



## **Characterizing the relationship between ozone formation and its precursors under different meteorological conditions in a megacity**

L. T. Molina (1,2), W. Lei (1,2), J. Song (1,2), N. Bei (1,2), D. Thornhill (1,2), B. de Foy (1,3) and M. Zavala (1,2)

(1) Molina Center for Energy and the Environment, CA, USA, (2) Department of Earth, Atmospheric and Planetary Sciences, Massachusetts Institute of Technology, MA, USA, (3) Department of Earth and Atmospheric Sciences, Saint Louis University, MO, USA

(ltmolina@mit.edu)

MILAGRO (Megacity Initiative: Local and Global Research Observations) was a multi-national field study that took place in Mexico City in March, 2006, aimed to understand the transport and transformation of emitted gases and aerosols from a megacity from local to global scales. Measurements of aerosols, VOCs and other gaseous species, as well as meteorological and solar radiation parameters inside the Mexico City basin were obtained during MCMA-2006, a component of MILAGRO, and in 2003 during the MCMA-2003 field campaign. The vast amount of datasets obtained is used to constrain and evaluate air quality models to improve our understanding of air pollution from urban areas. Ultimately, the knowledge gained will be incorporated into the formulation and evaluation of air pollution related policies in megacities. During the field campaigns, multi-daily meteorological events were categorized into several episodes (O3-North, O3-South, Cold Surge, South Venting, Convection South, and Convection North) according to the prevailing wind patterns and meteorological parameters in the region. In this work, we examine ozone photochemical formation rates using the Comprehensive Air Quality Model with extensions (CAMx v4.40) under several meteorological categories. The model's meteorological and chemical initial and boundary conditions are constrained with observations and the emissions inputs

are validated using locally measured emission rates during the campaigns. The performance of the model is evaluated with a large dataset of VOCs and other gaseous observations obtained during MCMA-2006. With the construction of validated base cases, the sensitivity of ozone formation to its precursors, including highly reactive aldehydes, under different meteorological episodes is also examined.