Supplemental information
Characteristics of channel networks in carbonate aquifers
Stephen R.H. Worthington

Table DR1 Length of mapped cave passage in caves from 1900 to 2001

Year	Number of caves >3 km long	Total length of passages in caves >3 km long (km)
1900	8	83
1910	16	124
1920	18	135
1930	23	166
1940	31	233
1950	46	327
1960	107	742
1970	278	2310
1977	603	5281
1988	1199	10824
2001	1488	15729

Note:
1) Data are compiled from Courbon and Chabert, 1986, Courbon et al., 1989; Madelaine, 2001

2) It is no longer feasible to compile accurate statistics on all mapped caves > 3 km long because so many are being explored that many are no longer reported in the major caving journals. However, Bob Gulden maintains lists of long and deep caves, including a global list of caves >15 km long (http://www.caverbob.com). The number of 15 km long caves has increased from 224 in 2000 to 321 in January 2014, and the cumulative length of these caves has increased from 8399 km to 13390 km. It is likely that similar increases of about 50% have occurred in the number and total length of caves >3 km long in the period 2000-2014.

Table DR2 Length of passages below the water table in caves >3 km long from 1950 to 2003

Year	Length of passages below the water table (km)
1950	0.5
1966	3
1977	15
1991	110
1997	340
2003	663
2013	1389

Note:
The earlier data were compiled from Farr (2000), and include estimates of the length of all mapped water-filled passages in caves >3 km long.

The 2003 figure includes 569 km from the 48 caves > 3 km in Bob Gulden's list of underwater caves (http://www.caverbob.com/uwcaves.htm), plus an estimated 94 km of water-filled passages in other caves > 3km which predominantly have passages above the water table.

The 2013 figures include 1239 km from the 77 underwater caves > 3 km long (http://www.caverbob.com/uwcaves.htm) and an estimated 150 km in other caves >3 km long. Examples in the latter category include Three Counties System (UK), Kingsdale (Keld Head) System (UK), and Gouffre de Padirac (France), each of which has several kilometers of cave passages below the water table (Chabert, 1981; Waltham et al., 1997; Farr, 2000; Magdelaine, 2006).

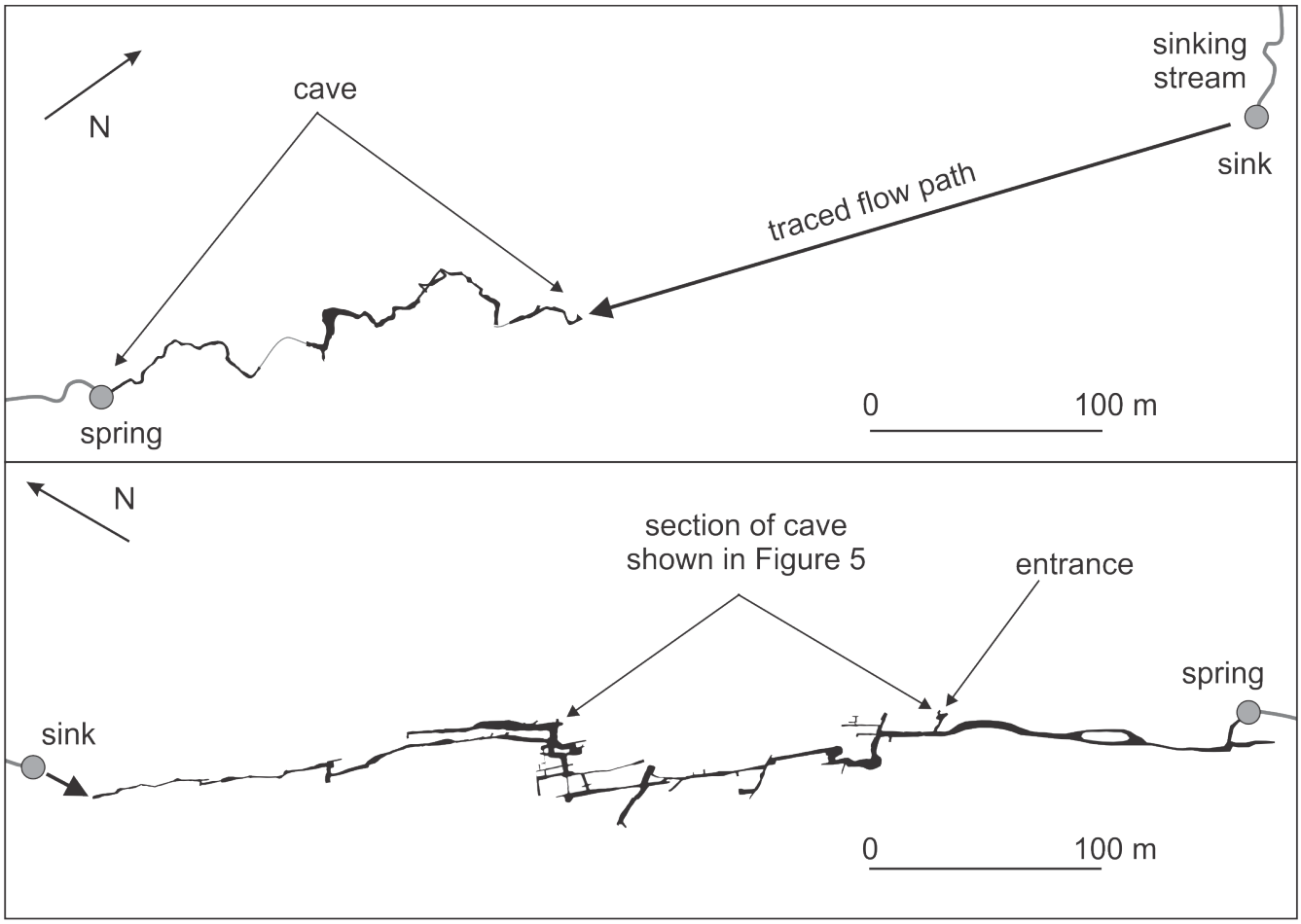

Figure DR1. Sink to spring flow paths for Runscar Cave (top) and Ogof y Ci (bottom) (after Brook et al, 1991, and Hereford Caving Club, 1966).

Note:
The overall flow direction of the 208 m in Runscar Cave where segment analysis took place is of 206º.
The overall flow direction of the 510 m sink to spring flow path is 202º.

The overall flow direction of the 165 m in Ogof y Ci where segment analysis took place is 149º.
The overall flow direction of the 525 m sink to spring flow path is 147º .

Table DR3. Tortuosity of the flow paths in 30 caves where the straight-line lengths exceeds 5 km

Cave name	Straight-line length	Conduit length m	Tortu-osity	Wx/Lx	Reference
Sistema de Purificación, Mexico	5410	6100	1.128	0.043	Sprouse, 1987; Buck, 1990
Rivière du Neuvon, France	7500	8700	1.160	0.052	Delance, 1988
Grotte de Chauveroche, France	5000	6224	1.245	0.18	Minvielle, 1977
Réseau d'Anialarra, France and Spain	5220	6540	1.253	0.119	ARSIP, 2014
Gruto do Padre, Brazil	5000	6300	1.260	0.076	Auler, 1988
Grotte de Gournier, France	6400	8325	1.301	0.14	Courbon & Chabert, 1986
Great Expectations Cave, WY, USA	5600	7300	1.303	0.17	Miller, 1980; Shifflett, 1987
Rio Encantado, Puerto Rico	10850	14500	1.337	0.15	Courbon et al., 1989
Bransford Ave.-Echo Spring, Mammoth Cave, KY, USA	5360	7200	1.343	0.14	Palmer, 1981, 2004
Gouffres des Partages, France and Spain	6730	9200	1.367	0.076	ARSIP, 2001, 2014
Teng Long Dong, China	5700	7800	1.368	0.165	Campion, 2011
Castleguard Cave, Alberta, Canada	6510	8921	1.370	0.11	Worthington, 1991
Gouffre Lonné Peyret, France	5300	7500	1.415	0.081	Courbon & Chabert, 1986
Puerto Princesa Subterranean River, Philippines	5700	8200	1.439	0.102	Devivo et al., 2009
Réseau de la Combe aux Prêtres, France	7250	10500	1.448	0.20	Delance, 1988
Rhar Bou'Maza, Algeria	6100	9000	1.475	0.097	Benoit & Collignon, 1988
Logsdon River, Mammoth Cave, KY, USA	6480	9750	1.505	0.15	Coons and Engler, 1981
Hang Khe Ry, Vietnam	7760	11752	1.514	0.161	Limbert and Limbert, 1999
Réseau du Verneau, France	6950	10800	1.554	0.040	Couturaud and Aucant, 1990
Crevice Cave, MO, USA	5050	8000	1.584	0.13	Courbon & Chabert, 1986
Red del Silencio, Spain	7540	12000	1.591	0.11	Rigal & Boyer, 1989
Gouffre de Padirac, France	11550	19000	1.645	0.13	Chabert, 1981; Magdelaine, 2006
Gouffre de la Pierre St Martin, France and Spain	5530	9100	1.646	0.17	Courbon & Chabert, 1986
Hang Vom, Vietnam	5950	9800	1.647	0.20	Limbert, 1992
Cathedral-Falmouth Cave System, FL, USA	5500	9250	1.682	0.12	Courbon & Chabert, 1986
Jaskiňa Domica - Baradla Barlang, Czechoslovakia - Hungary	5770	10500	1.812	0.25	MKBT, 1989
Siebenhengstehöhlensystem, Switzerland	5950	11000	1.849	0.14	Jeannin, 1990
Reinacherstollen - entrance, Hölloch, Switz.	5030	9350	1.859	0.13	Bögli, 1980
Big Dismal Sink - Wakulla Spring, FL, USA	10100	19783	1.959	0.24	Wisenbaker, 2007; Meyer and Davies, 2012; Worthington, 2013
Sima de las Puertas de Illamina, Spain	5550	10900	1.964	0.11	Pernette & Maire, 1983
Median for 30 flow paths			**1.462**		

Table DR4 Segment measurements from Runscar Cave and Ogof y Ci

Runscar Cave						**Ogof y Ci**			
n	bed	joint	bed-joint	total	n	bed	joint	total
	segment	segment	segment			segment	segment	
	length (m)	length (m)	length (m)			length (m)	length (m)	
Upper section of cave								
1	5.7				1	4.3		
2		5.2			2		5	
3	8.5				3		23.5	
4		5.9			4		12.4	
5	5				5		7.2	
6			5.3		6		0.8	
Middle section					7		2	
7			5.8		8		0.5	
8	53				9		2.5	
9		7.5			10		0.8	
10		3.1			11		6.2	
11		8.1			12	6.3		
12		1.3			13		13	
13		0.6			14		13.8	
14		4.6			15		3.4	
15		7.2			16		12.4	
16		1.6			17		14	
17		1.4			18		16.3	
18		2.2			19		3.1	
19		1.3			20		32	
20	8.1				21		8.3	
21		5.5			22		16.9	
22	12.9				23		5.2	
23		2			24	4.2		
24		1.2			25		4.8	
25		1.9			26		4.7	
26		0.6						
Lower section								
27	60.7							
28		0.8						
29	32							
sum	185.9	62	11.1		sum	14.8	208.8	
total				259	total			223.6
%	71.78	23.94	4.29		%	6.62	93.38	
n	8	19	2		n	3	23	
mean	23.24	3.26	5.55		mean	4.93	9.08	8.60
median	10.7	2	5.55			4.3	6.2	

Table DR5. Tortuosity of 55 flow paths between sinking streams and springs

Cave name	Straight - line length	Conduit length m	Tortu- osity	Wx/Lx	Reference
Sinks of Gandy, WV, USA	780	860	1.103	0.06	Medville et al., 1983
Gua Payau, Malaysia	1200	1400	1.167	0.206	Brook and Waltham, 1978a,b
Jordtulla, Norway	495	580	1.171	0.1	Lauritzen et al., 1985
Ogof y Ci, Wales	545	640	1.174	0.05	Ford, 1989
Devils Kitchen, WV,USA	820	970	1.183	0.119	Medville et al., 1983
Gua Tempurong, Mayaysia	970	1150	1.186	0.154	Crowther, 1978
Simmons-Mingo-My Cave, WV, USA	4450	5300	1.191	0.103	Medville and Storage, 1986
Moira Cave, Ontario, Canada	340	405	1.191	0.09	MacGregor, 1976
Sumidero de Agueyaco, Mexico	340	410	1.206	0.133	Spahl, 1983
Sof Omar, Ethiopia	970	1180	1.216	0.119	BSEE, 1973
Qiao Ban Dong, China	1800	2200	1.222	0.147	Gill et al., 1990
Sumidero Chicja, Mexico	650	795	1.223	0.137	Boon, 1977
Lubang Hijau, Malaysia	1350	1660	1.23	0.138	Brook and Waltham, 1978a,b
Ogof Rhyd Sych, Wales	590	730	1.237	0.141	Ford, 1989
San Che He Dong, China	890	1120	1.258	0.209	Waltham, 1986
Cueva de Agua Escondida, Guatemala	3370	4250	1.261	0.311	Boon, 1974
Lubang Angin, Malaysia	710	910	1.282	0.185	Brook and Waltham, 1978a,b
Gaolushuiluodong, China	3800	4900	1.259	0.157	Maire et al., 2004
Körükini Cave, Turkey	1030	1330	1.291	0.218	Doğan and Nazik, 2003
Cochol, Mexico	860	1120	1.302	0.217	Tracey, 1975
Grotte de la Roche, France	1210	1577	1.303	0.199	Minvielle, 1977
Nelson Cave, WV, USA	365	480	1.315	0.15	Medville et al., 1983
Sumidero de Río Atima, Honduras	1850	2450	1.324	0.11	Knutson, 1988
Cueva de Cunday, Columbia	450	600	1.333	0.229	Miller, 1979a
Rivière souterraine de Bramabiau, France	780	1050	1.346	0.283	Martel, 1894; Worthington, 2013
Ren Xiao Dong, China	1500	2050	1.367	0.182	Gill et al., 1990
The Tunnel, WA, Australia	430	590	1.372	0.35	Sweeting, 1973
Tigris Tunnel, Turkey	610	865	1.418	0.42	Waltham, 1976
Guan Yan, China	1010	1440	1.426	0.214	Waltham, 1986
Cueva Veronica del Río Candelaria, Guatemala	2810	4060	1.445	0.122	Courbon and Dreux, 1976
Gruta del Río San Jeronimo, Mexico	3830	5560	1.452	0.304	Coons, 1976
Grotte de Saint Casimir, QC, Canada	310	460	1.484	0.242	Beaupré et al., 1976
Tham Khoun Xe (Tham Xe Bang Fai), Laos	4700	7000	1.489	0.152	Mouret et al., 1997, 2010.

Cave name	Straight - line length	Conduit length m	Tortu- osity	Wx/Lx	Reference
Haphazard Cave - Pitchford's Cave, BC, Canada	470	700	1.489	0.21	Sawatzky, 1988
Actun Box Chi'ich, Belize	1260	1900	1.508	0.109	Blak, 1990
Sunken Forest Cave, Belize	580	880	1.517	0.114	Blak, 1990
White Scar Cave, England	1550	2360	1.523	0.228	Waltham, 1977
Cueva del Agua - la Cuevona, Spain	855	1320	1.544	0.203	Mills and Waltham, 1981
Bowden Cave, WV, USA	1010	1570	1.554	0.09	Medville et al., 1983
Tham Nam Hin Boun, Laos	4150	6500	1.566	0.139	Mouret et al., 1997
Tham Nam Mae Lana, Thailand	4770	7600	1.593	0.46	Boland, 1992
Darknight Cave, Belize	320	510	1.594	0.284	Miller, 1979b
Kahf Hoti, Oman	2630	4300	1.635	0.321	Waltham et al., 1985
Gruta del Rio Chontalcoatlan, Mexico	3320	5610	1.69	0.435	Coons, 1976
Cueva del Rio San Ramón, Guatemala	655	1110	1.695	0.24	Knutson, 1993
Raggejavrerage, Norway	885	1550	1.751	0.09	Courbon and Chabert, 1986
Cueva de Tecolo, Mexico	755	1370	1.815	0.431	Knutson, 1979
Réseau de Foussoubie, France	3400	6200	1.824	0.212	Le Roux, 1989
Solution Rift, TN, USA	670	1220	1.821	0.279	Brown and Smith, 2011
Cueva de el Chorreodero, Mexico	1470	2695	1.833	0.41	Thompson, 1972
Broken River Cave, New Zealand	340	650	1.912	0.264	Anon., 1986
Apetlanca, Mexico	1370	2740	2	0.289	Engler, 1982
Sumidero San Bernardo, Mexico	890	1910	2.146	0.432	Knutson 1984
Cueva de el Mano, Mexico	670	1520	2.27	0.43	Espinasa-Pereña, 2002
Sumidero Santa Elena, Mexico	2195	5200	2.369	0.32	Knutson 1982
Median for 55 caves			**1.418**		

Note: In most cases, the data are taken from flow paths that have been completely mapped. In some cases, a very small fraction of the flow path has not been mapped. An example is White Scar Cave, where there is a short distance between the stream sink on the surface and the underlying mapped cave stream (Figure 7).

Table DR6. Tracer tests >25 km in carbonate aquifers

Distance traced (m)	Elapsed time (days)	Ground-water velocity (m/day)	Tracer	Location	Reference
75000	226	330	Na fluorescein	Lake Beyşehir - Yedi Miyarlar Spring, Turkey	Bakalowicz, 1973; Chabert, 1977
66720	84.6	789	iodide	Saint-Donat - Fontaine de Vaucluse, France	Ducluzaux, 2006
63600	13	4900	Lycopodium spores	Sink in Middle Fork of Eleven Point River - Big Spring, Missouri, USA	Aley, 1978; Dreiss, 1983
63600	16	3970	Na fluorescein	Sink in Middle Fork of Eleven Point River - Big Spring, Missouri, USA	Aley, 1978; Dreiss, 1983
61300	12	5100	Na fluorescein	Jam Up Creek (losing stream) - Big Spring, Missouri, USA	Aley, 1978; Dreiss, 1983
53900	67	800	Na fluorescein	Sink below Stillhouse Spring - Big Spring, Missouri, USA	Aley, 1978; Dreiss, 1983
52800	19	2800	Na fluorescein	Dry Creek (losing spring-fed stream), Missouri - Mammoth Spring, Arkansas, USA	Aley 1978; Dreiss, 1983
46000	25	1840	Na fluorescein	Aven de la Belette - Fontaine de Vaucluse, France	Couturaud and Puig, 1992
44300	12	3700	Na fluorescein	Losing stream downstream of Nuttle Spring - Greer Springs, Missouri, USA	Aley, 1978; Dreiss, 1983
42000	12.4	3380	iodide	Perte du Cavalon - Fontaine de Vaucluse, France	Ducluzaux, 2009
41500	72	580	Na fluorescein	Sajevče stream, Slovenia - Timavo, Italy	Kogovšek and Petrič, 2007
40700	8.5	4800	Na fluorescein	Dowler Sinkhole - Big Spring, Missouri, USA	Aley, 1978; Dreiss, 1983
40200	15	2700	Na fluorescein	Renfrew Spring Sink, Missouri - Mammoth Spring, Arkansas	Aley, 1978; Dreiss, 1983
40000	92	430	Na fluorescein	Aven du Caladaïre - Vaucluse, France	Couturaud and Puig, 1992
39000	9.0	4300	H5 phage	Kapsia Sink - Kiveri Spring, Greece	Morfis and Zojer, 1986
38000	31.7	1200	^{51}Cr	Scotini Sink - Kroe Spring, Greece	Morfis and Zojer, 1986
36800	23.6	1560	Phages	Senožeče stream, Slovenia - Moščenice Spring, Italy	Kogovšek and Petrič, 2007
36000	25.5	1410	^{51}Cr	Scotini Sink - Kroe Spring, Greece	Morfis and Zojer, 1986
35700	17.3	2060	Phages	Senožeče stream, Slovenia - Timavo Spring, Italy	Kogovšek, 2007
35000	34	1030	Na fluorescein	Eynifovasi - Homa, Turkey	Bakalowicz, 1973; Chabert, 1977

Distance traced (m)	Elapsed time (days)	Ground-water velocity (m/day)	Tracer	Location	Reference
34300	8.8	3890	LiCl	Škocjanske Jama, Italy - Timavo Spring, Italy	Kogovšek and Petrič, 2007
34300	16.6	2060	^{3}H , Na fluorescein	Škocjanske Jama, Italy - Timavo Spring, Italy	Kogovšek and Petrič, 2007
32000	8.88	3600	^{51}Cr	Milea sink - Kiveri Spring, Greece	Morfis and Zojer, 1986
31000	6.04	5130	^{51}Cr	Kanatas Sink - Kiveri Spring, Greece	Morfis and Zojer, 1986
31000	13	2400	Coliphage	Kanatas Sink - Kiveri Spring, Greece	Morfis and Zojer, 1986
30900	9	3400	Na fluorescein	S. Branch Pike Creek (losing stream) - Big Spring, Missouri, USA	Aley, 1978; Dreiss, 1983
30800	79	390	Na fluorescein	Trou du Vent - Fontaine de Vaucluse, France	Couturaud and Puig, 1992
30000	13	2300	Na fluorescein	Aven du Château - Fontaine de Vaucluse, France	Couturaud and Puig, 1992
29900	32	930	Eosine	Crooked Oak Cave - Barton Springs, Texas, USA	Smith et al., 2005
29500	26	1130	Na fluorescein	Gouffre de la Tanne à la Chaumusse - Enragé Spring, France	Le Pennec, 1997
29000	47.5	610	Rhodamine WT	Dry Auglaize Creek (losing stream) - Hahatonka Soring, Missouri, USA	Skelton and Miller, 1979
29000	13	2200	Coliphage	Kanatas Sink - Kroe Spring, Greece	Morfis and Zojer, 1986
29000	14	2100	Coliphage	Kanatas Sink - Lerni Spring, Greece	Morfis and Zojer, 1986
29000	14	2100	Na fluorescein	Johnson Spring Branch (losing stream) of Hurricane Creek - Big Spring, Missouri, USA	Aley, 1978; Dreiss, 1983
28500	63	450	Na fluorescein	Perte du ravin de la Frache - Fontaine de Vaucluse, France	Couturaud and Puig, 1992
28200	8	3500	Na fluorescein	Antioch Cave - Barton Springs, Texas, USA	Smith et al., 2005
28100	10	2800	Na fluorescein	Leslie Spring Swallow - Big Spring, Missouri, USA	Aley, 1978; Dreiss, 1983
28000	2.8	10000	Na fluorescein	Perte du Chamois - Moulin Ecoutôts, France	Chauve et al., 1987
27800	13	2100	Na fluorescein	Wildcat Spring (losing stream) - Big Spring, Missouri, USA	Aley, 1978; Dreiss, 1983
27400	10	2740	Na fluorescein	Blowing Spring Estavelle - Big Spring, Missouri, USA	Aley, 1978; Dreiss, 1983
27400	12	2280	Lycopodium spores	Blowing Spring Estavelle - Big Spring, Missouri, USA	Aley, 1978; Dreiss, 1983

Distance traced (m)	Elapsed time (days)	Ground-water velocity (m/day)	Tracer	Location	Reference
27000	84.5	320	^{3}H	Pazinska Jama - Blaž Spring, Croatia	Uramović et al., 1997
27000	25	1100	Na fluorescein	Gouffre de la Tanne à la Chaumusse - Brive Spring, France	Le Pennec, 1997
27000	5.46	4940	Na fluorescein	Pertes du Val Launay - Fontaine Roger, France	Rodet, 1992
26600	8.66	3070	LiCl	Škocjanske Jama, Italy - Brojnica Spring, Italy	Kogovšek and Petrič, 2007
26600	22.2	1200	^{3}H, Na fluorescein	Škocjanske Jama, Italy - Brojnica Spring, Italy	Kogovšek and Petrič, 2007
26500	2.8	9500	Na fluorescein	Perte du Chamois - Source du Maine, France	Chauve et al., 1987
26000	8.0	3250	^{3}H	Nestani Sink - Kiveri Spring, Greece	Morfis and Zojer, 1986
26000	6.3	4100	^{51}Cr	Nestani Sink - Kiveri Spring, Greece	Morfis and Zojer, 1986
26000	11.1	2330	^{3}H	Sinkhole near Dane - Opatija Spring, Croatia	Uramović et al., 1997
26000	17.7	1470	rhodamine	Sinkhole near Dane - Opatija Spring, Croatia	Uramović et al., 1997
26000	72	360	Na fluorescein	Perte de la Blaise - Source de Trannes, France	Treffot, 1992
25500	16.3	1570	naphthionate	Alea Sink - Kefalari Spring, Greece	Morfis and Zojer, 1986

Table DR7. Measurements of basin length and area

Groundwater basin	Area (km^2)	Length (km)	Reference
Silver Springs north, Florida	1150	66	Figure 12B
Rainbow Springs west, Florida	990	49	Figure 12B
Rainbow Springs east, Florida	895	57	Figure 12B
Silver Springs south, Florida	485	38	Figure 12B
Gorin Mill Spring, Kentucky	281	26.6	Figure 11
Graham Springs, Kentucky	232	25.0	Figure 11
Turnhole Spring, Kentucky	168	24.7	Figure 11
Havant and Bedhampton Springs east, England	51.8	12.3	Figure 12A
Pike Spring, Kentucky	39.6	9.1	Figure 11
Havant and Bedhampton Springs central, England	31.5	12.1	Figure 12A
Havant and Bedhampton Springs west, England	27.8	13.3	Figure 12A
Lawler Blue Hole, Kentucky	25.2	9.8	Figure 11
Echo Spring, Kentucky	21.8	7.0	Figure 11
Garvin - Beaver, Kentucky	16.4	7.0	Figure 11
Suds Spring, Kentucky	15.9	6.7	Figure 11
Bush Island Spring, Kentucky	3.34	3.7	Figure 11
Mile 205.7 Spring	2.95	2.6	Figure 11

Note: Flow lines in Figures 12A show the main channels of the three main sub-basins at Havant / Bedhampton Springs. Flow lines in Figure 12B show the main channels of the two main sub-basins at Silver Spring and the two main sub-basins at Rainbow Springs.

Table DR8. Areal coverage and cave porosity of White Scar Cave

Area of cave passages shown in Figure 7	13,000 m^2
Area of high-level abandoned passages not shown in Figure 7	4150 m^2
Total area of cave	17,150 m^2
Area of 1700 m x 500m rectangle with which the cave lies	850,000 m^2
Areal coverage of cave	0.020
Volume of cave passages shown in Figure 7	65,300 m^3
Volume of high-level abandoned passages not shown in Figure 7	20,500 m^3
Total volume of cave	85,800 m^3
Mean thickness of limestone in 1700 m x 500 m rectangle	125 m
Volume of cuboid within which the cave lies	1.06E8 m^3
Cave porosity	0.00081

Note: the above estimates were made from the cave survey in Waltham (1977).

Table DR9. Areal coverage and cave porosity of major caves in the Pierre St Martin area

Cave	Areal coverage m^2 x10^3	Volume m^3 x 10^3
Gouffre de la Pierre St Martin	394	8140
Gouffre des Partages	272	4520
Réseau d'Anialarra	227	2380
Réseau Lonné Peyret	200	1850
Grotte d'Arphidia	78	596
AN8	58	637
Gouffre de Borrugues (part within rectangle)	20	86
Sima de Ukerdi Abajo	18	87
Chipi Joseteko Leze Handia	14	73
Réseau de Soudet (part within rectangle)	13	60
C110	3.8	34
AN534	3.7	61
Gouffre ded Quinquas	3.4	21
Grotte de l'Ours (part within rectangle)	1.8	5.4
Total	1305	1855

Total area of caves	1,305,000 m^2
Area of 7000 m x 5000 m rectangle within which the caves lie	3.5 E7 m^2
Areal coverage of caves	0.037
Total volume of caves	1.855 E7 m^3
Mean thickness of limestone in 1700 m x 500 m rectangle	391 m
Volume of cuboid within which cave lies	1.369 E10 m^3
Cave porosity	0.0014

Notes: The above estimates were made from cave surveys in Courbon and Chabert, 1986; ARSIP, 1989, 2002; Pont and Bie, 2014.

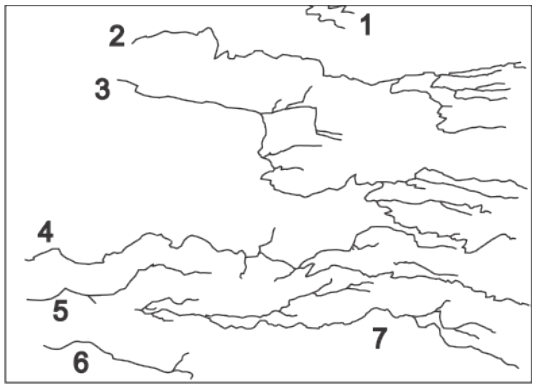

Figure DR2. Major cave stream passages in a 5 km by 7 km area in the centre of Figure 8. Caves: 1 - Réseau de Soudet; 2: Réseau Lonné Peyret; 3: Gouffre de la Pierre St Martin; 4: Gouffre des Partages; 5: Sima AN8; 6: Sima de Ukerdi Abajo; 7: Réseau d'Anialarra (after Pont and Bie, 2014).

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