Table S1. Outlet coordinates, designations, and numbers on map.

Number on the map	Designation	Latitude	Longitude	Number on map	Designation	Latitude	Longitude
1.	Sochi 1	43°42′30.8″	39°45′58.8″	17.	Hosta 1	43°37′47.9″	39°54′50.3″
2.	Sochi 2	43°42′32.8″	39°46′54.5″	18.	Hosta 2	43°37′42.2″	39°54′51.7″
3.	Sochi 3	43°42′46.6″	39°47′33.3″	19.	Kepsha 1	43°36′57.6″	40°03′04.5″
4.	Sochi 4	43°42′03.4″	39°45′53.4″	20.	Kepsha 2	43°38′57.0″	39°59′54.4″
5.	Sochi 5	43°38′02.4″	39°44′31.0″	21.	CHvizhepse	43°37′51.7″	40°05′08.7″
6.	Bzugu 1	43°37′54.7″	39°46′04.4″	22.	Monashka	43°40′01.5″	40°10′23.5″
7.	Bzugu 2	43°37′54.0″	39°46′07.3″	23.	Sorokopyatka	43°41′03.7″	40°12′25.4″
8.	Vol'nica 1	43°39′52.6″	39°49′41.7″	24.	Laura	43°41′59.2″	40°16′02.4″
9.	Vol'nica 2	43°39′53.6″	39°49′52.5″	25.	Berezovskij	43°40′54.8″	40°16′35.4″
10.	Vol'nica 3	43°39′50.4″	39°49′49.9″	26.	Pogranichnik	43°39′41.6″	40°20′30.6″
11.	Vol'nica 4	43°39′49.9″	39°49′54.4″	27.	Semikolenko	43°39′13.2″	40°26′19.2″
12.	Sovhoz	43°38′05.5″	39°49′36.6″	28.	Pokryshka	43°38′21.9″	40°26′01.0″
13.	Izmajlovka	43°37′43.0″	39°49′25.3″	29.	Komarova	43°38′18.8″	40°26′20.3″
14.	Progress 1	43°35′32.0″	39°49′48.9″	30.	Aishkha 2	43°37′34.0″	40°28′12.9″
15.	Progress 2	43°35′33.1″	39°49′59.2″	31.	Aishkha 1	43°37′30.4″	40°28′16.4″
16.	Progress 3	43°35′31.5″	39°50′00.3″	32.	Mzymta 1	43°34′28.7″	40°37′44.6″
17.	Hosta 1	43°37′47.9″	39°54′50.3″	33.	Mzymta 2	43°34′22.5″	40°37′31.1″

Table S2. Chemical composition of groundwater of the Mzymta and Sochi River valleys.

Number on the map	Name of groundwater source	Water sampling time	Water type	pH	Mtotal	Na^+	Ca^{2+}	Mg^{2+}	Cl^-	$SO4^{2-}$	HCO^{3-}
					mg/L						
1	Sochi 1	morning	I	7.43	164	2.86	43.40	2.40	4.48	1.00	129.93
		evening		7.16	194	2.79	42.23	2.34	4.90	1.00	147.25
2	Sochi 2	morning	I	7.55	224	1.76	63.63	1.36	5.88	1.00	181.90
		evening		7.15	208	2.02	64.72	1.53	5.60	1.00	212.22
3	Sochi 3	morning	I	7.55	248	3.93	70.53	5.77	5.46	40.00	207.89
		evening		7.45	248	4.01	71.02	5.81	5.32	40.00	203.56
4	Sochi 4	morning	I	6.79	116	1.58	32.95	1.59	2.94	20.00	108.28
		evening		7.90	270	2.15	73.38	2.06	3.22	20.00	112.61
5	Sochi 5	morning	I	7.45	288	1.53	97.66	2.12	4.48	1.00	303.17
		evening		7.58	304	2.02	99.75	2.83	4.76	1.00	333.49
6	Bzugu 1	morning	I	7.87	328	4.75	78.09	3.73	12.18	50.00	277.18
		evening		7.79	337	4.89	81.21	3.88	12.67	51.50	285.50
7	Bzugu 2	morning	I	7.79	358	4.86	76.70	3.83	6.90	48.94	236.66
		evening		7.73	366	5.11	80.04	3.91	7.42	50.00	242.54
8	Vol'nica 1	morning	I	6.05	148	2.52	41.68	1.60	11.34	1.00	151.59
		evening		6.85	146	1.36	35.73	1.24	5.88	1.00	138.59
9	Vol'nica 2	morning	I	7.07	184	0.87	52.45	0.87	5.60	1.00	181.90
		evening		7	164	1.55	54.86	1.54	10.92	1.00	125.60
		morning		7.05	204	2.28	65.78	2.26	10.50	1.00	212.22

10	Vol'nica 3	evening	I	6.95	172	1.64	57.27	1.94	13.86	1.00	164.58
11	Vol'nica 4	morning	I	7.18	282	6.09	90.56	4.47	13.44	40.00	225.21
		evening		7.25	278	6.70	95.56	4.73	9.80	40.00	233.87
12	Sovhoz	noon	II	7.15	278	5.62	75.62	3.89	6.86	65.00	212.22
13	Izmajlovka	noon	II	7.43	362	5.49	111.31	5.33	10.50	80.00	216.16
14	Progress 1	noon	III	6.7	578	37.33	151.17	7.44	31.22	130.00	368.14
15	Progress 2	noon	III	6.67	790	43.50	186.55	15.26	11.48	150.00	415.78
16	Progress 3	noon	III	6.79	574	38.15	151.58	11.77	10.08	140.00	454.76
17	Hosta 1	morning	IV	7.09	1104	303.89	4.98	5.01	291.20	40.00	606.34
		evening		7.18	1146	300.53	5.82	5.46	310.80	40.00	628.00
18	Hosta 2	morning	IV	8.1	1178	283.78	1.90	0.21	208.80	40.00	918.17
		evening		7.95	1212	305.43	1.76	0.22	289.00	40.00	866.20
19	Kepsha 1	noon	I	7.79	358	4.86	76.70	3.83	6.90	48.94	236.66
20	Kepsha 2	noon	I	7.48	252	2.26	80.24	2.25	4.34	1.00	233.87
21	Chvizhepse	noon	I	6.45	166	7.33	30.10	6.72	3.64	1.00	121.27
22	Monashka	noon	II	7.07	114	3.65	21.55	5.00	3.08	73.63	125.00
23	Sorokopyatka	noon	I	7.05	68	2.08	12.29	1.60	3.08	1.00	47.64
24	Laura	noon	II	6.28	106	3.17	14.02	4.93	2.38	60.00	56.30
25	Berezovskij	noon	II	7.35	172	4.83	43.05	4.69	4.20	40.00	129.93
26	Pogranichnik	noon	II	6.57	160	1.63	13.90	1.31	5.32	40.00	51.97
27	Semikolenko	noon	II	7.75	206	6.37	39.64	12.61	2.52	125.00	181.90
28	Pokryshka	noon	I	7.68	76	1.60	17.31	2.97	3.08	1.00	73.63
29	Komarova	noon	I	7.45	92	2.06	20.13	1.91	2.38	1.00	73.63
30	Aishkha 2	noon	II	6.83	254	1.22	39.03	12.78	2.94	125.00	125.60
31	Aishkha 1	noon	I	7.63	62	1.63	14.08	1.33	1.82	1.00	64.97
32	Mzymta 1	morning	V	7.45	314	0.49	9.87	0.71	10.08	20.00	43.31
		evening		8.12	333	0.54	10.56	0.75	10.68	21.60	45.48
33	Mzymta 2	morning	V	7.63	309	0.50	10.43	0.71	10.36	20.12	44.95
		evening		8.12	333	0.52	10.75	0.76	10.68	21.40	46.34

Table S3. Elemental composition of groundwater of the Mzymta and Sochi River valleys.

Number map	Water sampling time	Water type	B	Na	Mg	Al	Si	S	K	Ca	V	Mn	Fe	Cu	Zn
			μg/L												
Limits of detection (LOD)			1	10	5	1	12	18	10	10	0.1	0.1	5	0.5	1
1	morning	I	17.1	2859	2400	5.9	4871	4042	350	43396	0.41	0.88	LOD	LOD	LOD
	evening		16	2787	2336	8.5	4814	4268	354	42227	0.43	1.3	LOD	LOD	LOD
2	morning	I	10.6	1765	1357	1.9	4132	1796	661	63629	0.48	0.11	LOD	LOD	LOD
	evening		10.7	2016	1527	2	4561	2004	718	64717	0.39	LOD	LOD	LOD	LOD
3	morning	I	29.5	3932	5771	14.6	4874	10917	468	70533	0.46	0.28	7.7	LOD	LOD
	evening		28.5	4005	5810	6.3	4941	11645	486	71021	0.31	0.21	LOD	LOD	LOD
4	morning	I	9.5	1576	1595	84.1	4141	2171	349	32955	0.44	0.9	39.9	LOD	LOD
	evening		15.4	2155	2060	15.8	4242	3678	361	73379	0.44	2.2	24.5	LOD	LOD
5	morning	I	13.9	1533	2119	10.2	3166	2752	677	97659	0.45	1.2	13	LOD	1.9
	evening		16	2018	2827	6.8	3653	3712	746	99753	0.52	0.9	11	LOD	1.5
6	morning	I	30.3	4750	3733	42.4	4153	11711	1549	78087	0.74	6.9	36	0.97	1.6
	evening		30.4	5114	3907	38.6	4300	11858	1622	80039	0.68	6.1	33.9	0.94	LOD
7	morning	I	42.2	7259	3952	51.9	4094	20467	1146	115888	0.75	11.3	27.9	1.4	1.9
	evening		41.8	7050	3904	41.6	4067	20857	1195	115380	0.71	8	27.7	1.4	2.1
8	morning	I	11.8	2524	1601	12.2	4104	3226	369	41678	0.28	5.5	LOD	3.8	47
	evening		11.1	1357	1237	56.3	3805	2099	325	35730	0.43	5.6	26.8	2.3	14.9
9	morning	I	9.1	868	875	10.3	3185	1253	560	52445	0.37	10.6	6.9	0.71	6.5
	evening		11.4	1552	1544	181	3495	1133	997	54865	0.72	4.5	179	1.2	9.7
10	morning	I	19.8	2282	2259	23.6	3769	2516	792	65784	LOD	8.9	41.4	3.8	41.9
	evening		16	1638	1935	353	4265	1462	929	57275	0.94	13.5	328	1.7	741
11	morning	I	30.7	6088	4468	14.8	4297	9855	1277	90562	0.33	10.3	41	1.2	14.8
	evening		28.7	6698	4730	321	4442	9384	1400	95564	0.34	3.4	47.5	1.5	13.5

12	morning	II	29.5	5624	3887	2.1	4353	12026	1190	75616	0.38	0.42	LOD	0.55	2.6
	evening		32.3	6657	4077	23.9	4406	12244	1273	76653	LOD	1.4	6.2	4.5	8.7
13	morning	II	28.6	5486	5329	6.2	5860	15729	1617	111313	0.37	0.59	LOD	0.68	1.7
	evening		27.7	5068	5273	5.7	5792	15572	1397	110805	0.39	0.54	LOD	2.4	9.9
14	noon	III	48.9	17167	7471	LOD	4991	20380	2593	151067	0.37	8.2	LOD	5.1	10.1
15	noon	III	47.5	17330	7438	LOD	4940	19933	2596	151169	0.29	6.2	LOD	0.78	3.6
16	noon	III	54.3	8154	11771	15.2	5397	23113	2648	151575	0.81	6.2	12.3	1.1	2.6
17	morning	IV	373	303888	5009	35.2	5264	8249	1575	49767	0.7	8.7	65	1.5	18.2
	evening		375	300530	5457	36.1	5009	7434	1800	58170	LOD	11.7	112	1.8	30.8
18	morning	IV	1033	283781	209	23	3860	6057	558	1905	0.86	7.5	48.5	LOD	LOD
	evening		903	305432	219	12.5	4311	8293	641	1757	LOD	3.1	61.4	LOD	LOD
19	noon	I	14	2263	2252	2.1	3617	1502	301	80242	0.53	0.23	LOD	LOD	4.2
20	morning	I	73.8	7329	6721	1.8	6985	4118	646	30098	0.22	0.38	LOD	LOD	4.5
	evening		95.4	9196	8666	3.4	8875	5804	802	38953	0.31	1.2	LOD	16.3	1.8
21	morning	I	30.4	7013	2987	35.9	3928	8618	1660	73898	0.51	1.1	21	1.2	LOD
	evening		30.4	6291	2829	41.5	3833	8439	1664	72383	0.63	1.1	26.9	1.2	LOD
22	noon	II	28.7	3653	4996	23.1	4735	5219	400	21547	0.29	0.72	15.4	LOD	LOD
23	morning	I	3.8	2081	1598	LOD	5583	1502	155	12295	1	0.12	LOD	LOD	LOD
	evening		3.8	2125	1604	LOD	5681	1524	148	12895	1	0.34	LOD	0.64	LOD
24	noon	II	5.8	3175	4935	LOD	5054	7646	155	14023	0.12	0.87	LOD	LOD	87.9
25	noon	II	4.8	4829	4689	2.8	7405	7690	316	43051	0.23	0.56	6.9	LOD	7.7
26	noon	II	2.1	1634	1305	3.5	3592	1184	175	13901	0.28	0.34	LOD	LOD	LOD
27	morning	II	26.7	6370	12612	4.2	3097	5872	416	39645	1.2	1.2	11.1	1.4	4.9
	evening		26.4	6060	12296	15.9	3123	6172	408	39858	1.1	0.65	LOD	LOD	LOD
28	morning	I	8.7	1601	2975	17.8	4100	1058	334	17307	0.11	0.45	LOD	LOD	LOD
	evening		9.1	1760	4176	3.6	3927	1187	362	25116	0.19	0.75	LOD	LOD	LOD
29	morning	I	6.3	2062	1906	4.6	4772	1940	216	20134	0.95	0.49	LOD	LOD	LOD
	evening		5.5	1944	1970	9.8	4985	1966	200	20327	1	0.38	LOD	0.62	3
30	morning	I	11	1218	12777	LOD	2435	12357	561	39035	0.35	0.21	LOD	LOD	1.5
	evening		14.8	1638	15019	4.6	1992	7370	1690	52181	0.3	0.33	LOD	LOD	1.6
31	morning	II	2	1629	1333	4.5	3661	1168	245	14084	0.31	0.98	LOD	4.4	7.3
	evening		3.2	1716	1301	6.1	3595	1173	178	14105	0.28	0.67	LOD	0.66	5.8
32	morning	V	5.3	493	709	7.5	1770	1482	132	9867	0.4	12.7	8.3	1.3	14.3
	evening		5.7	513	752	7.7	1858	1556	138	10064	0.4	12.9	8.7	1.4	14.9
33	morning	V	4.9	474	667	7.3	1681	1408	125	9670	0.4	12.4	7.8	1.3	13.7
	evening		5.2	483	688	7.6	1717	1497	128	10360	0.4	13.2	8.3	1.3	14.7
Number map	**Water sampling time**	**Water type**	**As**	**Se**	**Br**	**Sr**	**Ba**	**Hg**	**Pb**	**Li**	**Be**	**Rb**	**Y**	**Zr**	**Mo**
			µg/L							**ng/L**					
Limits of detection (LOD)			0.1	0.5	20	0.1	0.1	0.01	0.02	7	8	20	5	6	20
1	morning	I	LOD	0.9	LOD	317	2.8	LOD	LOD	3298	LOD	178	10.9	LOD	378
	evening		LOD	1.2	LOD	320	3	LOD	LOD	3179	LOD	177	15.1	LOD	468
2	morning	I	LOD	LOD	LOD	288	14	LOD	LOD	1248	LOD	303	6.3	LOD	89.9
	evening		LOD	LOD	LOD	315	14	LOD	LOD	1261	LOD	313	LOD	LOD	98.4
3	morning	I	LOD	4.1	LOD	496	18	LOD	LOD	6635	LOD	247	7	LOD	603
	evening		LOD	4	LOD	500	17	LOD	LOD	6539	LOD	232	LOD	LOD	617
4	morning	I	LOD	LOD	LOD	188	14.4	LOD	0.027	1129	LOD	267	89.9	30.1	162
	evening		LOD	LOD	LOD	353	21.1	LOD	0.038	2692	LOD	184	62.7	LOD	92.5
5	morning	I	LOD	LOD	LOD	480	57.9	LOD	0.021	2599	LOD	295	41.3	LOD	191
	evening		LOD	1	LOD	563	62	LOD	LOD	3415	LOD	318	19.3	LOD	221
6	morning	I	LOD	4.7	LOD	317	40.4	LOD	0.36	8066	8.8	635	119	26.7	1146
	evening		LOD	4.9	LOD	321	40.9	LOD	0.29	8058	LOD	617	103	23.5	1111
7	morning	I	LOD	3.4	LOD	421	59.5	LOD	0.25	4503	11	558	185	29.4	1347
	evening		LOD	3.5	LOD	409	59.8	LOD	0.56	4604	LOD	537	149	29.1	1420
8	morning	I	LOD	0.8	LOD	252	10.8	LOD	1.4	2529	LOD	338	16.6	LOD	258

	evening		LOD	LOD	LOD	220	10	LOD	2.3	2087	LOD	442	51.5	33.4	266
9	morning	I	LOD	LOD	LOD	218	28.1	LOD	0.99	1123	LOD	225	13.7	LOD	82.2
	evening		LOD	LOD	LOD	220	25.8	LOD	1.7	1743	12.5	514	108	144	96.6
10	morning	I	LOD	LOD	LOD	336	80.4	LOD	3	4072	LOD	352	58.7	11.5	98.1
	evening		LOD	LOD	LOD	269	98.1	LOD	5.6	3494	11.7	696	206	195	81.2
11	morning	I	LOD	1.8	LOD	308	103	LOD	1.2	10285	LOD	922	23.7	7.8	328
	evening		LOD	1.8	LOD	321	109	LOD	1.3	10497	LOD	898	26.1	14.4	302
12	morning	II	LOD	0.8	LOD	289	93.9	LOD	LOD	9450	LOD	1025	14.7	LOD	356
	evening		LOD	1.3	LOD	295	95.6	LOD	0.93	9805	LOD	1122	21.2	7.3	358
13	morning	II	LOD	0.7	LOD	444	57.1	LOD	LOD	15225	LOD	1130	15.9	LOD	123
	evening		LOD	0.7	LOD	440	57	LOD	0.15	14920	LOD	986	21.2	LOD	114
14	noon	III	LOD	LOD	21	519	98.6	LOD	0.16	19470	LOD	2608	LOD	LOD	113
15	noon	III	LOD	LOD	LOD	519	97.3	LOD	LOD	19500	LOD	2579	LOD	LOD	112
16	noon	III	LOD	1.1	LOD	670	50.6	LOD	0.13	32289	LOD	3295	30.1	LOD	118
17	morning	IV	LOD	11.4	3096	1182	279	0.093	0.6	63192	LOD	867	LOD	LOD	1507
	evening		LOD	9	3415	1271	302	LOD	1.9	61242	LOD	966	LOD	LOD	1382
18	morning	IV	LOD	LOD	637	107	15.1	LOD	0.87	56462	LOD	465	LOD	LOD	3714
	evening		LOD	LOD	520	66.4	9.2	LOD	0.31	50249	LOD	341	LOD	LOD	3145
19	noon	I	LOD	LOD	LOD	348	152	LOD	LOD	3777	LOD	222	6.2	LOD	263
20	morning	I	2	LOD	LOD	175	4.4	LOD	LOD	12800	LOD	1573	10.2	6.4	287
	evening		2	0.7	LOD	217	9.1	LOD	2.4	14840	LOD	1812	39.8	LOD	515
21	morning	I	LOD	2.9	LOD	265	39.5	0.013	0.045	2603	LOD	463	99.4	33.6	1000
	evening		LOD	3.2	LOD	261	39.6	0.01	0.045	2663	LOD	478	99	55.3	1011
22	noon	II	0.21	LOD	LOD	82.8	4	LOD	LOD	1216	LOD	346	11.5	7	147
23	morning	I	0.9	LOD	LOD	46	0.49	LOD	LOD	1078	LOD	65.3	LOD	LOD	82.4
	evening		0.81	LOD	LOD	45.8	0.92	LOD	3.2	1075	LOD	69.6	5.4	LOD	206
24	noon	II	LOD	LOD	LOD	64.7	1.3	LOD	0.067	2888	LOD	231	LOD	LOD	34.1
25	noon	II	0.25	LOD	LOD	255	2.1	LOD	3.5	10786	LOD	302	LOD	LOD	379
26	noon	II	0.14	LOD	LOD	27.3	1.1	LOD	2.1	105	LOD	91.5	8.5	LOD	166
27	morning	II	LOD	LOD	LOD	164	1.6	LOD	0.14	2836	LOD	371	8.2	LOD	3848
	evening		0.32	LOD	LOD	165	1.8	LOD	1.2	2961	LOD	380	12.3	LOD	3900
28	morning	I	0.37	LOD	LOD	52	17.7	LOD	LOD	1391	LOD	358	15.9	LOD	160
	evening		0.27	LOD	LOD	71.3	24.7	LOD	3.7	1630	LOD	393	17.4	LOD	327
29	morning	I	4.2	LOD	LOD	45.1	0.99	LOD	LOD	744	LOD	327	LOD	LOD	293
	evening		4.3	LOD	LOD	51	13	LOD	LOD	556	LOD	264	LOD	LOD	252
30	morning	I	LOD	LOD	LOD	172	7.1	0.018	LOD	8201	LOD	620	LOD	LOD	35.5
	evening		LOD	LOD	LOD	209	13.6	0.011	3.5	7285	LOD	1478	9.9	LOD	225
31	morning	II	0.2	LOD	LOD	27.9	0.89	LOD	1.6	59.5	LOD	94.5	7.9	LOD	101
	evening		0.18	LOD	LOD	35	2.7	LOD	4.8	304	LOD	221	15.4	LOD	293
32	morning	V	LOD	LOD	LOD	12.7	3.9	0.011	0.79	26.2	LOD	173	18.7	117	1117
	evening		LOD	LOD	LOD	13	4.1	0.011	0.8	27.5	LOD	179	19.1	121	1173
33	morning	V	LOD	LOD	LOD	12.3	3.7	0.011	0.8	24.9	LOD	166	18.3	114	1061
	evening		LOD	LOD	LOD	12.7	3.8	0.011	0.8	25.7	LOD	174	19.7	118	1094
Number map	**Water sampling time**	**Water type**	**Ag**	**Cd**	**In**	**Sn**	**Sb**	**Cs**	**La**	**Ce**	**Pr**	**Nd**	**Sm**	**Eu**	**Gd**
			ng/L												
Limits of detection (LOD)			5	6	5	20	6	1	1	1	1	1	1	1	1
1	morning	I	LOD	LOD	LOD	LOD	21.4	2.2	11.1	28	3.7	13.9	3.4	LOD	2.4
	evening		LOD	LOD	LOD	LOD	20.1	3.2	12.9	39.6	4.5	18.7	4.5	LOD	2.9
2	morning	I	LOD	LOD	LOD	LOD	10.1	1.1	11.4	4.9	2.9	9.9	1.3	LOD	LOD
	evening		LOD	LOD	LOD	LOD	13.5	LOD	11.8	3.3	1.9	10.2	1.3	LOD	LOD
3	morning	I	LOD	LOD	LOD	LOD	19.2	3.9	8.3	16.9	3.2	13.9	1.8	LOD	LOD
	evening		LOD	LOD	LOD	LOD	16.6	1.7	8.9	6.7	2.3	9.6	1.8	LOD	LOD
4	morning	I	LOD	LOD	LOD	LOD	13.9	11.5	31	112	13.7	65.1	16.5	3.6	18.1
	evening		LOD	LOD	LOD	LOD	13.6	2.9	32.9	65	12.5	53	12.5	2.7	12.4
5	morning	I	LOD	LOD	LOD	LOD	17.9	2.3	29.9	63.3	9.5	40.5	11.1	1.1	9.5
	evening		LOD	LOD	LOD	LOD	16	2	16.8	33.3	6.3	22.6	3.8	LOD	6.3

6	morning	I	LOD	60.8	LOD	LOD	147	7.8	149	206	31.8	143	31.8	7.1	30.7
	evening		LOD	51.1	LOD	LOD	140	7.5	125	169	27.9	127	26.1	5.6	25.6
7	morning	I	LOD	82.3	LOD	LOD	184	6	149	261	51.9	228	48.5	10.8	51.4
	evening		LOD	81.4	LOD	LOD	183	3.7	124	206	40.2	188	39.4	8.1	36.5
8	morning	I	139	9	LOD	LOD	48.3	16.5	20.6	35.7	4.6	20.2	3.6	LOD	5.6
	evening		13.2	LOD	LOD	145	41	72.4	55.2	88.7	14.5	59.3	11.8	3.1	12.9
9	morning	I	28.3	LOD	LOD	134	23.3	2	18.1	29	4.3	13.1	2.7	LOD	3.4
	evening		7.9	LOD	LOD	126	66.2	19.3	99.2	175	27.5	105	18.4	4.6	22.5
10	morning	I	66.3	11.6	LOD	381	92.7	2.5	60.8	59.1	13.8	60.5	11.5	2.2	11.5
	evening		8.6	42.8	LOD	35.2	29.2	30.3	181	432	52.9	236	51.9	12.5	51.2
11	morning	I	7.4	17.6	LOD	LOD	96	5.9	20.6	27	3.7	18.8	4.1	LOD	3.3
	evening		LOD	6.7	LOD	110	89.4	5.1	38.9	67.2	7.4	30.5	5	LOD	6.4
12	morning	II	LOD	LOD	LOD	LOD	52.6	4.7	5.8	3.5	2	11.5	2.3	LOD	2.4
	evening		LOD	11.8	LOD	29.5	64.9	5.6	12.3	8.4	3.4	14.3	2.1	LOD	3.5
13	morning	II	LOD	LOD	LOD	LOD	30.6	3.7	13.4	20.6	5.2	24.1	5.2	LOD	5.1
	evening		25.5	79.3	LOD	LOD	19.2	4.1	12.4	20	LOD	LOD	6.7	4	148
14	noon	III	LOD	LOD	LOD	LOD	28.4	14.9	LOD	LOD	LOD	LOD	LOD	LOD	LOD
15	noon	III	LOD	LOD	LOD	LOD	28.4	13.2	LOD	LOD	LOD	LOD	LOD	LOD	LOD
16	noon	III	LOD	LOD	LOD	LOD	22	14.3	34.9	80.8	11.9	49.4	9.4	1.6	10.1
17	morning	IV	81.9	LOD	40418	LOD	424	24.2	19.8	57.5	7.1	23.9	11	LOD	9.8
	evening		91.3	LOD	41548	LOD	360	22.5	27.7	72.6	10.1	50.2	12	LOD	14
18	morning	IV	72.3	LOD	48443	LOD	58.5	12.5	19.2	56	6.1	29.4	3.2	LOD	7.5
	evening		LOD	LOD	36858	LOD	LOD	11.4	10.1	21.1	2.2	14	2.5	LOD	LOD
19	noon	I	142	LOD	LOD	LOD	27.1	2.7	3.3	3	1.1	6	1.5	LOD	LOD
20	morning	I	9.1	LOD	LOD	LOD	381	1757	7.1	4.1	1.2	6	LOD	LOD	1.1
	evening		LOD	LOD	LOD	LOD	712	1036	40.9	106	6	26.9	3	LOD	3.5
21	morning	I	LOD	26.6	LOD	LOD	138	4.3	81.5	77.4	26.3	122	23.2	4.4	22.8
	evening		LOD	25.5	LOD	LOD	138	5.4	83.8	85.5	28	114	25.6	5.1	23.1
22	noon	II	180	LOD	LOD	LOD	128	10.6	8.1	17.9	3.4	15	2.9	LOD	3.9
23	morning	I	9.2	LOD	LOD	LOD	41.5	5.9	LOD	LOD	LOD	LOD	LOD	LOD	LOD
	evening		61.6	LOD	LOD	LOD	282	7	4.8	7	1.1	3.1	LOD	LOD	LOD
24	noon	II	67	LOD	LOD	LOD	50.8	39.5	1.1	LOD	LOD	LOD	LOD	LOD	LOD
25	noon	II	7.2	LOD	LOD	LOD	206	97.3	5.7	6.1	LOD	4.4	1.4	LOD	LOD
26	noon	II	LOD	LOD	LOD	44.2	148	41.1	3.1	4.6	LOD	3.3	LOD	LOD	LOD
27	morning	II	63.9	LOD	LOD	LOD	35.1	59.5	43.3	75.7	6.6	22.7	4.3	LOD	2.8
	evening		LOD	LOD	LOD	315	99.5	57.8	30.9	47.6	6	17.9	4.2	1.1	3.4
28	morning	I	LOD	LOD	LOD	55	11.6	9.7	28.6	38.3	5	21	3.5	LOD	3.3
	evening		84.9	LOD	LOD	LOD	323	3.2	18.8	22.8	3.4	13.8	2.5	LOD	3
29	morning	I	LOD	LOD	LOD	104	76.1	97.8	1.5	2.3	LOD	1.7	LOD	LOD	LOD
	evening		LOD	LOD	LOD	73.9	73.9	27.6	1.5	6.7	LOD	1.9	LOD	LOD	LOD
30	morning	I	LOD	LOD	LOD	LOD	43.3	50.4	LOD	LOD	LOD	LOD	LOD	LOD	LOD
	evening		LOD	LOD	LOD	657	303	166	4.5	7.8	LOD	2.4	LOD	LOD	1.3
31	morning	II	68.6	20.3	LOD	LOD	19.3	1.7	3.9	7.3	1.1	3.4	LOD	LOD	2
	evening		87.7	11.8	LOD	244	401	96.1	35.1	46.3	1.6	9.2	2.1	LOD	2.4
32	morning	V	29.8	12.1	LOD	LOD	38.4	1.4	17.7	16.1	4	12.5	3	LOD	4
	evening		31.3	12.7	LOD	LOD	39.9	1.5	18.4	16.8	4.1	12.9	3	LOD	4.1
33	morning	V	28.3	11.5	LOD	LOD	36.9	1.3	17	15.5	3.9	12.1	2.9	LOD	3.9
	evening		30.4	11.8	LOD	LOD	38.8	1.4	17.4	16.4	4.1	12.6	3	LOD	4

Number map	**Water sampling time**	**Water type**	**Tb**	**Dy**	**Ho**	**Er**	**Tm**	**Yb**	**Lu**	**Re**	**Tl**	**Bi**	**Th**	**U**
			ng/L											
Limits of detection (LOD)			1	1	1	1	1	1	1	1	2	1	2	1
1	morning	I	LOD	2.3	LOD	LOD	LOD	LOD	LOD	2.8	LOD	LOD	LOD	68.8
	evening		LOD	2.9	LOD	1.3	LOD	1.3	LOD	3	LOD	LOD	LOD	74.5
2	morning	I	LOD	LOD	LOD	LOD	LOD	LOD	LOD	1.7	LOD	LOD	LOD	125
	evening		LOD	LOD	LOD	LOD	LOD	LOD	LOD	1.4	LOD	LOD	LOD	134
3	morning	I	LOD	LOD	LOD	LOD	LOD	LOD	LOD	5.9	LOD	LOD	LOD	155

	evening		LOD	LOD	LOD	LOD	LOD	LOD	LOD	6.2	LOD	LOD	LOD	156
4	morning	I	3	14.7	3.5	7.9	LOD	6.3	LOD	3.1	LOD	LOD	9.1	30.9
	evening		1.7	9.9	2.2	5.2	LOD	3.7	LOD	1.5	LOD	LOD	LOD	124
5	morning	I	1.7	9.1	1.8	3.9	LOD	3.6	LOD	1.9	LOD	LOD	LOD	150
	evening		LOD	4.8	LOD	1.8	LOD	1.7	LOD	2.5	LOD	LOD	LOD	158
6	morning	I	4.8	22.6	4.3	10.2	1.4	7.2	1.4	42.1	14.5	LOD	6.3	522
	evening		4.3	20.1	3.7	8.9	1.1	6.3	1.1	44.6	13.7	LOD	4.4	510
7	morning	I	7.6	36.3	6.8	15.9	2	12	1.8	36.3	6.9	LOD	6.2	1408
	evening		5.4	27	5.4	11.1	1.5	8.4	1.6	36.3	6.3	LOD	6.6	1415
8	morning	I	LOD	3.8	LOD	1.2	LOD	1.1	LOD	2.1	LOD	LOD	LOD	86.8
	evening		2	9.8	2	4.5	LOD	4	LOD	1.2	LOD	1.2	4.7	70.1
9	morning	I	LOD	2.7	LOD	1.2	LOD	LOD	LOD	LOD	LOD	LOD	LOD	108
	evening		3.4	17.9	4	8.7	1.4	6.6	1.1	LOD	3.4	2.3	20	69.3
10	morning	I	1.9	8.6	1.8	4.4	LOD	2.6	LOD	1.4	LOD	1.7	3.7	151
	evening		6.5	38.5	6.8	18.3	2.8	12.8	2.1	1.2	4.2	2.3	29	65.3
11	morning	I	LOD	3.1	LOD	2.2	LOD	1.2	LOD	8.6	LOD	LOD	LOD	144
	evening		LOD	5.1	LOD	2.7	LOD	1.9	LOD	8.5	LOD	LOD	LOD	141
12	morning	II	LOD	2	LOD	1.3	LOD	LOD	LOD	9	2.8	LOD	LOD	149
	evening		LOD	2.3	LOD	1.2	LOD	1.5	LOD	8.7	4.2	1.2	8.6	140
13	morning	II	LOD	3.1	LOD	1.7	LOD	1.1	LOD	5.2	LOD	LOD	LOD	235
	evening		17.4	6.9	LOD	2.8	LOD	1.9	1.6	5	LOD	LOD	LOD	238
14	noon	III	LOD	LOD	LOD	LOD	LOD	LOD	LOD	8.7	3.7	LOD	LOD	347
15	noon	III	LOD	LOD	LOD	LOD	LOD	1.2	LOD	9	3.9	LOD	LOD	343
16	noon	III	1.8	7.8	1.5	3.3	LOD	1.8	LOD	12.3	4.2	LOD	4	506
17	morning	IV	0.78	7.6	1.3	4.2	LOD	LOD	LOD	26.8	LOD	LOD	LOD	576
	evening		1.5	7.6	1.2	2.8	LOD	3	0.8	22.3	LOD	LOD	LOD	609
18	morning	IV	0.97	3.6	1.4	2.4	LOD	1.5	LOD	16	LOD	LOD	LOD	108
	evening		LOD	LOD	LOD	LOD	LOD	LOD	LOD	16.8	LOD	LOD	LOD	85.4
19	noon	I	LOD	LOD	LOD	LOD	LOD	LOD	LOD	1.2	LOD	LOD	LOD	85.1
20	morning	I	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	343
	evening		LOD	3.7	1.1	3.1	LOD	2.5	LOD	LOD	LOD	LOD	LOD	640
21	morning	I	3.9	17.6	3.3	8.8	LOD	6.1	LOD	28.7	4.4	LOD	9	423
	evening		3.5	17.8	3	6.9	LOD	5.4	1.1	28	4.5	LOD	8.3	425
22	noon	II	LOD	2.4	LOD	1.1	LOD	1.1	LOD	LOD	LOD	LOD	LOD	5.9
23	morning	I	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	2.8
	evening		LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	3
24	noon	II	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD
25	noon	II	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	52.8
26	noon	II	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	1.6
27	morning	II	LOD	LOD	LOD	1.1	LOD	LOD	LOD	2	LOD	LOD	3.9	38.9
	evening		LOD	2.4	LOD	1.1	LOD	1.1	LOD	1.8	LOD	LOD	LOD	39.9
28	morning	I	LOD	3.2	LOD	1.1	LOD	LOD	LOD	LOD	LOD	LOD	LOD	14.2
	evening		LOD	2.6	LOD	1.2	LOD	LOD	LOD	LOD	LOD	LOD	3	29.9
29	morning	I	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	15.3
	evening		LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	1.8	LOD	19
30	morning	I	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	9.2
	evening		LOD	1.4	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	20.6
31	morning	II	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	LOD	1.6
	evening		LOD	1.9	LOD	1.2	LOD	LOD	LOD	LOD	LOD	1.9	LOD	3.5
32	morning		LOD	3.2	LOD	1.1	LOD	1.1	LOD	LOD	LOD	2	LOD	83.9
	evening		LOD	3.4	LOD	1.2	LOD	1.2	LOD	LOD	LOD	2.1	LOD	87.3
33	morning		LOD	3	LOD	1.1	LOD	1	LOD	LOD	LOD	2	LOD	80.6
	evening		LOD	3.2	LOD	1.1	LOD	1	LOD	LOD	LOD	2.1	LOD	82.2

Table S4. Average chemical element concentrations in groundwater and groundwater clarks by [40], μg/L (P, Sc, Ti, Co, Nb, Ru, Rh, Pd, Te, Tm, Lu, Hf, Ta, W, Os, Ir, Pt, and Au are below analytical detection limits).

Element	Clarke	Water types				
		I	II	III	IV	V
B	42	21.64 ± 1.1	18.15 ± 1.3	50.22 ± 4.5	671.0 ± 47.0	5.27 ± 0.03
Al	280	40.9 ± 3.3	8.90 ± 0.4	5.57 ± 0.4	26.7 ± 1.9	7.52 ± 0.4
Si	8100	4345 ± 391	4556 ± 364	5110 ± 408.8	4611 ± 276.7	1757 ± 123
S	25000	5720 ± 343	7641 ± 687.7	21142 ± 1480	7508 ± 225.2	1486 ± 74.3
K	4590	745 ± 44.7	647.5 ± 38.9	2612 ± 156.7	1143 ± 45.7	130.5 ± 3.9
V	1.6	0.51 ± 0.05	0.42 ± 0.02	0.49 ± 0.02	0.60 ± 0.02	0.40 ± 0.03
Mn	49	3.14 ± 0.3	0.75 ± 0.06	6.87 ± 0.55	7.75 ± 0.23	12.8 ± 0.38
Fe	547	29.3 ± 1.8	6.63 ± 0.4	7.42 ± 0.45	71.84 ± 3.59	8.26 ± 0.33
Cu	5.6	1.43 ± 0.1	1.43 ± 0.1	2.34 ± 0.21	1.57 ± 0.08	1.33 ± 0.07
Zn	34	26.6 ± 2.4	11.6 ± 0.7	5.41 ± 0.27	14.86 ± 0.45	14.4 ± 1.01
As	2.1	0.50 ± 0.03	0.16 ± 0.01	< 0.1	0.30 ± 0.02	0.10 ± 0.01
Se	0.2	1.40 ± 0.1	0.63 ± 0.05	0.70 ± 0.06	6.05 ± 0.36	0.50 ± 0.03
Br	183	< 20	< 20	20.34 ± 1.83	1917 ± 115	20.0 ± 0.60
Sr	185	268 ± 24.1	190.7 ± 11.4	569.3 ± 45.5	656.6 ± 32.8	12.7 ± 0.89
Ba	20	34.7 ± 2.4	26.6 ± 1.9	82.18 ± 5.75	151.31 ± 7.6	3.90 ± 0.20
Hg	0.07	0.01 ± 0.001	< 0.01	< 0.01	0.05 ± 0.003	0.01 ± 0.003
Pb	2.2	0.92 ± 0.06	1.21 ± 0.06	0.11 ± 1.21	0.92 ± 0.06	0.80 ± 0.06
Li	14	4.33 ± 0.39	5.88 ± 0.5	23.75 ± 2.14	57.79 ± 1.73	0.03 ±0.003
Be		0.01 ± 0.003	<0.008	< 0.008	<0.008	<0.008
Rb	2.2	0.50 ± 0.03	0.525 ± 0.03	2.83 ± 0.14	0.66 ± 0.05	0.17 ± 0.01
Y	0.7	0.05 ± 0.002	0.014 ± 0.003	0.013 ± 0.003	<0.005	0.019 ± 0.004
Zr	2.6	0.02 ± 0.003	< 0.006	< 0.006	<0,006	0.117 ± 0.003
Mo	2.1	0.40 ± 0.02	0.818 ± 0.06	0.114 ± 0.01	2.437 ± 0.1	1.111 ± 0.07
Ag	0.29	0.020 ± 0.001	0.044± 0.001	<0.005	0.063 ± 0.002	0.030 ± 0.0018
Cd	0.02	0.020 ± 0.001	0.014± 0.0004	<0.006	<0.006	0.012 ± 0.0005
In	–	<0.010	0.005± 0.0002	<0.005	41.8 ± 2.01	0.005 ± 0.0004
Sn	0.04	0.070 ± 0.001	0.066 ± 0.002	<0.020	<0.020	0.020 ± 0.0010
Sb	1.5	0.110 ± 0.09	0.104 ± 0.006	0.026 ± 0.002	0.212 ± 0.011	0.039 ± 0.0012
Cs	0.03	0.100 ± 0.001	0.035 ± 0.002	0.014 ± 0.0007	0.018 ± 0.0005	0.001 ± 0.0001
La	0.04	0.040 ± 0.002	0.015 ± 0.001	0.012 ± 0.0007	0.019 ± 0.0008	0.018 ± 0.0005
Ce	0.06	0.070 ± 0.002	0.022 ± 0.007	0.028 ± 0.001	0.052 ± 0.0036	0.016 ± 0.0008
Pr	0.007	0.010 ±0.0004	0.038 ± 0.001	0.005 ± 0.0002	0.006 ± 0.0002	0.004 ± 0.0002
Nd	0.04	0.050 ± 0.001	0.011 ± 0.0004	0.017 ± 0.0007	0.029 ± 0.0012	0.013 ± 0.0005
Sm	0.008	0.010 ± 0.0004	0.003 ± 0.0002	0.004 ± 0.0003	0.007 ± 0.0004	0.003 ± 00020
Eu	0.001	0.003 ± 0.0001	0.001 ± 0.0001	0.001 ± 0.00003	<0.001	0.001 ± 0.00003
Gd	0.008	0.011 ± 0.0002	0.015 ± 0.001	0.004 ± 0.0003	0.008 ± 0.0004	0.004 ± 0.0002
Tb	0.001	0.002 ± 0.0001	0.002 ± 0.0001	0.001 ± 0.0001	0.001 ± 0.0001	0.001 ± 0.0001
Dy	0.005	0.008 ± 0.0002	0.002 ± 0.0001	0.003 ± 0.0001	0.005 ± 0.0002	0.003 ± 0.0002
Ho	0.001	0.002 ± 0.0001	0.001 ± 0.0001	0.001 ± 0.0001	0.001 ± 0.0001	0.001 ± 0.0001
Er	0.004	0.004 ± 0.0002	0.001 ±0.00003	0.002 ± 0.0001	0.003 ± 0.0001	0.001 ± 0.00003
Tm	0.001	0.001 ± 0.0001	0.001 ± 0.0001	0.001 ± 0.00004	<0.001	0.001 ± 0.00004
Yb	0.004	0.003 ± 0.0002	0.001 ± 0.0001	0.001 ± 0.0001	0.002 ± 0.0001	0.001 ± 0.0001
Lu	0.001	0.001 ± 0.0001	0.001 ±0.00003	0.001 ± 0.0001	0.001 ± 0.0001	0.001 ± 0.00004
Re	–	0.008 ± 0.0001	0.003 ± 0.0001	0.010 ± 0.0003	0.021 ± 0.0006	0.001 ± 0.00004
Tl	1	0.003 ± 0.0002	0.003 ± 0.0002	0.004 ± 0.0002	<0.002	0.002 ± 0.0001
Bi	–	0.001 ± 0.0001	0.001 ± 0.0001	0.001 ± 0.00003	<0.001	0.002 ± 0.0001
Th	0.42	0.005 ± 0.025	0.003 ± 0.0002	0.003 ±0.0001	<0.002	0.002 ± 0.0001
U	3.4	0.226 ± 0.004	0.076 ± 0.002	0.399 ± 0.012	0.344 ± 0.072	0.084 ± 0.0042