

## Thermohaline circulation changes in the North western Pacific during the late Quaternary

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To clarify the behavior of Pacific deepwater (PDW) in the late Quaternary is very important for understanding the thermohaline circulation in the world ocean basins and estimation of the ability of CO<sub>2</sub> storage in the Pacific. However there are less geochemical studies for the research of deepwater circulation changes in the Pacific Ocean, therefore the behavior of PDW is still unknown. In this study, we analyzed carbon isotope ( $\delta^{13}\text{C}$ ) in planktic and benthic foraminiferal shells and benthic Cd/Ca ratio to reconstruct the Pacific deepwater circulation history. We used the sediment core samples from the Emperor Seamounts (44° 47.2' N, 170° 9.6' E, water depth: 1,784 m) in the western North Pacific. Benthic foraminifera used in this study are *Uvigerina* spp.. Carbon isotope was measured by mass spectrometry with Kiel III device and Cd/Ca were analyzed using the magnetic sector field inductively coupled plasma mass spectrometry (ICP-MS) at JAMSTEC respectively. For the trace metal analysis, all chemical cleaning processes were carried out in the laminar flow bench in class 10,000 clean room. Foraminiferal cleaning procedure followed the methods of Boyle and Kegwin (1985/86) and Rosenthal et al. (1994).

Cd/Ca record in this study ranges from 0.14  $\mu\text{mol}$  to 0.24  $\mu\text{mol/mol}$  through the core, and show apparently glacial - interglacial variations during the last 250 kyr. The Cd/Ca values in interglacial periods is ca. 0.22 ~ 0.24  $\mu\text{mol/mol}$ , while the glacial Cd/Ca values are ca. 0.14 ~ 0.18  $\mu\text{mol/mol}$ . The glacial values are 20 ~ 30 % lower than the interglacial values. Thus, in the last glacial maximum (LGM), vertical distribution of Cd concentration of seawater (C<sub>dw</sub>) in the water column was 0.85 nmol/kg, about 10 % lower than present.

Moreover, the difference of carbon isotope between planktic foraminifera *Globigerina bulloides* and benthic foraminifera *Uvigerina* spp. is apparently smaller in the glacial periods and larger in interglacial periods. This result indicates that surface and deep watermass were well-ventilated and homogenised during the glacial periods. From these results, we conclude that obtained Cd/Ca and  $\delta^{13}\text{C}$  dataset in this study imply the existence of a better ventilated and nutrient-depleted water during the glacial periods at the northwestern Pacific.