



Temporal and spatial analysis on phytoplankton phenology in the Ross Sea Polynya (RSP) based on multi-temporal MODIS data

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The Ross Sea continental shelf containing the Ross Sea Polynya (RSP) is the most productive region among the shelves around Antarctica. Thus, the RSP plays an important role in changing various trophic level organisms due to the high productivity there. However, in recent years, the RSP has undergone the significant changes related to climate change. It is, therefore, necessary to understand the ecological changes in the RSP in response to the global-scale changes. Accordingly, this research aims to parameterize the characteristics of chlorophyll phenologies in the RSP derived from the MODIS chlorophyll concentration data and to investigate the effects of various physical forcings, modulated by climate change, on the phenologies. In this research, the main approaches are the adjusted Gaussian fitting method and multi-linear regression (MLR) model. The accurate determination of the chlorophyll phenology from the discontinuous and spatially sparse MODIS ocean color data is subject to considerable difficulty. In order to overcome the problem, the adjusted Gaussian fitting method was used to extract the appropriate chlorophyll phenology and to estimate the parameters related to the peak and the timing of the chlorophyll blooms. In addition, using MLR, we assessed how the physical forcings (temperature, wind, etc) affect the annual variation of the parameters extracted from the chlorophyll phenology to describe the characteristics of the chlorophyll bloom in the RSP.