find the high temperature water mass along 100°W and the low temperature water mass along 135°W. The reason for the appearance of such different water masses can not be explained clearly, but we infer that the distributions of anticyclonic and cyclonic circulations are influenced by the circumpolar current related to the bottom topographical relief.

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THERMAL OSCILLATION IN AN ICE-COVERED OCEAN (Abstract)

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An analytical model of ice-covered ocean is presented to interpret the thermal oscillation in a numerical model of the Arctic Ocean described by SAKAI and IMAWAKI (Mem. Natl Inst. Polar Res., Spec. Issue, **24**, 246, 1982). The model is a thermodynamical two-layer one, where the coefficient of the vertical diffusion has two discrete values according to the static stability. The model ocean is driven by three forcings; freshening by the river runoff, cooling through the sea surface, and supplies of heat and salinity from an adjacent basin. The effect of sea ice is parameterized by the surface cooling rate which varies according to the upper layer temperature.

Three qualitatively different solutions are obtained; a stably stratified solution, an unstably stratified solution, and a self-sustained oscillation, where the former two states appear alternately. It is important for the oscillation that the water density nonlinearly depends on the temperature near the freezing point.

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COMPUTER SIMULATION OF THE ICE SHEET IN THE SHIRASE BASIN, ANTARCTICA (Abstract)

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A three-dimensional numerical model is developed to simulate the time variation of the form of the ice sheet in the Shirase Basin, Antarctica. The model is composed of two-dimensional grids on which the mass flux of ice is computed so as to satisfy the equation of the continuity. Local conditions of the flow of ice, particularly the effect of the depth profile of temperature, are considered. Adopting a simple method for calculating the mass flux developed by the same authors (NAGAO *et al.*: Mem. Natl Inst. Polar Res., Spec. Issue, **24**, 192, 1982), procedures of numerical calculations are simplified. Areal grids of 50 km distances covering the basin are used, paying special attentions to the boundary conditions at its margin and glacier tongue.

Results of the calculations show that a nearly stable form of the ice sheet could

be obtained after approximately 10^4 years when started from 1000 m ice thickness all over the basin. The obtained stable surface topography shows its sensitive dependence on the bedrock topography. There appeared a tendency that the bottom temperature of the downstream of the Glacier is higher than the melting point, which may conform the suggested instability of the ice sheet near the central stream line of the Shirase Glacier (S. MAE: J. Glaciol., **24**, 53, 1979).

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ASSUMPTION OF SNOW TEMPERATURE NEAR SHIRASE GLACIER FROM ANALYSIS OF RADIO ECHO SOUNDING DATA (Abstract)

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Radio echo sounding was carried out in 1980 near the Shirase Glacier in East Antarctica. As radar echo intensity observed from a layer depends on refractive index which is a function of density, temperature and depth, intensity is a function of temperature and depth in the region where the density is nearly constant. As temperature is a function of depth, a relationship between temperature and depth was calculated using an intensity of radar echo and a value of surface temperature (actually snow temperature at 10 m depth) which had already been surveyed in a position. The profile of complex dielectric constant and temperature were calculated in other positions where radio echo soundings had been carried out in 1980 using the relationship between temperature and depth. In this calculation $\varepsilon_r=3.168+0.535\times\varepsilon_i$ was supposed when $\varepsilon_i\geqq 5.6\times10^{-3}$ and $\varepsilon_r=5.6\times10^{-3}$ was supposed when $\varepsilon_i<5.6\times10^{-3}$, where ε_r and ε_i were real and imaginary parts of dielectric constant, respectively. As snow temperature near the Shirase Glacier was assumed by these calculations, the comparison between this result and actual measurement in future will be necessary.

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NEUTRON ACTIVATION ANALYSIS OF SPHERULES FROM BARE ICE NEAR THE ALLAN HILLS AND AN ICE CORE FROM MIZUHO STATION (Abstract)

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Spherules contained in the Antarctic ice at two sites are studied in terms of their concentrations of refractory trace elements by means of instrumental neutron activation analyses (INAA). Results of INAA are consistent with those of