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## Stable isotopic composition of polar planktonic foraminifera: Results from sediment trap study in the North Pacific

Azumi Kuroyanagi<sup>1\*</sup>, hodaka kawahata<sup>1</sup>, Hiroshi Nishi<sup>2</sup>, Makio C. Honda<sup>3</sup>

<sup>1</sup>Atmosphere and Ocean Research Institute, <sup>2</sup>The Tohoku University Museum, <sup>3</sup>JAMSTEC

Planktonic foraminifera provide a record of the upper ocean environment through their species assemblage and individual tests. Oceanographic condition at high-latitude plays an important role in the changes in global ocean environment, thus it is significant to assess the detailed past ocean situation in this region. *Neogloboquadrina pachyderma* (Ehrenberg) mainly distribute and dominate in sub-polar and polar region, thus it is an important species for the reconstruction of paleo-oceanography in the high latitude. In the study, we investigated the changes in oxygen isotope of *N. pachyderma* (sin.) using a 3.5-year sediment trap sample (about two-weeks resolution), and inferred 1) vital offset value in the area, 2) size effect, and 3) apparent calcification depth. In this study area, offset values were approximately 1 permil throughout the sampling period for both size except for 2000 (around 0.8 permil offset). Oxygen isotope values of *N. pachyderma* (sin.) exhibit definite seasonal variation throughout the sampling period, 1998 -2001.  $\delta^{18}\text{O}$  values of both small (125-180  $\mu\text{m}$ ) and large (180-250  $\mu\text{m}$ ) shells decreased in autumn (September-October) with a minimum around September-October, and increased in spring with a maximum value around April-May. They ranged from 0.58 to 2.53 permil for smaller shells and 0.52 to 2.27 permil for larger shell throughout the study period. The differences in  $\delta^{18}\text{O}$  between small and large shells generally decreased during winter, and increased summer. During winter, water column is well mixed, and differences is small (0.14-0.21 permil), while water column become stratified during summer, and differences became big (0.30-0.51 permil). During stratified water column period, larger shell mostly represented lighter  $\delta^{18}\text{O}$  values, up to 0.54-0.79 permil lighter values. The large seasonal change in difference of  $\delta^{18}\text{O}$  suggests that the different  $\delta^{18}\text{O}$  between shell size would be mainly affected by water column situation rather than individual kinetic/metabolic effect. During stratification period, larger shell and smaller ones would mainly calcify at 24-35m and ~45m water depth, respectively. On the other hand, both size mainly reflect the water environment at 45-55m to their shells during water column mixed.

Keywords: planktonic foraminifer, *Neogloboquadrina pachyderma*, oxygen isotope ratio, sediment trap, northwestern North Pacific