surface elevation above sea level. This thick ice, which rarely breaks out, locks a glacier tongue, iceberg tongues, and many isolated icebergs in the western Lützow-Holm Bay.

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BRINE EXCLUSION AND SEA ICE SALINITY (Abstract)

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The exclusion process of brine from growing sea ice has been quantitatively studied under various ice growing conditions in the field and laboratory. With a decrease in ice growth rate the salinity of brine increases markedly but its volume flux decreases. Consequently, the salt flux decreases with decreasing ice growth rate, and hence the amount of salt excluded depends largely upon the volume rather than the salinity. The total volume of brine excluded during the ice formation process increases with increasing both growth rate and duration of formation. Change in salinity of sea ice with ice growing conditions can be understood from the above observation results on brine exclusion. A lower salinity in sea ice that took a longer time to grow to a fixed thickness is due to the exclusion of a larger amount of brine with a higher salinity during the ice formation process. Meanwhile, a higher salinity in thick sea ice that formed during a certain period is due to the exclusion of a smaller amount of brine with a lower salinity per unit growth amount of ice during the period. These results suggest that in future the salinity and volume of brine excluded during the formation process of sea ice can be estimated approximately by measuring the formation time, thickness and salinity of the sea ice.

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THE OCEANIC EDDY IN THE SOUTHERN OCEAN (Abstract)

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The object of this study is the analysis of oceanographical structure in the Southern Ocean (south of 50°S) around Antarctica. We deal with 627 oceanographical data including nutrient for the period from 1932 to 1974, provided by the Japan Oceanographical Data Center. In this report the analysis is made only on the Pacific Ocean side from the viewpoint of the ocean current pattern with the use of the dynamical topography and the water mass distributions by T-S diagram.

From the dynamical topography in the Pacific we can find the anticyclonic circulation near 100°W to 90°W and the cyclonic circulation near 135°W. In both areas the water mass analysis is also made by using T-S diagram. The water masses along 100°W have high water temperature, 6°C to 5°C from surface to 150 m depth near 55°S and 3°C to 2°C from surface to 150 m depth near 60°S, whereas the water masses along 135°W show lower temperature, that is, 3°C to 2°C from surface to 150 m depth near 56°S and 1°C to 0°C near 60°S. Namely, we

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