Aerosol Measurements in the Free Troposphere at the North Atlantic Pico Mountain Observatory in the Azores

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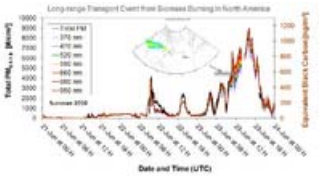
Category: Aerosol Properties



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Long-range transport event from biomass burning in North America to the Pico Mountain Observatory in the Azores, Portugal.

Pico is a small island (447 km2) in the archipelago of the Azores, Portugal, in the North Atlantic Ocean. The island has a very steep inactive volcano. An atmospheric monitoring station (Pico Mountain Observatory) was established close to the summit of the volcano by the late Dr. Richard Honrath and colleagues in 2001. The station, far from persistent local sources, is located near the northern cliff of the summit caldera at an altitude of 2225 meters. The station altitude is typically well above the boundary layer during summertime, when average marine boundary-layer heights are below 1200 meters and rarely exceed 1300 meters. Air masses reaching the station are often transported from North America and seldom from Europe or North Africa. The station's uniqueness and significance lie in its location that allows study of the transport and evolution of gases and aerosols from North America in the free troposphere.

Until recently, the focus was on the measurement and analysis of trace gases (ozone, carbon monoxide, non-methane hydrocarbons, nitrogen oxides) and light-absorbing aerosol (black carbon and iron oxide). Aerosol light attenuation has been measured at the site since 2001 using a seven-wavelengths aethalometer. An optical particle sizer was installed at the site in 2010 and has been running in parallel to the aethalometer for two seasons. A three-wavelength nephelometer, to measure the aerosol total- and back-scattering, and aerosol samplers for morphological and chemical analysis will be installed at the site in 2012. Our goal is to enhance the observatory monitoring capabilities for aerosol research. The objectives of this new research program are to: (a) assess background as well as specific event tropospheric aerosol properties, (b) compare aerosol and gases measurements with model outputs, and (c) use the data collected to provide satellite validation. This research is anticipated to enhance our understanding of the interactions between tropospheric aerosols, clouds, and climate by allowing, for example, the analysis of North American outflows and seasonal changes, the assessment of different source regions, the estimation of aerosol radiative forcing above marine clouds and in clear sky, and the study of the relative contribution of anthropogenic versus biomass burning emissions.

In this poster we present a preliminary analysis of the black carbon and aerosol size data in conjunction with retroplume model analysis.

http://instaar.colorado.edu/pico/index.html (http://instaar.colorado.edu/pico/index.html)

This poster will be displayed at ASR Science Team Meeting.

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