Abstract submitted for the AGU Fall Meeting section: Anthropogenic-Biogenic Interactions Affecting the Atmospheric Chemistry and Physics over Tropical Rainforests

Light Absorption of Biogenic Aerosol Particles in Amazonia

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Aerosol absorption is a key issue in proper calculation of aerosol radiative forcing. Especially in the tropics with the dominance of natural biogenic aerosol and brown carbon, the so called anomalous absorption is of particular interest. A special experiment was designed to study the wavelength dependence of aerosol absorption for PM2.5 as well as for PM10 particles in the wet season in Central Amazonia. Aerosol analysis occurred from May to August 2014, in the ZF2 ecological reservation, situated at about 55 km North of Manaus in very pristine conditions Two 7 wavelengths AE33 Aethalometers were deployed measuring in parallel, but with a PM2.5 and PM10 inlets. Two MAAP (Multiangle Aerosol Absorption Photometer) were operated in parallel with the AE33 at the same PM2.5 and PM10 inlets. Organic and elemental carbon was analyzed using collection with quartz filters and analysis using a Sunset OC/EC analyzer. Aerosol light scattering for 3 wavelengths was measured using Air Photon and TSI Nephelometers. Aerosol size distribution was measured with one TSI SMPS and a GRIMM OPC to have the size range from 10 nm to 10 micrometers. Particles were measured under dry conditions using diffusion dryers. Aerosol optical depth and absorption was also measured with an AERONET sunphotometer operated close to the site.

As the experiment was run in the wet season, very low equivalent black carbon (EBC) were measured, with average concentrations around 50 ng/m^3 during May, increasing to 130 ng/m^3 in June and July. The measurements adjusted for similar wavelengths shows excellent agreement between the MAAP and AE33 for both inlets (PM2.5 and PM10). It was not possible statistically infer absorption from the coarse mode biogenic particles, since the absorption was completely dominated by fine mode particles. AERONET measurements shows very low averages values of AOD, at 0.17 at 500 nm and 0.13 at 870 nm, with very low absorption AOD values at 0.00086 at 676 nm and 0.0068 at 872 nm. Single scattering albedo values will be calculated.