



Supplement of

Early spring subglacial discharge plumes fuel under-ice primary production at a Svalbard tidewater glacier

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Supplement

Figure

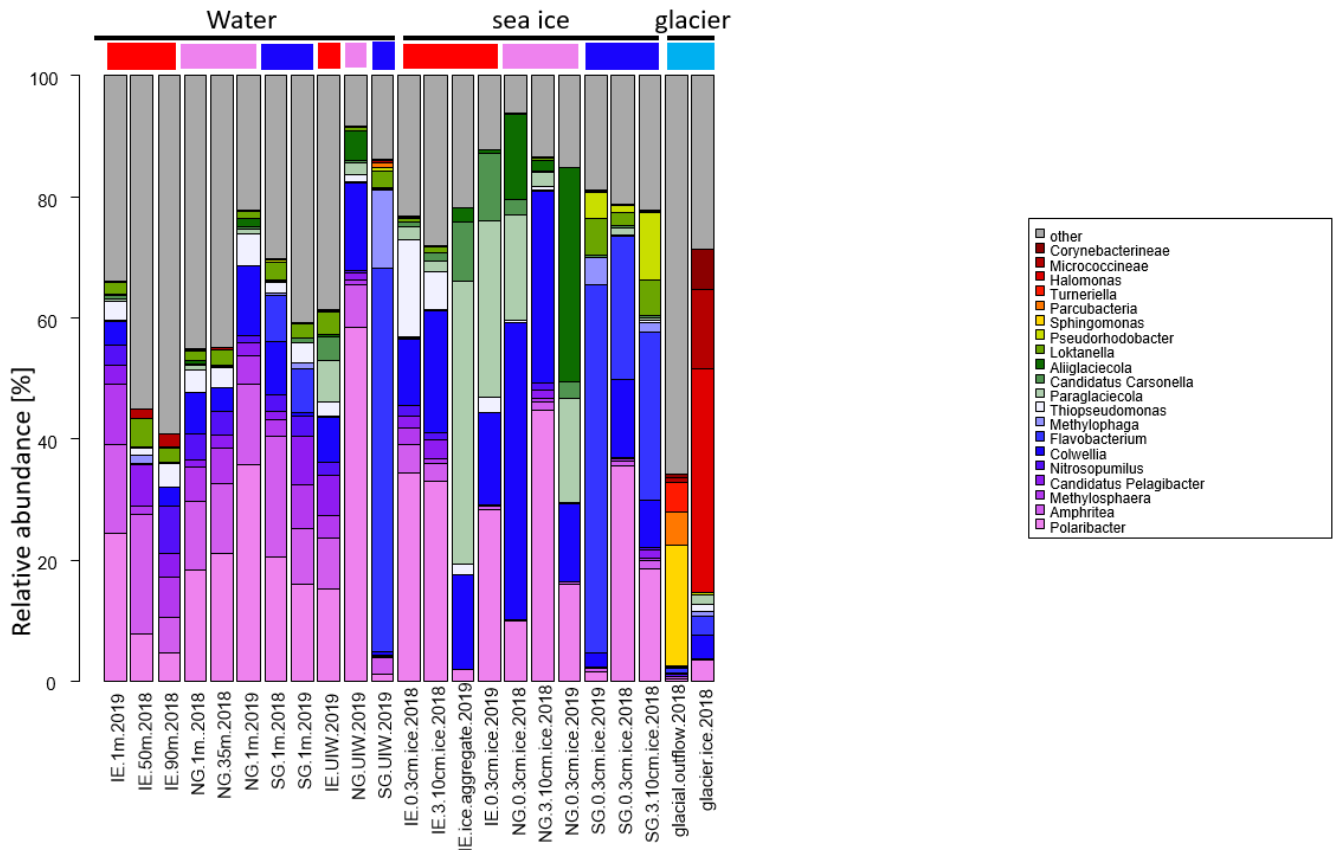


Fig. S1. Community composition of the most abundant genera based on 16S rRNA sequencing data.

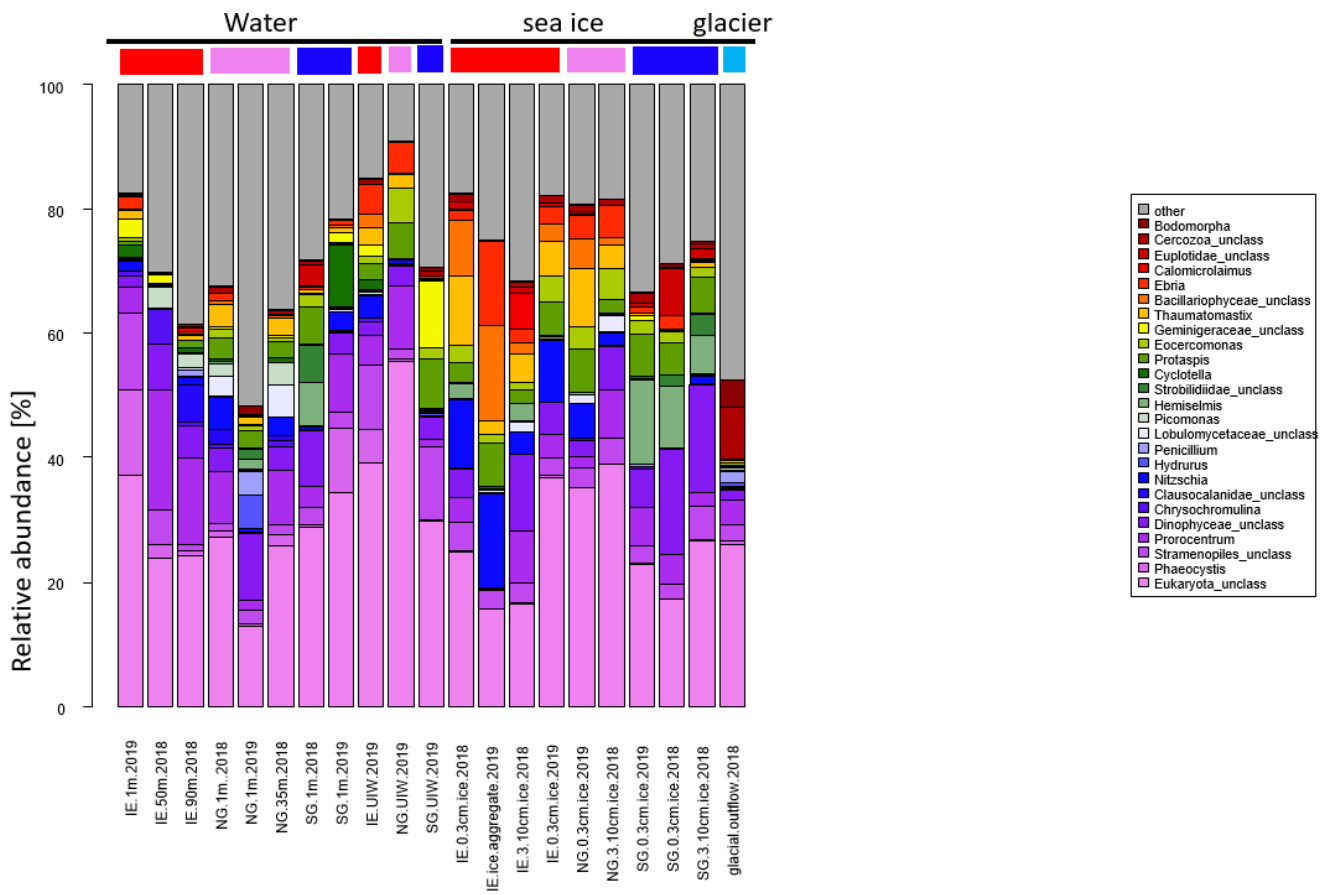


Fig. S2. Community composition based on 18S rRNA sequencing data of the most abundant genera or highest taxonomic level if no related genus has been found.

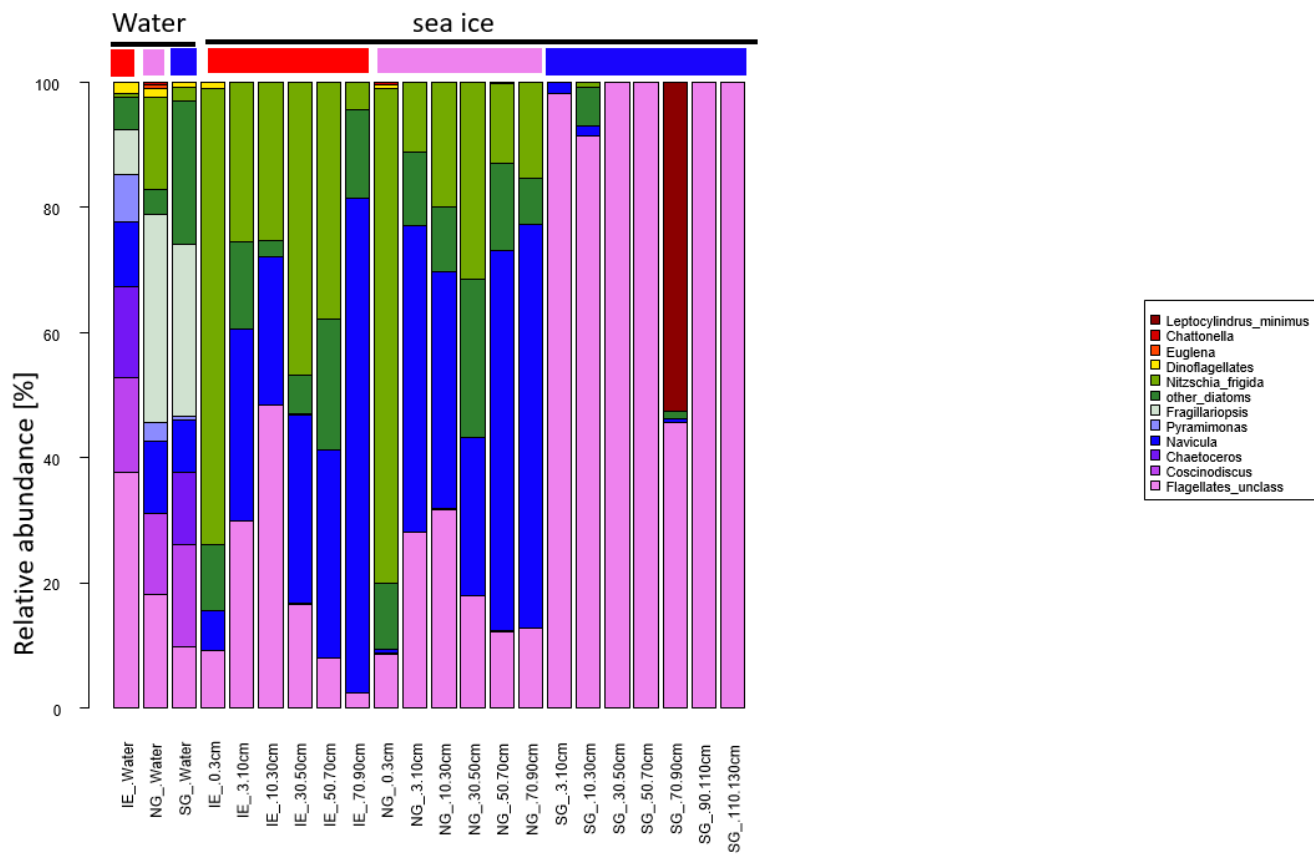


Fig. S3. Sea ice algae and UIW algae community composition of the most abundant taxonomic groups based on light microscopy.

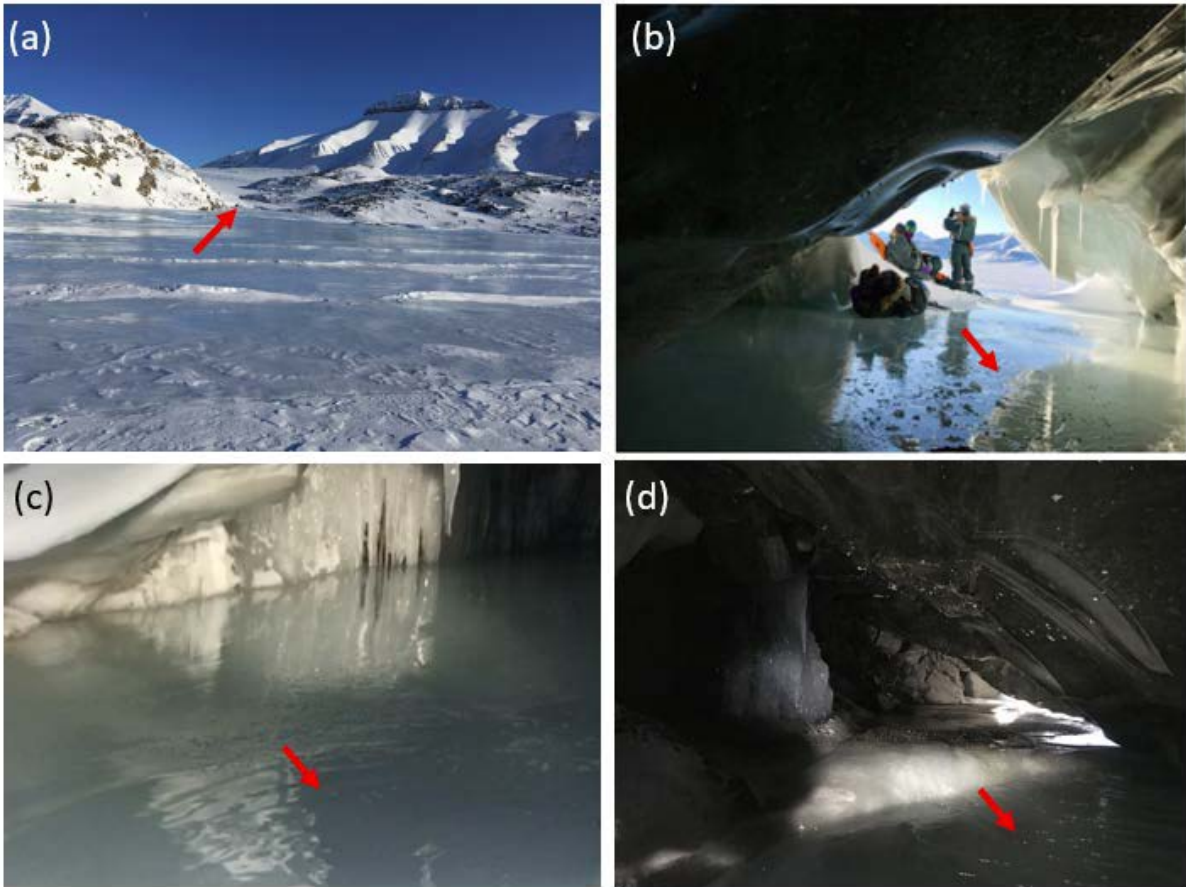


Fig S4. Sampling site for the subglacial discharge water. a) Aufeis on land in front of the southern part of the glacier and location of the ice cave shown in b-d (red arrow). b-d) Inside the ice cave with red arrow pointing to the liquid water sampled. The liquid meltwater was mostly covered by a layer of ice. Picture credits: a,c) Josef Elster, b) Marie Sabacka, d) Tobias Vonnahme.

Table S1. Sea ice properties and conversions from bulk salinity and temperature to brine salinity, densities, and brine volume fractions.

Station	Ice core section [cm]	Temp [°C]	Brine Sal [PSU]	Ice density [kg m ⁻³]	Brine density [kg m ⁻³]	Brine volume fraction
SG	0 to 3	-0.4	7.4	917.1	1005.9	7 %
	3 to 10	-0.4	7.4	917.1	1005.9	9 %
	10 to 30	-0.5	8.5	917.1	1006.8	5 %
	30 to 50	-0.6	10.7	917.1	1008.6	3 %
	50 to 70	-0.5	10.0	917.1	1008.0	1 %
	70 to 90	-0.7	13.3	917.1	1010.6	0 %
	90 to 100	-1.5	27.6	917.2	1022.0	1 %
	110 to 130	-1.7	31.7	917.2	1025.4	5 %
NG	0 to 3	-2.0	37.6	917.3	1030.0	28 %
	3 to 10	-2.1	39.4	917.3	1031.6	16 %
	10 to 30	-2.3	42.8	917.3	1034.2	10 %
	30 to 50	-2.5	46.1	917.3	1036.9	10 %
	50 to 70	-2.8	51.8	917.4	1041.4	8 %
	70 to 92	-2.7	51.1	917.4	1040.9	8 %
	IE	0 to 3	-2.2	41.3	917.3	1033.1
3 to 10		-2.4	44.1	917.3	1035.3	11 %
10 to 30		-2.6	48.3	917.4	1038.6	11 %
30 to 50		-3.0	55.6	917.4	1044.5	9 %
50 to 70		-3.1	57.7	917.4	1046.2	8 %
70 to 80		-3.1	57.3	917.4	1045.9	6 %

Table S2. Geographic metadata and nutrient concentrations in $\mu\text{mol L}^{-1}$ related to Billefjorden.

Depth	Station	Latitude (N)	Longitude (E)	type	Depth	Si(OH) ₄	NO _x	PO ₄	N:P
					[m]	[$\mu\text{mol L}^{-1}$]	[$\mu\text{mol L}^{-1}$]	[$\mu\text{mol L}^{-1}$]	[mol mol ⁻¹]
UIW	SG	78°39'03	16°56'44	water	0.01	19.3	10.4	0.19	55.8
1 m	SG	78°39'03	16°56'44	water	1	4.3	6.5	0.42	15.7
15 m	SG	78°39'03	16°56'44	water	15	4.4	8.7	0.68	12.9
25 m	SG	78°39'03	16°56'44	water	25	4.5	9.6	0.67	14.2
UIW	NG	78°39'40	16°56'19	water	0.01	1.2	1.5	0.07	21.4
1 m	NG	78°39'40	16°56'19	water	1	3.3	7.6	0.53	14.3
15 m	NG	78°39'40	16°56'19	water	15	3.8	8.7	0.62	14.0
25 m	NG	78°39'40	16°56'19	water	25	4.0	9.1	0.68	13.5
UIW	IE	78°39'09	16°34'01	water	0.01	2.8	6.1	0.44	13.8
1 m	IE	78°39'09	16°34'01	water	1	1.6	3.3	0.34	9.7
15 m	IE	78°39'09	16°34'01	water	15	3.6	7.8	0.62	12.6
25 m	IE	78°39'09	16°34'01	water	25	4.0	9.5	0.86	11.1
Bot	IE	78°39'09	16°34'01	water	57	4.0	9.1	0.70	13.0
0-3 cm	IE	78°39'09	16°34'01	Sea ice	-1.5	0.2	0.6	0.46	1.2
3-10 cm	IE	78°39'09	16°34'01	Sea ice	-6.50	0.1	0.2	0.04	5.1
10-30 cm	IE	78°39'09	16°34'01	Sea ice	-20	0.1	0.6	0.01	63.5
30-50 cm	IE	78°39'09	16°34'01	Sea ice	-40	3.6	1.0	0.04	26.6
50-70 cm	IE	78°39'09	16°34'01	Sea ice	-60	0.1	0.3	0.01	27.1
70-80 cm	IE	78°39'09	16°34'01	Sea ice	-75	0.1	0.5	0.01	48.1
0-3 cm	NG	78°39'40	16°56'19	Sea ice	-1.5	0.3	0.8	1.29	0.6
3-10 cm	NG	78°39'40	16°56'19	Sea ice	-6.50	0.1	0.2	0.03	7.9
10-30 cm	NG	78°39'40	16°56'19	Sea ice	-20	0.0	0.1	0.00	104.0
30-50 cm	NG	78°39'40	16°56'19	Sea ice	-40	0.1	0.2	0.01	20.3
50-70 cm	NG	78°39'40	16°56'19	Sea ice	-60	0.2	0.6	0.05	10.9
70-90 cm	NG	78°39'40	16°56'19	Sea ice	-80	0.4	1.5	0.21	6.9
0-3 cm	SG	78°39'03	16°56'44	Sea ice	-1.5	2.9	2.2	0.02	89.8
3-10 cm	SG	78°39'03	16°56'44	Sea ice	-6.50	3.2	3.3	0.03	97.1
10-30 cm	SG	78°39'03	16°56'44	Sea ice	-20	2.0	2.9	0.04	71.2
30-50 cm	SG	78°39'03	16°56'44	Sea ice	-40	0.6	1.3	0.02	68.1
50-70 cm	SG	78°39'03	16°56'44	Sea ice	-60	0.4	1.2	0.02	57.6
70-90 cm	SG	78°39'03	16°56'44	Sea ice	-80	0.9	0.4	0.01	38.9
90-110 cm	SG	78°39'03	16°56'44	Sea ice	-100	2.4	2.3	0.04	56.3
110-130 cm	SG	78°39'03	16°56'44	Sea ice	-120	2.6	2.4	0.04	55.4

Table S3. Geographic metadata and nutrient concentrations related to Nordenskiöldbreen.

Date	Stat	Lat (N)	Lon (E)	type	Silicate [$\mu\text{mol L}^{-1}$]	NO _x [$\mu\text{mol L}^{-1}$]	Phosphate [$\mu\text{mol L}^{-1}$]	Nitrite [$\mu\text{mol L}^{-1}$]	Nitrate [$\mu\text{mol L}^{-1}$]
09.07.2018	NC	78°38'3	16°59'4	Cryoconite	0.18	0.741	0.597	0.133	0.608
09.07.2018	NC	78°38'3	16°59'4	Cryoconite	0.179	0.555	0.75	0.084	0.471
09.07.2018	NC	78°38'3	16°59'4	Cryoconite	0.066	0.732	0.332	0.069	0.663
09.07.2018	NC	78°38'3	16°59'4	Cryoconite	0.157	0.674	1.281	0.067	0.607
09.07.2018	NC	78°38'3	16°59'4	Cryoconite	0.044	0.681	0.163	0.052	0.629
09.07.2018	NR	78°39'3	16°56'5	Cryoconite	0.323	0.537	0.611	0.311	0.226
09.07.2018	NR	78°39'3	16°56'5	Cryoconite	0.073	0.671	0.201	0.07	0.601
09.07.2018	NR	78°39'3	16°56'5	Cryoconite	0.062	0.361	0.383	0.077	0.284
09.07.2018	NR	78°39'3	16°56'5	Cryoconite	0.146	0.609	0.222	0.113	0.496
09.07.2018	NR	78°39'3	16°56'5	Cryoconite	0.049	0.53	0.26	0.065	0.465
25.04.2018	Out	78°38'2	16°75'2	outflow	1.535	2.304	0.083	0.009	2.295
25.04.2018	Out	78°38'2	16°75'2	outflow	2.047	1.814	0.096	0.013	1.801
25.04.2018	NC	78°38'3	16°59'4	glacier ice	0.085	0.928	0.038	0.008	0.92