

PP12C-0652 - Fire trends and variability in Neogene East Africa



Monday, 12 December 2022



09:00 - 12:30



McCormick Place - Poster Hall, Hall A (South, Level 3)

Abstract

The expansion of C_4 grasses was one of the greatest ecological shifts of the Cenozoic Era and led towards the ecosystems we see in modern tropical environments. Decreased atmospheric carbon dioxide and increased aridity are hypothesized as drivers of C_4 grassland expansion. The asynchronous nature of the expansion suggests regional drivers had pronounced influence, yet regional reconstructions of aridity do not always align temporally with the vegetation shift. Investigation of fire as a driver of grassland expansion in Pakistan and Australia demonstrated that the response of regional fire varied widely. In East Africa, there is a lack of data to test the role of fire in grassland expansion. Building upon a dataset of previously measured plant wax carbon and hydrogen isotopes, we analyzed sediment samples from Deep Sea Drilling Project (DSDP) Cores 235 and 241 for polycyclic aromatic hydrocarbons (PAHs). Plant waxes and their isotopes record information about ecosystem and climate dynamics, while PAHs are compounds created by biomass combustion that can be used as a proxy for past fire activity. We use a multi-proxy approach, comparing our PAH-inferred fire record with plant wax proxies to investigate whether fire was a major factor of grassland expansion. Our work also improves upon the sampling resolution of the original research to better capture ecosystem variability Neogene East Africa before, during, and after the grassland expansion at 10 Ma.