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Aerosol Physical and Chemical Properties Before and After the Manaus Plume in the GoAmazon2014 Experiment

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Abstract Text:

As part of the GoAmazon2014 experiment, several aerosol and trace gas monitoring stations are being operated for at least one year before and after the Manaus plume. Three sites are being operated in pristine conditions, with atmospheric properties under natural biogenic conditions. These three sites called T0 are: ATTO (Amazon Tall Tower Observatory), ZF2 ecological research site and a third site called EMBRAPA. After the air masses are exposed to the Manaus plume, one site (called T2) is being operated right on the opposite side of the Negro River under the direct influence of the Manaus plume at 5 Km downwind of Manaus. Finally, at about 150 Km downwind of Manaus is the T3 Manacapuru site. Aerosol chemical composition is being analyzed using filters for fine (PM_{2.5}) and coarse mode aerosol as well as three Aerodyne ACSM (Aerosol Chemical Speciation Monitors) instruments. Aerosol absorption is being studied with several aethalometers and MAAP (Multi Angle Absorption Photometers). Aerosol light scattering are being measured at several wavelengths using nephelometers. Aerosol size distribution is determined using scanning mobility particle sizers. The aerosol column is measured using AERONET sunphotometers before and after the Manaus plume, as well as several Lidar systems.

The three sites before the Manaus plume show remarkable similar variability in aerosol concentrations and optical properties. This pattern is very different at the T2 site, with large aerosol concentrations enhancing aerosol absorption and scattering significantly. The aerosol is very oxidized before being exposed to the Manaus plume, and this pattern changes significantly for T2 and T3 sites, with a much higher presence of less oxidized aerosol. Typical ozone concentrations at mid-day before Manaus plume is a low 10-12 ppb, value that changes to 50-70 ppb for air masses suffering the influence of Manaus plume. A detailed comparison of aerosol characteristics and composition for the several sites will be presented together with air mass trajectories following the evolution of aerosol and trace gases in GoAmazon2014.

Session Selection: Anthropogenic-Biogenic Interactions Affecting the Atmospheric Chemistry and Physics over Tropical Rainforests

Title: Aerosol Physical and Chemical Properties Before and After the Manaus Plume in the

GoAmazon2014 Experiment

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Preferred Presentation Format: Assigned by Program Committee (Oral or Poster)

Scheduling Request: None

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