

MICROALGAE IN FIRST-YEAR SEA-ICE OF SAROMA KO LAGOON:
SPATIAL HETEROGENEITY AND ESTIMATION OF BIOMASS
BY AN IRRADIANCE INDEX (ABSTRACT)

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We studied the horizontal distribution of sea-ice microalgae in Saroma Ko lagoon (Hokkaido, Japan) in March 1992. Three scales of variation were investigated. Cores were taken every 20 m along a 4-km transect from the Saromabetsu river mouth towards the eastern inlet of the lagoon. Two sampling grids were used to complete the study of spatial heterogeneity. The first grid was 10 × 10 m with an ice core every meter. The second grid was 1 × 1 m with an ice core every 20 cm. Two scales of chlorophyll *a* variability dominated along the transect at about 500 m and 100 m. The results for the transect are confirmed by the grids which presented no evidence of substantial variations in chlorophyll *a* biomass at scales inferior to 20 m. The relationship between salinity of the bottom ice and chlorophyll *a* was not linear but dome-shaped with a maximum in chlorophyll *a* at intermediate salinities.

The efficiency of irradiance ratios in predicting microalgal biomass was also tested. Ratios of irradiance showed spatial changes along the transect that appeared related to the salinity of the bottom ice but also to daily variations in the intensity of incident irradiance. The ratio 677/595 nm seemed the most promising for the estimation of microalgal biomass although the coefficient of multiple correlation was low (0.73). Thus, the biomass of microalgae remained difficult to estimate from an index of irradiance in Saroma Ko lagoon, in part because of the spatial gradient in salinity prevailing in the lagoon.

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