LBA

Experimento de Grande Escala
da Biosfera-Atmosfera na Amazônia

2ª Conferência Científica Internacional do LBA

07 a 10 de Julho de 2002

Centro de Convenções Studio 5,

Av. Rodrigo Otávio, 3555 - Distrito Industrial

Fone: (092) 216-3555 Manaus/AM

Organização:
Secretaria da Conferência
LBA - Escritório Gerencial de Manaus, INPA
Email: lbaconf@inpa.gov.br
Tel: (92) 216-6205 Telefax: (92) 643-3256
Manaus - AM - Brasil

Variations in carbon monoxide concentrations at a Central Amazonian site.

J. William Munger[1], Daniel M. Matross[1], Bruce C. Daube[1], V. W. J. H. Kirchhoff[2], Paulo Artaxo[3], Luciana Vanni Gatti[4], Steven C. Wofsy[1].

[1]Harvard University, Division of Engineering and Applied Sciences
20 Oxford St.
Cambridge, MA 02138 USA

[2] INPE
[3] Instituto de Fisica, USP
[4] IPEN

Carbon Monoxide (CO) plays a major role in controlling the global levels of OH in the atmosphere, and is a tracer of combustion sources. CO measurements are being made at a forested site near Santarem, Para, Brazil (km67 tower site) in order to determine background CO levels in the clean continental tropical atmosphere, to identify factors that control CO levels, and to serve as a tracer for emissions from local and distant biomass burning. A CO measurement system consisting of a Thermo Environmental Instruments model 48CTL analyzer, cold-trap at 2.5C to eliminate variations in water vapor interference, zeroing catalyst, and automated calibration with 100 and 500 nmol mol^{-1} standards was installed in April, 2001. Sample is drawn from an inlet above the forest canopy.

CO concentrations were less than 100 nmol mol^{-1} on average, with no significant diel variation during the rainy season, April to June. The wet season data indicate a low regional background CO concentration and suggest that the local forest is neither a significant source nor sink for CO. In mid July, after local rain ended, there was a modest increase in CO concentration that was not accompanied by a large increase variance. This increase we attribute to increased transport from distant CO sources or to increased production by photochemistry of biogenic hydrocarbons contributing to regional enhancement in CO. In late August, the variability of CO concentrations begins to increase dramatically. Individual half-hour concentrations exceed 1000 nmol mol^{-1}. By November, the frequency and magnitude of high CO events has increased. Maximum concentrations up to 5000 nmol mol^{-1} are observed and the minimum concentrations have increased to about 200 nmol mol^{-1}. The high CO levels and large variability are due to nearby fires. The diel variation during the late dry season when local fires are present shows a strong enhancement during the night as smoke is trapped in the nocturnal boundary layer. CO concentrations drop sharply after January 1, 2002 when heavy rains put an end to local burning.

CO during the burning season will be used as a tracer to quantify the contribution by fires to CO_2 variability and to determine emission factors for aerosol components.