# Origins of African Dust over the Tropical Atlantic Ocean

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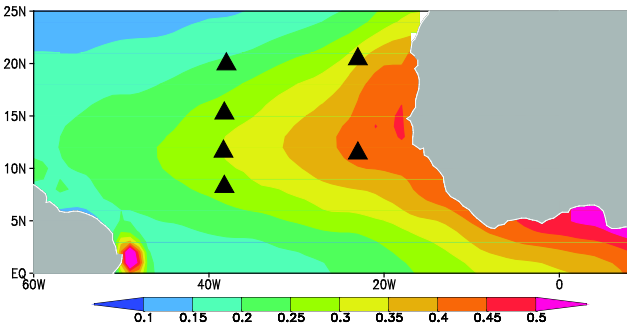
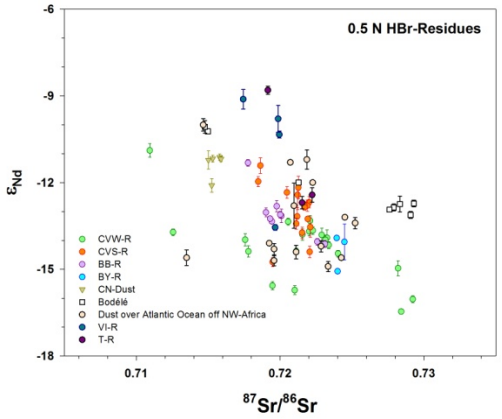
The goal of this project is to determine the source regions of African dust that is transported across the tropical Atlantic Ocean. Improving our knowledge of the continental origins of dust aerosols will enhance our understanding of ocean biogeochemistry, sea surface temperature variability, and tropical cyclone formation and intensification.

Previous work identified six moorings of the PIRATA array that are subject to significant dust buildup during their yearlong deployment in the tropical North Atlantic (see Figure 1). During the PIRATA Northeast Extension cruise in early 2013, dust sample were collected from the radiometers on three buoys and send to Max Planck Institute for isotope analysis. By comparing the ratios of different elemental isotopes present in the dust, the regions in Africa from which the dust originated were determined. For example, the samples from the 2013 cruise indicate that some of the dust came from the Bodélé depression in Chad (Figure 2). Dust samples will continue to be obtained from PIRATA mooring during each Northeast Extension cruise (run by AOML and PMEL) and 38°W cruise (run by Brazil) with the goal of building up a robust database of isotope ratios that can be used to trace African dust aerosol to their geographic origins.

Currently we are collecting dust aerosols that accumulate on the buoy's meteorological sensors. The ability to obtain samples therefore depends on the time of year in which the PIRATA cruise took place because there is strong seasonality in dust buildup on the sensors. During some years there is no dust buildup on a particular buoy because recent rainfall has washed it away. Future plans include building simple aerosol collectors that can be mounted to the PIRATA moorings to ensure consistent sampling.




*Annual mean aerosol optical depth (shaded) and locations of PIRATA moorings with significant dust buildup.*




*Scatter-plot of Sr and Nd isotopes from various dust samples in the tropical Atlantic. Samples from the 2013 PIRATA Northeast Extension cruise are shown in light blue.*