

Free Tropospheric Aerosol Measurements at the Pico Mountain Observatory, Azores (2225m asl)

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Key Points: In this poster we discuss a limited subset of the aerosol measurements performed at the Pico Mountain Observatory. The Black Carbon (BC) mass shows a clear seasonal pattern over a ten-years period. The 2012 scattering measurements show highly variable signals with events with high scattering and periods of very low aerosol loading. Dust events are clearly captured by the aethalometer, as well the nephelometer Angström exponents. Particles have various shapes, and mixing states, and soot particles typically are very compacted.

The Pico Mountain Observatory

The Pico Mountain Observatory is located on Pico Island in the Azores, Portugal (38.47°N, 28.40°W). The station is far from persistent local sources on the summit caldera at an altitude of 2225 m and it lays typically above the boundary layer during summertime. Air masses reaching the station are often transported from North America and seldom from Europe or North Africa. The station was installed in 2001.

<http://instaar.colorado.edu/groups/pico/>



http://upload.wikimedia.org/wikipedia/commons/2/26/North_Atlantic_Ocean_leaa_relief_location_map.jpg



The Pico Volcano
Measurements

The Pico Mt. Observatory

Gases:

1. Carbon monoxide (NDIR-GFC) (since 2001)
2. Ozone (chemiluminescence) (since 2001)
3. Non Methane Hydrocarbons (GC) (2004-2006 and 2009-present)
4. Noxy (2002-2005 and 2008-2010)
5. PAN (2008-2009)

Aerosol:

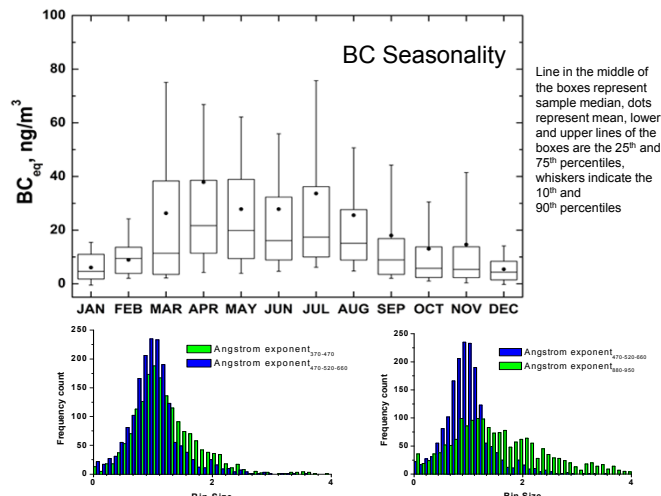
1. Seven-wavelength aethalometer (Mass equivalent Black Carbon) (since 2001)
2. PM intra-cavity Laser aerosol sizer (Aerosol optical Size from 0.09 to 1µm) (2010-2011)
3. Two-channels optical particle counter (PM>0.3 µm) (since 2012)
4. Three-wavelength nephelometer (Aerosol total and back-scattering) (since 2012)
5. Electron microscopy filter sampler (SEM membranes and TEM grids) (since 2012)
6. Four HiVol aerosol samplers (for EC/OC and detailed chemical analysis) (since 2012)

Meteorological data

1. Rh, T, P (since 2001)
2. Wind speed and direction (since 2001)

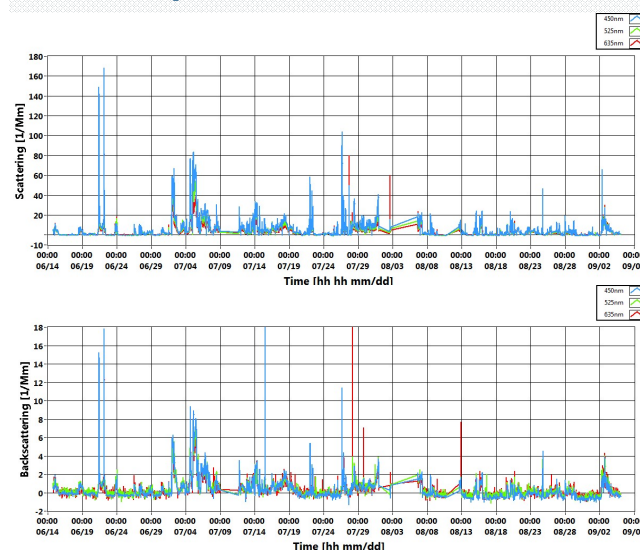
Decadal Black Carbon Dataset

An aethalometer measures light attenuation through a quartz filter at 7 wavelengths. The measured attenuation is calibrated to an equivalent mass of black carbon with an assumed 1/λ dependence. Data were collected since 2001 over different periods of the year. In 2004 the instrument was operated for most of the year.

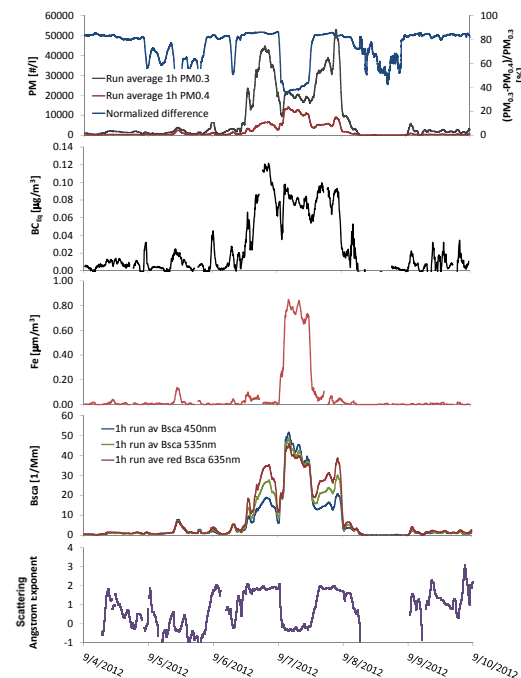


See also Poster by Katja Dzepina - 8RA.3 Thu 12:15-1:45 PM

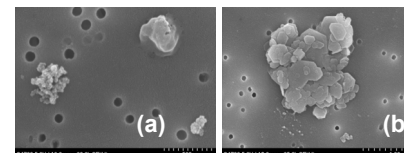
2012 Nephelometer Data



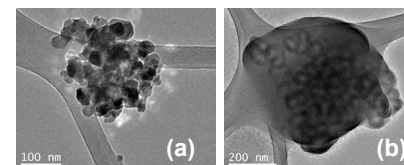
BC/Dust Event 2012



Electron Microscopy



SEM Images of bare soot and irregular particles (a) Pico - 21 July 2012 and dust particle (b) Pico - 22 July 2012



TEM Images of bare (a) Pico - 28 July 2012 and compacted-coated soot (b) Pico - 29 July 2012

Acknowledgments

1. Richard Honrath for his pioneering effort in establishing the site and building the collaboration network
2. Mark Wise for assisting in the installation of the particle sizer
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