

大気から海水表面への窒素供給過程

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Incorporation of dissolved inorganic nitrogen into sea ice from atmosphere

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Temporal measurements of temperature, salinity, oxygen isotopic ratio ($\delta^{18}\text{O}$) and inorganic nutrient concentrations at Saromako Lagoon, southern Sea of Okhotsk, were made in February-March 2008 to examine the incorporation processes of dissolved inorganic nitrogen (DIN) into the sea ice from the atmosphere via snowfall. Granular ice comprised more than half of the ice thickness and the snow fraction of the snow-ice layer at the top of the ice ranged from 1% to 47%. High concentrations of NO_3+NO_2 and NH_4 (DIN) were found in the snow and snow-ice throughout the study period. It is likely that these high nitrogen levels were due to the close proximity of the study site in northern part of Japan to the east coast of the Asian continent. From there, particulate pollutants containing high NO_3 and NH_4 concentrations were brought and deposited as snowfall over sea ice in the southern part of Okhotsk Sea. Compared with NO_3+NO_2 and NH_4 concentrations, PO_4 concentrations in the snow and snow-ice were low. The strong correlation between the NO_3+NO_2 and NH_4 concentrations in the snow-ice and the snow fractions indicates that the nutrient status (e.g. DIN at the top of sea ice) was mainly controlled by the snow contribution to the sea ice when snow-ice dominated. Our results indicate that chemical cycles in sea ice can be affected by polluted precipitation (snow) originating from non-polar sea.