

Organic Geochemical Signals of Pliocene Monsoon Rainfall

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Models and theoretical predictions suggest that subtropical continents will dry as a result of anthropogenic warming, with impacts on water resources and ecosystems. However, geologic evidence from past warm periods like the Pliocene document wetter conditions across the subtropics, at odds with theoretical expectations. In this talk, I show that compound-specific analyses of lipid biomarkers can provide a finer-scale view of the types of circulation changes that drove wetter Pliocene subtropics. Drawing on examples from the southwest US and southern Africa, I show that hydrogen isotopes in leaf waxes can provide new views on changes in atmospheric circulation, vapor transport, as well as the character of past rainfall. Moreover, interpreting these data in the context of model simulations and modern observational datasets reveals new insights on mechanisms that are likely to drive extreme precipitation in the 21st century, providing a bridge between our understanding of past hydroclimate and current change. From this perspective, improving our understanding of past climate can generate key lessons for understanding and adapting to a warmer future.