

A biomarker record of temperature and phytoplankton community in Okinawa Trough since the last glacial maximum

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A variety of biomarkers were examined from Ocean Drilling Program (ODP) core 1202B to reconstruct temperature and phytoplankton community structures in the southern Okinawa Trough for the past ca. 20000 years. Two molecular temperature proxies (Uk37 and TEX86) show 5-6 [U+2103] warming during the glacial/interglacial transition. Prior to the Holocene, the Uk37-derived temperature was generally 1-4 [U+2103] higher than TEX86-derived temperature. This difference, however, was reduced to <1 [U+2103] in the Holocene when the Kuroshio Current was intensified. Correspondingly, the phytoplankton biomarkers (e.g., C37:2 alkenone, brassicasterol, C30 1,15-diols and dinosterol) suggest a shift of planktonic community assemblages with coccolithophorids becoming more abundant in the Holocene at the expense of diatoms/dinoflagellates. Such a shift is related to the variability of nutrient, temperature and salinity in the Okinawa Trough, controlled by the sea level and the intensity of Kuroshio Current. The phytoplankton community change may have profound implications on atmospheric CO₂ fluctuations during glacial/interglacial cycles since diatoms and dinoflagellates have a higher efficiency of biological pump than coccolithophorids.