



## Observation of nucleation size particles in the Amazon

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New particle formation (NPF) and subsequent growth of nanometer particles is on a global scale responsible for a substantial fraction of the total particle budget and the number of cloud condensation nuclei (CCN). Under pristine conditions, NPF can be of particular significance when the activation of CCN to cloud droplets is mostly limited by the amount of available aerosol particles.

One of the few continental places to study atmospheric aerosols under present-day-pristine conditions is the Amazon rain forest. Here, we will present observations from the Amazon Tall Tower Observatory (ATTO) site, which is located about 150 km northeast of the city of Manaus, Brazil.

The ATTO site is equipped to measure microphysical, chemical, hygroscopic and optical particle properties well-above (325 m), close to (60 m) and below (5 m) the canopy.

Particle number size distributions inside and above canopy suggest, at least, two different types of new particle formation events or sources. In contrast to the well-established continental banana-like events, a large fraction of the observed events at ATTO features a burst-like character without subsequent growth.

These events, which are typically shorter than 1-2 hours, occur during the dry and wet season, preferably during night and sporadically in the presence of fog. The burst-like character and the sharp gradients of particle number concentration might indicate local particle sources.

In contrast, a rather regional increase of nucleation size particles is frequently observed during the wet season. In combination with vertical transport, often related to convective rainfall, these events extend over large vertical and horizontal distances.

In this study, we investigate different phenomena of nucleation size particles, with respect to their annual and diurnal behaviour. We focus on their sources and significance vertically resolved inside, close to and well-above the Amazon rain forest canopy.

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