

## Terrestrial and Marine Climate Variability in Tropical Africa During the Late Quaternary: Insights From Organic Geochemical Proxies

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In this talk, two examples will be used to illustrate the application of organic geochemical proxies to understanding past environmental change in tropical Africa.

Part 1: Two organic geochemical sea surface temperature (SST) proxies, the Uk'<sub>37</sub> Index and TEX<sub>86</sub>, were examined from a series of sediment trap samples collected from the Mozambique Channel, as part of the Long-term Ocean Currents Observation (LOCO) Project. The SST reconstructions based on Uk'<sub>37</sub> and TEX<sub>86</sub> are compared to Mg/Ca SST estimates from surface-dwelling foraminifera as well as to the *in situ* SST measurements. We find that TEX<sub>86</sub> accurately reflects the mean annual SST in the Mozambique Channel although seasonal cycles, which are present in the foraminiferal abundance and Mg/Ca data, are not captured. The Uk'<sub>37</sub> Index could not be calculated for these samples due to the absence of the C<sub>37:3</sub> alkenone.

Part 2: The carbon isotopic composition of individual plant leaf waxes (a proxy for C<sub>3</sub> vs. C<sub>4</sub> vegetation) in a marine sediment core collected from beneath the plume of Sahara-derived dust in NW Africa reveals three periods of the past 200,000 years when the central Sahara/Sahel contained C<sub>3</sub> plants (trees), indicating substantially wetter conditions than at present. Our data suggest that variability in the strength of Atlantic Meridional Overturning Circulation (AMOC) is a main control on vegetation distribution in central North Africa and we note expansions of C<sub>3</sub> trees during the African Humid Period (early Holocene), and within Marine Isotope Stage (MIS) 3 (~50-45 ka) and MIS 5 (~120-110 ka). The latter two wet periods coincide with major human migration events out of sub-Saharan Africa. Our results thus suggest that changes in AMOC influenced North African climate and, at times, contributed to amenable conditions in the central Sahara/Sahel, allowing humans to cross this otherwise inhospitable region.