

A STUDY OF FREQUENCY DEPENDENCE OF ELECTRO-
MAGNETIC WAVE ALBEDO FOR SEA ICE: ANALYSIS
BY MULTI-LAYER MODEL (ABSTRACT)

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A calculation method is derived as part of a study for developing a technique to detect salt density distributions in the sea ice. In this method, the distribution of salt density along the ice depth is approximated by a set of layers with different thicknesses and salt densities, and the power albedo for the electro-magnetic waves, reflected from the sea ice, is described analytically as a function of the relative complex permeability and the thickness of each layer, as well as the incident wave frequency.

The method is applied to the study of the influence of the salt density distributions on the power albedo frequency dependence. The frequency dependence of the calculated albedo can be seen in the form of a diffraction pattern. The influence is observed as a remarkable difference in the diffraction pattern in the frequency range from 1 MHz to about 100 MHz.

It is concluded that the proposed method can be an effective tool to analyze salt density distributions in sea ice, and that data evaluation, as well as data collection, of the complex permeability for actual sea ice is necessary for future application of the proposed method.

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