

Supplementary data

Dissolved extracellular polymeric substance (dEPS) dynamics and bacterial growth during sea ice formation in an ice tank study

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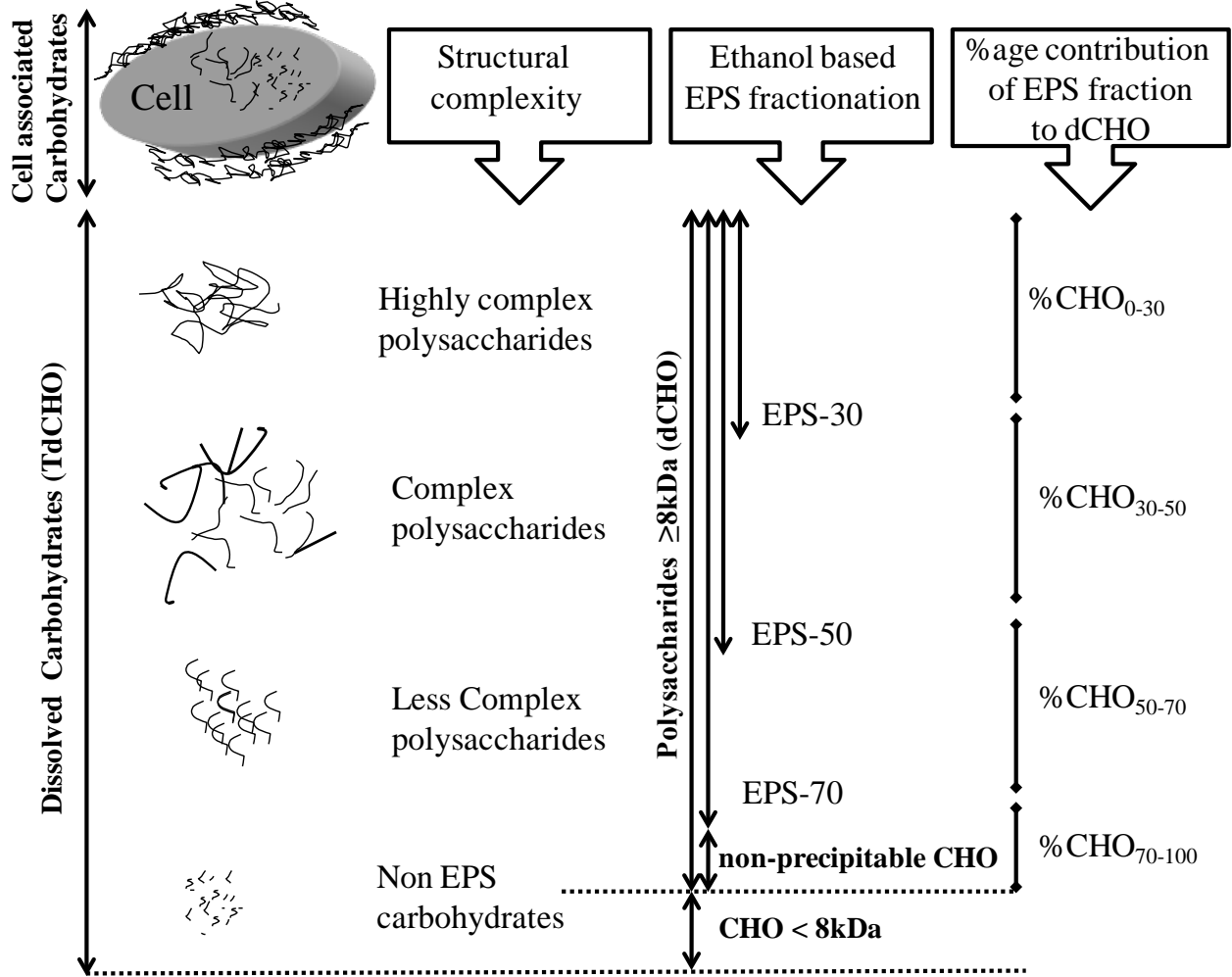
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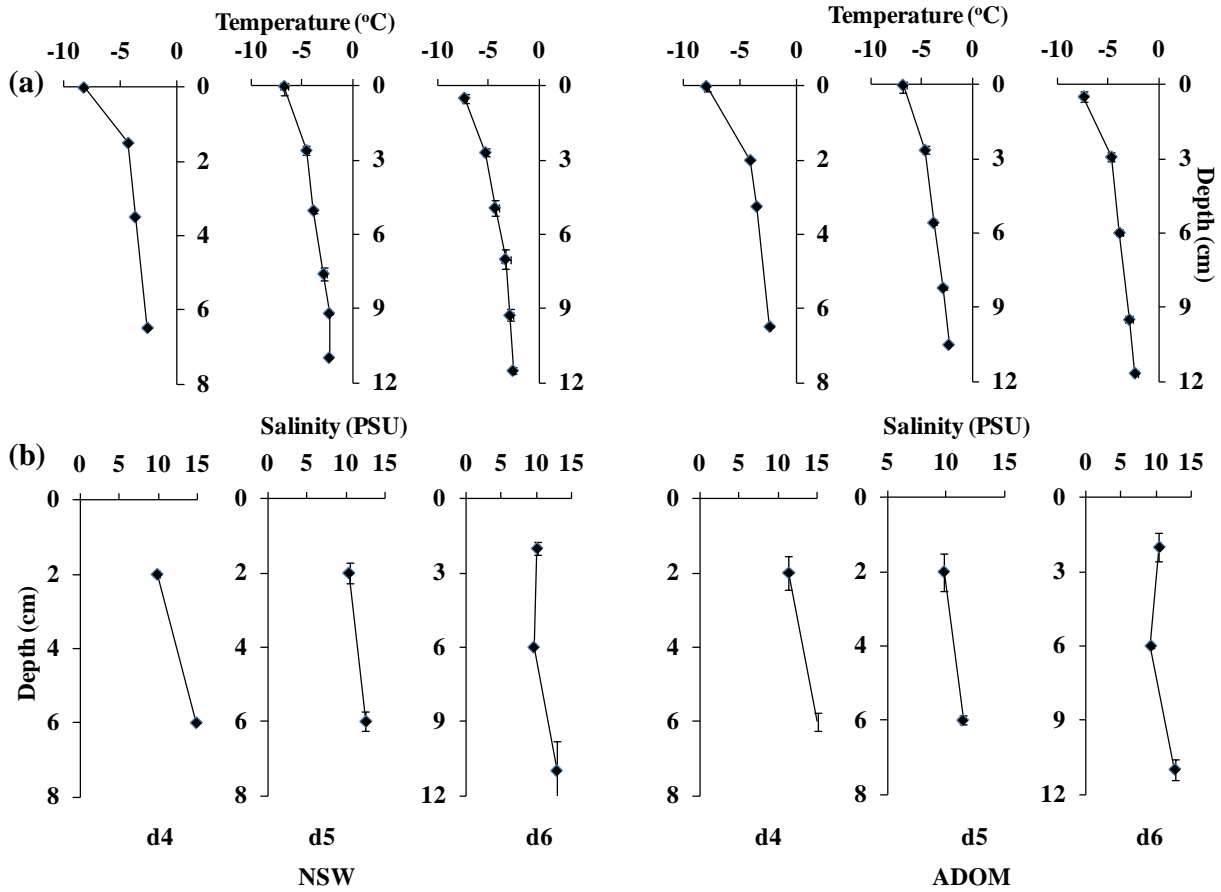
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ESM_1 Diatom extracellular polymeric substances (EPS), ethanol based dEPS fractionation, and percentage contribution of dEPS fractions to dissolved carbohydrates (dCHO). TdCHO represent dissolved carbohydrate concentration before dialysis, while dCHO represent carbohydrate concentration after dialysis. Adapted from Underwood et al. (2010)



ESM_2 Vertical profile of **a** temperature ($^{\circ}\text{C}$) and **b** salinity in ice cores collected on each sampling day. Except for d4 ($N = 1$ and 2 for NSW and ADOM respectively on d4), 3 ice cores were collected on each sampling day for both NSW and ADOM series and average of 3 ice cores was used for all graphs.



ESM_3 Abundances (cells ml⁻¹) of flagellates and ice algae (diatoms) over the experimental period. Diatoms were not counted after d3, as after d3 all diatoms encountered were empty frustules. Except for samples collected on d4 ($N > 3$ on d4) N (number of samples) was ≥ 3 for all sample types collected from both NSW and ADOM mesocosm on each day. Values are mean \pm SE.

Sampling day	Seawater		Sea ice		Brines		Frost flowers	
	NSW	ADOM	NSW	ADOM	NSW	ADOM	NSW	ADOM
Flagellates								
d0	278.1 \pm 22.4	249.2 \pm 21.6						
d3	137.2 \pm 19.3	119.2 \pm 19.9						
d4	65.0	97.5 \pm 32.5	16.3 \pm 16.3	40.6 \pm 15.6	97.5	65.0		
d5	97.5 \pm 18.3	97.5 \pm 33.0	27.1 \pm 13.1	58.5 \pm 18.9	43.3 \pm 10.8	86.7 \pm 28.7		
d6	65 \pm 18.8	75.8 \pm 10.8	8.1 \pm 5.3	20.3 \pm 5.9	10.8 \pm 10.8	65.0 \pm 21.7	0	0
Algae								
d0	800.0 \pm 188.6	977.8 \pm 143.1						
d3	244.4 \pm 80	300.0 \pm 112.5						
d4	n.d.	n.d.	n.d.	n.d.				
d5	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.		
d6	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.

n.d.= Not detected

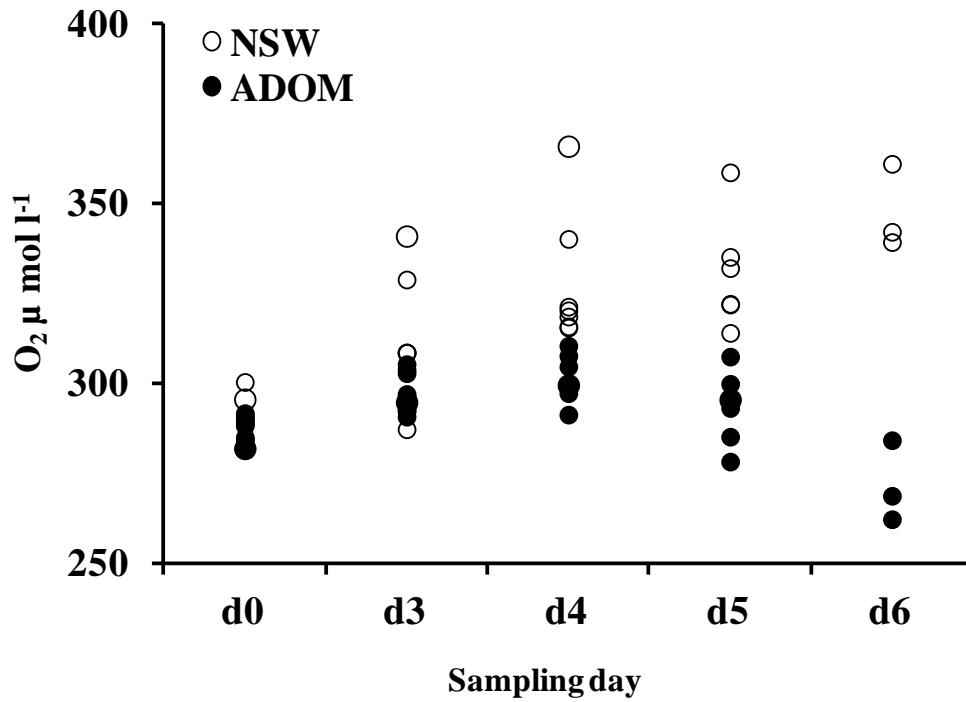
ESM_4 High-DNA/ low-DNA bacterial ratios for all sample types from sea ice generated in a 6d mesocosm experiment using North Sea Water (NSW) and North Sea Water enriched with additional algal-derived DOM (ADOM).

	Seawater		Sea ice		Brines		Frost flowers	
	NSW	ADOM	NSW	ADOM	NSW	ADOM	NSW	ADOM
d0	1.5	0.99						
d3	1.4	1.7						
d4	1.2	1.1	2.3	2.9				
d5	3.1	2.7	2.7	3.8	2.6	2.8	2.9	2.8
d6	2.6	6.6	0.5	2.2	2.3	4.2	2.1	2.9

ESM_5 Correlation between total bacterial numbers (TBN) and inorganic nutrients in seawater, sea ice and brines. Values in bold are significant at $P < 0.05^*$ or $< 0.01^{**}$

	Seawater		Sea Ice		Brines	
	NSW	ADOM	NSW	ADOM	NSW	ADOM
NH ₄	-0.410 (23)	0.821** (21)	0.491 (16)	-0.292 (19)	-0.257 (7)	-0.527 (7)
PO ₄	-0.269 (23)	-0.427 (21)	0.592* (16)	0.390 (19)	0.883** (7)	0.750 (7)
Si	-0.250 (23)	-0.269 (21)	0.526* (16)	0.396 (19)	0.664 (7)	-0.514 (7)
NO ₂	-0.466 (23)	-0.652** (21)	0.229 (11)	0.270 (14)	-0.119 (7)	-0.292 (7)
NO ₃	0.607** (23)	0.471* (21)	0.003 (16)	-0.484 (19)	0.038 (7)	-0.356 (7)

ESM_6 Dissolved oxygen levels ($\mu\text{mol l}^{-1}$) in the seawater on each sampling day in the NSW and ADOM mesocosms. Unfilled circles represent NSW and filled circles represent ADOM samples. N (sample numbers) ≥ 3 for all sample types collected from both NSW and ADOM mesocosm on each sampling day.



ESM_7: Concentration of salinity-normalised (normalised to salinity 33) **(a)** organic carbon (POC and DOC), **(b)** dissolved carbohydrate (dCHO and dUA) and **(c)** EPS fractions (EPS-70 and EPS-30) in all samples vs. salinity. Open symbols represent samples collected from NSW bags and filled symbols represent samples collected from ADOM bags. Lines (dotted line for NSW and solid line for ADOM samples) in the graphs represent average values in seawater on d0; values above these lines represent production of new material after d0 till the end of exp.

