

宗谷海岸の湖沼生態系

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Limnology and ecology of lakes along the Sôya Coast, East Antarctica

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The Sôya Coast in East Antarctica has several ice-free areas where many small (<1 km²) and shallow (<50-m depth) glacial lakes display various limnological features, such as coastal lagoons on raised beaches (from hyper saline waters to freshwaters), meromictic lakes, cold monomictic lakes on hill sides, ephemeral shallow lakes, ice-dammed lakes and perennially ice-covered lakes near glaciers, and so on (Fig. 1). Most of the lakes are oligotrophic; however, water quality, such as salinity, is highly variable depending on differences in water balance, morphometry and lake history. Most of the lakes appeared after the Last Glacial Maximum (LGM) and have since maintained a lacustrine condition. The ubiquitous occurrence of benthic microbial assemblages with low phytoplankton biomass is a feature common to other Antarctic lakes; however, diverse benthic assemblages such as ‘moss pillars’ and some large pinnacle microbial structures were found on the lake basins. Frequent limnological studies have revealed three typical water circulation patterns and underwater light climate features, and the structure of benthic assemblages is based on their photosynthetic physiology. Using the limnological parameters which were continuously recorded by means of mooring data-logger arrays in two Skarvsnes lakes, Oyako Ike, Naga Ike, and a lake in Langhovde, Nurume Ike (Fig. 2), as well as meteorological data recorded by automatic weather stations installed beside lakes, limnological and ecological events can be explained (Limnological and meteorological data were available in References). For example, relationships between seasonal changes of underwater light climate, water circulation and planktonic blooms on the hypolimnion in a meromictic lake, and the phenomenon of mass floatation of benthic assemblages was observed in a freshwater lake during the ice-covered season; this was explained by seasonal environmental conditions; thus, a hypothesis was formulated based on ecological matter cycling, eutrophication, and lake succession processes.

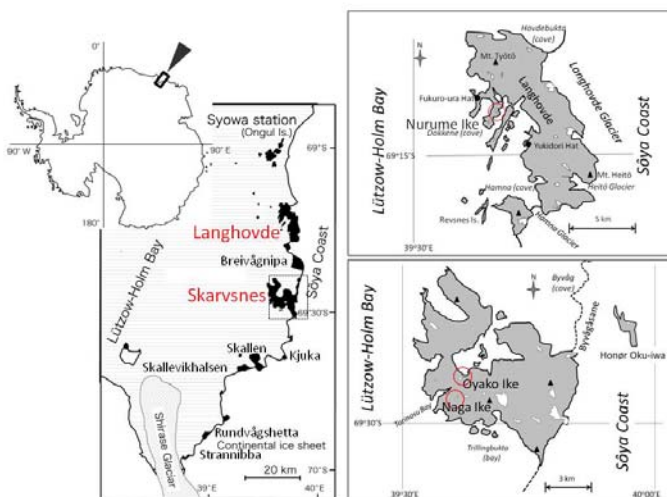


Figure 1. Maps of ice-free areas in Sôya Coast (left) and studied lakes in Langhovde (right-upper), and Skarvsnes (right-lower)

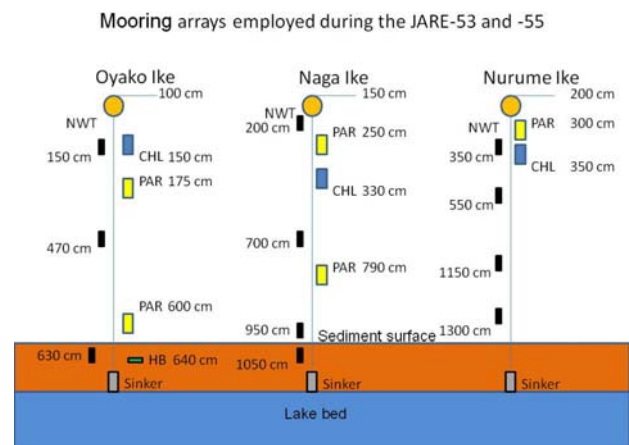


Figure 2. Designs of mooring arrays set in Oyako Ike (left), Naga Ike (center), and Nurume Ike (right).

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