Tropical TEX_{86} – $U^{k'}_{37}$ based sea surface temperature offsets from the Mid-Miocene through Pliocene

J. SUPER[1]* AND M. PAGANI[1]

[1]Department of Geology and Geophysics, Yale University, New Haven, CT 06511, USA (*correspondence: james.super@yale.edu)

Reliable reconstructions of tropical temperatures are critical to understanding the dynamics of the warm intervals of the Middle Miocene and Pliocene though some sea surface temperature (SST) proxies have shown substantial disagreement. Here, TEX_{86} and $U^{k'}_{37}$ records were developed from twenty DSDP and ODP sites in the Atlantic, Pacific and Indian Oceans to investigate how the offset between the two organic proxies varies in a variety of tropical oceanographic settings. TEX_{86}^{H} SST estimates throughout the studied interval from 14 to 2.5 Ma were, on average, 3.5°C cooler than $U^{k'}_{37}$ SST estimates (a difference slightly greater than the combined analytical and calibration errors of the proxies) though there was large variability between sites, with some Eastern Equatorial Pacific sites (ODP Sites 848 and 849) showing offsets exceeding 10°C. Previous work [1] has suggested that offsets might be explained by differences in depth habitat, and thus the environmental temperature, of the Thaumarcheota thought to produce the majority of glycerol dialkyl glycerol tetraethers (GDGTs) found in the open ocean. This hypothesis is tested by combining newly developed SST records with further analysis of the trace element composition of associated carbonate and previously published shifts in planktic foraminiferal assemblages. In particular, the influence of upwelling is investigated as a principal control on TEX_{86}^{H}-$U^{k'}_{37}$ SST offsets throughout the interval.

[1] Seki, Osamu, et al. "Paleoceanographic changes in the Eastern Equatorial Pacific over the last 10 Myr." *Paleoceanography* **27.3** (2012).