VARIATIONS OF OXYGEN ISOTOPIC COMPOSITION AND DISTRIBUTION OF CONTINENTAL ICE IN THE LAST ICE AGE (I) (ABSTRACT)

Kikuo KATO

Water Research Institute, Nagoya University, Furo-cho, Chikusa-ku, Nagoya 464-01

Oxygen isotopic composition ($\delta^{18}O$) of fossil foraminifera from deep-sea sediments has been used as indicators of past climate for more than thirty years since their first determinations. The foraminiferal $\delta^{18}O$ varies with the $\delta^{18}O$ of sea water as well as the temperature of ambient water. Therefore, for the past decade, the fossil foraminiferal $\delta^{18}O$ records have been derived from the benthic foraminifera living in the constant temperature abyssal ocean and have been considered to give the $\delta^{18}O$ record of sea water. However, there has been a discrepancy between the continental ice-volume records derived from sea level change and from the $\delta^{18}O$ change of sea water, which is based on the assumption that the $\delta^{18}O$ of the continental ice has been constant in the last ice age. Recent studies show that about one-third of the observed $\delta^{18}O$ variations can be due to the deep-sea water of about 1.5°C cooler than the present temperature throughout the glacial period.

I have studied the foraminiferal $\delta^{18}O$ and sea-level relation, assuming the followings: 1) The $\delta^{18}O$ of the continental ice should not have been constant throughout the last ice age and may have changed according to changed distributions of both the continental ice sheets and sea ice. 2) The $\delta^{18}O$ must have changed even in the continental ice of unchanged ice-volume. And I showed that the foraminiferal $\delta^{18}O$ record may not give the temperature record of the deep-sea but may give the records of $\delta^{18}O$ and distribution of the continental ice.

(Received November 12, 1988)

ISOTOPIC COMPOSITION DATA ALONG A 700-M LONG MIZUHO CORE (ABSTRACT)

Masayoshi NAKAWO[1], Okitsugu WATANABE[2] and Takao KAMEDA[3]

[1]*Nagaoka Institute of Snow and Ice Studies, National Research Center for Disaster Prevention, Science and Technology Agency, 187-16, Maeyama, Suyoshi-cho, Nagaoka 940*
[2]*National Institute of Polar Research, 9-10, Kaga 1-chome, Itabashi-ku, Tokyo 173*
[3]*Institute of Low Temperature Science, Hokkaido University, Kita-19, Nishi-8, Kita-ku, Sapporo 060*

It is estimated that the 700-m long core corresponds with the time period of the past 9400 years. Isotopic composition profile of the core, hence, would represent the temperature variation during the Holocence. Since Mizuho Station is located on a flowing ice sheet, however, ice at deep depths formed at rather higher elevations. In addition, total gas content measurements revealed that the ice sheet has started thinning at around 1000 years B.P. For constructing the past temperature variation from the core data, therefore, these two effects of downslope movement and ice sheet thinning have to be taken into account.

(Received January 12, 1989)