

A one-year study on coarse mode aerosol cycling in the Amazonian rainforest

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As a part of the ATTO (Amazon Tall Tower Observatory) project in the remote Amazonian rain forest located at: 2° 8' 36.1''S and 59° 0' 2''W; close to Manaus-Brazil,—a—long-term aerosol measurements have been conducted with specific focus on aerosol size, absorptivity, hygroscopicity, and chemical composition. The measurements help to understand the interplay of biogenic and anthropogenic aerosol as well as their significance for atmospheric cycling in this unique ecosystem.

This study presents initial results from a one year data set of optical particle sizing (0.3 - 10 μm), with focus on the seasonal and diurnal cycling of coarse mode particles. The measurements have been conducted continuously since February 2014, covering the rainy and dry season as well as transitional periods.

Throughout the year, the coarse mode particle concentration (number and mass) showed comparably low and constant values without any substantial variability; by means, that the local bioaerosol cycling accounts for a major fraction of the coarse mode burden. One exception was the African dust intrusions, which typically occurred between February and March. They were characterized by a strongly increased coarse mode concentration.

On the other hand, also a pronounced diurnal cycle ('pulsing pattern') was observed with maximum concentrations during the night as showed on figure 1, which has been experienced in previous works (Huffman et al., 2012).

We will present results with particular focus on the interplay of bioaerosol emissions and boundary

layer influences. In addition, meteorological parameters are taken into account to understand; whether or not, specific patterns in coarse mode concentrations reflect episodes with increased bioaerosol emission from the forest ecosystem. The long-term observation of coarse mode particles and a broad set of additional measurements at the ATTO site help to understand the role of bioaerosols in the atmospheric cycling of this biologically very active ecosystem.

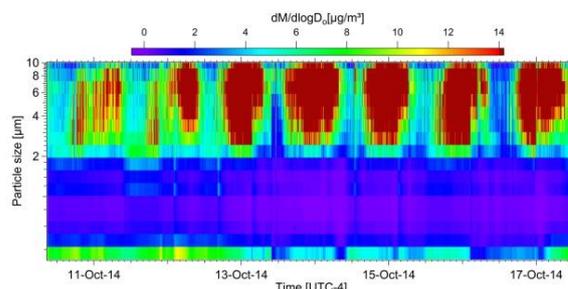


Figure 1. Contour plot of mass concentration $dM/d\log D_0$ ($\mu\text{g}/\text{m}^3$) during October 2014.

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Huffman, J. A., Sinha, B., Garland, R. M., Snee-Pollmann, A., Gunthe, S. S., Artaxo, P., . . . Pöschl, U. (2012). Size distributions and temporal variations of biological aerosol particles in the Amazon rainforest characterized by microscopy and real-time UV-APS fluorescence techniques during AMAZE-08. *Atmospheric Chemistry and Physics*, 12(24), 11997-12019. doi: 10.5194/acp-12-11997-2012