FIELD OBSERVATIONS OF MICROWAVE RADIOMETRIC PROPERTIES OF SNOW COVER IN JAPAN BY MEANS OF PASSIVE RADIOMETERS (Abstract)

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For the studies of snow and ice in the polar regions, microwave remote-sensing from both aircraft and spacecraft is becoming indispensable. A major goal of the present study is the use of airborne microwave radiometers in the Antarctic region. However, difficulties inhere in the studies of electric properties of the snow cover in the range of microwave band, because the snow cover is an aggregate of ice crystals, air, water and sometimes dust particles. A dual-microwave radiometer for aircraft use was constructed, which is the Dicke's type with 12.00 GHz and 19.35 GHz. Before introducing into it the Antarctic, a series of field observations of the snow cover in Japan have been carried out since 1981. According to the result of the wet snow observations in 1981 and 1982, the brightness temperatures showed an inverse relationship with the liquid-water content in the surface snow layer. Snow depth and the ground soil conditions gave little effect on the brightness temperatures.

For the use of the radiometers in the dry snow area, experiments were carried out in northern Hokkaido, Moshiri district, in January-February 1983. Air temperatures were $-10\sim-25$°C and no melting was observed during the experiments. The radiometers were set 2 meters above the snow surface and the snow cover depth was changed artificially. This gave the decrease in the surface brightness temperature with the increase of snow depth up to about 2 meters or less than 100 g·cm^{-2} in water equivalent. Accordingly, when the snow cover depth is thin, the effects of the ground in terms of penetration depth of microwave were obvious. The present studies are preliminary in nature, but the internal and intrinsic properties of dry snow are important to determine the emissivity of the snow cover.

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SNOW STRATIGRAPHY MEASURED WITH AN ACTIVE MICROWAVE SYSTEM (Abstract)

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Measurements were carried out for dry and wet snow-packs in the field and also in the laboratory, using an active microwave system to determine the stratigraphic layering of the snow-pack.