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Supplemental Information

Assessment of Hydrogeochemistry and Environmental Isotopes in Karst Springs of Makook Anticline, Kurdistan Region, Iraq. *Hydrology* 2015, *3*, 48–68.

Omed Mustafa [1,*], Broder Merkel [1] and Stephan M. Weise [2]

[1] Institute of Geology, Technische Universität Bergakademie Freiberg, Gustav Zeuner Str.12, 09599 Freiberg, Germany; E−Mail: merkel@geo.tu−freiberg.de

[2] Department Catchment Hydrology, Helmholtz Centre for Environmental Research−UFZ, Theodor−Lieser−Str. 4, 06120 Halle (Saale), Germany; E−Mail: stephan.weise@ufz.de

* Author to whom correspondence should be addressed; E−Mail: omedgeology@gmail.com; Tel.: +49−3731−39−2792; Fax: +49−3731−39−2720.

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This supplementary supports the main text as follows:

Table S1. The physiochemical and flow characteristics of the karst springs.

Springs & Code	*East Longitude*	*North Latitude*	*Elevation (m)*	*Date & Statistics*	*pH*	*Eh (mV)*	*EC (µS/cm)*	*DO (mg/l)*	*Tem (°C)*	*Flow (l/s)*
Sarwchawa (1)	36°16′32.9″	44°45′19.4″	584	15.09.2011	7.3	434.4	570	6.49	18.7	2370
				06.12.2011	7.6	414.4	516	NA	16	2990
				26.04.2012	7.1	384.1	482	6.45	12	4630
				04.06.2012	7.4	372.3	506	NA	17	3100
				05.09.2012	7.3	381.8	568	6.49	16	2910
				11.11.2012	7.3	342.6	664	NA	11	3400
				St.D	0.2	32.3	65.5	0.02	3	762.3
				Min	7.1	343	482	6.45	11	2370
				Max	7.6	434	664	6.49	18.7	4630
				Mean	7.3	388	551	6.48	15.1	3233
Shkarta (2)	36°18′21.7″	44°43′15.7″	578	15.09.2011	7.4	430.6	406	7.36	23.4	32.5
				06.12.2011	7.8	396.3	411	NA	19	0.75
				26.04.2012	7.1	378	443	6.37	16	1.1
				04.06.2012	7.3	384.1	432	NA	20	0.5
				05.09.2012	7.4	375.3	448	7.36	20	0.1
				11.11.2012	7.3	335	583	NA	6	0.17
				St.D	0.2	31.1	65.5	0.57	6.1	0.4
				Min	7.1	335	406	7.03	6	0.1
				Max	7.8	431	583	7.36	23.4	1.1
				Mean	7.4	383	453.8	6.37	17.4	0.5
Betwata (3)	36°20′39.5"	44°42′30.7″	1063	15.09.2011	7.7	432.6	391	8.46	16.4	18.8
				06.12.2011	7.8	383.8	380	NA	11	28.9
				26.04.2012	7.2	378.5	391	7.17	10	25.3
				04.06.2012	7.5	403.8	420	NA	15	59.3
				05.09.2012	7.9	359.7	407	8.46	19	20.4
				11.11.2012	7.3	336.9	831	NA	9	28.5
				St.D	0.3	33.4	177.4	0.74	4	14.8
				Min	7.2	337	380	8.03	9	18.8
				Max	7.9	433	831	8.46	19	59.3
				Mean	7.6	383	470	7.17	13.4	30.2

Table S1. *Cont.*

Springs & Code	East Longitude	North Latitude	Elevation (m)	Date & Statistics	pH	Eh (mV)	EC (µS/cm)	DO (mg/l)	Tem (°C)	Flow (l/s)
Zewa (4)	36°24′10″	44°34′25″	943	15.09.2011	8.4	415.5	316	8.34	15.2	61.4
				06.12.2011	8.1	388.1	306	NA	12	112.8
				26.04.2012	7.3	375.8	296	6.7	8	142.1
				04.06.2012	7.6	334.2	310	NA	14.5	165.8
				05.09.2012	7.8	365.8	344	8.34	12	48
				11.11.2012	7.3	323.8	350	NA	8	124
				St.D	0.4	34.1	21.7	0.9	3.1	45.9
				Min	7.3	324	296	7.8	8	48
				Max	8.4	416	350	8.34	15.2	165.8
				Mean	7.8	367	320.3	6.7	11.6	109
Chewa (5)	36°20′50.4″	44°34′20.2″	838	15.09.2011	7.28	442	535	5.9	19	101
				06.12.2011	7.8	378	444	NA	12	125
				26.04.2012	7.2	384.7	522	6.05	8	149.9
				04.06.2012	7.3	408.1	530	NA	16	332.5
				05.09.2012	7.3	379.4	467	5.9	19	112
				11.11.2012	7.3	358.4	1117	NA	11	141
				St.D	0.2	29.3	254.7	0.09	4.5	86.3
				Min	7.2	358	444	5.95	8	101
				Max	7.8	442	1117	6.05	19	332.5
				Mean	7.4	392	602.5	5.9	14.2	160.2
Bla (6)	36°31′23.9″	44°29′46.3″	945	15.09.2011	7.4	478.4	510	7.64	15.5	393.3
				06.12.2011	7.8	368	396	NA	13	336.2
				26.04.2012	7.2	388.9	438	6.47	8	638
				04.06.2012	7.4	424.6	495	NA	14	875
				05.09.2012	7.4	373.5	495	7.64	10	126
				11.11.2012	7.2	350.6	599	NA	8	331.8
				St.D	0.2	46.9	69.1	0.7	3.2	265
				Min	7.2	351	396	7.25	8	126
				Max	7.8	478	599	7.64	15.5	875
				Mean	7.4	397	488.8	6.47	11.4	450.1
Qala Saida (7)	36°20′19.9″	44°46′02.1″	953	15.09.2011	7.6	445.7	458	8.15	16	1.5
				06.12.2011	7.8	359.9	422	NA	14	3.6
				26.04.2012	7.3	386.8	383	6.43	9	6.8
				04.06.2012	7.6	357.1	518	NA	16	1.6
				05.09.2012	7.6	374.9	430	8.15	17	1.8
				11.11.2012	7.3	360.8	722	NA	13	2.7
				St.D	0.2	33.7	122.7	1	2.9	2
				Min	7.3	357	383	7.58	9	1.5
				Max	7.8	446	722	8.15	17	6.8
				Mean	7.5	381	488.8	6.43	14.2	3
Gullan (8)	36°23′23.7″	44°41′44.8″	1309	15.09.2011	8.2	432.4	299	8.5	14.1	45
				06.12.2011	8	359.9	291	NA	9	27.4
				26.04.2012	7.3	384.6	265	6.13	8	63.5
				04.06.2012	7.6	371	360	NA	8	87.6
				05.09.2012	7.8	365	320	8.5	10	39
				11.11.2012	7.3	323.2	328	NA	8	41
				St.D	0.4	35.7	33	1.4	2.4	21.6
				Min	7.3	323	265	7.71	8	27.4
				Max	8.2	432	360	8.5	14.1	87.6
				Mean	7.7	373	310.5	6.13	9.5	50.6

Eh = oxidation reduction potential; ***EC*** = Electrical conductivity; ***Tem*** = temperature; ***DO*** = dissolved oxygen; ***Flow*** = discharge of the springs; NA = not available; ***St.D*** = standard deviation; ***Min*** = minimum; ***Max*** = maximum; The statistical tests are based on 6 measurements (***n***) for each springs, except ***DO*** that measured only 3 times; The field parameters were measured onsite; Spring codes can be used to trace the locations of the springs in **Figure 1**

Table S2. The hydrogeochemical characteristics of the karst springs.

Springs & Code	*Date & Statistics*	*Na*	*K*	*Ca*	*Mg*	*Cl*	*SO_4*	*HCO_3*	*F*	*Si*	*Sr*	*NO_3*	*PO_4*	*E%*
		Concentrations in mg/L												
Sarwchawa(1)	**15.09.2011**	2.39	0.85	87.5	23.9	3.5	81.8	286.2	0.17	4.9	0.85	5.5	0.0025	−1
	06.12.2011	2.39	0.80	78.0	22	2.4	73.2	275	0.07	4.7	0.88	1.8	0.0030	1
	26.04.2012	2.32	0.71	77.3	17	3.4	39	265.7	0.13	4.9	0.44	10.5	0.0028	0
	04.06.2012	2.51	0.78	72.2	20.9	2.1	59.7	270	0.09	4.6	0.67	1.7	0.0034	0
	05.09.2012	2.32	0.70	91.7	21.8	2.4	86.6	298.9	0.19	4.3	0.82	5.0	0.0033	−1
	11.11.2012	2.53	0.78	49.9	23.4	2	82.2	280	0.11	4.5	0.85	2.7	0.0036	−1
	St.D	0.09	0.06	14.7	2.5	0.6	18.1	12	0.05	0.2	0.17	3.3	0.02	NA
	Min	2.32	0.7	49.9	17	2	39	265.7	0.07	4.3	0.44	1.7	0.021	−1
	Max	2.53	0.85	91.7	23.9	3.5	86.6	298.9	0.19	4.9	0.88	10.5	0.06	1
	Mean	2.41	0.77	76.1	21.5	2.6	70.4	279.3	0.13	4.7	0.75	4.5	0.039	−0.3
Shkarta(2)	**15.09.2011**	3.59	1.75	65.8	10.3	4.8	21.9	213.7	0.10	9.4	0.34	17.2	0.0009	−1
	06.12.2011	4.57	1.84	64.8	10.4	9.2	21	230	0.06	8.9	0.31	16.0	0.0013	0
	26.04.2012	4.24	2.27	73.8	10.3	8.7	21.8	253.9	0.14	9.1	0.30	17.1	0.0013	−4
	04.06.2012	3.96	1.82	48.2	9.8	4.9	17.4	240	0.07	8.5	0.29	23.5	0.0012	−1
	05.09.2012	3.92	1.48	71.1	9.6	6.6	21.8	216.6	0.10	8.5	0.30	22.5	0.0012	0
	11.11.2012	5.89	1.88	75.3	13.7	15.5	40.4	235	0.08	8.8	0.44	29.6	0.0017	0
	St.D	0.82	0.25	9.9	1.5	4	8.2	15	0.03	0.4	0.06	5.2	0.04	NA
	Min	3.59	1.48	48.2	9.6	4.8	17.4	213.7	0.06	8.5	0.29	16	0.034	−4
	Max	5.89	2.27	75.3	13.7	15.5	40.4	253.9	0.14	9.4	0.44	29.6	0.12	0
	Mean	4.36	1.84	66.5	10.7	8.3	24	231.5	0.09	8.9	0.33	21	0.072	−1

Table S2. *Cont.*

Springs & Code	*Date & Statistics*	*Na*	*K*	*Ca*	*Mg*	*Cl*	*SO_4*	*HCO_3*	*F*	*Si*	*Sr*	*NO_3*	*PO_4*	*E%*
		Concentrations in mg/L												
Betwata(3)	**15.09.2011**	1.23	0.47	53.9	20.4	2.6	16.7	235.1	0.04	4.3	0.14	5.5	0.0007	1
	06.12.2011	1.29	0.50	52.7	18.5	1.4	11.2	242	0.06	3.9	0.12	1.7	0.0010	0
	26.04.2012	1.26	0.45	55.4	18.6	2	12.7	248	0.06	4.3	0.13	8.8	0.0010	−1
	04.06.2012	1.30	0.38	37.2	18.6	1.3	11.4	237	0.05	4.0	0.12	5.4	0.0010	−1
	05.09.2012	1.30	0.43	54.7	18.0	2	11	241	0.06	3.9	0.12	6.1	0.0009	−1
	11.11.2012	1.30	0.39	45.1	18.4	1.3	11.3	260	0.07	3.9	0.12	3.8	0.0009	0
	St.D	0.03	0.05	7.2	0.8	0.5	2.2	9.1	0.01	0.2	0.01	2.4	0.01	NA
	Min	1.23	0.38	37.2	18	1.3	11	235.1	0.04	3.9	0.12	1.7	0.015	−1
	Max	1.3	0.5	55.4	20.4	2.6	16.7	260	0.07	4.3	0.14	8.8	0.04	1
	Mean	1.28	0.44	49.8	18.8	1.8	12.4	243.9	0.06	4.1	0.12	5.2	0.024	−0.3
Zewa(4)	**15.09.2011**	0.93	0.47	42.9	15.5	2.1	13.9	187.6	0.04	2.9	0.13	2.5	0.0005	0
	06.12.2011	0.84	0.58	48.8	14.1	1.1	9	180	0.04	2.7	0.10	2.1	0.0007	1
	26.04.2012	0.79	0.45	45.6	12.9	1.5	10.2	189	0.04	3	0.10	6.0	0.0006	0
	04.06.2012	0.89	0.47	56.6	14.7	0.9	8.4	185	0.06	3.2	0.11	1.7	0.0007	1
	05.09.2012	0.94	0.94	47.3	13.6	1.6	9.3	183	0.05	2.8	0.11	3.2	0.0007	3
	11.11.2012	0.87	0.41	41.4	14.5	0.9	9.1	192	0.07	2.9	0.10	2.0	0.0007	−1
	St.D	0.06	0.2	5.4	0.9	0.5	2	4.3	0.01	0.1	0.01	1.6	0.01	NA
	Min	0.79	0.41	41.4	12.9	0.9	8.4	180	0.04	2.7	0.1	1.7	0.009	−1
	Max	0.94	0.94	56.6	15.5	2.1	13.9	192	0.07	3.2	0.13	6	0.05	3
	Mean	0.88	0.55	47.1	14.2	1.4	10	186.1	0.05	2.9	0.11	2.9	0.027	0.7
Chewa(5)	**15.09.2011**	1.77	0.57	84.4	20.5	3	14.7	332.3	0.07	6	0.21	2.1	0.0013	1
	06.12.2011	1.92	0.55	43.3	18.8	1.8	9.7	341	0.06	5.4	0.17	1.7	0.0017	0
	26.04.2012	1.88	0.46	88.1	18.8	2.8	11.2	348.4	0.08	6	0.18	5.2	0.0017	0
	04.06.2012	2.03	0.66	46.9	19.5	1.9	9.7	338	0.06	5.7	0.18	1.9	0.0018	0
	05.09.2012	1.92	0.48	85.5	18.5	2.8	9.2	332.5	0.08	5.3	0.18	3.0	0.0017	1
	11.11.2012	1.94	0.52	43.7	19	1.8	9.8	350	0.11	5.5	0.17	1.7	0.0018	1
	St.D	0.08	0.07	22.7	0.7	0.5	2.1	7.6	0.02	0.3	0.01	1.4	0.01	NA
	Min	1.77	0.46	43.3	18.5	1.8	9.2	332.3	0.06	5.3	0.17	1.7	0.025	0
	Max	2.03	0.66	88.1	20.5	3	14.7	350	0.11	6	0.21	5.2	0.05	1
	Mean	1.91	0.54	65.3	19.2	2.4	10.7	340.4	0.08	5.6	0.18	2.6	0.034	0.5
Bla(6)	**15.09.2011**	1.53	0.74	74.6	22.6	3	16.9	318.5	0.05	4.3	0.18	3.0	0.0009	0
	06.12.2011	1.56	0.81	43.8	21.6	1.7	10.7	302	0.05	3.6	0.13	1.9	0.0011	0
	26.04.2012	1.37	0.52	69.5	17.1	2.3	13.5	289.3	0.05	3.5	0.11	8.9	0.0008	0
	04.06.2012	1.55	0.59	49.2	21.3	1.6	11.4	310	0.04	3.7	0.13	3.7	0.0011	1
	05.09.2012	1.51	0.56	75.1	21.8	2.1	10.7	314.2	0.06	3.7	0.15	3.5	0.0011	1
	11.11.2012	1.62	0.70	41.4	21.8	1.7	11.0	298	0.11	3.7	0.13	2.2	0.0011	0
	St.D	0.08	0.11	15.8	2	0.5	2.5	10.9	0.02	0.3	0.02	2.6	0.01	NA
	Min	1.37	0.52	41.4	17.1	1.6	10.7	289.3	0.04	3.5	0.11	1.9	0.018	0
	Max	1.62	0.81	75.1	22.6	3	16.9	318.5	0.11	4.3	0.18	8.9	0.05	1
	Mean	1.52	0.65	58.9	21	2.1	12.4	305.3	0.06	3.8	0.14	3.9	0.031	0.3
Qala Saida(7)	**15.09.2011**	1.33	0.43	66	22.2	2.8	15.9	286.2	0.04	3.5	0.09	8.3	0.0005	0
	06.12.2011	1.27	0.48	48.4	21.9	1.5	10.7	264	0.03	3.3	0.07	7.7	0.0008	−1
	26.04.2012	1.24	0.39	54.5	20.4	2.3	12.8	242.1	0.05	3.5	0.08	8.1	0.0009	−2
	04.06.2012	1.31	0.43	77.3	22.5	1.5	10.9	270	0.06	3.4	0.08	4.5	0.0010	−1
	05.09.2012	1.29	0.42	63	20.9	2.0	11.3	274.5	0.05	3.0	0.07	7.8	0.0009	0
	11.11.2012	1.47	0.35	47.2	21.6	1.6	11.0	269	0.08	3.2	0.07	4.2	0.0009	1
	St.D	0.08	0.04	11.6	0.8	0.5	2	14.6	0.02	0.2	0.01	1.9	0.02	NA
	Min	1.24	0.35	47.2	20.4	1.5	10.7	242.1	0.03	3	0.07	4.2	0.012	−2
	Max	1.47	0.48	77.3	22.5	2.8	15.9	286.2	0.08	3.5	0.09	8.3	0.05	1
	Mean	1.32	0.42	59.4	21.6	1.9	12.1	267.6	0.05	3.3	0.08	6.8	0.027	−0.5
Gullan(8)	**15.09.2011**	2.09	0.39	42.3	14.4	2.8	14.8	185.1	0.03	2.4	0.07	2.8	0.0004	−1
	06.12.2011	0.78	0.35	45.5	13.4	1	8.9	173	0.04	2.3	0.06	3.2	0.0006	−1
	26.04.2012	0.78	0.27	38.5	11.4	1.5	10.8	159.4	0.04	2.2	0.06	5.3	0.0006	0
	04.06.2012	0.72	0.27	43.9	12.4	0.9	9.2	165	0.02	2.1	0.06	2.9	0.0005	−1
	05.09.2012	0.88	0.27	41.4	12.5	1.4	8.9	170.8	0.05	2.1	0.06	3.2	0.0007	1
	11.11.2012	0.87	0.33	44.9	12.9	1	9.8	180	0.05	2.2	0.06	4.1	0.0006	−1
	St.D	0.53	0.05	2.6	1	0.7	2.3	9.4	0.01	0.1	0	1	0.01	NA
	Min	0.72	0.27	38.5	11.4	0.9	8.9	159.4	0.02	2.1	0.06	2.8	0.009	−1
	Max	2.09	0.39	45.5	14.4	2.8	14.8	185.1	0.05	2.4	0.07	5.3	0.04	1
	Mean	1.02	0.31	42.7	12.8	1.4	10.4	172.2	0.04	2.2	0.06	3.6	0.026	−0.5

E% = Anion cation balance calculated by PHREEQC; ***Na, K, Ca, Mg, F, Cl, PO_4, NO_3*** and ***SO_4*** were measured by Ion Chromatography (IC); HCO_3 measured by Titration; ***Si, Li*** and ***Sr*** measured by Inductively Coupled plasma – Mass Spectrophotometer (ICP-MS) ; ***St.D*** = standard deviation; ***Min*** = minimum; ***Max*** = maximum; The statistical tests are based on 6 measurements (***n***) for each spring; Spring codes can be used to trace the locations of the springs in **Figure 1**

Table S3. Saturation indices of selected mineral in the karst springs.

Springs & Code	*Date & Statistics*	*log P_{CO2}*	*$SI_{Calcite}$*	*$SI_{Dolomite}$*	*SI_{Gypsum}*	*$SI_{Fluorite}$*	*SI_{Halite}*	*$SI_{Celestite}$*
Sarwchawa(1)	**15.09.2011**	−1.90	0.11	−0.09	−1.63	−2.42	−9.65	−1.94
	06.12.2011	−2.23	0.31	0.29	−1.70	−3.18	−9.80	−1.94
	26.04.2012	−1.77	−0.25	−1	−1.94	−2.56	−9.65	−2.48
	04.06.2012	−2.03	0.09	−0.12	−1.81	−3	−9.84	−2.14
	05.09.2012	−1.90	0.10	−0.19	−1.58	−2.26	−9.82	−1.93
	11.11.2012	−1.95	−0.24	−0.68	−1.80	−2.90	−9.84	−1.87
	St.D	0.16	0.22	0.5	0.1	0.4	0.1	0.23
	Min	−2.23	−0.25	−1	−1.9	−3.2	−9.8	−2.48
	Max	−1.77	0.31	0.3	−1.6	−2.3	−9.6	−1.87
	Mean	−1.96	0.02	−0.3	−1.7	−2.7	−9.8	−2.05
	Date & Statistics	**log PCO2**	SICalcite	SIDolomite	SIGypsum	SIFluorite	SIHalite	SICelestite

Table S3. *Cont.*

Springs & Code	Date & Statistics	log PCO2	SICalcite	SIDolomite	SIGypsum	SIFluorite	SIHalite	SICelestite
Shkarta(2)	**15.09.2011**	−2.09	0.08	−0.32	−2.24	−2.99	−9.33	−2.82
	06.12.2011	−2.49	0.43	0.34	−2.26	−3.38	−8.93	−2.87
	26.04.2012	−1.77	−0.23	−1.10	−2.19	−2.54	−8.98	−2.88
	04.06.2012	−1.96	−0.15	−0.70	−2.44	−3.37	−9.26	−2.96
	05.09.2012	−2.11	0.06	−0.46	−2.21	−2.91	−9.15	−2.88
	11.11.2012	−2.05	−0.20	−1.11	−1.90	−2.89	−8.57	−2.43
	St.D	0.24	0.25	0.5	0.2	0.3	0.3	0.19
	Min	−2.49	−0.23	−1.1	−2.4	−3.4	−9.3	−2.96
	Max	−1.77	0.43	0.3	−1.9	−2.5	−8.6	−2.43
	Mean	−2.08	0.006	−0.6	−2.2	−3	−9	−2.81
Betwata(3)	**15.09.2011**	−2.39	0.23	0.26	−2.43	−3.79	−10.04	−3.32
	06.12.2011	−2.51	0.25	0.19	−2.59	−3.36	−10.27	−3.54
	26.04.2012	−1.90	−0.33	−1.01	−2.52	−3.32	−10.14	−3.45
	04.06.2012	−2.19	−0.13	−0.36	−2.72	−3.71	−10.30	−3.53
	05.09.2012	−2.57	0.48	0.75	−2.61	−3.46	−10.14	−3.56
	11.11.2012	−1.98	−0.31	−0.90	−2.64	−3.25	−10.30	−3.52
	St.D	0.28	0.33	0.7	0.1	0.2	0.1	0.09
	Min	−2.57	−0.33	−1	−2.7	−3.8	−10.3	−3.56
	Max	−1.9	0.48	0.8	−2.4	−3.3	−10	−3.32
	Mean	−2.26	0.03	−0.2	−2.6	−3.5	−10.2	−3.49
Zewa(4)	**15.09.2011**	−3.21	0.71	1.19	−2.57	−3.85	−10.24	−3.39
	06.12.2011	−2.93	0.42	0.46	−2.69	−3.73	−10.56	−3.68
	26.04.2012	−2.12	−0.44	−1.35	−2.65	−3.69	−10.46	−3.6
	04.06.2012	−2.41	0.03	−0.32	−2.68	−3.36	−10.63	−3.7
	05.09.2012	−2.62	0.12	−0.15	−2.69	−3.55	−10.34	−3.62
	11.11.2012	−2.12	−0.47	−1.32	−2.74	−3.25	−10.62	−3.64
	St.D	0.44	0.47	1	0.1	0.2	0.2	0.11
	Min	−3.21	−0.47	−1.3	−2.7	−3.8	−10.6	−3.7
	Max	−2.12	0.71	1.2	−2.6	−3.2	−10.2	−3.39
	Mean	−2.57	0.06	−0.2	−2.7	−3.6	−10.5	−3.61
Chewa(5)	**15.09.2011**	−1.81	0.16	−0.01	−2.36	−3.18	−9.84	−3.26
	06.12.2011	−2.36	0.32	0.44	−2.75	−3.47	−10.00	−3.45
	26.04.2012	−1.75	0.04	−0.42	−2.44	−2.95	−9.83	−3.43
	04.06.2012	−1.84	−0.08	−0.32	−2.73	−3.49	−9.96	−3.44
	05.09.2012	−1.83	0.19	−0.01	−2.55	−3.05	−9.84	−3.53
	11.11.2012	−1.85	−0.17	−0.57	−2.73	−2.92	−9.99	−3.43
	St.D	0.22	0.19	0.4	0.2	0.3	0.1	0.09
	Min	−2.36	−0.17	−0.6	−2.7	−3.5	−10	−3.53
	Max	−1.75	0.32	0.4	−2.4	−2.9	−9.8	−3.26
	Mean	−1.9	0.08	−0.1	−2.6	−3.2	−9.9	−3.42
Bla(6)	**15.09.2011**	−1.97	0.17	0.03	−2.33	−3.47	−9.90	−3.25
	06.12.2011	−2.40	0.29	0.45	−2.70	−3.64	−10.11	−3.54
	26.04.2012	−1.85	−0.21	−0.94	−2.41	−3.36	−10.03	−3.5
	04.06.2012	−1.98	−0.03	−0.23	−2.64	−3.80	−10.15	−3.5
	05.09.2012	−2.00	0.08	−0.25	−2.50	−3.22	−10.03	−3.5
	11.11.2012	−1.83	−0.41	−1.01	−2.69	−2.89	−10.09	−3.49
	St.D	0.21	0.26	0.6	0.2	0.3	0.1	0.11
	Min	−2.4	−0.41	−1	−2.7	−3.8	−10.1	−3.54
	Max	−1.83	0.29	0.5	−2.3	−2.9	−9.9	−3.25
	Mean	−2.01	−0.02	−0.3	−2.5	−3.4	−10.1	−3.46
Qala Saida(7)	**15.09.2011**	−2.21	0.28	0.31	−2.40	−3.71	−9.99	−3.56
	06.12.2011	−2.46	0.29	0.44	−2.66	−4.05	−10.26	−3.79
	26.04.2012	−2.02	−0.26	−0.85	−2.52	−3.47	−10.08	−3.65
	04.06.2012	−2.24	0.32	0.33	−2.50	−3.30	−10.25	−3.77
	05.09.2012	−2.23	0.26	0.29	−2.56	−3.55	−10.13	−3.81
	11.11.2012	−1.95	−0.22	−0.60	−2.66	−3.19	−10.17	−3.76
	St.D	0.18	0.27	0.6	0.1	0.3	0.1	0.1
	Min	−2.46	−0.26	−0.8	−2.7	−4	−10.3	−3.81
	Max	−1.95	0.32	0.4	−2.4	−3.2	−10	−3.56
	Mean	−2.18	0.11	0.002	−2.5	−3.5	−10.1	−3.72
Gullan(8)	**15.09.2011**	−3.01	0.49	0.72	−2.54	−4.08	−9.77	−3.62
	06.12.2011	−2.86	0.23	0.04	−2.71	−3.71	−10.61	−3.87
	26.04.2012	−2.20	−0.58	−1.60	−2.67	−3.75	−10.44	−3.77
	04.06.2012	−2.48	−0.21	−0.89	−2.70	−4.30	−10.70	−3.89
	05.09.2012	−2.66	0.01	−0.38	−2.74	−3.66	−10.42	−3.88
	11.11.2012	−2.14	−0.47	−1.39	−2.67	−3.50	−10.57	−3.82
	St.D	0.35	0.41	0.9	0.1	0.3	0.3	0.1
	Min	−3.01	−0.58	−1.6	−2.7	−4.3	−10.7	−3.89
	Max	−2.14	0.49	0.7	−2.5	−3.5	−9.8	−3.62
	Mean	−2.56	−0.09	−0.6	−2.7	−3.8	−10.4	−3.81

log P$_{CO2}$ = Partial pressure of CO_2; ***SI*** = Saturation index of minerals; The data was calculated with PHREEQC; ***St.D*** = standard deviation; ***Min*** = minimum; ***Max*** = maximum; The statistical tests are based on 6 measurements (***n***) for each spring; Spring codes can be used to trace the locations of the springs in **Figure 1**

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