



IV ROSS SEA CONFERENCE 2023

Università degli Studi di Napoli "Parthenope"

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Topic: Biogeochemistry

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ABSTRACT Subject :

Phytoplankton seasonal cycle and carbon export in the Ross Sea: A modeling study

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A previous modeling study that used a one-dimensional biogeochemical model implemented for the Ross Sea showed that the temporal progression of blooms of the haptophyte *Phaeocystis antarctica* and diatoms is sustained by dissolved iron (dFe) supplied by sea ice, benthic and Circumpolar Deep Water sources, and light availability, which is moderated by sea ice. This modeling study extends the one-dimensional biogeochemical model to the Ross Sea shelf. The biogeochemical model is embedded in a three-dimensional coupled circulation-sea ice-ice sheet model implemented for the Ross Sea. The expanded model allows simulation of the space and time progression of *P. antarctica* and diatom blooms and identification of the processes that govern these blooms. Initial simulations consider the effect of opening of the polynya and winter recharge of surface dFe concentrations on spring phytoplankton blooms. Preliminary results suggest the opening of the polynya enables early availability of light, which coupled with enhanced dFe concentrations, favors *P. antarctica* dominated blooms in the spring. Simulated bloom progression along across-shelf transects shows the relative importance of dFe and light availability in controlling the phytoplankton assemblage in the western and eastern Ross Sea, with implications for patterns of primary production in different regions of the Ross Sea.

