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Seasonal dynamics of organic carbon and metals in thermokarst lakes from the discontinuous permafrost zone of western Siberia

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Supplementary information (Tables and Figures) for bg-2014-606, Manasypov et al.

Table S1. Equations, regressions and coefficients to the data shown in Figures 2, 3, 4, 8, S2 and S4 of the manuscript. R_S is Spearman Rank Order Correlations ($p < 0.05$).

Figure No	Variables	Season	Equation, R^2	R_S
2	DOC, ppm/ Lake surface area, m^2	Spring (all)	$y = 24.6x^{-0.066}$ $R^2 = 0.495$	-0.69
		>100 m^2	$y = 21.6x^{-0.053}$ $R^2 = 0.173$	-0.33
		Summer	$y = 57.1x^{-0.116}$ $R^2 = 0.327$	-0.57
		Autumn	$y = 48.106x^{-0.073}$ $R^2 = 0.177$	-0.39
3	UV_{280}/[DOC]/ Lake surface area, m^2	Spring	$y = 0.0251x^{-0.007}$ $R^2 = 0.027$	-0.12
		Summer	$y = 0.0284x^{0.0014}$ $R^2 = 0.0002$	0.09
		Autumn	$y = 0.0301x^{0.0135}$ $R^2 = 0.016$	0.14
S2 A	Ca, ppb/ Lake surface area, m^2	Spring	$y = 206.8x^{-0.028}$ $R^2 = 0.045$	-0.16
		Summer	$y = 184.9x^{0.0412}$ $R^2 = 0.033$	0.12
		Autumn	$y = 297.3x^{0.0109}$ $R^2 = 0.0015$	0.03
S2 B	Si, ppb/ Lake surface area, m^2	Spring	$y = 106.5x^{-0.055}$ $R^2 = 0.0864$	-0.30
		Summer	$y = 85.6x^{0.1047}$ $R^2 = 0.109$	0.27
		Autumn	$y = 393x^{-0.031}$ $R^2 = 0.0054$	-0.05
4	pH/ Lake surface area, m^2	Spring	$y = 4.04x^{0.0067}$ $R^2 = 0.096$	0.24
		Summer	$y = 3.846x^{0.0254}$ $R^2 = 0.30$	0.56
		Autumn	$y = 3.04x^{0.0374}$ $R^2 = 0.44$	0.60
S4 A	Fe, ppb/ DOC, ppm	Spring	$y = 41.8x^{0.2403}$ $R^2 = 0.02$	0.17
		Summer	$y = 23.4x^{0.7182}$ $R^2 = 0.31$	0.56
		Autumn	$y = 199.5x^{0.0383}$ $R^2 = 0.001$	0.14
S4 B	As, ppb/ Fe, ppb	Spring	$y = 0.247x^{0.1053}$ $R^2 = 0.087$	0.43
		Summer	$y = 0.126x^{0.2998}$ $R^2 = 0.53$	0.95

		Autumn	$y = 0.0567x^{0.4327}$ $R^2 = 0.33$	0.56
S4 C	Cd, ppb/ DOC, ppm	Spring	$y = 3E-05x^{1.9488}$ $R^2 = 0.21$	0.51
		Summer	$y = 0.0003x^{1.3096}$ $R^2 = 0.40$	0.67
		Autumn	$y = 0.0071x^{0.3962}$ $R^2 = 0.086$	0.29
8A	DOC, ppm/ Residence time, years	Spring	$y = 9.48x^{-0.589}$ $R^2 = 0.237$	-0.33
		Summer	$y = 14.8x^{-0.859}$ $R^2 = 0.386$	-0.65
		Autumn	$y = 15.4x^{-0.413}$ $R^2 = 0.298$	-0.1
8B	Fe, ppb/ Residence time, years	Spring	$y = 73.8x^{-0.037}$ $R^2 = 0.0006$	-0.39
		Summer	$y = 160x^{-0.448}$ $R^2 = 0.086$	-0.55
		Autumn	$y = 199x^{-0.421}$ $R^2 = 0.18$	-0.12
S3 A	Fe, ppb/ Lake surface area, m^2	Spring	$y = 76.3x^{0.0025}$ $R^2 = 0.0003$	0.0003
		Summer	$y = 233x^{-0.014}$ $R^2 = 0.0029$	-0.15
		Autumn	$y = 151x^{0.0419}$ $R^2 = 0.05$	0.19
S3 B	Al, ppb/ Lake surface area, m^2	Spring	$y = 39.7x^{-0.023}$ $R^2 = 0.055$	-0.26
		Summer	$y = 82.5x^{0.0066}$ $R^2 = 0.0006$	0.03
		Autumn	$y = 80.8x^{0.0661}$ $R^2 = 0.05$	0.36
S3 C	Mn, ppb/ Lake surface area, m^2	Spring	$y = 7.13^{-0.064}$ $R^2 = 0.10$	-0.25
		Summer	$y = 9.40^{0.0344}$ $R^2 = 0.01$	0.06
		Autumn	$y = 13.4x^{-7E-04}$ $R^2 = 4E-06$	-0.11
S3 D	Zn, ppb/ Lake surface area, m^2	Spring	$y = 28.5x^{-0.091}$ $R^2 = 0.0498$	-0.22
		Summer	$y = 31.5x^{0.0407}$ $R^2 = 0.0051$	0.15
		Autumn	$y = 359x^{-0.136}$ $R^2 = 0.063$	-0.18
S3 E	Cu, ppb/ Lake surface area, m^2	Spring	$y = 0.4311x^{-0.102}$ $R^2 = 0.13$	-0.55
		Summer	$y = 0.389x^{0.01}$ $R^2 = 0.0021$	0.01
		Autumn	$y = 0.566x^{0.0216}$ $R^2 = 0.0065$	0.16
S3 F	Pb, ppb/	Spring	$y = 0.504x^{-0.148}$ $R^2 = 0.602$	-0.80

		Summer	$y = 0.499x^{-0.096}$ $R^2 = 0.11$	-0.43
	Lake surface area, m^2	Autumn	$y = 0.254x^{0.0261}$ $R^2 = 0.006$	0.06
S3 G	Mo, ppb/	Spring	$y = 0.0132x^{-0.027}$ $R^2 = 0.03$	0.06
	Lake surface area, m^2	Summer	$y = 0.0054x^{0.062}$ $R^2 = 0.03$	0.36
		Autumn	$y = 0.0158x^{0.0184}$ $R^2 = 0.0042$	0.10
S3 H	V, ppb/	Spring	$y = 0.3621x^{-0.028}$ $R^2 = 0.12$	-0.44
	Lake surface area, m^2	Summer	$y = 0.1018x^{0.1398}$ $R^2 = 0.28$	0.48
		Autumn	$y = 0.200x^{0.1}$ $R^2 = 0.073$	0.45
S3 I	As, ppb/	Spring	$y = 0.465x^{-0.029}$ $R^2 = 0.25$	-0.49
	Lake surface area, m^2	Summer	$y = 0.735x^{-0.019}$ $R^2 = 0.032$	-0.25
		Autumn	$y = 0.655x^{-0.011}$ $R^2 = 0.0058$	-0.06
S3 J	Sb, ppb/	Spring	$y = 0.0483x^{-0.029}$ $R^2 = 0.167$	-0.39
	Lake surface area, m^2	Summer	$y = 0.0415x^{0.0141}$ $R^2 = 0.014$	-0.04
		Autumn	$y = 0.094x^{-0.018}$ $R^2 = 0.0069$	0.06

Table S2. Primary data of thermokarst lake chemical composition during different seasons

Sample:	S, m²	B	Na	Mg	Al	Si	K	Ca	Ti	V	Cr
June											
Z-43	1.8	32	378	106	40.9	248	149	158	0.777	0.443	0.205
Z-44	0.071	31	398	140	46.0	236	323	163	0.684	0.352	0.255
Z-45	4.9	33	399	171	71.7	369	176	353	1.306	0.565	0.236
Z-46	31400	35	402	97	26.0	79	119	183	0.341	0.174	0.087
Z-47	1.8	34	327	109	35.8	217	142	176	0.659	0.333	0.194
Z-48	78.5	35	463	83	27.0	70	137	124	0.547	0.278	0.148
Z-49	1.0	31	355	78	97.3	182	145	185	0.743	0.324	0.121
Z-50	96163	19	315	46	26.8	46	180	98	0.349	0.160	0.073
Z-51	25434	27	353	87	24.0	26	129	122	0.388	0.204	0.125
Z-52	17663	37	466	102	28.4	85	176	241	0.363	0.178	0.110
Z-53	9.6	24	325	122	28.4	55	137	185	0.568	0.306	0.133
Z-54	0.13	37	430	164	51.9	252	206	221	0.847	0.397	0.232
Z-55		61	2987	651	57.3	2210	188	1446	1.057	0.315	0.289
Z-56	5671.6	1.1	211	23	51.5	103	80	47	0.471	0.318	0.129
Z-57	3000	83	1810	95	22.1	70	116	346	0.250	0.178	0.096
Z-58	314	116	1862	83	26.4	68	292	280	0.362	0.241	0.117
Z-59	5024	45	616	105	25.1	158	357	165	0.547	0.221	0.175
Z-60	314.0	< d.l.	127	62	35.2	47	24	95	0.628	0.335	0.100
Z-61	176.6	124	2796	95	22.3	66	122	264	0.399	0.248	0.157
Z-62	1766000	92	2655	89	39.7	135	337	265	0.705	0.344	0.173
Z-63	28.3	2.0	122	29	41.7	96	38	39	0.693	0.356	0.145
Z-64	19.6	45	644	116	40.6	173	219	167	0.851	0.497	0.200
Z-65	11304	93	2634	98	65.6	232	540	247	0.919	0.529	0.277
Z-66	314.0	86	1721	130	29.3	66	277	360	0.501	0.308	0.107
Z-67	78.5	1.6	272	74	45.4	105	61	108	0.961	0.464	0.206
Z-68	176.6	172	2628	112	31.5	108	372	416	0.744	0.376	0.218
Z-69	314.0	< d.l.	295	59	37.7	39	186	101	0.516	0.288	0.131
Z-70	78.5	18	546	80	38.9	46	259	96	0.815	0.319	0.190
Z-71	0.0079	246	4947	154	50.1	166	1833	444	0.884	0.466	0.305
Z-72	1.8	222	3430	110	17.3	213	826	236	0.606	0.328	0.197
Z-73	706.5	2.6	325	91	40.0	15	25	116	0.416	0.237	0.106
Z-74	1766250	12	426	18	36.7	115	504	33	0.411	0.278	0.120
Z-75	0.20	215	3793	205	36.7	246	894	417	0.991	0.360	0.215
Z-77	113	< d.l.	224	164	96.7	56	31	294	1.311	0.414	0.328
Z-78	3.1	3.0	194	104	36.6	83	28	176	0.831	0.333	0.204
Z-79	314	< d.l.	259	144	31.8	25	40	313	0.439	0.225	0.098
Z-80	1256	2.1	326	159	37.2	23	37	158	0.564	0.257	0.154
Z-81	31400	2.4	629	114	49.0	40	91	181	0.399	0.326	0.132
Z-82	113	< d.l.	131	109	22.9	88	30	151	0.472	0.283	0.078
Z-83	1766250	3	1120	426	22.6	244	179	528	0.206	0.123	0.122
Z-84	314	< d.l.	135	155	26.6	31	28	228	0.424	0.252	0.084
Z-85	70650	76	2071	55	21.4	73	98	224	0.283	0.290	0.127
Z-86		4.0	1478	532	19.9	192	188	620	0.396	0.325	0.109
Z-87	1256	87	1695	99	16.4	95	117	386	0.225	0.171	0.028
Z-88	176.6	3	236	52	29.0	63	87	127	0.803	0.443	0.166
Z-89	706.5	< d.l.	331	66	14.2	18	36	116	0.227	0.188	0.027
Z-90	1589.6	< d.l.	277	92	20.0	24	25	141	0.274	0.204	0.045
Z-91	379.9	2.6	292	145	45.7	121	36	226	0.665	0.288	0.157
Z-92	78.5	2.2	137	19	35.6	19	65	42	0.835	0.461	0.170
Z-93	2268650	2.2	333	44	45.6	84	114	123	0.798	0.774	0.150
Z-94	19.6	< d.l.	100	69	25.8	59	32	109	0.724	0.371	0.092
Z-95	4.9	279	3620	151	19.2	172	724	292	0.695	0.226	0.192
Z-96	502400	21	722	36	33.5	78	313	62	0.453	0.533	0.125
Z-97		< d.l.	210	133	57.8	45	40	255	0.894	0.397	0.163
Z-98	0.79	0.5	176	68	48.1	40	45	260	0.981	0.546	0.130
Z-99	314.0	2.5	719	107	82.4	407	82	252	1.308	0.425	0.320
Z-100	3.1	2.6	138	105	31.2	70	7	190	0.692	0.316	0.232
Z-101	7850	< d.l.	208	68	18.3	20	26	156	0.296	0.192	0.026
Z-102	4.9	2.4	132	95	27.3	166	13	174	0.809	0.348	0.175
Z-103	961.6	3.2	370	148	46.4	14	51	222	0.638	0.240	0.148
Z-104	0.13	2.6	347	182	119.4	403	38	299	2.192	0.657	0.396
Z-105	706.5	< d.l.	188	124	24.9	51	24	297	0.365	0.244	0.037
Z-106	12.6	2.5	122	94	25.4	40	15	157	0.717	0.258	0.139
Z-107	196250	2.4	730	123	72.5	76	92	267	0.840	0.435	0.249

Sample: June	Mn	Fe	Co	Ni	Cu	Zn	Ga	As	Rb	Sr	Zr
Z-43	5.8	178	0.121	0.466	0.337	65	0.023	0.490	0.069	2.39	0.316
Z-44	7.9	55.2	0.078	0.461	0.662	66	0.020	0.443	0.187	2.28	0.322
Z-45	7.4	313	0.263	0.444	0.540	56	0.038	0.585	0.082	3.37	0.084
Z-46	4.2	46.4	0.062	0.210	0.166	54	0.010	0.304	0.054	3.27	0.290
Z-47	7.7	130	0.085	0.242	0.457	54	0.020	0.464	0.070	2.54	0.312
Z-48	3.9	118	0.022	0.139	0.248	56	0.012	0.410	0.059	2.20	0.040
Z-49	4.2	75	0.033	0.102	0.309	49	0.015	0.358	0.060	2.05	0.038
Z-50	2.9	85	0.033	0.076	0.182	55	0.007	0.212	0.205	1.75	0.289
Z-51	4.8	83	0.066	0.140	0.259	58	0.010	0.418	0.055	2.41	0.302
Z-52	4.4	49	0.066	0.191	0.365	64	0.010	0.302	0.087	3.45	0.291
Z-53	7.9	136	0.077	0.180	0.295	52	0.010	0.394	0.048	2.59	0.035
Z-54	17.7	151	0.149	0.252	0.666	62	0.025	0.554	0.109	2.90	0.324
Z-55	47.1	759	0.139	0.538	0.341	62	0.008	0.360	0.051	17.1	0.118
Z-56	2.3	160	0.026	0.067	0.112	1.4	0.014	0.393	0.274	0.81	0.318
Z-57	1.0	68	0.019	0.047	0.341	29	0.006	0.319	0.034	4.68	0.029
Z-58	2.3	99	0.025	0.078	0.435	124	0.009	0.294	0.106	4.97	0.039
Z-59	14.4	31.2	0.038	0.086	0.630	187	0.015	0.306	0.149	3.90	0.324
Z-60	4.8	72.3	0.043	0.083	0.103	2.7	0.011	0.282	0.034	1.09	0.037
Z-61	2.1	45.9	0.028	0.133	0.559	103	0.011	0.342	0.038	4.58	0.485
Z-62	1.3	57.8	0.020	0.062	0.350	38	0.011	0.389	0.138	4.43	0.501
Z-63	2.8	66.1	0.014	0.186	0.163	2.3	0.016	0.371	0.099	0.37	0.052
Z-64	6.5	97	0.047	0.160	0.617	113	0.021	0.384	0.196	3.65	0.508
Z-65	5.4	125	0.055	0.104	0.559	281	0.016	0.400	0.205	5.38	0.559
Z-66	5.6	45.3	0.040	0.072	0.498	138	0.013	0.359	0.107	5.30	0.041
Z-67	4.1	91.8	0.046	0.143	0.615	3.9	0.022	0.463	0.194	0.95	0.494
Z-68	2.4	48.7	0.024	0.111	0.869	322	0.015	0.398	0.098	5.35	0.050
Z-69	4.9	71.0	0.037	0.152	0.219	4.2	0.011	0.448	0.618	1.07	0.477
Z-70	6.2	92.6	0.040	0.123	0.344	49	0.016	0.538	0.283	2.18	0.483
Z-71	2.1	70.3	0.048	0.091	1.504	685	0.024	0.629	0.306	6.44	0.491
Z-72	2.3	16.2	0.015	0.009	1.329	701	0.013	0.415	0.153	5.26	0.474
Z-73	5.9	78.3	0.047	0.068	0.169	3.9	0.011	0.432	0.081	1.76	0.463
Z-74	0.6	107	0.013	0.048	0.125	66	0.005	0.328	0.331	1.21	0.480
Z-75	16.6	32	0.047	0.171	1.497	772	0.020	0.434	0.170	6.49	0.492
Z-77	14.7	194	0.073	0.331	2.234	7.7	0.024	0.519	0.032	1.77	0.070
Z-78	12.5	74	0.032	0.151	0.491	4.5	0.015	0.469	0.054	0.90	0.474
Z-79	9.4	163	0.034	0.086	0.109	3.3	0.012	0.434	0.055	3.31	0.040
Z-80	11.7	59	0.051	0.134	0.293	6.2	0.009	0.390	0.114	1.59	0.454
Z-81	9.8	85	0.044	0.112	0.099	2.2	0.009	0.391	0.304	2.20	0.457
Z-82	12.6	92	0.020	0.038	0.046	4.7	0.006	0.366	0.007	0.71	0.024
Z-83	24.6	256	0.052	0.138	0.227	4.5	0.004	0.269	0.254	5.77	0.471
Z-84	16.7	84	0.032	0.062	0.002	3.7	0.006	0.340	0.031	1.89	0.026
Z-85	0.1	40	0.019	0.024	0.264	15	< d.l.	0.272	0.038	3.15	0.443
Z-86	7.1	647	0.026	0.059	0.117	0.9	< d.l.	0.312	0.324	7.47	0.462
Z-87	1.3	29	0.017	0.063	0.291	50	0.001	0.238	0.030	4.57	0.017
Z-88	2.4	49	0.021	0.120	0.372	1.5	0.010	0.430	0.402	1.89	0.469
Z-89	2.7	33	0.010	0.037	0.042	1.8	0.005	0.279	0.069	1.58	0.023
Z-90	4.7	60	0.027	0.064	0.008	2.3	0.009	0.385	0.027	1.57	0.023
Z-91	11.2	100	0.067	0.152	0.187	9.0	0.007	0.595	0.137	3.04	0.459
Z-92	2.3	55	0.023	0.270	0.366	3.2	0.015	0.610	0.199	0.28	0.476
Z-93	2.9	98	0.020	0.105	0.185	1.0	0.001	0.429	0.336	1.94	0.497
Z-94	9.0	42	0.016	0.084	0.309	3.2	0.015	0.316	0.045	0.65	0.040
Z-95	15.0	26	0.021	0.111	1.375	718	0.008	0.367	0.146	5.89	0.461
Z-96	2.1	99	0.017	0.124	0.176	119	0.008	0.334	0.268	1.90	0.484
Z-97	7.9	118	0.050	0.117	0.206	5.8	0.013	0.442	0.077	2.52	0.056
Z-98	4.1	78	0.022	0.197	0.358	6.0	0.018	0.361	0.063	2.20	0.051
Z-99	9.3	309	0.049	0.214	0.129	3.1	0.017	0.454	0.399	3.61	0.552
Z-100	10.1	60	0.026	0.178	0.342	4.2	0.016	0.495	0.017	1.70	0.455
Z-101	3.7	25	0.000	0.024	0.006	1.0	0.005	0.235	0.024	1.71	0.013
Z-102	8.7	41	0.027	0.197	0.426	4.2	0.016	0.451	0.028	1.41	0.461
Z-103	8.9	114	0.050	0.214	0.228	7.4	0.014	0.608	0.203	2.90	0.441
Z-104	4.6	333	0.100	0.414	0.540	9.2	0.050	0.904	0.107	3.24	0.509
Z-105	7.6	72	0.025	0.067	0.020	3.6	0.008	0.381	0.027	2.72	0.026
Z-106	14.5	44	0.023	0.164	0.322	4.3	0.013	0.383	0.029	1.21	0.448
Z-107	10.2	144	0.052	0.160	0.183	2.7	0.014	0.477	0.323	3.47	0.496

Sample:	Nb	Mo	Cd	Sb	Cs	Ba	La	Ce	Pr	Nd	Sm	Eu
June												
Z-43	0.017	0.009	0.005	0.040	< d.l.	110	< d.l.	0.0021	< d.l.	0.0198	0.0007	0.0313
Z-44	0.016	0.014	0.033	0.057	< d.l.	104	0.0058	0.0137	< d.l.	0.0266	0.0015	0.0296
Z-45	0.013	0.022	0.050	0.062	0.009	119	0.0277	0.0578	0.0123	0.0312	0.0149	0.0156
Z-46	0.013	0.004	0.003	0.028	< d.l.	106	< d.l.	< d.l.	< d.l.	0.0095	< d.l.	0.0320
Z-47	0.016	0.008	0.014	0.039	< d.l.	117	< d.l.	0.0015	< d.l.	0.0179	0.0002	0.0367
Z-48	0.005	0.007	0.015	0.044	0.003	97	0.0083	0.0200	0.0023	0.0105	0.0033	0.0063
Z-49	0.003	0.008	0.011	0.036	0.000	115	0.0079	0.0217	< d.l.	0.0064	0.0002	0.0063
Z-50	0.014	0.007	0.000	0.027	< d.l.	80	< d.l.	< d.l.	< d.l.	0.0110	< d.l.	0.0211
Z-51	0.014	0.002	0.005	0.042	< d.l.	103	< d.l.	< d.l.	< d.l.	0.0129	< d.l.	0.0311
Z-52	0.013	0.005	0.004	0.037	< d.l.	103	< d.l.	< d.l.	< d.l.	0.0107	< d.l.	0.0317
Z-53	< d.l.	0.002	0.027	0.048	< d.l.	103	0.0069	0.0202	-0.0007	0.0081	0.0012	0.0047
Z-54	0.017	0.044	0.040	0.043	< d.l.	122	0.0016	0.0151	-0.0192	0.0254	0.0019	0.0394
Z-55	0.007	0.016	0.006	0.025	0.003	271	0.0974	0.2520	0.0282	0.1325	0.0287	0.0222
Z-56	0.014	0.018	0.001	0.024	< d.l.	0.73	< d.l.	< d.l.	< d.l.	0.0125	< d.l.	< d.l.
Z-57	0.001	0.011	0.008	0.026	0.003	102	0.0099	0.0163	0.0013	0.0067	0.0033	0.0080
Z-58	0.019	0.009	0.013	0.033	0.005	194	0.0148	0.0292	0.0044	0.0105	0.0073	0.0171
Z-59	0.015	0.016	0.013	0.035	< d.l.	377	0.1305	0.1299	< d.l.	0.0233	0.0017	0.1324
Z-60	0.006	0.004	0.017	0.036	0.006	3.01	0.0120	0.0258	0.0029	0.0122	0.0026	0.0003
Z-61	0.012	0.009	0.003	0.031	< d.l.	116	< d.l.	< d.l.	< d.l.	0.0200	0.0037	0.0356
Z-62	0.013	0.019	0.001	0.031	< d.l.	124	< d.l.	< d.l.	< d.l.	0.0194	0.0034	0.0396
Z-63	0.010	0.016	0.008	0.041	0.018	0.66	0.0527	0.1243	0.0090	0.0523	0.0090	< d.l.
Z-64	0.019	0.013	0.018	0.038	< d.l.	275	0.0090	0.0203	< d.l.	0.0331	0.0069	0.0963
Z-65	0.015	0.021	0.008	0.040	< d.l.	224	0.0093	0.0253	< d.l.	0.0380	0.0083	0.0812
Z-66	0.046	0.025	0.017	0.055	0.011	189	0.0168	0.0268	0.0070	0.0145	0.0077	0.0168
Z-67	0.016	0.014	0.013	0.044	0.003	1.40	0.0015	0.0145	< d.l.	0.0300	0.0054	0.0016
Z-68	0.031	0.017	0.017	0.044	0.006	192	0.0203	0.0431	0.0058	0.0272	0.0058	0.0141
Z-69	0.013	0.010	0.006	0.040	0.016	1.34	< d.l.	< d.l.	< d.l.	0.0162	0.0025	0.0004
Z-70	0.012	0.008	0.016	0.040	< d.l.	236	0.0011	0.0297	< d.l.	0.0461	0.0091	0.0846
Z-71	0.014	0.023	0.025	0.048	< d.l.	340	0.0150	0.0197	< d.l.	0.0395	0.0094	0.1250
Z-72	0.013	0.015	0.019	0.031	< d.l.	281	0.0030	0.0011	< d.l.	0.0297	0.0071	0.0992
Z-73	0.010	0.016	0.015	0.043	< d.l.	1.77	< d.l.	< d.l.	< d.l.	0.0162	0.0023	0.0025
Z-74	0.010	0.021	< d.l.	0.027	< d.l.	104	< d.l.	< d.l.	< d.l.	0.0204	0.0037	0.0340
Z-75	0.022	0.020	0.050	0.036	< d.l.	345	0.0142	0.0260	< d.l.	0.0436	0.0181	0.1239
Z-77	0.020	0.014	0.035	0.059	0.004	3.44	0.0220	0.0556	0.0098	0.0351	0.0111	0.0031
Z-78	0.021	0.016	0.009	0.044	< d.l.	1.77	< d.l.	0.0040	< d.l.	0.0222	0.0121	0.0034
Z-79	0.030	0.019	0.020	0.044	0.006	2.14	0.0077	0.0164	0.0018	0.0081	0.0015	0.0006
Z-80	0.015	0.014	0.010	0.038	0.005	1.48	< d.l.	< d.l.	< d.l.	0.0183	0.0106	0.0032
Z-81	0.015	0.013	0.008	0.045	0.019	2.56	< d.l.	< d.l.	< d.l.	0.0181	0.0107	0.0037
Z-82	< d.l.	< d.l.	0.010	0.038	< d.l.	1.75	0.0027	0.0153	< d.l.	0.0036	< d.l.	< d.l.
Z-83	0.012	0.019	< d.l.	0.025	< d.l.	4.03	0.0063	0.0276	< d.l.	0.0405	0.0164	0.0052
Z-84	0.002	0.005	0.016	0.035	0.004	2.65	0.0067	0.0163	0.0009	0.0091	0.0015	< d.l.
Z-85	0.017	0.023	< d.l.	0.042	< d.l.	74	< d.l.	< d.l.	< d.l.	0.0241	0.0144	0.0302
Z-86	0.011	0.020	< d.l.	0.032	< d.l.	3.9	0.0058	0.0202	< d.l.	0.0385	0.0174	0.0045
Z-87	0.001	0.004	0.000	0.017	0.001	114	0.0055	0.0074	< d.l.	0.0030	0.0005	0.0046
Z-88	0.018	0.016	< d.l.	0.054	0.027	1.06	0.0035	0.0164	< d.l.	0.0329	0.0152	0.0027
Z-89	0.016	0.012	0.010	0.052	0.007	1.20	0.0229	0.0391	< d.l.	0.0008	0.0010	< d.l.
Z-90	0.047	0.022	0.013	0.038	0.005	1.59	0.0064	0.0096	0.0019	0.0059	0.0015	0.0016
Z-91	0.018	0.012	0.014	0.078	0.004	3.06	< d.l.	0.0014	< d.l.	0.0208	0.0134	0.0026
Z-92	0.018	0.026	< d.l.	0.066	0.010	0.38	0.0009	0.0053	< d.l.	0.0277	0.0145	0.0022
Z-93	0.013	0.041	< d.l.	0.048	0.005	1.58	< d.l.	0.0008	< d.l.	0.0268	0.0141	0.0029
Z-94	0.007	0.012	0.014	0.033	0.005	1.29	0.0077	0.0194	0.0018	0.0123	0.0020	< d.l.
Z-95	0.014	0.017	0.018	0.040	< d.l.	332	0.0098	0.0111	< d.l.	0.0379	0.0175	0.1109
Z-96	0.013	0.020	< d.l.	0.043	< d.l.	145	0.0015	0.0008	< d.l.	0.0299	0.0139	0.0469
Z-97	0.016	0.009	0.024	0.063	0.007	4.24	0.0134	0.0364	0.0036	0.0207	0.0035	< d.l.
Z-98	0.004	0.017	0.014	0.078	0.015	1.47	0.0136	0.0303	0.0036	0.0154	0.0040	0.0013
Z-99	0.020	0.027	0.003	0.037	0.008	3.83	0.0024	0.0250	< d.l.	0.0428	0.0166	0.0082
Z-100	0.018	0.006	0.004	0.057	< d.l.	2.00	< d.l.	< d.l.	< d.l.	0.0255	0.0121	0.0059
Z-101	< d.l.	0.002	0.003	0.023	0.001	0.85	0.0011	0.0037	< d.l.	< d.l.	< d.l.	< d.l.
Z-102	0.019	0.007	0.005	0.051	< d.l.	2.07	< d.l.	< d.l.	< d.l.	0.0235	0.0115	0.0056
Z-103	0.015	0.004	0.010	0.075	0.023	1.91	< d.l.	< d.l.	< d.l.	0.0230	0.0117	0.0053
Z-104	0.027	0.013	0.020	0.101	0.004	1.60	0.0095	0.0311	< d.l.	0.0414	0.0163	0.0061
Z-105	0.004	0.006	0.015	0.029	0.005	2.21	0.0046	0.0091	0.0025	0.0046	0.0025	0.0014
Z-106	0.016	0.004	0.001	0.048	< d.l.	1.76	< d.l.	< d.l.	< d.l.	0.0246	0.0118	0.0053
Z-107	0.016	0.018	< d.l.	0.050	0.001	3.06	0.0012	0.0027	< d.l.	0.0288	0.0125	0.0054

Sample: June	Gd	Dy	Ho	Er	Tm	Yb	Lu	Hf	W	Pb	Th	U
Z-43	0.0151	0.0148	< d.l.	0.0216	< d.l.	0.0155	< d.l.	0.223	0.019	0.350	0.065	< d.l.
Z-44	0.0150	0.0165	< d.l.	0.0217	< d.l.	0.0153	< d.l.	0.222	0.026	1.012	0.066	< d.l.
Z-45	0.0140	0.0111	0.0072	0.0088	0.0058	0.0079	0.0064	0.011	0.020	0.609	0.012	0.0077
Z-46	0.0114	0.0139	< d.l.	0.0211	< d.l.	0.0146	< d.l.	0.221	0.012	0.052	0.062	< d.l.
Z-47	0.0134	0.0145	< d.l.	0.0208	< d.l.	0.0145	< d.l.	0.222	0.020	0.459	0.064	< d.l.
Z-48	0.0039	0.0013	0.0001	0.0007	0.0000	0.0007	< d.l.	0.002	0.007	0.343	0.001	0.0018
Z-49	0.0005	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	0.007	0.343	0.000	< d.l.
Z-50	0.0112	0.0133	< d.l.	0.0206	< d.l.	0.0145	< d.l.	0.220	0.012	0.073	0.063	< d.l.
Z-51	0.0118	0.0136	< d.l.	0.0206	< d.l.	0.0146	< d.l.	0.221	0.013	0.110	0.063	< d.l.
Z-52	0.0122	0.0140	< d.l.	0.0207	< d.l.	0.0147	< d.l.	0.220	0.012	0.088	0.062	< d.l.
Z-53	0.0009	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	0.006	0.342	< d.l.	< d.l.
Z-54	0.0142	0.0164	< d.l.	0.0218	< d.l.	0.0153	< d.l.	0.222	0.076	0.714	0.066	< d.l.
Z-55	0.0297	0.0245	0.0034	0.0129	0.0003	0.0122	0.0007	0.004	0.009	0.101	0.014	0.0032
Z-56	0.0116	0.0132	< d.l.	0.0203	< d.l.	0.0142	< d.l.	0.221	0.012	0.129	0.066	< d.l.
Z-57	0.0040	0.0019	0.0003	0.0003	0.0010	0.0008	0.0008	0.001	0.009	0.061	0.003	0.0020
Z-58	0.0052	0.0054	0.0011	0.0023	0.0007	0.0019	0.0014	0.004	0.013	0.142	0.005	0.0035
Z-59	0.0157	0.0152	< d.l.	0.0218	< d.l.	0.0158	< d.l.	0.222	0.023	0.599	0.065	< d.l.
Z-60	0.0035	0.0010	< d.l.	0.0005	< d.l.	0.0009	0.0000	0.002	0.009	0.287	0.003	0.0017
Z-61	0.0121	0.0173	< d.l.	0.0265	< d.l.	0.0174	< d.l.	0.371	0.028	0.113	0.118	< d.l.
Z-62	0.0114	0.0167	< d.l.	0.0265	< d.l.	0.0172	-0.0132	0.365	0.025	0.046	0.118	< d.l.
Z-63	0.0093	0.0034	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	0.002	0.008	0.408	0.002	< d.l.
Z-64	0.0143	0.0192	< d.l.	0.0280	< d.l.	0.0190	< d.l.	0.364	0.027	0.387	0.122	< d.l.
Z-65	0.0157	0.0215	< d.l.	0.0292	< d.l.	0.0195	< d.l.	0.363	0.023	0.114	0.126	< d.l.
Z-66	0.0067	0.0052	0.0045	0.0067	0.0044	0.0051	0.0049	0.008	0.029	0.177	0.008	0.0085
Z-67	0.0128	0.0184	< d.l.	0.0273	< d.l.	0.0177	< d.l.	0.359	0.026	0.429	0.119	< d.l.
Z-68	0.0091	0.0053	0.0012	0.0040	0.0006	0.0018	0.0002	0.006	0.029	0.265	0.007	0.0060
Z-69	0.0093	0.0163	< d.l.	0.0260	< d.l.	0.0165	< d.l.	0.356	0.021	0.254	0.119	< d.l.
Z-70	0.0165	0.0191	< d.l.	0.0270	< d.l.	0.0176	< d.l.	0.357	0.029	0.385	0.119	< d.l.
Z-71	0.0181	0.0247	< d.l.	0.0312	< d.l.	0.0229	< d.l.	0.359	0.035	0.238	0.118	< d.l.
Z-72	0.0157	0.0221	< d.l.	0.0300	< d.l.	0.0216	< d.l.	0.357	0.031	0.159	0.117	< d.l.
Z-73	0.0094	0.0159	< d.l.	0.0258	< d.l.	0.0167	< d.l.	0.355	0.017	0.183	0.116	< d.l.
Z-74	0.0106	0.0172	< d.l.	0.0270	< d.l.	0.0175	< d.l.	0.355	0.015	0.074	0.117	< d.l.
Z-75	0.0196	0.0287	< d.l.	0.0361	< d.l.	0.0278	< d.l.	0.349	0.034	0.497	0.101	< d.l.
Z-77	0.0071	0.0065	0.0028	0.0045	0.0021	0.0040	0.0022	0.005	0.015	0.774	0.010	0.0045
Z-78	0.0115	0.0204	< d.l.	0.0295	< d.l.	0.0209	< d.l.	0.342	0.031	0.558	0.100	< d.l.
Z-79	0.0022	0.0007	0.0005	0.0016	< d.l.	0.0006	0.0002	0.004	0.015	0.151	0.003	0.0032
Z-80	0.0112	0.0196	< d.l.	0.0291	< d.l.	0.0204	< d.l.	0.337	0.026	0.199	0.100	< d.l.
Z-81	0.0116	0.0196	< d.l.	0.0294	< d.l.	0.0209	< d.l.	0.336	0.022	0.077	0.099	< d.l.
Z-82	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	0.003	0.374	< d.l.	< d.l.
Z-83	0.0169	0.0249	< d.l.	0.0330	< d.l.	0.0244	< d.l.	0.335	0.019	0.213	0.100	< d.l.
Z-84	0.0007	0.0005	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	0.001	0.003	0.130	0.001	0.0004
Z-85	0.0213	0.0281	< d.l.	0.0333	< d.l.	0.0286	< d.l.	0.336	0.032	0.068	0.094	< d.l.
Z-86	0.0200	0.0269	< d.l.	0.0305	< d.l.	0.0261	< d.l.	0.329	0.013	0.099	0.101	< d.l.
Z-87	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	0.006	0.068	< d.l.	< d.l.
Z-88	0.0177	0.0239	< d.l.	0.0283	< d.l.	0.0238	-0.0065	0.330	0.026	0.471	0.104	< d.l.
Z-89	0.0004	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	0.001	0.008	0.110	< d.l.	< d.l.
Z-90	0.0025	0.0006	0.0009	0.0014	0.0009	0.0011	0.0008	0.004	0.019	0.082	0.002	0.0023
Z-91	0.0154	0.0224	< d.l.	0.0275	< d.l.	0.0233	< d.l.	0.328	0.017	0.230	0.102	< d.l.
Z-92	0.0166	0.0236	< d.l.	0.0279	< d.l.	0.0239	< d.l.	0.327	0.019	0.546	0.107	< d.l.
Z-93	0.0170	0.0246	< d.l.	0.0292	< d.l.	0.0251	< d.l.	0.325	0.013	0.049	0.105	< d.l.
Z-94	0.0031	0.0001	< d.l.	< d.l.	0.0000	< d.l.	0.0001	0.002	0.006	0.567	0.003	0.0014
Z-95	0.0212	0.0299	< d.l.	0.0331	< d.l.	0.0296	< d.l.	0.328	0.028	0.498	0.102	< d.l.
Z-96	0.0179	0.0264	< d.l.	0.0285	< d.l.	0.0220	< d.l.	0.333	0.019	0.079	0.109	< d.l.
Z-97	0.0032	0.0002	< d.l.	< d.l.	< d.l.	0.0006	< d.l.	0.003	0.020	0.404	0.003	0.0007
Z-98	0.0046	0.0021	0.0007	0.0005	< d.l.	0.0002	0.0005	0.002	0.004	0.931	0.004	0.0022
Z-99	0.0204	0.0282	< d.l.	0.0294	< d.l.	0.0228	< d.l.	0.336	0.018	0.368	0.115	< d.l.
Z-100	0.0154	0.0249	< d.l.	0.0271	< d.l.	0.0204	< d.l.	0.329	0.020	0.492	0.108	< d.l.
Z-101	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	0.081	< d.l.	< d.l.
Z-102	0.0151	0.0247	< d.l.	0.0271	< d.l.	0.0205	< d.l.	0.328	0.022	0.391	0.109	< d.l.
Z-103	0.0149	0.0243	< d.l.	0.0268	< d.l.	0.0201	< d.l.	0.324	0.019	0.245	0.108	< d.l.
Z-104	0.0192	0.0280	< d.l.	0.0291	< d.l.	0.0220	< d.l.	0.329	0.024	1.577	0.114	< d.l.
Z-105	0.0021	0.0012	0.0009	0.0007	0.0014	0.0010	0.0011	0.002	0.004	0.087	0.001	0.0024
Z-106	0.0147	0.0245	< d.l.	0.0270	< d.l.	0.0202	< d.l.	0.323	0.019	0.436	0.114	< d.l.
Z-107	0.0157	0.0259	< d.l.	0.0278	< d.l.	0.0211	< d.l.	0.323	0.017	0.102	0.114	< d.l.

Sample:	S, m²	B	Na	Mg	Al	Si	K	Ca	Ti	V	Cr
August											
Z-1	1200000	31	734	130	152.7	465	324	321	6.068	1.017	0.453
Z-2	547000	39	967	124	244.9	435	282	238	7.652	1.198	0.669
Z-3	513000	63	850	106	184.5	569	414	180	6.248	1.220	0.485
Z-4	33000	42	1189	68	52.32	35	53	190	0.360	0.351	0.151
Z-5	74000	8	331	83	111	630	227	120	1.969	0.984	0.488
Z-6	1380000	7	1501	1118	27.55	731	201	1185	0.907	0.320	0.287
Z-7	60000	16	409	118	79.5	255	193	205	1.462	0.425	0.291
Z-8	6000	34	596	235	134.8	170	111	297	1.982	0.317	0.388
Z-9	359.8	13	253	236	76.26	181	106	261	0.813	0.173	0.246
Z-10	1481.9	2	476	548	165.3	236	111	503	2.121	0.550	0.503
Z-11	1766250	11	429	142	72.87	214	139	424	1.406	0.484	0.392
Z-12	1256	8	228	199	56.74	165	114	159	0.874	0.126	0.298
Z-13	1963	4	237	271	97.71	56	91	254	1.246	0.287	0.241
Z-14	1963	85	1623	117	31.01	47	324	228	0.395	0.153	0.216
Z-15	1809	17	183	133	47.98	146	128	140	0.470	0.163	0.197
Z-16	201.0	9	183	251	67.43	71	35	240	0.798	0.255	0.224
Z-17	2374.6	324	3647	155	332	726	1637	404	1.993	0.652	0.795
Z-18	706.5	22	308	96	52.36	180	63	95	0.675	0.122	0.241
Z-19	415.3	8	177	175	87.44	171	91	215	1.127	0.214	0.311
Z-20	78.5	93	1609	240	228.7	286	443	354	3.760	0.478	0.837
Z-21	491	68	1096	189	175.8	189	457	373	2.593	0.360	0.550
Z-22	7850	93	3623	397	124.4	49	453	507	0.949	0.208	0.504
Z-23	4416	12	2851	322	219.2	207	161	447	1.984	0.382	0.712
Z-24	6359	9	274	104	98.94	225	65	216	1.067	0.244	0.303
Z-25	5408	7	178	24	74.05	111	77	54	0.909	0.955	0.357
Z-26	314	3	186	104	90.11	419	25	157	1.573	0.224	0.406
Z-27	2375	46	2708	516	18.37	153	110	586	0.150	0.203	0.299
Z-28	3524	12	1577	900	32.94	252	93	692	0.554	0.168	0.216
Z-29	1520	204	2506	110	172	960	713	292	1.265	0.679	0.461
Z-30	31400	54	3370	166	122.9	790	763	438	1.534	0.779	0.578
Z-31	5024	10	1253	229	18.23	147	71	154	0.091	0.110	0.170
October											
OZ-1	96163	15	268	38	62.52	68	114	135	0.806	0.220	0.180
OZ-2	17663	243	2050	106	326.2	35	882	211	2.009	0.782	0.557
OZ-3	491	155	1200	48	280.8	286	587	107	1.409	0.677	0.620
OZ-4	70650	46	724	118	394.8	471	493	204	4.262	1.104	0.579
OZ-5	1963	23	206	100	66.88	67	28	183	0.462	0.215	0.187
OZ-6	12266	17	364	180	105.1	140	118	289	1.020	0.260	0.272
OZ-7	49063	26	367	84	289.9	150	236	138	3.074	0.770	0.424
OZ-8	707	1808	29160	864		3157	8050	2612	20.130	5.924	5.691
OZ-9	2826	15	230	91	118.5	104	69	244	1.053	0.210	0.269
OZ-10	177	526	8624	172	279.3	1394	1454	673	2.951	0.449	0.779
OZ-11	0	81	880	212	91.51	875	398	362	1.284	0.265	0.502
OZ-12	196250	195	1729	187	316.5	250	875	374	1.698	0.782	0.616
OZ-13	196250	43	809	133	173.7	208	473	242	1.257	0.726	0.370
OZ-14	707	10	103	110	44.03	98	60	156	0.249	0.160	0.145
OZ-15	41527	73	1287	82	175.7	360	468	239	1.482	0.630	0.411
OZ-16	567163	11	454	131	219.9	556	241	226	6.065	0.853	0.525
OZ-17	502400	442	7034	265	312.4	454	2162	728	1.828	0.910	0.668
OZ-18	1326650	14	643	214	312.3	1061	389	506	11.630	1.562	1.081
OZ-19	9499	114	1916	374	115.8	546	705	476	1.042	0.590	0.555
OZ-20	2375	9	107	114	54.24	206	66	219	0.515	0.181	0.308
OZ-21	11304	33	1609	83	254.6	603	362	130	2.690	1.686	0.614
OZ-22	2462	13	1018	310	109.8	296	59	494	0.994	0.181	0.473
OZ-23	5024	65	660	179	156.7	780	224	403	1.440	0.270	0.338
OZ-24	3215	79	1037	180	144.4	119	348	302	1.029	0.266	0.385
OZ-25	31400	58	1514	160	119.9	87	275	414	1.909	0.562	0.484
OZ-26	5672	235	5415	169	490.1	1555	1784	598	5.877	4.428	1.532
OZ-27	17663	50	1043	214	155.7	213	305	348	2.089	0.486	0.510
OZ-28	785000	32	2760	1399	31.37	589	284	1472	1.000	0.305	0.367
OZ-29	28339	106	1830	201	181.2	163	489	403	1.505	0.448	0.412
OZ-30	13267	31	579	174	180.7	252	166	331	2.173	0.374	0.584
OZ-31	962	71	1000	156	57.77	305	300	418	0.437	0.131	0.351
February											
LF1	580586	1138	9603	484	613.55	895	3434	1315	4.648	1.548	1.641
LF4	351335.4	198	1139	148	245	382	516	345	1.886	0.910	0.606
LF5	1742778.5	993	8817	317	592.45	913	2803	1018	4.365	1.535	1.160

Sample:	Mn	Fe	Co	Ni	Cu	Zn	Ga	As	Rb	Sr	Zr
August											
Z-1	23.5	136	0.123	0.351	0.530	179	0.043	0.661	0.299	7.56	0.327
Z-2	17.3	215	0.135	1.406	1.478	82	0.068	0.690	0.591	6.10	0.504
Z-3	11.9	153	0.075	0.373	0.556	257	0.052	0.614	0.536	6.09	0.398
Z-4	4.9	103	0.136	0.304	0.301	44	0.008	0.443	0.017	6.34	0.065
Z-5	11.3	314	0.085	0.419	0.333	24	0.023	0.606	0.664	3.46	0.273
Z-6	15.8	748	0.038	0.299	0.215	3	0.008	0.641	0.386	18.3	0.125
Z-7	19.4	126	0.104	0.275	0.218	234	0.017	0.430	0.123	5.64	0.148
Z-8	21.7	285	0.123	0.430	0.426	46	0.037	0.688	0.082	6.12	0.153
Z-9	23.7	352	0.123	0.148	0.297	20	0.015	0.725	0.061	2.51	0.036
Z-10	37.0	237	0.160	0.347	0.832	13	0.033	0.933	0.116	6.09	0.093
Z-11	20.9	114	0.106	0.356	0.390	17	0.013	0.523	0.128	6.66	0.189
Z-12	17.0	101	0.109	0.131	0.399	15	0.011	0.500	0.144	1.94	0.063
Z-13	16.6	181	0.106	0.265	0.318	7	0.019	0.592	0.345	4.62	0.066
Z-14	6.8	96	0.068	0.188	0.828	351	0.012	0.474	0.097	7.38	0.061
Z-15	11.2	133	0.096	0.139	0.231	43	0.010	0.521	0.071	3.68	0.029
Z-16	20.3	161	0.089	0.225	0.367	15	0.015	0.812	0.071	3.88	0.052
Z-17	9.4	669	0.131	0.351	1.034	605	0.074	0.838	1.215	18.5	0.642
Z-18	8.2	239	0.053	0.207	0.137	67	0.015	0.493	0.100	2.86	0.048
Z-19	12.8	173	0.113	0.194	0.223	13	0.022	0.556	0.060	2.86	0.047
Z-20	17.6	378	0.175	0.774	0.865	287	0.056	0.979	0.450	7.42	0.204
Z-21	17.4	319	0.138	0.746	0.968	170	0.043	1.035	0.355	6.01	0.151
Z-22	35.9	185	0.226	0.304	0.800	331	0.021	0.646	0.157	11.6	0.110
Z-23	34.2	345	0.222	0.598	0.474	38	0.038	0.708	0.268	5.42	0.211
Z-24	12.7	219	0.082	0.278	0.254	18	0.024	0.512	0.043	3.49	0.061
Z-25	3.1	145	0.012	0.329	0.283	12	0.024	0.699	0.274	1.72	0.186
Z-26	8.3	323	0.050	0.395	0.220	3	0.028	0.671	0.158	1.93	0.096
Z-27	0.4	47	0.053	0.503	0.383	3	0.002	0.302	0.029	8.10	0.015
Z-28	11.2	385	0.078	0.240	0.289	69	0.005	0.486	0.029	8.73	0.068
Z-29	15.6	453	0.099	0.278	1.142	315	0.043	0.863	1.040	13.9	0.965
Z-30	29.5	660	0.109	0.482	0.740	351	0.036	1.001	0.825	8.70	0.223
Z-31	5.3	35	0.013	0.121	0.272	32	0.001	0.379	0.082	2.26	0.055
October											
OZ-1	1.6	107	0.063	0.358	0.458	46	0.019	0.277	0.155	1.72	0.214
OZ-2	4.1	201	0.166	0.479	1.210	349	0.072	0.543	0.954	12.62	0.297
OZ-3	1.5	97	0.135	0.212	0.928	227	0.070	0.431	0.505	10.11	0.309
OZ-4	8.7	221	0.170	0.340	0.951	92	0.053	0.591	0.819	8.92	0.212
OZ-5	10.2	155	0.077	0.119	0.178	45	0.015	0.465	0.067	3.60	0.138
OZ-6	16.0	151	0.179	0.291	0.345	24	0.027	0.467	0.114	3.79	0.064
OZ-7	6.2	157	0.103	0.210	0.504	47	0.029	0.419	0.572	4.89	0.150
OZ-8	44.0			2.131		3783	0.678		5.843	61.37	2.821
OZ-9	12.8	162	0.081	0.317	0.255	26	0.025	0.509	0.061	2.77	0.073
OZ-10	4.2	358	0.227	0.410	1.764	693	0.068	0.521	0.941	24.11	1.292
OZ-11	34.2	289	0.224	0.307	1.479	194	0.028	0.994	0.120	6.24	0.067
OZ-12	15.1	304	0.107	0.295	1.380	229	0.049	0.688	1.249	13.72	0.707
OZ-13	10.8	242	0.073	0.234	0.616	71	0.026	0.581	0.830	8.59	0.378
OZ-14	15.6	97	0.074	0.070	0.371	15	0.012	0.467	0.032	1.85	0.027
OZ-15	6.6	269	0.057	0.168	0.698	154	0.031	0.500	0.497	7.61	0.336
OZ-16	15.2	199	0.053	0.293	0.591	15	0.059	0.546	0.628	4.10	0.367
OZ-17	17.0	230	0.136	0.262	2.604	687	0.082	0.604	1.672	19.16	1.155
OZ-18	38.3	337	0.130	0.632	0.945	26	0.101	0.991	0.957	7.84	0.735
OZ-19	29.9	164	0.268	0.332	1.327	329	0.039	1.002	0.192	11.47	0.137
OZ-20	17.6	195	0.114	0.242	0.555	12	0.023	0.709	0.047	3.17	0.048
OZ-21	9.2	432	0.092	0.438	0.599	57	0.062	0.820	0.721	4.29	0.427
OZ-22	36.8	311	0.184	0.267	0.451	22	0.022	0.699	0.057	5.26	0.079
OZ-23	23.4	282	0.128	0.149	0.359	130	0.036	0.467	0.222	10.60	0.236
OZ-24	19.7	188	0.150	0.127	0.577	138	0.040	0.500	0.343	8.98	0.197
OZ-25	14.9	138	0.104	0.278	0.517	115	0.032	0.451	0.147	5.54	0.177
OZ-26	13.5	557	0.322	0.900	3.552	590	0.171	1.768	1.479	20.79	0.656
OZ-27	18.1	248	0.147	0.385	0.620	116	0.036	0.623	0.199	6.95	0.157
OZ-28	19.9	612	0.041	0.272	0.484	26	0.009	0.461	0.096	20.02	0.096
OZ-29	18.2	265	0.119	0.178	0.802	240	0.044	0.533	0.325	12.72	0.606
OZ-30	20.9	356	0.127	0.446	0.644	56	0.039	0.695	0.154	5.36	0.164
OZ-31	26.9	180	0.148	0.155	0.484	164	0.007	0.621	0.099	6.83	0.048
February											
LF1	42.7	571	0.223	0.640	5.404	1222	0.201	1.321	2.912	45.02	4.559
LF4	19.3	309	0.252	0.288	0.760	218	0.049	0.587	0.723	14.21	0.426
LF5	16.7	461	0.169	0.503	4.528	942	0.187	0.925	2.577	29.15	1.187

Sample:	Nb	Mo	Cd	Sb	Cs	Ba	La	Ce	Pr	Nd	Sm	Eu
August												
Z-1	0.018	0.017	0.022	0.070	0.014	176	0.0536	0.1064	0.0119	0.0511	0.0130	0.0145
Z-2	0.012	0.020	0.031	0.075	0.021	184	0.0682	0.1490	0.0177	0.0738	0.0148	0.0162
Z-3	0.038	0.024	0.019	0.072	0.021	228	0.0904	0.1369	0.0182	0.0783	0.0195	0.0203
Z-4	< d.l.	0.001	0.005	0.039	< d.l.	105	0.0868	0.2717	0.0347	0.1514	0.0402	0.0136
Z-5	0.008	0.016	0.020	0.036	0.004	141	0.1517	0.4031	0.0474	0.2121	0.0498	0.0207
Z-6	0.038	0.024	0.001	0.034	0.006	7.9	0.0478	0.1103	0.0136	0.0613	0.0130	0.0044
Z-7	< d.l.	0.003	0.017	0.041	< d.l.	160	0.0508	0.1215	0.0113	0.0533	0.0134	0.0132
Z-8	0.013	0.006	0.035	0.048	0.000	142	0.0419	0.1069	0.0124	0.0550	0.0136	0.0129
Z-9	< d.l.	0.006	0.035	0.057	0.001	107	0.0115	0.0332	0.0034	0.0195	0.0047	0.0077
Z-10	0.006	0.007	0.053	0.053	0.011	5.03	0.0184	0.0464	0.0046	0.0226	0.0047	0.0012
Z-11	0.014	0.023	0.011	0.068	0.003	103	0.0975	0.2496	0.0296	0.1272	0.0326	0.0150
Z-12	< d.l.	0.004	0.024	0.056	0.002	60	0.0211	0.0461	0.0041	0.0194	0.0078	0.0053
Z-13	0.001	-0.001	0.044	0.071	0.022	7.12	0.0213	0.0491	0.0033	0.0216	0.0022	< d.l.
Z-14	0.033	0.019	0.015	0.052	0.007	231	0.0125	0.0211	0.0066	0.0179	0.0084	0.0199
Z-15	< d.l.	0.011	0.024	0.055	0.002	146	0.0059	0.0138	0.0009	0.0077	0.0053	0.0109
Z-16	0.000	0.003	0.059	0.059	< d.l.	109	0.0243	0.0415	0.0020	0.0124	0.0017	0.0064
Z-17	< d.l.	0.021	0.021	0.037	0.011	974	0.0613	0.1125	0.0145	0.0534	0.0160	0.0735
Z-18	0.003	0.003	0.011	0.037	0.003	104	0.0145	0.0358	0.0041	0.0189	0.0033	0.0090
Z-19	< d.l.	0.005	0.036	0.044	0.003	101	0.0202	0.0542	0.0055	0.0262	0.0076	0.0071
Z-20	0.009	0.014	0.050	0.071	0.004	292	0.0714	0.1820	0.0212	0.0824	0.0207	0.0262
Z-21	0.027	0.009	0.041	0.066	0.001	244	0.0555	0.1291	0.0144	0.0652	0.0141	0.0204
Z-22	< d.l.	-0.001	0.042	0.054	< d.l.	295	0.0368	0.0882	0.0095	0.0452	0.0100	0.0225
Z-23	0.005	0.012	0.031	0.053	0.005	117	0.0542	0.1369	0.0156	0.0643	0.0179	0.0111
Z-24	< d.l.	0.001	0.020	0.031	0.002	53	0.0208	0.0506	0.0050	0.0271	0.0094	0.0044
Z-25	0.013	0.022	0.007	0.050	0.014	74	0.0195	0.0478	0.0052	0.0241	0.0036	0.0060
Z-26	0.021	0.007	0.019	0.041	0.024	1.48	0.0199	0.0547	0.0057	0.0237	0.0022	< d.l.
Z-27	< d.l.	0.012	0.000	0.022	0.001	118	0.0159	0.0356	0.0027	0.0134	0.0029	0.0085
Z-28	< d.l.	0.007	0.007	0.029	0.001	103	0.0433	0.0872	0.0107	0.0468	0.0077	0.0088
Z-29	0.005	0.023	0.011	0.022	0.016	844	0.0551	0.1046	0.0128	0.0535	0.0155	0.0640
Z-30	0.039	0.043	0.021	0.043	0.011	319	0.0512	0.1136	0.0162	0.0590	0.0151	0.0264
Z-31	0.021	0.018	0.004	0.044	0.003	49	0.0177	0.0402	0.0047	0.0193	0.0038	0.0042
October												
OZ-1	0.008	0.010	0.016	0.045	0.003	61	0.0180	0.0351	0.0045	0.0186	0.0048	0.0059
OZ-2	0.026	0.034	0.023	0.101	0.012	711	0.0545	0.1031	0.0121	0.0506	0.0135	0.0595
OZ-3	0.014	0.020	0.026	0.051	0.017	715	0.0618	0.1256	0.0165	0.0573	0.0131	0.0568
OZ-4	0.013	0.020	0.021	0.120	0.013	616	0.1900	0.3894	0.0472	0.1794	0.0444	0.0602
OZ-5	0.003	0.008	0.011	0.056	0.001	261	0.0179	0.0347	0.0035	0.0129	0.0037	0.0207
OZ-6	0.014	0.014	0.026	0.072	0.002	76	0.0230	0.0502	0.0064	0.0203	0.0075	0.0065
OZ-7	0.000	0.014	0.013	0.084	0.004	350	0.1366	0.2820	0.0333	0.1191	0.0285	0.0354
OZ-8	0.121	0.127		0.657	0.151	3971	0.7683	1.6870	0.2197	0.8318	0.2169	0.3290
OZ-9	0.002	0.023	0.032	0.063	0.002	71	0.0306	0.0635	0.0088	0.0313	0.0064	0.0080
OZ-10	0.010	0.028	0.019	0.031	0.012	1300	0.0641	0.1054	0.0147	0.0537	0.0209	0.1084
OZ-11	0.006	0.008	0.077	0.116	0.004	205	0.0205	0.0502	0.0080	0.0373	0.0065	0.0179
OZ-12	0.006	0.015	0.061	0.103	0.030	695	0.0888	0.1403	0.0143	0.0603	0.0138	0.0597
OZ-13	0.032	0.030	0.013	0.090	0.023	569	0.0625	0.0986	0.0111	0.0453	0.0140	0.0496
OZ-14	0.016	0.016	0.024	0.068	0.002	56	0.0061	0.0125	0.0006	0.0089	0.0013	0.0037
OZ-15	0.006	0.020	0.015	0.077	0.011	491	0.0633	0.1223	0.0149	0.0508	0.0170	0.0444
OZ-16	0.029	0.018	0.017	0.080	0.020	62	0.0638	0.1382	0.0163	0.0755	0.0150	0.0064
OZ-17	0.007	0.038	0.018	0.071	0.023	948	0.0872	0.1649	0.0201	0.0874	0.0289	0.0858
OZ-18	0.039	0.023	0.023	0.112	0.041	98	0.0724	0.1518	0.0210	0.0839	0.0171	0.0115
OZ-19	0.096	0.056	0.062	0.117	0.014	345	0.0333	0.0578	0.0110	0.0416	0.0105	0.0341
OZ-20	0.025	0.017	0.043	0.113	0.005	54	0.0102	0.0221	0.0047	0.0174	0.0066	0.0079
OZ-21	0.014	0.025	0.019	0.062	0.025	298	0.0815	0.1896	0.0202	0.0904	0.0194	0.0277
OZ-22	0.006	0.010	0.040	0.091	0.003	64	0.0406	0.0703	0.0069	0.0257	0.0048	0.0059
OZ-23	0.013	0.012	0.034	0.056	0.006	571	0.0466	0.0953	0.0116	0.0439	0.0147	0.0480
OZ-24	0.031	0.023	0.031	0.071	0.008	496	0.0425	0.0828	0.0103	0.0419	0.0100	0.0412
OZ-25	0.021	0.024	0.019	0.060	0.002	127	0.0618	0.1531	0.0177	0.0794	0.0186	0.0133
OZ-26	0.076	0.072	0.063	0.177	0.048	1557	0.2386	0.4779	0.0659	0.2452	0.0828	0.1364
OZ-27	0.013	0.013	0.026	0.063	0.002	164	0.0384	0.0845	0.0103	0.0421	0.0105	0.0150
OZ-28	< d.l.	0.012	0.005	0.036	0.001	122	0.0442	0.1045	0.0123	0.0618	0.0143	0.0118
OZ-29	0.019	0.012	0.031	0.059	0.004	772	0.0619	0.1262	0.0143	0.0576	0.0221	0.0696
OZ-30	0.017	0.015	0.032	0.065	0.003	117	0.0440	0.1034	0.0104	0.0492	0.0111	0.0111
OZ-31	< d.l.	0.003	0.029	0.064	0.001	175	0.0087	0.0172	0.0026	0.0178	0.0032	0.0138
February												
LF1	0.024	0.057	0.051	0.196	0.039	1683	0.2050	0.5065	0.0566	0.1883	0.0591	0.2130
LF4	< d.l.	0.015	0.037	0.088	0.012	604	0.2153	0.5980	0.0737	0.2426	0.0605	0.0875
LF5	< d.l.	0.028	0.031	0.136	0.030	1036	0.2426	0.5799	0.0661	0.2146	0.0694	0.1264

Sample:	Gd	Dy	Ho	Er	Tm	Yb	Lu	Hf	W	Pb	Th	U
August												
Z-1	0.0147	0.0138	0.0025	0.0092	0.0011	0.0098	0.0010	0.009	0.150	0.118	0.015	0.0084
Z-2	0.0168	0.0188	0.0026	0.0116	0.0008	0.0106	0.0014	0.008	0.035	0.232	0.020	0.0041
Z-3	0.0199	0.0199	0.0049	0.0121	0.0032	0.0109	0.0033	0.016	0.055	0.167	0.029	0.0174
Z-4	0.0364	0.0321	0.0037	0.0191	0.0000	0.0178	< d.l.	0.000	0.074	0.079	0.012	< d.l.
Z-5	0.0516	0.0418	0.0096	0.0258	0.0046	0.0244	0.0047	0.010	0.016	0.240	0.032	0.0111
Z-6	0.0128	0.0151	0.0023	0.0092	0.0017	0.0065	0.0009	0.015	0.035	0.117	0.017	0.0053
Z-7	0.0151	0.0153	0.0001	0.0085	< d.l.	0.0132	< d.l.	0.002	0.015	0.158	0.019	< d.l.
Z-8	0.0217	0.0205	0.0038	0.0108	0.0011	0.0072	0.0006	0.009	0.076	0.254	0.026	0.0069
Z-9	0.0068	0.0022	-0.0005	0.0016	< d.l.	0.0012	< d.l.	0.002	0.024	0.129	< d.l.	< d.l.
Z-10	0.0078	0.0085	0.0010	0.0048	< d.l.	0.0038	0.0001	0.002	0.003	0.322	0.010	0.0016
Z-11	0.0323	0.0282	0.0063	0.0165	0.0040	0.0146	0.0027	0.010	0.022	0.288	0.032	0.0141
Z-12	0.0077	0.0074	0.0006	0.0030	< d.l.	0.0032	< d.l.	< d.l.	0.006	0.176	0.004	< d.l.
Z-13	0.0033	0.0060	< d.l.	0.0023	< d.l.	< d.l.	< d.l.	0.000	0.002	0.240	0.006	< d.l.
Z-14	0.0105	0.0097	0.0055	0.0069	0.0042	0.0063	0.0053	0.010	0.131	0.179	0.010	0.0190
Z-15	0.0056	0.0036	< d.l.	0.0017	< d.l.	0.0015	< d.l.	< d.l.	0.012	0.125	< d.l.	< d.l.
Z-16	0.0007	0.0004	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	0.010	0.435	0.002	< d.l.
Z-17	0.0190	0.0168	0.0030	0.0105	< d.l.	0.0107	< d.l.	0.010	0.240	0.576	0.009	0.0041
Z-18	0.0065	0.0070	0.0016	0.0031	0.0007	0.0008	0.0007	0.003	0.028	0.226	0.008	0.0053
Z-19	0.0071	0.0051	0.0002	0.0040	< d.l.	0.0024	< d.l.	0.000	0.014	0.279	0.002	< d.l.
Z-20	0.0232	0.0185	0.0032	0.0120	0.0001	0.0091	0.0011	0.008	0.130	1.185	0.024	0.0077
Z-21	0.0170	0.0157	0.0024	0.0077	0.0006	0.0060	< d.l.	0.010	0.142	0.882	0.028	0.0076
Z-22	0.0143	0.0149	0.0011	0.0067	< d.l.	0.0036	< d.l.	0.002	0.190	0.185	0.013	0.0015
Z-23	0.0187	0.0158	0.0025	0.0086	0.0003	0.0071	0.0007	0.008	0.012	0.338	0.021	0.0012
Z-24	0.0088	0.0100	0.0011	0.0044	< d.l.	0.0033	< d.l.	< d.l.	0.007	0.197	0.003	< d.l.
Z-25	0.0068	0.0091	0.0011	0.0033	0.0003	0.0042	0.0009	0.008	0.009	0.293	0.015	0.0043
Z-26	0.0057	0.0042	< d.l.	0.0023	< d.l.	0.0028	< d.l.	0.007	0.015	0.448	0.012	0.0004
Z-27	0.0041	0.0014	< d.l.	0.0004	< d.l.	0.0004	< d.l.	< d.l.	0.097	0.025	< d.l.	< d.l.
Z-28	0.0070	0.0096	0.0011	0.0044	< d.l.	0.0048	0.0000	0.001	0.005	0.144	0.003	0.0006
Z-29	0.0205	0.0168	0.0026	0.0100	0.0013	0.0099	0.0020	0.018	0.275	0.438	0.011	0.0078
Z-30	0.0222	0.0164	0.0057	0.0113	0.0036	0.0104	0.0041	0.020	0.053	0.236	0.026	0.0155
Z-31	0.0059	0.0033	0.0002	0.0012	0.0000	0.0009	0.0003	0.006	0.027	0.042	0.007	0.0022
October												
OZ-1	0.0046	0.0049	0.0007	0.0036	0.0003	0.0020	0.0001	0.001	0.023	0.222	0.007	0.0030
OZ-2	0.0184	0.0128	0.0020	0.0075	0.0009	0.0078	0.0006	0.014	0.193	0.729	0.012	0.0102
OZ-3	0.0197	0.0148	0.0033	0.0104	0.0023	0.0072	0.0020	0.011	0.263	0.965	0.011	0.0069
OZ-4	0.0484	0.0438	0.0098	0.0258	0.0053	0.0188	0.0044	0.012	0.071	0.874	0.037	0.0219
OZ-5	0.0039	0.0023	0.0001	0.0005	< d.l.	0.0007	-0.0008	0.004	0.023	0.379	0.003	0.0012
OZ-6	0.0090	0.0104	0.0026	0.0077	0.0009	0.0016	0.0004	0.001	0.026	0.247	0.009	0.0053
OZ-7	0.0285	0.0261	0.0050	0.0156	0.0010	0.0125	0.0007	0.005	0.033	0.530	0.022	0.0127
OZ-8	0.2306	0.1806	0.0446	0.1162	0.0251	0.1127	0.0268	0.089	2.542	N.D.	0.173	0.1004
OZ-9	0.0092	0.0073	0.0022	0.0041	0.0015	0.0040	0.0009	0.003	0.039	0.348	0.009	0.0047
OZ-10	0.0295	0.0139	0.0042	0.0099	0.0021	0.0112	0.0023	0.020	0.461	0.814	0.010	0.0129
OZ-11	0.0100	0.0080	0.0010	0.0042	0.0018	0.0044	0.0012	0.006	0.111	0.104	0.006	0.0042
OZ-12	0.0241	0.0221	0.0044	0.0147	0.0024	0.0113	0.0022	0.013	0.158	0.410	0.015	0.0066
OZ-13	0.0165	0.0173	0.0026	0.0078	0.0013	0.0086	0.0006	0.017	0.049	0.544	0.015	0.0056
OZ-14	0.0023	0.0015	< d.l.	< d.l.	< d.l.	< d.l.	< d.l.	0.001	0.022	0.083	< d.l.	-0.0008
OZ-15	0.0200	0.0136	0.0035	0.0085	0.0019	0.0064	0.0023	0.012	0.070	0.522	0.019	0.0077
OZ-16	0.0165	0.0143	0.0026	0.0104	0.0012	0.0070	0.0011	0.010	0.023	0.174	0.024	0.0050
OZ-17	0.0293	0.0281	0.0047	0.0162	0.0034	0.0201	0.0023	0.020	0.377	0.285	0.016	0.0144
OZ-18	0.0209	0.0190	0.0043	0.0137	0.0018	0.0151	0.0022	0.018	0.031	0.268	0.032	0.0109
OZ-19	0.0178	0.0165	0.0061	0.0108	0.0051	0.0088	0.0043	0.039	0.283	0.351	0.026	0.0112
OZ-20	0.0058	0.0049	0.0036	0.0039	0.0034	0.0022	0.0035	0.007	0.026	0.123	0.0038	0.0065
OZ-21	0.0241	0.0223	0.0038	0.0139	0.0008	0.0146	0.0013	0.017	0.029	0.511	0.032	0.0109
OZ-22	0.0068	0.0049	0.0014	0.0026	0.0011	0.0014	0.0002	0.005	0.027	0.222	0.006	0.0036
OZ-23	0.0156	0.0101	0.0030	0.0055	0.0012	0.0061	0.0008	0.008	0.100	0.498	0.013	0.0052
OZ-24	0.0156	0.0127	0.0023	0.0063	0.0016	0.0062	0.0010	0.008	0.198	0.425	0.006	0.0069
OZ-25	0.0210	0.0193	0.0038	0.0132	0.0008	0.0099	0.0001	0.007	0.133	0.256	0.023	0.0079
OZ-26	0.0791	0.0709	0.0220	0.0465	0.0109	0.0476	0.0159	0.042	0.277	1.918	0.085	0.0449
OZ-27	0.0113	0.0143	0.0029	0.0091	0.0004	0.0077	0.0006	0.008	0.124	0.195	0.022	0.0067
OZ-28	0.0147	0.0143	0.0031	0.0103	0.0008	0.0111	0.0007	0.001	0.061	0.144	0.004	0.0018
OZ-29	0.0225	0.0193	0.0037	0.0095	0.0011	0.0091	0.0021	0.014	0.102	0.694	0.019	0.0109
OZ-30	0.0159	0.0122	0.0016	0.0090	0.0005	0.0070	< d.l.	0.007	0.048	0.257	0.026	0.0069
OZ-31	0.0033	0.0023	-0.0002	0.0030	< d.l.	0.0009	< d.l.	< d.l.	0.065	0.038	0.000	0.0014
February												
LF1	0.0619	0.0475	0.0143	0.0346	0.0078	0.0365	0.0090	0.071	0.048	1.161	0.030	0.0366
LF4	0.0614	0.0595	0.0177	0.0369	0.0101	0.0338	0.0094	0.012	0.001	0.895	0.017	0.0155
LF5	0.0793	0.0772	0.0231	0.0529	0.0089	0.0499	0.0101	0.020	0.030	0.899	0.030	0.0360

Table S3. Pearson pair correlations between elements. Marked correlations are significant at p < 0.05. N=98 (Casewise deletion of missing data)

Element	DOC, all seasons	DOC, only spring	Al, all seasons	Al, only spring	Fe, all seasons	Fe, only spring
DOC	**1.00**	**1.00**	0.35	0.48	0.33	
Cl	0.27		0.30		**0.50**	
SO4	0.20				0.37	
Be			**0.82**		0.45	
Na			0.39		0.31	
Mg					**0.55**	0.36
Al	0.35	0.48	**1.00**	**1.00**	**0.50**	**0.75**
Si	0.21	**0.54**	0.61	0.58	0.69	0.64
K	0.22		**0.57**		0.31	
Ca			0.22		**0.64**	
Ti		**0.75**	0.68	0.81	0.32	**0.52**
V		0.37	**0.69**	0.59	0.36	
Cr	0.39	**0.72**	**0.89**	0.73	**0.62**	0.47
Mn	0.21	0.36	0.25		0.40	
Fe	0.33		**0.50**	0.75	**1.00**	**1.00**
Co	0.36	0.43	**0.67**	0.42	0.42	0.46
Ni	0.29	**0.60**	**0.59**	0.43	0.47	0.40
Cu	0.28	0.48	**0.65**		0.26	
Zn	0.25		0.35			
Ga	0.38	**0.75**	**0.90**	0.69	0.48	0.45
As	0.45	**0.67**	0.61	0.69	0.62	0.40
Rb			**0.80**		0.49	
Sr	0.22		**0.62**		**0.65**	
Zr			0.28			
Nb		**0.76**	0.20	**0.53**		0.32
Mo			0.43		0.28	
Cd	**0.53**	0.68	0.47		0.26	
Sb		**0.59**	0.63	0.54		
Cs	0.22		**0.66**		0.44	
Ba	0.30		**0.73**		0.38	
La			**0.77**		0.46	
Ce		0.35	**0.73**		0.47	
Pr		0.35	**0.74**		**0.57**	
Nd		0.39	**0.64**	0.36	0.40	0.33
Gd		0.33	**0.60**		0.29	
Lu	0.22		**0.62**		**0.53**	
W	0.28	0.33	**0.61**		0.33	
Pb	**0.52**	**0.83**	0.54	**0.53**	0.27	0.34
U	0.23		**0.73**		**0.55**	

Table S4. Elementary composition of the ice cores in three sampled lakes

Ice, samples, cm	N	pH	R, μS cm-1	DIC, ppm	DOC, ppm	OD 280 nm	Cl- ppm	SO4 ppm	B	Na	Mg	Al	Si	K	Ca	Ti	V	Cr	Mn	Fe
LF 1-1 (0-5)	63˚48'19.6"			0.3992	18.37	0.1832	0.202	0.596	33.2	708	67.7	44.6	101	274	189	0.677	0.375	0.188	8.38	70.9
LF 1-2 (5-16)		5.308	6	0.5394	5.48	0.1365	0.121	0.378	21.6	301	42.8	46.4	105	167	122	1.099	0.287	0.136	5.83	61.6
LF 1-3 (16-27)		5.078	14	0.576	10.69	0.2926	0.288	1.152	51.2	483	91.9	92.3	167	271	220	2.054	0.620	0.346	12.41	127.7
LF 1-4 (27-42)		5.381	4	0.56	4.586	0.933	0.065	0.393	35.5	334	22.4	22.0	77	163	75	0.446	0.385	0.079	2.30	31.6
LF 1-5 (42-60)		5.55	2	0.4363	4.659	0.0529	0.054	0.061	40.2	1255	18.6	27.8	95	84	92	0.935	0.148	0.141	0.119	37.0
LF 1-6 (60-80)		5.474	3	0.4078	5.604	0.039	0.065	0.058	<d..l.	498	24.3	8.7	59	44	89	0.242	0.067	0.048	0.672	10.6
LF1 bottom water					30.34	N.D.	0.792	3.45	1138	9603	483.6	614	895	3434	1315	19.2	1.55	1.64	42.7	571.3
LF 4-1 (0-11)	63˚48'44.7"	5.495	5	0.4976	3.861	0.1049	0.127	0.236	4.27	187	26.9	32.1	106	130	167	0.333	0.210	0.103	3.465	71.3
LF 4-2 (15-29)		5.787	3	0.5121	1.776	0.045	0.039	0.147	3.6	121	13.2	10.0	55	82	151	0.040	0.108	0.044	1.531	12.5
LF 4-3 (29-41)		5.607	5	0.436	6.035	0.0195	0.035	0.054	< d.l.	34	24.0	2.6	31	36	99	0.008	0.030	< d.l.	0.264	1.9
LF 4-4 (41-49)		5.702	2	0.4772	35.66	0.0248	0.025	0.031	< d.l.	28	6.5	4.4	87	40	127	0.013	0.072	0.037	0.677	5.4
LF 4-5 (49-57)		5.713	3	0.5164	3.994	0.018	0.034	0.060	13.31	43	15.1	3.7	82	54	144	0.032	0.032	0.073	0.126	4.9
LF4 bottom water		4.655	19		18.99	N.D.	0.235	1.68	198	1139	147.9	245	382	516	345	58.2	0.910	0.606	19.3	309.0
LF 5-1 (0-3)	63˚49'09.4"	4.963	19	0.8373	33.78	0.507	0.257	1.276	28.89	378	62.1	114.4	235	220	147	1.925	0.680	0.358	6.724	155.8
LF 5-2 (3-11)		4.939	15	0.5834	10.38	0.355	0.165	1.137	19.12	259	48.6	77.6	116	178	106	1.460	0.442	0.265	4.939	97.2
LF 5-3 (11-23)		5.193	9	0.3798	4.501	0.0452	0.122	0.420	<d.l.	103	49.0	25.2	65	72	134	0.390	0.252	0.139	2.645	33.7
LF 5-4 (23-35)		5.157	12	0.4735	9.091	0.2667	0.128	0.935	41.2	1267	51.9	48.2	67	252	170	0.819	0.327	0.203	2.457	64.3
LF 5-5 (35-38)		5.227	13	0.6717	11.01	0.3136	0.173	1.042	23.9	312	25.2	76.9	127	230	48	1.552	0.836	0.174	2.165	83.1
LF 5-6 (38-47)		5.379	3	0.5905	5.183	0.1228	0.065	0.108	17.9	543	12.6	26.2	64	77	69	0.762	0.093	0.082	0.010	34.9
LF 5-7 (47-60)		5.958	3	0.4641	1.577	0.028	0.076	0.067	15.5	488	13.2	4.2	53	57	76	0.061	0.087	0.059	0.126	5.3
LF5 bottom water		4.778	31		32.86	N.D.	0.281	2.97	992.8	8817	317.3	592	913	2803	1018	71.2	1.535	1.160	16.7	461

Table S4, continued.

Ice, samples, cm	Co	Ni	Cu	Zn	Ga	As	Rb	Sr	Zr	Mo	Cd	Sb	Cs	Ba
LF 1-1 (0-5)	0.039	0.185	0.430	83.5	0.008	0.302	0.268	3.87	0.111	0.0128	0.012	0.0696	0.0039	138.6
LF 1-2 (5-16)	0.030	0.105	0.187	74.5	0.013	0.175	0.211	2.38	0.130	< d.l.	0.005	0.0317	0.0050	110.1
LF 1-3 (16-27)	0.053	0.223	0.454	80.1	0.022	0.406	0.515	4.62	0.200	< d.l.	0.012	0.0535	0.0089	147.1
LF 1-4 (27-42)	0.007	0.068	0.160	51.4	0.009	0.080	0.083	2.87	0.028	< d.l.	0.006	0.0145	0.0044	100.7
LF 1-5 (42-60)	0.001	0.059	0.105	7.97	0.061	0.028	0.098	2.33	0.147	0.073	0.108	0.0771	0.0552	41.8
LF 1-6 (60-80)	< d.l.	0.031	0.082	1.21	0.004	0.027	0.046	1.15	0.0069	< d.l.	0.007	0.0143	0.0048	55.4
LF1 bottom water	0.223	0.640	5.40	1222	0.201	1.321	2.91	45.0	4.56	0.057	0.051	0.196	0.0393	1683
LF 4-1 (0-11)	0.059	0.117	0.190	48.07	0.008	0.145	0.139	1.25	0.0495	0.002	0.029	0.0352	0.0085	54.7
LF 4-2 (15-29)	0.017	0.053	0.034	40.97	0.002	0.042	0.033	0.91	0.0056	< d.l.	0.005	0.0186	0.0021	52.1
LF 4-3 (29-41)	< d.l.	0.018	0.038	1.413	0.006	0.011	0.024	1.15	0.0050	< d.l.	0.008	0.0124	0.0062	0.37
LF 4-4 (41-49)	0.033	0.063	0.027	1.745	0.006	0.068	0.027	0.24	0.0065	< d.l.	0.016	0.0173	0.0090	0.49
LF 4-5 (49-57)	0.002	0.023	0.052	1.726	0.003	0.019	0.035	2.58	0.0044	0.022	0.004	0.0104	0.0048	45.9
LF4 bottom water	0.252	0.288	0.760	218.2	0.049	0.587	0.723	14.2	0.426	0.015	0.037	0.0875	0.0118	604
LF 5-1 (0-3)	0.086	0.488	0.665	58.71	0.027	0.427	0.555	3.51	0.187	0.007	0.023	0.082	0.014	145.1
LF 5-2 (3-11)	0.058	0.197	0.329	28.7	0.018	0.323	0.423	2.29	0.139	0.009	0.019	0.052	0.012	89.5
LF 5-3 (11-23)	0.030	0.135	0.183	2.235	0.015	0.176	0.192	1.82	0.054	0.014	0.022	0.039	0.019	1.0
LF 5-4 (23-35)	< d.l.	0.169	0.391	71.86	0.011	0.234	0.279	3.82	0.092	0.024	0.009	0.045	0.004	99.6
LF 5-5 (35-38)	0.033	0.170	0.304	49.41	0.019	0.239	0.500	1.83	0.080	0.007	0.011	0.038	0.009	101.2
LF 5-6 (38-47)	< d.l.	0.086	0.127	19.4	0.021	0.043	0.042	1.86	0.023	0.019	0.018	0.021	0.013	49.8
LF 5-7 (47-60)	< d.l.	0.030	0.076	3.114	0.005	0.016	0.062	1.85	0.003	0.008	0.006	0.013	0.005	27.3
LF5 bottom water	0.169	0.503	4.53	942	0.187	0.925	2.58	29.2	1.19	0.028	0.031	0.136	0.030	1036

Table S4, continued.

Ice, samples, cm	La	Ce	Pr	Nd	Sm	Eu	Gd	Dy	Ho	Er	Tm	Yb	Lu	Hf	W	Pb	Th	U
LF 1-1 (0-5)	0.026	0.055	0.007	0.018	0.007	0.013	0.006	0.005	0.002	0.003	0.000	0.004	0.001	0.0026	0.023	0.370	< d.l.	0.0043
LF 1-2 (5-16)	0.023	0.051	0.006	0.022	0.006	0.011	0.007	0.005	0.002	0.005	0.001	0.003	0.000	0.0018	0.030	0.112	< d.l.	0.0030
LF 1-3 (16-27)	0.045	0.108	0.012	0.040	0.013	0.015	0.012	0.009	0.002	0.007	0.002	0.008	0.001	0.0056	0.001	0.173	0.0063	0.0071
LF 1-4 (27-42)	0.018	0.041	0.005	0.012	0.005	0.012	0.004	0.004	0.002	0.004	0.001	0.002	0.002	0.0004	< d.l.	0.048	< d.l.	0.0041
LF 1-5 (42-60)	0.077	0.096	0.059	0.061	0.047	0.055	0.047	0.046	0.058	0.040	0.058	0.054	0.074	0.0401	0.067	0.117	0.0665	0.0722
LF 1-6 (60-80)	0.006	0.013	0.003	0.003	0.004	0.002	0.003	0.002	0.003	0.002	0.002	0.004	0.003	0.0006	< d.l.	0.019	< d.l.	0.0032
LF1 bottom water	0.205	0.507	0.057	0.188	0.059	0.213	0.062	0.048	0.014	0.035	0.008	0.036	0.009	0.0709	0.048	1.161	0.030	0.0366
LF 4-1 (0-11)	0.029	0.072	0.015	0.035	0.013	0.013	0.015	0.011	0.009	0.009	0.008	0.009	0.009	0.0048	< d.l.	0.111	0.0035	0.0104
LF 4-2 (15-29)	0.010	0.023	0.003	0.008	0.004	0.006	0.001	0.001	0.001	0.001	0.001	0.002	0.001	< d.l.	< d.l.	0.037	< d.l.	0.0018
LF 4-3 (29-41)	0.008	0.012	0.005	0.005	0.005	0.005	0.006	0.004	0.006	0.004	0.005	0.003	0.007	0.0013	< d.l.	0.010	< d.l.	0.0080
LF 4-4 (41-49)	0.010	0.014	0.008	0.009	0.008	0.008	0.010	0.007	0.009	0.008	0.008	0.009	0.011	0.0060	< d.l.	0.019	0.001319	0.0092
LF 4-5 (49-57)	0.003	0.007	0.001	0.004	0.001	0.003	0.003	0.001	0.001	0.001	0.000	0.001	< d.l.	0.0034	0.109	0.035	< d.l.	0.0010
LF4 bottom water	0.215	0.598	0.074	0.243	0.061	0.087	0.061	0.059	0.018	0.037	0.010	0.034	0.009	0.0123	0.001	0.895	0.0173	0.0155
LF 5-1 (0-3)	0.053	0.134	0.015	0.043	0.014	0.016	0.014	0.014	0.004	0.009	0.002	0.008	0.002	0.0126	0.071	0.345	0.0140	0.0079
LF 5-2 (3-11)	0.038	0.082	0.013	0.037	0.012	0.014	0.013	0.012	0.007	0.009	0.005	0.010	0.007	0.0113	0.094	0.198	0.0114	0.0103
LF 5-3 (11-23)	0.023	0.038	0.014	0.017	0.013	0.012	0.014	0.014	0.013	0.012	0.012	0.012	0.014	0.0090	0.019	0.082	0.0110	0.0159
LF 5-4 (23-35)	0.034	0.065	0.008	0.027	0.010	0.011	0.010	0.011	0.003	0.005	0.002	0.006	0.002	0.0064	0.074	0.069	0.0095	0.0062
LF 5-5 (35-38)	0.072	0.146	0.016	0.053	0.013	0.013	0.019	0.015	0.005	0.011	0.003	0.008	0.002	0.0072	0.017	0.148	0.0043	0.0082
LF 5-6 (38-47)	0.035	0.063	0.017	0.026	0.011	0.016	0.015	0.015	0.013	0.014	0.011	0.013	0.012	0.0079	0.037	0.043	0.0083	0.0153
LF 5-7 (47-60)	0.009	0.012	0.004	0.006	0.004	0.005	0.004	0.004	0.004	0.003	0.004	0.005	0.005	0.0022	0.065	0.023	< d.l.	0.0049
LF5 bottom water	0.243	0.580	0.066	0.215	0.069	0.126	0.079	0.077	0.023	0.053	0.009	0.050	0.010	0.0203	0.030	0.899	0.0295	0.0360

Table S5. PCA analysis of lake water chemical composition revealed two factors, with F1 mostly pronounced in October.

	June	August	October	All seasons
F1	8.1 % (DOC, UV, Al, Ti, Cr, Ni, As, Sb)	11.8% (Cl, B, Al, Si, K, Cr, Fe, Cu, Zn, Rb, Sr, Ba, Zr)	18.8 % (B, Na, Si, K, Ca, Ti, V, Cr, Ni, Zn, Rb, Sr, Zr, Mo, Sb, Cs, Ba, La, Ce and U)	16.6% (B, Na, Si, K, Ca, Ti, V, Cr, Ni, Zn, Rb, Mo, Sb, Cs, Ba, La, Ce, U
F2	7.6% (B, Na, K, Cu, Zn, Sr, Ba	5.8% (pH, DIC)	4.4% (Fe, Al, Cu, Co, As).	6.3% (Al, Fe, Co, As, Cd)

Table S6 A. Percentage of complexed trace element with organic ligands calculated using NICA-Donnan model for the average lake composition in spring, summer, autumn and winter as listed in Table 3 of the manuscript.

	% complexed with organics (NICA-Donnan)			
element	SPRING	SUMMER	AUTUMN	WINTER
Al^{3+}	100	100	100	99.8
Ba^{2+}	100	100	99	92
Ca^{2+}	100	100	99	92
Cd^{2+}	100	100	100	99
Cu^{2+}	100	100	100	100
Fe^{3+}	100	100	100	100
K^+	83	71	46	15
La^{3+}	100	100	100	100
Mg^{2+}	100	100	99	92
Mn^{2+}	100	100	99	93
Na^+	83	71	46	15
Ni^{2+}	100	100	100	95
Pb^{2+}	100	100	100	100
Sr^{2+}	100	100	99	92
UO_2^{2+}	100	100	100	100
Zn^{2+}	100	100	99	92

Table S6 B. Percentage of complexed trace element with organic ligands calculated using Stockholm Humic Model for the average lake composition in spring, summer, autumn and winter as listed in Table 3 of the manuscript.

	% complexed with organics (SHM)			
element	SPRING	SUMMER	AUTUMN	WINTER
Al^{3+}	99	100	99	99
Ba^{2+}	40	47	34	23
Ca^{2+}	41	50	37	25
Cd^{2+}	48	63	52	38
Cu^{2+}	88	96	93	86
Fe^{3+}	100	100	100	100
K^+	99	100	99	97
La^{3+}	41	49	36	24
Mg^{2+}	41	50	37	25
Mn^{2+}	0	1	1	0
Na^+	59	78	69	57
Ni^{2+}	79	94	91	84
Pb^{2+}	40	48	34	23
Sr^{2+}	100	100	100	100
UO_2^{2+}	45	62	49	36

Figure S1. Small water bodies of the thermokarst zone, filled by melted snow in June. Submerged ground vegetation provides significant amount of DOC and related metals after few hours of interaction.
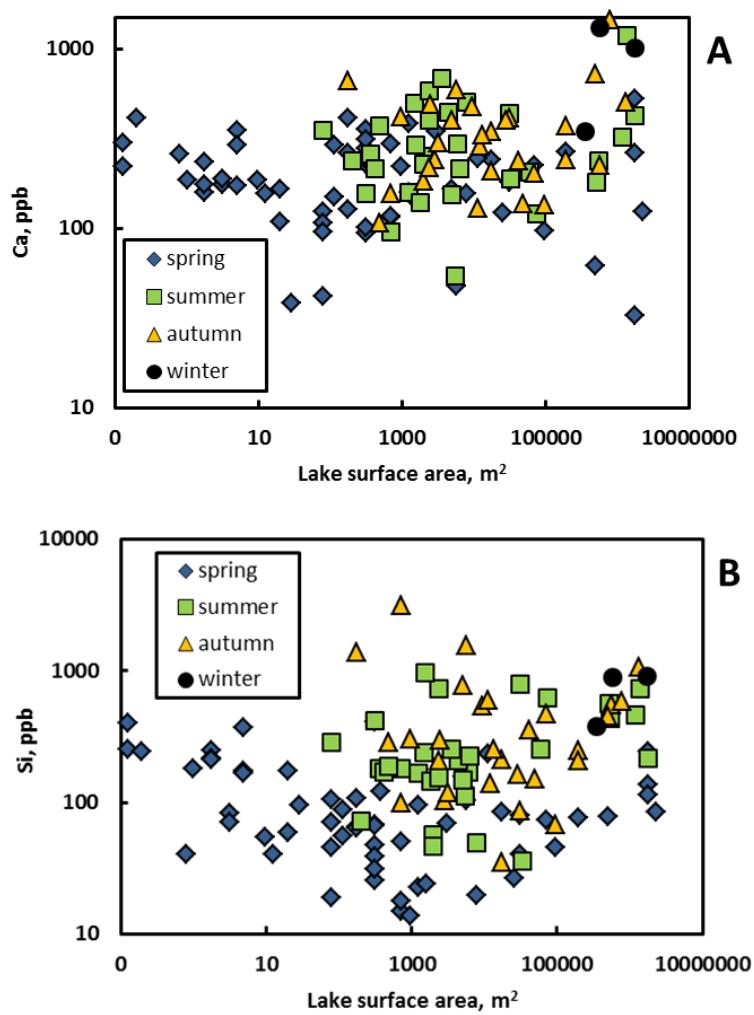
Figure S2. Significant variability, over 2 orders of magnitude, of Ca (A) and Si (B) concentration in thermokarst lakes of a wide range of the lake area. Note logarithmic scale in element concentration.
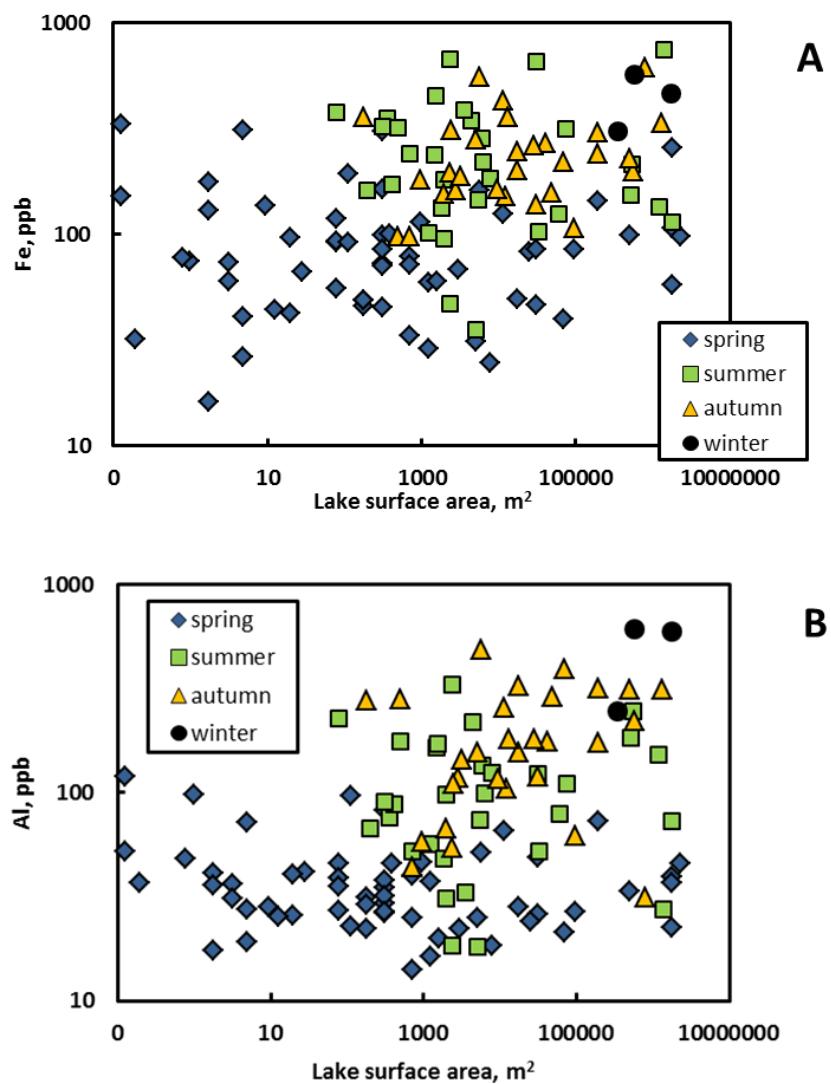
Figure S3. Fe (A) and Al (B) concentration as a function of the lake surface area for different seasons.
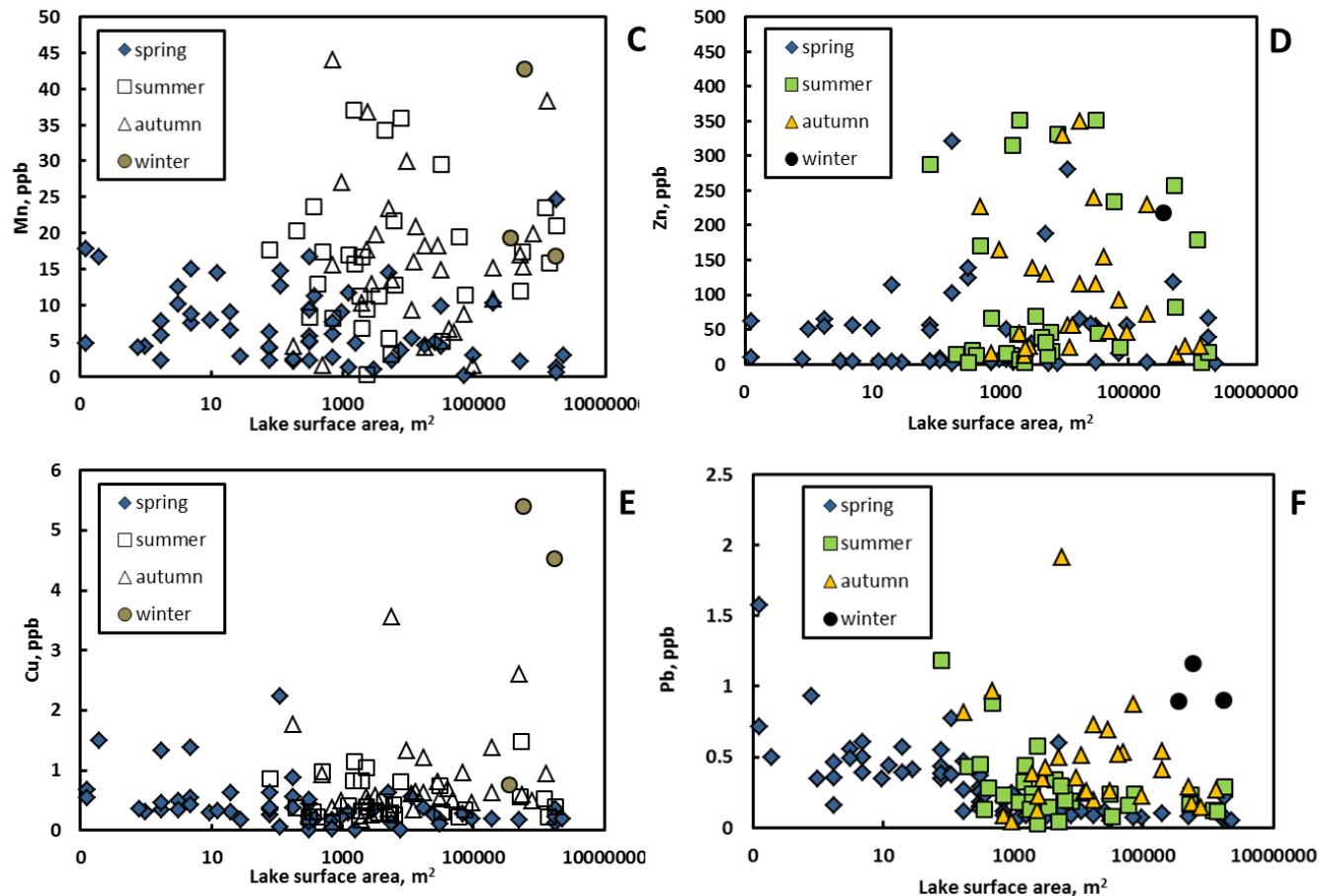
Fig. S3, continued. Mn (C), Zn (D), Cu (E) and Pb (F) concentration in thermokarst lakes as a function of the lake size over different seasons.

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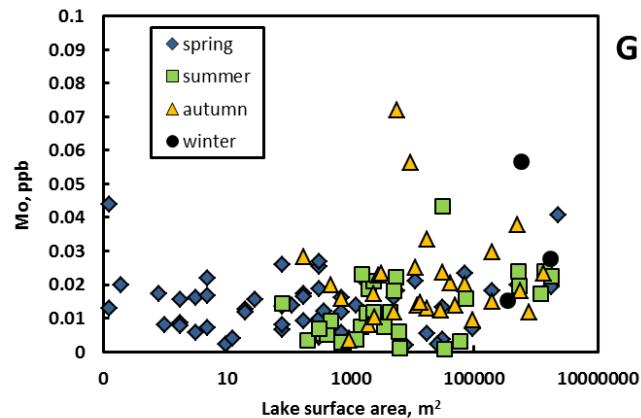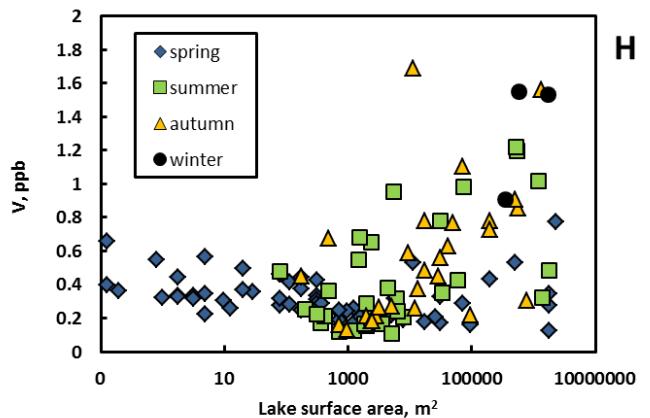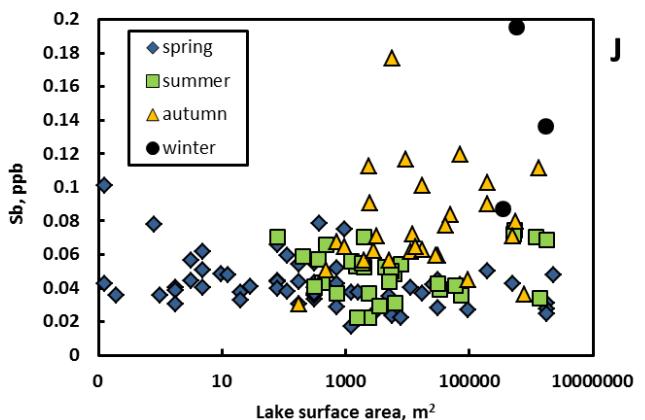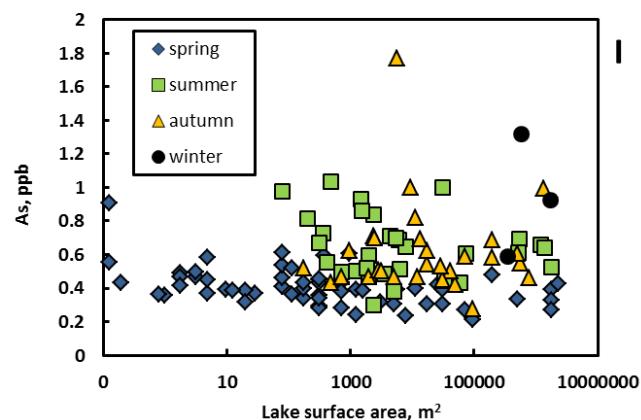
Fig. S3, continued. Anions and metalloids (Mo, G; V, H; As, I, and Sb, J) concentration in thermokarst lakes as a function of the lake size over different seasons.
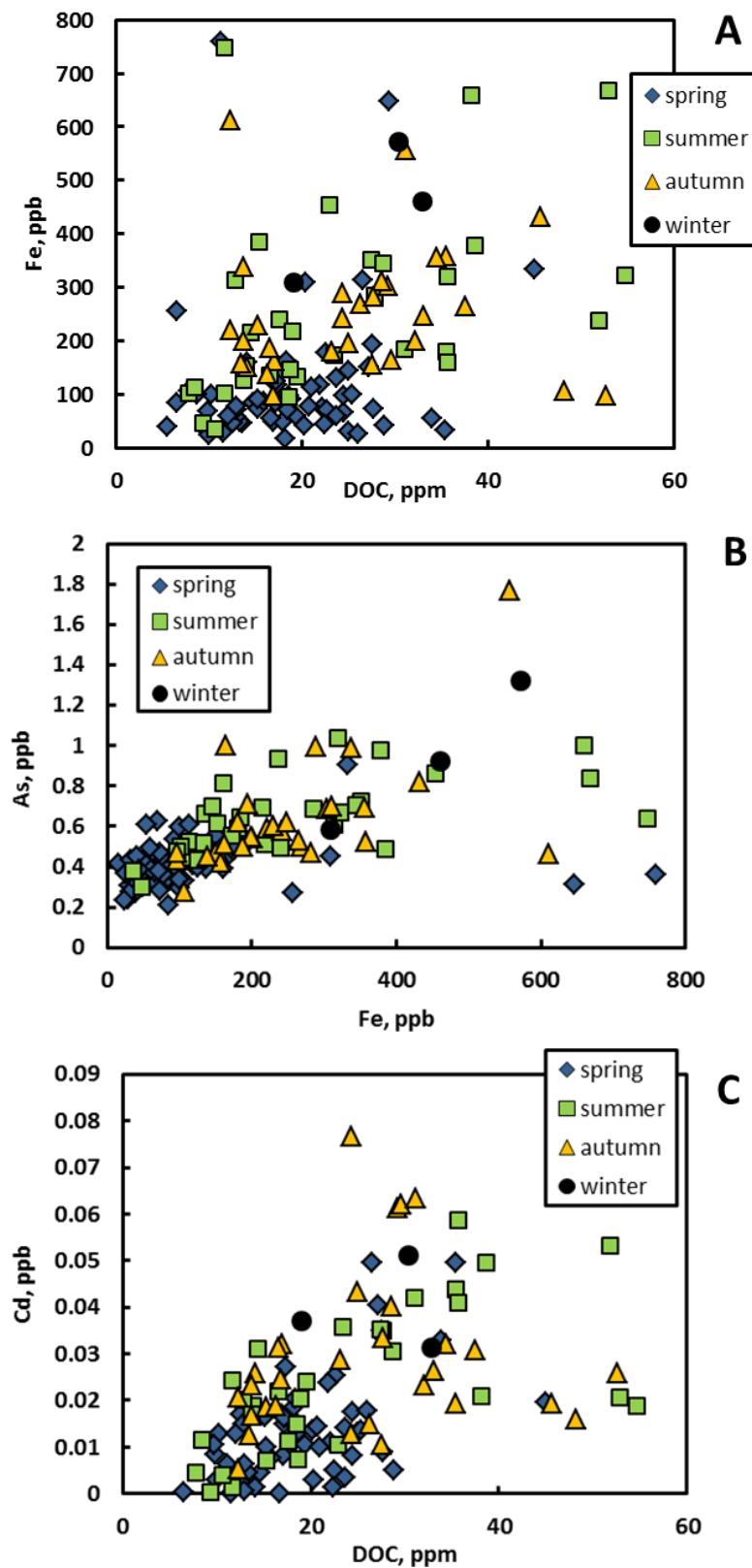
Figure S4. Examples of element concentration in thermokarst lakes measured over different seasons, all lake size included.

Figure S5. Allochthonous ice and ice ripples at the lake surface in October.

Figure S6. Organo-ferric coagulates at the lake surface in early June (up) and significant amount of solid precipitates formed during winter freezing and collected for analysis (bottom)
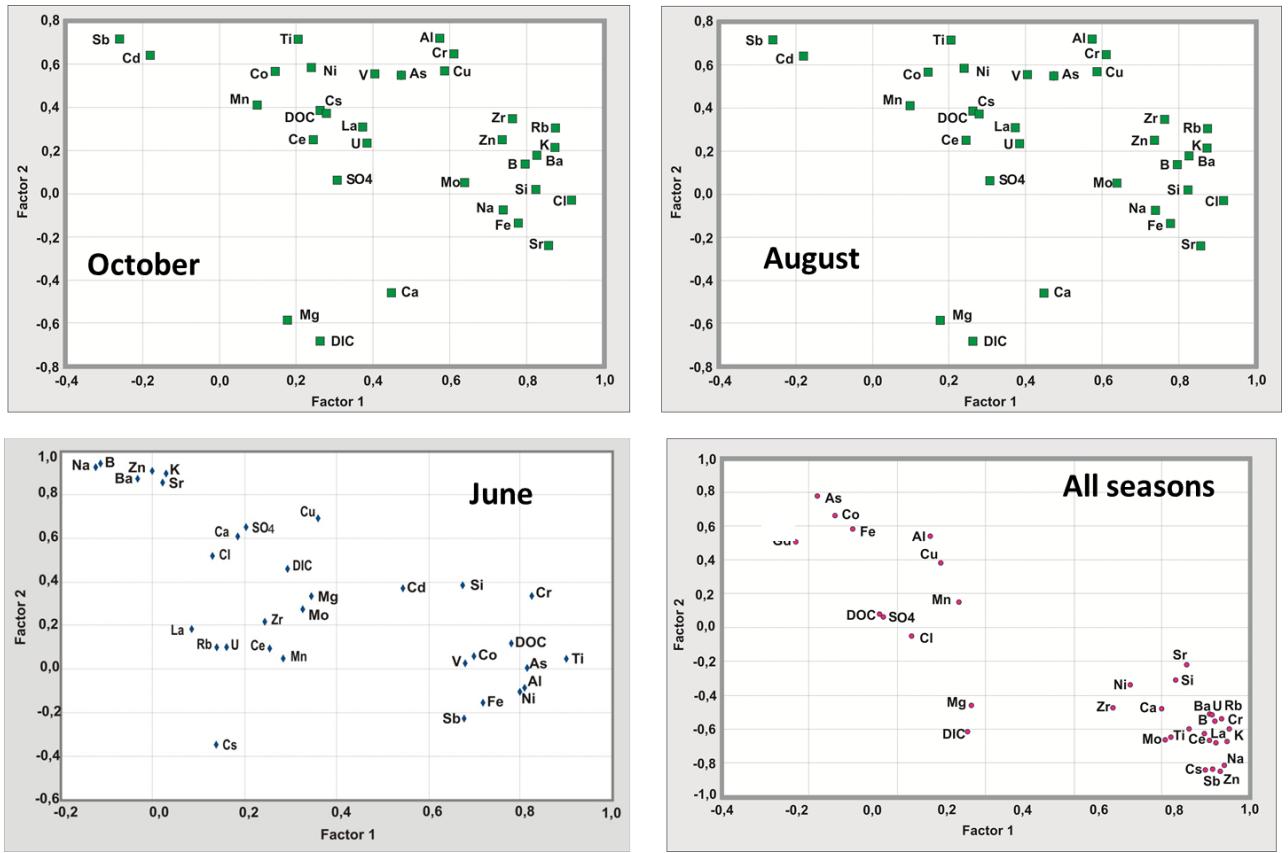
Fig S7-A. PCA matrix of F1XF2 factors on the lake water chemical composition during different seasons.
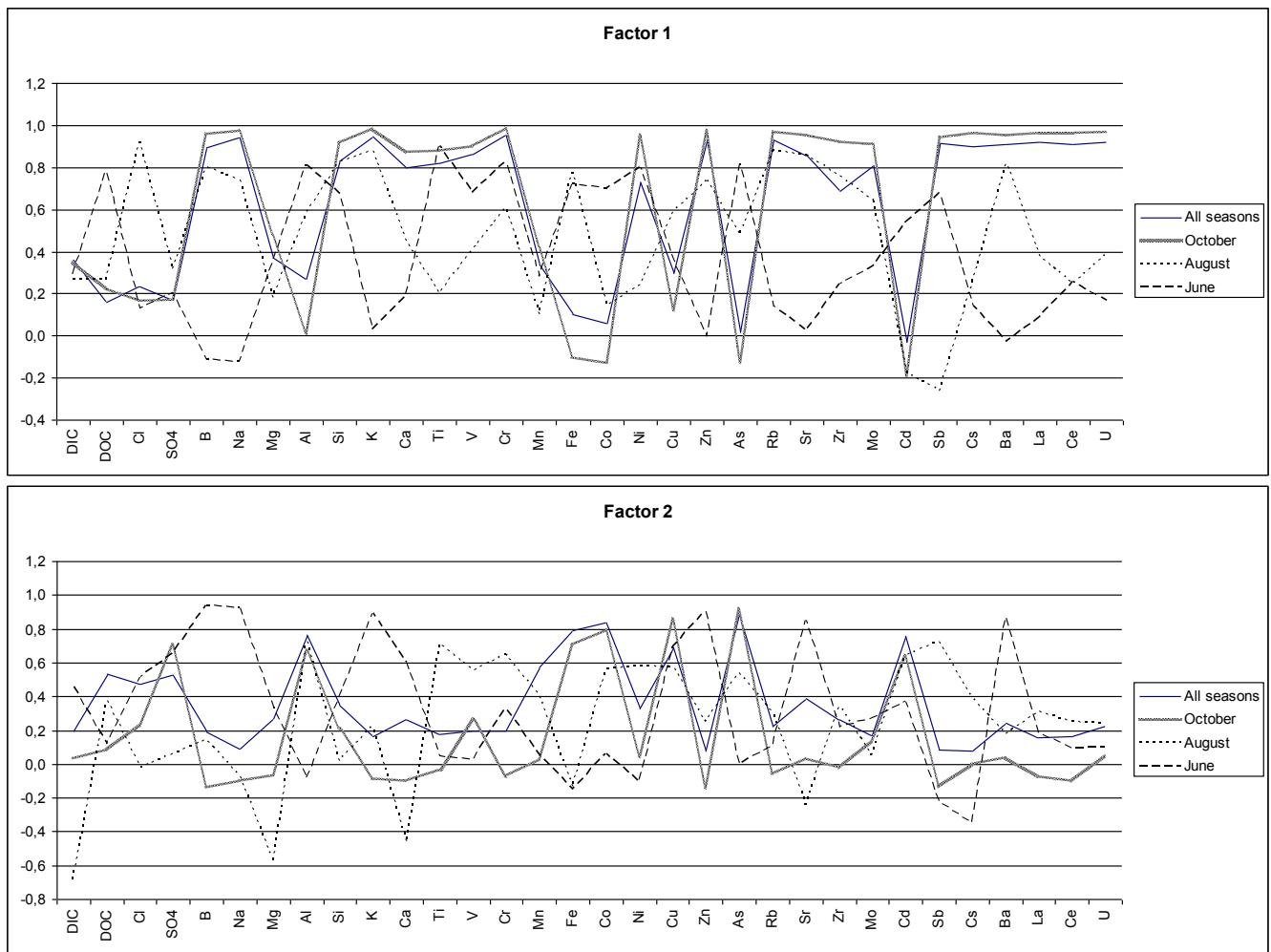
Fig. S7-B. Correlation profiles of F1 (upper graph) and F2 (bottom graph) separately for each season and for all seasons together.
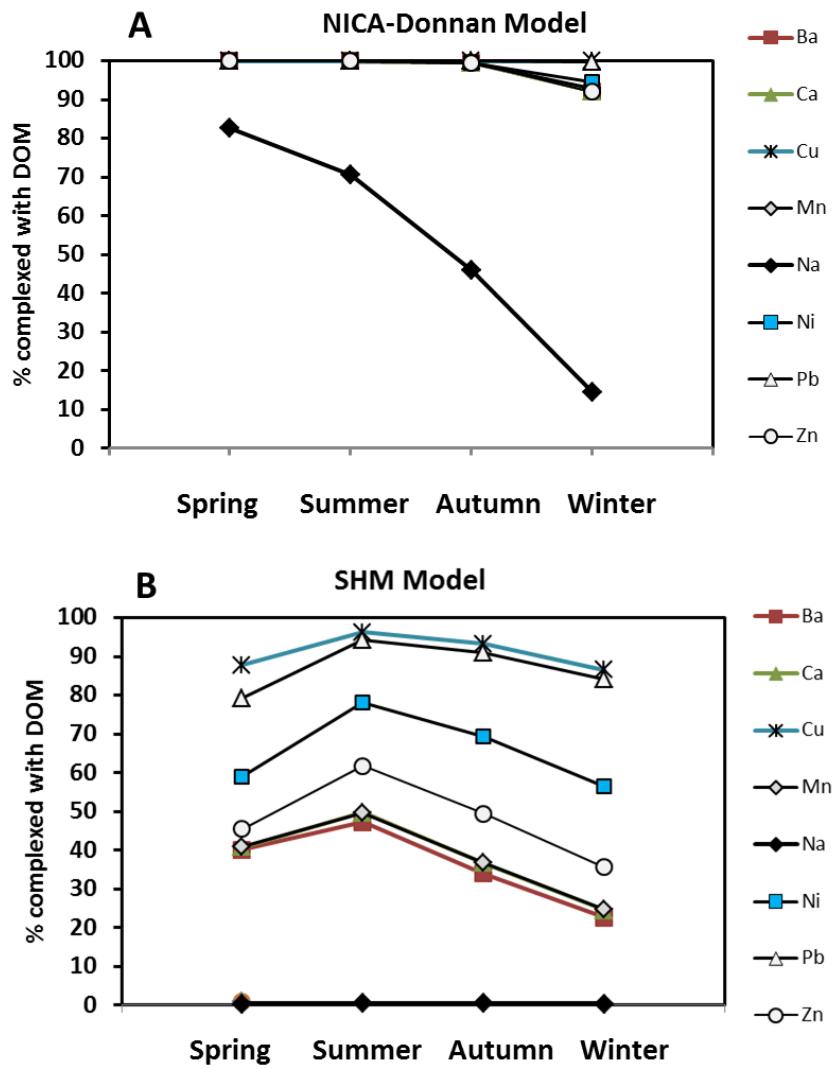
Figure S8. Proportion of TE bound to complexes with dissolved organic matter during different seasons, calculated using visual MINTEQ within the NICA-Donnan (A) and SHM model (B). Note that Al^{3+}, Fe^{3+}, La^{3+} and UO_2^{2+} are predicted to be 100% complexed with DOM in all systems.
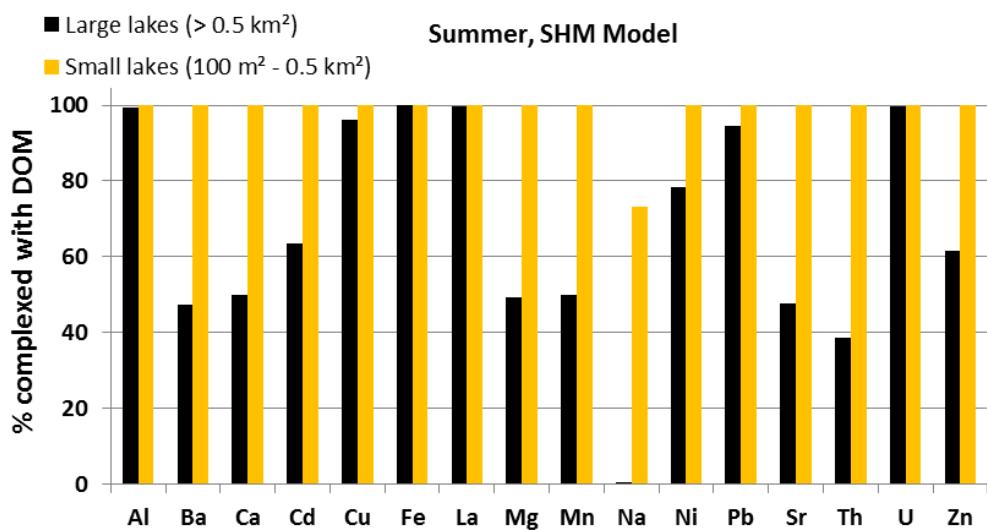
Figure S9. Percentage of organic-complexed TE in large and small thermokarst lakes in summer calculated using visual MINTEQ with Stockholm Humic Model.
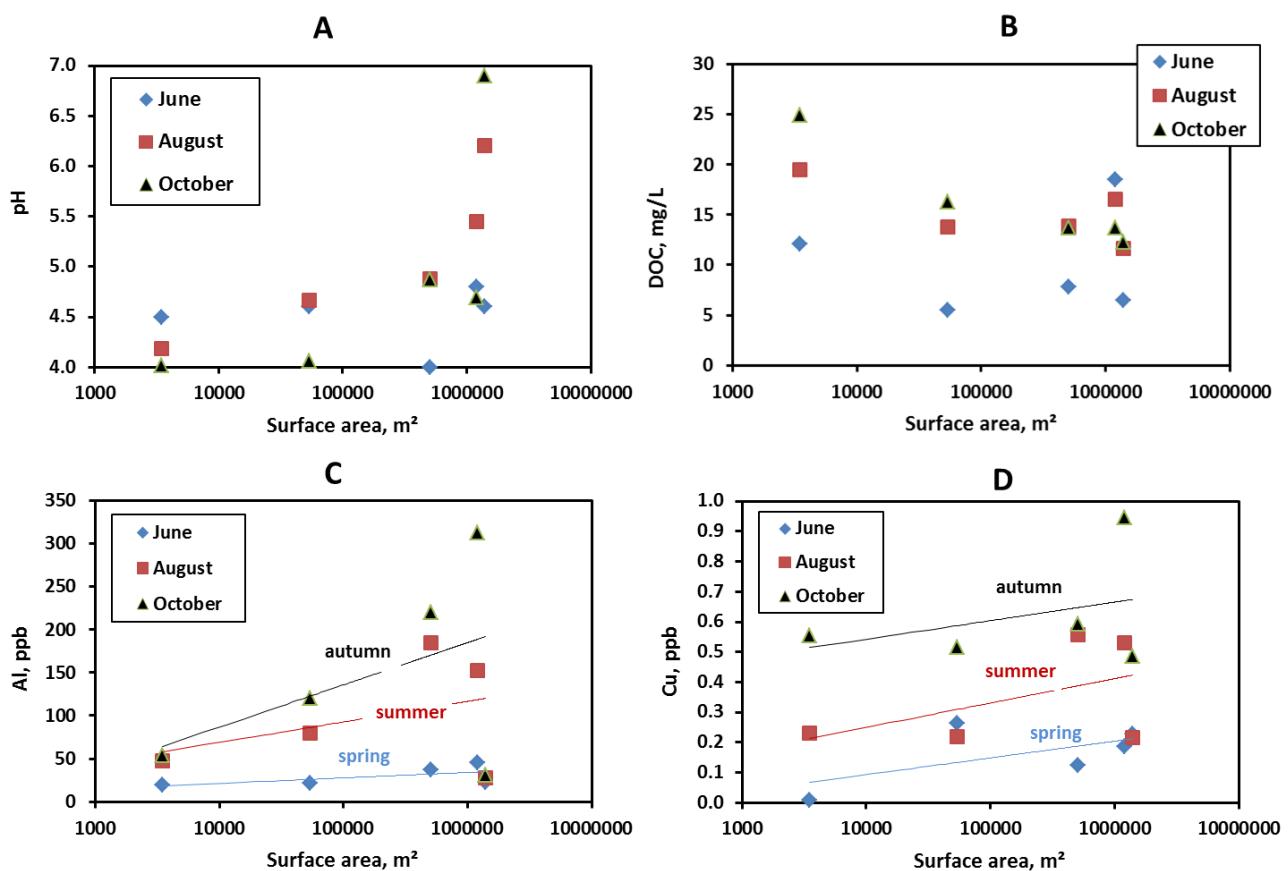
Figure S10. pH (A), DOC (B), Al (C) and Cu (D) concentration in five lakes of various size. Each lake was sampled three times during the year (June, August and October). The symbols are the measured values and the solid lines are the log fit to the data. The difference in element concentration between 3 seasons (spring < summer < autumn) is statistically significant at $p < 0.05$.
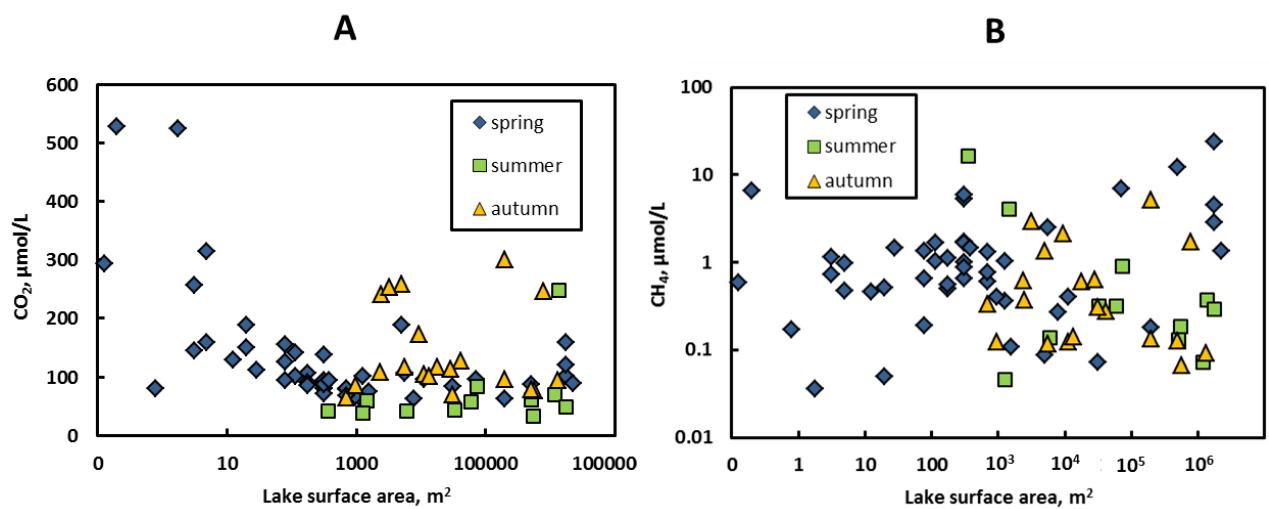
Figure S11. CO_2 (**A**) and CH_4 (**B**) concentration in depressions, thaw ponds and lakes of the Khanymey test site sampled in May, August and October 2013 (Pokrovsky et al., unpublished).