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Supplement of

Permafrost coverage, watershed area and season control of dissolved carbon and major elements in western Siberian rivers

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SUPPLEMENT

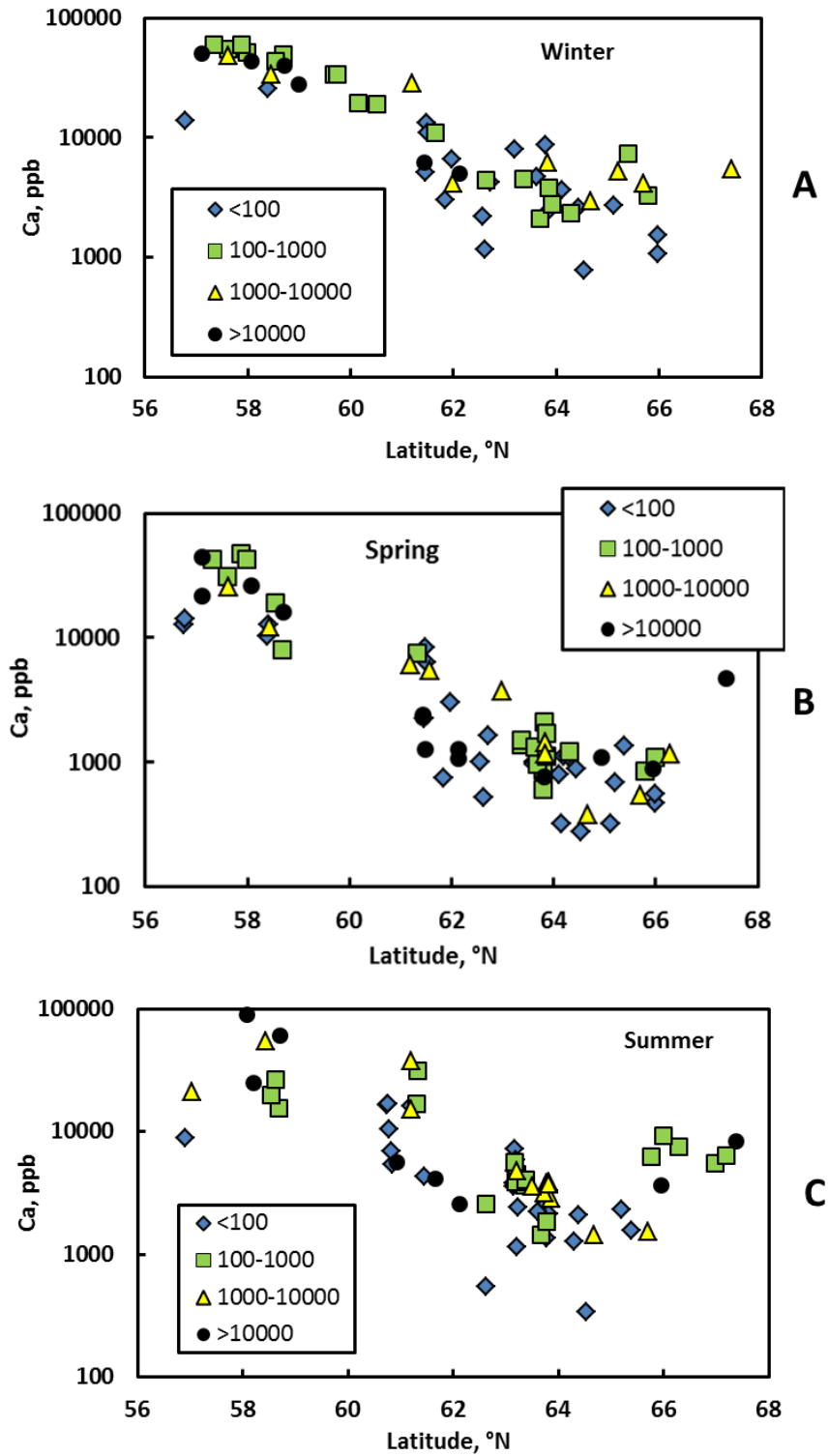


Figure S1. Significant decrease of Ca concentration in western Siberian rivers with latitude during winter (A), spring (B) and summer (C). The symbols represent different size of the watershed, see Fig. 2. Note the logarithmic scale on concentration in all three plots. The latitudinal trend is significant at $p < 0.001$.

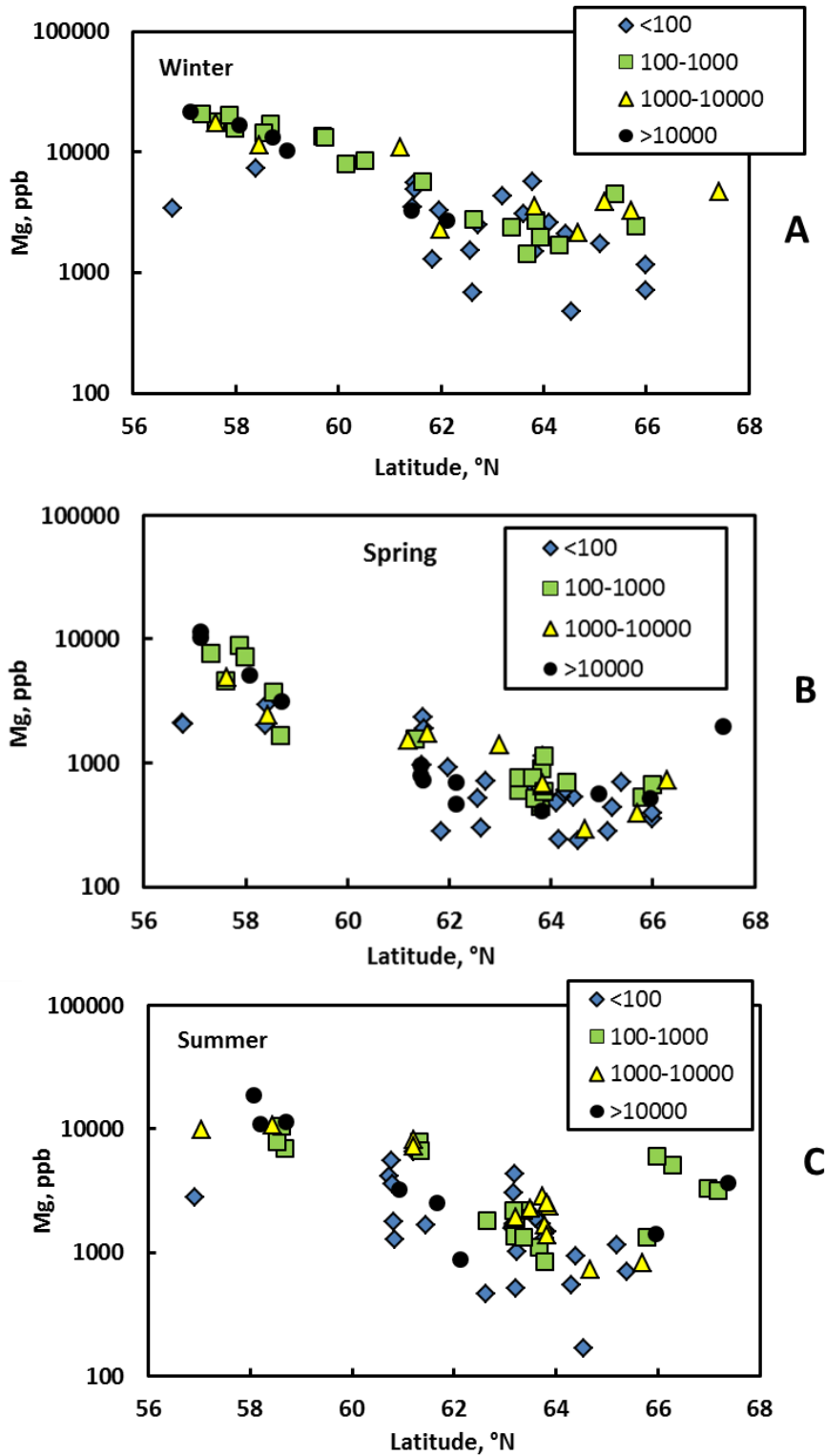


Figure S2. Significant decrease of Mg concentration in western Siberian rivers with latitude during winter (A), spring (B) and summer (C). The symbols represent different size of the watershed, see Fig. 2. Note the logarithmic scale on concentration in all three plots. The latitudinal trend is significant at $p < 0.001$.

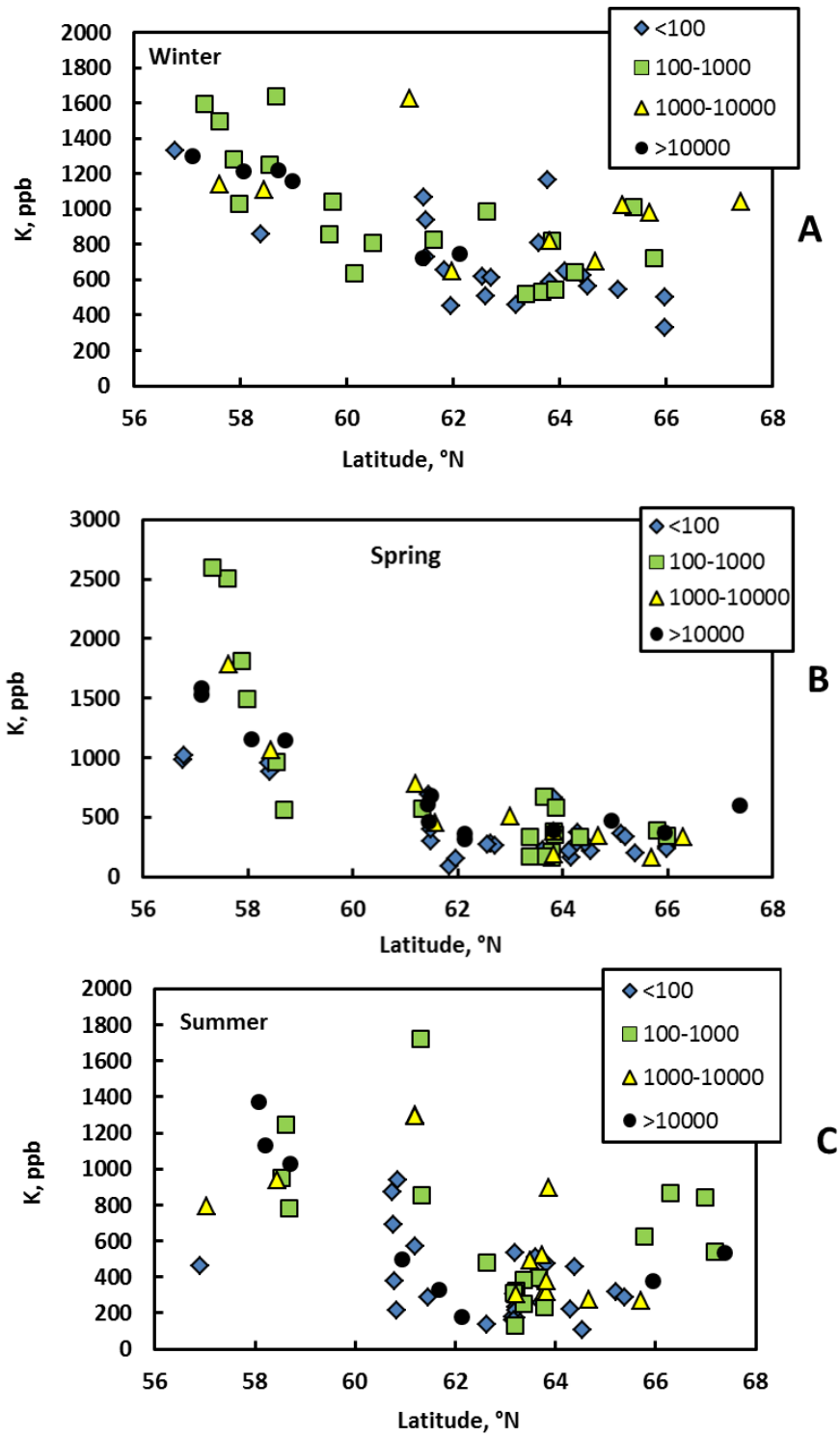


Figure S3. Evolution of K concentration in western Siberian rivers with latitude during winter (A), spring (B) and summer (C). The symbols represent different size of the watershed, see Fig. 2. The latitudinal trend is significant at $p < 0.001$.

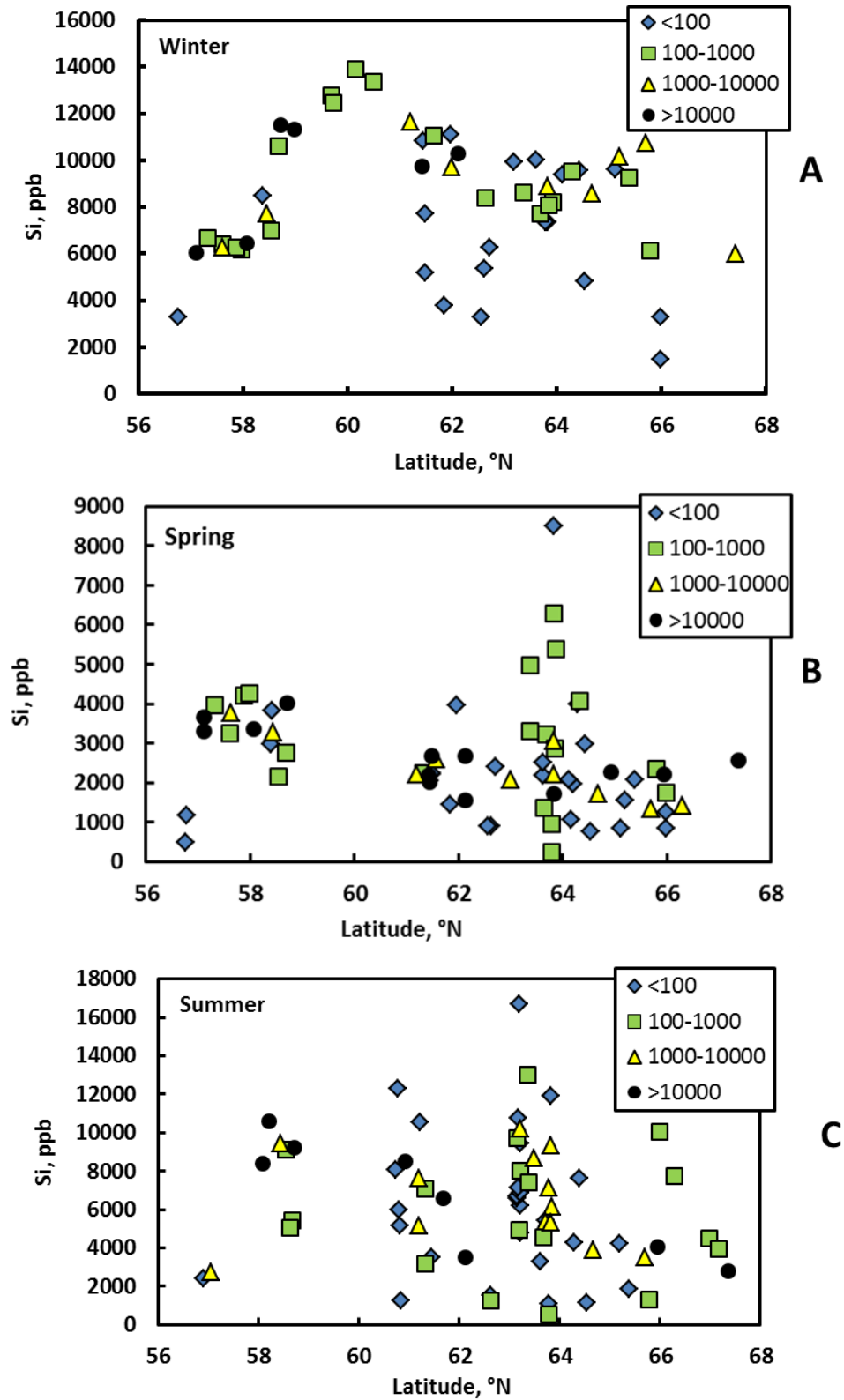


Figure S4. Evolution of Si concentration in western Siberian rivers with latitude during winter (A), spring (B) and summer (C). The symbols represent different size of the watershed, see Fig. 2.

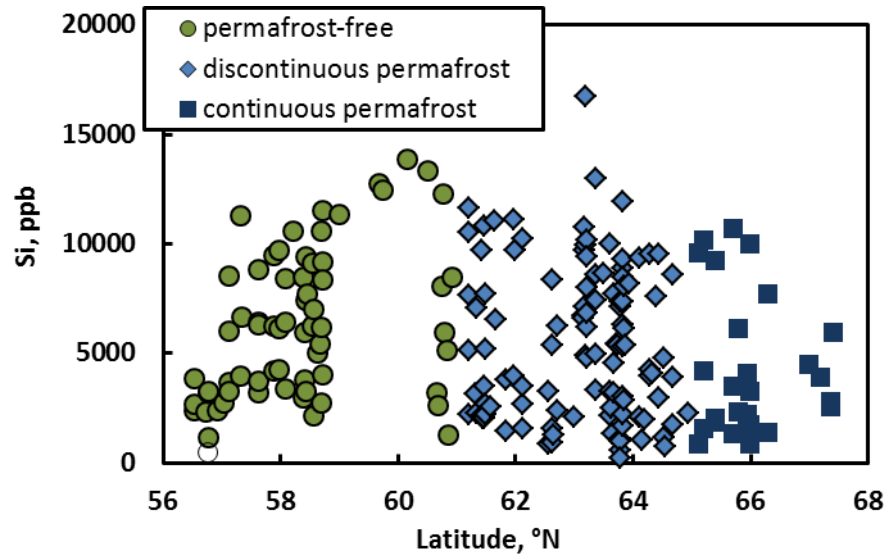


Figure S5. Si concentration in rivers as a function of latitude representing all seasons and all river watersheds. The difference between three permafrost zone are not significant ($p > 0.05$).

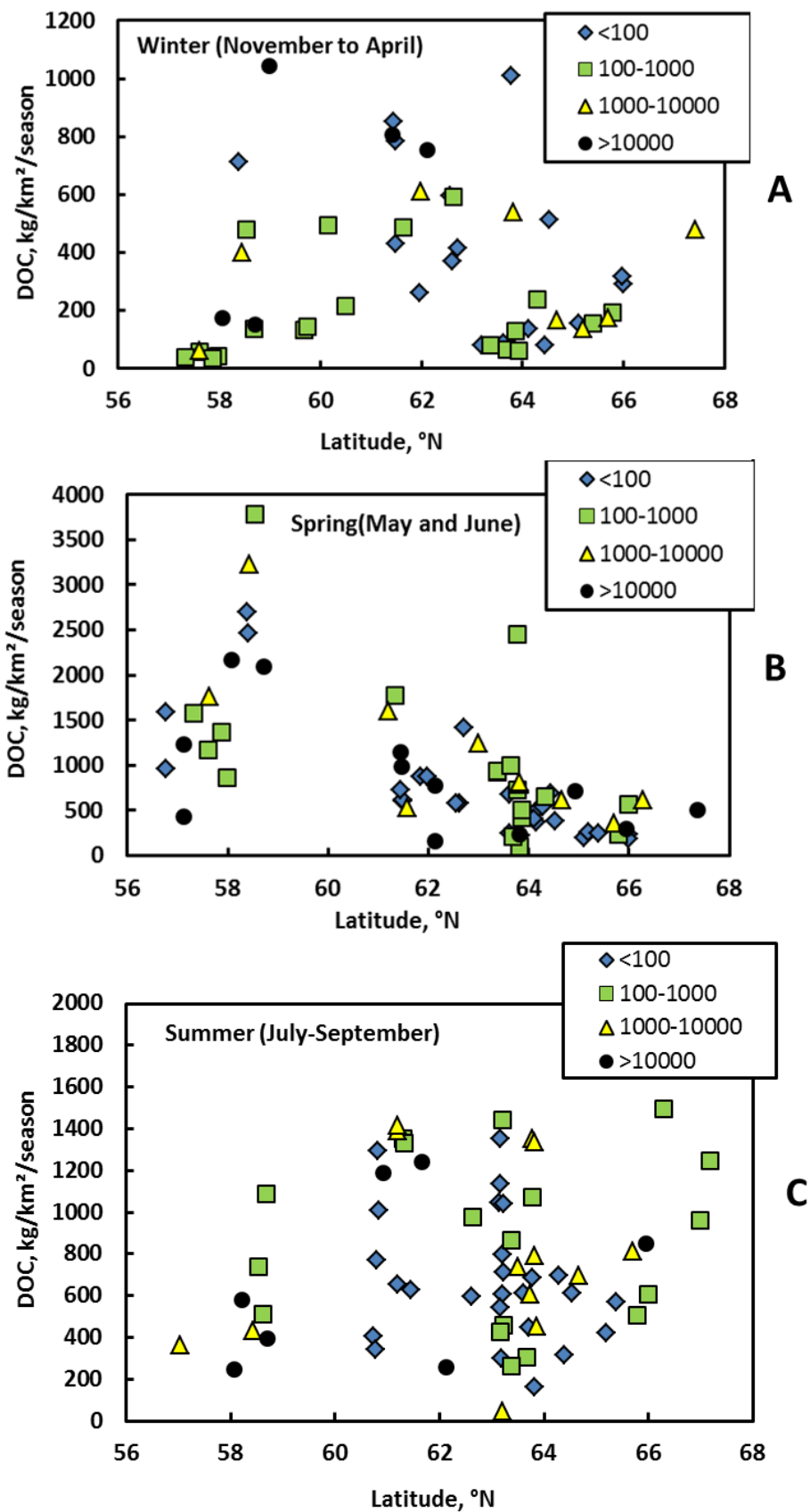


Figure S6. Seasonal fluxes of DOC in rivers of various sizes in winter (A), spring (B) and summer (C). The difference between watershed of different size is not significant ($p > 0.05$). The symbols represent different size of the watershed, see Fig. 2.

Table S1. Major physical and hydro-chemical parameters of sampled rivers. See Table 1 and Fig. 1 for localization.

SPRING	Date	S, km ²	D, m ³ /s	O ₂ , % sat	R, μS cm ⁻¹	pH	DIC, ppm	DOC, ppm	UV _{280nm}	Cl, ppm	SO ₄ , ppm	δ ¹³ C _{DIC} ‰
RJ-22	29.05.2014	1.79	0.017	72.4	106	6.64	5.326	12.22	1.352	15.07	0.070	-12.7
RJ-21	29.05.2014	3.37	0.032	85.9	115	6.85	3.65	12.23	1.384	22.22	0.156	-10.5
RJ-20	29.05.2014	7.18	0.069	70.3	34	6.16	0.785	14.58	1.455	4.403	0.630	-22.8
RJ-39	31.05.2014	7.46	0.044	79	9	5.12	0.309	6.546	1.143	0.128	0.555	-22.8
RJ-2	27.05.2014	8.14	0.062	91	66	6.91	6.037	24.61	1.804	0.161	0.010	-15.8
RJ-24	29.05.2014	9.52	0.091	66.6	20	4.71	0.372	17.62	1.654	0.741	0.273	-25.5
RJ-56	07.06.2014	9.65	0.124	71.6	9	5.16	0.356	8.59	1.264	0.425	0.489	-22
RJ-40	31.05.2014	12.04	0.070	72	10	5.63	0.6474	8.585	1.27	0.150	0.581	-23.5
RJ-12	27.05.2014	12.25	0.400	68.5	84	6.86	8.409	14.54	1.462	0.411	0.957	-14.4
RJ-36	30.05.2014	15.19	0.146	77.5	12	4.83	0.2915	7.684	1.188	0.222	0.381	-21.5
RJ-31	30.05.2014	18.8	0.180	61.3	8	5.43	0.3335	7.346	1.181	0.082	0.267	-21.8
RJ-25	29.05.2014	21.55	0.207	76.3	39	5.91	1.433	17.5	1.677	4.35	0.327	-21.7
RJ-55	07.06.2014	23.95	0.309	60.1	30	4.94	0.3504	21.22	1.876	3.480	0.364	-25.9
RJ-57	07.06.2014	33.48	0.432	75.1	12	5.86	0.638	8.557	1.244	0.466	0.366	-19.7
RJ-52	07.06.2014	34.61	0.447	65.3	19	5.46	0.575	10.18	1.38	2.268	0.370	-23.7
R-4	10.06.2013	34.61	0.447	79	n.d.	6.3	1.461	8.70	0.29	2.366	2.095	n.d.
RJ-46	02.06.2014	39.88	0.233	72.8	10	4.95	0.882	7.57	1.2	0.142	0.626	-23.8
RJ-45	02.06.2014	42.39	0.248	78.2	9	5.61	0.756	6.13	1.155	0.180	0.602	-21.8
RJ-35	30.05.2014	46.4	0.599	67.9	11	5.78	0.483	10.2	1.365	0.0889	0.230	-22.7
RJ-11	27.05.2014	58.56	1.913	59.3	67	7.02	6.611	15.9	1.484	0.251	0.182	-14.4
RJ-32	30.05.2014	59.86	0.772	68.1	39	5.68	0.591	7.63	1.235	8.13	0.276	-22.4
RJ-3	27.05.2014	61.48	0.775	73	76	6.91	7.275	24.4	1.758	0.106	0.0181	-16.5
RJ-30	30.05.2014	67.06	0.865	67.2	10	5.78	0.6641	6.10	1.142	0.076	0.248	-20.8
RJ-33	30.05.2014	71.61	0.924	62.8	28	6.02	1.053	7.99	1.259	3.754	0.329	-22
R-3	10.06.2013	74	0.955	65	n.d.	6.3	3.201	3.20	0.134	7.879	2.439	n.d.
RJ-50	07.06.2014	74	0.54	60.7	29	6.37	1.835	4.57	1.142	1.830	1.367	-23
RJ-41	31.05.2014	78.94	0.461	63.9	15	5.92	1.173	7.93	1.26	0.165	0.455	-21.6
RJ-34	30.05.2014	105.08	1.58	60.7	16	5.99	0.867	8.29	1.288	0.465	0.387	-21.4
RJ-43	31.05.2014	106.16	0.724	67.6	14	5.84	0.951	6.45	1.215	0.704	0.954	-22.9
RJ-27	30.05.2014	115.39	1.86	64.7	10	5.56	0.581	8.64	1.276	0.136	0.353	-21.2
Z-86	07.06.2013	115.39	1.86	82	13	5.22	1.067	29.25	0.2357	0.232	0.328	n.d.
RJ-58	11.06.2014	116.88	6.93	66.2	46	6.59	2.615	30.36	1.988	0.0583	1.168	-20.8
RJ-53	07.06.2014	175.29	2.64	70.7	16	5.86	0.707	11.83	1.41	0.469	0.6014	-23.2
R-5	10.06.2013	175.29	5.33	64	n.d.	6.1	1.774	10.53	0.391	4.71	1.178	n.d.
RJ-8	27.05.2014	177.45	3.16	68.3	286	7.53	35.34	14.82	1.351	0.345	0.1735	n.d.
RJ-9	27.05.2014	275.16	3.52	64.1	258	7.44	30.95	13.01	1.319	0.256	0.2606	-13.7
RJ-51	07.06.2014	280.59	1.32	61.6	13	5.97	0.687	8.69	1.293	0.577	0.4154	-19.8
RJ-6	27.05.2014	302.46	3.81	75.4	179	7.40	19.95	17.97	1.504	0.265	0.5110	-14.3
RJ-5	27.05.2014	320.04	6.15	83.1	256	7.40	30.6	15.82	1.419	0.3019	0.176	-14.2
RJ-18	29.05.2014	359.31	5.17	71.5	118	6.49	2.598	23.8	1.874	22.46	0.4025	-20
RJ-49	04.06.2014	512.33	4.24	78.4	15	5.76	0.6836	13.24	1.447	0.3160	0.667	-25
R-6	10.06.2013	598	11.6	80	n.d.	6.0	1.298	9.948	0.33	1.379	8.258	n.d.
RJ-54	07.06.2014	598	25.8	67.6	156	5.64	0.598	11.17	1.472	40.92	0.123	-20.2
RJ-14	27.05.2014	689	22.5	84.2	112	7.11	11.88	22.31	1.707	0.1145	0.0907	-10.7
R-2	10.06.2013	820.66	9.56	66	n.d.	6.2	2.786	6.606	0.2215	4.815	7.077	n.d.
RJ-29	30.05.2014	820.66	9.56	67.2	32	5.90	0.752	8.247	1.26	5.358	0.4519	-21.7
RJ-7	27.05.2014	1020.47	13.8	57.5	151	7.28	16.47	25.1	1.827	0.2299	0.4997	-16.1
RJ-23	29.05.2014	1260	9.10	72.5	132	6.64	2.976	13.95	1.455	27.31	0.4227	-18
RJ-48	04.06.2014	1970	16.3	77.7	14	5.78	0.675	14.24	1.479	0.1563	0.5026	-25.4
RJ-17	29.05.2014	3190	51.0	109	94	6.56	1.908	19.33	1.611	17.61	0.8858	-19.8
RJ-13	27.05.2014	3460	113	65.5	75	7.25	7.262	19.04	1.591	0.2680	0.5762	-15.7
RJ-42	31.05.2014	4030	44.5	77.5	10	5.70	0.596	6.215	1.17	0.1947	0.6968	-22.3
RJ-37	30.05.2014	5110	68.5	64.7	13	6.72	0.2806	8.776	1.221	0.6556	0.3655	-21.8
Z-55	05.06.2013	9881	134	n.d.	n.d.	n.d.	1.265	11.17	0.374	2.046	0.7693	n.d.
R-1	10.06.2013	9881	134	76	29	6.4	1.498	11.61	0.357	2.915	3.297	n.d.
RJ-28	30.05.2014	9881	134	79.1	17	5.33	0.456	10.55	1.316	1.676	0.3923	-24.3
R-7	10.06.2013	10768	154	79	n.d.	5.7	1.288	10.42	0.331	2.304	1.329	n.d.
R-8	10.06.2013	10768	367	68	31	6.2	1.249	10.82	0.330	2.340	3.904	n.d.
RJ-26	29.05.2014	10768	154	81.1	14	5.27	0.5529	11.39	1.393	0.5485	0.4622	-25.7
RJ-4	27.05.2014	12000	122	58.5	334	7.58	37.25	23.48	1.609	4.799	6.361	-13.7
R-10	12.06.2013	12000	121	67	347	8.1	35.73	26.86	0.709	2.870	7.046	n.d.
RJ-15	27.05.2014	25500	403	72.3	99	6.89	9.555	25.59	1.825	0.6347	0.958	-16.6
RJ-38	31.05.2014	26100	350	83.5	15	5.89	0.8026	10.34	1.362	0.2963	0.703	-24.6
RJ-10	27.05.2014	27200	348	58.1	159	7.11	15.68	32.75	2.024	1.572	1.88	-15.5
R-9	12.06.2013	27622	475	61	42	6.3	2.028	12.86	0.415	1.890	5.60	n.d.
RJ-19	29.05.2014	27622	475	8.04	33	6.37	1.107	13.45	1.445	4.552	0.730	-23.2
RJ-44	31.05.2014	112000	888	79.3	15	5.67	0.8375	7.288	1.231	0.955	0.886	-23.8
RJ-47	04.06.2014	150000	1286	79.6	43	6.87	3.739	11.27	1.37	0.319	1.03	-19.7
RJ-1	27.05.2014	423100	n.d.	181	242	7.90	24.8	5.449	1.056	2.393	13.7	-9.3
RJ-16	29.05.2014	773200	n.d.	95.2	99	7.09	9.034	13.25	1.384	1.167	4.933	-12.7

Table S1, continued.

SUMMER	Date	S, km ²	D, m3/s	O ₂ , % sat	R, μS cm ⁻¹	pH	DIC, ppm	DOC, ppm	UV _{280 nm}	Cl, ppm	SO ₄ , ppm
BL-35	22.08.2013	7	0.035	n.d.	n.d.	7.81	23.22	10.44	0.2409	5.98	5.20
RA-18	08.08.2014	7.18	0.061	n.d.	52	6.42	4.253	9.481	1.268	2.90	0.341
BL-28	22.08.2013	9.35	0.080	n.d.	n.d.	7.83	31.51	9.830	0.3644	4.556	1.30
BL-25	22.08.2013	9.65	0.16	n.d.	n.d.	7.08	0.659	10.47	0.1796	1.009	0.283
RA-6	03.08.2014	11	0.10	n.d.	12.6	5.7	n.d.	n.d.	1.21	n.d.	n.d.
RY 14-45	24.08.2014	12.04	0.11	82.8	47	6.65	2.266	5.851	1.181	0.436	0.855
RA-5	03.08.2014	15	0.14	n.d.	31.9	6.48	4.114	8.410	1.291	0.1725	0.2062
RY 14-47	24.08.2014	15.19	0.14	88.7	9	5.66	0.551	61.49	1.225	0.2582	0.369
RA-12	04.08.2014	19	0.18	n.d.	29	5.84	n.d.	n.d.	1.678	n.d.	n.d.
BL-23	21.08.2013	23.95	0.38	n.d.	n.d.	7.25	3.827	7.813	0.277	4.276	3.28
BL-34	22.08.2013	26	0.130	n.d.	n.d.	7.80	27.27	8.842	0.3492	9.426	5.133
BL-31	22.08.2013	31	0.155	n.d.	n.d.	7.42	1.277	25.98	0.769	2.243	39.9
BL-3	12.08.2013	32	0.185	n.d.	n.d.	7.51	6.003	67.53	2.474	3.673	0.1393
BL-33	22.08.2013	32	0.160	n.d.	n.d.	7.42	16.66	19.88	0.594	2.977	0.5419
RA-15	04.08.2014	32	0.30	n.d.	26.3	6.62	3.123	14.47	1.51	0.133	0.208
BL-19	21.08.2013	34.61	0.76	n.d.	n.d.	7.03	3.902	8.519	0.3025	4.9	4.729
RA-9	03.08.2014	43	0.40	n.d.	19.5	6.52	n.d.	n.d.	1.185	0.4350	0.267
BL-32	22.08.2013	44	0.220	n.d.	n.d.	7.37	6.797	33.40	1.1032	2.054	0.250
RY 14-48	24.08.2014	53	0.49	73.5	34	6.24	3.779	4.349	1.073	0.3571	0.638
RY 14-49	24.08.2014	71.61	0.66	68.7	43	6.26	1.657	9.692	1.192	4.7540	0.500
BL-17	21.08.2013	74	0.54	n.d.	n.d.	7.09	3.808	2.828	0.092	8.544	2.679
RY 14-44	24.08.2014	78.94	0.73	65.5	22	6.6	1.689	7.930	1.194	0.627	0.177
RA-4	03.08.2014	79.5	0.74	n.d.	54	6.85	7.893	7.527	1.218	0.1963	0.113
BL-22	21.08.2013	82	0.76	n.d.	n.d.	7.06	9.972	4.130	0.102	11.75	7.22
RA-10	03.08.2014	88	0.82	n.d.	29.9	6.64	4.002	9.859	n.d.	0.136	0.345
RA-13	04.08.2014	96	0.89	n.d.	31.5	6.35	3.831	15.75	1.529	0.330	0.080
BL-14	21.08.2013	115.39	0.60	n.d.	n.d.	6.82	2.273	11.99	0.345	0.644	0.192
RA-1	30.07.2014	115.39	1.07	n.d.	19	6.36	1.186	14.87	1.462	0.143	0.238
BL-5	03.08.2014	116.88	1.04	n.d.	n.d.	7.75	25.81	26.57	0.916	4.314	0.147
RA-8	03.08.2014	121	1.12	n.d.	34.9	6.73	5.046	6.338	1.175	0.115	0.373
RT2 14-30	21.08.2014	157	1.74	89.3	82	7.07	5.965	11.15	1.171	5.49	2.65
RA-11	04.08.2014	170	1.67	n.d.	42.1	6.71	6.062	5.603	1.145	0.658	0.394
BL-21	21.08.2013	175.29	2.87	n.d.	n.d.	7.05	6.102	3.620	0.1015	9.54	3.895
RA-16	08.08.2014	175.29	3.04	n.d.	42	6.49	3.220	11.35	1.387	1.87	0.478
RY 14-42	24.08.2014	183	1.79	77.5	11	5.06	0.499	6.655	1.267	0.321	0.2626
RA-14	04.08.2014	250	2.45	n.d.	32	6.47	2.250	18.95	1.659	3.311	0.2070
BL-18	21.08.2013	280.59	0.81	n.d.	n.d.	7.09	3.003	4.844	0.158	6.973	1.2247
BL-27	22.08.2013	359.31	5.97	n.d.	n.d.	7.88	25.83	14.39	0.5274	4.84	59.2
RA-19	08.08.2014	359.31	4.35	n.d.	293	7.62	24.52	14.14	1.427	23.4	0.164
BL-9	12.08.2013	473	2.32	n.d.	n.d.	7.57	34.65	19.45	0.7005	7.197	0.1424
BL-6	12.08.2013	510	2.50	n.d.	n.d.	7.83	46.62	13.45	0.3092	7.602	0.183
RT2 14-32	21.08.2014	512.33	8.77	110.3	173	7.46	12.17	6.169	1.119	13.69	2.16
BL-24	21.08.2013	598	7.33	n.d.	n.d.	7.22	2.652	10.25	0.3152	1.999	16.97
RT2 14-29	21.08.2014	656	10.4	83	81	7.18	6.506	10.10	1.182	4.34	2.01
BL-16	21.08.2013	820.66	10.2	n.d.	n.d.	7.10	5.348	4.553	0.1486	9.134	7.36
BL-13	21.08.2013	1396	11.5	n.d.	n.d.	6.65	6.012	9.465	0.283	3.928	0.662
RT2 14-31	21.08.2014	1970	6.97	97.4	138	7.26	11.80	15.19	1.322	9.3048	1.371
RA-3	03.08.2014	1979	40.7	n.d.	39	7.22	n.d.	n.d.	1.236	n.d.	n.d.
RA-7	03.08.2014	1979	2.33	n.d.	36.2	6.88	5.446	5.072	1.128	0.105	0.265
BL-29	22.08.2013	3190	45.4	n.d.	n.d.	7.87	29.97	12.87	0.317	4.234	10.54
RA-20	08.08.2014	3190	45.4	n.d.	n.d.	n.d.	22.70	12.80	1.365	107.2	0.296
BL-2	12.08.2013	3197	2.92	n.d.	n.d.	7.65	31.99	51.58	1.591	4.206	2.52
RA-22	08.08.2014	3460	17.0	n.d.	369	7.51	45.23	11.39	1.196	0.328	0.146
RY 14-43	24.08.2014	4030	58	90	32	6.6	2.674	7.196	1.081	0.739	1.096
RY 14-46	24.08.2014	5110	73	90.5	36	6.71	3.190	6.297	1.158	0.779	0.113
RA-2	02.08.2014	9881	142	n.d.	50	6.89	3.179	11.96	1.378	4.568	0.318
BL-20	21.08.2013	9881	60	n.d.	n.d.	7.03	5.835	6.681	0.219	6.46	6.101
BL-15	21.08.2013	9881	142	n.d.	n.d.	6.86	5.930	7.093	0.232	7.02	4.17
RA-17	08.08.2014	10768	120	n.d.	27	6.4	1.498	15.26	1.512	1.70	0.269
BL-4	12.08.2013	25500	73.5	n.d.	n.d.	7.92	43.97	18.59	0.513	8.05	1.84
RA-21	08.08.2014	25500	107	n.d.	406	7.78	49.93	12.09	1.261	1.62	0.811
RA-23	08.08.2014	27200	72.4	n.d.	610	7.96	74.16	12.01	1.237	10.06	1.23
BL-26	22.08.2013	27622	408	n.d.	n.d.	6.86	6.109	10.82	0.287	2.77	2.97
BL-30	22.08.2013	75090	1425	n.d.	n.d.	7.87	8.809	8.062	0.217	3.35	0.310
RY 14-41	24.08.2014	112000	1168	93.3	45	6.69	3.777	71.21	1.111	1.29	0.408
RT2 14-40	16.08.2014	150000	3977	n.d.	80	6.57	8.197	11.45	1.154	0.581	0.743
BL-36	22.08.2013	773200	n.d.	n.d.	n.d.	7.92	19.57	5.974	0.143	2.295	1.51

Table S1, continued.

AUTUMN	Date	S, km ²	D, m3/s	O ₂ , % sat	R, μS cm ⁻¹	pH	DIC, ppm	DOC, ppm	UV _{280 nm}	Cl, ppm	SO ₄ , ppm	δ ¹³ C _{DIC} , ‰
R-2	18.10.2013	8.14	0.0074	93.9	35	6.8	5.951	40.2	1.132	1.462	0.877	n.d.
R-12	18.10.2013	12.25	0.050	88	n.d.	6.9	7.173	26.25	0.888	3.983	0.607	n.d.
R-13	18.10.2013	61.48	0.060	86.9	37	6.5	8.496	36.6	0.9873	2.024	0.458	n.d.
R-15	18.10.2013	116.88	0.19	93.1	25	7.7	7.835	32.94	1.068	4.183	0.591	n.d.
R-8	18.10.2013	177.45	0.23	99.5	199	7.8	67.88	8.775	0.1674	6.083	0.916	n.d.
R-9	18.10.2013	275.16	0.25	93.4	170	7.82	56.04	8.528	0.1585	6.294	0.53	n.d.
R-5	18.10.2013	320.04	0.44	95.3	239	7.2	75.92	7.056	0.1235	7.107	0.640	n.d.
R-14	18.10.2013	689	2.10	106	58	7.06	19.03	24.86	0.790	4.217	0.455	n.d.
R-7	18.10.2013	1020.47	0.99	100	158	7.6	51.2	16.7	0.459	6.20	0.614	n.d.
R-13	18.10.2013	3460	15.4	84.2	87	7	16.34	24.37	0.7399	4.929	0.411	n.d.
R-4	18.10.2013	12000	7.60	98	212	7.8	60.4	22.75	0.521	5.236	8.61	n.d.
R-17	18.10.2013	25500	66.9	84.4	72	7.36	20.09	30.96	0.9709	5.227	1.71	n.d.
R-1	18.10.2013	423100	n.d.	85.4	95	7.8	24.92	3.284	0.0712	n.d.	2.40	n.d.
WINTER												
RF13	22.02.2014	1.79	0.057	n.d.	270	7.48	15.72	14.57	0.554	37.0	0.168	-13.4
RF54	03.03.2014	3.37	0.059	n.d.	239	6.51	15.44	26.51	0.417	29.26	0.616	-12.4
RF55	03.03.2014	7.18	0.034	n.d.	112	6.18	13.36	28.85	0.717	2.77	0.769	-10.2
RF31	26.02.2014	7.46	0.054	n.d.	70	6.33	6.704	5.853	0.463	0.234	0.155	-12.1
RF52	03.03.2014	9.52	0.018	n.d.	79	5.73	n.d.	n.d.	n.d.	n.d.	n.d.	-20.6
RF48	03.03.2014	9.65	0.04	n.d.	28	6.19	2.68	12.65	0.340	0.411	0.438	-11.7
RF30	26.02.2014	12.04	9.80	n.d.	105	6.62	9.603	3.904	0.07	0.499	1.86	-17
RF33	26.02.2014	15.19	0.09	n.d.	32	5.79	1.716	17.57	0.771	0.658	0.947	-18.6
RF14	22.02.2014	21.55	0.103	n.d.	112	6.80	10.73	8.86	0.4158	5.36	0.607	-15.1
RF46	03.03.2014	23.95	0.10	n.d.	91	6.40	7.229	14.14	0.411	7.23	0.295	-14.8
RF49	03.03.2014	33.48	0.06	n.d.	45	6.09	4.433	20.34	0.578	0.469	0.610	-14.5
RF39	27.02.2014	34.61	0.07	n.d.	111	6.37	6.531	7.197	0.5068	4.625	0.261	-13.2
RF26	25.02.2014	39.88	0.094	n.d.	25	5.70	1.848	10.96	0.4798	0.529	0.954	-19.1
RF25	25.02.2014	42.39	0.162	n.d.	33	5.66	1.82	12	0.3275	1.424	1.335	-19.7
RF34	26.02.2014	46.4	0.10	n.d.	56	6.35	6.506	2.709	0.1774	0.406	0.982	-18.7
RF10	19.02.2014	58.56	0.05	n.d.	329	6.84	36.23	18.34	1.6655	0.374	0.205	-10
RF2	19.02.2014	61.48	n.d.	n.d.	144	6.58	33.13	3.185	1.0453	1.201	0.343	-19.3
RF36	26.02.2014	67.06	0.08	n.d.	69	6.28	7.419	4.643	0.095	0.1643	0.105	-17
RF35	26.02.2014	71.61	0.27	n.d.	59	6.38	5.134	8.08	0.1311	3.463	0.725	-18.6
RF41	27.02.2014	74	0.14	n.d.	53	6.40	4.456	2.291	0.0484	2.85	1.43	-19.8
RF29	26.02.2014	78.94	0.34	n.d.	120	6.56	12.47	5.854	0.1625	0.605	0.235	-14.9
RF45	03.03.2014	82	0.15	n.d.	137	6.62	12.18	2.755	0.0485	8.65	0.667	-18.7
RF27	25.02.2014	106.16	0.91	n.d.	68	n.d.	6.79	5.523	0.2241	0.700	0.568	-13.3
RF44	27.02.2014	115.39	0.15	n.d.	240	6.61	18.5	34.51	1.8222	0.628	0.178	-11.3
RF65	05.03.2014	116.88	0.12	n.d.	579	7.08	77.4	14.27	0.2261	0.348	0.057	-11.2
RF38	27.02.2014	175.29	0.78	n.d.	78	6.33	8.03	2.022	0.0761	1.955	0.888	-19.6
RF7	19.02.2014	177.45	0.14	n.d.	665	7.43	83.3	5.25	0.094	0.897	0.427	-14.7
RF62	04.03.2014	190	0.17	n.d.	409	6.86	51.5	9.796	0.2684	0.169	0.0747	-13.9
RF60	04.03.2014	220	0.19	n.d.	258	6.62	34.3	36.25	0.1377	0.158	0.1398	-18
RF61	04.03.2014	253	0.22	n.d.	415	6.86	52.7	10.52	0.266	0.174	0.2331	-10.4
RF8	19.02.2014	275.16	0.16	n.d.	576	7.42	75.05	4.536	0.0763	0.322	0.2176	-14.8
RF40	27.02.2014	280.59	0.16	n.d.	47	6.31	4.66	2.496	0.1074	1.513	0.467	-19.9
RF5	19.02.2014	302.46	0.18	n.d.	621	7.38	79.8	6.377	0.1199	0.516	0.095	-14.3
RF4	19.02.2014	320.04	0.28	n.d.	688	7.45	85.4	4.869	0.0844	1.59	0.739	-13.9
RF37	27.02.2014	350	0.88	n.d.	57	6.48	6.18	1.585	0.0714	1.305	0.680	-18.7
RF47	03.03.2014	598	1.60	n.d.	125	6.15	6.362	14.27	0.6597	16.55	0.483	-12.8
RF12	19.02.2014	689	1.27	n.d.	489	7.17	63.66	12.28	0.2796	0.3438	0.133	-10.2
RF58	04.03.2014	732	1.62	n.d.	258	6.65	30.98	6.234	0.2358	0.267	0.383	-15.6
RF42	27.02.2014	820.66	2.38	n.d.	95	6.41	7.58	2.735	0.0761	6.85	0.469	-18.5
RF6	19.02.2014	1020.47	0.63	n.d.	568	7.29	74.4	7.105	0.1442	0.570	0.186	-14.9
RF53	03.03.2014	1260	1.80	n.d.	237	6.50	16.2	11	0.3805	24.0	0.810	-9.6
RF51	03.03.2014	1648	4.12	n.d.	100	6.24	8.08	15.76	0.2495	8.68	0.525	-12.3
RF57	03.03.2014	3190	n.d.	n.d.	608	6.70	44.22	48.61	0.2349	76.4	0.335	-10.5
RF11	19.02.2014	3460	9.35	n.d.	403	7.06	50.84	10.29	0.3459	0.353	0.163	-12.6
RF28	25.02.2014	4030	11.8	n.d.	95	6.26	8.193	3.954	0.2199	1.455	2.82	-17.2
RF32	26.02.2014	5110	17.1	n.d.	63	6.34	6.143	2.819	0.0552	0.964	0.38	-18.2
RF21	25.02.2014	5190	13.8	n.d.	120	6.34	7.79	11.61	0.3771	4.61	4.34	n.d.
RF43	27.02.2014	9881	33.3	n.d.	132	6.38	9.97	4.347	0.0892	8.36	0.733	-16.3
RF50	03.03.2014	10768	31.9	n.d.	88	6.29	10.02	16.4	0.3752	2.02	0.551	-14
RF3	19.02.2014	12000	n.d.	n.d.	707	7.32	13.78	36.67	0.1549	11.01	5.79	-13.6
RF64	05.03.2014	25500	28.6	n.d.	460	6.92	58.4	8.906	0.1807	1.96	0.843	-16.6
RF9	19.02.2014	27200	21.2	n.d.	558	7.14	68.8	13.44	0.3596	8.78	1.63	-14.4
RF56	03.03.2014	27622	95.3	n.d.	131	6.55	10.9	15.02	0.1124	11.0	0.470	-14.3
RF63	04.03.2014	63780	81.6	n.d.	358	6.96	44.1	52.46	0.3612	4.52	0.735	-12.6
RF1	19.02.2014	423100	n.d.	n.d.	317	7.58	25.7	8.359	0.0538	3.69	13.17	-10.3

Table S2. Results of PCA analysis of 13 variables. For spring, summer, winter and all seasons, 70, 80, 55 and 205 cases were processed, respectively.

Spring				Summer			
	F1	F2	F3		F1	F2	F3
Latitude	-0.872	-0.074	-0.047	Latitude	0.135	-0.133	-0.969
Surface	0.110	-0.012	0.914	Surface	0.020	0.955	-0.123
R, $\mu\text{S cm}^{-1}$	0.865	0.370	0.253	R, $\mu\text{S cm}^{-1}$	0.905	0.264	0.308
$\delta^{13}\text{C } \text{‰}$	0.762	0.206	0.306	$\delta^{13}\text{C } \text{‰}$			
pH	0.853	0.107	0.218	pH	0.685	0.345	-0.322
DIC	0.908	0.000	0.277	DIC	0.936	0.180	0.290
DOC	0.662	0.089	-0.370	DOC	-0.975	0.122	-0.038
Cl	-0.054	0.983	-0.072	Cl	0.951	0.059	-0.249
SO4	0.275	0.053	0.893	SO4	0.086	0.975	0.158
Na	0.246	0.952	0.099	Na	0.483	0.837	0.216
Mg	0.913	0.107	0.252	Mg	0.889	0.326	0.305
Si	0.514	0.015	-0.046	Si	0.952	0.121	-0.204
K	0.904	-0.063	0.128	K	0.286	-0.002	0.914
Ca	0.947	0.021	0.227	Ca	0.937	0.120	0.314
Expl.Var	7.041	2.097	2.201	Expl.Var	6.938	2.955	2.442
Prp.Totl	0.503	0.150	0.157	Prp.Totl	0.534	0.227	0.188

Winter				All seasons			
	F1	F2	F3		F1	F2	F3
Latitude	-0.880	-0.074	0.194	Latitude	-0.762	0.283	-0.131
Surface	0.083	0.019	-0.928	Surface	0.050	-0.878	-0.025
R, $\mu\text{S cm}^{-1}$	0.958	0.240	0.003	R, $\mu\text{S cm}^{-1}$	0.856	0.037	0.277
$\delta^{13}\text{C } \text{‰}$	0.068	0.617	0.189	$\delta^{13}\text{C } \text{‰}$			
pH	0.879	0.067	-0.213	pH	0.803	-0.281	0.146
DIC	0.954	-0.033	0.138	DIC	0.944	0.091	0.025
DOC	0.096	0.715	0.023	DOC	0.129	-0.088	0.543
Cl	-0.032	0.892	-0.009	Cl	-0.043	0.100	0.934
SO4	0.070	0.064	-0.946	SO4	0.140	-0.879	0.099
Na	0.340	0.884	-0.072	Na	0.360	-0.038	0.887
Mg	0.970	0.095	0.029	Mg	0.945	0.027	0.133
Si	0.005	0.281	0.520	Si	0.516	0.344	0.155
K	0.808	0.289	-0.076	K	0.800	-0.192	0.137
Ca	0.988	0.027	0.011	Ca	0.959	-0.066	0.060
Expl.Var	6.088	2.714	2.178	Expl.Var	5.738	1.891	2.144
Prp.Totl	0.435	0.194	0.156	Prp.Totl	0.441	0.145	0.165