

Massive phytoplankton blooms in the Amundsen polynya, Southern Ocean

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As a Korea Polar Research Institute (KOPRI) Amundsen project, three times intensive Antarctic cruises were conducted in the Amundsen Sea (west Antarctic) in early (2010/2011 and 2013/2014) and late (2011/2012) austral summertime. The study area includes Amundsen polynya which is one of the most productive and high chlorophylls (both in directly observed and satellite induced ocean color data) are concentrated coastal polynya among 37 Antarctic polynyas. Interestingly, the high chlorophylls were concentrated in polynya center rather than in the edge of polynya at all time (regardless of season). To understand these high blooms of phytoplankton in iron limited environment (expected), the phytoplankton physiological parameters were measured by Fluorescence Induction and Relaxation (FIRe) system. In addition, we carried out iron assimilation experiments on board to demonstrate that iron enrichment responses of natural phytoplankton assemblages. Moreover, to double-check the influence of physical effect of the study area, we also observed and analysed the mixed layer depth and euphotic depth, and so on. Possible implications of iron/light limitation and controlling factors of phytoplankton growth in this polynya system will be discussed.