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PROGRAM•ABSTRACT

P-3-2

Long-term monitoring of marine ecosystem at King Sejong station in King George Island, Antarctica

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Microalgal assemblages at surface along with water temperature, salinity, and macronutrients were monitored daily from January to December at a fixed coastal site in Marian Cove, King George Island from 1996 to 2008. The annual mean water temperature ranged from -0.48 to 0.49 °C, whereas the annual mean salinity was from 32.5 to 34.3. In general, the temperature of the surface water at the site was highest (1.18 ± 0.36 °C) during the summer period (December to February) and lowest (–1.53 ± 0.22 °C) during the winter period (July to September). The salinity had an opposite trend with lowest (32.8 ± 0.68) during the summer and highest (33.7 ± 1.15) during the winter. The total chlorophyll-a generally started increasing from late November and had a peak (0.87 ± 0.32 mg Chl-a m^{-3}) at around January-February when the water temperature is warmest in a year. Within the phytoplankton communities, small phytoplankton < 20 μm contributed more than 60 % of biomass. However, there are not distinct large blooms of the phytoplankton biomass all around the year. Although there were some seasonal fluctuations, the concentrations of major nutrients were always high enough for the phytoplankton growth, indicating the nutrients are not a main controlling factor in their growth in the region.

P-3-3

Population dynamics of an ice-associated diatom, *Thalassiosira australis* Peragallo, under fast ice near Syowa Station, East Antarctica, during austral summer

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Little information on life histories of ice algal diatoms, which develop dense populations under fast ice in Antarctic coastal areas, is available. Diatoms form auxospores to restore the cell size through the sexual phase after several binary fissions, which reduce the cell size. Resting spore formation is induced to tolerate extremes of environmental conditions. We investigated the population dynamics of *T. australis*, including auxospore and resting spore formation, under the fast ice near Syowa Station in austral summer. A clear shift from vegetative cells to auxospores and resting spores in *Thalassiosira australis* was observed in the water column. Active vegetative growth would result in cell size reduction and initiate auxospore formation. Resting spore formation would have been resulted from the nutrient depression or low light condition under the ice. Resting spores were observed in the sediment through the investigation period even before new spore formation, suggesting that *T. australis* can overwinter in the sediment. Heterotrophic dinoflagellates ingested and digested vegetative cells and auxospores but did not digest resting spores. This suggests that grazing by heterotrophic dinoflagellates influence the dynamics of vegetative cells and auxospores but that of resting spores. We discuss the possible life history and overwintering strategy that *T. australis* uses in an Antarctic coastal area to cope with the unpredictable timing of sea ice growth and decay.