

NUMERICAL ANALYSIS OF THE ECHO OBTAINED BY A RADIO ECHO SOUNDER (III) (Abstract)

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We have analyzed the echo obtained by a radio echo sounder near the Shirase Glacier and the Yamato Mountains, and got the temperature profile in the ice sheet. In this paper, we show the analytical results of the echo near the ground in the ice sheet. But, as the shape of the echo is not in agreement with the theoretical value and observed value, the boundary condition of the ice sheet near the ground must be considered. 1) The boundary layer of the ice sheet near the bottom has cracks caused by a flow of the ice sheet. 2) This boundary layer contained fragments of aerolite and bedrock. 3) The temperature profile near the bottom in the ice sheet has a large gradient. 4) The reflection from the ground under the ice sheet. 5) The reflection from the boundary layer that is nearly in the condition of pressure melting point. Under these conditions, analysis was made by using the effective assumption 2) or 5) on the boundary layer assumption. In this case we have calculated the rate of the fragments of aerolite or bedrock as the parameter of the depth at the melting layer.

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MICROWAVE PROPERTIES OF PURE-ICE AND SEA-ICE OBSERVED BY RADIOMETER (Abstract)

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It is important to study radiative properties of sea-ice in the microwave region in order to identify sea-ice from sea-water or glacier bed in the polar region and to discuss the usage of microwave radiometer for measuring sea-ice thickness and coverage of sea-ice in the polar region. Field observations were carried out for studying radiative properties of sea-ice at Lake Saroma in the western part of Hokkaido, and of pure-ice at our Institute for comparison with the data of sea-ice. Computations of three layers model also were introduced for considering the emissivities of sea-ice and pure-ice.

The results of the field observations and computations are the following: (1) The field observational data of pure-ice were in good agreement with the result of the computational model and the value of emissivity of pure-ice fluctuated periodically with increasing ice thickness while its thickness was less than 15 mm. (2) On the other hand, the field observational data of sea-ice were not in good agreement with the result of the model. This is because it is very difficult to determine accurate dielectric constant for many types of sea-ice and the sea-ice shows anisotropy for electric waves and inequality for salinity.

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