Supplementary Material

1 Supplementary tables

Supplementary Table 1: Correlation coefficients after Spearman's rank correlation of environmental parameters at ice stations. Temp: temperature, Sal: salinity, Chl *a*: chlorophyll *a* ice; Ice thick: ice thickness; Snow thick: snow thickness; Btm depth: bottom depth; light blue: correlation coefficient > 0.8; light grey: excluded parameters for PCA analysis; black: included parameters in PCA

Environmental parameter	Temp	Sal	Chl a	Ice thick	Snow thick	Btm depth
Temp		-0,50	0,09	0,40	-0,92	0,69
Sal			-0,57	-0,08	0,21	-0,14
Chl a				0,59	-0,28	0,46
Ice thic					-0,63	0,94
Snow thick						-0,82
Btm depth						

Supplementary Table 2: Correlation coefficients after Spearman's rank correlation of environmental parameters at SUIT stations. Temp: temperature; Sal: salinity, Chl *a*: chlorophyll *a* surface water; Ice thick: ice thickness; Ice cover: ice coverage; Btm depth: bottom depth; Ridge dens: ridge density; light blue: correlation coefficient > 0.8; light grey: excluded parameters for PCA analysis; black: included parameters in PCA

Environmental parameter	Temp	Sal	Chl a	Ice thick	Ice cover	Btm depth	Ridge dens
Temp		0,72	-0,97	0,92	-0,79	-0,59	-0,15
Sal			-0,93	0,74	-0,73	-0,91	-0,70
Chl a				-0,89	0,86	0,85	0,44
Ice thick					-0,72	-0,61	-0,22
Ice cover						0,82	0,38
Btm depth							0,70
Ridge dens							