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Atmos. Chem. Phys., 9, 3721-3730, 2009

www.atmos-chem-phys.net/9/3721/2009/

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## Primary and secondary contributions to aerosol light scattering and absorption in Mexico City during the MILAGRO 2006 campaign

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**Abstract.** A photoacoustic spectrometer, a nephelometer, an aethalometer, and an aerosol mass spectrometer were used to measure at ground level real-time aerosol light absorption, scattering, and chemistry at an urban site located in North East Mexico City (Instituto Mexicano del Petroleo, Mexican Petroleum Institute, denoted by IMP), as part of the Megacity Impact on Regional and Global Environments field experiment, MILAGRO, in March 2006. Photoacoustic and reciprocal nephelometer measurements at 532 nm accomplished with a single instrument compare favorably with conventional measurements made with an aethalometer and a TSI nephelometer. The diurnally averaged single scattering albedo at 532 nm was found to vary from 0.60 to 0.85 with the peak value at midday and the minimum value at 07:00 a.m. local time, indicating that the Mexico City plume is likely to have a net warming effect on local climate. The peak value is associated with strong photochemical generation of secondary aerosol. It is estimated that the photochemical production of secondary aerosol (inorganic and organic) is approximately 75% of the aerosol mass concentration and light scattering in association with the peak single scattering albedo. A strong correlation of aerosol scattering at 532 nm and total aerosol mass concentration was found, and an average mass scattering efficiency factor of 3.8 m<sup>2</sup>/g was determined. Comparisons of photoacoustic and aethalometer light absorption with oxygenated organic aerosol concentration (OOA) indicate a very small systematic bias of the filter based measurement associated with OOA and the peak aerosol single scattering albedo.

Final Revised Paper (PDF, 829 KB) Discussion Paper (ACPD)

Citation: Paredes-Miranda, G., Arnott, W. P., Jimenez, J. L., Aiken, A. C., Gaffney, J. S., and Marley, N. A.: Primary and secondary contributions to aerosol light scattering and absorption in Mexico City during the MILAGRO 2006 campaign, Atmos. Chem. Phys., 9, 3721-3730, 2009. Bibtext EndNote Reference Manager



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