Geomorphology 389 (2021) 107848

Contents lists available at ScienceDirect

Geomorphology

journal homepage: www.elsevier.com/locate/geomorph

Corrigendum

Corrigendum to "Statistical metrics for the characterization of karst network geometry and topology" [Geomorphology (2017) 283: 122–142]

Pauline Collon [a,*], David Bernasconi [b], Cécile Vuilleumier [a], Philippe Renard [b]

[a] Université de Lorraine, CNRS, GeoRessources Laboratory, F-54000 Nancy, France
[b] Centre for Hydrogeology and Geothermics, University of Neuchatel, Rue Emile Argand, 2000 Neuchatel, Switzerland

The authors regret that six of the statistical metrics published in Tables 2, 5, and 6 in Collon et al. (2017) are incorrect. The errors were discovered while coding and testing the open-source python package *Karstnet* freely available at https://github.com/karstnet/karstnet. The errors are smaller than 2%, except for the correlation of vertex degree, and they do not affect the general conclusions of the paper. The corrected tables are provided in this corrigendum, and we summarize below the changes.

Correlation of vertex degree r_k (Table 5)
The corrected values of the correlation of vertex degree r_k are all negative, indicating that the karstic networks in our data set are disassortative as it was reported for other natural networks by Newman (2002).

This correction implies the following changes in the text:

- In the abstract: "The correlation of vertex degree is rather simple to obtain. It is *systematically negative* on all studied data sets indicating a *predominance of disassortative networks* among karst systems."
- The last paragraph of the section "4.2.2. Correlation of vertex degrees: assortativity" must be updated as: "The values obtained on the 34 reduced networks *are all negative*, ranging from −0.56 to −0.15. The reduced representations of karstic system are thus *disassortative* (Table 5). Note that maximal node degrees rarely exceed 4, which limits the interpretation of this parameter, moreover as nodes of degree 2 are removed from the analysis (we work on reduced graphs)."
- The second paragraph of the discussion (Section 5.2) must be updated as: "The correlations of vertex degrees show that the reduced graphs of karstic systems were all slightly *disassortative* ($-0.56 \leq r_k \leq -0.15$). Previously, Newman (2002) has shown that many social networks were assortative while technological and biological networks seem to be disassortative. Note that high degree vertices are quite rare in karstic networks: we did not record k values >5."

Branch lengths entropy H_{len} (Table 2)
In the previous Matlab code, we computed the branch length entropy on 11 bins instead of the 10 bins described in the paper. Correcting this (computing on 10 bins) slightly decreases the values, ranging now from 0.07 to 0.67 instead of 0.18 to 0.74 (page 9).

Coefficient of variations of lengths CV_{len} (Table 2)
Contrary to what was written, the coefficient of variations of the lengths was not provided in percentages but in absolute value. A $CV_{len} = 1.09$, should thus be read $CV_{len} = 109\%$. The update of Table 2 below is also the occasion to put the values in accordance with their definition.

Mean length $\overline{len}$ (Table 5)
In the previous code, when computing the mean length of the branches, the looping branches (branches that close on the starting point) were ignored. If this is meaningful for tortuosity computation, these branches should not be ignored for the mean length computation. This has been corrected and explains the minor differences observable for the mean length values of Agen Allwed, Daren Cilau, Foussoubie Goule, Krubera, Lechuguilla, MammuthHöhle, Ratasse, SaintMarcel, Sakany, Shuanghe, SiebenHengsteFull and SiebenHengsteSP2.

Average shortest path length $\overline{SPL}$ (Table 5)
In addition, the previous code also ignored independent connected components of two nodes. This is not justified. This correction slightly impacts the values of the coefficient of Agen Allwed, Arphidia Robinet, Daren Cilau, Grotte du Roy, Krubera, Lechuguilla, Llangattwg, MammuthHöhle Ratasse, SaintMarcel, Sakany, SiebenHengsteUpPart.

Linear correlation coefficients r (Table 6)
The corrections described above impact slightly the Pearson correlation coefficient values (differences <0.01), but not the conclusions.

The authors would like to apologise for any inconvenience caused.

DOI of original article: https://doi.org/10.1016/j.geomorph.2017.01.034.
* Corresponding author.
E-mail address: pauline.collon@univ-lorraine.fr (P. Collon).

https://doi.org/10.1016/j.geomorph.2021.107848

Table 2
Geometry measures on the 31 three-dimensional karst networks (L is the total explored length (in kilometers); H_O is the entropy of orientations; n is the number of survey stations, i.e., the number of nodes of the complete graph; s is the number of line-of-sights, i.e., edges; $\overline{len}$ is the average length of karst branches (in meters); H_{len} is the entropy of karst branch lengths; CV_{len} is the coefficient of variation of the branch lengths, expressed in %; $\overline{t}$ is the average tortuosity of karst branches); for each parameter, minimal and maximal values are indicated in **bold**.

	L (km)	H_0	n	s	$\overline{len}$ (m)	H_{len}	CV_{len}	$\overline{t}$
AgenAllwedd	13.7	0.964	1874	1893	113.42	0.29	189%	**1.54**
ArphidiaRobinet	13.5	0.918	1461	1477	70.73	0.54	109%	1.42
Arrestelia	60.9	0.907	6257	6268	69.74	0.21	149%	1.35
Ceberi	7.2	0.972	881	886	55.61	0.39	135%	1.27
CharentaisHeche	13.5	0.986	1985	2013	50.84	0.10	**256%**	1.25
ClydachGorgeCaf1	2.3	**0.746**	230	229	**331.74**	0.50	157%	1.18
ClydachGorge OgofCapel	0.8	0.892	145	146	50.80	0.41	157%	1.35
DarenCilau	20.2	0.921	2665	2687	55.66	0.21	187%	1.21
EglwysFaen	1.4	0.947	307	308	15.81	0.57	129%	1.14
FoussoubieEvent	2.6	0.928	333	339	33.20	0.35	161%	1.27
FoussoubieGoule	20.2	0.987	2326	2354	62.29	0.54	141%	1.21
GenieBraque	2.7	0.884	164	163	194.03	**0.67**	97%	1.20
GrottesDuRoy	3.8	0.981	724	733	29.76	0.61	110%	1.24
HanSurLesse	9.8	0.976	1668	1705	62.06	0.53	126%	**1.12**
Krubera	13.2	0.996	2150	2157	55.84	0.32	185%	1.30
Lechuguilla	**329**	0.996	12725	13503	69.28	0.41	92%	1.26
Llangattwg	0.9	0.954	232	228	15.32	0.58	114%	1.15
Mammuthöhle	63.9	0.996	9348	9712	30.60	0.12	127%	1.42
Monachou	0.7	0.984	251	258	**8.46**	0.55	**90%**	1.24
OjoDelAgua	12.3	0.964	1292	1326	43.81	0.40	143%	1.21
OxBelHa	143	**0.997**	10098	10098	170.79	0.57	94%	1.37
PicDuJer	**0.6**	0.933	292	309	25.51	0.60	114%	1.21
Ratasse	3.6	0.986	692	693	64.27	0.33	160%	1.41
SaintMarcel	56.5	0.992	5506	5556	76.10	0.29	177%	1.23
Sakany	7.5	0.992	1716	1784	20.71	0.38	91%	1.40
Shuanghe	130	0.988	7581	7634	118.70	0.31	128%	1.22
SiebenHengsteLargePart	82.2	0.988	15340	15570	36.83	**0.07**	173%	1.36
SiebenHengsteUpPart	3.3	0.978	753	753	52.46	0.65	104%	1.36
SiebenHengsteSP1	7.5	0.991	1881	1915	26.97	0.45	132%	1.40
SiebenHengsteSP2	6.8	0.991	1396	1418	39.52	0.53	121%	1.43
Wakulla	17.8	0.982	474	477	330.51	0.46	154%	1.28

Table 5
Topology measures on the 34 reduced graphs of the karst networks: other parameters ($\overline{k}$ is the average vertex degree; CV_k is the coefficient of variation of degrees; r_k is the correlation of vertex degrees; $\overline{SPL}$ is the average shortest path length; CPD is the central point dominance); maximal and minimal values are enhanced in **bold**.

	$\overline{k}$	CV_k	r_k	$\overline{SPL}$	CPD
AgenAllwedd	2.29	50%	−0.32	11.17	0.54
ArphidiaRobinet	2.18	49%	−0.26	13.14	0.45
Arrestelia	2.03	57%	−0.23	29.16	0.50
BlueSpring (2D)	2.11	47%	−0.27	26.90	0.46
Ceberi	2.08	51%	−0.37	7.20	0.30
CharentaisHeche	2.22	46%	−0.31	25.40	0.43
ClydachGorge Caf1	**1.75**	59%	**−0.56**	**2.32**	0.56
ClydachGorge OgofCapel	2.11	52%	−0.51	3.95	0.47
Crevice (2D)	2.07	48%	−0.30	19.66	0.55
Crossroads (2D)	2.32	42%	−0.17	17.33	0.34
DarenCilau	2.13	55%	−0.26	18.40	0.51
EglwysFaen	2.02	59%	−0.41	8.69	**0.57**
FoussoubieEvent	2.16	48%	−0.28	7.87	0.47
FoussoubieGoule	2.19	46%	−0.24	25.07	0.44
GenieBraque	1.87	**60%**	−0.45	3.37	0.51
GrottesDuRoy	2.15	49%	−0.25	11.19	0.31
HanSurLesse	**2.57**	**35%**	**−0.15**	7.14	0.20
Krubera	2.06	59%	−0.40	21.41	0.45
Lechuguilla	2.37	52%	−0.16	**55.72**	0.49
Llangattwg	1.88	60%	−0.48	3.96	0.16
Mammuthöhle	2.34	54%	−0.30	14.42	**0.02**
Monachou	2.18	50%	−0.25	7.58	0.40
OjoDelAgua	2.26	47%	−0.22	19.57	0.38
OxBelHa	2.00	52%	−0.35	49.42	0.54
PicDuJer	2.00	49%	−0.41	5.80	0.37
Ratasse	2.03	56%	−0.40	8.27	0.44
SaintMarcel	2.14	52%	−0.28	21.67	0.23
Sakany	2.40	47%	−0.17	12.62	0.27
Shuanghe	2.10	51%	−0.27	25.97	0.27
SiebenHengsteLargePart	2.22	48%	−0.23	47.36	0.46
SiebenHengsteUpPart	2.00	53%	−0.34	4.18	0.14
SiebenHengsteSP1	2.27	46%	−0.29	15.50	0.49
SiebenHengsteSP2	2.28	47%	−0.21	14.04	0.39
Wakulla	2.11	47%	−0.36	8.11	0.43

Table 6
Linear (Pearson) correlation coefficients r between all studied metrics; light blue values correspond to $0.7 \le |r| < 0.85$; dark blue values correspond to $|r| \ge 0.85$, which expresses a strong linear correlation between both variables.

	n	s	H_O	$\overline{len}$	H_{len}	CV_{len}	$\bar{t}$	N	S	p	N_{cycl}	α	β	γ	D_C	Θ	$\bar{k}$	CV_k	r_k	$\overline{SPL}$	CPD
n		1.00	0.32	-0.03	-0.50	-0.02	0.20	0.87	0.85	0.27	0.69	0.13	0.26	0.01	0.15	0.08	0.26	-0.03	0.39	0.87	-0.04
s	1.00		0.32	-0.04	-0.50	-0.03	0.20	0.88	0.86	0.27	0.71	0.14	0.27	0.02	0.16	0.09	0.27	-0.03	0.40	0.87	-0.04
H_O	0.32	0.32		-0.48	-0.18	-0.07	0.24	0.28	0.27	0.15	0.25	0.38	0.57	-0.04	0.34	0.36	0.57	-0.42	0.57	0.38	-0.39
$\overline{len}$	-0.03	-0.04	-0.48		0.14	0.07	-0.09	-0.09	-0.09	-0.15	-0.11	-0.33	-0.42	0.00	-0.27	-0.30	-0.41	0.18	-0.40	-0.05	0.32
H_{len}	-0.50	-0.50	-0.18	0.14		-0.69	-0.28	-0.39	-0.38	-0.28	-0.28	-0.18	-0.31	-0.11	-0.22	-0.16	-0.31	0.04	-0.25	-0.40	0.02
CV_{len}	-0.02	-0.03	-0.07	0.07	-0.69		0.04	-0.14	-0.15	-0.11	-0.18	-0.05	0.01	0.00	-0.01	0.00	0.01	-0.02	-0.13	0.06	0.24
$\bar{t}$	0.20	0.20	0.24	-0.09	-0.28	0.04		0.10	0.10	0.17	0.08	0.19	0.26	0.10	0.20	0.16	0.25	-0.07	0.13	0.13	0.07
N	0.87	0.88	0.28	-0.09	-0.39	-0.14	0.10		1.00	0.32	0.95	0.27	0.35	0.17	0.28	0.20	0.34	0.02	0.40	0.76	-0.07
S	0.85	0.86	0.27	-0.09	-0.38	-0.15	0.10	1.00		0.32	0.96	0.29	0.36	0.20	0.30	0.22	0.35	0.01	0.40	0.74	-0.08
p	0.27	0.27	0.15	-0.15	-0.28	-0.11	0.17	0.32	0.32		0.35	0.20	0.16	0.07	0.15	0.18	0.16	0.11	0.01	-0.08	-0.67
N_{cycl}	0.69	0.71	0.25	-0.11	-0.28	-0.18	0.08	0.95	0.96	0.35		0.39	0.42	0.33	0.40	0.33	0.41	-0.03	0.37	0.59	-0.11
α	0.13	0.14	0.38	-0.33	-0.18	-0.05	0.19	0.27	0.29	0.20	0.39		0.94	0.86	0.99	0.98	0.94	-0.76	0.66	0.06	-0.34
β	0.26	0.27	0.57	-0.42	-0.31	0.01	0.26	0.35	0.36	0.16	0.42	0.94		0.72	0.95	0.91	1.00	-0.76	0.80	0.26	-0.25
γ	0.01	0.02	-0.04	0.00	-0.11	0.00	0.10	0.17	0.20	0.07	0.33	0.86	0.72		0.90	0.85	0.72	-0.63	0.39	-0.07	-0.07
D_C	0.15	0.16	0.34	-0.27	-0.22	-0.01	0.20	0.28	0.30	0.15	0.40	0.99	0.95	0.90		0.97	0.95	-0.76	0.67	0.10	-0.24
Θ	0.08	0.09	0.36	-0.30	-0.16	0.00	0.16	0.20	0.22	0.18	0.33	0.98	0.91	0.85	0.97		0.91	-0.82	0.61	0.02	-0.35
$\bar{k}$	0.26	0.27	0.57	-0.41	-0.31	0.01	0.25	0.34	0.35	0.16	0.41	0.94	1.00	0.72	0.95	0.91		-0.77	0.81	0.26	-0.25
CV_k	-0.03	-0.03	-0.42	0.18	0.04	-0.02	-0.07	0.02	0.01	0.11	-0.03	-0.76	-0.76	-0.63	-0.76	-0.82	-0.77		-0.65	-0.09	0.21
r_k	0.39	0.40	0.57	-0.40	-0.25	-0.13	0.13	0.40	0.40	0.01	0.37	0.66	0.80	0.39	0.67	0.61	0.81	-0.65		0.47	-0.19
$\overline{SPL}$	0.87	0.87	0.38	-0.05	-0.40	0.06	0.13	0.76	0.74	-0.08	0.59	0.06	0.26	-0.07	0.10	0.02	0.26	-0.09	0.47		0.23
CPD	-0.04	-0.04	-0.39	0.32	0.02	0.24	0.07	-0.07	-0.08	-0.67	-0.11	-0.34	-0.25	-0.07	-0.24	-0.35	-0.25	0.21	-0.19	0.23	

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