

Supplement of Biogeosciences, 12, 6573–6590, 2015
<http://www.biogeosciences.net/12/6573/2015/>
doi:10.5194/bg-12-6573-2015-supplement
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Supplement of

Constraints on the applicability of the organic temperature proxies $U_{37}^{K'}$, TEX_{86} and LDI in the subpolar region around Iceland

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Supplementary Table S1.

Sampling depth, in-situ, satellite and WOA temperatures, proxy data and proxy derived temperatures for SPM.

Sample station	Depth (m)	In-situ SST (°C)	Satellite SST (°C) ¹	Satellite SST (°C) ²	Summer mean T (°C) ³ 50 m ³	U ^K ₃₇	U ^K ₃₇ -SST (°C)	TEX ₈₆	TEX ₈₆ -SST (°C)	TEX ^L ₈₆	TEX ^L ₈₆ -SST (°C)	LDI	LDI-SST (°C)
St 1	5	10.5	11.3			0.40	10.8	0.49	13.4	0.32	13.7	n.d.	n.d.
St 7	5	12.0	11.5			0.53	14.8	0.50	14.3	0.28	9.4	n.d.	n.d.
St 8	5	12.0	11.6			0.31	8.0	0.50	13.9	0.32	13.4	n.d.	n.d.
St 10	5	9.5	9.5			0.26	6.4	0.51	14.8	0.32	13.5	n.d.	n.d.
St 13	5	7.0	7.4			n.d.	n.d.	0.55	17.9	0.32	13.3	n.d.	n.d.
St 16	5	10.0	10.0			0.36	9.5	0.49	13.1	0.30	11.6	n.d.	n.d.
St A	20			12.9		0.45	12.4	0.50	14.4	0.29	10.6	0.21	3.4
St A	50			12.5	9.9	0.36	9.7	0.35	1.9	0.24	4.6	0.11	0.5
St B	50			12.5	9.8	0.45	12.4	0.48	12.1	0.27	8.0	0.20	3.1
St C	50			12.7	9.6	0.45	12.4	0.48	12.9	0.28	9.3	n.d.	n.d.
St D	50			13.0	9.4	0.39	10.5	0.39	5.6	0.26	7.3	n.d.	n.d.
St E	50			13.3	9.4	0.35	9.3	0.34	1.0	0.22	2.5	n.d.	n.d.
St F	20			13.0		0.27	6.9	0.35	1.6	0.22	2.7	0.49	12.0
St G	50			13.2	9.2	0.26	6.6	0.37	3.7	0.22	3.1	0.08	-0.4

n.d.: not detected

¹Satellite SST July 2011 (NOAA)

²Satellite SST July 2012 (NOAA)

³Summer mean temperature (WOA09)

Supplementary Table S2.

Sampling intervals for the sediment trap, satellite and WOA temperatures, proxy data and proxy derived temperatures.

Period	Start (mm/dd/yy)	Sampling interval (days)	Satellite SST (°C)	WOA temp 0-200 m (°C)	$U_{37}^{K'}$	$U_{37}^{K'} \text{ SST}$ (°C)	TEX_{86}	TEX_{86} - SST (°C)	TEX_{86}^L	TEX_{86}^L - SST (°C)	TEX_{86}^L -Temp 0-200 m (°C)	LDI	LDI-SST (°C)
1	07/15/11	16.5	11.9	8.3	0.36	9.5	0.43	8.1	0.32	13.9	11.3	n.d.	n.d.
2	08/01/11	17.5	11.6	8.5	0.35	9.4	0.41	7.0	0.33	14.0	11.4	0.07	-0.6
3	08/19/11	17.5	11.6	8.5	0.41	11.0	0.41	6.9	0.32	13.1	10.7	n.d.	n.d.
4	09/05/11	17.5	11.0	8.5	0.42	11.3	0.41	6.8	0.31	12.6	10.3	0.01	-2.6
5	09/23/11	17.5	10.5	8.5	n.d.	n.d.	0.43	8.2	0.33	14.1	11.4	n.d.	n.d.
6	10/10/11	17.5	9.7	8.6	0.37	9.8	0.42	7.9	0.32	13.7	11.1	n.d.	n.d.
7	10/27/11	17.5	9.6	8.6	0.40	10.7	0.43	8.8	0.34	15.2	12.3	n.d.	n.d.
8	11/14/11	17.5	9.0	8.6	0.40	10.9	0.43	8.6	0.35	15.9	12.8	n.d.	n.d.
9	12/01/11	17.5	8.7	8.3	0.36	9.7	0.43	8.7	0.35	16.2	13.0	0.07	-0.8
10	12/19/11	17.5	8.5	8.3	0.34	9.1	0.44	8.9	0.36	16.9	13.5	0.09	-0.3
11	01/05/12	17.5	8.5	8.0	0.38	10.2	0.44	9.6	0.37	17.5	13.9	n.d.	n.d.
12	01/23/12	17.5	8.3	8.0	0.37	9.9	0.44	9.1	0.36	17.3	13.8	n.d.	n.d.
13	02/09/12	17.5	8.0	7.9	0.36	9.7	0.44	9.3	0.37	17.5	14.0	0.05	-1.2
14	02/26/12	17.5	8.0	7.9	0.42	11.4	0.44	9.0	0.36	17.1	13.7	n.d.	n.d.
15	03/15/12	17.5	8.2	8.1	n.d.	n.d.	0.43	8.2	0.36	16.8	13.4	n.d.	n.d.
16	04/01/12	17.5	8.0	7.9	0.35	9.3	0.44	9.0	0.37	17.4	13.9	n.d.	n.d.
17	04/19/12	17.5	8.3	7.9	0.35	9.4	0.44	9.5	0.37	17.5	13.9	0.1	0.2

18	05/06/12	17.5	8.8	7.9	0.26	6.7	0.44	9.0	0.31	12.7	10.4	0.01	-2.7
19	05/24/12	17.5	10.2	7.9	0.22	5.3	0.44	9.0	0.32	13.6	11.0	n.d.	n.d.
20	06/10/12	17.5	10.9	8.2	0.27	6.8	0.43	8.2	0.32	13.2	10.8	n.d.	n.d.
21	06/27/12	17.5	12.2	8.2	0.29	7.5	0.44	8.9	0.33	14.8	12.0	0.05	-1.4

n.d.: not detected

Supplementary Table S3.

WOA temperatures, proxy data and proxy derived temperatures for surface sediments.

Sample station	Annual mean SST (°C)	Summer mean SST (°C)	Winter mean SST (°C)	Annual mean 0-200 m (°C)	Winter mean 0-200 m (°C)	U_{37}^{K}	U_{37}^{K} SST (°C)	TEX_{86}	TEX_{86}^{K} SST (°C)	TEX_{86}^L	TEX_{86}^L SST (°C)	TEX_{86}^L Temp 0-200 m (°C)	LDI	LDI-SST (°C)
St 1	9.4	11.4	7.9	8.7	7.9	0.40	10.7	0.44	9.2	-0.49	14.0	11.4	0.05	-1.3
St 7	9.1	11.0	7.7	8.5	7.7	0.41	11.1	0.42	7.6	-0.51	12.6	10.3	0.04	-1.7
St 3	8.5	10.9	7.3	8.1	7.5	0.36	9.5	0.40	6.1	-0.59	7.3	6.3	0.27	5.2
St 5	7.8	10.8	6.3	7.6	6.7	0.36	9.4	0.38	4.7	-0.62	4.9	4.5	0.06	-1.1
St 6	8.3	10.8	6.6	7.9	6.9	0.39	10.5	0.39	5.2	-0.61	5.9	5.3	0.05	-1.4
St 8	7.5	10.4	5.7	7.0	5.9	0.39	10.4	0.38	4.4	-0.62	4.9	4.5	0.23	4.0
St 10	4.4	7.2	2.9	4.3	3.5	0.29	7.6	0.38	4.3	-0.64	3.5	3.4	0.04	-1.6
St 11	4.2	7.2	2.2	4.1	2.5	0.31	8.2	0.39	5.6	-0.63	4.4	4.1	0.02	-2.1
St 13	3.1	6.4	1.0	2.0	0.9	0.26	6.7	0.36	2.4	-0.71	-1.2	-0.1	0.08	-0.5
St 14	4.0	7.3	1.9	2.8	1.7	0.28	7.0	0.39	5.1	-0.68	1.3	1.8	0.03	-1.9