

Ice cover monitoring on Lake Saroma Using ERS-1 SAR

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Abstract

In order to confirm an effectiveness for SAR to monitor sea ice in the Sea of Okhotsk, the ground truth data associated with SAR data onboard the ERS-1 and the JERS-1 were acquired for four consecutive years (1993-1996). Lake Saroma had been chosen as a test site for this field observation, because this lake is a salt water lake connected to the Sea of Okhotsk, and the ice cover on this lake is considered to be first-year ice with the same salinity as the sea ice in the open sea. The ice cover on the lake was thick and stable enough to collect ground truth data. The ground truth data from sampling sites, where were chosen to cover various ice thickness with the same surface conditions, have been acquired during observations. By comparing the backscattering coefficient derived from SAR data with the ice physical data, the following interesting results were obtained: (1) The ice layer structure, the salinity profiles, and the ice surface conditions of the ice cover on Lake Saroma were found to be similar to those of thin first-year ice observed in the Arctic region; (2) The observed backscatter of ERS-1 was about 7 dB higher than that of JERS-1 and the backscatter range of ERS-1 was about three times as large as that of J-SAR; (3) The backscatter values observed by ERS-1 and JERS-1 were correlated to the ice thickness. It is assumed that the backscatter from the ice cover is mainly dominated by the ice surface scattering.