

The Western Pacific Warm Pool hydrology during the last 1.68 million years

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The hydrology of the Western Pacific Warm Pool (WPWP) region is a key element of the earth's climate, which sensitively responds to greenhouse gas concentration, insolation, hemispheric energy balance, Hadley and Walker circulations, interhemispheric monsoons and El Niño-Southern Oscillation. The behaviors of the WPWP hydrology are not fully understood on a glacial-interglacial timescale. In this study, we generated a 1.68 Myr records of sea surface temperature (SST) and precipitation from IODP Site U1486 based on TEX₈₆ and the cyclization index of branched GDGTs (CBT). The SST varied 26.5 and 30.5°C, showing a pattern similar to variations in global ice volume and atmospheric CO₂ concentration. The greenhouse gas effect was a most likely factor determining the SST at Site U1486. Soil organic matter contribution, expressed as the CBT, shows a strong precession cycle. The precipitation maxima in northern New Guinea was anti-phased with the minima of Chinese stalagmite $\delta^{18}\text{O}$ on a precession cycle, suggesting a common forcing of hydrology in the WPWP and East Asia.

Keywords: WPWP, ITCZ, Pleistocene