Long term observations of Sahara dust in Central Amazonia at the ATTO and ZF2 towers

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The Amazon, during the wet season, receives dust supplies from the Sahara desert, which is the largest source of global dust. We have analyzed the elemental composition of aerosol filter samples from 2008 to 2015, together with Aeronet AOD and ground based light scattering and absorption. Scattering and absorption Ångström matrix was used to identify Sahara dust events. Large scale AOD derived from the MODIS and HYSPLIT air mass trajectories complemented the analysis.

The mean volumetric radius ranged from 1.3 μm to 8.7 μm, and dust contributed up to 78% of AOD at 500 nm. Dust accounted for a concentration of 204 ng/m^3, and 60 dust-intensive events were identified between 2008 and 2015. The black barbon in the wet season has an average of 265 ± 250 ng/m^3, and has higher concentrations during the dust transport events. The Ångström parameter of scattering and absorption was calculated during dust transport episodes, with scattering values ≤ 0.50 and absorption of ≥ 1,11. The analysis of back-trajetories and remote sensing confirm that the origin of the air masses were Sahara and Sahel. From these results it can be concluded that the highest frequency of dust deposition during the wet season occurs between mid-January and May and that soil dust has an average contribution of 14.6% of the measured mass and its deposition has a strong impact on the absorption and scattering coefficients at the visible spectrum, and impacts the radiation balance over Amazonia.