

## Paleoenvironmental Change recorded in an IMAGES core off Kashima since the last 150 ka

# Tadamichi Oba[1]

[1] Environmental Earth Sci., Hokkaido Univ.

The northwest Pacific Ocean, where the cold Oyashio and the warm Kuroshio Currents meet each other today, is the most sensitive region in the North Pacific for monitoring the migration of the western boundary currents in response to the past climatic change. The present study aims to reconstruct the detailed paleoenvironmental change off the East Coast of the Japanese Islands during the last two glacial-interglacial cycles. A long giant core (MD012421, 45.82 m length) was recovered from 2,224 m water depths off the central Japan during the IMAGES (WEPAMA) cruise in 2001. The core is composed of homogeneous olive gray silty clay and contains relatively abundant calcareous and siliceous microfossils. A multi-disciplinary study was carried out on this core by analyzing the following: color, grain size, mineral composition, paleomagnetism, oxygen isotope, carbon isotope, Opal%, CaCO<sub>3</sub>%, species of diatoms, coccolithophorids, radiolaria, planktonic foraminifera, and benthic foraminifera, CaCO<sub>3</sub> preservation, alkenone, TOC, C/N, carbon and nitrogen isotopes of total organic matter, biomarkers and the composition of the pollen assemblage. The following results were obtained.

1. The oxygen isotope curve of *G. bulloides* is very similar to the standard oxygen isotope curve in the open ocean. This means that the core records paleoenvironmental change continuously over the last 15 ka.
2. The color components between a\* and b\* are different in each oxygen isotope (MIS) stage, suggesting the different supply of material and/or conditions of burial at each stage.
3. Millennial-scale variations in grain size and mineral composition of detritus component show that the cold periods correspond to larger grain size and less clay mineral content, respectively. These data suggest that soil erosion was enhanced and chemical weathering was weakened in the hinterland during millennial-scale cold-dry climatic events.
4. The dry bulk density of the sediments is mainly determined by the ratio of opal (diatom abundance) versus terrestrial detritus contents.
5. It is deduced from paleomagnetic analysis that the upper 7 m of sediments in the core was stretched during the coring operation.
6. The oxygen and carbon isotope values of *G. bulloides* indicate southward progression of cold surface water temperatures, and associated penetration of the Oyashio Current during the glacial periods.
7. The diatom abundance reaches one million per one-gram dry sediment and increases during the warm periods with a 20 ky cyclicity.
8. The coccolith number is also high during the warm periods when the carbonate preservation index gives high scores.
9. All warm water indices yielded by the four microfossil assemblages (diatoms, coccoliths, radiolaria and planktonic foraminifera) show temperature decreases during the MIS 2 and 6, and increases during the MIS 5, although their correlation coefficients with each other are not always high.
10. The total organic contents (TOC) increase during the MIS 1 and 6 when the opal percents also increase, suggesting high productivity in the surface water during these periods.
11. The C/N ratio, carbon and nitrogen isotopes of total organic matter indicate that the TOC is mainly of marine origin. However, organic matter of terrestrial origin (based on n-alkane abundance) slightly increases during the MIS 6.
12. The curve of the warm pollen index is similar to the oxygen isotope curve, except for the MIS 6 and 5e when temperature changes inferred from the pollen curve precede the oxygen isotope curve. During the MIS 5e-4 and the late half of the MIS 1, wet conditions in central Japan are suggested by the increase of *Cryptomeria*.