

Electronic Supplementary Material

ESM – 1: (pdf file) Photos of lake stage development in Western Siberia

ESM – 2: (excel file) Trace element concentration in various filtrates and dialysates

ESM – 3: Correlations between element concentrations in < 0.45 μm fraction

ESM – 4: Filtration and dialysis pattern of various samples

ESM – 5: A PowerPoint (animated) presentation of three types of trace element association with organo-mineral colloids and their evolution during bacterioplankton consumption of the organic matter.

ESM – 1: (pdf file) Photos of lake stage development in Western Siberia

First, a crack in lichen coverage on the surface of frozen mound



2nd step, the palsa depression is being filled by thawed water



Fresh thermokarst depression: dwarf shrubs submerged into water



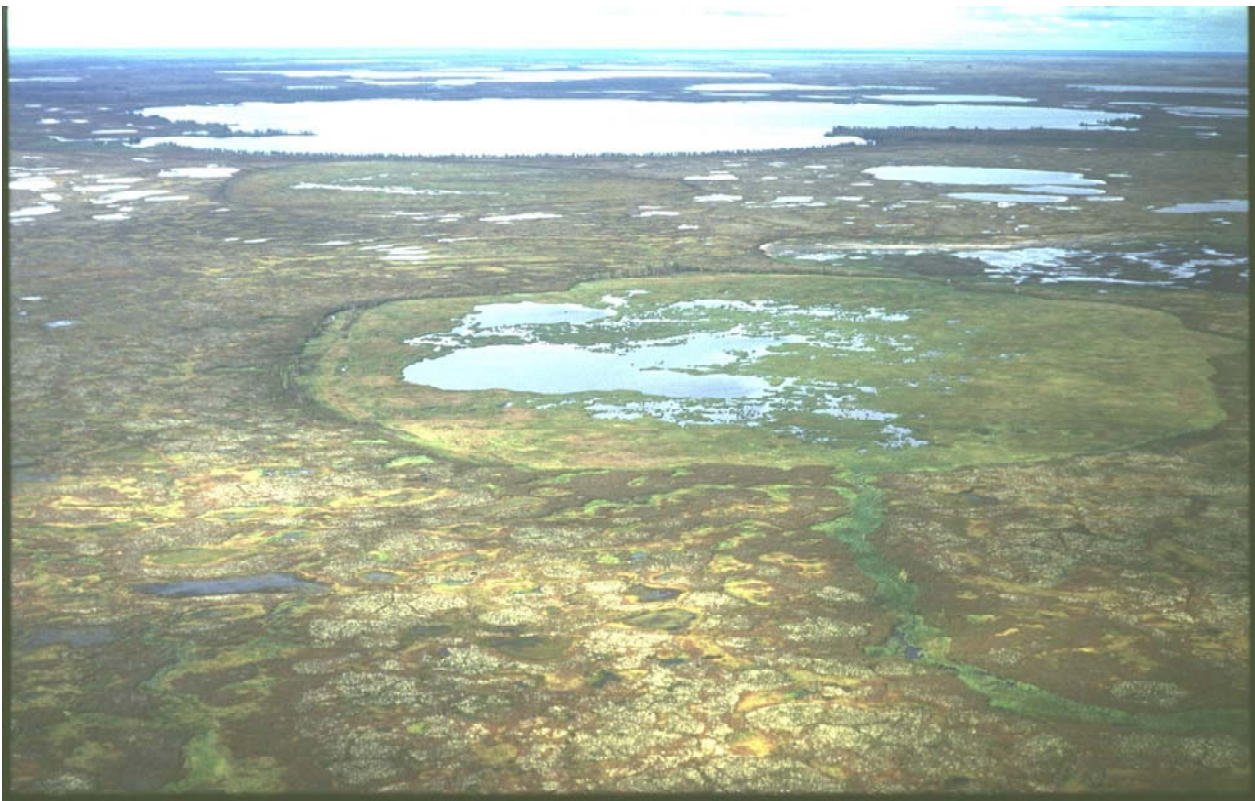
**The border of small thermokarst lake; some dwarf shrubs are still alive
(photo of S.N. Kirpotin)**



Third stage of cyclic succession of permafrost degradation: round thermokarst lake (photo S.N. Kirpotin)



Khasyrey: drained lake
(4th stage of cyclic succession - photo S.N. Kirpotin)



Khasyrey: drained lake



(photo S.N. Kirpotin)

ESM – 2: Trace element concentration in various filtrates and dialysates (µg/L)

	U-1 5µm	U-1 0.45µm	U-1 10kDa	U-1 1kDa	U-2 0.45 µm
DOC	11.5	10.6	4.42	3.58	10.66
Na	531	529.1	425.6	342.6	528.5
Mg	353.9	352.3	184.7	122.1	365.1
Al	137.8	69.25	35.22	21.69	84.43
Si	281	277	270	275	285
K	183.2	180.4	170.4	130.6	185.2
Ca	546.1	536.9	280.5	194.2	576.9
Ti	3.588	0.6084	0.2255	0.08955	0.6408
V	0.5099	0.1754	0.1729	0.17234	0.2415
Cr	0.388	0.2829	0.2235	0.1453	0.3091
Mn	47.9	47.64	25.24	17.1	49.14
Fe	388.6	227	35.63	25.67	224.4
Co	0.725	0.7205	0.3971	0.2412	0.7926
Ni	0.8067	0.7148	0.4059	0.2435	0.8822
Cu	0.5335	0.4223	0.3869	0.2058	0.3996
Zn	6.633	6.143	5.242	4.357	16.36
Ga	0.02405	0.005712	0.002482	0.001219	0.006561
Ge	0.003726	0.001372	0.003356	0.002542	0.0007896
As	0.7112	0.7305	0.71637	0.6346	0.5078
Rb	0.5628	0.482	0.359	0.2834	0.5116
Sr	5.535	5.519	2.909	1.956	5.834
Y	0.06964	0.04143	0.01475	0.007513	0.06003
Zr	0.2035	0.08659	0.0191	0.01391	0.1018
Mo	0.04259	0.04257	0.03519	0.03364	0.01992
Cd	0.01422	0.01378	0.014073	0.008017	0.02309
Sb	0.05653	0.0494	0.047324	0.04674	0.05553
Cs	0.006681	0.00164	0.001967	0.001013	0.001391
Ba	2.28	1.703	1.104	1.079	4.436
La	0.07396	0.03308	0.01504	0.004139	0.04951
Ce	0.1923	0.09071	0.0322	0.01195	0.1281
Pr	0.01823	0.01173	0.004832	0.001427	0.01503
Nd	0.0838	0.04667	0.01669	0.007916	0.06115
Sm	0.01647	0.01356	0.003707	0.001617	0.01502
Eu	0.004066	0.002889	0.001607	0.0004809	0.00422
Gd	0.02094	0.01159	0.004879	0.003519	0.0159
Th	0.002799	0.001704	0.000411	0.0002092	0.001922
Dy	0.01423	0.007772	0.0031	0.0006583	0.01366
Ho	0.003538	0.001956	0.0008754	0.0003287	0.002082
Er	0.007973	0.00506	0.001841	0.0007676	0.00711
Tm	0.0008841	0.0003062	0.0004091	< d.l.	0.0007221
Yb	0.007879	0.005497	0.001359	0.001011	0.004964
Lu	0.001288	0.0006651	0.0002946	0.0001032	0.0007939
Hf	0.009866	0.003801	0.0003229	0.0001488	0.002454
Pb	0.154	0.098888	0.09482	0.03727	0.2235
Bi	0.004257	0.002016	0.001056	0.0003424	0.003815
Th	0.02408	0.008678	0.0006394	< d.l.	0.006771
U	0.01034	0.006007	0.004623	0.002419	0.006372

U-2 10kDa	U-2 1kDa	U-3 5µm	U-3 0.45 µm	U-3 10kDa	U-3 1kDa
4.68	3.67	14.89	13.97	4.436	3.104
458.1	1139	478.9	467	463	370
211.3	422.1	382.5	374.3	208.2	164.6
31.88	69.25	193.5	128.7	28.01	16.82
277	232	634	641	612	605
225.9	480.9	54.98	36.83	29.5	21.2
386.4	652.1	773.5	773	448.8	331
0.12	0.2001	4.242	1.62	0.1268	0.09685
0.1569	0.5936	0.753	0.3614	0.1085	0.0949
0.1556	0.5572	0.8135	0.7306	0.2291	0.147
28.8	61.16	46.99	46.89	23.68	18.88
67.85	68.82	1347	767.8	32.53	14.6
0.4462	0.9826	1.055	1.024	0.4408	0.3556
0.4475	0.8781	1.852	1.661	0.6749	0.486
0.3445	0.4719	0.794	0.76558	0.7427	0.4869
15.33	12.84	6.984	7.507	6.0	5.1
0.002659	0.004599	0.02952	0.01002	0.001724	0.002047
0.002874	0.02232	0.005759	0.002047	0.001544	0.003591
0.7974	2.466	1.342	1.169	0.8649	0.7743
0.4376	0.9463	0.257	0.24397	0.2342	0.22552
3.656	3.716	7.264	7.046	3.916	2.987
0.01283	0.009984	0.3061	0.2544	0.02517	0.01207
0.01712	0.0623	0.477	0.3745	0.03022	0.01411
0.012701	0.01131	0.02023	0.01368	0.013404	0.0131
0.02469	0.02732	0.01496	0.01646	0.013121	0.012328
0.06896	0.2217	0.04042	0.0372	0.06535	0.03883
0.001884	0.005135	0.005321	0.001097	0.002102	0.001224
2.848	3.805	4.684	4.072	2.211	1.594
0.007882	0.003285	0.2382	0.1784	0.0134	0.005658
0.02099	0.007686	0.6426	0.4888	0.03889	0.01774
0.003067	0.001569	0.07705	0.05897	0.005386	0.002288
0.01272	0.006283	0.3301	0.2508	0.02651	0.01257
0.001489	0.003992	0.06925	0.05784	0.00632	0.001937
0.001206	0.001227	0.01637	0.01655	0.001164	0.0004854
0.003151	0.002866	0.08079	0.06593	0.007093	0.002483
0.0005077	0.0002275	0.01132	0.008668	0.0007543	0.0002265
0.001795	0.003386	0.05977	0.0481	0.004438	0.002403
0.0004793	0.0005476	0.01217	0.009941	0.001119	0.0003715
0.001168	0.002696	0.03614	0.03332	0.003244	0.001067
9.26E-05	0.0005005	0.005586	0.004	0.0001964	0.0001677
0.001245	0.0008663	0.03193	0.02986	0.002849	0.001956
0.000338	0.0003712	0.005811	0.004285	0.0004854	0.0002781
0.001644	0.0006473	0.01647	0.01088	0.000458	0.0006833
0.04811	0.0916	0.2161	0.1388	0.04677	0.02386
0.003265	< d.l.	0.005141	0.001717	0.02021	0.0001084
< d.l.	0.002014	0.05724	0.03896	0.00102	0.0005463
0.003265	0.005283	0.018	0.01341	0.002349	0.001297

U-4 5µm	U-4 0.45µm	U-4 10kDa	U-4 1kDa	U-5 5µm
32.1	29.8	9.35	8.06	79.9
215.5	207.6	158.5	113.4	186.3
145.8	144.2	58.82	40.35	892.5
135	108.3	34.33	22.96	366.5
132	126	122	128	1710
9.942	16.03	N.D.	N.D.	1052
360.6	357.6	162.6	114.9	2055
1.626	0.8341	0.152	0.117	6.209
0.2465	0.1712	0.2138	0.2157	1.254
0.4594	0.3769	0.2903	0.326	1.915
14.21	14.77	5.145	3.579	405.9
677.9	525.8	66.91	44.07	4775
0.3907	0.3768	0.124	0.07019	2.231
0.7599	0.9809	0.2682	0.1694	3.455
0.2882	0.2444	0.20511	0.2007	1.906
2.776	2.95	2.4192	3.725	38.01
0.0235	0.01339	0.004914	0.002988	0.06999
0.001759	0.0012	0.0007	<d.l.	0.0052
0.7309	0.6743	0.5256	0.4579	4.711
0.05629	0.04881	0.05103	0.02679	3.585
2.106	2.084	0.9698	0.568	14.96
0.06473	0.04061	0.003928	0.002169	0.2478
0.1797	0.1356	0.01653	0.01075	1.236
0.009566	0.007708	0.0162	0.002431	0.05152
0.02189	0.02644	0.02285	0.008245	0.1866
0.03315	0.03544	0.03583	0.02824	0.072
0.002701	0.001389	0.001088	0.0007516	0.03267
2.82	2.95	0.8598	0.6071	18.17
0.03483	0.0247	0.006428	0.002723	0.1421
0.1162	0.07178	0.006049	0.003791	0.403
0.01379	0.009163	0.0008399	0.0006463	0.04814
0.05883	0.03931	0.004232	0.003018	0.214
0.01548	0.01212	<d.l.	0.0002857	0.04604
0.004195	0.002188	0.0004111	<d.l.	0.01367
0.01553	0.01175	0.001422	0.0008275	0.04894
0.001785	0.00159	1.58E-05	<d.l.	0.008334
0.01442	0.01044	0.0009632	0.0004524	0.04404
0.002882	0.001898	0.0001258	7.58E-05	0.009518
0.00846	0.006334	0.0003513	0.000291	0.02999
0.0007875	0.0007852	<d.l.	<d.l.	0.004572
0.006954	0.003753	0.0005497	0.0001205	0.0261
0.001208	0.0006912	0.0001219	-7.21E-06	0.003989
0.005486	0.005317	0.0016	0.0006921	0.04266
0.209	0.193	0.07292	0.03138	1.605
0.003978	0.00187	0.002908	0.0005626	0.02487
0.01663	0.01082	0.0001108	-0.0001573	0.139
0.005852	0.00441	0.0005757	0.0005049	0.01664

U-5 0.45µm	U-5 10kDa	U-5 1kDa	U-6 5µm	U-6 0.45µm
75.9	18.0	12.1	127.4	118.6
176	123.8	118.7	1437	1432
819.9	334.4	262.1	2136	2004
300.3	71.65	47.07	1163	937
1660	1650	1620	689	681
987.6	617.6	632.1	1099	1082
1875	827.8	613.3	6836	6343
3.953	0.7864	0.5771	35	24
0.7779	0.6484	0.6285	7.32	5.57
1.689	0.6795	0.5745	6.47	6.47
374.1	133.1	108.7	413	386
3430	651.3	450.5	15254	13444
2.008	0.6807	0.5217	8.1867	7.4851
3.088	1.03	0.7307	15.8450	14.6893
1.412	0.5566	0.4421	7.8601	5.9149
35.68	17.06	13.21	16.1862	15.2655
0.05785	0.01513	0.009782	0.2105	0.1599
0.0045	0.0026	0.0017	0.0616	0.053
4.216	3.542	3.579	29.1947	26.5413
3.384	2.091	1.878	3.4474	3.4433
13.59	5.626	4.154	49.3183	45.3315
0.1996	0.0214	0.009748	1.7030	1.4867
1.09	0.1522	0.07378	4.7190	4.2708
0.04516	0.0418	0.04168	0.2145	0.1428
0.1504	0.1351	0.05814	0.1220	0.1182
0.06621	0.04737	0.04292	0.1720	0.1703
0.02895	0.01807	0.01523	0.0325	0.0245
15.62	5.471	4.098	31.0551	28.9205
0.1158	0.01175	0.00429	1.5559	1.1749
0.3179	0.03052	0.01394	3.7392	3.0243
0.04008	0.004421	0.001648	0.4425	0.3494
0.1759	0.01934	0.009261	1.7804	1.4113
0.03792	0.003401	0.002982	0.3652	0.3646
0.01074	0.00259	0.0009035	0.1033	0.0851
0.0444	0.006272	0.002547	0.4451	0.3828
0.0067	0.0006641	0.0002041	0.0581	0.0473
0.03986	0.00398	0.001028	0.3243	0.3007
0.008227	0.0009593	0.000464	0.0652	0.0563
0.02304	0.002829	0.001643	0.1878	0.1579
0.003703	0.0001448	0.0003203	0.0282	0.0257
0.02874	0.003648	0.001381	0.1723	0.1641
0.00458	0.0004403	0.000189	0.0278	0.0263
0.03935	0.007548	0.002453	0.1393	0.1139
2.926	0.1634	0.0994	3.7457	3.6631
0.0145	0.005504	0.009865	0.0505	0.0437
0.1085	0.007793	0.002769	0.5090	0.4677
0.01502	0.001981	0.001263	0.1141	0.1026

U-6 10kDa	U-6 1kDa	U-7 5µm	U-7 0.45µm	U-8 5µm	U-9 0.45µm
34.1	25.3	10.4	10.5	21.9	33.93
898.5	754.5	537.1	582.7	536.8	318
967.2	701.2	350.1	364.2	356.3	95.01
135.7	88.53	130.2	71.21	152	142.5
651	646	296	291	577	759
434.5	468.3	185.2	173	182.2	72.14
2839	2317	541	547.6	612.9	247.5
1.8	1.6	3.203	0.4177	4.454	2.142
1.31	1.16	0.4908	0.1276	0.6134	0.7075
1.12	0.81	0.3579	0.2782	0.4516	0.4284
167	121	49.23	52.95	47.53	12.17
1458	1333	387.2	186.1	432.8	465.8
2.584	1.871	0.808	0.8273	0.7637	0.1195
4.164	3.053	0.821	0.8132	0.9628	0.8332
0.9451	0.7175	0.5148	0.4395	1.679	0.5983
14.14	13.14	7.988	8.449	18.21	3.317
0.0193	0.01546	0.02132	0.00577	0.02711	0.03053
0.035	0.033	0.005	0.005	0.005	0.001
14.73	14.73	0.5724	0.5548	0.6071	0.7609
1.554	1.505	0.5231	0.4255	0.5383	0.4177
19.43	14.96	5.683	5.556	5.934	2.113
0.1585	0.08815	0.07003	0.0336	0.0745	0.04659
0.2794	0.1784	0.167	0.09729	0.234	0.2016
0.006346	0.02758	0.04922	0.02104	0.04579	0.01214
0.032	0.03963	0.01444	0.01419	0.01578	0.009435
0.08498	0.08348	0.0537	0.05008	0.06184	0.02526
0.01296	0.01252	0.005956	0.001213	0.006938	0.01825
10.1	7.847	2.13	2.556	2.761	1.852
0.07269	0.03664	0.0756	0.02475	0.07261	0.04007
0.2308	0.1343	0.1948	0.06756	0.1862	0.1006
0.0322	0.01939	0.02403	0.008744	0.0199	0.01163
0.1555	0.1063	0.08842	0.0392	0.08059	0.04876
0.03704	0.02831	0.01968	0.009184	0.01957	0.01067
0.009548	0.006251	0.004627	0.002266	0.004665	0.002359
0.04495	0.02354	0.02161	0.0112	0.01629	0.01262
0.004666	0.002494	0.003341	0.001144	0.002749	0.0009272
0.02792	0.01688	0.01716	0.009285	0.01869	0.009319
0.006656	0.003644	0.003117	0.001333	0.002685	0.00182
0.0207	0.01336	0.008044	0.003356	0.007757	0.004528
0.002918	0.001847	0.000865	0.0003945	0.001103	0.0007661
0.02438	0.01106	0.00779	0.003873	0.007966	0.003943
0.003846	0.002971	0.001087	0.000951	0.00102	0.0006954
0.01168	0.006719	0.005571	0.004121	0.009429	0.005437
0.1007	0.05239	0.8954	0.1591	9.986	0.7127
0.003838	0.001711	0.003971	0.0005425	0.005754	0.004778
0.01429	0.008535	0.01879	0.008844	0.02485	0.01914
0.01786	0.009481	0.009086	0.006079	0.009925	0.005836

U-9 10kDa	U-9 3.5kDa	U-9 1 kDa	U-10 0.45µm	U-11 0.5m	U-11 1.25m
6.38	7.01	5.517	31.32	10.2	10.2
160.8	277	138.5	324.1	350.2	354.3
18.44	24.86	12.43	99.7	287.2	288
9.727	12.538	6.269	152.4	63.34	64.53
707	711.000	738.900	464	205	189
42.49	69.06	34.53	109.9	135.4	132.9
86.95	89.44	44.72	278.1	421.3	433.5
0.07554	0.13678	0.06839	2.272	0.3765	0.4085
0.7698	1.386	0.693	0.5825	0.1899	0.1884
0.08884	0.12862	0.06431	0.4783	0.3102	0.2969
1.999	2.396	1.198	15.22	23.02	23.93
6.71	6.926	3.463	487.2	99.59	102.9
< d.l.	-0.03176	-0.01588	0.1812	0.4678	0.4823
0.2001	0.2268	0.1134	0.6969	1.085	1.01
0.2474	0.2662	0.1331	2.536	0.6579	1.581
2.567	2.166	2.083	7.199	7.072	6.8985
0.001873	0.003194	0.001597	0.03115	0.002217	0.004606
0.001	0.001	0.001	0.001	0.002	0.002
0.5329	0.93	0.465	0.8357	0.6189	0.6082
0.1846	0.3026	0.1513	0.4475	0.169	0.173
0.6749	0.5804	0.2902	2.306	3.314	3.331
0.001745	0.0012306	0.0006153	0.04913	0.065	0.06564
0.00676	0.01019	0.005095	0.2038	0.1849	0.1595
0.02365	0.05452	0.02726	0.04287	0.01703	0.04948
0.007301	0.002942	0.001471	0.01629	0.005784	0.007564
0.03196	0.06004	0.03002	0.04555	0.04141	0.04521
0.006188	0.013576	0.006788	0.01672	0.0004157	0.0001819
0.2769	0.3322	0.1661	2.366	1.791	1.792
0.001527	0.005682	0.002841	0.0493	0.05088	0.04503
0.001944	0.0016922	0.0008461	0.1166	0.1313	0.1361
0.0003	0.0002872	0.0001436	0.0131	0.01601	0.01586
0.0002207	0.000901	0.0004505	0.05079	0.07477	0.06345
0.0003011	#VALEUR!	<d.l.	0.009883	0.01718	0.01575
5.90E-05	3.20E-05	1.60E-05	0.003595	0.003544	0.004004
0.0004257	#VALEUR!	<d.l.	0.01253	0.01546	0.016
<d.l.	2.01E-05	1.01E-05	0.001784	0.002544	0.002126
<d.l.	0.000261	0.0001305	0.00957	0.01601	0.01662
1.96E-05	1.40E-04	6.98E-05	0.002231	0.002187	0.002385
0.0002917	#VALEUR!	<d.l.	0.00468	0.008025	0.008284
<d.l.	#VALEUR!	<d.l.	0.0008327	0.000878	0.001135
3.54E-06	2.04E-06	1.02E-06	0.00449	0.008134	0.008635
2.42E-05	<d.l.	<d.l.	0.0007728	0.001298	0.001195
0.0004309	0.0011832	0.0005916	0.009008	0.005157	0.006045
0.02076	0.02348	0.01174	0.7335	0.1014	0.3457
0.01292	0.000358	0.000179	0.003406	0.0005104	0.0007138
0.0002369	0.0005716	0.0002858	0.0176	0.0176	0.01482
0.0007415	0.0010778	0.0005389	0.007117	0.009507	0.009607

U-11 surface	U-12 5µm	U-12 0.45µm	U-12 10kDa	U-12 3.5kDa
10.3	41.94	11.57	4.116	2.87
374.6	660.6	660.5	436.6	420
293	356.3	334.1	155	130.3
63.35	203.1	78.55	13.69	10.39
193	188	182.8	194	181
148.4	176	155.5	109.5	102.7
407	548.9	513.9	300	218.9
0.38879	6.118	0.4579	0.336	0.01019
0.2093	0.9311	0.2437	0.23978	0.23546
0.3835	1.058	0.4305	0.2137	0.174
24.82	26.03	25.86	11.55	9.532
104.8	439	107.6	4.267	2.68
0.4804	0.3806	0.3163	0.08994	0.05478
1.143	48.52	0.8008	0.7078	0.1953
0.8067	0.829	0.7329	0.4202	0.2151
5.258	4.946	5.59	5.153	3.208
0.004115	0.03042	0.003245	0.001544	0.001169
0.000	0.002	0.000	<d.l.	<d.l.
0.7147	0.7984	0.75	0.5601	0.5888
0.1882	0.307	0.1832	0.1422	0.1396
3.361	4.548	4.451	2.322	1.973
0.07728	0.1194	0.07521	0.008763	0.005652
0.2176	0.3201	0.2053	0.01551	0.008469
0.0143	0.02317	0.01765	0.0162023	0.015804
0.008341	0.01055	0.009237	0.007843	0.008232
0.04725	0.0732	0.07768	0.069657	0.071047
0.0006535	0.007233	0.0004849	0.0001756	0.00014068
2.071	3.78	2.838	1.215	0.9565
0.06075	0.1145	0.05513	0.006185	0.003021
0.1614	0.2723	0.1476	0.01427	0.009021
0.0194	0.06145	0.01818	0.002241	0.001439
0.09158	0.1431	0.08476	0.01198	0.004893
0.02344	0.03234	0.01558	0.002405	0.001043
0.004398	0.007094	0.004421	0.0003102	0.0001475
0.02416	0.03673	0.02019	0.001699	0.002809
0.002878	0.003991	0.002985	0.0005094	0.0001109
0.01745	0.02925	0.0158	0.002098	0.0003437
0.003046	0.006352	0.003158	0.0005826	0.0003212
0.009849	0.01523	0.009894	0.00203	0.000858
0.001285	0.002034	0.001318	0.0001127	0.0001793
0.00828	0.01339	0.009724	0.001584	0.0008465
0.001377	0.002317	0.001666	0.0001201	0.000253
0.006797	0.01091	0.008021	-0.000159	0.0002354
0.1124	0.1807	0.09529	0.0374	0.01523
0.0003596	0.004263	0.0007687	0.0002415	0.0009086
0.01639	0.027	0.01748	0.0002026	0.0001978
0.008801	0.01203	0.00723	0.002481	0.001064

U-13 1.25 m	U-13 1.5 m	U-13 5µm	U-13 0.45µm	U-13 10kDa
8.82	9.19	10.94	7.58	1.9
181.9	181.9	160.9	147	137.1
289.6	281.2	298.2	301.9	120.4
41.68	37.55	66.31	47.3	4.338
230	206	215	221	206
54.78	355.7	14.58	11.35	28.32
356.9	397.8	386.9	361.7	154.4
0.2082	0.2707	1.195	0.398	0.02954
0.1067	0.2064	0.2288	0.1252	0.0558
0.1614	0.1698	0.2149	0.1494	0.06683
5.895	11.34	6.69	6.6802	2.503
87.12	98.63	280	92.7	1.425
0.04871	0.1622	0.1009	0.10043	0.01052
0.6258	0.5778	0.7185	0.6333	0.166
0.4564	0.425	0.389	0.3562	0.3336
7.812	9.848	7.37	6.022	3.341
0.001695	0.001986	0.006923	0.002377	8.07E-05
<d.l.	<d.l.	<d.l.	0.000	0.000
0.4557	0.4979	0.4658	0.466779	0.3116
0.05041	0.2432	0.05668	0.03825	0.04824
2.897	3.134	2.957	2.946	1.276
0.0294	0.02967	0.05554	0.03472	0.0009649
0.0596	0.06811	0.0907	0.06553	0.001482
0.006311	0.03358	0.005961	0.003657	0.002536
0.01082	0.01331	0.02207	0.006354	0.01285
0.0344	0.05518	0.052223	0.024341	0.02429
0.0004596	0.001355	0.0006329	0.0005057	0.0002639
1.089	1.047	1.229	1.08	0.4405
0.02388	0.02414	0.0459	0.02813	0.001894
0.06016	0.06022	0.1194	0.074	0.001705
0.007384	0.008356	0.01392	0.009228	0.0001766
0.03407	0.0373	0.0704	0.03396	0.00119
0.007106	0.005658	0.01284	0.009159	0.0003801
0.001448	0.001519	0.004043	0.002139	4.51E-05
0.008231	0.008138	0.01671	0.009324	0.0004437
0.001234	0.001102	0.002055	0.001214	6.49E-05
0.005715	0.006616	0.01097	0.005696	<d.l.
0.001081	0.001231	0.002252	0.00133	0.0001559
0.0039	0.003737	0.006152	0.003467	<d.l.
0.0003978	0.00061	0.0006609	0.0005338	<d.l.
0.004246	0.002896	0.004938	0.003679	<d.l.
0.0003831	0.0005123	0.0008391	0.0004795	<d.l.
0.001915	0.001119	0.00313	0.001329	0.0008068
0.08553	0.12752	0.08389	0.1002	0.02
0.0000665	0.000545	0.002094	2.55E-06	0.0003218
0.00549	0.004867	0.01214	0.007699	7.75E-05
0.00426	0.004333	0.005179	0.0042663	0.0004358

U-13 3.5kDa	U-13 3.5kDa in-situ	U-14 0.45µm	U-15 0.45µm	U-16 0.45 µm
1.59	2.48	4.91	8.41	11.62
98.47	109.7	230.6	492	397.5
104.8	125.7	136.3	362.9	374.6
3.175	4.607	43.49	239.4	119.1
210	222	122	114	38
12.91	23.76	49.4	264.7	216.6
138.1	166.1	336.5	1050	809.3
0.01853	0.01722	0.6098	7.161	1.241
0.05229	0.0743	0.2162	1.497	0.4209
0.01983	0.05649	0.1791	0.6641	0.5086
2.213	2.1305	9.054	18.18	52.17
1.013	1.378	56.96	584.7	437.6
0.004142	<d.l.	0.06441	0.3525	0.6703
0.1437	0.1745	0.6675	2.095	1.613
0.30672	0.2278	0.6194	2.056	1.495
3.213	4.659	2.398	6.316	6.467
0.0002296	0.0001686	0.004468	0.04573	0.009094
0.000	<d.l.	0.001	0.006	0.001
0.2804	0.3153	0.2761	0.8703	0.9398
0.02866	0.04601	0.09576	0.332	0.3194
1.17	1.337	2.434	6.713	5.614
0.0006074	0.001546	0.05813	0.482	0.2436
0.000222	0.002969	0.08952	0.455	0.3277
0.0025058	0.03902	0.01163	0.01113	0.06946
0.01123	0.00403	0.007257	0.02102	0.0123
0.01614	0.02612	0.04268	0.07326	0.0422
0.0001478	<d.l.	0.001255	0.01045	0.001068
0.3825	0.4322	1.84	4.4	3.604
0.0006109	0.002316	0.04569	0.3821	0.1849
0.0008634	0.002167	0.1216	0.9815	0.4975
1.83E-04	0.0003291	0.01601	0.1209	0.05872
0.0006192	0.001752	0.06779	0.5073	0.2575
0.0003395	0.0003312	0.01804	0.1106	0.05934
0.0001091	0.0002053	0.003479	0.02533	0.01325
0.0001632	0.0000876	0.01658	0.1189	0.06219
8.34E-05	5.33E-05	0.001631	0.0166	0.008589
<d.l.	0.0005416	0.01262	0.1031	0.04761
<d.l.	6.27E-05	0.002584	0.02011	0.009463
<d.l.	0.0003219	0.0076	0.05611	0.02602
-9.31E-05	1.58E-05	0.00114	0.008018	0.004048
0.0002122	<d.l.	0.006779	0.05153	0.02592
<d.l.	4.19E-05	0.001188	0.008157	0.004463
0.0004631	<d.l.	0.002698	0.01429	0.01146
0.01216	0.01068	0.05404	0.6502	0.142
0.0003106	<d.l.	<d.l.	0.004415	0.00149
0.0001229	<d.l.	0.01308	0.07851	0.04368
0.000234	0.0004799	0.007728	0.04055	0.01465

U-17 0.45µm	U-18 0.45 µm	U-19 0.45 µm	U-20 0.45 µm	U-21 0.45µm	U-21 10 kDa	U-21 3.5 kDa
10.87	17.09	4.86	9.11	23.44	7.13	6.03
8271	74.32	1306	703.2	449.4	491.4	166.1
1857	546.2	476.6	481.3	160.2	98.15	41
77.56	122.4	41.15	50.23	157.1	45.81	24.28
451	150	35	948	2350	2120	2150
386.4	20.91	185	133.3	9.315	105	10.46
2883	1534	1096	1045	457.3	311.9	134.2
2.277	0.6787	1.245	0.4097	1.412	0.8166	0.3463
0.9091	0.2502	0.1119	0.1209	0.2478	0.9676	0.3498
0.2431	0.4813	0.3887	0.3881	0.4004	0.5411	0.1481
19.85	8.738	77.03	49.26	16.87	9.123	3.472
508.6	560.5	197	147	339	15.89	15.62
0.2703	0.2309	0.755	0.6871	0.3992	0.1956	0.03175
1.044	1.936	1.008	1.911	0.8231	0.4702	0.2107
0.8866	0.2699	0.1712	0.856	0.2816	0.6474	0.3901
24.28	5.465	5.984	5.811	6.778	3.9001	3.287
0.0147	0.008918	0.01159	0.00708	0.0138	0.004602	0.001033
0.006	0.001	0.013	0.005	0.003	0.018	<d.l.
1.806	0.9404	0.5942	0.7002	0.5317	0.9652	0.3182
0.287	0.06388	0.2631	0.3415	0.02449	0.03873	0.0173
19.79	10.31	9.948	7.894	4.007	3.098	1.232
0.1644	0.1308	0.1121	0.2369	0.07967	0.001474	0.001705
0.1325	0.206	0.1031	0.2295	0.1407	0.02715	0.01088
0.07512	0.01001	0.009603	0.01327	0.001493	0.1222	0.01651
0.001793	0.00618	0.007847	0.008726	0.01281	0.03084	0.01313
0.03487	0.01934	0.0181	0.02927	0.02091	0.04955	0.0197
0.003947	0.0003172	0.0007281	0.0005583	0.0001222	0.002889	<d.l.
3.941	2.031	3.822	2.46	3.914	2.977	1.224
0.1757	0.08221	0.06279	0.1422	0.0618	0.0006366	0.001743
0.3712	0.2194	0.1814	0.3799	0.1475	0.001212	0.003387
0.04571	0.02756	0.02166	0.04724	0.01828	0.0002269	0.0003745
0.1962	0.1152	0.09669	0.2132	0.07476	0.0009252	0.002071
0.04094	0.02173	0.01928	0.04856	0.01358	0.0005385	<d.l.
0.01028	0.00719	0.005186	0.01304	0.004	0.0007152	0.0001832
0.04366	0.03367	0.02182	0.06006	0.01588	<d.l.	0.001312
0.005191	0.003654	0.003663	0.006874	0.002655	<d.l.	<d.l.
0.03336	0.02238	0.01957	0.04284	0.01478	0.0009518	0.0003594
0.00612	0.004586	0.003556	0.008551	0.002681	9.09E-05	9.63E-06
0.01807	0.01435	0.01214	0.02423	0.007887	0.0004237	0.0001447
0.001795	0.001947	0.001435	0.004002	0.0007513	0.000229	-8.92E-05
0.01625	0.0147	0.01222	0.02387	0.007462	0.0004801	0.0002487
0.002033	0.002507	0.002254	0.004084	0.0006008	8.79E-05	4.83E-05
0.005161	0.005818	0.003517	0.006415	0.004786	<d.l.	<d.l.
0.135	0.1333	0.03842	0.03695	0.29	0.07497	0.02236
0.001431	0.001843	0.0002531	0.0003514	0.002015	0.001275	0.0001269
0.0249	0.01728	0.01235	0.025	0.01215	0.0001681	5.95E-05
0.01593	0.002635	0.004114	0.01119	0.004649	0.001775	0.0008385

µg/L	U 11* March	U 12* March	U 13* March
Na	152	656.2	234.6
Mg	30.18	118.7	36.23
Al	3.256	14.04	3.515
Si	100	110	80
P	4.181	14.85	4.492
K	361	1058	359.2
Ca	93.43	729.9	163.3
Ti	0.02811	0.1213	0.05096
V	0.02026	0.1537	0.0746
Cr	0.06004	0.4837	0.062
Mn	1.381	6.625	2.372
Fe	5.421	22.08	6.281
Co	0.00657	0.07951	0.01173
Ni	0.2806	1.777	0.3562
Cu	0.9626	5.385	0.9848
Zn	Cntd	Cntd	Cntd
Ga	0.001476	0.002361	0.001573
Ge	0.000246	0.002718	0.0002482
As	0.01985	0.133	0.0239
Rb	0.2187	0.6297	0.234
Sr	0.2769	1.999	0.5024
Y	0.002356	0.02012	0.002319
Zr	0.002544	0.08166	0.00271
Mo	0.011	0.05277	0.01005
Sb	0.03584	0.2553	0.04444
Cs	0.0002435	0.001903	0.000742
Ba	0.6661	7.33	1.09
La	1.608	2.366	1.914
Ce	0.004049	0.02164	0.004997
Pr	0.0005642	0.002624	0.0006037
Nd	0.003011	0.01474	0.002913
Sm	0.0006634	0.002631	< d.l.
Eu	0.0005487	0.001962	0.0002779
Gd	0.00057	0.00642	0.0008039
Th	7.18E-05	0.0006654	< d.l.
Dy	0.0002509	0.004821	< d.l.
Ho	3.71E-05	0.0008712	< d.l.
Er	0.0002053	0.002645	< d.l.
Tm	0.0001921	0.0007892	< d.l.
Yb	0.0006768	0.002467	0.0003876
Lu	< d.l.	0.0003608	7.29E-05
Hf	0.0001519	0.001793	< d.l.
W	0.01357	0.06766	0.1739
Pb	0.01138	0.06639	0.01564
Bi	0.0001018	0.0003825	0.00011
Th	0.0003122	0.004671	6.74E-05
U	0.0005604	0.003345	0.0005602

ESM – 3 Correlations between element concentrations in < 0.45 μm fraction

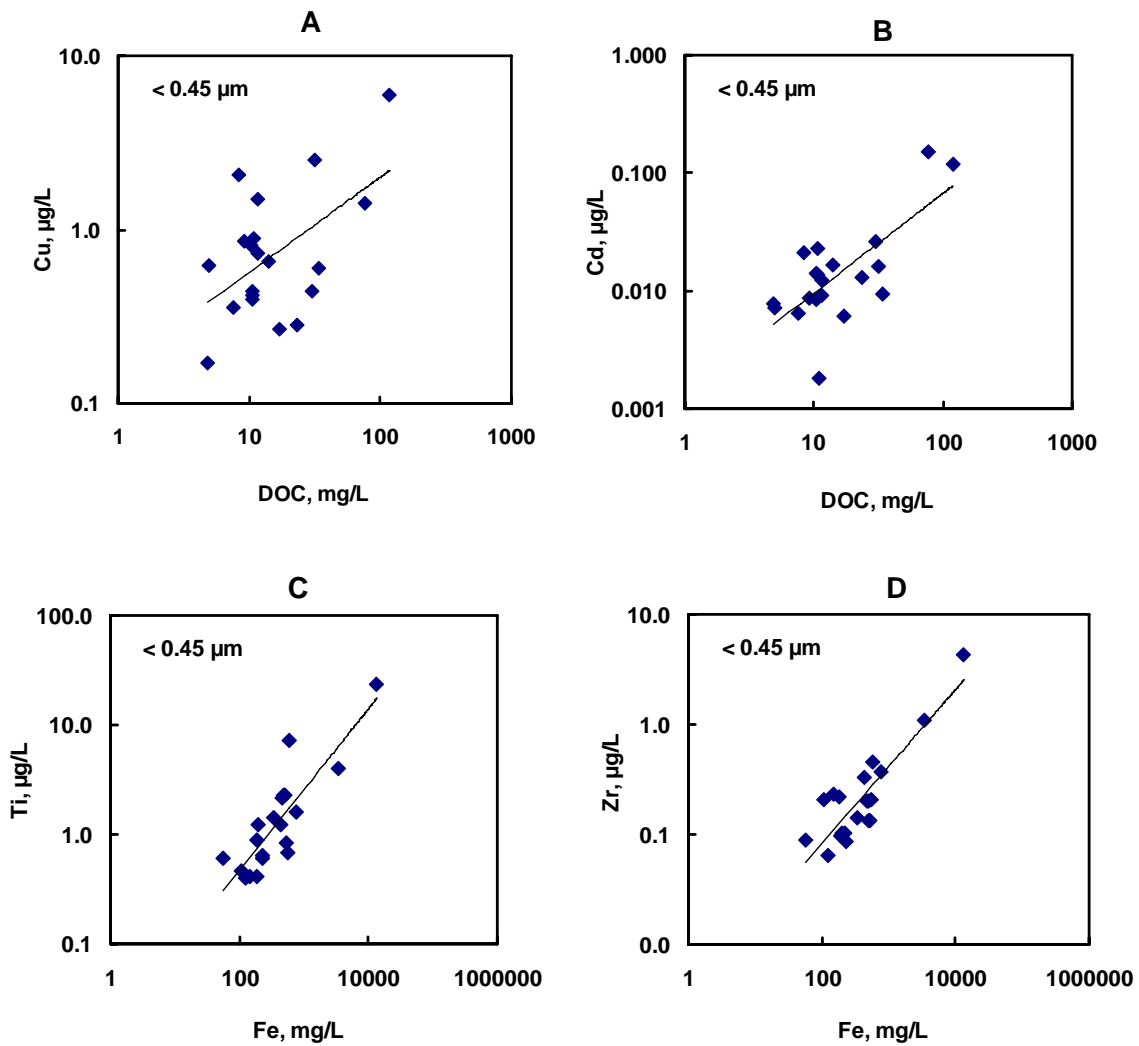


Fig. ESM-3. Concentration of Cu (A), Cd (B), Ti (C) and Zr (D) as a function of Fe in < 0.45 μm fraction of various lakes and ponds. There is a clear trend of concentration decrease following the lake stage evolution, from peat abrasion, young lakes and ponds to mature lakes and khasyreys.

ESM -4 Filtration and dialysis pattern of various samples

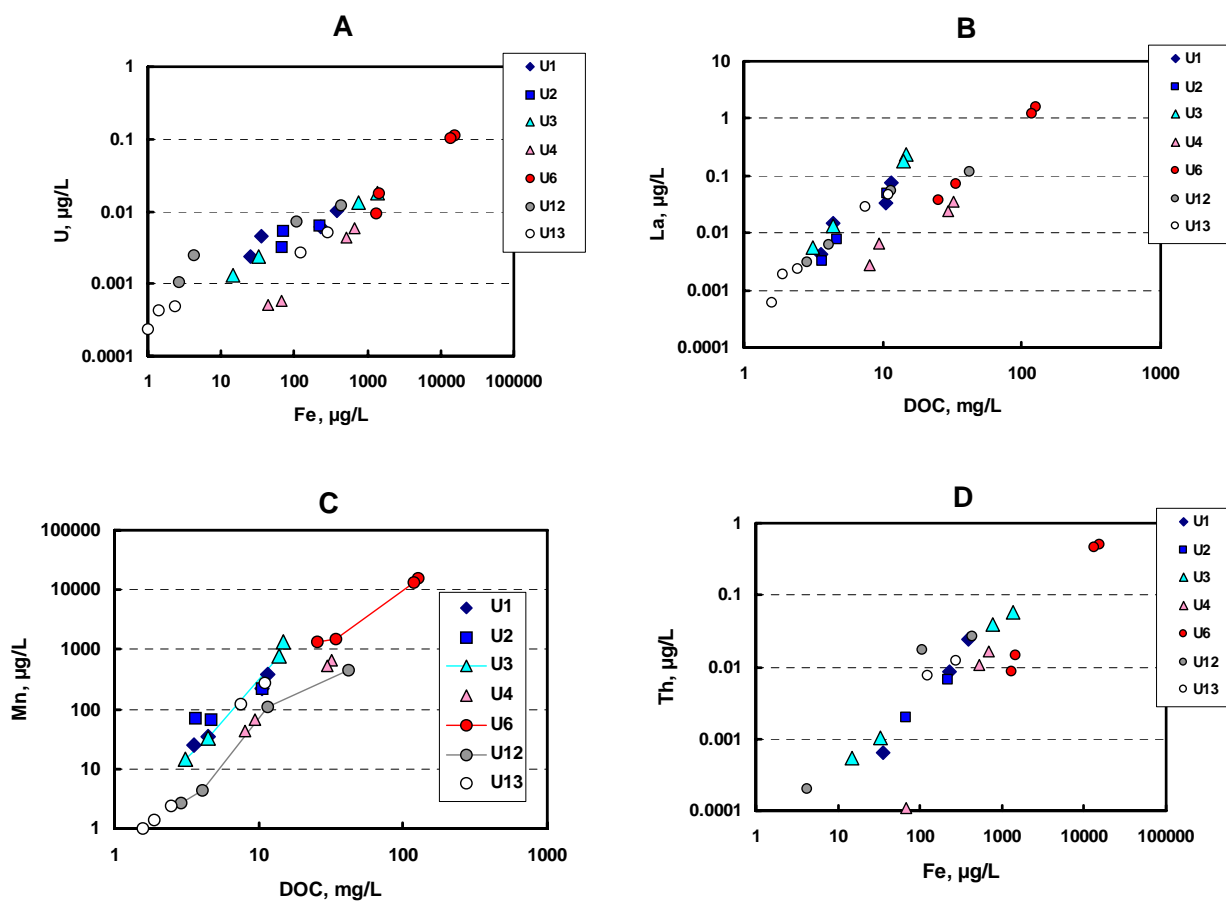


Fig. ESM-4. Correlation between U and Fe (A), La and DOC (B), Mn and DOC (C) and Th and Fe (D) in filtrates and dialysates of various samples shown by different symbols. In each series, the first (highest) point corresponds to filtration through 5 or 0.45 μm and the lowest point represents dialysis through 1 kDa.

ESM – 5: A PowerPoint (animated) presentation of three types of trace element association with organo-mineral colloids and their evolution during bacterioplankton consumption of the organic matter.

