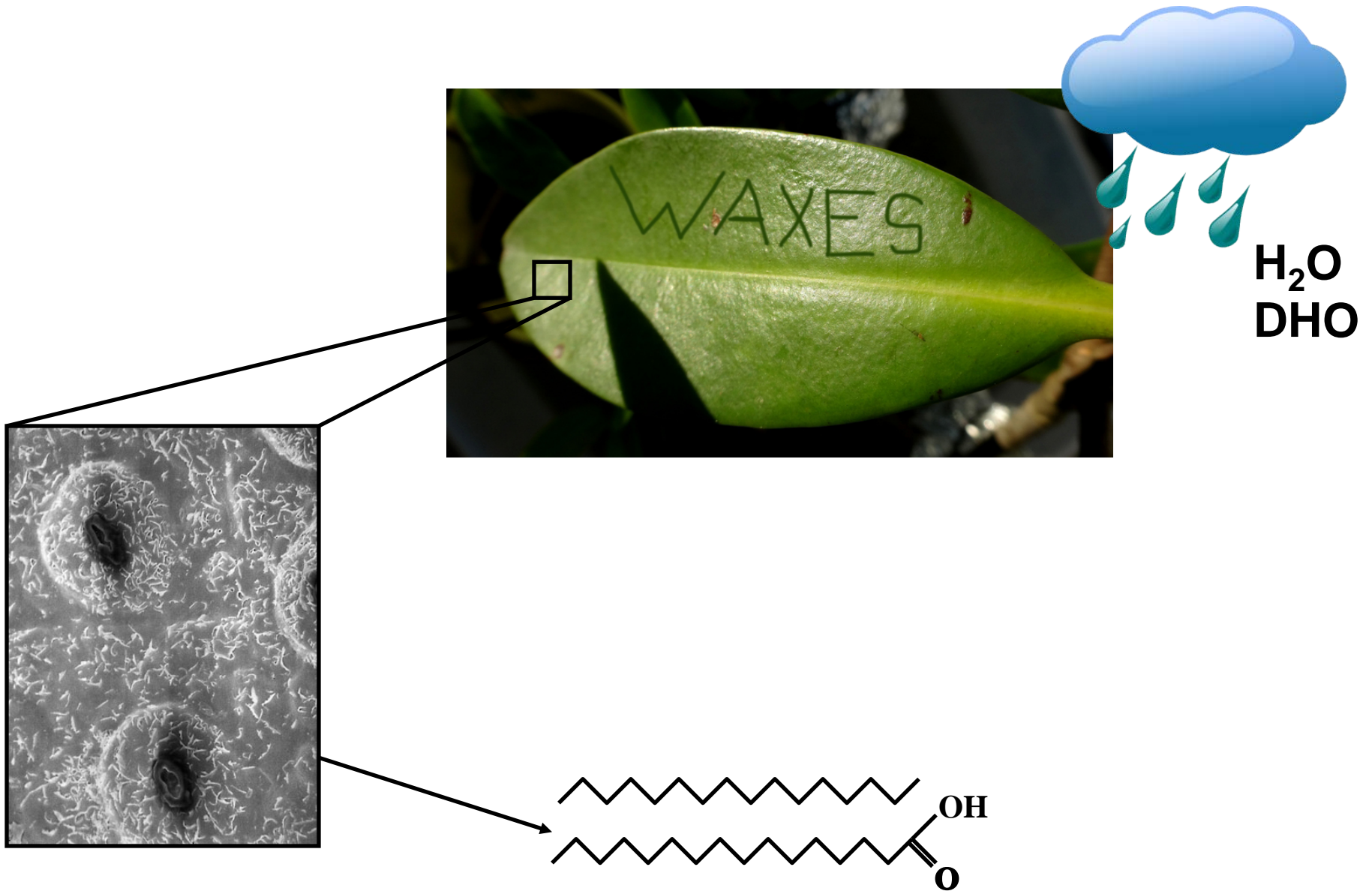


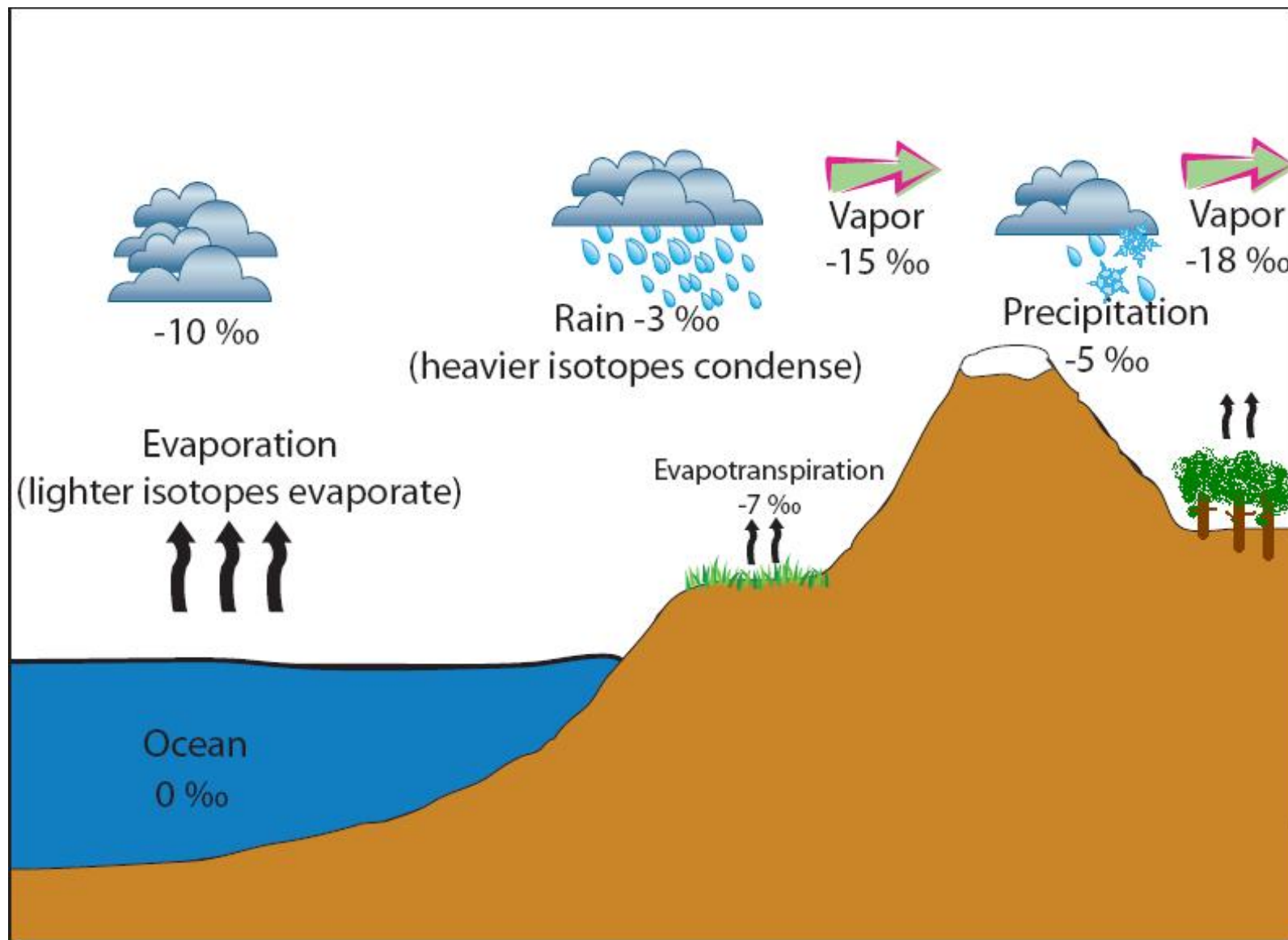
HSPDP 2015 Annual Meeting: Organic Geochemistry

Rachel Lupien

Past hydrology from leaf wax: δD



Amount Effect

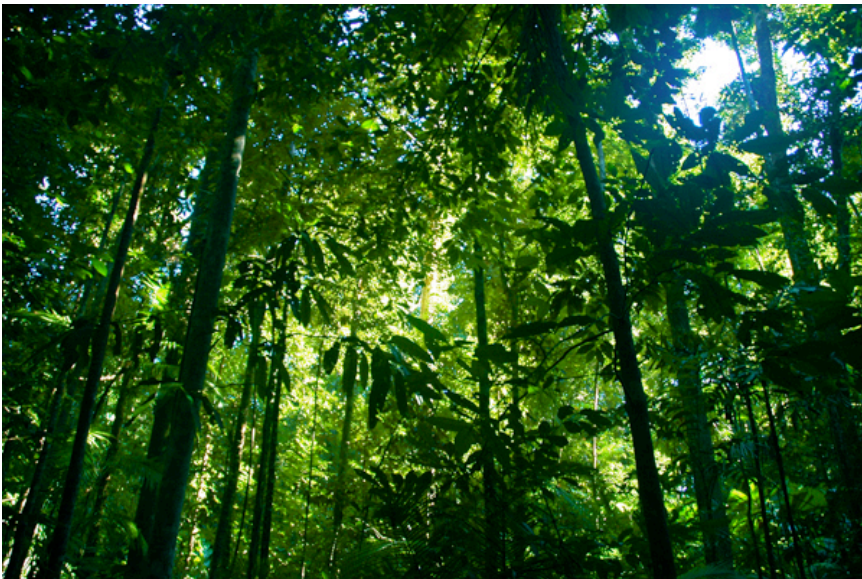


Past vegetation from leaf wax: $\delta^{13}\text{C}$

$\delta^{13}\text{C}$ of leaf wax records plant photosynthetic pathway: C3 vs. C4 vegetation

C3: tropical trees, shrubs

$\delta^{13}\text{C}$: -30 to -40



C4: tropical grasses

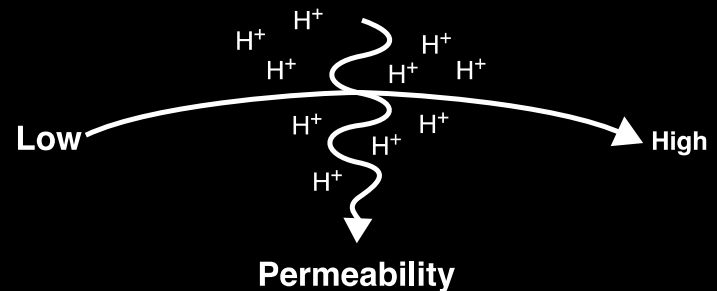
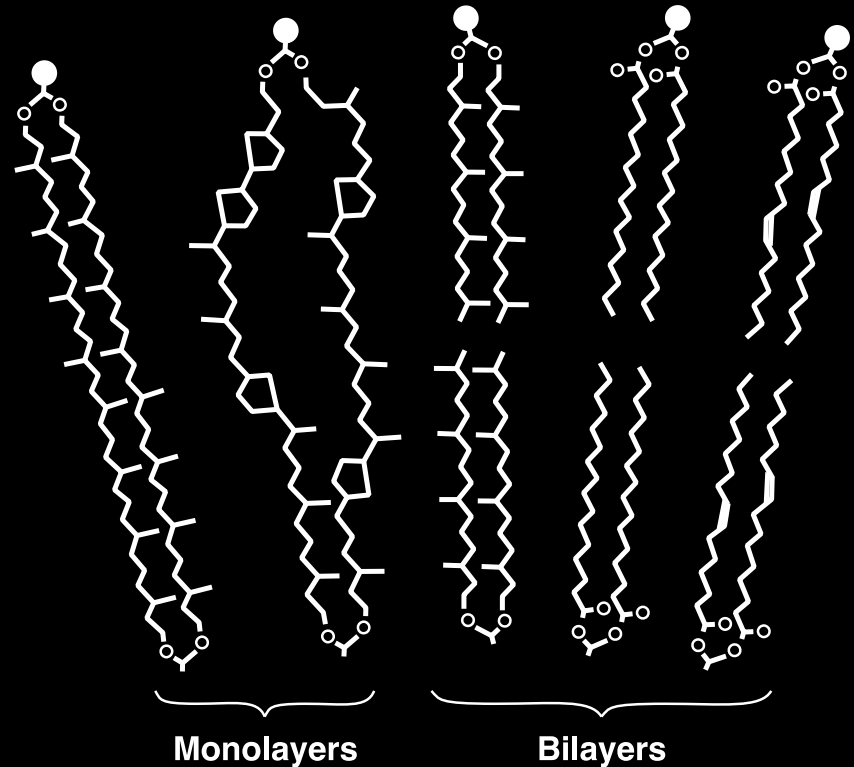
$\delta^{13}\text{C}$: -20 to -26



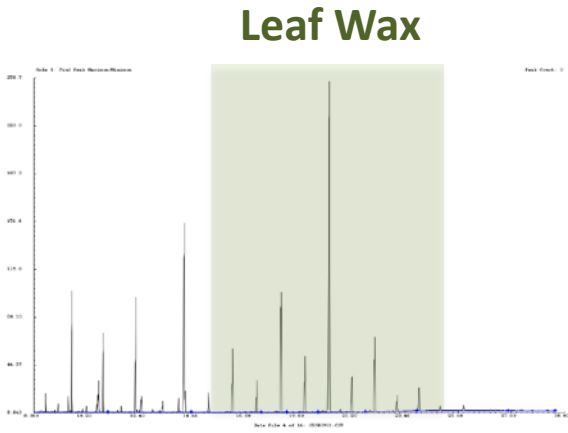
Past temperature from Microbial Lipid Membranes: GDGTs

Some Archaea and bacteria have stable monolayer membranes composed of GDGTs

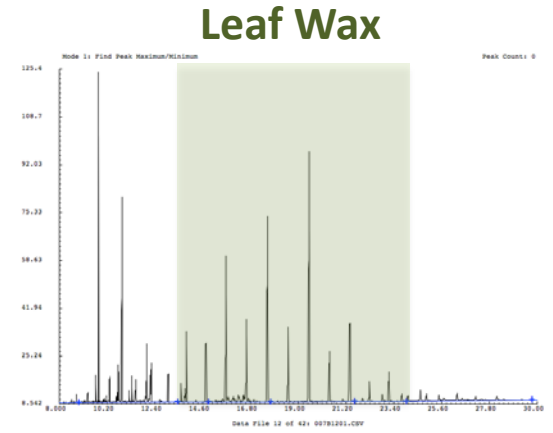
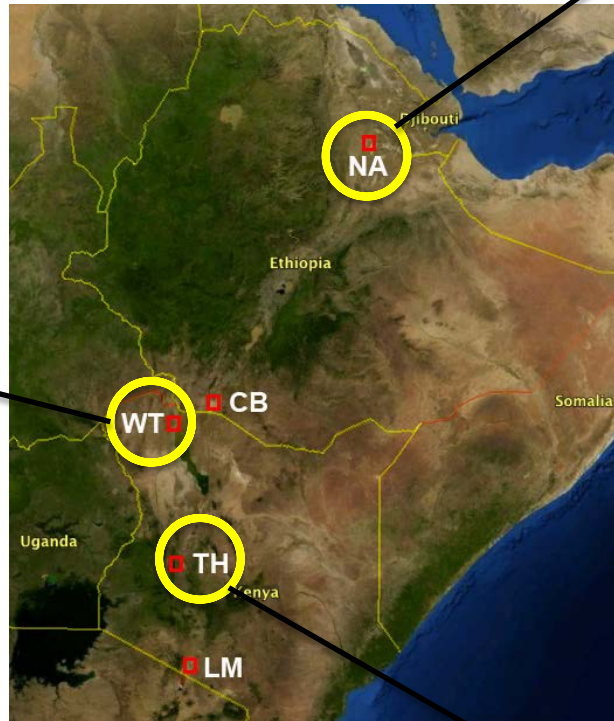
Change structure to regulate permeability and fluidity based upon environmental conditions (temperature)



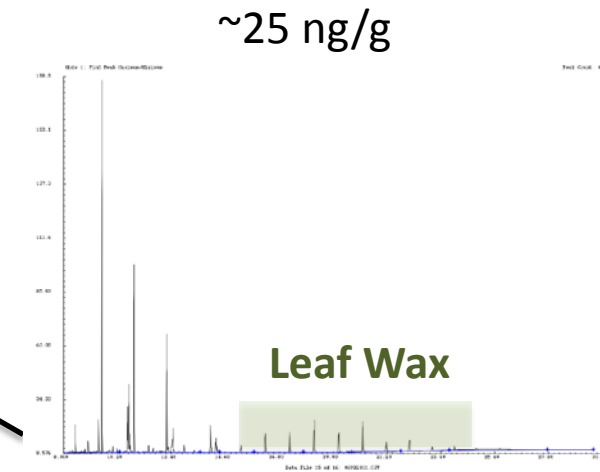
~20 samples from three sites



~700
ng/g



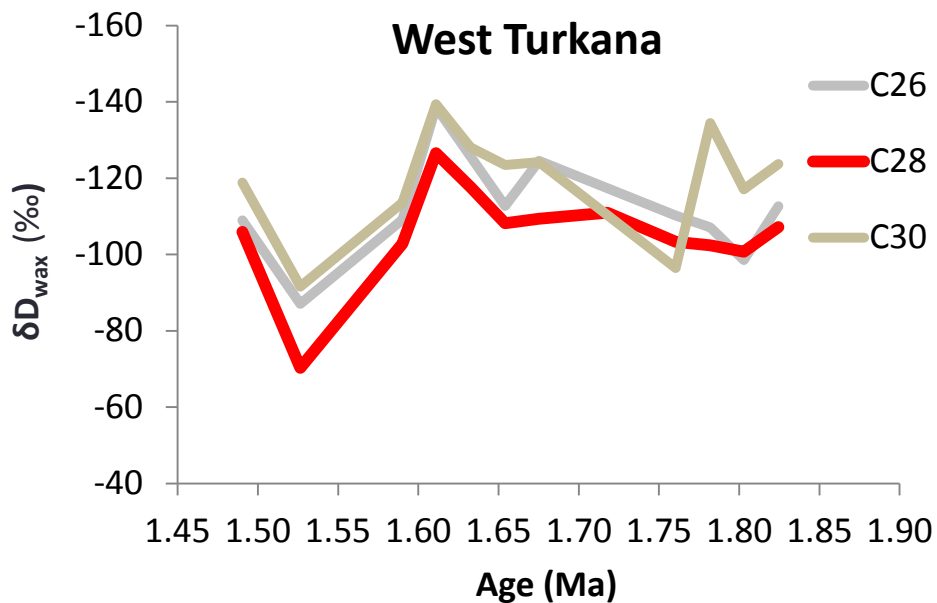
~200
ng/g



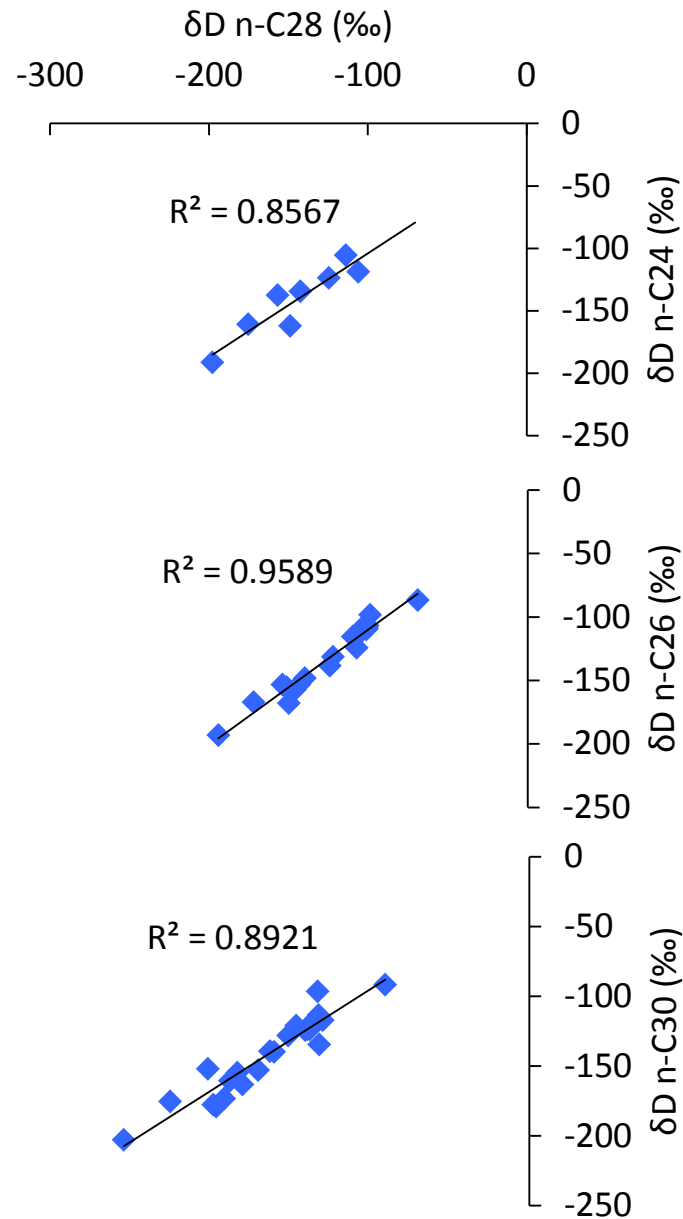
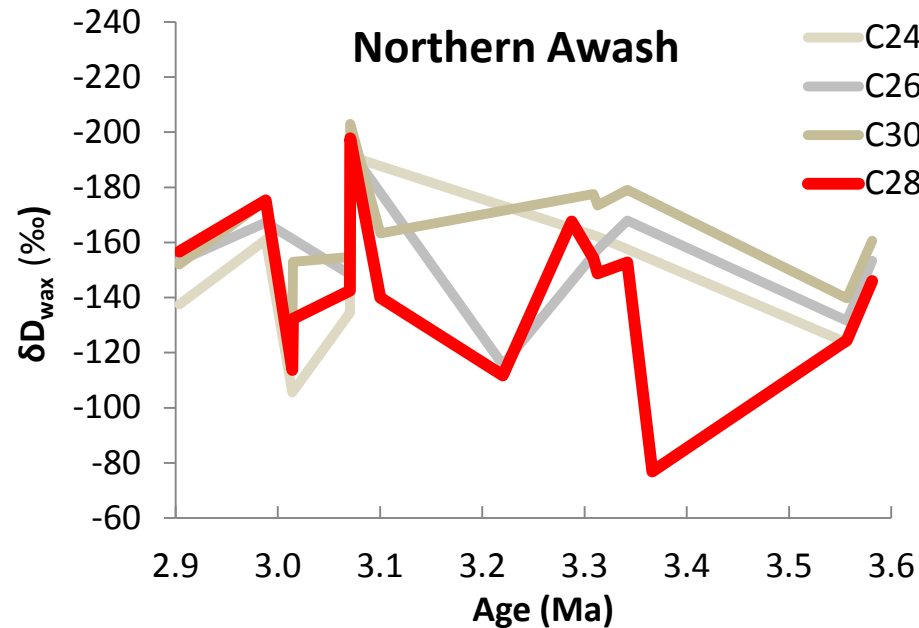
~25 ng/g

Hydrogen

Wetter

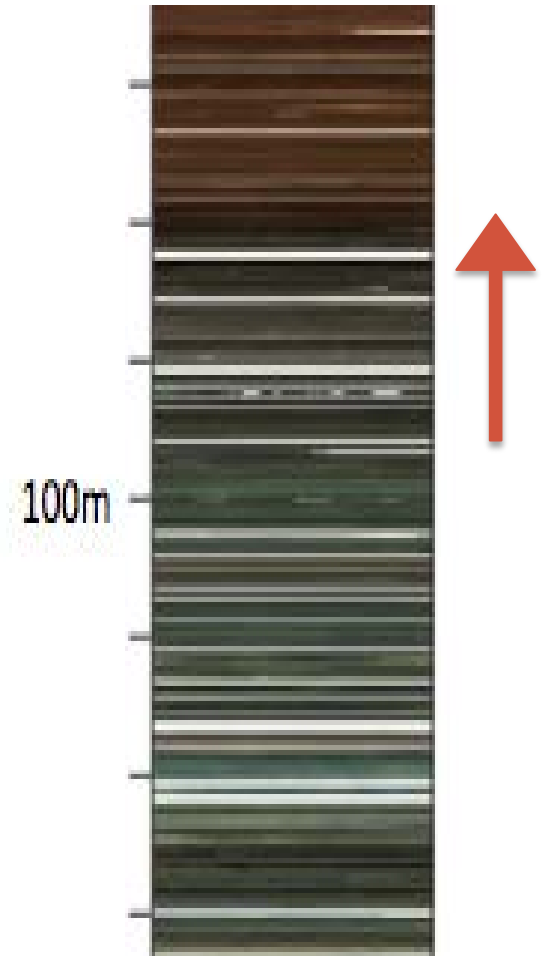
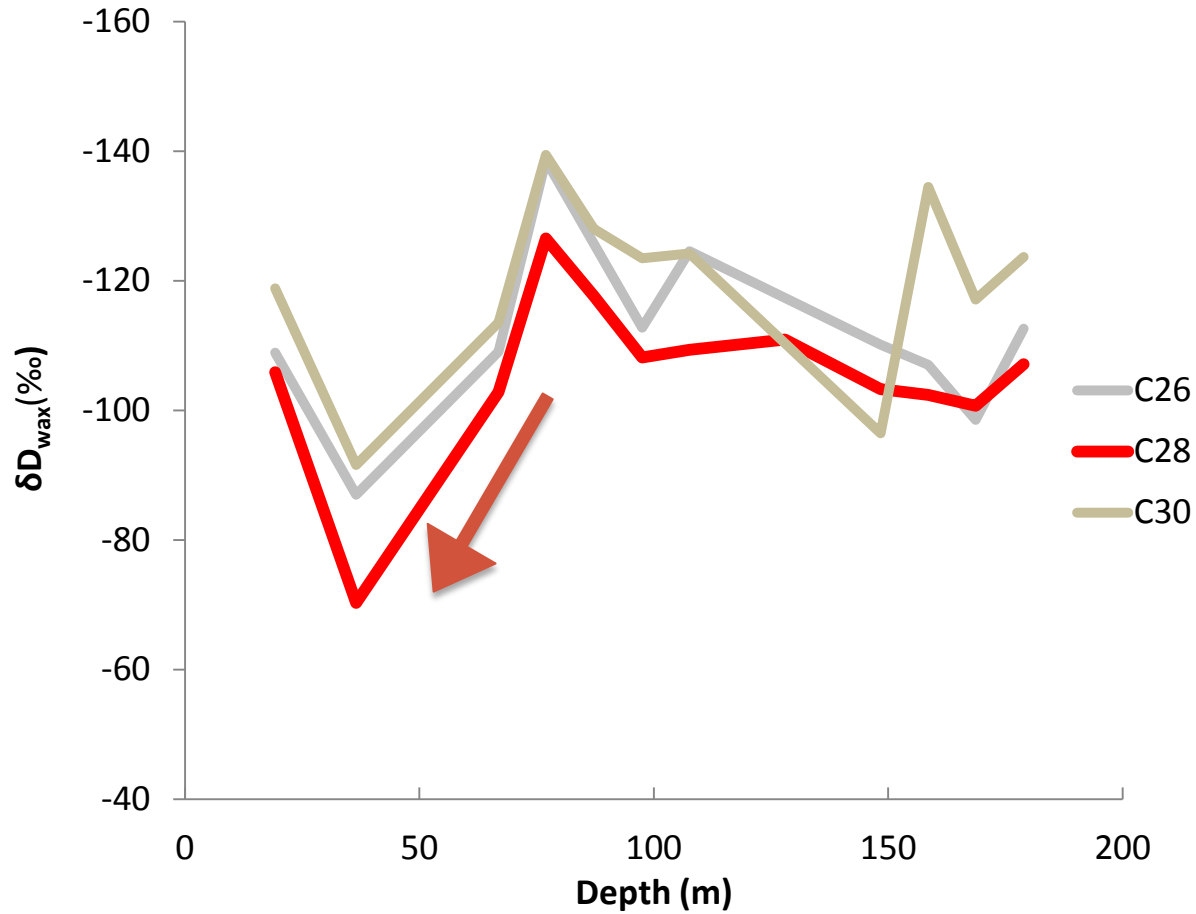


Wetter



Hydrogen

West Turkana



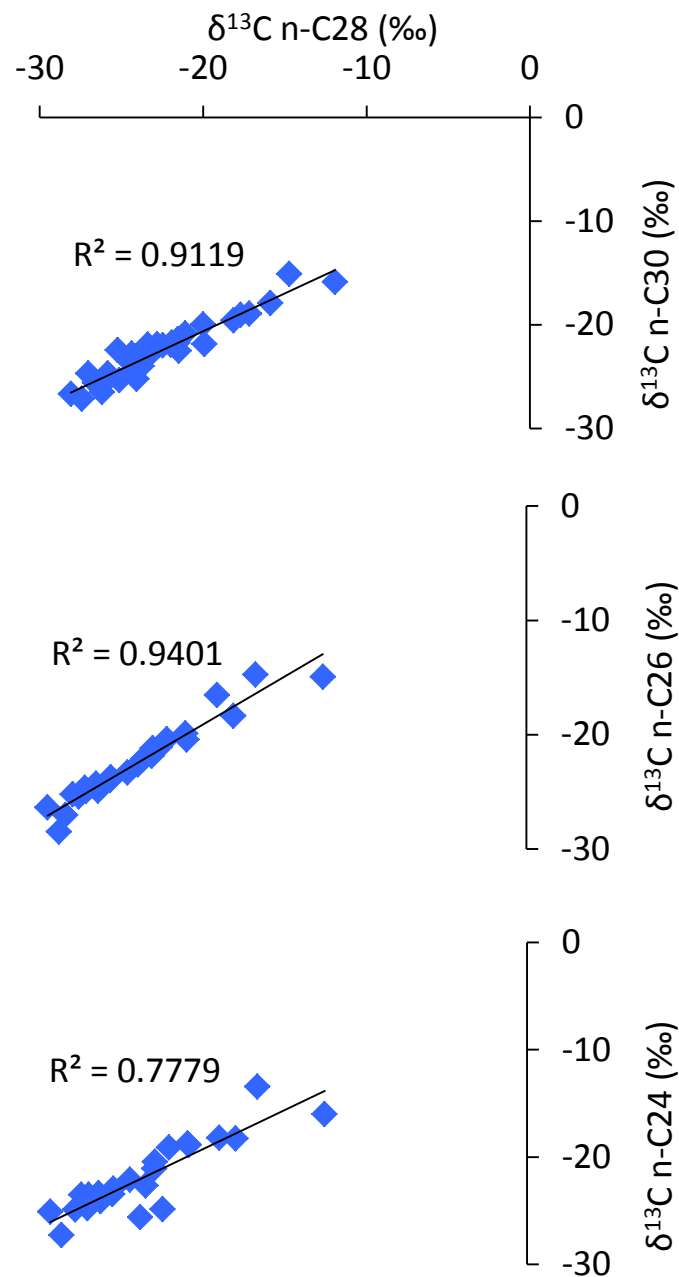
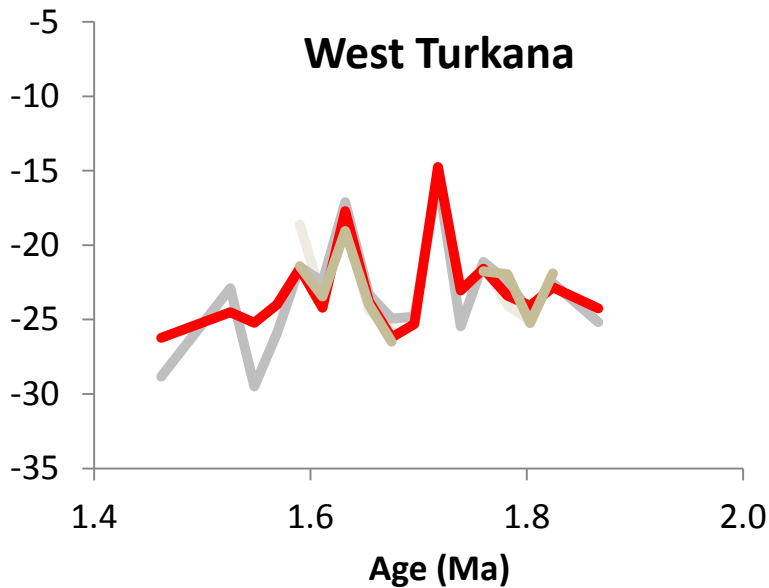
Carbon

C4



C3

$\delta^{13}\text{C}_{\text{max}}$ (‰)

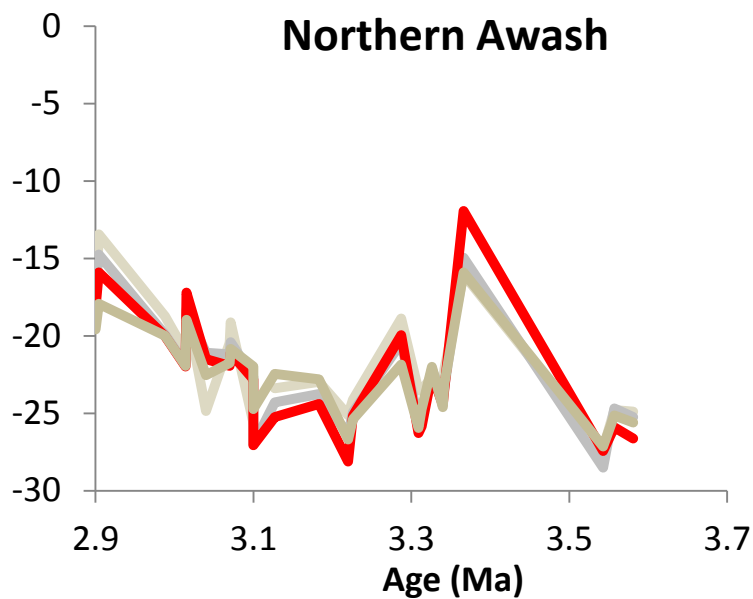


C4



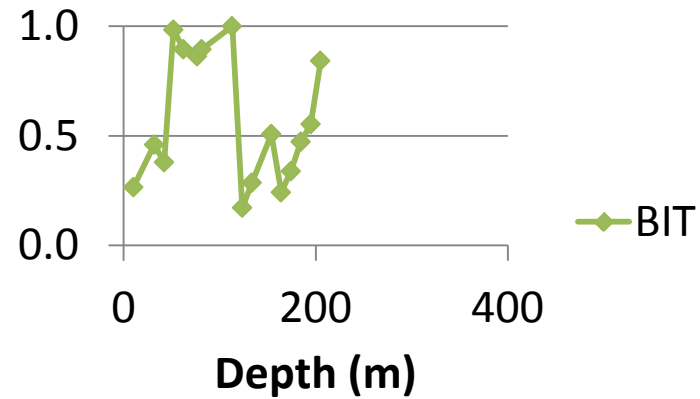
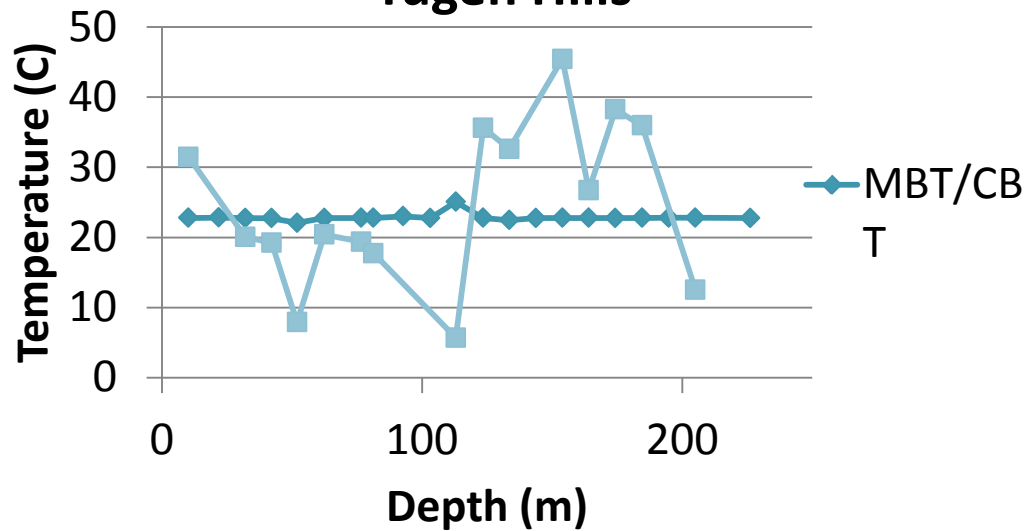
C3

$\delta^{13}\text{C}_{\text{max}}$ (‰)

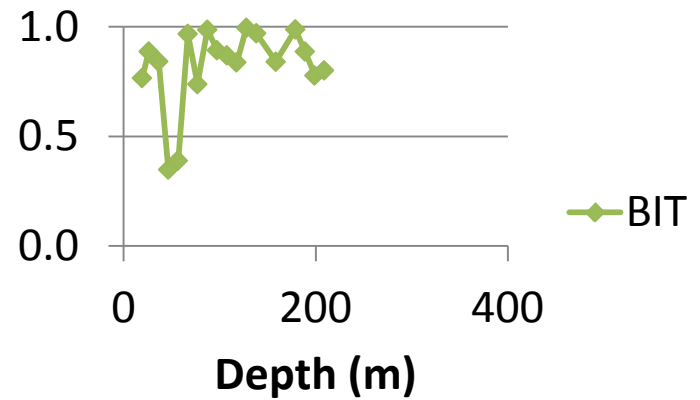
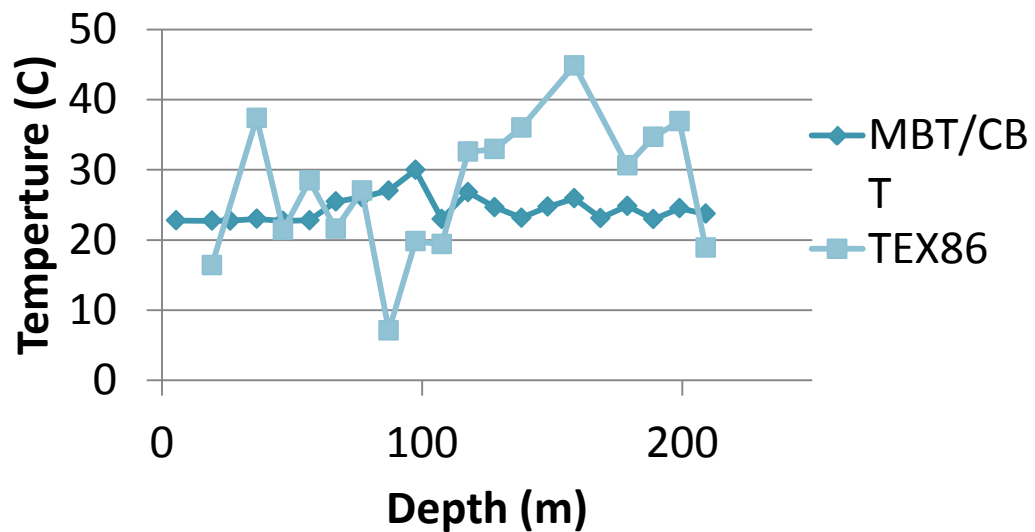


GDGTs

Tugen Hills



West Turkana



Upcoming Work

- 200 samples from both Turkana and Awash to study hydrogen, carbon, and GDGTs
- ~2,500 year resolution for Awash
- ~2,000 year resolution for Turkana

Thank you!

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