Geophysical Research Abstracts,
Vol. 10, EGU2008-A-06073, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-06073
EGU General Assembly 2008

Source apportionment of fine organic aerosol in Mexico City during the MILAGRO experiment 2006

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Mega-cities can have a large impact on regional air quality due to their high population density and many emission sources. The Megacity Impacts on Regional and Global Environment (MIRAGE) study of the atmosphere in Mexico City, as part of the Megacity Initiative: Local and Global Research Observations (MILAGRO), was designed to characterize the chemical composition and the transformation of atmospheric pollutants generated in and transported from the urban area. OC comprises a large fraction of fine particulate matter (PM2.5) in Mexico City. Daily and select 12-h PM2.5 samples were collected in urban (T0) and peripheral (T1) sites in Mexico City from 17–30 March 2006. Samples were analyzed for OC and elemental carbon (EC) and also organic molecular markers by gas chromatography-mass spectrometry. Real-time water-soluble organic carbon (WSOC) was collected at the peripheral site. A chemical mass balance model (CMB) based on molecular marker species was used to determine the relative contribution of major sources to ambient OC. Motor vehicles, including diesel and gasoline, consistently accounted for 47% of OC at T0 and 31% at T1. The daily contribution of biomass burning to OC ranged from 5–30% at T0 and 11–50% at T1. The remaining OC, unapportioned to primary sources, showed a strong correlation with WSOC and was considered to be secondary in nature. This study provides quantitative understanding of the important sources of OC during the

MILAGRO 2006 field campaign.