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Modeling of secondary organic aerosols from mobile sources in Mexico City

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Mobile sources are significant contributors of emissions of CO, NOx, hydrocarbons and particle matter (PM) that constitute critical precursors of ozone as well as secondary organic and inorganic particles that decisively impact the photochemical levels and aerosol loadings in the atmosphere. Currently there are large uncertainties in regional air quality models during the treatment of aerosol formation from aerosol precursors via the production of condensable organic gases. As a result, the modeling of the concentrations and properties of aerosols resulted from mobile emissions sources is an important challenge. In this study we compare aerosol simulations using the PM-CAMx air quality model linked to the SAPRC99 chemical mechanism with measured aerosol data obtained during the MILAGRO/MCMA-2006 field campaign in Mexico City. The PM-CAMx modeling framework is based on the volatility-basis approach: both primary and secondary organic components are assumed to be photochemically reactive and are logarithmically distributed in volatility bins. The distinction of the volatility properties of aerosols precursors is particularly important for diesel and gasoline emission sources due to their different organic carbon speciation emissions profiles. Using this volatility-basis technique, we will present results on the relative contributions from both gasoline and diesel vehicle fleet emission sources to the formation of secondary organic aerosols in an urban area.