

Microphysics of Amazonian aerosol under pristine condition and the impact from Manaus urban plume observed during GoAmazon campaign

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The Green Ocean Amazon (GoAmazon) campaign takes place from January 2014 to December 2015 in the vicinity of Manaus, Brazil. One of the main objectives of GoAmazon is to study the aerosol lifecycle under pristine condition and the impact from Manaus urban plume. During GoAmazon, comprehensive characterization of aerosol and trace gases are carried out both at surface sites continuously, and onboard DOE Gulfstream-1 (G-1) research aircraft from February 15th to March 25th (wet season), and from September 5th to October 15th, 2014. Here we present diurnal variation of aerosol properties, including aerosol size distribution and CCN spectrum under pristine conditions observed at the T3 site, 70 km downwind of the Manaus city. Also shown are vertical distributions of aerosol observed onboard G-1. The sources and sinks of aerosol particles under pristine conditions are discussed. Measurements show strongly enhanced nucleation and Aiken mode particle concentrations in Manaus plume. As the plume travels downwind, particle growth and higher CCN activation fraction are observed. The particle growth inside the plume is likely due to condensation of secondary species and coagulation. The vertical distribution of aerosol measured onboard G-1 suggests cumulus clouds enhance the upward transport of aerosol and pollutants from the surface. The impact of Manaus urban plume on aerosol size distribution and CCN spectrum are examined, and the results from wet and dry seasons are compared.