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Chemical apportionment of size-resolved aerosol particles during the dry-to-wet period in the Brazilian Amazon

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Size-resolved chemical characterization was performed on aerosol samples collected in a pasture site in the Amazon Basin as part of the project LBA-SMOCC 2002 (*Large Scale Biosphere Atmosphere Experiment in Amazonia - Smoke Aerosols, Clouds, Rainfall and Climate: Aerosols from Biomass Burning Perturb Global and Regional Climate).* The sampling period (Sept. to Nov. 2002) included the end of the dry season, the transition period, and the beginning of the wet season. Real-time measurements of particle number concentrations were performed simultaneously with aerosol filter sampling. A Dekati low-pressure impactor (DLPI) with 13 stages was used to collect particles with diameters below 10 μm and above 0.03 μm. The mass concentrations collected on the DLPI aluminum substrates were determined by gravimetric analyses. The determination of the concentrations of carbonaceous species (elemental carbon and organic carbon) and the water-soluble ions (Na^+, NH_4^+, K^+, Mg^{2+}, Ca^{2+}, Cl^-, NO_3^-, SO_4^{2-}) was performed using evolved gas analysis and ion chromatography, respectively. A light transmission method was used to determine the mass concentrations of the absorbing fraction for the size-resolved samples.

Preliminary results show that carbonaceous aerosol comprised more than 85% of the total aerosol mass during the three sampling periods. Particle number concentrations

showed seasonal variation (dry: 8000 cm^{-3} and wet: 2000cm^{-3}). Size-resolved mass concentrations showed higher concentration during nighttime (day vs. night: 40.9 μg m^{-3} vs. 76.9 μg m^{-3}). Mass concentrations for the fine fraction were higher than the coarse fraction during the dry period (fine: 56.7 μg m^{-3}; coarse: 4.1 μg m^{-3}) due to biomass burning emissions. The aerosol during the dry season was composed mainly of pyrogenic aerosols (SO_4^{2-} (30%), NO_3^-, (26%), NH_4^+ (20%), and K^+(20%)) and the coarse fraction was mainly composed of biogenic and dust particles (NO_3^- (46%), Na^+ (22%) and SO_4^{2-} (12%)). During the beginning of the wet season aerosols were mainly composed of biogenic particles with SO_4^{2-} (59%) and NH_4^+ (27%) dominating the fine fraction and SO_4^{2-} (28%), NO_3^- (29%) and K^+(20%)in the coarse fraction. The size-resolved carbonaceous material measured by the light transmission method showed higher concentrations for particles with diameters between 0.1 to 0.6 μm. Additional results on the size-resolved concentrations of the carbonaceous aerosol and its absorbing properties will be presented.