



Sea-surface hydro-climatic trend of Kuroshio during the past 6,000 years near Taiwan

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New and published data (Lin et al., 2006; Lo et al., 2014) of hydrological proxies of the Late Holocene collected from two marine sedimentary cores (ORI715-21 and MD01-2403) adjacent to Taiwan were compiled in an attempt to provide a marine perspective on Taiwan's climate during the past 6000 years. Sea surface temperatures (SSTs) are derived from Mg/Ca ratio of planktic foraminifer *Globigerinoides ruber*. Sea surface salinities (SSSs) and water densities were calculated using Mg/Ca derived SSTs and paired oxygen isotopic ratios of the same foraminifera species. All the associated AMS radiometric carbon-14 dates were re-calibrated using Calib 6.1 to put all the hydrological data on a common time scale.

The SSTs at ORI715-21 (121.5°E, 22.7°N, water depth 760 m) off East Taiwan varied between 26.0 and 29.0°C, showing three phases of temperature changes: (1) a mild warm phase between 6.0-4.0 ka, ended by a distinctive drop centered at about 3.6 ka, (2) a rising trend between 3.6 -3.2 ka heralded a long, warmer interval between 3.2 and 1.2 ka; (3) a general cooling from 1.2 ka to ~0.7 ka, and a final warming up in the last 600 years.

The SSTs from Core MD01-2403 (123.2°E, 25.3°N, water depth 1420 m) in the southern Okinawa Trough varied between 26.5 and 29.5°C, exhibiting a stable, mild warm period between 6.0 and 2.6 ka, followed by a distinctive SST rise ~2°C at 2.4 ka and then a generally declining trend with some minor ups and downs towards today.

The SSTs and SSSs and sea-surface water densities are generally higher at the northern site MD01-2403 than that to the south at ORI715-21. The water densities have been also denser at the northern site. This counter-intuitive phenomena is explained by the fact that the planktonic foraminifera deposited at the southern site spent part of their life in the northern South China Sea where temperature and salinity is lower, whereas those archived at the northern site MD01-2404 are likely spent all their life time at the Kuroshio Current flowing off east Taiwan. Both the SSSs and water densities at two sites show a decline trend during the past 6,000 years, in consistence with the general trend in the western tropical Pacific Ocean (Stott et al., 2004).