Changes in natural biogenic aerosols in Amazonia influenced by urban air pollution at the GoAmazon 2014/15

P. ARTAXO[1*], H. M. J. BARBOSA[1], J. F. DE BRITO[1], S. CARBONE[1], C. FIORESE[1], L. V. RIZZO[2], S.T. MARTIN[3]

[1] University of São Paulo, São Paulo, Brazil
[2] Federal University of São Paulo, Brazil.
[3] Harvard University, Cambridge, USA
(*correspondence: artaxo@if.usp.br)

As part of the GoAmazon2014/15 experiment, several aerosol and trace gas monitoring stations were operated for two years before and after the Manaus urban plume in Central Amazonia. Aerosol chemical composition is being analysed using filters for fine (PM2.5) and coarse mode aerosol as well as three real time Aerodyne ACSM (Aerosol Chemical Speciation Monitors) instruments. Optical properties were measured with aethalometers, MAAP, and nephelometers. Aerosol size distribution is measured with SMPS in the range of 10 to 600 nm. The aerosol optical depth (AOD) was measured using AERONET sunphotometers and Lidars.

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 as a result of the Manaus pollution plume. 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. Aerosol size distribution also change significantly, with stronger presence of nucleation mode particles. A detailed comparison of aerosol characteristics and composition for the several sites will be presented showing the evolution of aerosol and trace gases in GoAmazon2014/15.