Modeling phytoplankton biomass (chlorophyll a) during fall and winter of 2001 and 2002 at 64o and 68o S in coastal waters west of the Antarctic Peninsula

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Phytoplankton concentration in the fall and winter is a crucial parameter to estimate food availability for krill larvae during periods of ice coverage (March to August). Field sampling indicates a dynamic exchange between ice formation and decay and suspended algae resulting in cells being entrained into ice to become the sea ice microbial community (SIMCO). Due to the inability to estimate chlorophyll via remote sensing during periods of low sun angle, we propose modeling as the best tool to estimate phytoplankton during this time period. We have modeled chlorophyll a from primary production based on irradiance, photosynthetic efficiency and day length for areas around Anvers Island (64o S) and Marguerite Bay (68o S). The model was parameterized with estimates of photosynthesis vs irradiance response, mixed layer depth and euphotic zone depth obtained during the 2001 and 2002 Palmer LTER and SOGlobec field seasons. Loss terms include macro- and micro-zooplankton grazing. The model is constrained with weekly measurements of chlorophyll a (which show large interannual variability). Grazing estimates of krill larvae based ….

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