# PP11F-03: A synthesis of Plio-Pleistocene leaf wax biomarker records of hydrological variation in East Africa and their relationship with hominin evolution

**Monday, 11 December 2017**
**08:27 - 08:38**
*New Orleans Ernest N. Morial Convention Center - 343*

Climate change is thought to play a critical role in human evolution. However, the mechanisms behind this relationship are difficult to test due to a lack of long, high-quality paleoclimate records from hominin fossil locales. We improve the understanding of this relationship by examining Plio-Pleistocene lake sediment cores from East Africa that were drilled by the Hominin Sites and Paleolakes Drilling Project, an international effort to study the environment in which our hominin ancestors evolved and dispersed.

We have analyzed organic geochemical signals of climate from drill cores from Ethiopia and Kenya spanning the Pliocene to recent time (from north to south: paleolake Hadar, Lake Turkana, Lake Baringo, and paleolake Koora). Specifically, we analyzed the hydrogen isotopic composition of terrestrial leaf waxes, which records changes in regional atmospheric circulation and hydrology. We reconstructed quantitative records of rainfall amount at each of the study sites, which host sediment spanning different geologic times and regions. By compiling these records, we test hominin evolutionary hypotheses as well as crucial questions about climate trend and variability. We find that there is a gradual or step-wise enrichment in $\delta D_{wax}$, signifying a trend from a wet to dry climate, from the Pliocene to the Pleistocene, perhaps implying an influence of global temperature, ice sheet extent, and/or atmospheric greenhouse gas concentrations on East African climate. However, the shift is small relative to the amplitude of orbital-scale isotopic variations. The records indicate a strong influence of eccentricity-modulated orbital precession, and imply that local insolation effects are the likely cause of East African precipitation. Several of the intervals of high isotopic variability coincide with key hominin fossil or technological transitions, suggesting that climate variability plays a key role in hominin evolution.

## Plain Language Summary

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