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RELATION BETWEEN THE SPECIAL RADAR ECHO FROM WITHIN THE ICE SHEET AND THE CONFIGURATION OF THE GROUND (III): ESTIMATION OF TEMPERATURE PROFILE IN THE ICE SHEET (ABSTRACT)

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To measure temperature profiles directly in the huge ice sheet in Antarctica is very difficult. Therefore, we introduce the possibility of estimation of temperature profiles in the ice sheet using the data from two radars for ice which have frequencies 60 and 179 MHz. Since a temperature profile was measured directly at Mizuho Station, the temperature profile there was estimated using the data of two radars. It is surmised that in the ice sheet the gradient of temperature with depth is constant and the density of ice is also constant.

The calculation was done for depths above 500 m depth below surface. From the assumption above the values of temperature gradient with depth and surface temperature can be estimated using the data of two radars which have different frequencies. Comparing the surface temperature from direct measurement with that from estimation using the radar data, the difference was about 5°C.

Moreover, the temperature difference at 500 m depth between both methods was about 4°C. Hereafter, it is necessary to improve the above assumption and to estimate temperature profiles using data of two radars at other positions.

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