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## On the diurnal variability of particle properties related to light absorbing carbon in Mexico City

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**Abstract.** The mass of light absorbing carbon (LAC) in individual, internally mixed aerosol particles was measured with the Single Particle Soot Photometer (SP2) in April of 2003 and 2005 and evaluated with respect to concentrations of carbon monoxide (CO), particle bound polycyclic aromatic hydrocarbons (PPAH) and condensation nuclei (CN). The LAC and CO have matching diurnal trends that are linked to traffic patterns and boundary layer growth. The PPAH reaches a maximum at the same time as CO and LAC but returns rapidly back to nighttime values within three hours of the peak. The number of particles containing LAC ranges between 10% to 40% of all particles between 150 nm and 650 nm and the mass is between 5% and 25% of the total mass in this size range. The average LAC equivalent mass diameter varies between 160 and 230 nm and the thinnest coating of non-light absorbing material is observed during periods of maximum LAC mass. The coating varies between 10 nm and 30 nm during the day, but is a strong function of particle size. The mass absorption cross sections,  $\sigma_{\text{abs}}$ , derived from the SP2, are  $5.0 \pm 0.2 \text{ m}^2 \text{ g}^{-1}$  and  $4.8 \pm 0.2 \text{ m}^2 \text{ g}^{-1}$ , dependent on the optical model used to describe LAC mixtures. The LAC contributes up to 50% of the total light extinction in the size range from 100 nm to 400 nm. The estimated emission rate of LAC is 1200 metric tons per year in Mexico City, based upon the SP2 measurements and correlations between LAC and CO.

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