Reconstructing Late Pleistocene Changes in the Western Equatorial Pacific Thermocline and Analyzing the Viability of Coarse Fraction as a Temperature Proxy

Hamilton, Miles (School: Hastings High School)

The Western Pacific Warm Pool (WPWP) is a crucial component of global climate and has direct influence in the modulation of heat throughout the global ocean. Changes in geochemistry in the vertical thermocline gradient are important indicators of the region's response to climate change. Here, we extend d18O records from 670 - 770 kyr at International Ocean Discovery Program Site U1486 (2°22'S, 144°36'E, 1332 m water depth??) located in the Bismarck Sea in the southern portion of the WPWP using two thermocline-dwelling foraminifera species Globorotalia tumida and Pulleniatina obliquiloculata and one surface dwelling species Globigerinoides ruber. Foraminifera samples were picked at 20 cm intervals working down core and prepared for mass spectrometry. Additionally, we compared coarse fraction data (wt %>63 um) from 0-670 kyr to d18O from the same time frame. We found that in certain time frames, most notably 200-670 kyr, changes in wt %>63 um anticipate changes in d18O by ~19 ka with a significant correlation demonstrated through a linear regression and t-statistic. More specifically, when the biomass of foraminifera, reflected by wt %>63, increases, ice volume displays a reflected increase. While coarse fraction alone does not provide consistently accurate information as a temperature proxy, when paired with d18O, it could provide confirmation and reinforce noticeable trends.

Awards Won:

Fourth Award of $500