

2.033 African Dust as a source of nutrients to a Tropical Montane Cloud Forest in the Caribbean.

Early Career Scientist

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Abstract:

Huge amounts of African dust travels thousands of kilometers from the Sahara and Sahel regions to the Caribbean, northern South America and southern North America. These dust particles can play an important role in cloud formation and be deposited to the ecosystems as wet deposition in cloud and rainwater. In order to improve our understanding of the role of long-range transported African dust (LRTAD) as a source of nutrients in a tropical montane cloud forest (TMCF) in Puerto Rico, we had field campaigns measuring dust physical and chemical properties in summers of 2013, 2014 and 2015, as part of the *Luquillo Critical Zone Observatory* (LCZO). Measurements were performed at the TMCF of Pico del Este (PE, 1051 masl) and at the nature reserve of Cabezas de San Juan (CSJ, 60 masl), that serves as a control station. In both stations we monitored meteorological parameters (e.g., temperature, wind speed, wind direction). At CSJ, we measured light absorption and scattering at three wavelengths (467, 528 and 652 nm). At PE we collected cloud and rainwater for chemical analyses. Samples were classified as low or high dust influenced using data from models, satellites and CSJ measurements. Soluble ions, insoluble trace metals, pH, conductivity, total and dissolved organic carbon and nitrogen were measured for cloud and rainwater. Enrichment factor analysis was used to determine sea and crustal contribution of species by sample, as well as the neutralization factor and fractional acidity. Some preliminary results show cloud water conductivity for low and high dust periods was 47.7 vs 81.1 $\mu\text{S}/\text{cm}$, respectively, and for rainwater was 12.8 vs 15.0 $\mu\text{S}/\text{cm}$. pH showed differences no larger than 11% for both 2013 and 2014 periods. Also, increases in the overall ion concentration were seen in high dust samples. Detailed results will be presented at the meeting.