

南極海季節海水域における海洋炭酸系の動態

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CO₂ dynamics of seawater in the seasonal ice zone in the Indian sector of the Southern Ocean

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The oceanic observations for the partial pressure of CO₂ (pCO₂) in the surface water and the vertical profile of the carbonate systems were performed in the Indian sector of the Southern Ocean (64–67°S, 33–56°E) in January 2006 to understand spatial and temporal CO₂ dynamics of seawater in the seasonal ice zone (SIZ). The pCO₂ in the surface water were from 275 to 400 μatm, and there were longitudinal variations dominated by the change of the water temperature and the dilution by sea ice melt water in the area of 33–40°E and by the biological productivity in the area of 40–56°E. Based on the data from the vertical profiles of the carbonate system parameter in the temperature minimum layer, the winter to summer evolution of the pCO₂ in the surface water was examined. Results indicated that the seasonal increase of the pCO₂ in the surface water was mainly demonstrated by the increase in the water temperature during the winter to summer period while the subsequent biological productivity likely led to decrease the pCO₂ in the surface water in SIZ.

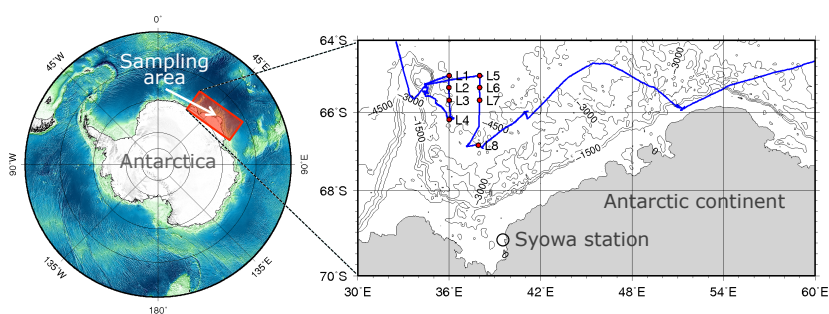


Figure 1. Geographic location of sampling stations and cruise track in the Indian sector of the Southern Ocean.

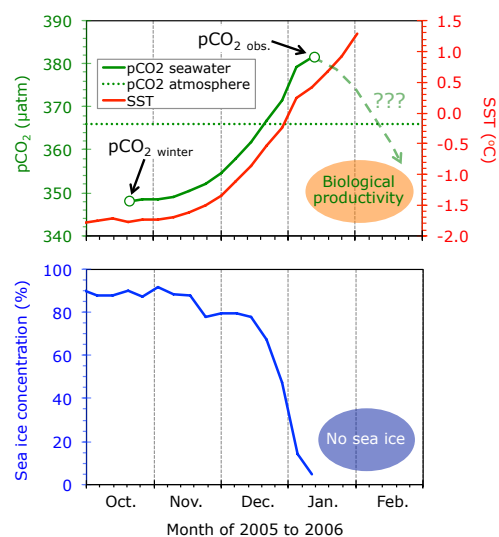


Figure 2. Seasonal evolutions of pCO₂ and temperature in the surface water (upper) and sea ice concentration (bottom).