Supplement of Biogeosciences, 14, 5471–5485, 2017
https://doi.org/10.5194/bg-14-5471-2017-supplement

Biogeosciences Open Access EGU

Supplement of

Capturing temporal and spatial variability in the chemistry of shallow permafrost ponds

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Supplementary Table S1. Reported sampling designs for studies focused on, or including small (< 1 km^2) lakes and ponds. When categorizing analytes of interest for each study, "nutrients" refers to the measurement of any dissolved or particulate nitrogen or phosphorus speciation, "carbon" refers to any measurements of dissolved or particulate organic or inorganic carbon, "major ions" refers to the measurement of dissolved sodium, magnesium, calcium, potassium, chloride, sulphate, and carbonate, and "metals" refers to the measurement of dissolved or suspended trace metal elements.

Study	Analytes of interest	Region	Study year(s)	Number of ponds/lakes studied	Number of samples per year
Archer et al., 2016	Nutrients, Metals	Ross Sea, Antarctica	2009-2013	41	1
Balasubramaniam et al., 2015	Nutrients, Carbon, Major Ions	Old Crow Flats, Yukon	2007	56	3
Bos and Pellatt., 2012	Nutrients, Carbon, Metals	Hudson Bay Lowlands, Manitoba	2004	32	1
Breton et al., 2009	Nutrients, Carbon	Northern Quebec and Baffin Island	2004-2005	46	1
Hinkel et al., 2016	Nutrients, Carbon, Major Ions	North Slope of Alaska	2012-2013	28	1
Houben et al., 2016	Nutrients, Carbon, Major Ions, Metals	Northwest Territories	2009-2012	38	1
Jacques et al., 2016	Nutrients, Carbon, Major Ions	Hudson Bay Lowlands, Manitoba	2010-2012	33	1
Kokelj et al., 2009	Carbon, Major Ions	Mackenzie River Delta, Canada	2005-2006	73	1
Larsen et al., 2017	Nutrients, Carbon, Major Ions	Environmental Gradient within Alaska	2006-2013	617	1
Lim et al., 2001	Nutrients, Carbon	Bathurst Island, Arctic Canada	1994	38	1
Lyons et al., 2012	Major Ions	Taylor Valley, Antarctica	2000-2010	7	1
MacDonald et al., 2014	Nutrients, Carbon	Hudson Bay Lowlands, Manitoba	2010 - 2012	16	3
MacLeod et al., 2016	Nutrients, Carbon, Major Ions, Metals	Hudson Bay Lowlands, Ontario	2011 - 2012	98	1
Mallory et al., 2006	Nutrients, Carbon, Major Ions, Metals	Southampton Island, Nunavut	2001-2002	32	1
Manasypov et al., 2014	Carbon, Major Ions, Metals	Western Siberia	2010-2011	58	1
Michelutti et al., 2002	Nutrients, Carbon, Major Ions, Metals	Wynniatt Bay, Victoria Island, Arctic Canada	1997	34	1

Niu et al., 2011	Major Ions	Kunlun Mountain pass, Tibet	2007	10	1
Paterson et al., 2014	Nutrients, Carbon, Major Ions, Metals	Hudson Bay Lowlands, Ontario	2009-2011	17	1
Pienitz et al., 1997	Nutrients, Carbon, Major Ions, Metals	Yukon and NWT, Canada	1990	59	1
Pokrovsky et al., 2011	Carbon, Major Ions, Metals	Northewestern Siberia	2008-2010	20	1
White et al., 2014	Nutrients, Major Ions	Hudson Bay Lowlands, Manitoba	2010	20	3

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Supplementary Table S2. All concentration data of all chemical species over study period in each study pond, including an intensive sampling campaign in Frisbee and Strange lakes coincident with a storm event, DOY 185 to 188.

Location	Date and Time	DON	Cl^-	SO_4^{2-}	Na^+	K^+	Mg^{2+}	Ca^{2+}	NH_4^+	NO_3^-
Erin	2015-05-25 12:00 PM	0.50	12.11	2.47	7.25	0.78	4.99	7.26	0.11	0.01
	2015-06-04 12:00 PM	0.39	10.41	2.16	6.26	0.62	4.45	13.00	0.03	0.01
	2015-06-17 12:00 PM	0.36	10.29	2.11	6.44	0.57	4.70	8.79	0.05	0.01
	2015-07-01 4:05 PM	0.60	12.53	2.43	7.95	0.78	6.11	10.27	0.08	0.01
	2015-07-06 4:30 PM	0.55	10.22	1.95	6.64	0.57	5.10	12.06	0.11	0.01
	2015-07-22 10:39 AM	0.65	12.10	2.27	7.88	0.78	6.42	12.28	0.07	0.01
	2015-08-05 10:16 AM	0.68	12.26	2.38	7.86	0.75	6.59	7.90	0.04	0.00
	2015-08-19 3:03 PM	0.72	13.39	2.38	8.46	0.82	7.15	7.97	0.04	0.01
	2015-09-02 3:23 PM	0.90	14.18	2.41	8.91	0.84	7.72	7.23	0.05	0.01
	2015-09-17 8:39 AM	0.76	14.62	2.60	9.38	0.89	8.46	5.95	0.06	0.01
	2015-10-03 3:37 PM	0.90	15.03	2.99	9.91	0.87	8.94	8.24	0.08	0.01
	2015-10-14 10:00 AM	0.53	12.14	2.78	7.51	0.70	8.00	6.30	0.16	0.01
Frisbee	2015-05-25 12:00 PM	0.41	35.67	7.49	19.44	1.15	6.61	18.81	0.07	0.01
	2015-06-04 12:00 PM	0.40	20.00	7.34	12.32	0.59	5.56	18.02	0.02	0.01
	2015-06-17 12:00 PM	0.72	19.39	9.17	11.65	0.45	7.30	22.04	0.07	0.01
	2015-07-01 3:52 PM	2.25	56.62	18.89	26.60	1.54	15.47	32.34	0.10	0.00
	2015-07-04 7:45 AM	1.66	31.09	10.92	14.69	0.82	10.25	24.91	0.09	0.01
	2015-07-04 2:30 PM	0.88	29.54	10.32	14.60	0.73	10.19	19.73	0.13	0.00
	2015-07-04 8:30 PM	1.02	26.75	12.03	13.61	0.70	10.16	25.50	0.06	0.02
	2015-07-05 7:45 AM	0.61	14.07	7.17	8.70	0.42	6.99	20.90	0.04	0.01
	2015-07-05 3:00 PM	0.60	13.88	6.78	8.89	0.34	6.55	19.01	0.04	0.01
	2015-07-06 7:30 AM	0.64	14.57	8.75	9.70	0.30	7.27	23.42	0.04	0.00
	2015-07-06 4:30 PM	0.89	15.97	9.83	10.08	0.32	7.18	24.40	0.04	0.00
	2015-07-22 10:25 AM	1.33	40.53	17.56	20.66	0.95	15.32	23.01	0.05	0.00
	2015-08-05 10:32 AM	1.17	36.50	14.84	18.81	0.87	15.69	17.05	0.06	0.01
	2015-08-19 3:21 PM	1.67	52.49	18.44	26.61	1.20	19.10	25.29	0.08	0.01
	2015-09-02 3:37 PM	2.36	67.82	19.31	31.20	1.49	24.55	21.60	0.05	0.00
	2015-09-17 8:57 AM	1.86	72.63	17.96	32.99	1.74	27.50	28.84	0.04	0.01
	2015-10-03 3:55 PM	1.25	46.06	23.22	25.03	0.93	24.28	15.00	0.06	0.01
	2015-10-14 9:46 AM	0.46	25.27	22.57	13.80	0.59	15.86	14.87	0.20	0.01
Larch	2015-05-25 12:00 PM	0.15	12.13	2.18	5.88	0.58	4.31	9.18	0.04	0.01
	2015-06-04 12:00 PM	0.32	15.32	5.86	10.33	0.78	8.50	11.59	0.03	0.01
	2015-06-17 12:00 PM	0.33	15.25	3.31	11.39	0.80	9.26	8.46	0.03	0.01
	2015-07-01 3:47 PM	0.43	19.44	7.18	13.40	0.85	10.90	12.24	0.05	0.01
	2015-07-06 4:30 PM	0.51	13.30	1.08	8.96	0.53	7.10	12.22	0.06	0.01
	2015-07-22 10:20 AM	0.47	15.45	2.86	11.19	0.65	9.83	8.93	0.09	0.00
	2015-08-05 10:26 AM	0.58	16.32	2.90	12.03	0.73	11.19	8.99	0.06	0.01
	2015-08-19 3:15 PM	0.58	17.80	3.00	14.80	0.94	13.58	7.98	0.04	0.01
	2015-09-02 3:30 PM	0.65	19.25	3.27	13.42	0.91	12.68	7.56	0.04	0.01

	2015-09-17 8:46 AM	0.59	20.25	3.12	14.47	1.02	14.15	7.81	0.14	0.01
	2015-10-03 3:48 PM	0.57	19.38	2.81	13.66	0.99	13.31	6.99	0.07	0.00
	2015-10-14 9:42 AM	0.55	17.70	2.09	12.15	0.91	11.58	8.81	0.19	0.01
Left	2015-05-25 12:00 PM	0.35	14.73	2.68	9.31	1.09	6.37	8.51	0.06	0.01
	2015-06-04 12:00 PM	0.45	14.47	1.36	12.77	0.98	9.34	10.70	0.07	0.01
	2015-06-17 12:00 PM	0.39	23.38	6.40	14.87	1.00	11.14	10.67	0.03	0.01
	2015-07-01 4:00 PM	1.07	38.83	9.58	22.44	1.52	14.52	13.21	0.10	0.01
	2015-07-06 4:30 PM	0.75	23.17	5.10	13.99	0.82	10.33	17.34	0.00	0.00
	2015-07-22 10:48 AM	0.90	32.89	7.14	18.70	1.18	13.25	14.78	0.08	0.01
	2015-08-05 10:48 AM	0.89	36.20	6.97	20.41	1.21	14.88	12.98	0.03	0.00
	2015-08-19 2:53 PM	1.10	48.32	11.11	26.63	1.33	16.68	10.70	0.07	0.01
	2015-09-02 3:57 PM	1.12	57.11	13.73	31.64	1.28	20.64	12.02	0.05	0.01
	2015-09-17 9:07 AM	1.03	73.92	19.65	40.34	1.42	28.88	13.89	0.16	0.01
	2015-10-03 4:16 PM	0.72	57.13	17.92	32.88	1.43	24.25	10.29	0.03	0.01
	2015-10-14 10:14 AM	0.54	45.56	14.68	25.39	1.82	18.04	9.63	0.04	0.01
Sandwich	2015-05-25 12:00 PM	0.26	8.70	0.65	5.82	0.55	4.21	8.87	0.16	0.01
	2015-06-04 12:00 PM	0.35	14.36	1.31	9.45	0.69	7.25	8.16	0.05	0.01
	2015-06-17 12:00 PM	0.55	15.32	3.55	9.44	0.67	7.54	10.42	0.25	0.01
	2015-07-01 3:43 PM	0.60	17.43	1.06	11.38	0.90	8.56	10.19	0.13	0.01
	2015-07-06 4:30 PM	0.53	13.04	0.95	8.73	0.50	7.15	15.01	0.04	0.01
	2015-07-22 10:17 AM	0.57	14.08	1.04	9.86	0.55	8.34	8.02	0.16	0.01
	2015-08-05 10:24 AM	0.73	15.14	1.04	10.69	0.60	9.34	8.13	0.05	0.01
	2015-08-19 3:11 PM	0.76	17.10	0.87	12.12	0.69	9.86	7.34	0.03	0.00
	2015-09-02 3:27 PM	0.77	18.82	0.88	13.28	0.74	11.27	13.65	0.04	0.01
	2015-09-17 8:45 AM	0.72	20.04	0.83	14.50	0.76	12.77	9.59	0.06	0.01
	2015-10-03 3:45 PM	0.75	20.11	0.90	13.80	0.77	11.77	6.65	0.04	0.01
	2015-10-14 9:39 AM	0.48	19.14	0.81	12.49	0.70	10.98	5.97	0.05	0.01
Strange	2015-05-25 12:00 PM	0.41	12.47	4.11	8.56	1.29	5.68	8.33	0.03	0.01
	2015-06-04 12:00 PM	0.26	13.53	4.42	9.89	1.40	7.35	14.76	0.07	0.01
	2015-06-17 12:00 PM	0.32	13.74	4.93	10.36	1.38	7.90	13.95	0.06	0.01
	2015-07-01 3:56 PM	0.74	17.42	7.13	12.51	1.71	9.50	12.51	0.04	0.01
	2015-07-03 2:30 PM	0.83	17.77	6.76	12.58	1.74	9.68	15.16	0.03	0.01
	2015-07-04 7:45 AM	0.67	15.52	5.79	11.43	1.53	9.32	15.40	0.03	0.01
	2015-07-04 2:30 PM	0.85	15.95	5.96	11.57	1.53	9.36	10.97	0.04	0.01
	2015-07-04 8:30 PM	0.71	15.48	5.93	11.43	1.51	9.37	10.51	0.05	0.01
	2015-07-05 7:45 AM	0.55	13.85	5.30	10.38	1.29	8.93	19.89	0.04	0.01
	2015-07-05 3:00 PM	0.57	12.99	4.63	10.02	1.17	8.48	18.69	0.06	0.01
	2015-07-06 7:30 AM	0.49	11.83	4.32	9.71	1.08	8.42	15.23	0.06	0.01
	2015-07-06 4:30 PM	0.50	12.10	5.14	9.79	1.15	8.52	17.65	0.04	0.01
	2015-07-22 10:33 AM	0.49	14.87	6.42	12.31	1.37	10.85	12.06	0.03	0.01
	2015-08-05 10:37 AM	0.66	15.95	6.49	13.22	1.43	12.01	8.53	0.04	0.01
	2015-08-19 3:26 PM	0.72	19.57	8.16	15.84	1.45	13.17	8.42	0.10	0.01
	2015-09-02 3:42 PM	0.77	25.40	10.77	18.96	1.57	15.77	8.16	0.08	0.01

2015-09-17 8:55 AM	0.65	49.87	18.58	28.18	2.13	24.31	10.89	0.05	0.01
2015-10-03 4:02 PM	0.51	32.37	14.39	22.93	1.82	19.33	7.53	0.03	0.01
2015-10-14 9:52 AM	0.25	24.95	12.30	18.92	1.84	16.96	6.65	0.05	0.01