Eglinton, T.I., Eglinton, G., Dupont, L., Montlucon, D., Sholkovitz, E. and Reddy, C.M., *Composition, age, provenance of organic matter in N.W. African dust over the Atlantic Ocean*, Geochemistry, Geophysics, and Geosystems, 2002; v3, Art. No. 1050

Eolian dust deposited on a meteorology buoy over the boreal winter and spring of 1992/1993 in the Northeast Atlantic off Northwest Africa (18degreesN, 22degreesW) afforded sufficient material for detailed assessment of its biogeochemical characteristics and provenance. The sample was subjected to microscopic examination and bulk, elemental, isotopic, black carbon, and molecular (lignin, lipid) analyses. The bulk elemental composition and organic carbon (OC) content (1.02% dry weight) establishes the dust's origin as continental upper crust and is typical of dusts that emanate from West Africa. These data are in accord with the extensive satellite imagery documenting the transit of dust clouds from the Sahara and Sahel regions (e. g., NASA TOMS aerosol index). Microscopic examination reveals that charcoal-like particles from vegetation fires ("black carbon" (BC)) are the most abundant morphologically distinct organic components. Accelerator mass spectrometry (AMS) C-14 analysis yields conventional C-14 ages for bulk OC of 1260 +/- 40 years and BC of 2070 +/- 35 years. Taken together with corresponding stable carbon isotopic compositions (delta(13)C, -18.9 and -15.1parts per mille, respectively), these results suggest the presence of biomass and burning residues derived from predominantly C-4 vegetation that accumulated in soils over the late Holocene. Molecular-level measurements are also consistent with this scenario. For example, lignin-derived phenols in the dustfall sample indicate a significant contribution of angiosperm grass-type tissue. The altered nature of the lignin suggests storage as residues in soils. Solvent extractable (lipid) constituents include a marked leaf wax type component with a molecular and stable carbon isotopic composition similar to those observed in surface marine sediments in this region. The hydrocarbon fraction contained some diesel-type contamination but the n-alkanes (C-23-C-33) retained a prominent odd/even distribution, with delta(13)C ranging from -26.7 to 28.5 parts per mille. The suite of even carbon numbered n-alkanols (C-22-C-32) is C-14 dated at 647 +/- 150 years, with delta(13)C values ranging from 23.9 to 30.4 parts per mille. The long-chain n-alkanoic acids (C-22-C-32) exhibited delta(13)C values ranging from 22.6 to 27.4parts per mille. These waxes are evidently a mixed signal derived from contemporary C-3 and C-4 vegetation and from ablated soils and desiccated lake sediments of middle to late Holocene age. This molecular approach shows promise as a tool for continental paleoenvironmental assessment, particularly with respect to past vegetation cover, regional aridity, and wind systems.