The differences of the transportation process of water vapor to Mizuho Station and the formation process of snow at the station were found between the austral winter and the other seasons. The fallen snow is considered to be formed almost all by an isobaric cooling process under anticyclone in the austral winter, whereas by a moist-adiabatic cooling process of water vapor supplied by circumpolar cyclone in the other seasons.

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OXYGEN ISOTOPE PROFILE IN THE 150 m CORE FROM MIZUHO STATION, EAST ANTARCTICA (Abstract)

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As is well known, oxygen isotopic composition ($\delta^{18}O$) in the cores from the Antarctic and Greenland ice sheets provides important information about paleoclimatic records, though the interpretation of $\delta^{18}O$ values in the cores, especially from the Antarctic ice sheet, is not always easy.

At Mizuho Station core drilling operations have been conducted by the Japanese Antarctic Research Expedition since 1970. The core was recovered from the depth down to 150 m. The $\delta^{18}O$ profile to a depth of 60 m of the Mizuho core was already reported (K. KATO: Mem. Natl Inst. Polar Res., Spec. Issue, **10**, 165, 1978). In the present study was determined the $\delta^{18}O$ profile in the depth range between about 60 m and about 150 m.

Since any dating of the Mizuho core was not carried out, mean annual accumulation of 7 g/cm^2 estimated from $\delta^{18}O$ determination (KATO *et al.*: Mem. Natl Inst. Polar Res., Spec. Issue, **14**, 88, 1979) and from the measurement of the growth rate of crystal grain (NARITA and MAENO: Nankyoku Shiryô, **67**, 11, 1979) of the Mizuho core was applied to dating of the core. The age of core bottom is estimated to be some 1700 years B.P. The climatic change in the past 1700 years shown in the $\delta^{18}O$ profile of the Mizuho core agrees fairly well with that from the long tree-ring records in North America (V. C. LAMARCHE, Jr.: Science, **183**, 1043, 1974).

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OXYGEN ISOTOPE PROFILES IN THE CORES FROM MIZUHO STATION, EAST ANTARCTICA AND THEIR CLIMATIC IMPLICATIONS (Abstract)

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Oxygen isotopic composition ($\delta^{18}O$) in the cores from the Antarctic and Greenland ice sheets provides important information about paleoclimatic records. However, the interpretation of the $\delta^{18}O$ values in the cores, especially from the Antarctic ice sheet, is not always easy.

Mizuho Station is under the influence of a stationary katabatic wind, so that periods of erosion and deposition are not discerned on the snow surface around

the station. Therefore, the interpretation of $\delta^{18}O$ values in the cores from Mizuho Station becomes complicated. The $\delta^{18}O$ values of thick and fine-grained layers with little-developed depth hoar in the Mizuho cores are considered to provide the best information about paleo-temperature records (KATO and WATANABE: Mem. Natl Inst. Polar Res., Spec. Issue, **19**, 243, 1981). However, such layers were not determined in most of the previous studies to be compared with the studies on the Mizuho cores and cannot be determined in the deeper core from Mizuho Station.

The profile of $\delta^{18}O$ of little increments in the Mizuho cores does not always show the same trend of $\delta^{18}O$ variation as that shown by the profile of $\delta^{18}O$ of such layers. The profile of $\delta^{18}O$ of composite samples of little increments in the long interval of one core agrees very well with those of $\delta^{18}O$ of such layers in one adjacent core as well as $\delta^{18}O$ of the long depth interval in another adjacent core. This good agreement of the trend of $\delta^{18}O$ variation among these three cores shows that the trend of $\delta^{18}O$ variation indicates that of paleo-temperature changes.

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TECHNICAL ASSESSMENT OF DEEP DRILLING (Abstract)

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The drill system used in the successful U.S. deep drillings through Greenland and Antarctic ice in late sixties was very large and required enormous logistic support far beyond the capability of the Japanese Antarctic Research Expedition (JARE). However, recent technological progress has so much reduced the necessary power for ice drilling that now a small deep-drilling system suitable for JARE becomes feasible. Based on the reports of the Japanese dry-hole drillings, of the Danish drill which drilled through Greenland ice 2000 m thick in 1979 to 1981, and of the French thermo- and electrodrills intended for a 3000-m drilling, all presented at the Ice Drilling Technology Workshop held in Calgary in 1982, the following system was assessed technically feasible: *A drill* (est. wt.: 100 kg) equipped with a simplified French-type (the centrifugal cage omitted) chip-transport device will take a 2-m core in 5 minutes with an input of 200 V, 2A. *A 7.5-kW winch* (1000 kg, including a 5.7-mm-ϕ armored cable 3 km in length and 400 kg in weight) will hoist the drill at 60 m/min. With a soft-start device, *a 12-kVA generator* can run the winch. A 5-minutes preparation time for a run assumed, the system will drill to 2.4 km in 1200 runs in 1000 hours. Auxiliary equipments added, the total net weight of the system will be less than 2000 kg, excluding the hole liquid, a mixture of kerosene and R-11, which, though amounting to 25000 kg, or, loss considered, 35000 kg for a 120-mm-ϕ hole 2.4 km deep, may be transported over a few years.

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