Paleoceanographic change through the Marine Isotope Stage 19 in the Kuroshio-Oyashio subarctic boundary, the northwestern Pacific, based on benthic and planktic foraminiferal oxygen and carbon isotope records

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Orbital configuration during the Marine Isotope Stage (MIS) 19 are characterized by weak eccentricity-precession forcing and the obliquity maximum, and they have occurred at around the precession minimum as well as MIS 1, the present interglacial period, although the both absolute values of obliquity are different (Tzedakis, 2010; Tzedakis et al., 2012). Thus, MIS 19c, the one of sub-stages during MIS 19, is assumed as the close analogue for the present interglacial and will suggest the timing of the next glacial inception in the future excluded anthropogenic influences.
Here, we report foraminiferal stable oxygen and carbon isotopic records from the Chiba composite section, and the Higashinagata Formation, Toyofusa Group in the Boso Peninsula, and the CHOSHI-1 core drilled through the Yokone Formation, Inubo Group, at Choshi city, northestern part of Chiba. The Chiba composite section is one of the candidates for the middle Pleistocene GSSP (Global boundary Stratotype Sections and Points). We carried out stable oxygen and carbon isotopic analyses by using benthic foraminifers, *Bolivinita quadrilatera*, *Cibicides* spp. and *Uvigerina* spp., and planktic foraminifers, *Globigerina bulloides*, *Globigerinoides ruber* and *Globorotalia inflata*. Stable isotope measurements were performed by a Finnigan-MAT253 Isotope mass spectrometer coupled with a Kiel IV carbonate preparation device installed at the Department of Geology and Paleontology, National Museum of Nature and Science. In order to develop age models, the resultant $\delta^{18}O_{benthic}$ curves were correlated to the sea level equivalent curve (Elderfield et al., 2012).
$\delta^{18}O_{planktic}$ and $\delta^{18}O_{benthic}$ curves basically represent synchronized changes in the glacial-interglacial cycle scale. Especially, $\delta^{18}O_{G.\ bulloides}$ curves show millennial scale oscillations from the peak of the MIS 19 to MIS 18 superimposed on the glacial-interglacial cycles in both of the Chiba composite section and the CHOSHI-1 core. However, the $\delta^{18}O_{G.\ ruber}$ curve from the Higashinagata Formation, in which the isotope data yielded only through the late MIS 19, exhibits a slight oscillation in contrast to those of the Chiba composite section and the CHOSHI-1 core during the same interval. This implies that since the Kuroshio front facing to the Kuroshio-Oyashio subarctic boundary was placed at near the latitude of the present Choshi region, the Chiba composite section and the CHOSHI-1 core were commonly affected by sea surface temperature (SST) changes associated with a latitudinal shift of the Kuroshio front during the MIS 19 –MIS 18 transition. In contrast, the Higashinagata Formation was less affected by the SST changes since the Kuroshio front have not reached down to the southernmost part of the Boso Peninsula during the interval.

References

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Keywords: Marine Isotope Stage 19, Foraminifera, Oxygen isotope, Carbon isotope, Kuroshio front

