

## Catastrophic reduction of sea-ice in the Arctic Ocean - its impact on the marine ecosystems in the polar region-

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The sea-ice in the Arctic Ocean has dramatically reduced during the past decade. The drastic sea-ice reduction would cause a complicated and difficulty to understand the perspective on marine ecosystem surrounding the Arctic Ocean, because disadvantage phenomena such as ocean acidification and advantage phenomena such as improving light condition for primary producers, respectively, are simultaneously progressing. We have investigated the response of marine organisms caused by catastrophic sea ice reduction in the Chukchi Sea and Northwind abyssal plain at where the sea ice reduction has progressed most seriously in the Arctic Ocean. The aims of our study are No.1 to understand temporal changes in primary production, No.2 to understand the physiological response of marine phyto and zooplanktons having carbonate tests on warming or freshening associated with sea ice melting, No.3 to develop a new model for marine ecosystems in the Arctic Ocean, to reproduce the primary production by using the model and to understand the response of marine ecosystems on the environmental changes caused by rapid sea-ice reduction. In this presentation, we will show an overview of this project composed of three sub-themes, Observation, Culturing, and Modeling. For the observation, we will show a seasonal change in biogenic components flux obtained at the Northwind abyssal plain by a year round time series sediment trap system and seasonal change in dissolution of pteropod tests due to the seasonal change in the ocean acidification. We will also show the potential mechanism of high biogenic fluxes found in the beginning of the sea-ice season using the original Arctic Ocean ecosystem model. For the culture experiment, the physiological response of *Emiliana huxleyi*, coccolithophorid strain on the environmental changes caused by sea-ice melting will be presented.

Keywords: Arctic Ocean, Biogenic particle, Eddy, Ocean acidification, Coccolithophorid