

Using Leaf Waxes to Establish Climate Trends in the Horn of Africa

Taylor, Richard¹, Tierney, Jessica E.², deMenocal, Peter²

1. Marine Earth & Atmospheric Sciences, North Carolina State University, Raleigh, North Carolina

2. Lamont-Doherty Earth Observatory of Columbia University, Palisades, New York

The Horn of Africa is an arid region of East Africa with an annual rainfall rate of approximately 26 cm/yr. Because of the low rainfall, droughts are a major issue for the inhabitants of the region, and currently, the Horn of Africa is experiencing its worst drought in sixty years. Understanding natural oscillations of the climate in the Horn region will help to reduce the severity of the impact these droughts have. Here we study the concentration and distribution of terrestrial leaf waxes in a marine sediment core from the Gulf of Aden in order to reconstruct Horn region climate during the past millennium. Due to the aridity of the region grasses dominate the landscape. Grass leaves are coated in waxes, which are transported to the Gulf of Aden by summer winds. These waxes are thus a proxy for wind strength as well as potentially aridity: in the last 100 years, we observe that concentrations of saturated fatty acids appear to decrease with multi-decadal increases in precipitation. Over the entire record, we observe long-term trends in the concentration of the primary leaf wax homolog, the saturated 28-carbon fatty acid (C28:0) that shows a decrease in aridity from 700 C.E. to 1400 C.E., and an increase in aridity from 1400 C.E. to present.