

Supplementary material

Table S1: Table containing station names, sampling dates, snow depth, ice thickness, daily incoming average irradiances (PAR_{24}), % transmission (through ice for ice covered stations or surface waters for open water stations) and the water column diffuse attenuation coefficient (K_d). Stations were either ice covered or open water designated by IC and OW respectively. Na defines “not available”.

Station	Ice cover /open water	Date	Snow [cm]	Ice [cm]	PAR_{24}	% Transmission	K_d
IS	IC	28.04.17	7-8.5	57	241	2.4-2.6	Na
IM	IC	28.04.17	19	55	241	1.1	Na
MS	IC	09.03.17	8	29	31	5.8	Na
MS	IC	07.04.17	4-8	49	220	1.9-4.3	Na
MS	IC	23.04.17	3-3.5	55	408	4.9-5.4	Na
MS	IC	23.04.17	19-20	55	408	1.1-1.2	Na
MS	IC	02.05.17	0	52	281	26.4	Na
MS	IC	02.05.17	20	52	281	2.5	Na
Vmf1	IC	07.04.17	5-6	44	220	2.5-3.3	Na
Vmf1	IC	30.04.17	15-16	40	355	3.0-3.2	Na
Vmf2	IC	26.04.17	3.5-5	40	498	2.7-3.8	Na
Vmf2	IC	26.04.17	26-27	40	498	0.5-0.6	Na
Vmf1	OW	23.08.17	Na	Na	281	92.2	0.9
Vmf3	OW	13.03.17	Na	Na	43	61.4	0.1
Vmf4	OW	13.06.17	Na	Na	342	48.9	0.2
Vmf4	OW	23.08.17	Na	Na	171	63.4	0.3
Vmf5	OW	14.03.17	Na	Na	54	61.4	0.1

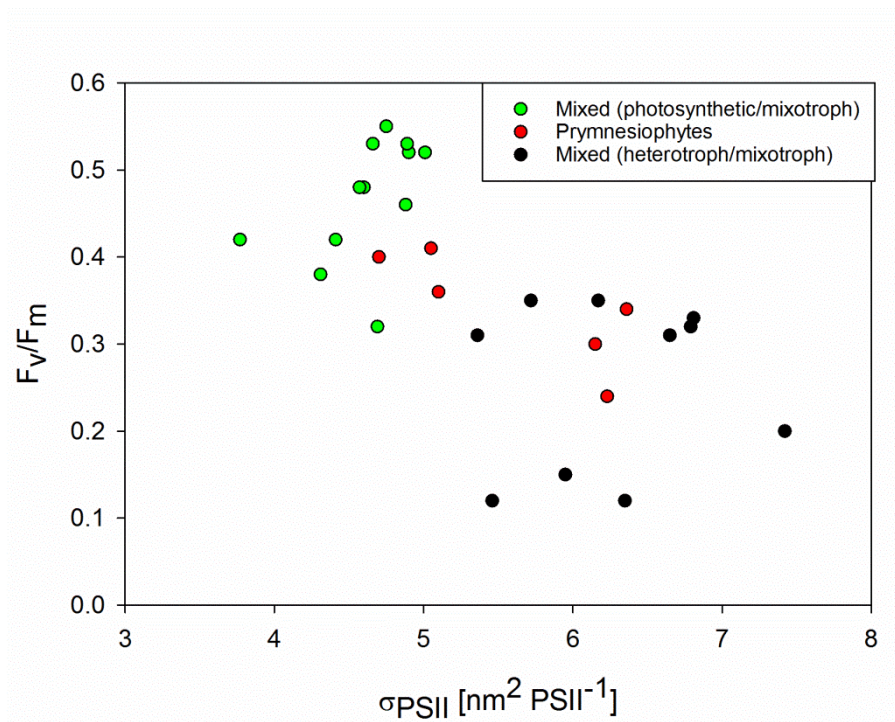


Fig. S1: Maximum dark-acclimated quantum yield of PSII (F_v/F_m) and the absorption cross-section of PSII (σ_{PSII} [$\text{nm}^2 \text{PSII}^{-1}$]) of different pelagic algal assemblages; (i) mixed community between photosynthetic species (diatoms and *Phaeocystis pouchetii*) and mixotrophic species (dinoflagellates), (ii) communities dominated > 80 % *Phaeocystis pouchetii*, and (iii) mixed community consisting of heterotrophic and mixotrophic species.

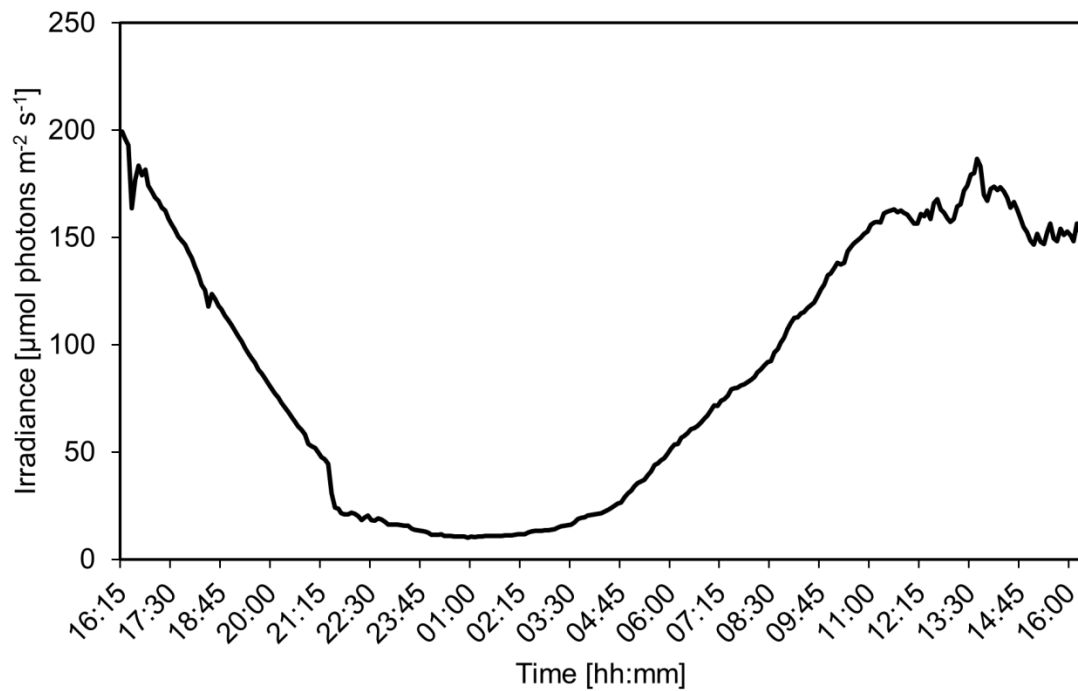


Fig. S2: Irradiance regimes during the *in situ* incubation experiment (1st of May – 2nd of May) conducted underneath the sea ice in Van Mijenfjorden, 2017.