

Physiological limitation of phytoplankton photosynthesis in the Amundsen Sea, Southern Ocean

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The phytoplankton physiological parameters were measured by Fluorescence Induction and Relaxation (FIRe) system in the Amundsen Sea (west Antarctic) in early (2013/2014) and late (2011/2012) austral summer during the Korea Antarctic research cruises. These cruises were conducted as a Korea Polar Research Institute (KOPRI) Amundsen project. Three ice shelves, such as Dotson, Getz, and Pine Island Glacier, and two polynyas (Amundsen and Pine Island) belong to the study area. The FIRe physiological parameters provide an express diagnostics of the effects of environmental factors, including iron limitation, on photosynthetic processes. On-board FIRe measurements showed that the quantum efficiencies of photosystem II (Fv/Fm) in near-surface phytoplankton were highly variable both in space and time. To demonstrate that iron limited responses of natural phytoplankton assemblages, we carried out iron assimilation experiments (during more than seven days) at four different sites (open sea, outer shelf, polynya center, and front of ice shelf, respectively). Possible implications of iron limitation and controlling factors of phytoplankton growth in this polynya system are discussed.

Keywords: phytoplankton physiology, Amundsen Sea

Poster presentation