

Last interglacial climate variability derived from fossil coral oxygen isotopes and growth rates from Yonaguni Island.

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Oxygen isotope ratios and annual growth rate of a Last Interglacial massive Porites (U-Th age of 137 ± 4 ka; Omura et al., 1994) from Yonaguni Island were measured, and correlated with those of modern corals from Ishigaki Island (Suzuki et al., 1999). The fossil coral contains annual bandings for 142 years and the total length of the core was 1.3 m. Oxygen isotope analysis was conducted at several parts of the core for 306 sub samples at 400 microns interval. Oxygen-18 enrichment of 0.9-1.5 permil compared to the modern analogue (Suzuki et al., 1999) was observed in the fossil coral. This suggests that some reduction of sea surface temperature (SST) and O-18 enrichment of the seawater had occurred at the same time during the Last Interglacial around Yonaguni Island. The spectral analysis of annual growth rate for the same fossil coral and a 223-year modern coral from Ishigaki Island was carried out using the software Arand provided by NOAA. The spectra of growth rate for both modern and fossil corals showed a strong 4.2-year cycle. Instrumental records of SST at Ishigaki Island, temperature at Shanghai, and precipitation in India, which are all influenced by Asian monsoon, showed similar 4-5 year cycle. These results indicate that the variation of annual growth rate of coral is affected by SST. It is also suggested that the change in SST in southern Ryukyu Islands is mainly affected by Asian monsoon activities, and the periodicity of Asian monsoon during the Last Interglacial was similar to the present.