The Large Scale Biosphere - Atmosphere Experiment in Amazonia (LBA) atmospheric chemistry Program: First results

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A better understanding of tropical atmospheric chemistry is important for several global change questions. The LBA "Large Scale Biosphere-Atmosphere Experiment in Amazonia – LBA" experiment will address key questions regarding the role of Amazonia in regional and global climate. The LBA experiment is structured in five components: 1) Physical climate; 2) Carbon cycle and biogeochemistry; 3) Chemistry and Physics of the atmosphere; 4) Hydrology and water chemistry; 5) Numerical Modeling.

On the Chemistry and Physics of the atmosphere component, we are installing and operating continuously for four years three atmospheric monitoring stations at different locations in Amazonia. These sites will have CO_2 flux towers from the LBA experiment. At these sampling stations we will measure continuously several trace gases, including CO_2, CH_4, N_2O, CO, VOCs (Volatile Organic Compounds), and SVOCs (Semivolatile Organic Compounds), NO_x, NO_y and Ozone. Aerosol particles will be studied in detail, with measurements of aerosol composition, size distribution and optical properties, as well as organic and elemental carbon. In addition, precipitation composition in terms of trace elements, ionic content, dissolved and total carbon are being measured, in order to obtain the wet deposition fluxes of essential nutrients.

Two intensive field studies were performed in Manaus in March-April 1998 and in Rondonia (January-March 1999). The first site is a primary rain forest site, and the second site have both pasture and forest sites. In Balbina, ozone concentrations were very low (8-10 ppb) at mid-day. Aerosol concentrations were also extremely low, on the range of 3-10$\mu g/m^3$ PM_{10}. Black carbon was at about 50 ng/m^3 range, assuring the absence of any significant biomass burning component. Aerosol particle number concentration was about 400 particles/cc. A strong Sahara dust event was observed with high load (20$\mu g/m^3$) of soil dust and marine aerosol concentrations. In Rondonia, ozone concentrations were higher than in Manaus, (15-20ppb) at mid day, with also higher aerosol concentrations were observed due to higher regional anthropogenic emissions. Black carbon were at the level of 100 ng/m^3, and total aerosol number concentration averages at 800 particles/cc. The presence and chemical and radiative properties of natural biogenic aerosol particles will be studied in detail.

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Oral Presentation, Section 1