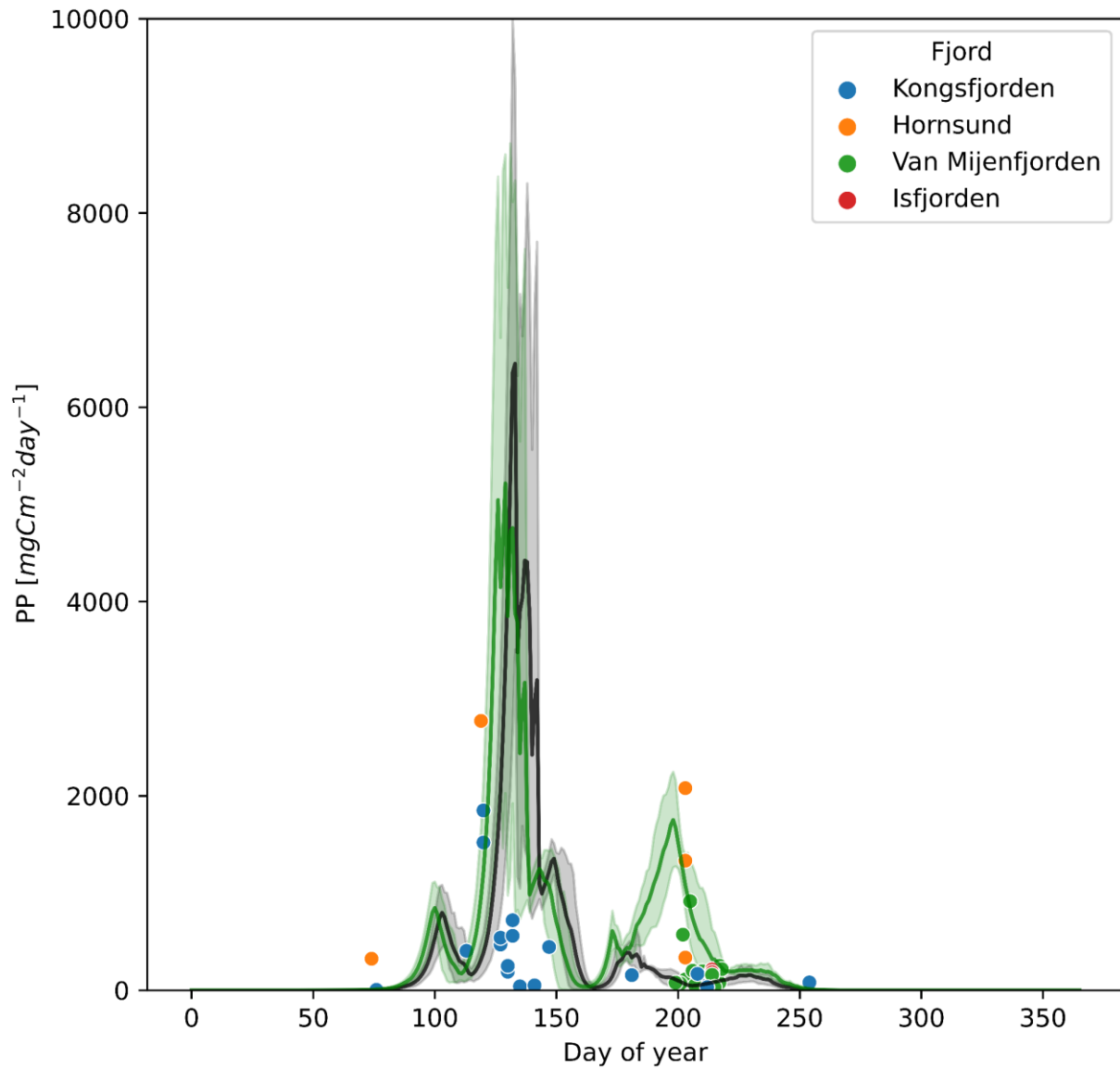


Sup. Fig. The differences in daily average air temperature (AT), and daily precipitation between the inner and outer fjord based on ERA interim reanalysis (Dee et al., 2011).

Table 1 Variables used to create the assessment and parametrization datasets, and for iSPM simulations

iSPM reconstruction	iSPM in simulation results	iSPM input to the model	Parametrization of iSPM input
SPM measurements annual sum of PDD	$dC_{iSPM}/dt = C_{iSPM} + C_{iSPMinput}$ general system dynamics	Parametrization 6accPDD (Polish Polar Station) Salinity (from Jakacki et al., 2018)	Sediment Flux measurements 6accPDD (Polish Polar Station) Salinity measurements



Sup. Fig. Comparison of pelagic primary production from the modeling (station H3, black - iSPM scenario, green - noSPM scenario; average for 2005-2009 with standard deviation) and field studies as reported by Hodal et al., 2012 (Kongsfjorden), Iversen and Seuthe 2011 (Kongsfjorden), Piwosz et al., 2009 (Kongsfjorden and Hornsund), Eilertsen et al., 1989 (Kongsfjorden, Isfjorden, Van Mijenfjorden and Hornsund).