REMOTE SENSING OF SEA ICE BY AIRBORNE AND SATELLITE-BORNE IMAGING RADARS (ABSTRACT)

Ken'ichi OKAMOTO[1] and Hideyuki INOMATA[2]

[1]*Kashima Space Communication Center, Radio Research Laboratory, 893–1, Hirai, Kashima-machi, Ibaraki 314*
[2]*Radio Research Laboratory, 2–1, Nukui-Kitamachi 4-chome, Koganei-shi, Tokyo 184*

Principles of remote sensing of Arctic sea ice by airborne real and synthetic aperture radar (SAR) are shown with some examples of Beaufort Sea ice images obtained by 9350 MHz SAR on board the Convair-580 airplane at Canada Center for Remote Sensing. The finger raftings between new ices are clearly observed and the image of the ice island T3 surrounded by the multi-year ice floes is also clearly observed.

The Seasat satellite-borne SAR images of pack ice in the Beaufort Sea are also shown with the leads between ice floes and ridging and rafting of floes. Drift motion of the small ice island calved from the ice shelf on Ellesmere Island was imaged by the Seasat SAR on 20 separate passes. During the 80-day period, the ice island traveled circuitously approximately 435 km, an average of 5.4 km per day.

Since the remote sensing of Antarctic sea ice by the airborne SAR or the real aperture radar has not yet been performed, the proposal to introduce the airborne imaging radars for the remote sensing of the Antarctic sea ice is presented. The 9530 MHz airborne real aperture radar system under development by Radio Research Laboratory is introduced showing its potential to the remote sensing of sea ice off the coast of the Hokkaido district.

The satellite-borne SAR projects, such as SIR-B′, RADARSAT, ERS-1 and Japanese ERS-1 are introduced. Especially the experiment planned by the 27th Japanese Antarctic Research Expedition by using the cubic corner reflector with a length of 1 m in the experiment of SIR-B′ to be conducted in February 1987 is introduced.

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SURVEY OF SNOW COVER BY MICROWAVE RADIOMETER AT ISHIKARI IN HOKKAIDO (ABSTRACT)

Makoto WADA[1], Takashi YAMANOUCHI[1], Kazuo FUJINO[2], Masahiro SUZUKI[3] and Tadashi MATSUMOTO[3]

[1]*National Institute of Polar Research, 9–10, Kaga 1-chome, Itabashi-ku, Tokyo 173*
[2]*Institute of Low Temperature Science, Hokkaido University, Kita-19, Nishi-8, Kita-ku, Sapporo 060*
[3]*Hokkaido Institute of Technology, 419–2, Teine-Maeda, Nishi-ku, Sapporo 061–24*

Survey of snow cover was carried out from 29 to 30 in January 1985 on the ground of a junior high school at Ishikari near Sapporo. A 19.35-GHz microwave radiometer, an infrared thermometer and a thermister thermometer for measuring snow surface temperature were set there from 1200 LST on 29 to 1200 LST on 30 January. The depth of snow cover was 107 cm and water equivalent of it was 31.5 g/cm^2, and the both values were kept constant mostly during the

survey period. Although the infrared data showed a remarkable peak around midnight, the microwave data did not. It suggests that the microwave data do not always depend on the infrared data which are said to measure the surface physical temperatures. Another experiment to survey the relationship between water equivalent and brightness temperature by microwave was made on 30 January. The result showed that brightness temperature increased with increase of water equivalent. However, a field experiment at Moshiri in 1983 showed an opposite result, that is, brightness temperature decreased with increase of water equivalent. It is not definite but most likely that the difference between the two results is caused by the difference of the condition of the ground under snow cover.

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DISTRIBUTION OF SURFACE MORPHOLOGICAL FEATURES OF THE ICE SHEET, EAST QUEEN MAUD LAND, ANTARCTICA (ABSTRACT)

Yoshiyuki FUJII

National Institute of Polar Research, 9–10, Kaga 1-chome, Itabashi-ku, Tokyo 173

Surface morphological features of the ice sheet of the East Queen Maud Land were observed visually from an oversnow vehicle along the routes from 0 to 3400 m a.s.l. The oversnow traverse was conducted from October to December 1984. Surface features were morphologically classified and described with the areal ratio of each feature. The distributional boundaries were recorded with a resolution of 10 m.

The distribution of surface features in the area above dry snow line below 3400 m is characterized as follows. 1) The ice sheet surface is divided into three altitudinal zones. 2) The region above dry snow line (700 m) to 1800 m: Smooth surface develops because of high snow accumulation. 3) The region above 1800 m below 2400–2800 m: Rough surface composed of lager scale sastrugi more than 30 cm in height develops. This region is in the active stage of deposition-erosion process of snow. 4) The region above 2400–2800 m to at least 3400 m: Glazed surface composed of multi-layered ice crust dominates. Because of the long-term absence of snow accumulation and sublimation on the glazed surface, area of negative mass balance, is extensive.

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