

The following supplement accompanies the article

## Seasonal changes in quantity and composition of suspended particulate organic matter in lagoons of the Alaskan Beaufort Sea

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Table S1. Concentration, stable isotopes, and molar ratios of suspended particulate organic carbon (POC) and suspended particulate organic nitrogen (PON) collected at  $\leq 2$  m from coastal sites along the Alaskan Beaufort Sea shelf. Values are means (SD) of sites (inside and outside barrier islands) from each year and season. SD not available for sites outside the barrier islands in April and June because  $n = 1$ .

	April				June				August					
	Inside Islands		Outside Islands		Inside Islands		Outside Islands		Inside Islands		Outside Islands		Outside Islands	
	2012 (n = 4)	2013 (n = 4)	2012 (n = 1)	2013 (n = 1)	2012 (n = 4)	2013 (n = 4)	2012 (n = 1)	2013 (n = 1)	2011 (n = 6)	2012 (n = 6)	2013 (n = 3)	2011 (n = 3)	2012 (n = 3)	2013 (n = 2)
POC ( $\mu\text{g L}^{-1}$ )	73.2 (21.8)	91.4 (35.7)	43.2	55.5	441.7 (135.8)	633.2 (206.0)	575.9	541.5	196.8 (67.7)	226.6 (23.8)	278.2 (11.5)	275.8 (119.8)	123.8 (27.2)	183.7 (52.2)
PON ( $\mu\text{g L}^{-1}$ )	10.0 (3.4)	17.7 (9.1)	5.0	7.9	67.4 (19.6)	73.3 (17.3)	90.6	65.0	37.0 (10.3)	36.4 (4.0)	42.3 (1.5)	51.5 (23.7)	19.1 (4.8)	29.5 (0.7)
POC:PON	8.6 (0.7)	6.0 (1.6)	10.2	8.2	7.6 (0.3)	10.1 (1.0)	7.4	9.7	6.2 (1.0)	7.3 (0.3)	7.7 (0.1)	6.3 (0.3)	7.6 (1.3)	7.3 (1.9)
$\delta^{13}\text{C}$	-26.1 (1.2)	-26.8 (1.3)	-27.9	-28.1	-28.0 (0.9)	-28.5 (1.0)	-26.4	-31.1	-24.2 (1.4)	-29.1 (1.1)	-28.3 (0.5)	-23.0 (0.6)	-28.6 (0.5)	-27.7 (0.3)
$\delta^{15}\text{N}$	6.7 (0.3)	3.7 (2.0)	5.4	7.0	4.5 (1.1)	3.4 (0.7)	5.5	3.6	7.0 (0.8)	5.5 (1.5)	7.0 (1.4)	7.5 (0.7)	6.2 (1.7)	9.3 (0.1)

Table S2. Fatty acid composition (% total fatty acids, %TFA) of suspended particulate organic matter collected at  $\leq 2$  m from coastal sites along the Alaskan Beaufort Sea shelf. Values are means (SD) of sites (inside and outside barrier islands) for each year and season. SD not available for sites outside the barrier islands in April and June because  $n = 1$ . Sums and ratios were calculated from data for each site and not from the season and year means.

Fatty acid* (% TFA)	April				June				August			
	Inside Islands		Outside Islands		Inside Islands		Outside Islands		Inside Islands		Outside Islands	
	2012 (n = 4)	2013 (n = 4)	2012 (n = 1)	2013 (n = 1)	2012 (n = 4)	2013 (n = 4)	2012 (n = 1)	2013 (n = 1)	2012 (n = 6)	2013 (n = 4)	2012 (n = 3)	2013 (n = 2)
14:0	2.6 (0.4)	4.1 (0.4)	3.5	4.8	9.0 (3.0)	5.1 (0.8)	9.0	7.0	7.3 (3.1)	6.3 (1.0)	6.4 (1.0)	7.0 (1.4)
TMTD <sup>a</sup>	0.2 (0.0)	0.7 (0.1)	0.3	0.8	0.1 (0.0)	0.1 (0.1)	0.1	0.1	0.3 (0.1)	0.4 (0.1)	0.3 (0.1)	0.4 (0.1)
<i>i</i> 15:0	0.4 (0.1)	0.8 (0.3)	0.3	0.6	0.5 (0.2)	1.0 (0.4)	0.6	0.9	1.2 (0.3)	0.8 (0.2)	0.7 (0.1)	0.8 (0.1)
<i>a</i> 15:0	0.4 (0.1)	0.8 (0.1)	0.4	0.7	0.5 (0.2)	1.3 (0.5)	0.6	1.1	1.0 (0.2)	0.8 (0.3)	0.6 (0.0)	0.9 (0.1)
15:0	1.0 (0.1)	2.1 (0.3)	1.5	2.6	0.4 (0.1)	0.6 (0.2)	0.5	0.5	1.0 (0.1)	1.0 (0.2)	1.0 (0.2)	1.3 (0.2)
15:1	0.4 (0.0)	0.6 (0.1)	0.4	0.6	0.2 (0.0)	0.4 (0.2)	0.3	0.4	0.3 (0.0)	0.2 (0.0)	0.4 (0.2)	0.3 (0.1)
16:0	28.4 (2.9)	26.7 (2.8)	28.6	29.4	17.6 (1.8)	18.7 (1.3)	20.4	10.3	19.3 (2.0)	17.8 (0.6)	22.1 (4.3)	25.1 (1.3)
16:1 $\omega$ 9	1.4 (0.3)	5.0 (1.1)	2.4	5.8	0.2 (0.1)	0.6 (0.2)	0.2	0.4	1.1 (0.2)	1.4 (0.4)	1.2 (0.5)	1.9 (0.9)
16:1 $\omega$ 7	5.7 (2.7)	3.8 (0.4)	11.0	2.1	27.1 (3.9)	21.1 (6.3)	28.2	16.1	7.8 (2.2)	8.3 (3.2)	12.3 (1.8)	9.9 (1.8)
16:1 $\omega$ 5	0.3 (0.1)	0.6 (0.3)	0.2	0.5	0.4 (0.2)	0.7 (0.2)	0.5	0.6	0.4 (0.1)	0.6 (0.2)	0.7 (0.3)	0.7 (0.1)
<i>i</i> 17:0	0.4 (0.2)	0.3 (0.1)	0.1	0.3	0.3 (0.1)	0.6 (0.3)	0.6	0.7	0.9 (0.4)	0.9 (0.2)	0.6 (0.1)	0.6 (0.0)
<i>a</i> 17:0	0.3 (0.2)	0.3 (0.1)	0.1	0.2	0.3 (0.1)	0.7 (0.2)	0.4	0.3	0.4 (0.1)	0.7 (0.1)	0.4 (0.2)	0.3 (0.3)
16:2 $\omega$ 4	0.3 (0.1)	0.6 (0.2)	0.3	0.4	1.3 (0.4)	0.7 (0.4)	2.2	1.3	1.5 (2.2)	0.7 (0.1)	0.4 (0.2)	0.6 (0.0)
17:0	1.1 (0.1)	1.4 (0.1)	1.0	1.3	0.4 (0.2)	0.6 (0.2)	0.1	0.6	0.6 (0.3)	0.5 (0.1)	0.5 (0.2)	0.7 (0.0)
16:3 $\omega$ 4	0.7 (0.3)	0.7 (0.1)	0.6	0.8	1.0 (0.4)	0.7 (0.4)	1.8	1.5	0.4 (0.1)	0.4 (0.1)	0.3 (0.1)	0.5 (0.1)
17:1	0.3 (0.3)	0.2 (0.1)	0.1	0.1	0.6 (0.0)	0.7 (0.4)	0.9	0.5	1.0 (0.3)	0.7 (0.1)	0.4 (0.1)	0.4 (0.0)
16:4 $\omega$ 3	0.3 (0.1)	0.2 (0.2)	0.5	0.3	1.3 (0.6)	1.4 (1.6)	1.3	4.0	2.3 (1.1)	1.7 (0.7)	2.0 (0.6)	0.7 (0.1)
16:4 $\omega$ 1	0.1 (0.0)	0.1 (0.0)	0.1	0.1	1.7 (0.5)	0.9 (0.6)	3.9	2.9	0.2 (0.1)	0.2 (0.1)	0.2 (0.1)	0.3 (0.0)
18:0	32.1 (3.9)	20.8 (3.7)	27.1	19.6	2.8 (1.2)	6.9 (3.2)	3.0	1.9	6.8 (0.7)	6.9 (0.9)	11.0 (6.6)	11.9 (1.4)
18:1 $\omega$ 11	0.2 (0.1)	0.1 (0.1)	0.4	0.0	0.4 (0.2)	0.4 (0.1)	1.2	0.3	0.1 (0.1)	0.1 (0.0)	0.2 (0.1)	0.1 (0.0)
18:1 $\omega$ 9	8.3 (1.2)	10.7 (1.6)	9.0	13.4	8.2 (1.9)	9.1 (2.6)	3.0	3.1	5.5 (0.7)	7.0 (0.4)	9.2 (1.6)	7.8 (1.0)
18:1 $\omega$ 7	1.9 (0.5)	1.8 (0.7)	1.7	0.9	1.1 (0.3)	3.0 (1.1)	1.7	1.7	3.3 (0.6)	3.1 (1.1)	2.0 (0.5)	3.0 (0.2)
18:2 $\omega$ 6	2.8 (0.8)	3.0 (0.9)	1.3	2.8	3.4 (0.6)	3.4 (2.0)	1.6	4.0	3.4 (0.4)	4.6 (1.3)	3.7 (0.7)	4.4 (0.8)
18:3 $\omega$ 3	0.4 (0.1)	0.5 (0.4)	0.3	0.8	3.2 (1.0)	3.9 (3.9)	1.4	5.7	5.0 (0.5)	4.2 (0.7)	2.5 (0.9)	3.5 (1.1)
18:4 $\omega$ 3	0.7 (0.4)	0.8 (0.6)	0.9	0.9	4.9 (1.3)	3.1 (2.7)	4.0	7.9	6.1 (0.5)	5.6 (1.1)	3.8 (1.8)	3.6 (0.7)
20:0	0.7 (0.1)	1.2 (0.3)	0.5	1.1	0.1 (0.0)	1.0 (0.8)	0.1	0.1	0.7 (0.1)	0.6 (0.2)	0.5 (0.2)	0.7 (0.0)
20:1 $\omega$ 9	1.3 (0.5)	1.3 (0.5)	1.7	1.1	2.2 (1.3)	1.8 (1.2)	1.0	9.5	4.6 (1.2)	4.3 (1.2)	3.2 (1.5)	2.8 (0.0)
20:5 $\omega$ 3	2.6 (1.9)	2.8 (2.3)	2.3	0.6	6.0 (1.1)	3.7 (1.5)	6.0	9.6	5.6 (1.7)	6.8 (0.6)	5.6 (3.6)	3.3 (0.5)
22:0	0.3 (0.1)	1.0 (0.3)	0.1	1.1	0.1 (0.0)	1.4 (1.2)	0.1	0.2	0.9 (0.2)	0.6 (0.1)	0.6 (0.2)	0.8 (0.0)
22:1 $\omega$ 9	0.3 (0.2)	0.9 (0.4)	0.1	0.9	0.3 (0.2)	0.4 (0.1)	0.8	0.1	0.2 (0.1)	0.3 (0.1)	0.1 (0.1)	0.6 (0.1)

24:0	0.6	(0.3)	2.1	(0.2)	0.6	2.2	0.2	(0.1)	1.8	(1.2)	0.4	0.2	1.2	(0.3)	1.2	(0.3)	0.6	(0.1)	1.3	(0.1)
22:6 $\omega$ 3	0.9	(0.4)	1.3	(1.1)	0.9	0.3	2.6	(0.7)	1.7	(1.2)	1.7	4.1	6.5	(1.9)	7.9	(1.8)	4.0	(3.8)	1.7	(0.4)
$\Sigma$ SFA <sup>b</sup>	68.8	(5.9)	61.9	(7.2)	64.0	64.2	32.4	(3.4)	40.4	(8.0)	36.5	24.0	41.7	(2.4)	38.6	(3.1)	45.3	(12.2)	51.8	(1.5)
$\Sigma$ MUFA <sup>c</sup>	20.8	(3.9)	25.8	(2.8)	27.2	26.2	41.1	(4.2)	38.9	(5.8)	38.1	33.5	25.3	(1.5)	26.7	(2.4)	30.2	(3.2)	28.1	(1.8)
$\Sigma$ PUFA <sup>d</sup>	10.2	(3.0)	11.6	(4.7)	8.5	8.9	26.4	(4.9)	20.5	(12.0)	25.3	42.3	32.8	(2.5)	34.3	(5.2)	24.1	(9.4)	19.6	(3.4)
$\Sigma\omega$ 3	5.4	(1.9)	5.7	(4.3)	4.9	2.9	18.4	(4.2)	13.9	(10.3)	14.8	31.8	26.1	(4.4)	26.9	(3.5)	18.2	(9.6)	13.1	(2.7)
$\Sigma\omega$ 6	3.6	(1.1)	4.1	(0.7)	2.5	4.5	4.2	(0.7)	4.5	(1.9)	2.8	5.2	4.6	(0.6)	5.8	(1.3)	5.0	(0.9)	5.1	(0.7)
$\omega$ 3/ $\omega$ 6 <sup>k</sup>	1.5	(0.4)	1.3	(0.8)	1.9	0.6	4.5	(1.0)	2.8	(1.4)	5.3	6.1	5.8	(1.1)	4.8	(0.4)	3.8	(2.3)	2.5	(0.2)
DHA/EPA <sup>ek</sup>	0.4	(0.1)	0.4	(0.1)	0.4	0.5	0.4	(0.1)	0.4	(0.2)	0.3	0.4	1.2	(0.1)	1.1	(0.2)	0.6	(0.3)	0.5	(0.0)
$\Sigma$ C <sub>16</sub>	37.2	(2.2)	37.9	(3.0)	43.5	39.2	50.6	(4.0)	44.9	(5.8)	58.4	37.3	33.2	(3.8)	31.3	(3.1)	39.4	(2.9)	39.7	(1.6)
$\Sigma$ C <sub>16</sub> PUFA	1.4	(0.4)	1.7	(0.2)	1.5	1.5	5.3	(1.5)	3.8	(1.8)	9.3	10.0	4.5	(1.7)	3.1	(0.6)	3.1	(0.6)	2.1	(0.0)
$\Sigma$ C <sub>18</sub>	46.9	(2.5)	38.4	(1.1)	41.1	39.4	24.6	(2.1)	30.5	(5.4)	16.4	25.5	31.1	(1.8)	32.3	(2.7)	33.0	(4.4)	34.9	(2.3)
$\Sigma$ C <sub>18</sub> PUFA	4.3	(1.1)	4.9	(1.6)	2.8	5.1	11.8	(2.4)	10.6	(8.4)	7.3	18.0	15.0	(0.8)	14.8	(2.9)	10.3	(2.9)	11.8	(2.6)
Diatom <sup>fk</sup>	0.3	(0.1)	0.4	(0.0)	0.5	0.3	1.6	(0.2)	1.2	(0.3)	1.4	1.7	0.5	(0.1)	0.6	(0.2)	0.7	(0.2)	0.5	(0.1)
Terrestrial <sup>g</sup>	3.2	(0.9)	3.5	(1.1)	1.6	3.6	6.6	(1.1)	7.2	(5.8)	3.0	9.8	8.4	(0.6)	8.8	(2.0)	6.2	(1.3)	7.9	(1.9)
Bacteria <sup>h</sup>	4.8	(1.2)	6.8	(0.5)	4.3	6.7	3.3	(0.9)	6.5	(2.0)	4.7	5.2	6.7	(1.2)	5.9	(1.0)	5.1	(0.7)	5.7	(0.2)
Copepod <sup>i</sup>	1.8	(0.1)	2.5	(0.9)	1.8	2.2	2.5	(1.1)	2.2	(1.1)	1.8	9.8	4.8	(1.2)	4.6	(1.2)	3.4	(1.5)	3.4	(0.1)
22:0 + 24:0	0.9	(0.4)	3.1	(0.4)	0.7	3.3	0.3	(0.1)	3.2	(2.5)	0.5	0.5	2.1	(0.4)	1.9	(0.5)	1.1	(0.3)	2.1	(0.1)
C <sub>16</sub> PUFA index <sup>j</sup>	3.7	(1.2)	5.1	(0.8)	3.5	4.4	10.6	(3.5)	8.8	(4.9)	15.7	26.4	13.6	(3.4)	10.4	(2.6)	8.0	(1.6)	5.5	(0.0)

\*data not shown for fatty acids <0.5% in all seasons and years (14:1, ai16:0, i16:0, 16:1 $\omega$ 11, 18:1 $\omega$ 6, 18:2 $\omega$ 4, 18:3 $\omega$ 6, 18:3 $\omega$ 4, 18:4 $\omega$ 1, 19:0, 20:1 $\omega$ 7, 20:3 $\omega$ 6, 21:0, 20:4 $\omega$ 6, 20:3 $\omega$ 3, 20:4 $\omega$ 3, 21:0, 22:1 $\omega$ 7, 22:1 $\omega$ 11(13), 22:5 $\omega$ 6, 24:1); '-' = not detected or  $\leq$ 0.1%; <sup>a</sup>4,8,12-trimethyltridecanoic acid; <sup>b</sup> $\Sigma$  saturated FA; <sup>c</sup> $\Sigma$  monounsaturated FA; <sup>d</sup> $\Sigma$  polyunsaturated FA; <sup>e</sup>22:6 $\omega$ 3/20:5 $\omega$ 3; <sup>f</sup> $\Sigma$ 16:1/16:0; <sup>g</sup>18:2 $\omega$ 6 + 18:3 $\omega$ 3; <sup>h</sup> $\Sigma$  odd-carbon numbered and branched chain FA; <sup>i</sup> $\Sigma$ 22:1 +  $\Sigma$ 20:1; <sup>j</sup>(16:2 $\omega$ 4 + 16:3 $\omega$ 4 + 16:4 $\omega$ 3 + 16:4 $\omega$ 1)/(16:0 + 16:1 $\omega$ 7 + 16:1 $\omega$ 5 + 16:2 $\omega$ 4 + 16:3 $\omega$ 4 + 16:4 $\omega$ 3 + 16:4 $\omega$ 1) as a percent; <sup>k</sup>unitless ratio