

The paleotemperature reconstruction during the late-Holocene using the sediment core recovered from the Tokyo Bay, Japan

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Recently, investigations of Holocene climatic variability and its socioeconomic impacts have received increasing attention with regard to the prediction of future climatic change and the evaluation of its impact on human society. The Kanto area around the Tokyo Bay, Japan had a large population in the Neolithic Jomon age. After the establish of centralized system, this area has been a stage of major change in Japanese history for many times. The paleoenvironment around the Tokyo Bay has been estimated based on the analysis of the shell mounds along the coast or historical documents. However, the continuous and high time resolution paleotemperature record has not existed yet.

A piston core KT12-06-2B (8.99m) were recovered from the Tokyo Bay during the Tansei-maru KT12-06 cruise. An age model for the core, determined by the AMS¹⁴C dating for 22 molluscan shells and the scoria layer of Hoei eruption, showed that it has the continuous records from about 4, 500 years ago. We analyzed the content of total organic carbon (TOC), alkenone unsaturation ratio ($U_{37}^{k'}$), and coccolith assemblages for this core in order to reconstruct the paleoenvironment in the Toyo Bay.

The constant TOC values (1.3-1.7 wt.%) before 1700AD suggested the stable biological production at the core site. We converted $U_{37}^{k'}$ into alkenone-SST using the conversion formula, proposed by the culture experiment of *G. oceanica* because most of coccolith contained in the sediments were *G. oceanica* based on the polarizing microscope observations. From 400 AD to the present, the alkenone-SST ranged from 20.5°C to 22.4°C (21.6°C on average), including several cold periods around 1700 AD, 1420 AD, 1280 AD, and 1010 AD, which corresponded approximately to the Maunder, Spörer, Wolf, and Oort Minimum, respectively. The SSTs before 400 AD largely fluctuated between 19.5°C and 25.3 °C, and its average value was 22.6°C, which was 1 °C higher than the average after 400 AD. Especially large cold periods were detected around 520-440 BC (with a minimum value of 20.0°C) and 2360-2280 BC (with a minimum value of 19.5°C). The former cold period, which was also reported by the several previous studies in East Asia, might be caused by the other large minimum of solar activity around 500BC. The latter cold period corresponds to the global cooling/drying event accompanied by the monsoon retreat. In the mid- to late-Jomon age, the Neolithic Jomon society around the Tokyo Bay based on hunting and gathering, not paddy rice cultivation. We assume that they lived in warm but unstable climate, which might be disadvantageous for them to start agriculture.

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