



Long term measurements of physical and chemical properties of biogenic atmospheric aerosols at the ATTO tower, Central Amazonia

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The ATTO (Amazonian Tall Tower Observatory) is a 325 m tall tower in Central Amazonia, where aerosol and trace gases are being continuously analyzed. A 60 m tall tower is also used to measure aerosol properties close to the forest canopy. Organic and inorganic composition, optical properties, size distribution, vertical profile and other measurements are routinely observed. In the wet season, very low concentration of particles is being measured. Strong gradients of particle properties can be observed from 85 to 325 meters heights. Episodic downdraft associated with convective systems brings particles produced in the upper troposphere to the lower boundary layer. Wet season particle number concentrations are about 340 \#/cm^{-3} , with an average diameter of 150 nm. Aerosols are 70-85% organic in composition, with very low sulfate and nitrate. New particle formation is only observed after convective rain events, or after sunrise, with a very low frequency. In the fine fraction, SOA dominates 80% of aerosol mass, while in the coarse mode we observe 6-10 $\mu\text{g/m}^3$ of coarse mode primary biogenic aerosol particles. Strong gradients on the ATTO tower is being observed for biogenic particles. Equivalent black carbon is at a low 250-300 ng/m^3 in the wet season, with brown carbon a low fraction, as can be observed using absorption Ångström exponent. An overview of these extensive measurements will be provided.