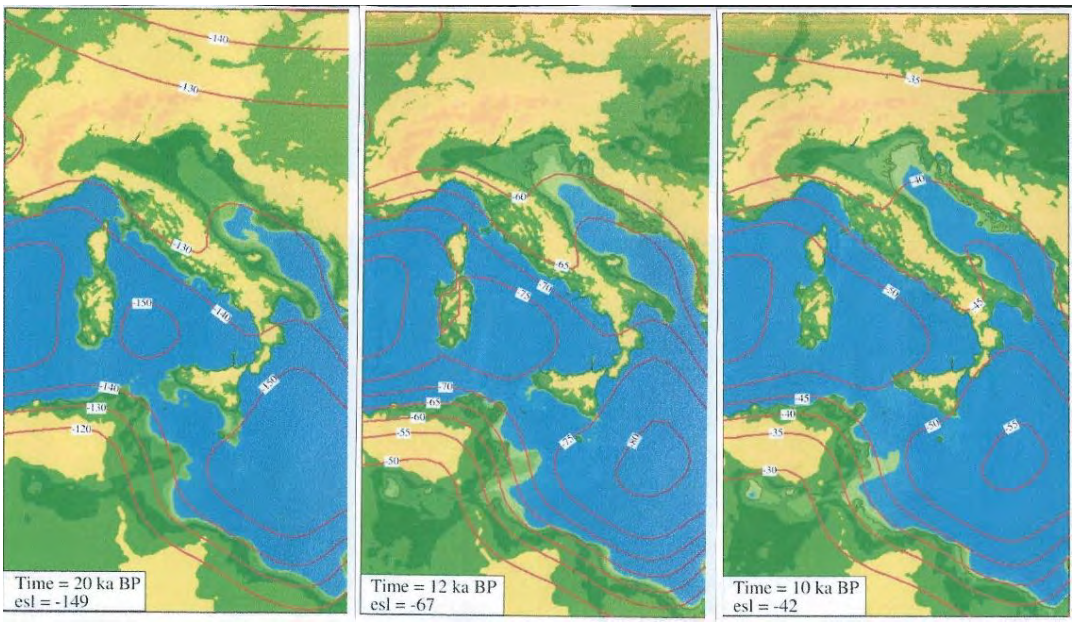
Map R19

Notes:
● = Mesolithic / Transition sites
● = Neolithic / Transition sites

Site names:

1. Riparo della Sperlinga di San Basileo; 2. Rocca di Pietro Pallio; 3. Grotta di San Teodoro; 4. Riparo del Castello di Termine Imerese; 5. Grotta Geraci; 6. Grotta dell'Arco; 7. Grotte dell'Addaura; 8. Grotta Niscemi; 9. Grotta Regina; 10. Grotta della Molara; 11. Grotta dei Puntali; 12. Grotta Perciata; 13. Grotta Dei Ciavarelli; 14. Grotta dell'Uzzo; 15. Grotta di Cala Mancina; 16. Isolidda; 17. Grotta Mangiapane; 18. Grotta della Cala dei Genovesi; 19. Grotta della Ucceria; 20. Grotta d'Oriente; 21. Grotta Maiorana; 22. Parcazzi; 23. Stretto; 24. Grotta Kronio; 24a. Sciacca; 25. Muglia Bassa; 26. Riparo di Perriere Sottano; 27. Pezza Mandria; 28. Rocchicella di Mineo; 29. Riparo Roccarazzo; 30. Grotta dell'Aqua Fitusa; 31. Piano Vento; 32. Stentinello; 33. Petraro di Melille; 34. Grotta Masella; 35. Grotta Giovanna; 36. Grotta Corruggi di Pachino; 37. Vulpiglia; 38. Cala Pisana.

Figures – Region 19 – Sicily



From: Lambeck K., *et al.,* 2004

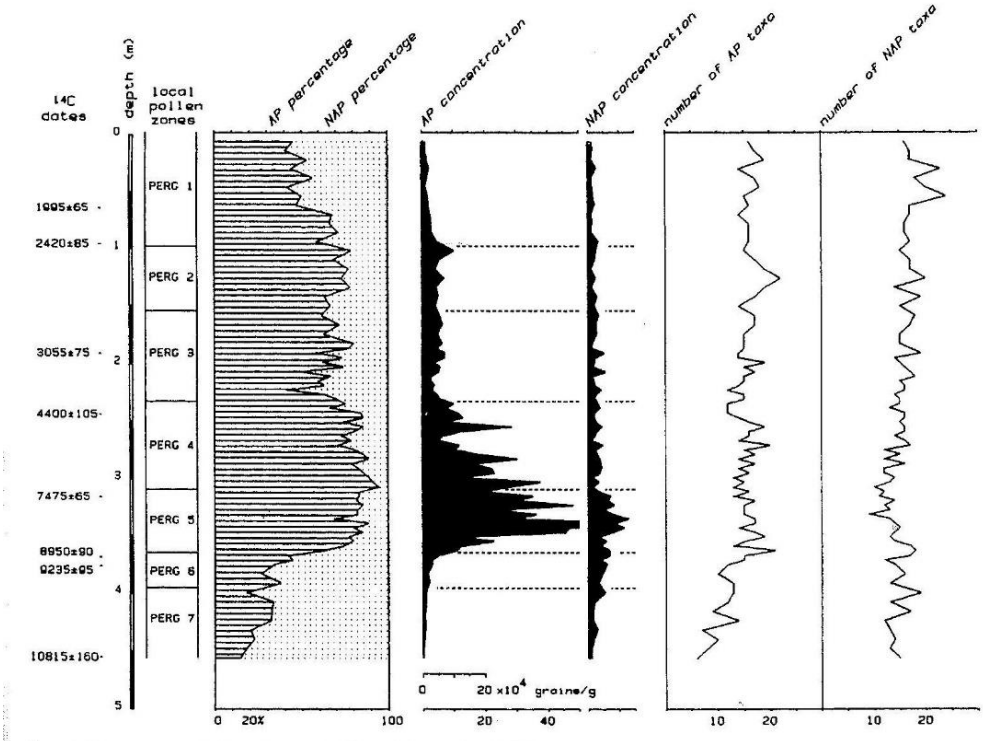
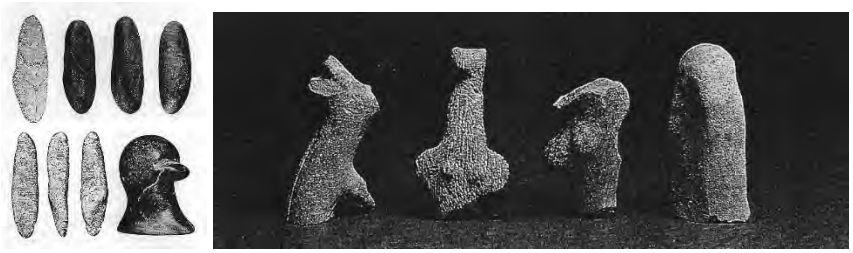


Figure 5 Summary curves for the pollen record of Lago di Pergusa (core PRG1).

From: Sadoni L. & Narcisi B., 2001

Fig. R19-1 Estimated Sea-level around Sicily and Italy at the LGM, 10k and 8k BC; Pollenic diagram from Lake Pergusa in Sicily showing the arboreal pollen peak in 'Period 5' *ca*. 8250-6000 BC.



From: Tusa S., 1997

Fig. R19-2 Anthropomorphic and bird-like head figures from Grotta Kronio; Figurines from Piano Vento.

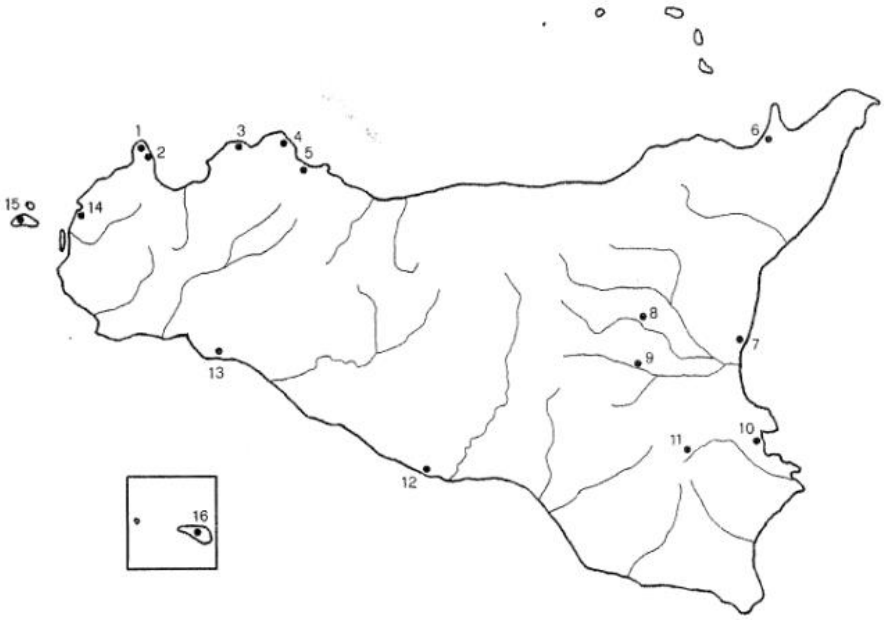
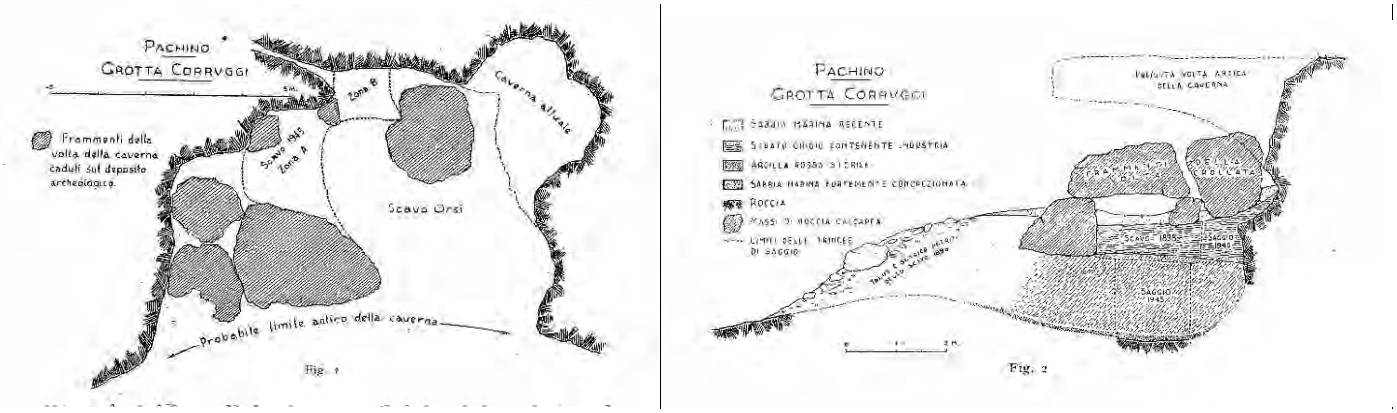


Fig. 1 - Distribuzione dei siti della facies di Pre-Stentinello. 1 - Gr. dell'Uzzo; 2 - Gr. dei Ciaravelli; 3 - Gr. dei Puntali; 4 - Gr. Regina; 5 - Gr. della Molara; 6 - Rocca di Pietro Pallio; 7 - Pezza Mandria; 8 - Muglia Bassa; 9 - Perriere Sottano; 10 - Petraro; 11 - Gr. Masella; 12 - Piano Vento; 13 - Kronio; 14 - Gr. Maiorana; 15 - Gr. d'Oriente; 16 - Cala Pisana.

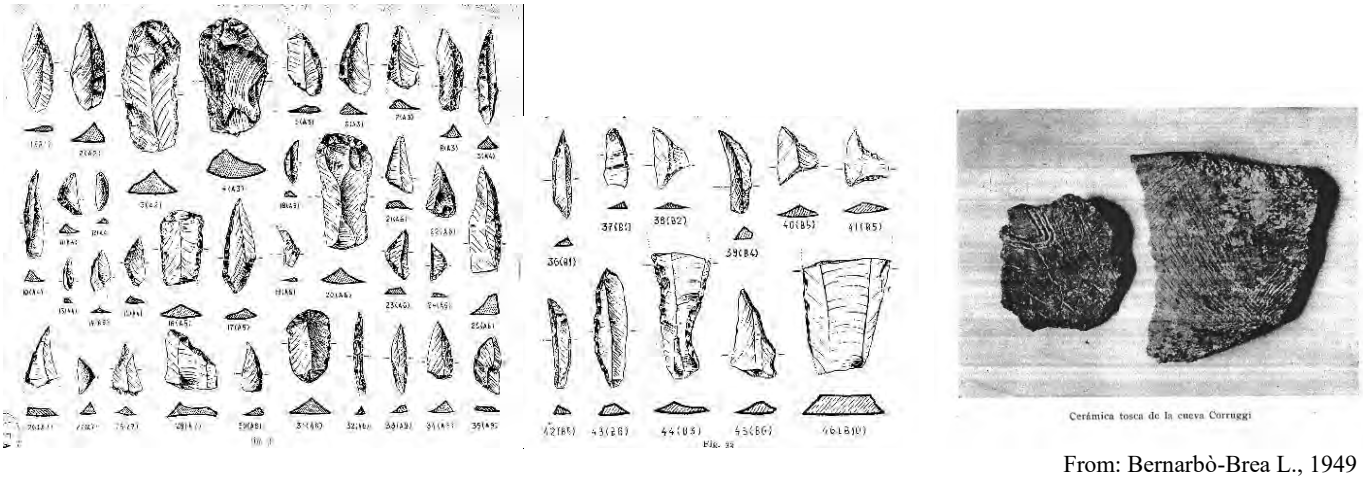
From: Marconi M., 2004

Fig. R19-3 Pre-Stentinello sites in Sicily according to M. Marconi, 2004.



From: Bernarbò-Brea L., 1949

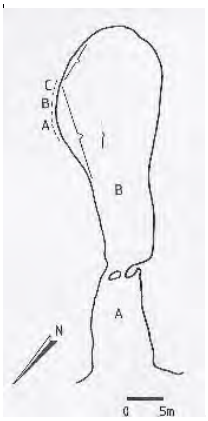
Fig. R19-4 Grotta Corruggi di Pachino site plan showing 19th century and later excavation surfaces, and cave profile showing post Neolithic rock-fall.

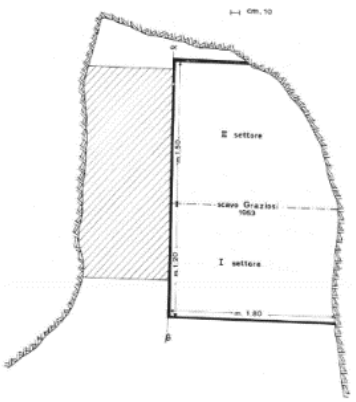


From: Bernarbò-Brea L., 1949

Fig. R19-5 Grotta Corruggi di Pachino lithics from Trench A; Lithics from Trench B; pre-Stentinello pottery.







From: Mannino M., 2010 Photo M. Templer From: Vigliardi A., 1982

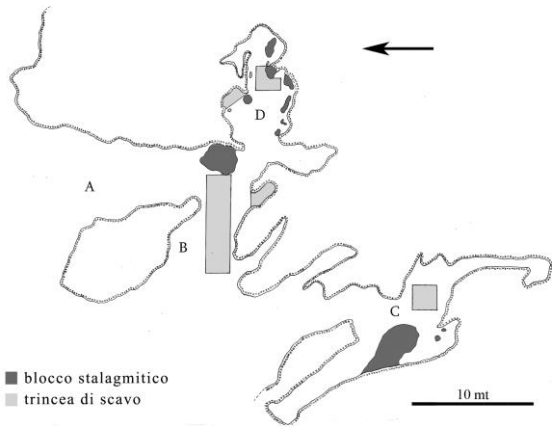
Fig. R19-6 Location of Grotta della Cala dei Genovesi on the west coast of the Island of Levanzo; Antechamber with gate to passage to inner chamber; Plan of cave showing antechamber (A) and inner chamber (B); excavated surface in antechamber.

Specie	Strato 2		Strato 3		Strato 4
	taglio 3°	taglio 4°	taglio 5°	taglio 6°	taglio 7°
Sus domesticus L.	17	7 *			
Bos taurus L.	1				
Ovis vel *Capra* L.	35	32 *			
Sus scrofa ferus L.	8	20	4		2 *
Cervus elaphus L.	14	35	126	3 + 4 *	3 * + 5
Bos primigenius Boj.	2 *	5	32		
Equus (Asinus) hydruntinus Reg.	3 *	4	16	1	
Crocuta spelaea Goldf.			coprol. *		2 + coprol.
Vulpes vulpes L.			6	1 *	
Monachus monachus Erman.		1			
Oryctolagus cuniculus L.		3			
Arvicola italicus L.	2	9	2		
Micromammiferi ind.		1	5	1	
Aves	14	31	7		
Caretta caretta L.	8	33	1 *		
Emys orbicularis L.		1		1	
Pisces:					
Epinephelus sp.	27	117			
Dentex sp.	1	4			
Sparus sp.	2	9			
Labrax sp.		1			
Indeterminati	10	32			
Homo sapiens			1		
Indeterminabili	18	60	80	7	2



From: Cassoli P. & Tagliacozzo A., 1982 From: Pluciennik M., 1994

Fig. F19-7 Grotta della Cala dei Genovesi faunal assemblage from later excavation; Late Pleistocene or Early Holocene engravings.



From: Martini F., *et al*., 2012a

Fig. F19-8 Plan of Grotta della Ucceria showing excavated surfaces.



Photos M. Templer

Fig. F19-9 Grotta dell'Uzzo seen from the north at the edge of the steep torrent detrical fan; Interior of cave; Coastal shelf seen from cave where the fresh water spring is now below sea level.

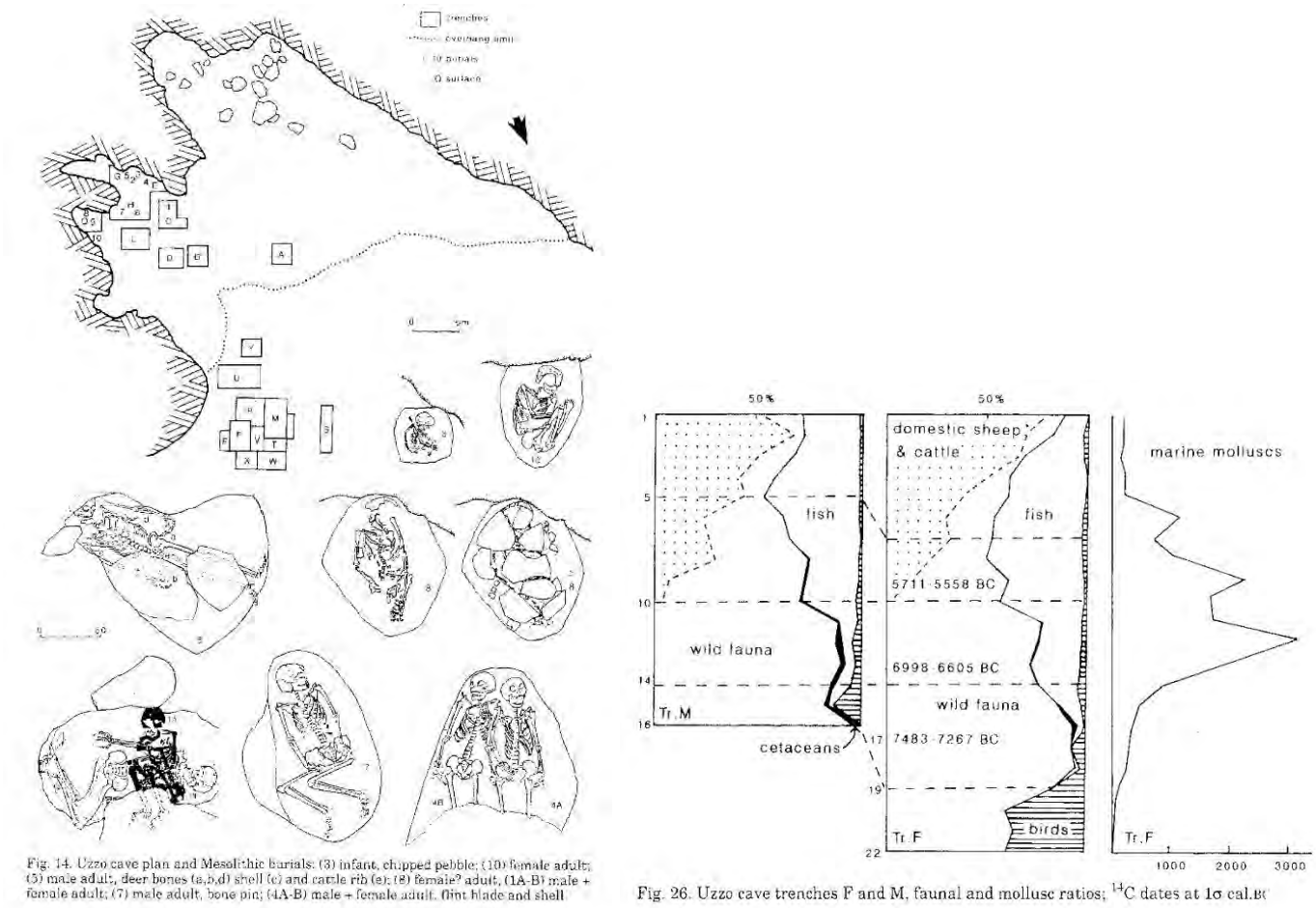
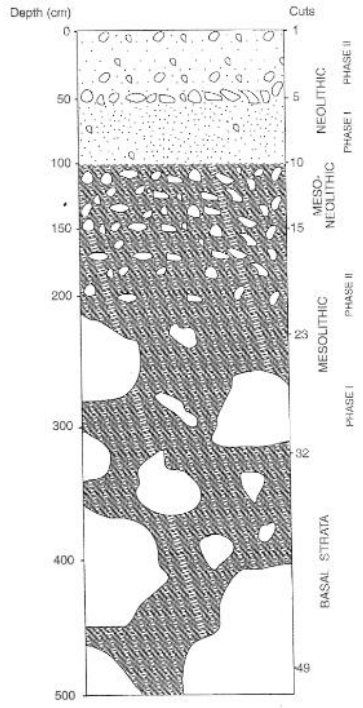


Fig. 14. Uzzo cave plan and Mesolithic burials: (3) infant, chipped pebble; (10) female adult; (5) male adult, deer bones (a,b,d) shell (c) and cattle rib (e); (8) female? adult; (1A-B) male + female adult; (7) male adult, bone pin; (4A-B) male + female adult, flint blade and shell

Fig. 26. Uzzo cave trenches F and M, faunal and mollusc ratios; ^{14}C dates at 1σ cal.BC

From: Leighton R., 1999

Fig. R19-10 Grotta dell'Uzzo cave plan with brow shown as dotted line, excavated areas and graphical representation of inhumations; Evolution of the faunal assemblage correlating trenches F and M, which confirm the progressive Transition from hunting and fishing to herding commencing with the Transition Cut 10 (From Cassoli P. F., *et al*., 1987).



From: Mannino M., 2006

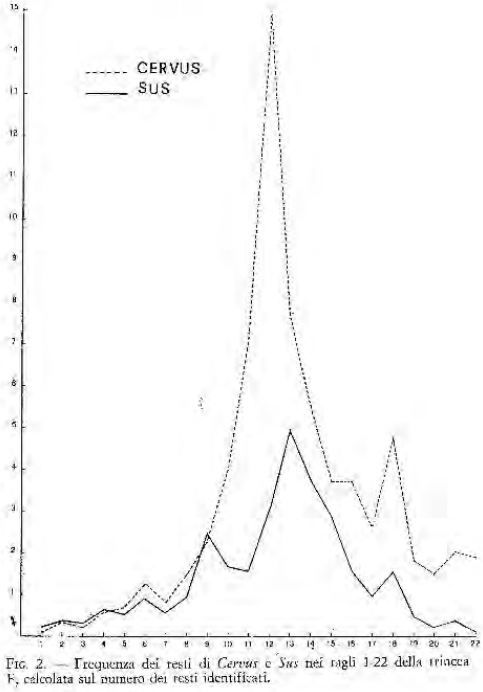
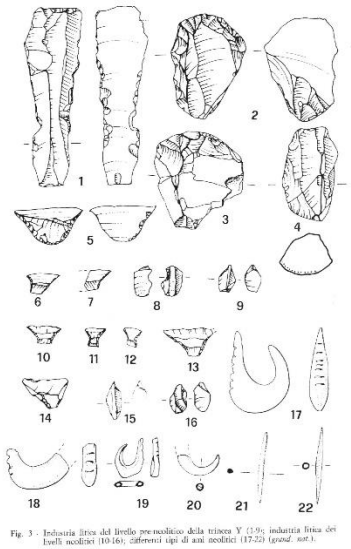


Fig. 2. — Frequenza dei resti di *Cervus* e *Sus* nei strati 1-22 della trincea F, calcolata sul numero dei resti identificati.

From: Piperno M., *et al.,* 1980



From: Cassoli P., *et al*., 1987

Fig. R19-10a Grotta dell'Uzzo schematic stratigraphy of Trench F; Peak and decline of *Cervus elaphus* and *Sus scrofa*; Pre-Transition lithics (1-9) and Transition lithics and fish-hooks (10-22).

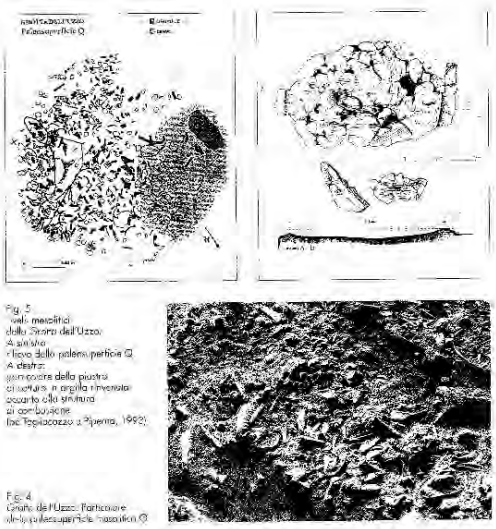


2 Esemplari di *Columbella rustica* decorati con incisioni verticali: a, da Grotta dell'Uzzo (da Compagnoni 1993); b, da Perriere Sottano.

From: Aranguren A. & Redevin A., 1996



From: Piperno M., *et al.,* 1980



From: Piperno M., *et al.,* 1980

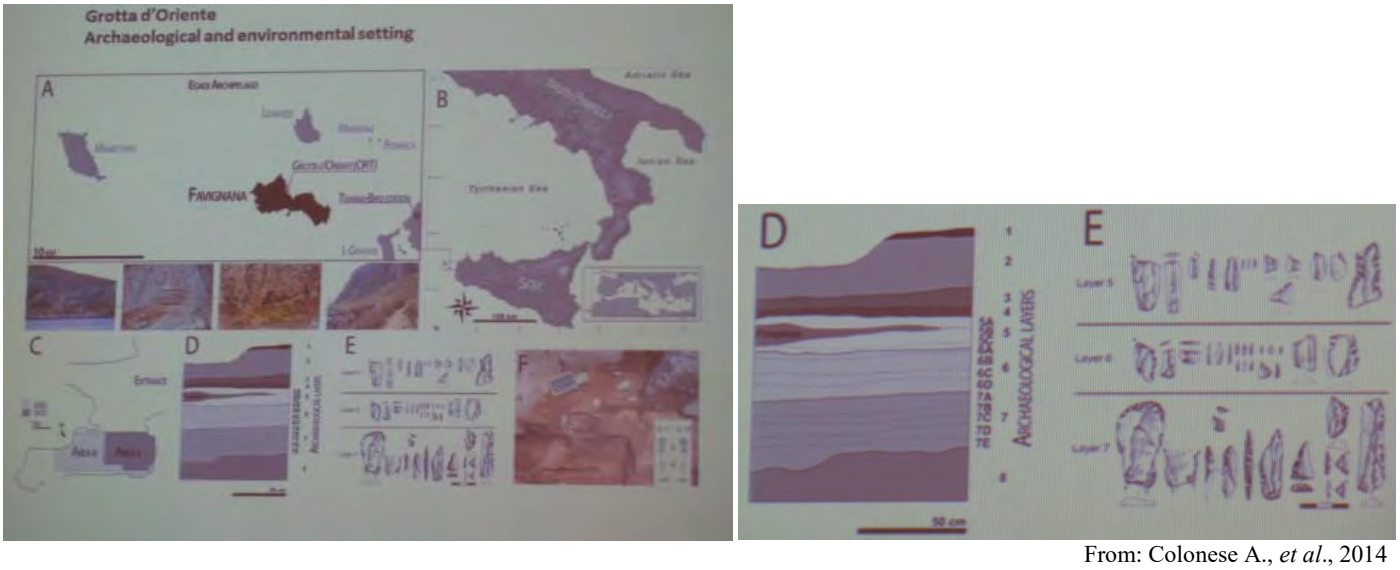
Fig. R19-11 Similarly decorated *Columbella rustica* shells found at Grotta dell'Uzzo (a, left) and Perriere Sottano (b, right) in Mesolithic levels; Grotta dell'Uzzo pottery from the Transition levels – the five sherds at the lower right (t) come from Cut 15 dated after 7000 BC; Mesolithic hearth with baked clay base.





Photos M. Templer

Fig. R19-12 Grotta di San Teodoro and excavation pit in 2009.



From: Colonese A., *et al*., 2014

Fig. R19-13 Grotta d'Oriente presentation at MesoLife Convention showing location (A & B), cave plan (C), stratigraphy (D) and lithics (E) from Levels 5, 6 and 7 – D & E are repeated enlarged.



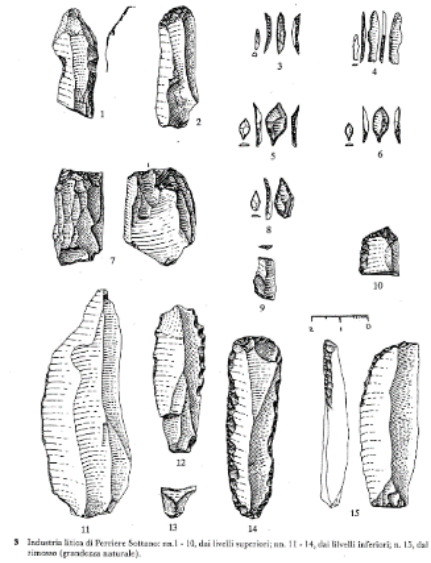
From: Wikipedia

Fig. R19-14 Looking out on Cape Gallo from Grotta Perciata.



From: Wikipedia

Fig. R19-15 Grotte Addaura - Grotta delle Incisioni engraved scene.



From Aranguren A. & Redevin A., 1996

Fig. R19-16 Riparo di Perriere Sottano lithics from the Upper Levels.

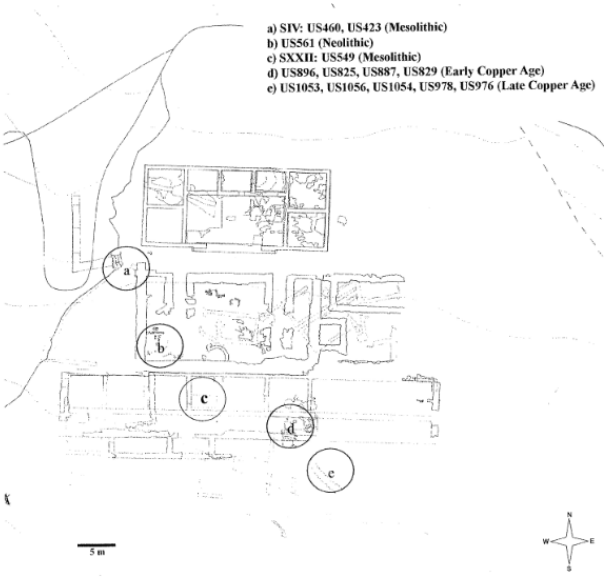
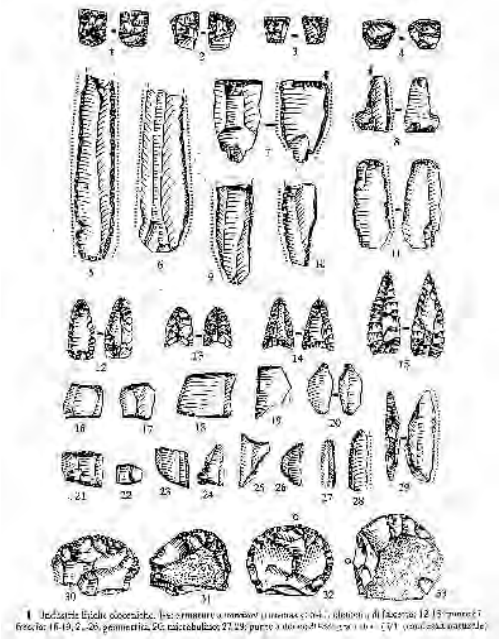


Figure 2 *The archaeological site of Rocchicella: the prehistoric excavation sites are indicated by circles.*

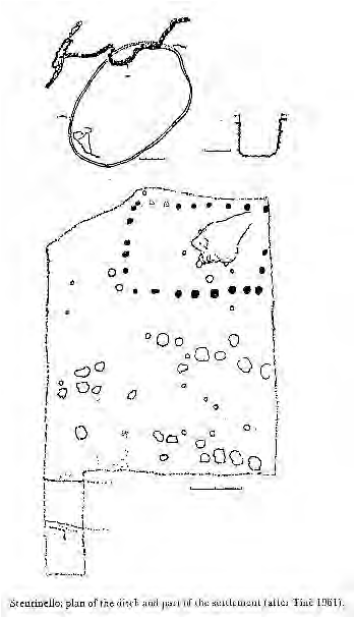
From: Iovino M., *et al*., 2008

Fig. R19-17 Site plan of Rocchicella di Mineo with the Mesolithic (a & c) and Neolithic (b) locations.



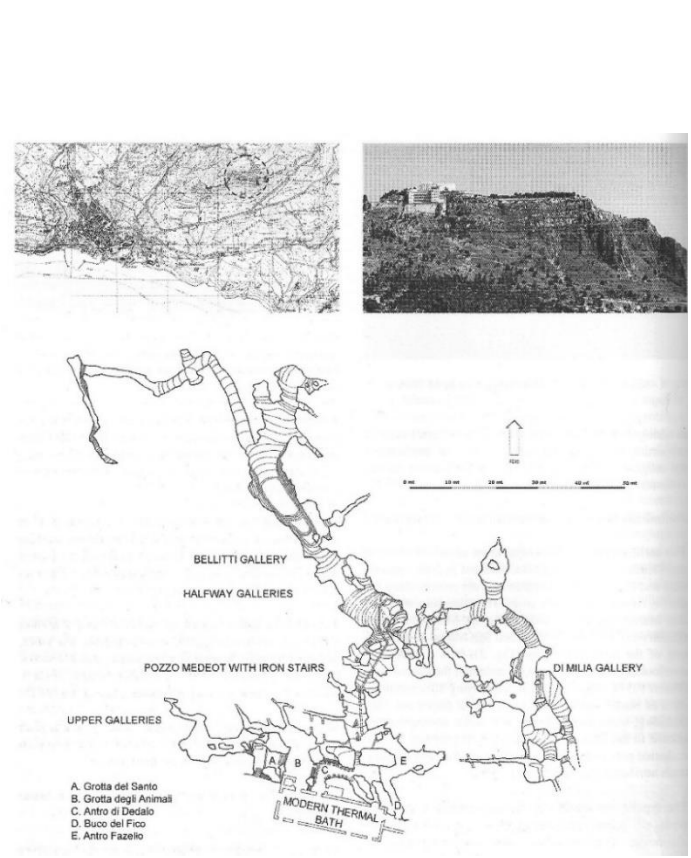
From: Nicoletti F., 1996

Fig. R19-18 Petraro di Melille lithics (N° 19, 21-25, 27).

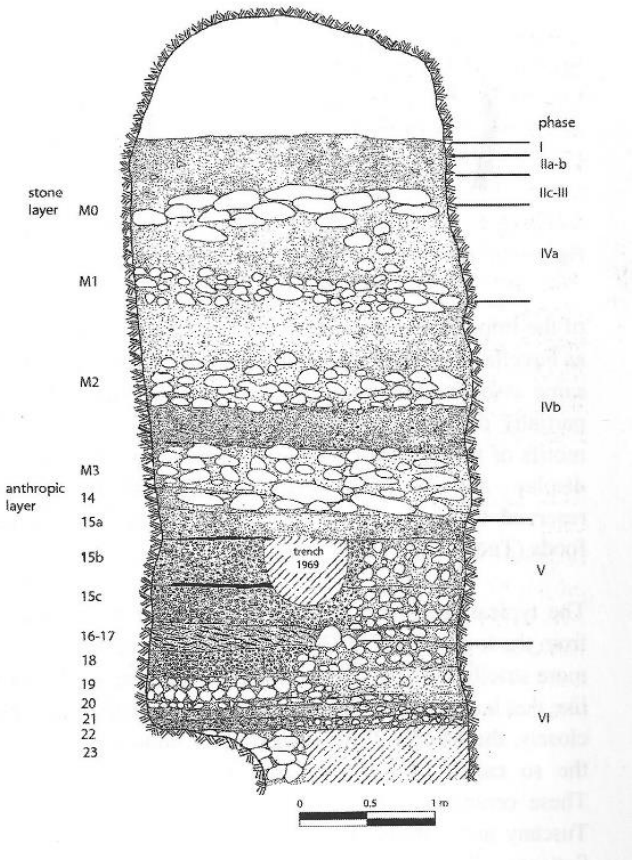


From: Tusa S., 1996

Fig. R19-19 Stentinello site plan eroded by the sea (top), ditch profile and post-holes of quadrangular structure (bottom).



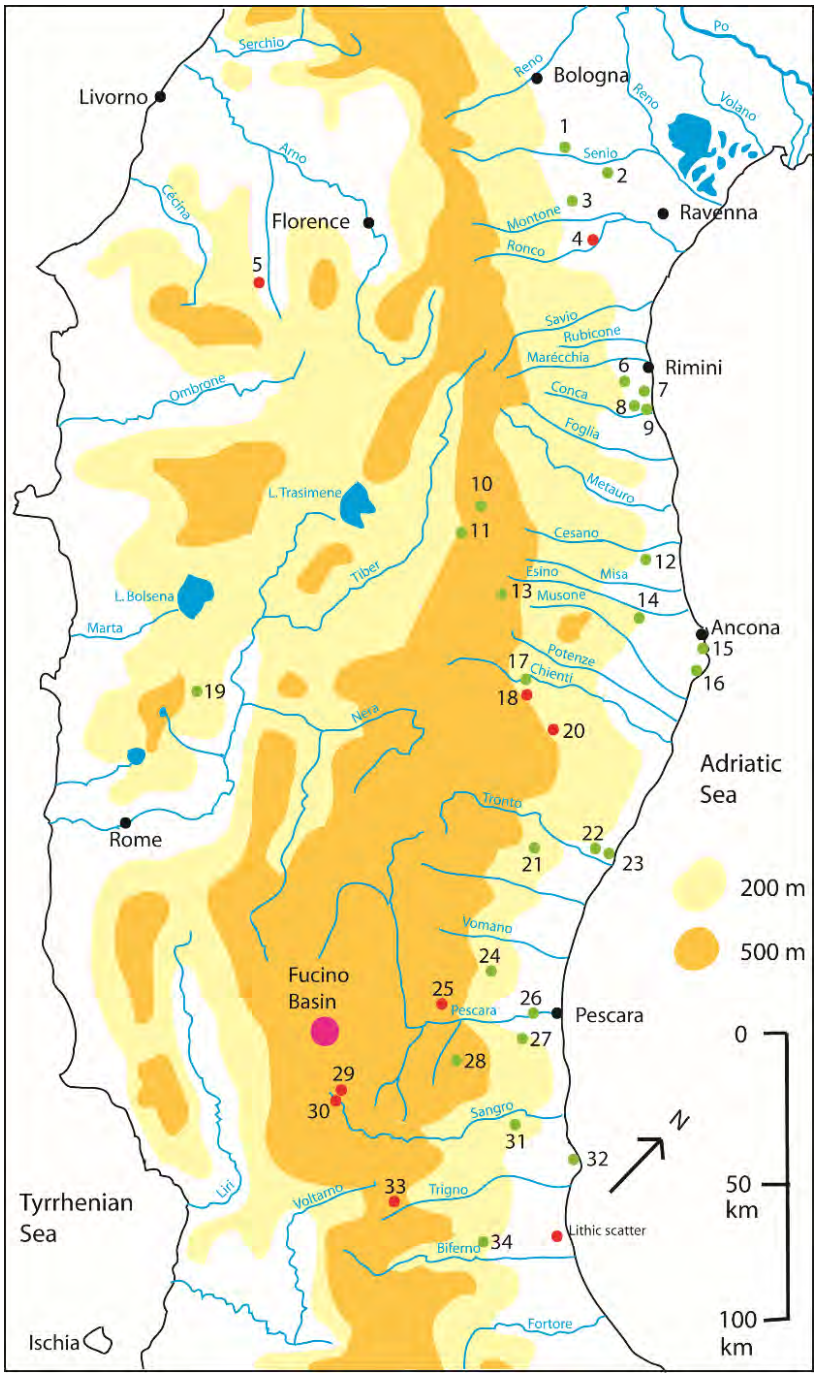
From: Gullì D., 2014



From: Tiné V., 2014

Fig. R19-20 Location and horizontal plan of Grotta Kronio; Stratigraphy of excavations of Antro del Fazello. Phase VI, Levels 18-22 are pre-Neolithic and Phase IV, Levels 15-17 are Stentinello Neolithic at the top with pre-Stentinello Impressed Ware below.

Region 20 – Southern Italy and West Adriatic Seaboard – Molise to Romagna



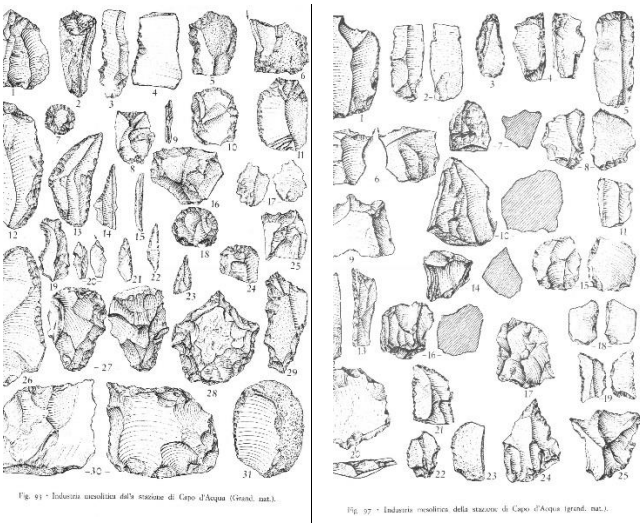
Map R20

Notes:
● = Mesolithic / Transition sites
● = Neolithic / Transition sites

Site names:

1. Imola Ospedale Nuovo; 2. Lugo di Romagna; 3. Faenza - Fornace Cappuccini; 4. Forlì, Cantiere ANAS; 5. Petriolo III South; 6. Miramare di Rimini; 7. Riccione; 8. Misano Adriatico; 9. Marina di Focara; 10. San Rocco di Cantiano; 11. Gubbio; 12. Ripabianca di Monterado; 13. Piana di Calisti di Esanatoglia; 14. Monte Capone di Jesi; 15. Portonovo di Ancona; 16. Monte Colombo di Sirolo; 17. Maddalena di Muccia; 18. Luciano di Pievetorina; 19. Grotta Bella; 20. Grotta del Prete; 21. Grotta San Angelo; 22. Monteprandone Colle Appeso; 23. Villa Laureate; 24. Villaggio Leopardi; 25. Capo d'Acqua; 26. Fontanelle di Pescara; 27. Tricale; 28. Grotta dei Piccioni; 29. Altopiano delle Cinque Miglia; 30. Fonte Chiarano; 31. Marcianese; 32. Torre Sinello; 33. San Lorenzo di Civitanova del Sannio; 34. Monte Maulo.

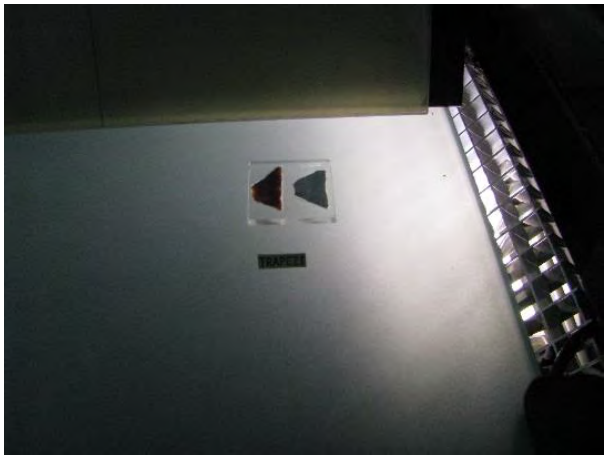
Figures – Region 20 – Molise to Romagna



From: Radmilli A., 1997b

Fig. R20-1 Capo d'Acqua Mesolithic lithics.





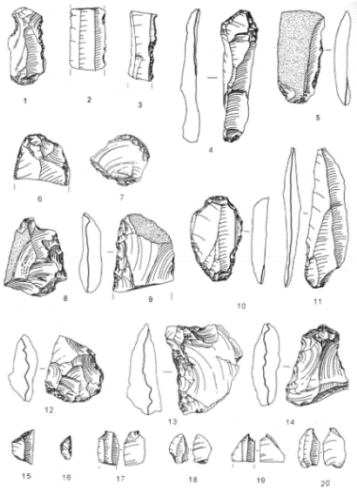
Photos M. Templer

Fig. R20-2 Luciano di Pievetorina lithics in the Ancona Museum and close-up of trapezes at bottom right.



From: WWW





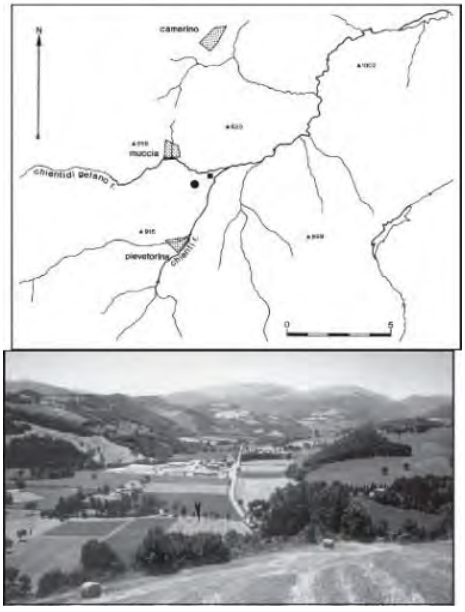
From: Fontana F., 2006

Fig. R20-3 Location of dried-out lake of San Lorenzo di Civitanova del Sannio at 1200 masl; Hypothetical reconstruction of Late Mesolithic hunting scene by M. Cutrona; Late Mesolithic lithics.



From: Bagolini B. & Biagi P., 1987

Fig. R20-4 Faenza - Fornace Cappuccini lithics.

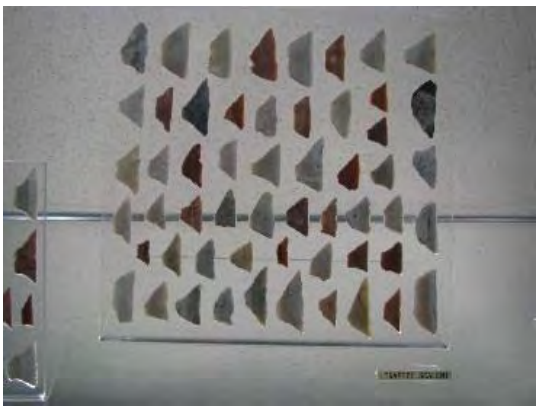


From: Biagi P., 2003



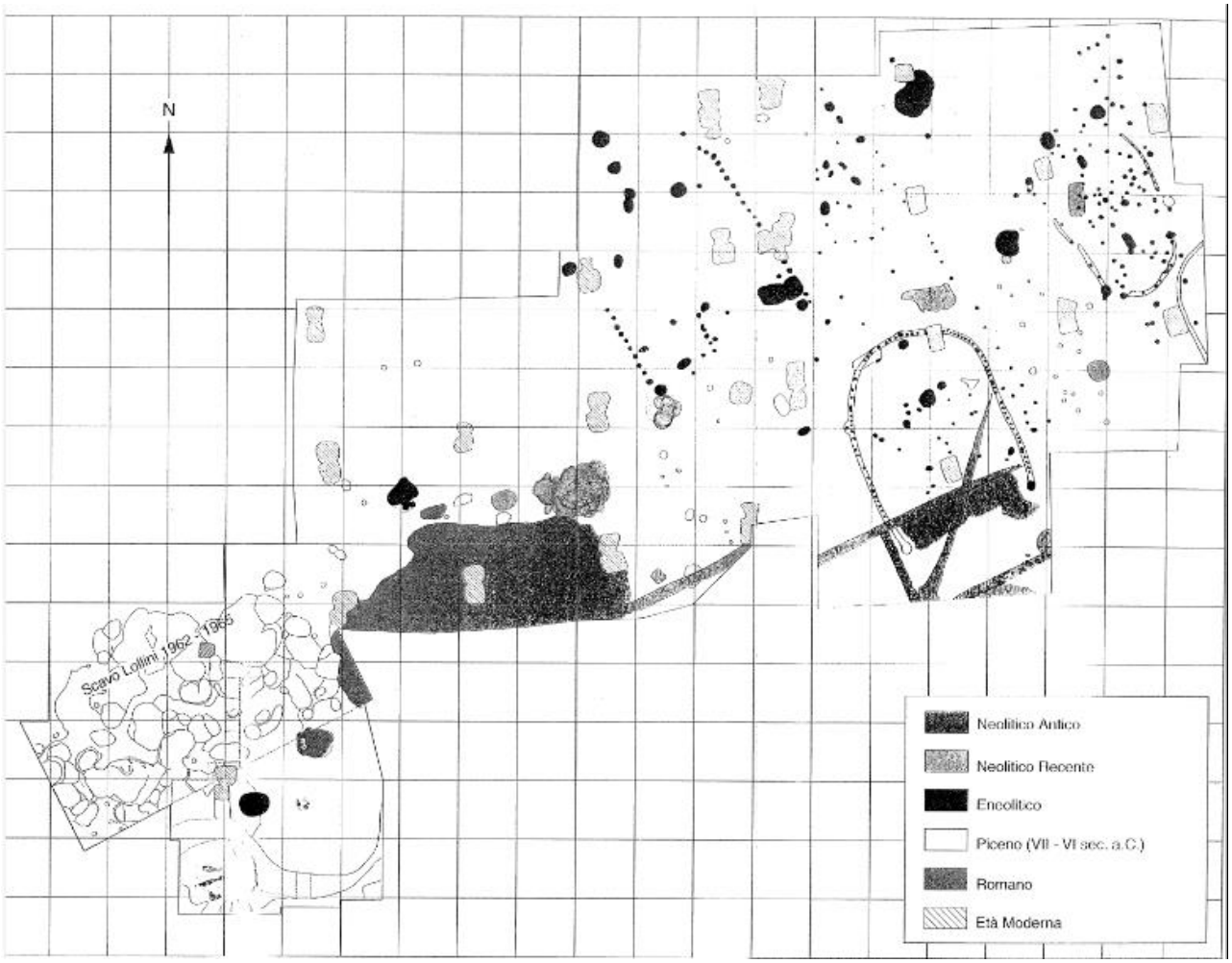
Photo M. Templer





Photos M. Templer

Fig. R20-5 Location of the site of Maddalena di Muccia, which lies in the field behind the sign; Lithics in Ancona Museum with Impressed Ware at the bottom of the cabinet; Close-up of Trapezes.



From: Silvestrini M., *et al*., 2005

Fig. R20-6 Maddalena di Muccia excavations site plan.







Photos M. Templer

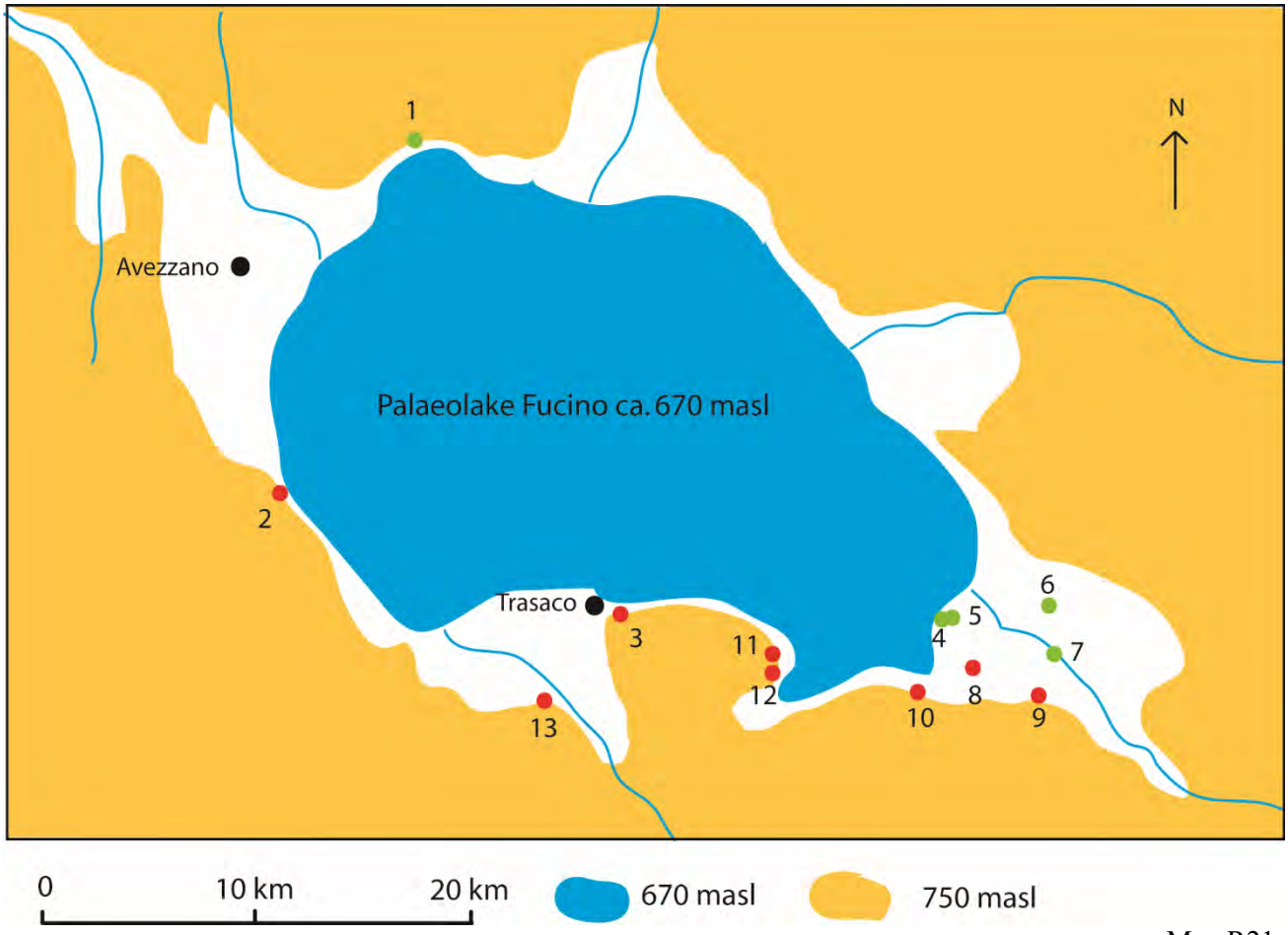


From: Lollini D., 1991

Fig. R20-7 Ripabianca di Monterado site location; Model of pit features from excavation with inhumation in Ancona Museum; Ripabianca burins; Triangles and trapezes.

Map R21

Region 21 – Southern Italy and West Adriatic Seaboard – The Fucino Basin



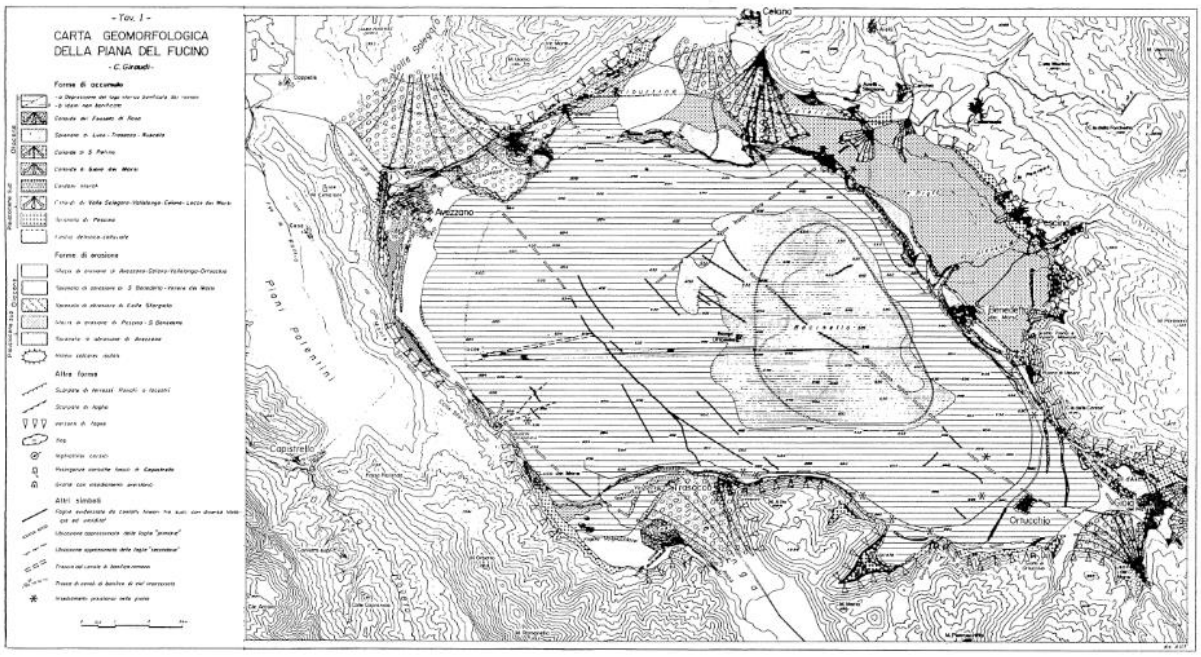
Map R21

Notes:
● = Mesolithic / Transition sites
● = Neolithic / Transition sites

Site names:

1. Paterno; 2. Grotta di Ciccio Felice; 3. Grotta Continenza di Trasaco; 4. Ortucchio Laghetto; 5. Sant'Orante; 6. Colle Santo Stefano; 7. Rio Tana; 8. Ortucchio-Strada 28; 9. Grotta di Pozzo; 10. Grotta di Ortucchio; 11. Grotta Maritza; 12. Grotta la Punta; 13. Grotta San Nicola.

Figures – Region 21 – The Fucino Basin



From: Irti U., 1991

Fig. R21-1 Geology of the Fucino Basin showing the extent of the lake in Roman times and the land area they recovered.



Photos M. Templer

Fig. R21-2 Grotta Continenza di Trasaco is in the centre at the foot of the escarpment above the white buildings; view looking out from the cave over the Fucino Basin with Trasaco to the left; porch of cave showing obstruction.

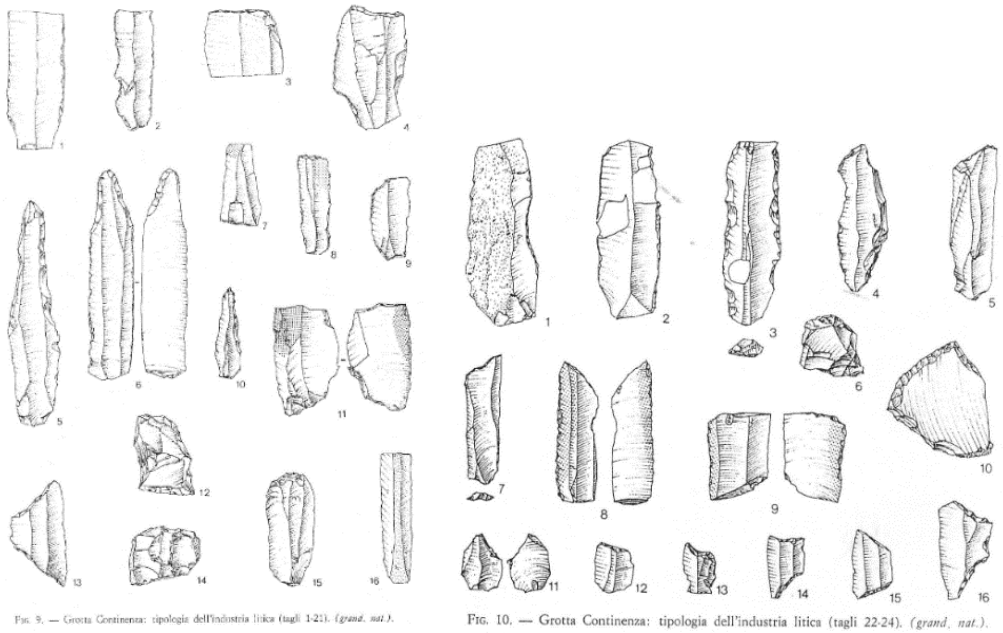


Fig. 9. — Grotta Continenza: tipologia dell'industria litica (tagli 1-21). (*grand. nat.*).

Fig. 10. — Grotta Continenza: tipologia dell'industria litica (tagli 22-24). (*grand. nat.*).

From: Barra A., *et al*., 1990

Fig. R21-2a Grotta Continenza Lithics from the Transition Level 21 (left), and Late Mesolithic Levels 22-24 (right)

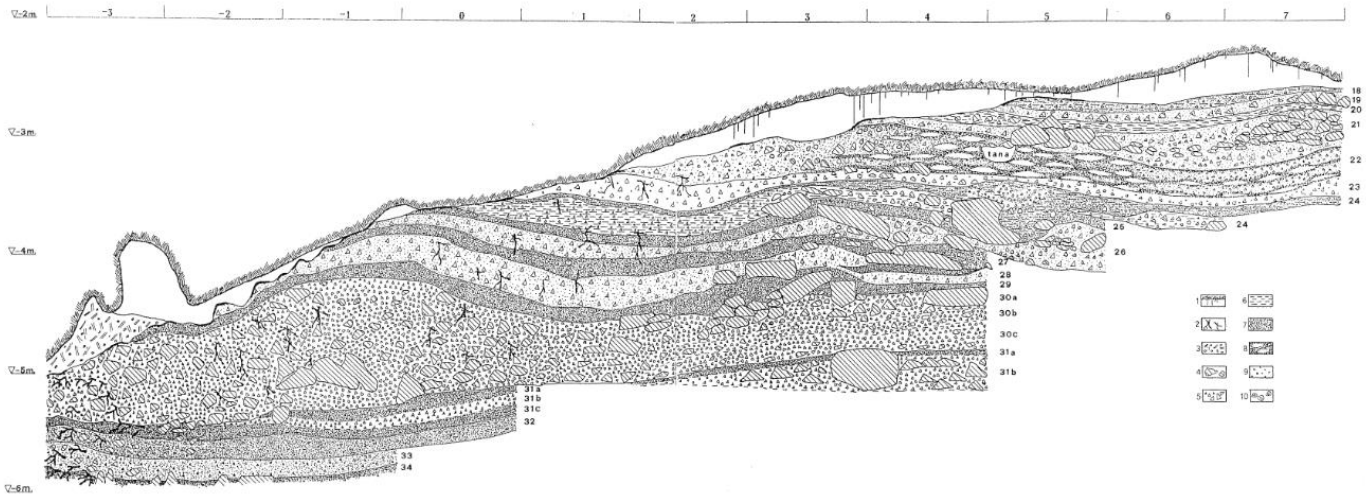
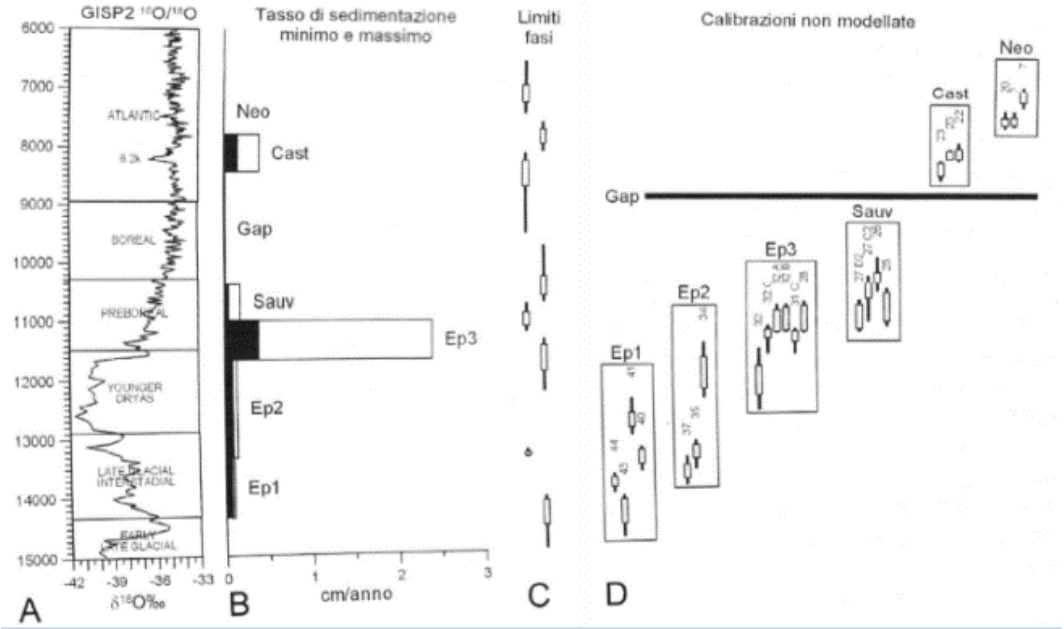


FIG. 2. — Grotta Continenza (AQ): sezione A/AA. Legenda: 1) Roccia con stalattiti; 2) Concrezioni calcaree; 3) Terreno rimaneggiato; 4) Pietre; 5) Pietrischi; 6) Livelli argillosi; 7) Focolari e livelli a contenuto vario di materia organica; 8) Livelli carboniosi con ceneri stratificate; 9) Carboni; 10) *Helix ligata* (Disegno di A. Tramonti).

From: Bevilacqua, 1994

Fig. R21-3 Grotta Continenza Stratigraphy with Mesolithic, Transition and Neolithic levels at top, showing how the anthropic sedimentation filled the cavity.



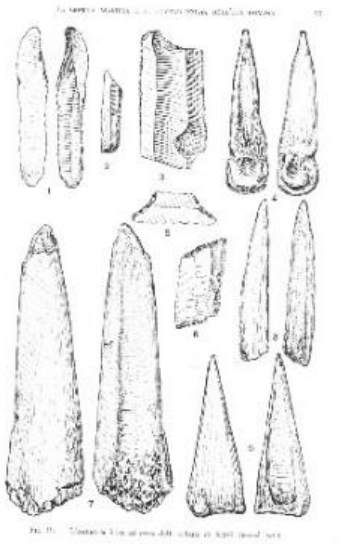
From: Boschian G. & Ghislandi S., 2011

Fig. R21-3a Grotta Continenza Sedimentation with Transition overlap between the Castelnovian Mesolithic and Neolithic assemblages.



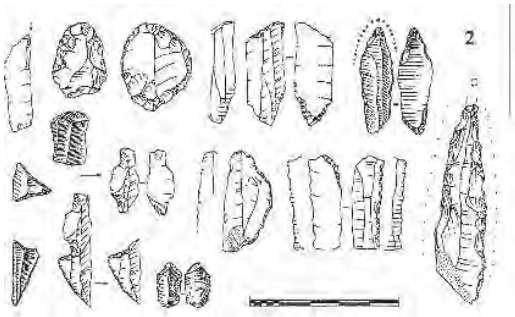
Photos M. Templer

Fig. R21-4 Grotta di Ortucchio is to be found to the right of the quarry in the centre.

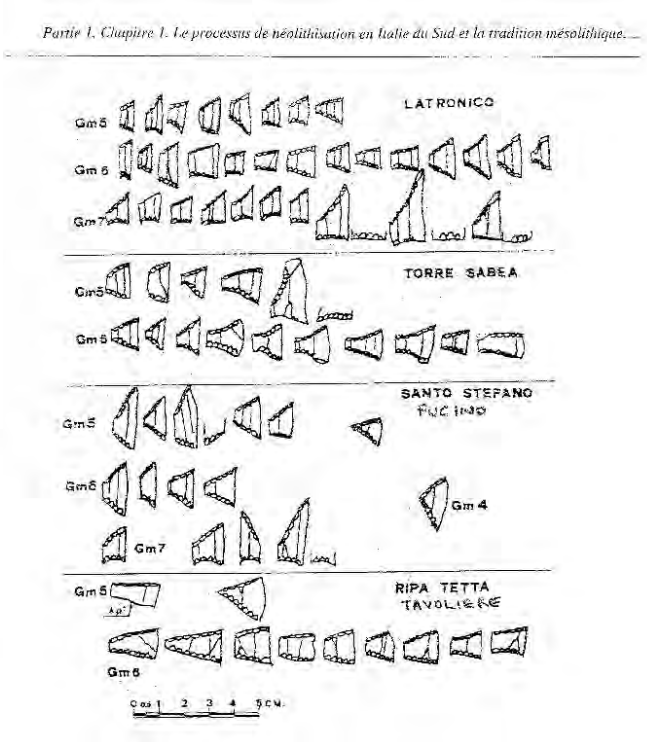


From: Grifoni R. and Radmilli A., 1964

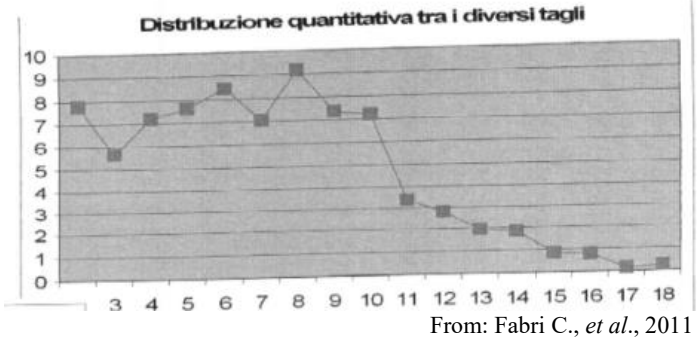
Fig. R21-5 Grotta Maritza lithics and bone tools from the Ripoli Neolithic.



From: Grifoni-Cremonesi R., 2014

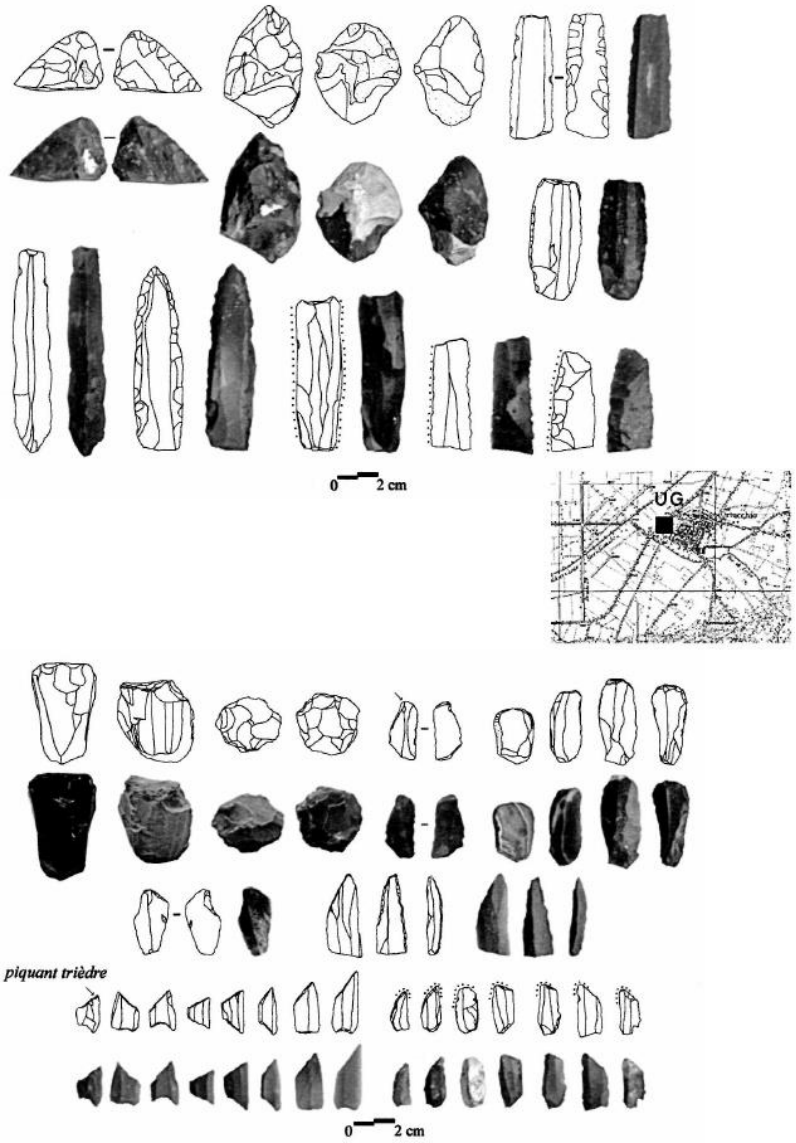


From: Tine V., 1996



From: Fabri C., *et al*., 2011

Fig. R21-6 Colle Santo Stefano lithics with reconnected trapeze; Comparison of trapezoidal armatures with sites further south (Gr. di Latronico, Torre Sabea and Ripa Tetta), which suggests a different lithic tradition in the Fucino Basin; Percentage presence of obsidian by stratigraphic level showing increase after Level 17.

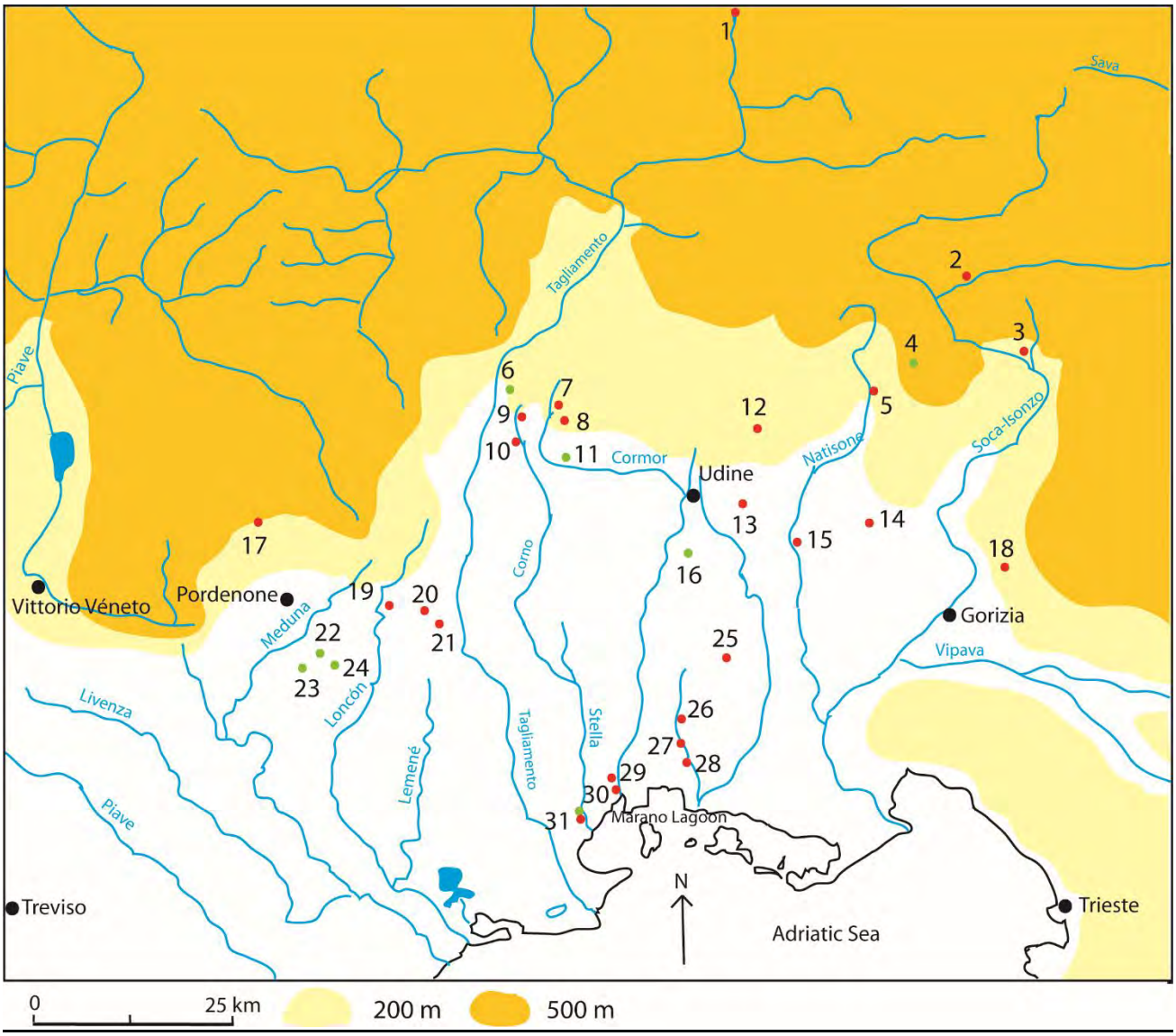


From: Angeli L, *et al.*, 2011

Fig R21-7 Ortucchio Laghetto lithics

Map R22

Region 22 – North Adriatic – Friuli-Venezia Giulia



Map R22

Notes:
● = Mesolithic / Transition sites
● = Neolithic / Transition sites

Site names:

1. Pramolo Dosso Confine; 2. Zapleč & Zaprikraj; 3. Gorenji Pretovč; 4. Velika Jama; 5. Riparo di Biarzo; 6. Lago di Ragogna 1-5; 7. Mulino Ferrant; 8. Rive d'Arcano; 9. Corno-Ripudio; 10. Fornaci di Mezzo; 11. Fagagna; 12. Taviele (Ziracco); 13. Orzano; 14. Grotta di Cladrecis; 15. Buttrio; 16. Sammardenchia di Pozzuolo; 17. Aviano – Collini di Gials; 18. Kuk; 19. Orcenico; 20. San Giovanni di Casarsa; 21. San Vito al Tagliamento Boscat; 22. Cesena; 23. Fagnigola; 24. Valer; 25. Palmanova; 26. Porpetto Cembirs; 27. San Giorgio di Nogaro - Bosco Sgobitta; 28. San Giorgio di Nogaro – Fontanive; 29. Muzzana del Turgnano - La Favorit; 30. Muzzana del Turgnano - Bosco Communale; 31. Piancada.

Figures – Region 22 – Friuli-Venezia Giulia

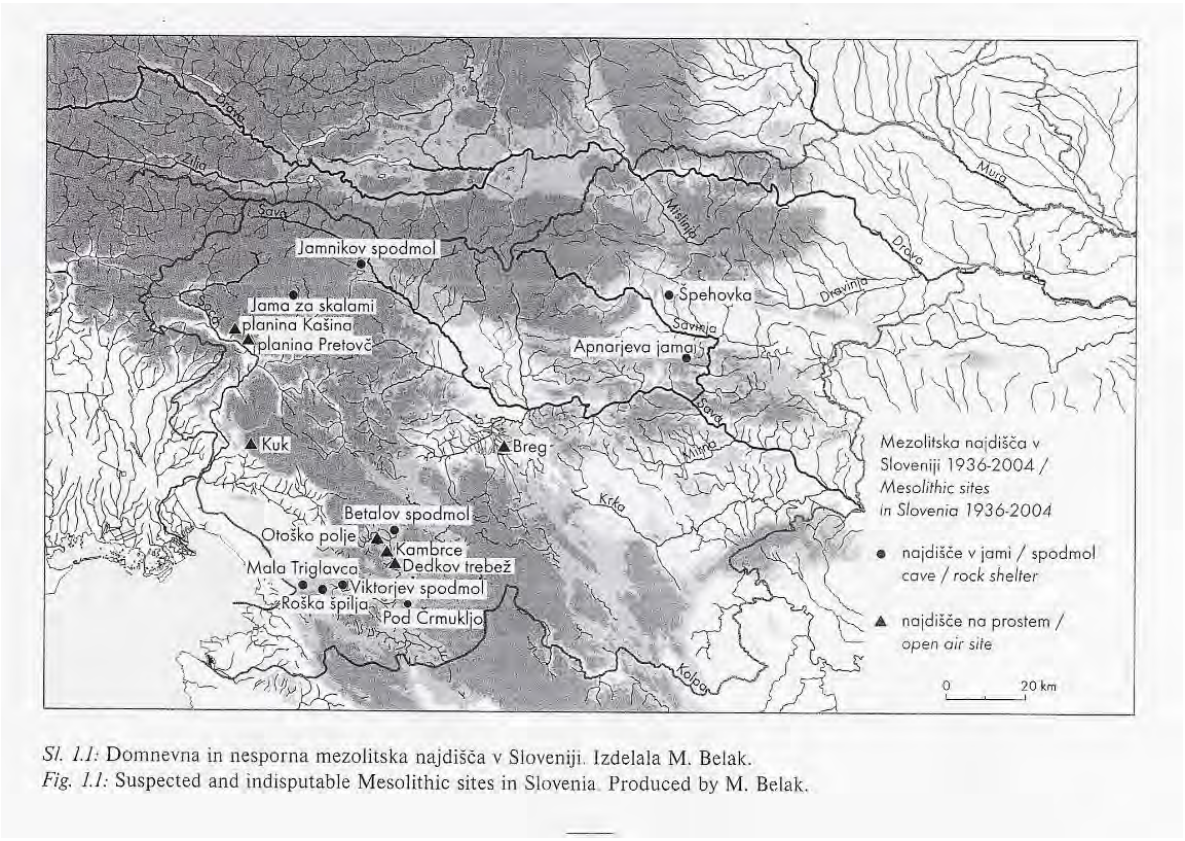


From: Pessina A., 2006a



From: Guerreschi A., 1998b

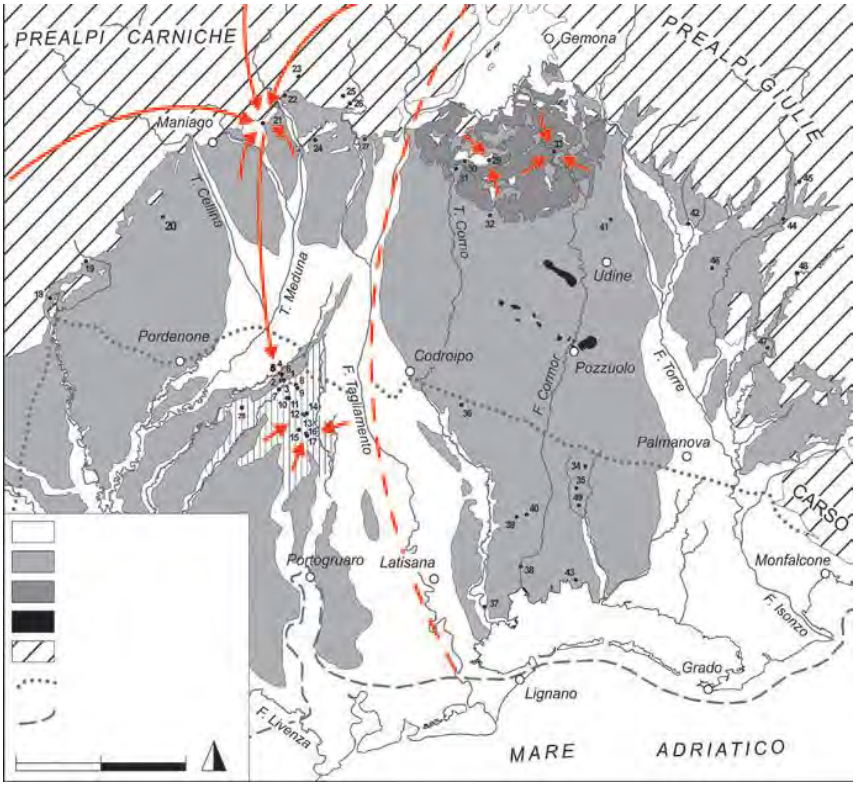
Fig. R22-1 Selected Mesolithic sites on the Lower Friuli Plain, the Tagliamento Morainic Amphitheatre, the Julian Alps and the Trieste Karst.



Sl. 1.1: Domnevna in nesporna mezolitska najdišča v Sloveniji. Izdelala M. Belak.
Fig. 1.1: Suspected and indisputable Mesolithic sites in Slovenia. Produced by M. Belak.

From: Turk I., 2003

Fig. R22-1a Selected Mesolithic sites in Western Slovenia.



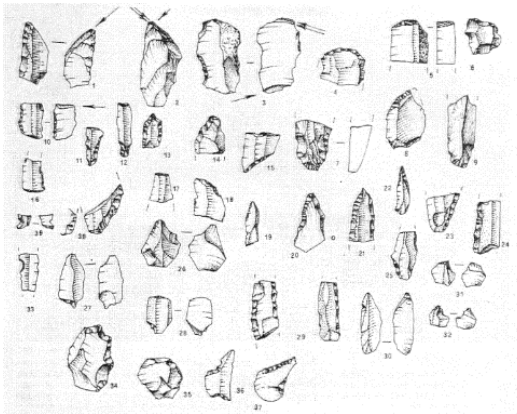
From: Corazza S., *et al*., 2000

Fig. R22-1b Mesolithic sites on the south-western Friuli Plain with red arrows indicating the probable provenance of the flint and the hashed red line marking the Tagliamento River divide.



Photos M. Templer

Fig. R22-2 Site of Mulino Ferrant; Mesolithic lithic scatter and surface finds in the collection of B. Tullio.

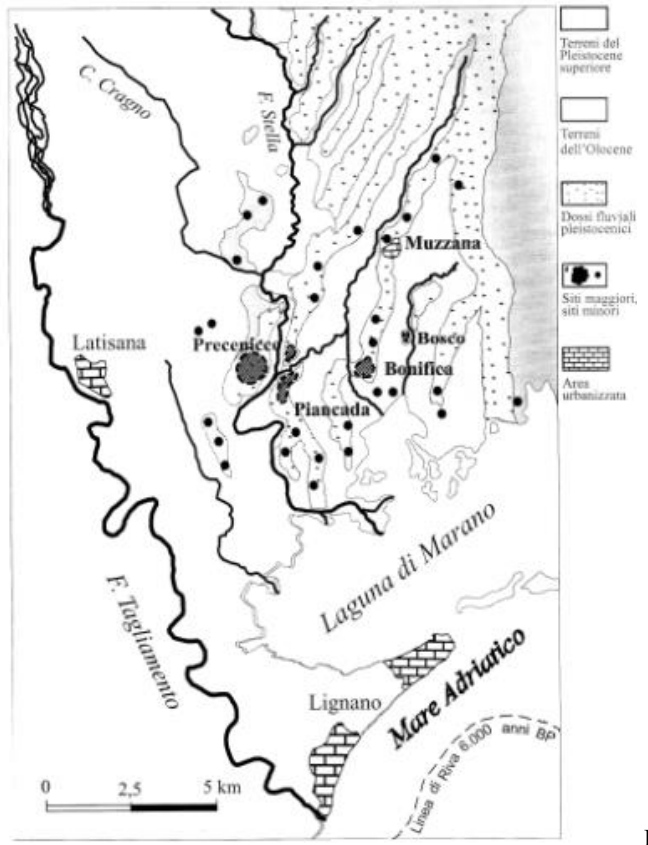


From: Bressan F., 1981a



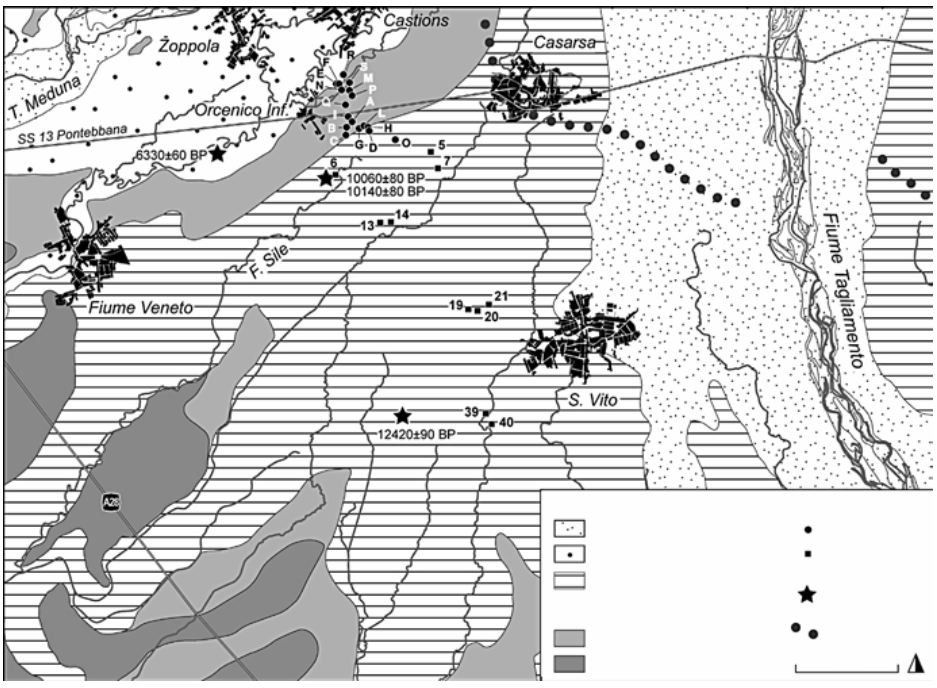
From: Pessina A. & Rottoli M., 1996

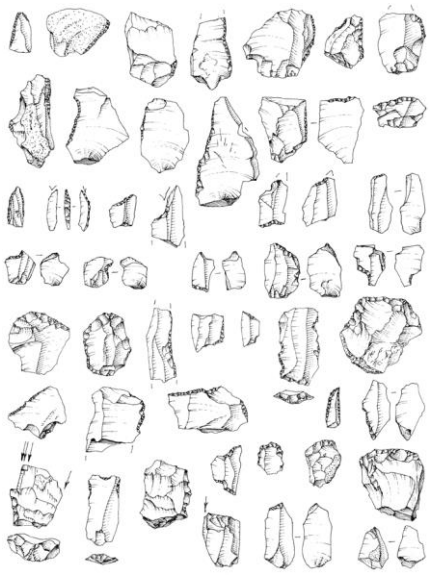
Fig. R22-3 Muzzana del Turgnano - Bosco Communale Mesolithic lithics (left); Muzzana del Turgnano - La Favorita Mesolithic lithics (right).



From: Fontana A., 2000

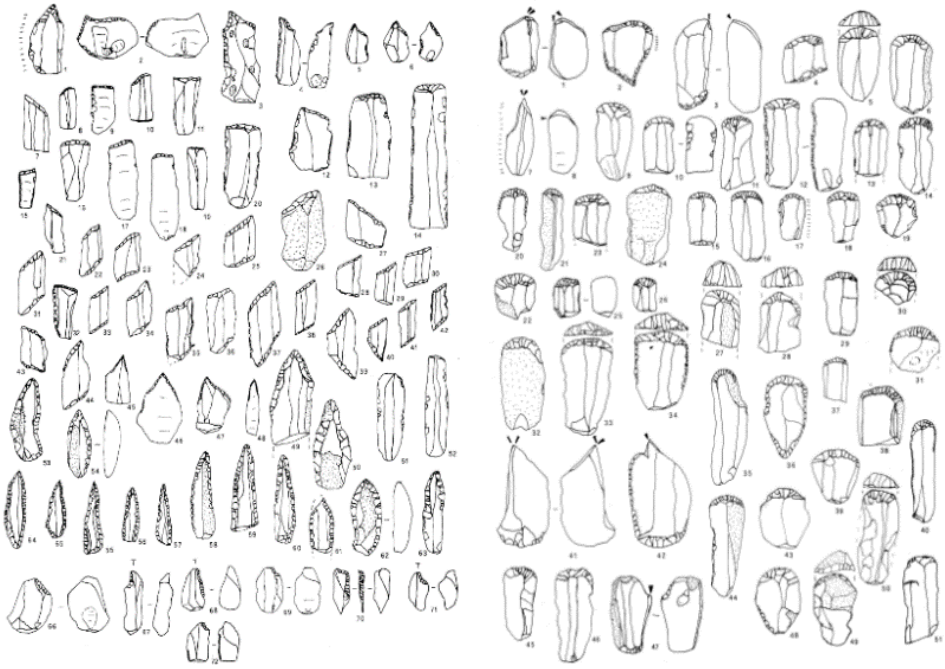
Fig. R22-4 Early Neolithic sites in South-Western Friuli, north of the Marano Lagoon, showing probable shoreline at bottom right *ca*. 4000 BC.





From: Corazza S., *et al*., 2000

Fig. R22-5 Orcenico Mesolithic open-air sites in the spring region west of the River Tagliamento; Mesolithic lithics.



From: Bressan S. & Candussio A., 1981

Fig. R22-6 Palmarola lithics



Photos M. Templer

Fig. R22-7 Pramolo Dosso Confine lake at 1560 masl, with the mesolithic site to the left of the building on the far left; The pyramidal core and blade were found close to where the left-hand photograph was taken.



Photos M. Templer

Fig. R22-8 Riparo di Biarzo under boulder in 2011; Escarpment encasing the River Natisone.

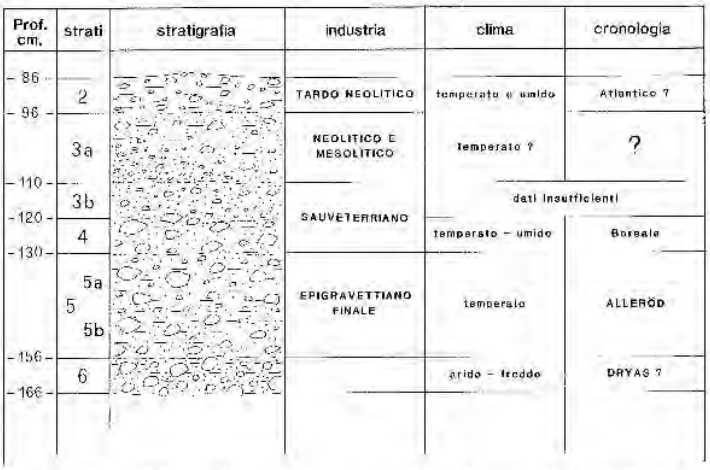


Fig. 3 - Riparo di Biarzo: Inquadramento stratigrafico, paleoecologico e cronologico dell'insediamento preistorico.
- *Riparo di Biarzo: stratigraphyc, paleoecological and chronologic framing of the prehistoric settlement.*

From: Cattani L., 1986

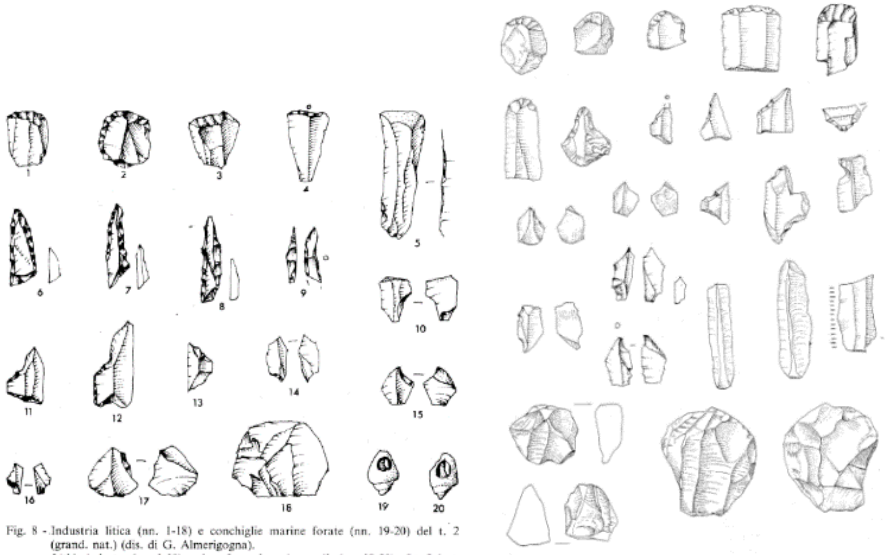


Fig. 8 - Industria litica (nn. 1-18) e conchiglie marine forate (nn. 19-20) del t. 2 (grand. nat.) (dis. di G. Almerigogna).
- *Lithic industry (nn. 1-18) and perforated marine snails (nn. 19-20) of t. 2 (nat. size) (des. of G. Almerigogna).*

Fig. 2 - Industria litica dell'USSA. Disegni R. Zanella, G. Almerigogna (Grand. nat.).

From: Bressan F., *et al*., 1982

Fig. R22-9 Riparo di Biarzo stratigraphic analysis which was corrected by E. Christiani (2014), considering Level 2 to be Early Neolithic and not Late Neolithic as shown here; Lithics from the Transition / Early Neolithic Level 2 and the Mesolithic Level 3a, which suggest continuity.

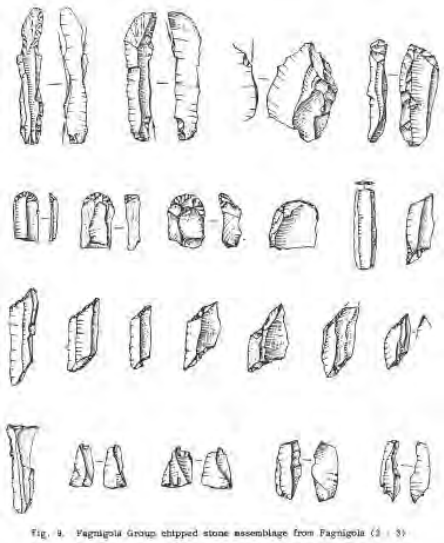


Fig. 9. Fagnigola Group chipped stone assemblage from Fagnigola (2 : 3)

From: Bagolini B. & Biagi P., 1987

Fig. R22-10 Fagnigola lithics.

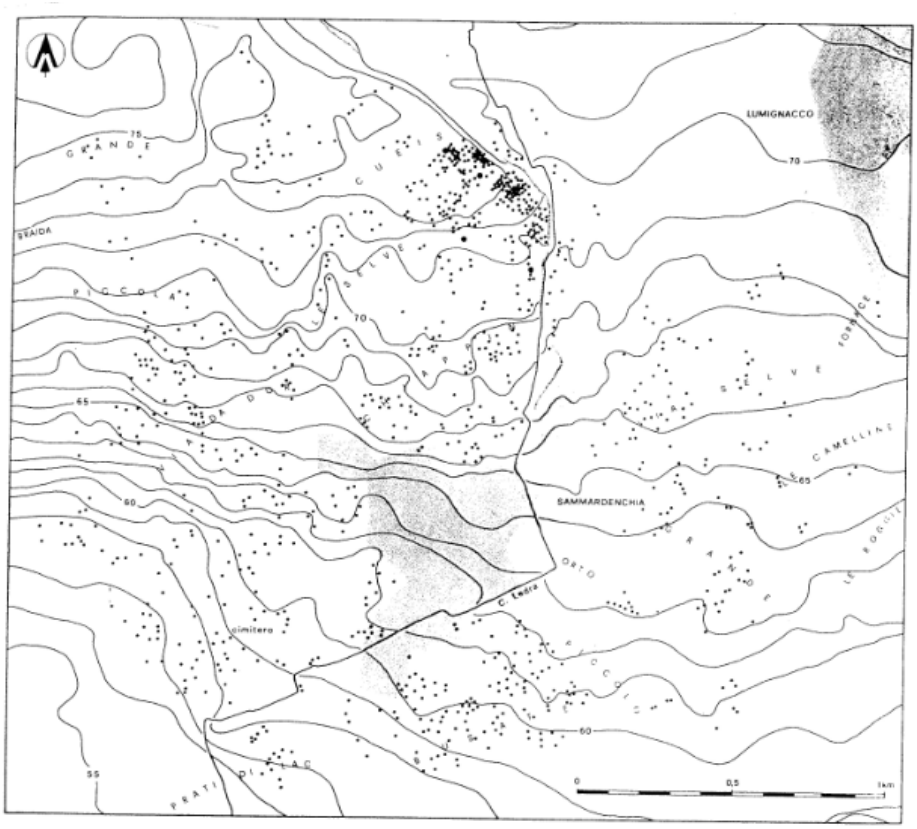


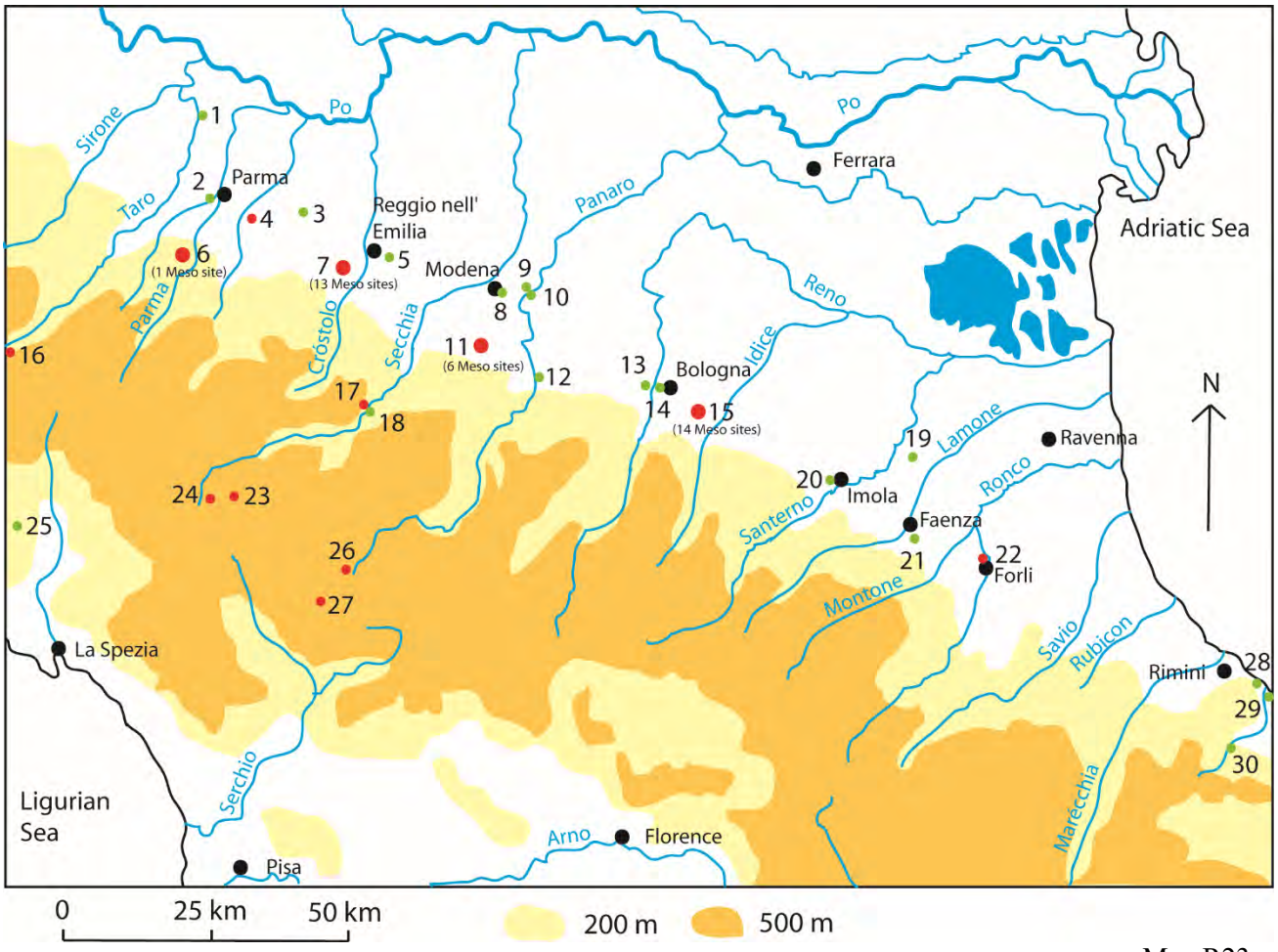
Fig. 6 - Sammardenchia: distribuzione delle evidenze superficiali di sottostrutture.

From: Ferrari A. & Pessina A., 1992

Fig. R22-11 Sammardenchia di Pozzuolo find-spots from surface surveys.

Map R23a

Region 23 – North Adriatic – Eastern Emilia-Romagna and the Veneto – Sites south of River Po



Map R23a

Notes:

● = Mesolithic / Transition sites

● = Neolithic / Transition sites

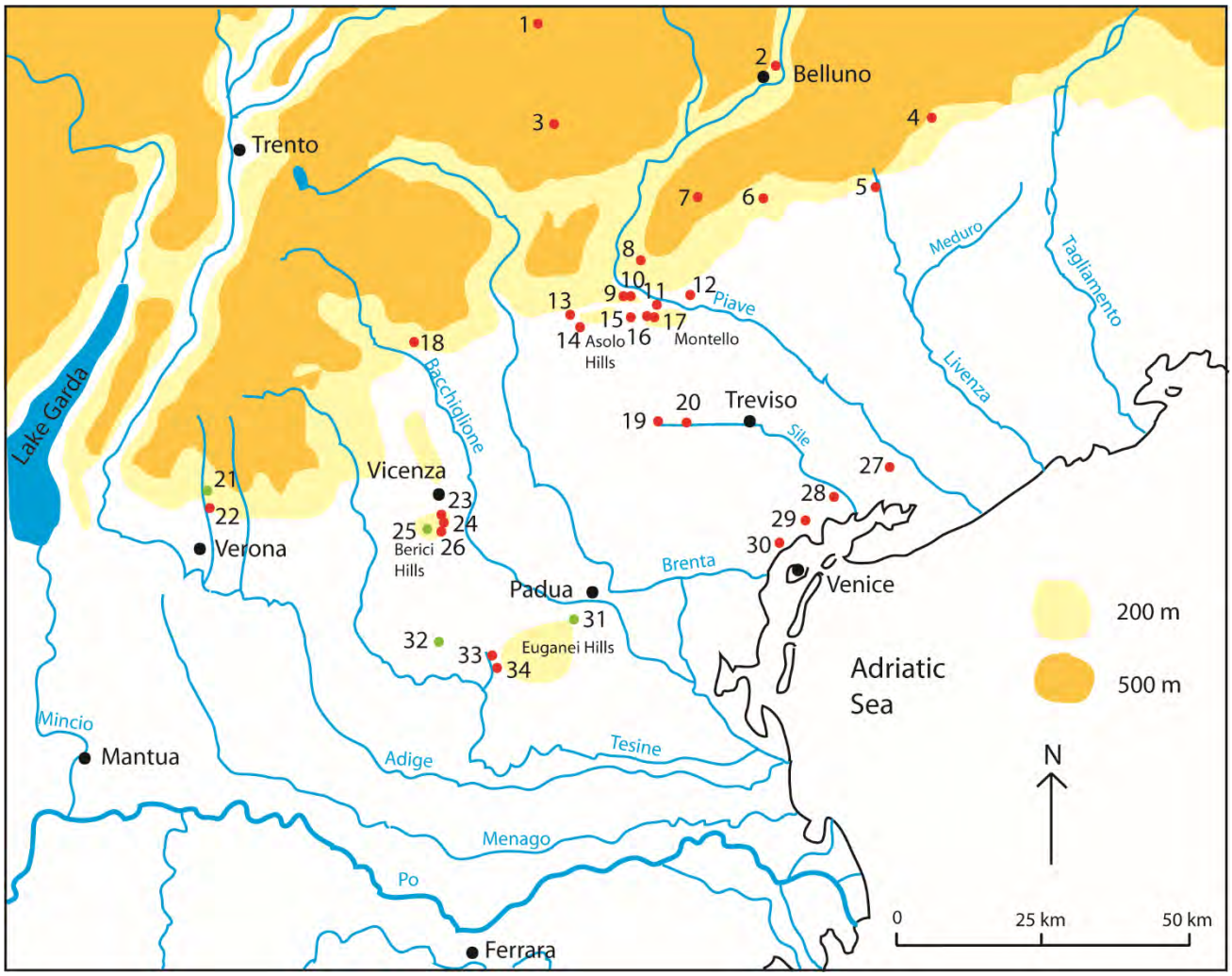
In the text, Castelnovian Mesolithic lithic scatter sites are mostly grouped under the Italian Provinces (Bologna, Modena, Parma and Reggio Emilia) and represented on the map by large red dots.

Site names:

1. Copezzato di San Secondo; 2. Benefizio; 3. Razza di Campegine; 4. Gazzaro; 5. Bazzarola; 6. Parma Mesolithic lithic scatters; 7. Reggio Emilia Mesolithic lithic scatters; 8. Fiorano Modenese; 9. Cava V. Macchioni, Spilamberto; 10. Panaro; 11. Modena Mesolithic lithic scatters; 12. Savignano; 13. Casalecchio di Reno; 14. Bologna - via Andrea Costa (area ex ICO); 15. Bologna Mesolithic lithic scatters; 16. Cabriolini; 17. Castellarano; 18. Pescale; 19. Lugo di Romagna; 20. Imola Ospedale Nuovo; 21. Faenza - Fornace Cappuccini; 22. Forlì, Cantiere ANAS; 23. Passo della Comunella; 24. Lama Lite; 25. La Pianaccia di Suvero; 26. Passo del Lupo; 27. Lago Baccio; 28. Riccione; 29. Misano Adriatico; 30. Miramare di Rimini.

Map R23b

Region 23 – North Adriatic – Eastern Emilia-Romagna and the Veneto – Sites north of River Po



Map R23b

Notes:

● = Mesolithic / Transition sites

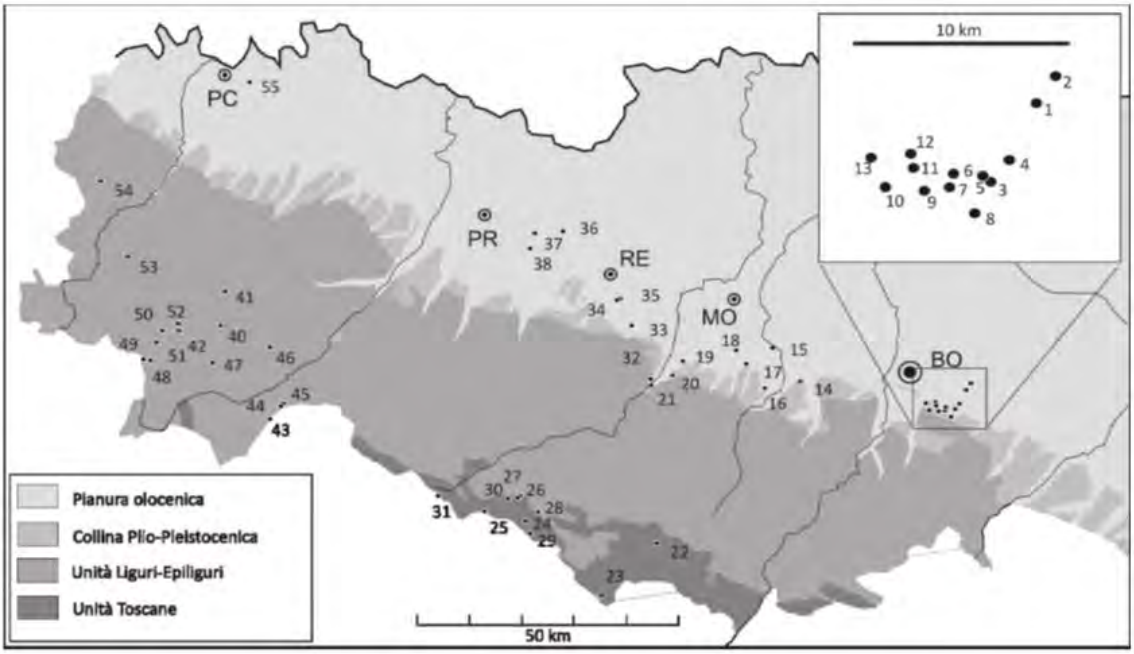
● = Neolithic / Transition sites

In the text, sites in and around the Asolo Hills, Berici Hills, Euganei Hills and Montello, are listed under these locations.

Site names:

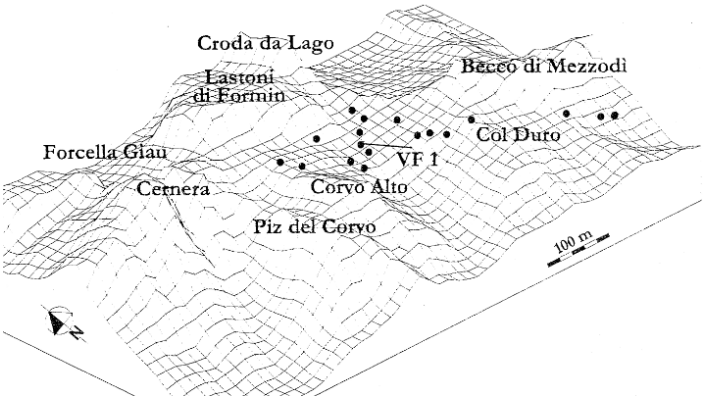
1. Colbricon; 2. Fiammoi; 3. Riparo Villabruna; 4. Aviano; 6. Corbanese - San Giuseppe; 7. Fondo Carniellon; 8. Soprapiana - Fondo Bernardi; 9. Cornuda - Casa Castagna; 10. Cornuda - La Valle; 11. Santa Mamma; 12. Falze di Piave - Ca'Mira; 13. Pagnano d'Asolo; 14. Fornaci di Casella; 15. Capo di Monte; 16. Montello Presa 21; 17. Biadine - Presa 19; 18. Riparo di Lonedo; 19. Sorgenti del Sile; 20. Morgano – Le Vallazze; 22. Riparo Tagliente; 23. Grottina dei Covoloni del Broion; 23. Grottina dei Covoloni del Broion; 24. Grotta di Paina; 25. Soghe; 26. Grotta di San Bernardino; 27. Meolo I & II; 28. Altino; 30. Mestre; 33. Malandrina; 34. Valcalaona.

Figures – Region 23 – Eastern Emilia-Romagna and the Veneto



From: Ferrari S., 2010

Fig. R23-1 Mesolithic sites south of River Po.



From: Fontana F. & Vullo N., 2000



Photo M. Templer





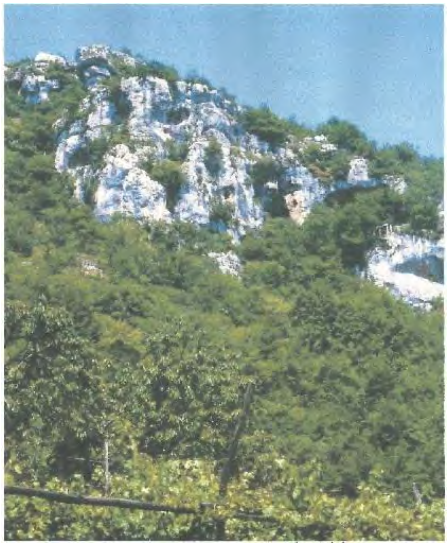
From: Guerreschi A., 1998a

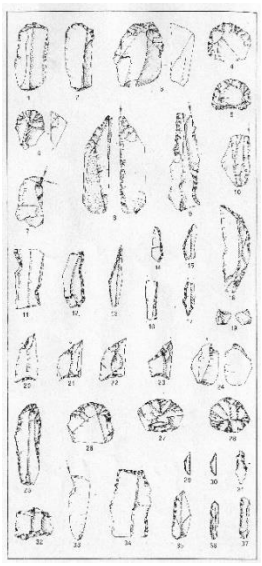
R23-2 Sites located in the Mondeval de Sora Depression; View of depression with VF 1 boulder site left of centre in the distance; Boulder rockshelter VF 1 under excavation; Castelnovian inhumation.



From: Castelletti L., *et al*., 1976

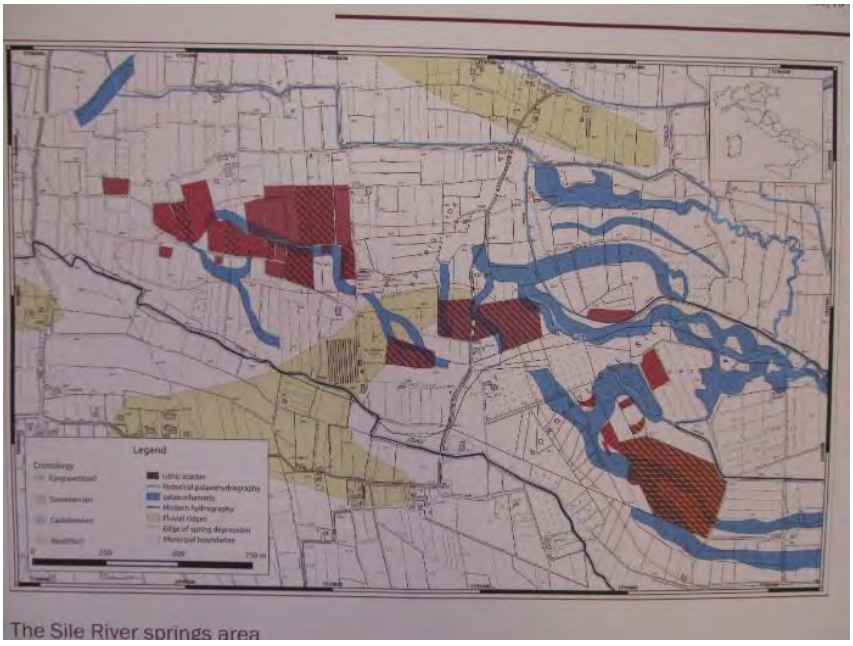
Fig. R23-3 Lama Lite Mesolithic lithics.





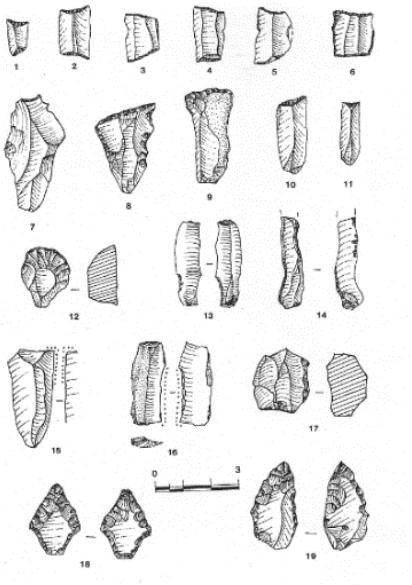
From: Fedele F., 2013 From: Broglio A., 1984

Fig. R23-4 Cavollini del Broion in the Berici Hills; Lithics.



From: Fontana F., *et al*., 2014

Fig. R23-5 Sorgenti del Sile area of springs with lithic scatter areas marked in brown.



Pianaccia di Suvero, industria litica. Materiale del primo Neolitico: geometrici (1-6), troncature (7-11), grattatoio (12) lamelle denticolate (13-14), «elementi di falsetto» (15-16), nucleo (17). Materiali di epoche posteriori: cuspidi (18-19). Disegni di Elisabetta Starnini.

From: Maggi R., 1983

Fig. R23-6 Pianaccia di Suvero Early Neolithic lithics (N° 1-17) and later periods (N° 18-19).



Photo M. Templer

Fig. R23-7 Benefizio explicative panel at the Parma Archaeological Museum, with a brief note on the site of Copezzato di San Secondo below.



Photos M. Templer

Fig. R23-7a Benefizio pottery and lithics (left), and Copezzato di San Secondo pottery and lithics (right) in the Parma Archaeological Museum.

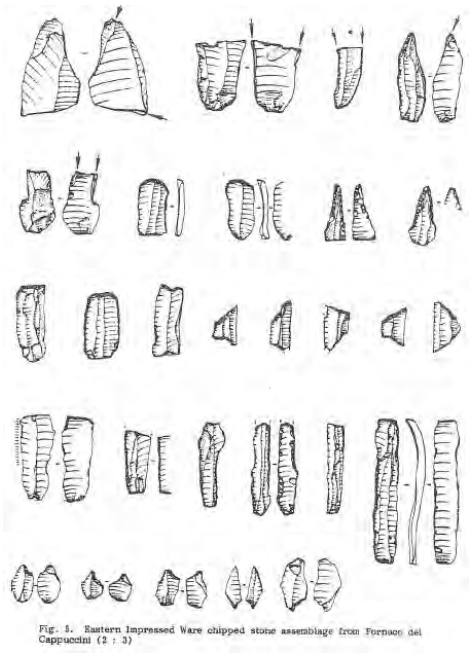
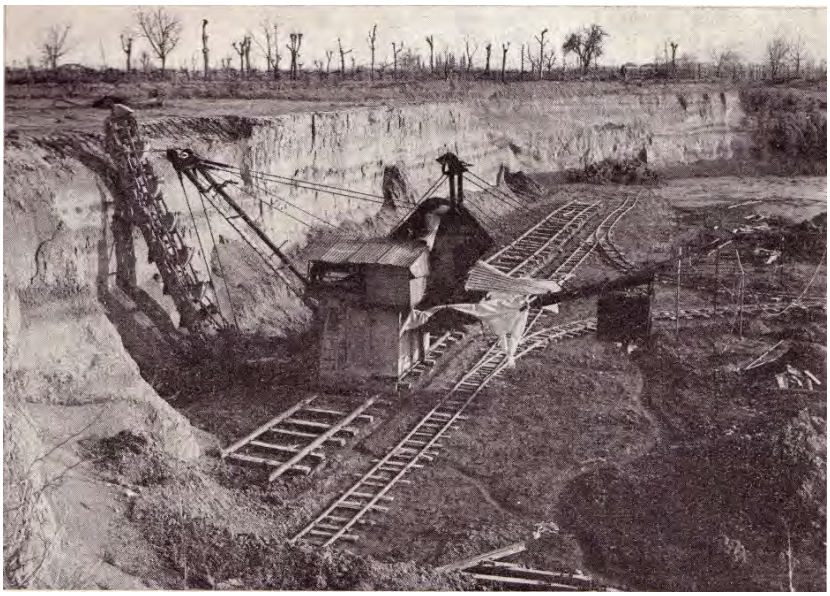


Fig. 5. Eastern Impressed Ware chipped stone assemblage from Fornace dei Cappuccini (2 : 3)

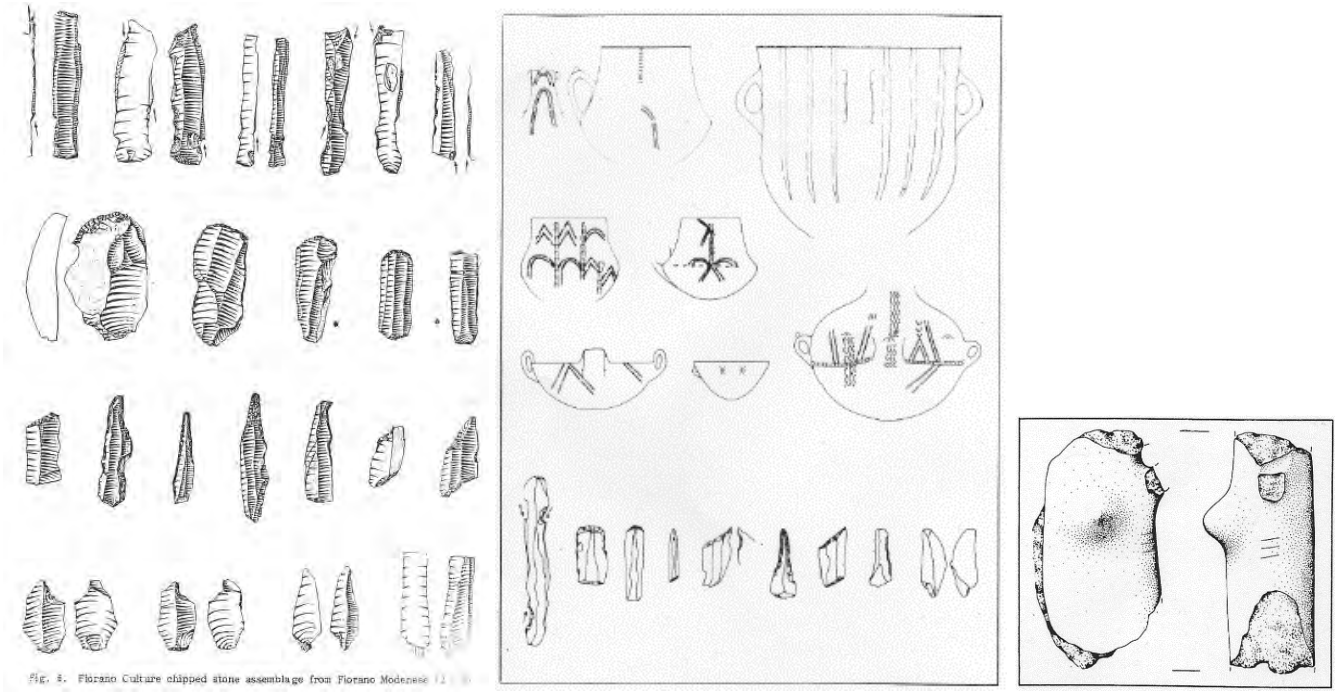
From: Bagolini B. & Biagi P., 1987

Fig. R23-8 Faenza-Fornace Cappuccini lithics.



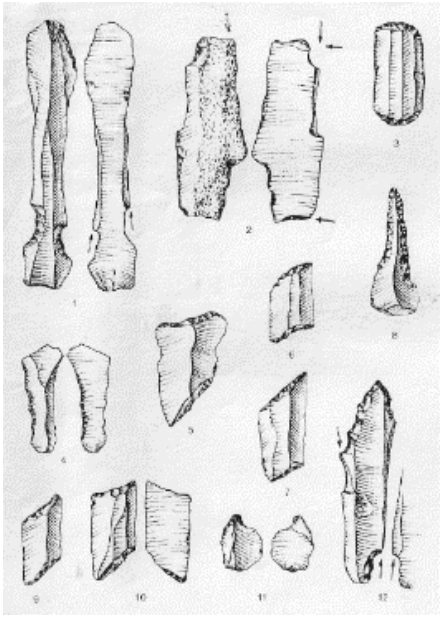
From: "Fiorano un borgo ai piedi di un santuario"

Fig. R23-9 Clay extraction pit at Fornace Carini where the site of Fiorano Modenese was discovered.



From: Bagolini B., 1984

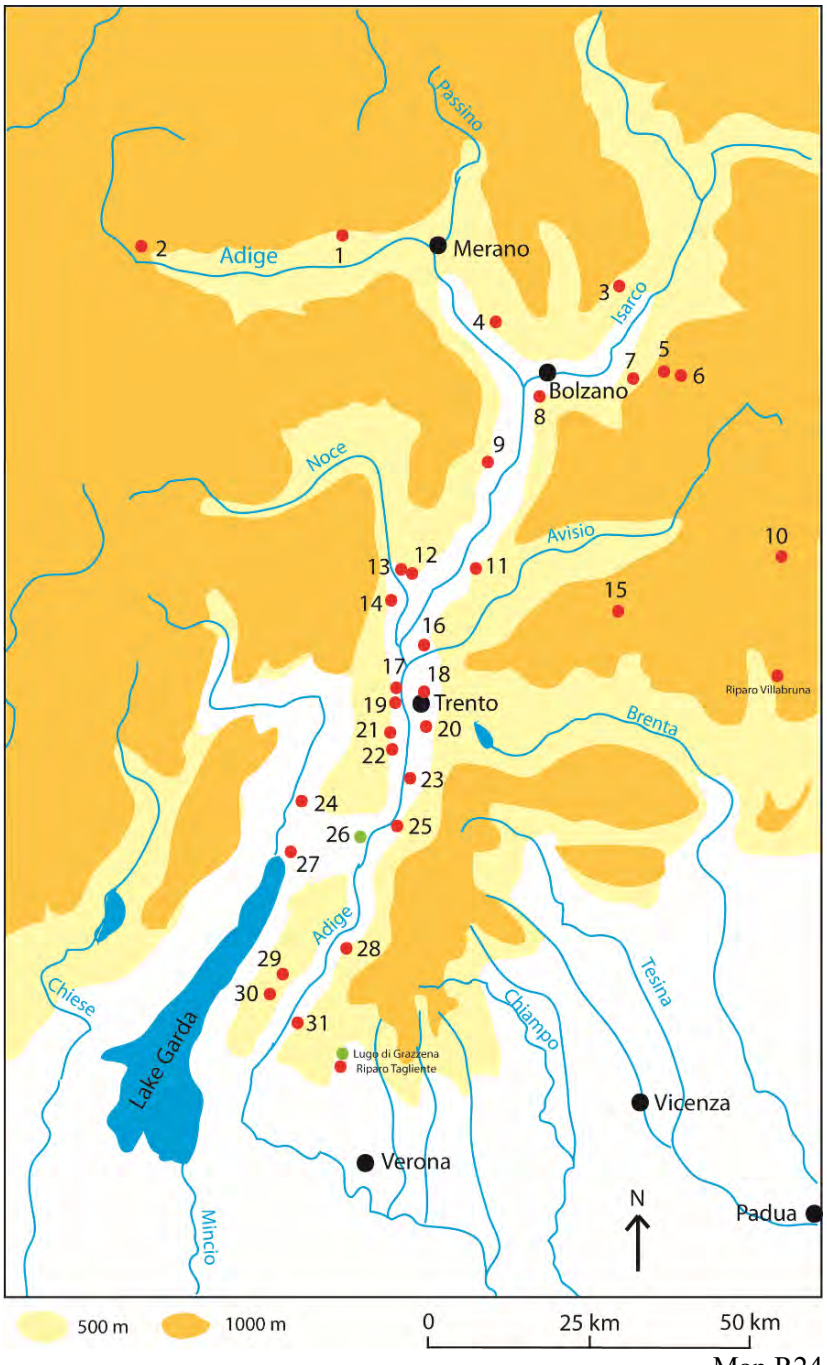
Fig. R23-9a Fiorano Modenese lithics, pottery and clay figurine.



From: Broglio A., 1973

Fig. R23-10 Le Basse di Valcalaona lithics

Region 24 – North Adriatic – Trentino-Alto Adige



Map R24

Notes:
● = Mesolithic / Transition sites
● = Neolithic / Transition sites

Site names:

1. Castel Juvale; 2. Coel di Tarces; 3. Villandro-Plunacker; 4. Terlano Meitingerhof; 5. Val Dona; 6. Plan de Frea IV; 7. Aica di Fiè; 8. San Giacomo; 9. Malga Romeno; 10. Colbricon; 11. Dos de la Forca; 12. Mezzocorona-Borgonuovo; 13. Mezzocorona-Doss de la Forca; 14. Nogarole; 15. Lago delle Buse; 16. Vatte di Zambana; 17. Riparo di Pradestel; 18. Riparo Gaban; 19. La Vela; 20. Riparo Madonna Bianca; 21. Doss Trento; 22. Romagnano III; 23. Acquaviva di Besenello; 24. Riparo di Moletta Patone di Arco; 25. Paludei; 26. Isera-Torbiera; 27. Prè Alta; 28. Ala Le Corone; 29. Fontana de La Teia; 30. Riparo Monte Terlago; 31. Riparo Soman.

Figures – Region 24 – Trentino-Alto Adige

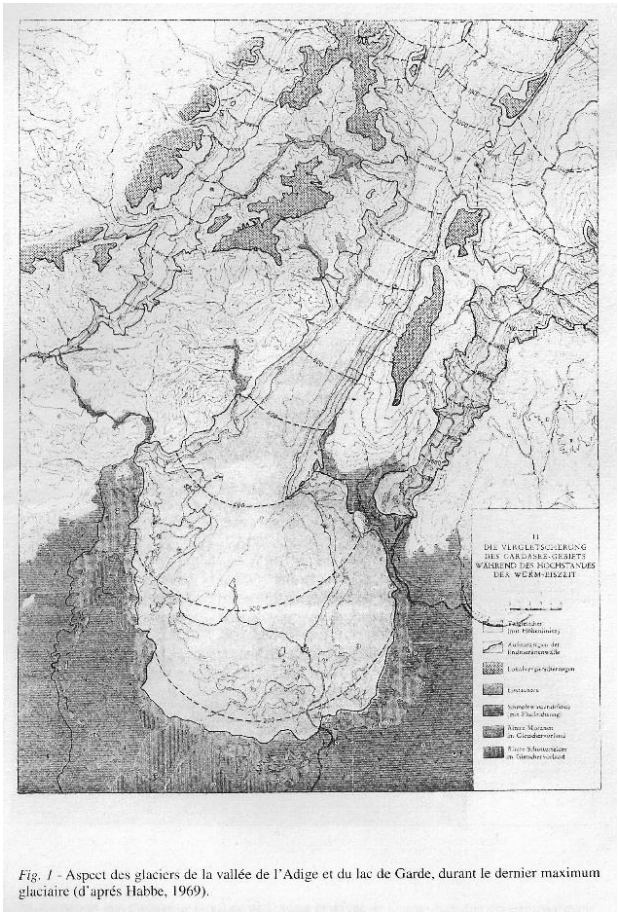
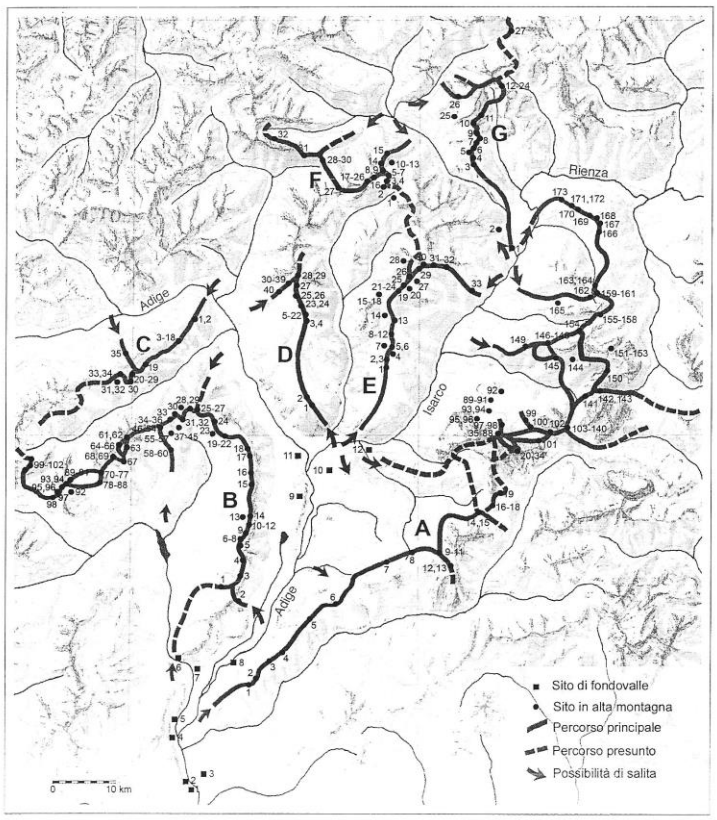


Fig. 1 - Aspect des glaciers de la vallée de l'Adige et du lac de Garde, durant le dernier maximum glaciaire (d'après Habbe, 1969).

From: Cremaschi M., 1984

Fig. R24-1 Glaciers at LGM superimposed over Lake Garda (centre) and the Adige Valley (right)



SITI IN VALLE		PERCORSO "B"			PERCORSO "E"	
1	Dos Trento	308	1	Bus del Spin	1424	1	Flachen	1825
2	La Vela Trento	201	2	Fennberg/ Favogna	1490	2	Auf der Schön/ Belmonte	1890
3	Riparo Gaban	270	3	Schweiggalm I	1860	3	Auf der Schön/ Belmonte	1920
4	Riparo Pradestel	250	4	Schweiggalm II	1810	4	Schwarzseespitze	2070
5	Zambana Loc. Vatte	210	5	Mendel/ Mendola VII	1787	5,6	Unterhorn/ Corno di sotto 1,2	2040
6	Dos della Forca	241	6-8	Mendel/ Mendola V-VII	1772	7	Festenhorn	2045
7	Mezzocorona Borgonuovo	250	9	Mendel/ Mendola IV	1790	8-12	Rittner Horn/ Corno di Renon	2137-2150
8	Galgenbühl/ Dos della Forca	225	10-12	Mende I/ Mendola I-II	1650	13	Gasteigersattel/ Sella dei Seniteri	2058
9	Montiggler See/ Lago Monticolo	500	13	Mendel/ Mendola - Golfwiesen I	1525	14	Schlehebergalm	2075
10	St.Jakob Leifers/ S. Giacomo Laives	302	14	Mendel/ Mendola - Golfwiesen II	1500	15-18	Seeberg/ Lago Nero	2040
11	Schloss Sigmundskron/ Castel Firmiano	340	15	Mendel/ Mendola IX	1720	19	Stöfflhütte/ Alpe del Passo	2120
12	Karneid/ Carnedo	488	16	Mendel/ Mendola X	1491	20	Jocherer Alm 1	2117
			17	Sorgente Vel	1480	21-24	Jocherer Alm 2-5	2158-2163
PERCORSO "A"			18	Mendel/ Mendola XI	1770	25	Jocherer Alm 6	2235
1	Lago Santo	1194	19-22	Felixer Weiher/ Lago Tret	1615	26	Schäferhütte	2215
2	Val Freddata	1245	23	Tillwiesen I	1480	27	Gampberg	2138
3	Lago Valda	1371	24	Tillwiesen II	1655	28	Getrum	2238
4	Lago del Vedes	1484	25-27	Gampenpass/ Passo Palade	1520	29	Latzfonser Kreuz/ Santa Croce	2311
5	Weißsee/ Lago Bianco	1671	28,29	Laugen/ Monte Lucco I,II	1940	30	Fortschell/ Forcella	2076
6	Krabesalm/ Malga Krabes	1554	30	Laugen/ Monte Lucco III	2185	31	Rungger Alpe	2080
7	Jochgrimm/ Passo Occlini	1989	31,32	Steinmandljoch VII-VIII	1965	32	Talalm/ Alpe di Valle	2040
8	Lavazè	1810	33	Steinmandljoch II	2070	33	Feldthurns/ Velturno	850
9-11	Reiterjoch I-III/ Passo Pampeago I-III	1950-2200	34-36	Steinmandljoch I, IV, V	2070			
12,13	Satteljoch/ Passo Feudo	2121	37-45	Malga Lucar I-IX	2065		PERCORSO "F"	
14,15	Karerpass I, II/ Passo Carezza I, II	1760	46-54	Hofmahdjoch/ Malga Castrin	1910	1	Traminalm/ Malga Tramin	1980-2002
16-18	Vael-Vaialon	2100	55-57	Rio Novello I-II	1800	2	Penser Alm/ Alpe di Pennes 1	2245
19	Valle Vajolet	1900	58-60	Sam I-III	1750	3,4	Penser Alm / Alpe di Pennes 2,3	2175
20-34	Val Doaa I-XV	2175-2275	61,62	Samerberg II, III	1870	5-7	Penser Alm / Alpe di Pennes 4-6	2125-2225
35-88	Seiseralm Schneid/ Alpe di Siusi Cresta	2125-2275	63	Samerberg I	2180	8,9	Penser Joch/ Passo Pennes	2215-2220
89-91	Seiseralm/ Alpe di Siusi - Compatsch	1845-1855	64-66	Samerberg IV	2090	10-13	Penser Joch/ Passo Pennes Nord 1-4	1990-2035
92	Seiseralm/ Alpe di Siusi - Icaro	1870	67	Cermiglio 4	1860	14	Jaufertaljöchl	2195
93,94	Seiseralm/ Alpe di Siusi - Joch I, II	2008-2020	68,69	Cermiglio 2, 3	2260-2270	15	Stilfeser Jöchl	2168
95-96	Seiseralm/ Alpe di Siusi - Salternhütte	1810	70-77	Lago Pozzella 1-8	2150-2195	16	Penserjochsee/ Lago di Pennes I	2220
97,98	Seiseralm/ Alpe di Siusi - Molignon I, II	2040-2075	78-88	Malga Binassa	2155-2245	17-26	Penserjochsee/ Lago di Pennes II	2210-2220
99	Seiseralm/ Alpe di Siusi -Zallinger	2150	89-91	Malga Scalet 1, 2, 3	2130-2230	27	Wannser Jöchl	2247
100	Seiseralm/ Alpe di Siusi - Passajoch	2303	92	Malga Bordolona di sotto	1880	28-30	Jaufenpass/ Passo del Giovo 1, 3	2100
101	Val Duron	1780	93-97	Malga Bordolona di sopra	2170-2280	31	Jaufenpass/ Passo del Giovo4	2000-2060
102	Sassplat	2290	98	Passo Palù		31	Wumblsalm	2070
103-140	Sellajoch/ Passo Sella I-XVII	2220-2310	99-102	Weissbrunnalm	2075-2360			
141	Plan de Frea	1903					PERCORSO "G"	
142,143	Grödner Joch/ Passo Gardena	2090		PERCORSO "C"		1	Brixen/ Bressanone - Stufels	565
144	Cisles	1990	1,2	Vigiljoch/ Passo S. Vigilio	1745	2	Vahrn/ Varna - Gois	670
145	Cucasattel/ Passo Cuca	2200	3-18	Naturnseralm/ Alpe di Naturno I-VI	1975	3	Jochtal I	2010
146-148	Broglessattel/ Passo Brogles	2100	19	Innere Falkomaialm	2110	4	Jochtal II	1985
149	Raschötz/ Rasciesa	2120	20-29	Ob. Marschnellalm I-X	2350	5	Valser Joch	1920
150	Puez	2500	30	Unt. Marschnellalm	2250	6	Rotensteinalm I	2090
151-153	Antersasc I-IV	2280	31,32	Unt. Kofelrastersee I, II	2190-2315	7	Rotensteinalm II	2180
154	Tschuntschenon	1928	33,34	Kofelrastersee I, II	2410-2415	8	Rotensteinalm III	2210
155-158	Putia I-VI	2165	35	Zirmsee	2115	9	Pearchen Jöchl	2210
159-161	Kompatschwiesen I-II	2050-2060				10	Labeseben II	2250
162	Gunggan	1850		PERCORSO "D"		11	Labeseben I	2138
163,164	Würzjoch/ Passo delle Erbe	2004-2006	1	Jenesien/ San Genesio I	1380	12-24	Weitenbergalm I-X	2099-2125
165	Villnöss/ Funes - Laseider	1640	2	Jenesien/ San Genesio II	1420	25	Sengesalm	2280
166	Glittnersee	2151	3,4	Auenjoch/ Giogo dei Prati XII, XVI	1925	26	Burgum	2400
167	Wieseralm	2054	5-22	Auenjoch/ Giogo dei Prati I-XI	1900-1960	27	Pflocher Joch/ Passo di Vizze	2250
168	Jakobsköckl	2026	23,24	Kreuzjoch/ Giogo della Croce	2080			
169	Lechneralm		25,26	Kreuzjoch I/ Passo della Croce	1984			
170	Amalm /Malga Laste	1954	27	Scharthoden	1964			
171	Starkenfeldhütte I	1920	28,29	Missensteiner Joch	2122			
172	Starkenfeldhütte II	1920	30-39	Haflinger Almen I-X	2000-2190			
173	Rienzquelle/ Sorgente Rienza	1535	40	Stoffelli/ Passo di Vizze	2250			

From: Kompatscher K. & Hrozny Kompatscher N. M., 2007

Fig. R24-2 Mesolithic (mostly Early) sites in the Trentino-Alto Adige, for the most part along natural communication paths.

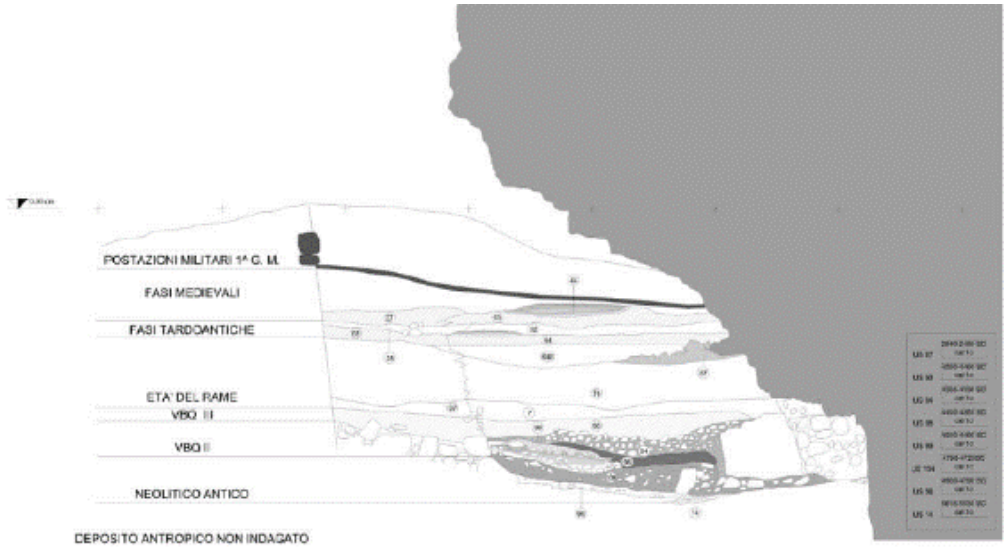


Fig. 1. Ala Le Corone (Trento). Sezione nord-sud del deposito archeologico (rilievo di Nicola Degasperi; elaborazione grafica di Chiara Maggioni).

From: Nicolis F., *et al*., 2007

Fig. R24-3 Ala le Corone north-south profile (drawn by N. Degasperi and C. Maggioni).



Fig. 1 - Panoramica della Valle dell'Adige a nord di Trento con localizzazione dell'area di interesse archeologico all'interno dell'abitato odierno de La Vela (foto di Gianni Zotta).



Fig. 2 - La Vela di Trento 2003. Mappa catastale con indicazione dei settori indagati (VELA I-VIII) (elaborazione grafica di Chiara Maggioni).

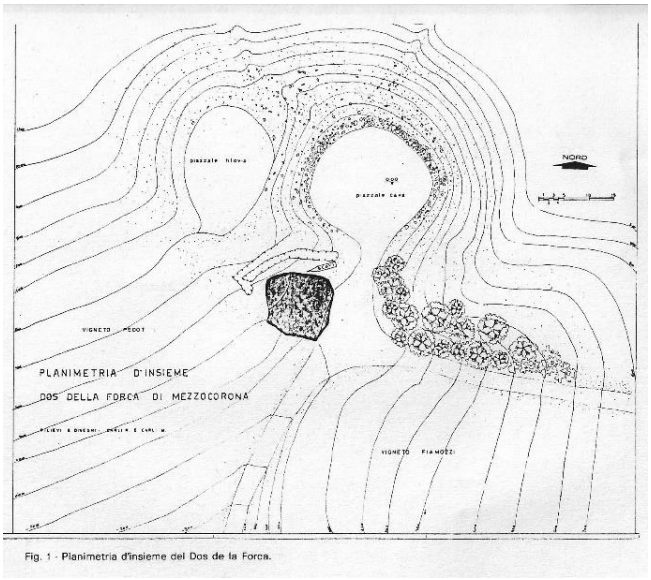
From: Degasperi N., et al., 2006

Fig. R24-4 La Vela di Trento open-air location is circled on left of photo; Excavated areas within housing complex.



From: Bazzanella M., *et al*., 2001

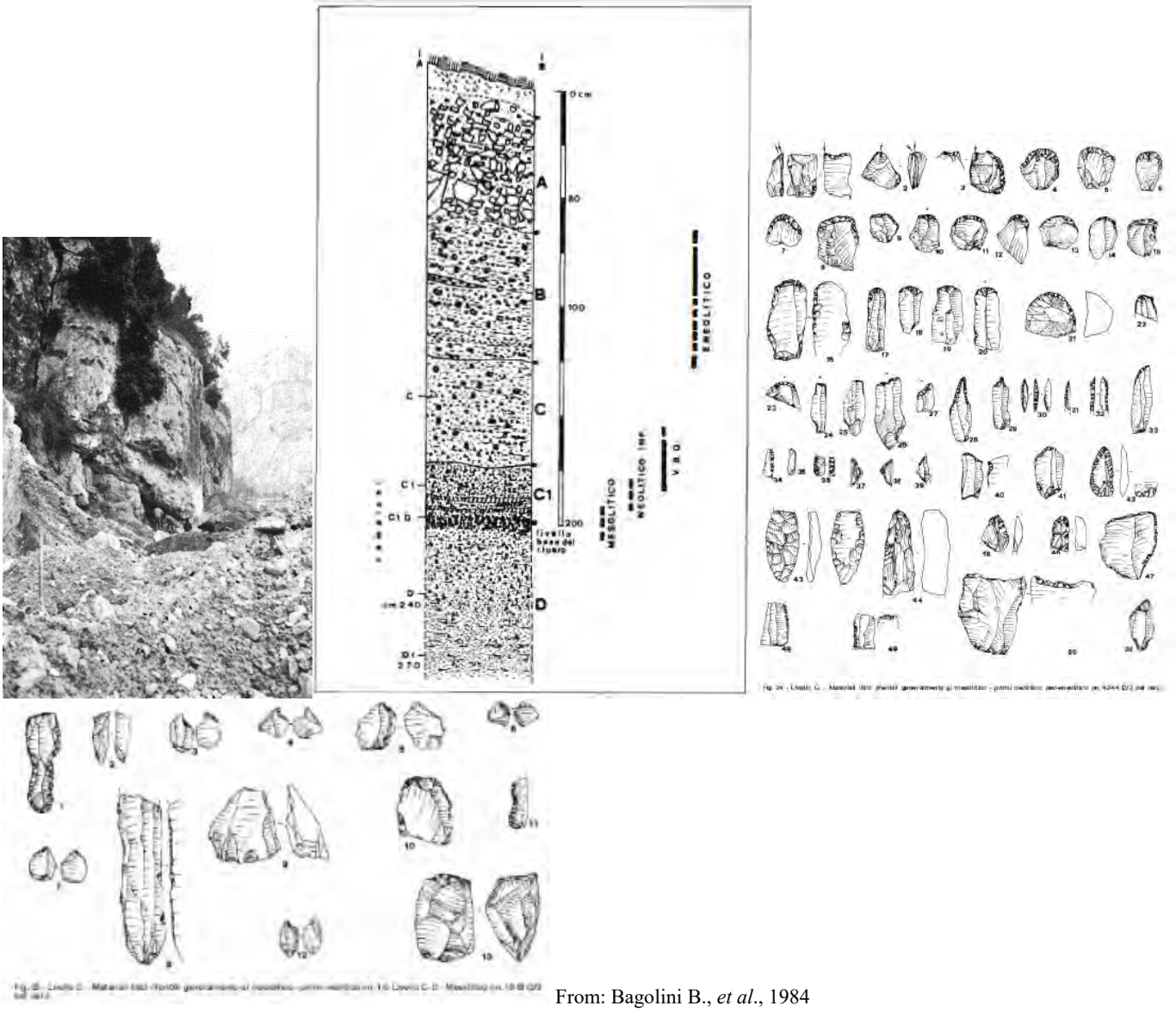
Fig. R24-5 Mezzocorona-Borgonuovo Gaban Culture lithics.





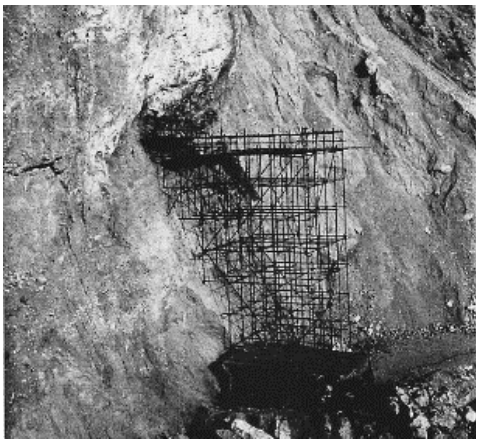
From: Bagolini B., *et al*., 1985 From: Coltorti M., *et al*., 2009

Fig. R24-6 Mezzocorona-Doss de la Forca location north of the boulder; the original height of the 'talus' shows up as a change in colour on the rock-face and the white arrow shows the 'lost' continuation of the shelter.



From: Bagolini B., *et al*., 1984

Fig. R24-7 Moletta Patone di Arco excavations in progress; Stratigraphy with the Mesolithic at the base of Level C1 at 200 cm, transitioning into Early Neolithic (Gaban Culture) and VBQ; Lithics from Level C1.



From: Broglio A., 1980

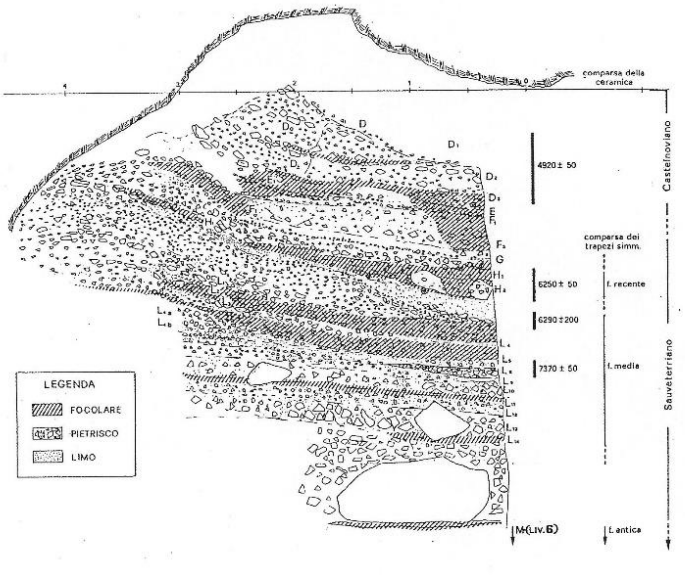
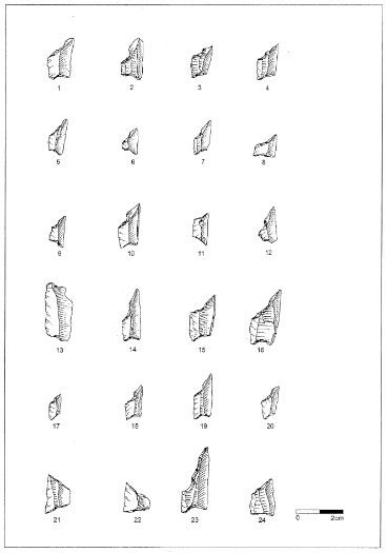


Fig. 5 - Sezione dei depositi mesolitici di Riparo di Pradestel, con le datazioni radiometriche (BC) (da Broglio 1980).
Fig. 5 - Section of mesolithic deposits of Riparo Pradestel, with ^{14}C dates (BC) (from Broglio 1980).

From: Dalmeri G., *et al*., 2008



Tab. 3 - Numero e frequenza di strumenti e armature microlitiche.
Tab. 3 - Number and frequency of tools and microliths.

Pezzi ritoccati	M - 6	L4 ÷ L8	L ÷ L3a	I - I1	H ÷ H2	G ÷ G3	F ÷ F3	E ÷ E4	D ÷ D3	A ÷ B
Strumenti	3	52 29,1	61 38,4	3	105 21,6	52 25,9	117 30,1	94 45,2	67 55,4	7
Armature microlitiche	8	127 70,9	98 61,6	15	382 78,4	149 74,1	272 69,9	114 54,8	54 44,6	4
Totale	11	179	159	18	487	201	389	208	121	11

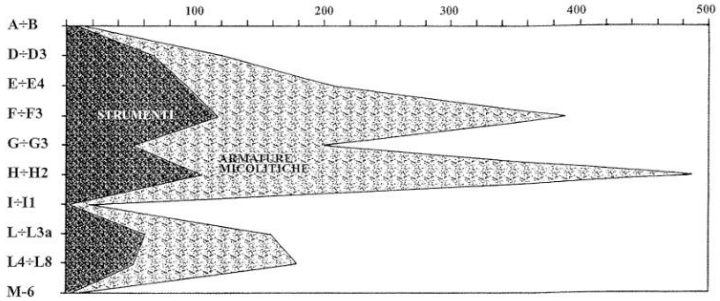


Fig. 6 - Numero di strumenti e di armature microlitiche.
Fig. 6 - Number of tools and microliths.

From: Dalmeri G., *et al*., 2008

Fig. R24-8 Riparo di Pradestel during excavations; Stratigraphy with the top Levels D1-D3 representing the Late Mesolithic; Castelnovian armatures from Levels D1-D3; Ratio of tools (dark colour) to armatures (lighter colour) during the different occupational phases, with levels D1-D3 at the top.



Photo M. Templer

Excavation Areas:	Zone IV						Zone III		Zone V		
Early Neolithic	E1-E2			D8-D9			Pit N TBN	TC 1	26		
Later Castelnovian	E3-E5	E3-E4		D10-E9	E2	TBN E E2-E5		TC-1A TC-1B	27 TCE-F	TCE-F	
Earlier Castelnovian	F1-F5	F1-F8/9	F1-F5	E3-E5	E6-E7	TBNE 1-5 TBNE 6		TC 1C TC2 A-B	TCG-L TCG-L	TC G-K TC G-K	27B
Later Sauveterrian	F6-F9	F9/10-F10/3	F6-E11/13	E6-E7	E8	E09		TC 2C	TCM-R	TC-L	
Earlier Sauveterrian	F10 etc	F11/14	F12/14	F8	BEDROCK				TC S-Y		
Bedrock											

Figure 8.3a Riparo Gaban: Schematic section showing spit numbers in relation to the interpreted Mesolithic and Neolithic phasing

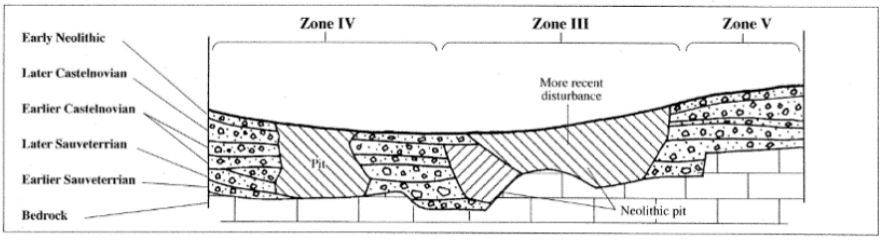


Figure 8.3b Riparo Gaban
section based on site drawing from archive

From: Clark R., 2000

Fig. R24-9 Riparo Gaban in 2013; Schematic stratigraphy of areas IV, III and V.



From: Pedrotti A., 1998

Fig. R24-10 Riparo Gaban portable mobiliary art ornaments.

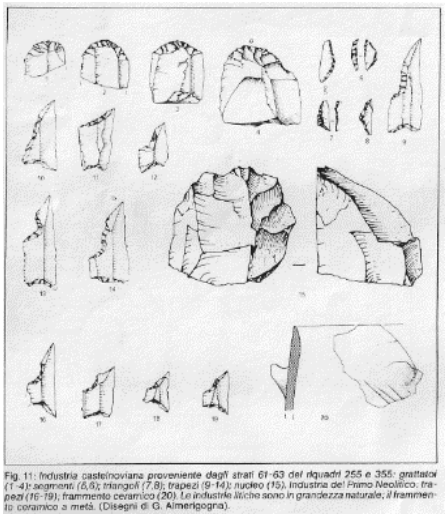


Fig. 11: Industria castelnoviana proveniente dagli strati 61-63 dei riquadri 255 e 355: grattatoi (1-4); segmenti (5,6); triangoli (7,8); trapezi (9-14); nucleo (15). Industria del Primo Neolitico: trapezi (16-19); frammento ceramico (20). Le industrie litiche sono in grandezza naturale, il frammento ceramico a metà. (Disegni di G. Almerigogna).

From: Broglio A. & Lanzinger M., 1984-1985

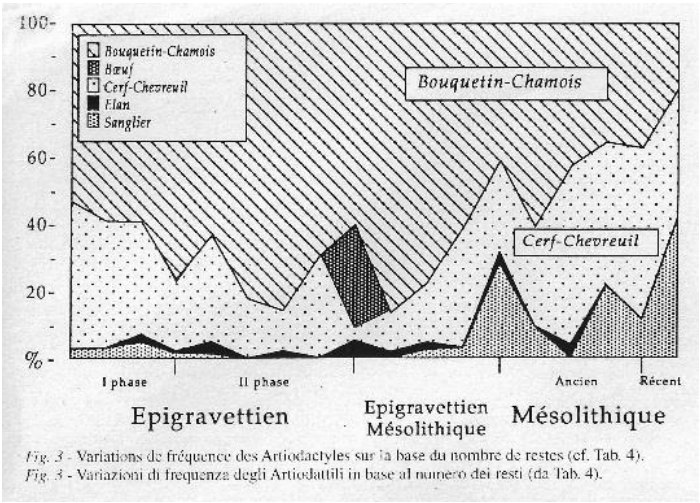


Fig. 3 - Variations de fréquence des Artiodactyles sur la base du nombre de restes (cf. Tab. 4).
Fig. 3 - Variazioni di frequenza degli Artiodattili in base al numero dei resti (da Tab. 4).

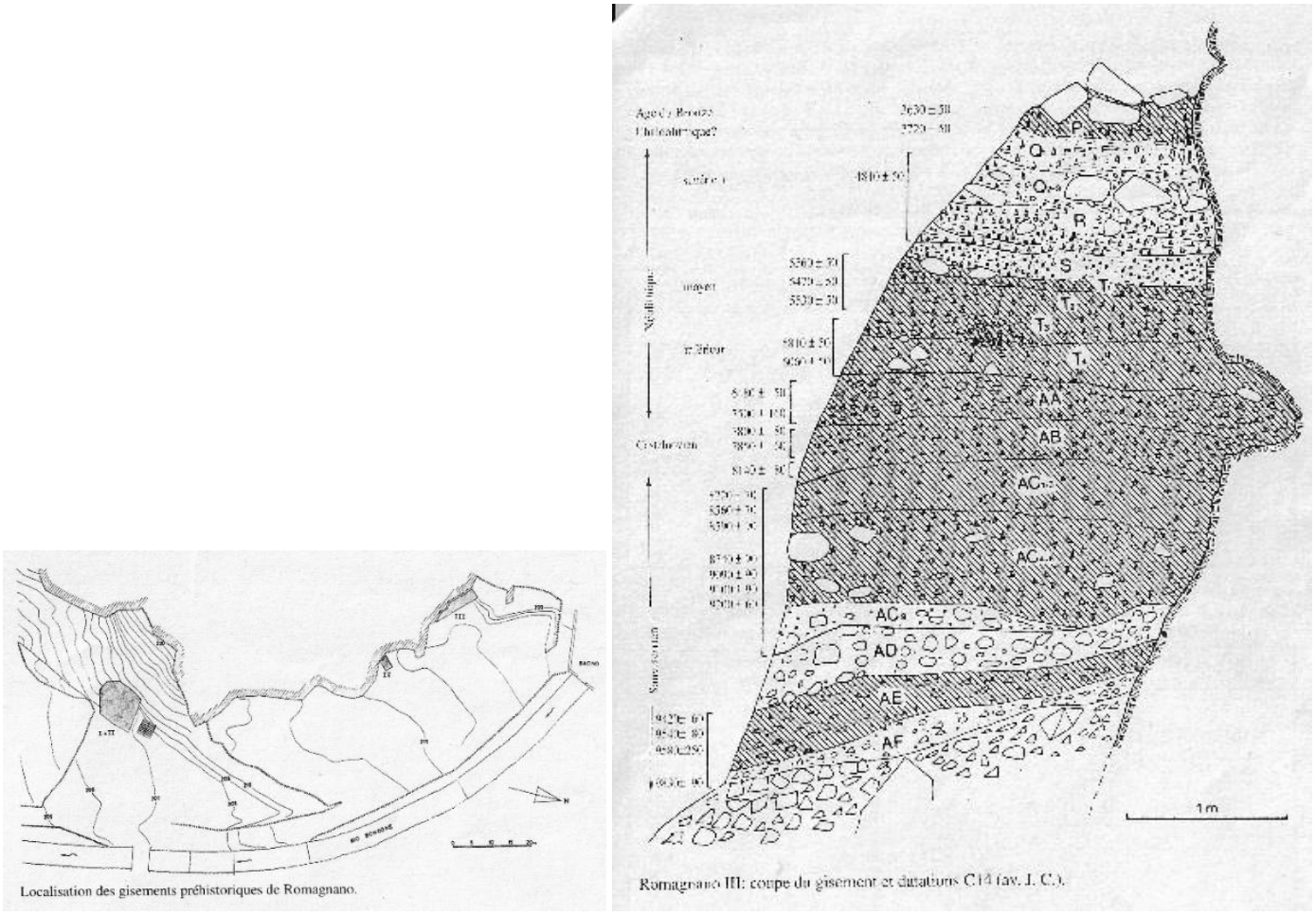
From: Tagliacozzo A. & Cassoli P., 1994

Fig. R24-11 Riparo Soman Gaban Culture Castelnovian lithics and sherd; evolution of large faunal assemblage.



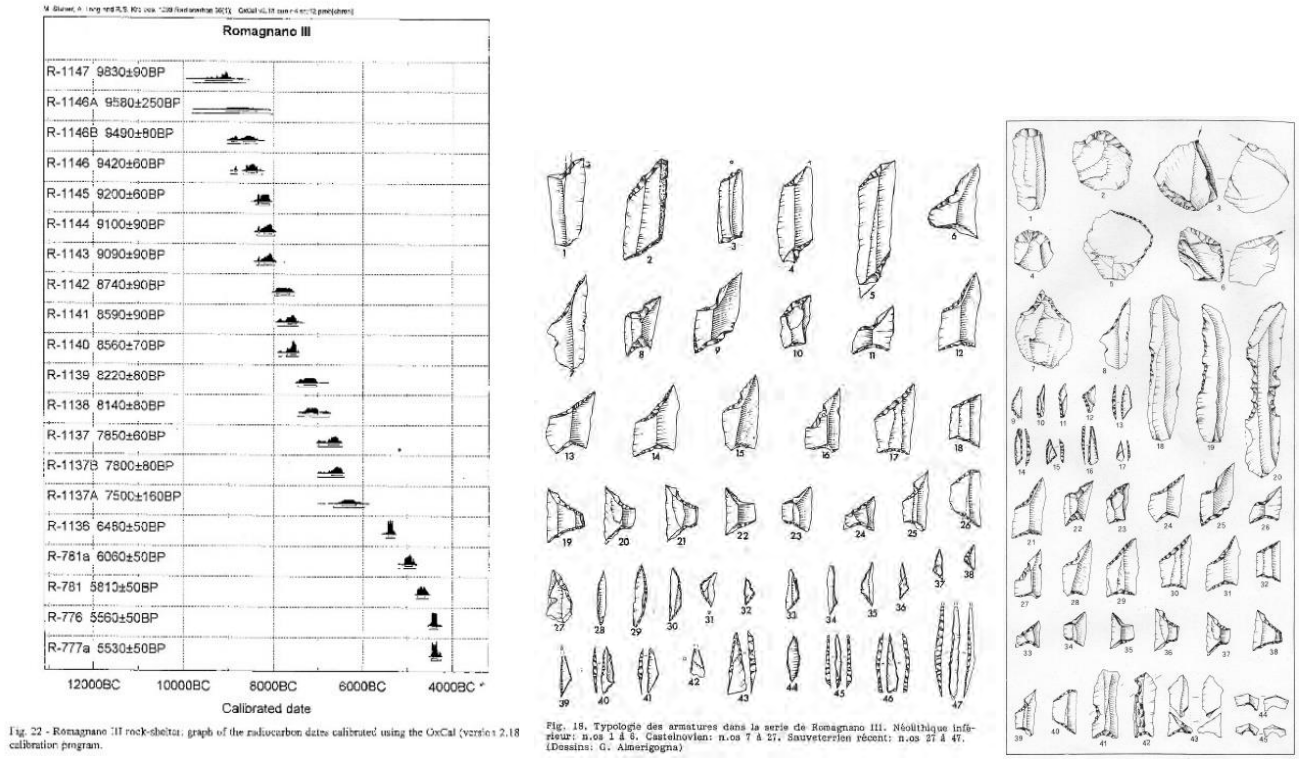
Photo M. Templer

Fig. R24-12 Romagnano III site in 2012.



From: Boscato P., et al., 1994

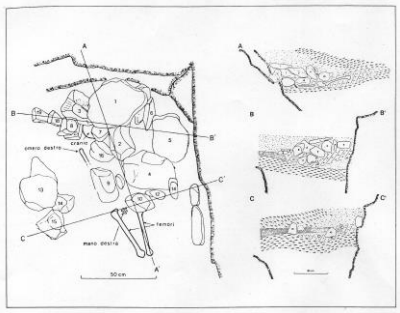
Fig. R24-12 Location of 3 Romagnano sites under rock-wall close to the River Bondone with north-east facing Romagnano III at top right; Romagnano III stratigraphy.



From: Biagi P. & Spataro M., 2001 From Bisi F., *et al*., 1987 From: Broglio A., 1984

Fig. R24-13 Romagnano III dates with a possible hiatus in occupation between *ca.* 6000-5500 BC prior to the Transition; Armatures from the Early Neolithic (1-6), the Gaban Transition and Castelnovian (7-27) and the Sauveterrian (28-47); Lithics from Levels AB2 and AB1.





From: Broglio A., 1984

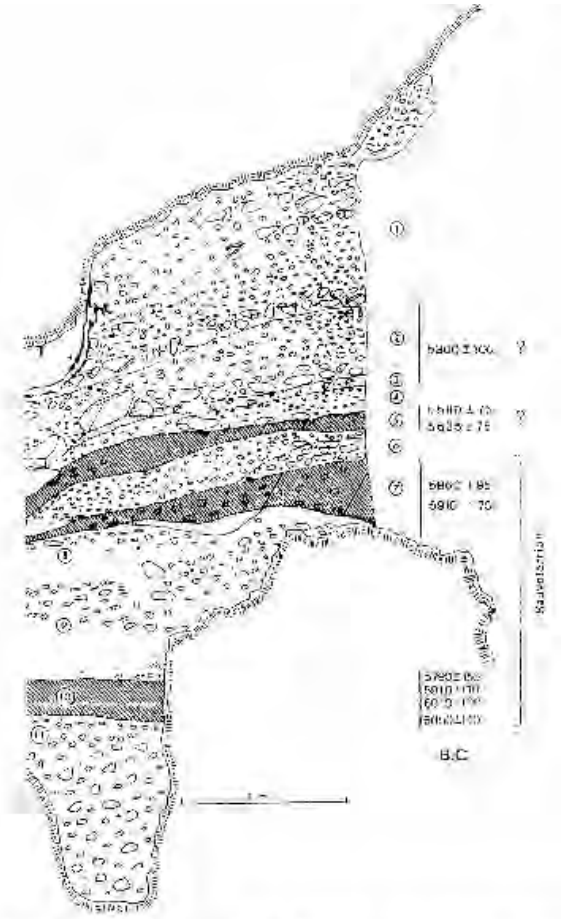
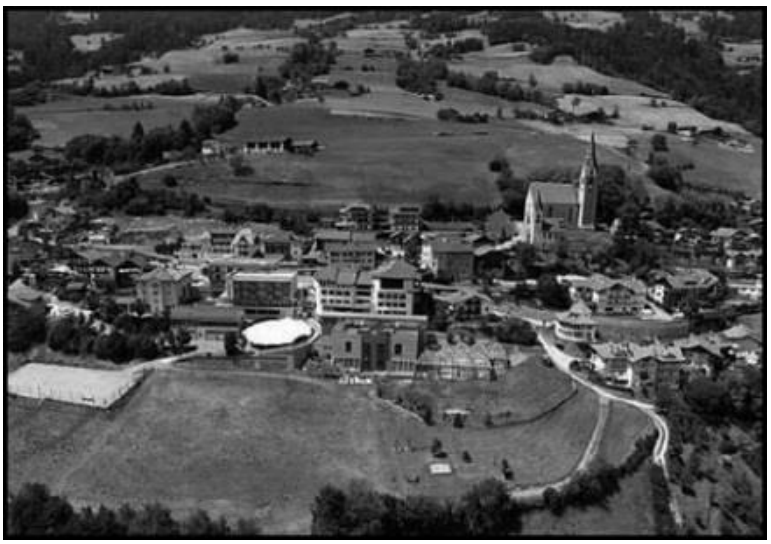


Fig. 1 - Schematic section of the Mesolithic deposits of Vatte di Zambana shelter in which radiometric datings are indicated. Dashed areas correspond to strongly anthropized deposits (G. Bartolomei's surveys).

From: Alessio M., *et al*., 1984

Fig. R24-14 Vatte di Zambana rock-shelter; Mesolithic inhumation in its stratigraphic context; Stratigraphy with dates.



From: Nisbet R., 2008

Fig. R24-15 The site of Villandro-Plunacker can be seen right of centre at the bottom of the photo.