

Table DR1. Chemical composition (mg/l) of some acidic springs and corresponding draining streams. The chloride/sulfate ratio (Cl/SO₄) in weight units. The last row presents the chemical composition of a typical cold meteoric water of a stream that is fed by perennial snow on the surface of an old lava flow

Name	T°C	pH	Na	K	Ca	Mg	Al	Fe	Cl	SO ₄	SiO ₂	Cl/SO ₄
Paramushir Island												
Yurievsky spring	81	1.20	187	128	230	15	356	181	2734	6861	136	0.39
Yurievskaya River	14	2.59	74	58	111	41	105	43	646	1946	52	0.33
Shiashkotan Island, Kuntomintar volcano												
Spring	65	2.40	64	2	365	29	338	181	462	3463	156	0.13
Craterny Creek	16	3.52	31	2.3	111	22	51	10	74	721	81	0.10
Shiashkotan Island, Sinarka volcano												
Spring	51	2.71	385	30	545	501	49	106	2538	1538	135	1.7
Agglomerate creek	14	3.75	93	5.4	415	105	117	37	470	1640	51	0.29
Urup Island, Berg volcano												
Spring	40	3.30	262	14	382	294	17	14	1174	1190	146	0.98
Maria River	15	3.65	101	12	193	81	15	4.5	282	648	101	0.43
Iturup Island, Baranski volcano												
Blue lake spring*)	100	1.23	225	66	136	44	190	39	1702	4661	388	0.37
Sernaya River**)	15	2.78	12	1.7	11	3.1	nd	nd	32	33	nd	0.50
Kunashir Island, Mendeleev volcano												
Spring	82	2.28	398	39	142	52	26	54	1230	1085		1.1
Lesnaya River	14	5.4	43	4.6	17	5.4	1.4	0.38	75	71	77	1.1

Kunashir Island, Golovnin caldera

Boiling Lake	29	2.22	218	24	71	28	6.6	6.2	687	254	178	2.7
Ozernoy Creek	16	2.88	53	6.1	36	7.8	2.9	2.5	104	162	101	0.64

Meteoric water, Paramushir Island

Creek 2	2.4	7.39	3.6	0.7	3.7	0.8	nd	nd	5.0	4.3	18	1.16
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*) From Taran et al. (1996). **) from Bragin et al. (2015). nd – not determined

Table DR2. Output of chlorine and sulfur by rivers and creeks draining volcano-hydrothermal systems of the Kuril Arc. Numbers of streams correspond to numbers on the map (Fig. 1)

No		Q m ³ /sec	pH (field)	Cl (ex) mg/l	SO ₄ mg/l	Cl t/d	S t/d
Paramushir							
1	Yurieva	2.04	1.84	480	1433	85.0	84.0
2	Gorshkova	1.97	3.13	28	115	4.8	6.5
3	Galochkina	1.16	4.09	17	41	1.7	1.4
4	Tayna	4.1	7.12	18	72	6.4	8.5
5	Trudnaya	1.24	4.11	84	147	9.0	5.2
6	Kuzminka	0.8	4.04	19	47	1.3	1.1
7	Nasedkina	3.18	4.18	25	82	6.9	7.5
8	Other rivers	98				22.7	121
Shiashkotan							
9	Agglomerate	0.24	3.75	475	1640	9.8	11.3
10	Craternyi	0.2	3.52	78	721	1.3	4.2
11	Sernyi	0.14	7.4	118	316	1.4	1.3
Ketoy							
12	Vodopadnyi	0.63	4.55	165	474	9.0	8.6
13	Gorchichnyi	0.13	6.79	5	714	0.1	2.7
Urup							
14	Maria	0.24	3.67	287	648	6.0	4.5
15	Daria	0.22	3.55	163	521	3.1	3.3
16	Daikovy	0.2	5.05	23	555	0.4	3.2
Iturup							
17	South Chirip*	2	5.5	25	793	4.3	45.7
18	North Chirip*	2.5	5.5	28	932	6.0	67.1
19	Sernaya**	12	2.9	33	98	33.0	11.0
Kunashir							
20	Lesnaya	1.1	5.4	80	71	7.6	2.2
21	Zmeinny	0.04	7.8	178	65	0.6	0.1
22	Chetveryakova	0.37	4.11	18	104	0.6	1.1
23	Valentiny	0.08	7.07	68	73	0.5	0.2
24	Ozernoy	0.55	2.88	109	162	5.2	2.6
	Total	149				227	406

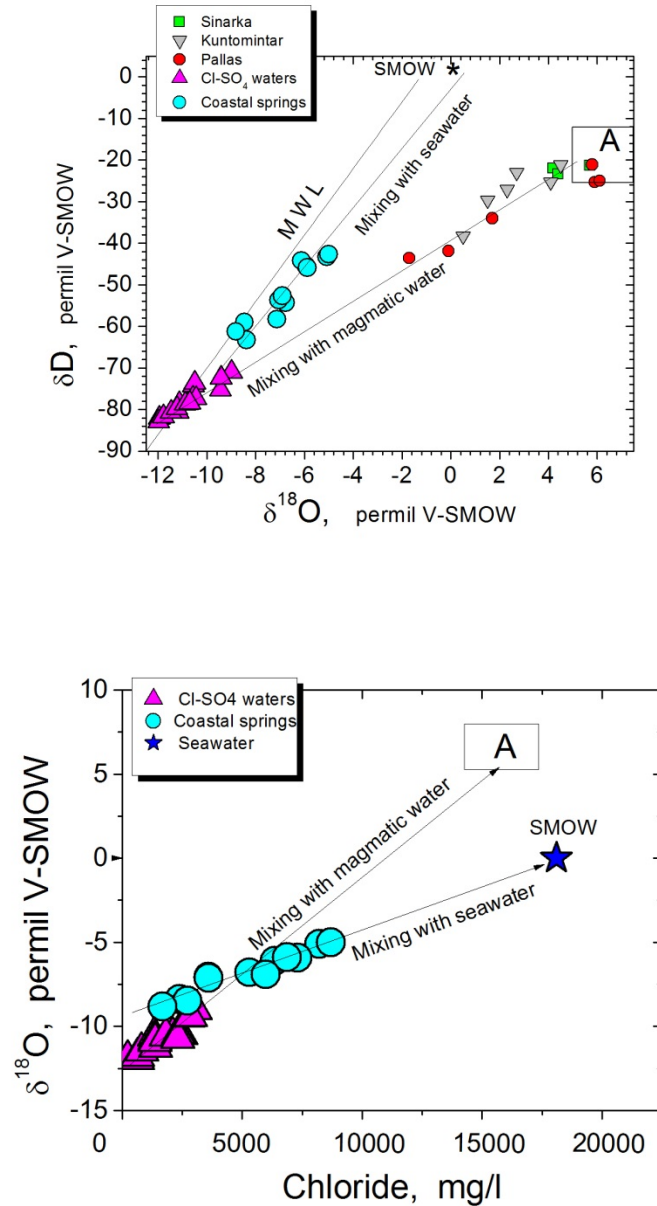


Figure DR1. δD vs $\delta^{18}O$ and $\delta^{18}O$ vs chloride plots for acidic Cl-SO₄ waters and coastal springs in Kuril Islands (data from Kalachava et al., 2015 and 2016). On the upper plot isotopic composition of volcanic vapors from some Kuril volcanoes are also shown (Taran et al., 2018).

References

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