Atmos. Chem. Phys. Discuss., 5, S3365–S3366, 2005
www.atmos-chem-phys.org/acpd/5/S3365/
European Geosciences Union

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Airborne measurements of trace gas and aerosol particle emissions from biomass burning in Amazonia" *by* P. Guyon et al.

P. Guyon et al.

Received and published: 20 October 2005

Answer to Referee's point #1: 1) the authors claim they retrieved emission ratios for aerosol number concentration from deforestation fires, but on page 2797 they mentioned they had an instrumental problem with the particle counter which saturated when concentration was higher than 6999 cm-3, limiting analysis for data collected on the edges of the emitted plumes. Could the obtained aerosol number emission ratio present a bias due to this methodological problem?

Our analysis is based on the assumption that there is a linear dependence between CO and aerosol number concentration from biomass burning fires. As a matter of fact, 75 % of the correlation coefficients (r2) of the CN-to-CO linear regressions were larger than 0.84, and all were statistically significant (ms page: 2803). There is no reason

to assume that dilution of the particles in the course of plume mixing with surrounding air either produces or removes particles. Consequently, the same dilution of aerosol particles as of CO takes place and thus the CN/CO relation is the same close to the edges as inside the plume. Therefore, we could not expect that sampling at the center of the plumes would have changed our results significantly.

Answer to Referee's point #2: 2) Actually, due to an instrumentation limit the estimated emission ratio comprises aerosol particles smaller than 300-500 nm in diameter only. From Reid and Hobbs, 1998 (JGR 103 D24, 32013-32030), particles larger than 1 micrometer in diameter can also be detected.

Correct. Supermicron particles are emitted from biomass burning fires. However, citing the reference the referee mentions (Reid and Hobbs, 1998, JGR 103 D24, 32013-32030), these particles only make less than 10% of the total particle volume. Therefore, supermicron particle make an infinitesimally small part of the total aerosol number in biomass smoke. In the boundary layer, where most of our data are taken, the inlet does not lead to significant losses up to 500 nm. The aerosol size spectra presented in Rissler et al. (ACPD 5(2005) 8149-8207) show that only a negligible part of the number distribution is above 500 nm. At the highest flight altitudes, when inlet losses may become important at 300 nm, up to 5% of particles may be lost, which is in the range of the error we give (see instrumental section of the ms).

Answer to Referee's point #3: 3) How much those limitations could interfere on the estimated CN emission ratio/factor?

To make this clearer, we have added a short description in Section 2.1.

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 2791, 2005.