

# CCN activity of Amazonian aerosols: diel and seasonal variations

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During the Green Ocean Amazon (GoAmazon) 2014/5 campaign size-resolved cloud condensation nuclei (CCN) spectra were collected and characterized at a measurement site (T3) 5 hours downwind of the city of Manaus (pop. 2 million). These measurements ran from March 12, 2014 to March 3, 2015. Particle hygroscopicity ( $\kappa_{\text{CCN}}$ ) and chemical mixing state were derived from the particle activation spectrum measured by size selecting aerosols and exposing them to a wide range of supersaturation in the CCN counter. The supersaturation was varied between 0.07 and 1.1% by changing a combination of both total flow rate and temperature gradient in the CCN counter. During October 2014, measurements were also made in combination with the Oxidation Flow Reactor (OFR) system coupled to an Aerosol Mass Spectrometer (AMS). This enabled evaluation of a range of measured organic particle hygroscopicities with respect to indicators of oxidation ( $f_{44}$  and O:C) as measured by the AMS and the Aerosol Chemical Speciation Monitor (ACSM). We observe overall diel trends in  $\kappa_{\text{CCN}}$ , its dispersion ( $\sigma_{\kappa}/\kappa_{\text{CCN}}$ ), hygroscopicity of the organic components of the aerosol ( $\kappa_{\text{org}}$ ), and  $f_{44}$  for all of the seasons and air mass sources. We discuss the factors contributing to the changing particle hygroscopicity throughout the day with respect to air mass sources and relative to the regional background aerosol. . The annual  $\kappa_{\text{CCN}}$  trend ( $\kappa_{\text{CCN}} = 0.14 \pm 0.04$  (wet season),  $0.12 \pm 0.04$  (dry season)) can, for the most part, be explained by the changing aerosol composition and contributions from the various air mass sources encountered by the T3 site; that is, regional background changes during the transition from the wet to dry season from clean to heavily influenced by biomass burning. Background conditions are sampled in ~19% of the available data while polluted and biomass burning conditions each make up ~40% of the available data.