Changes in Thermocline structure in the Eastern Equatorial Pacific since the Last Glacial Maximum

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The Eastern Equatorial Pacific (EEP) is an important region of study due to its dynamic nature and role in El Niño-Southern Oscillation (ENSO), which is the biggest source of global interannual climate variability. The modern EEP is characterized by relatively cool sea surface temperatures that are tightly coupled to a shallow thermocline. Variability in the depth of the EEP thermocline is important in initiating and propagating El Niño events. Here, we investigate changes in thermocline depth during the Last Glacial Maximum (LGM) to gain insight into how conditions within the EEP changed with different boundary conditions (CO_2, ice volume) than today. Using the stable isotope values of planktonic foraminifera from a range of calcification depths in the water column, we show that the thermocline was deep during the LGM relative to the Holocene at Ocean Drilling Program Site 849 (0°N, 110°W, 3839 m water depth). In comparison to previous studies that have been done in the region site 849 has the smallest change of $\delta^{18}O$ surface values indicating less glacial cooling. Looking at just site 849 values, the $\delta^{18}O$ values during the LGM had a smaller range between subsurface and surface foraminifera of 1.64‰ compared to the Holocene range of 2.11‰. This difference indicates that the thermocline was deeper in the equatorial cold tongue during the LGM. A deep thermocline may have inhibited some of the thermocline related feedbacks in ENSO variability and led to reduced ENSO during the LGM. Mg/Ca data was also generated from different the foraminfera species, and it was found that subsurface temperatures did not change that much during the LGM.