BNL-79682-2007-AB

MODELING GAS-AEROSOL PROCESSES DURING MILAGRO 2006

Zaveri, R. A., Chapman, E. G., Easter, R. C., Fast, J. D., Flocke, F., Kleinman, L. I., Madronich, S., Springston, S. R., Voss, P. B., and Weinheimer, A.

For presentation at the
American Geophysical Union Fall Meeting
San Francisco, CA
December 10-14, 2007

[*Eos Trans. AGU 88*(52), Fall Meet. Suppl., Abstract A33D-1570]

Environmental Sciences Department/Atmospheric Sciences Division
Brookhaven National Laboratory
P.O. Box, Upton, NY
www.bnl.gov

MODELING GAS-AEROSOL PROCESSES DURING MILAGRO 2006

Zaveri, R A , Rahul.Zaveri@pnl.gov , Pacific Nortwest National Laboratory, MSIN K9-30, P.O. Box 999, Richland, WA 99352
Chapman, E G , elaine.chapman@pnl.gov , Pacific Nortwest National Laboratory, MSIN K9-30, P.O. Box 999, Richland, WA 99352
Easter, R C , richard.easter@pnl.gov , Pacific Nortwest National Laboratory, MSIN K9-30, P.O. Box 999, Richland, WA 99352
Fast, J D , jerome.fast@pnl.gov , Pacific Nortwest National Laboratory, MSIN K9-30, P.O. Box 999, Richland, WA 99352
Flocke, F , ffl@ucar.edu , National Center for Atmospheric Research, Atmospheric Chemistry Division, Boulder, CO 80307
Kleinman, L I , kleinman@bnl.gov , Brookhaven National Laboratory, Environmental Sciences Department, Upton, NY 11973
Madronich, S , sasha@ucar.edu , National Center for Atmospheric Research, Atmospheric Chemistry Division, Boulder, CO 80307
Springston, S R , srs@bnl.gov , Brookhaven National Laboratory, Environmental Sciences Department, Upton, NY 11973
Voss, P B , pvoss@email.smith.edu , Smith College, Department, Northhampton, MA 01063
Weinheimer, A , wein@ucar.edu , National Center for Atmospheric Research, Atmospheric Chemistry Division, Boulder, CO 80307

Significant gas-aerosol interactions are expected in the Mexico City outflow due to formation of various semi- volatile secondary inorganic and organic gases that can partition into the particulate phase and due to various heterogeneous chemical processes. A number of T0-T1-T2 Lagrangian transport episodes during the MILAGRO campaign provide focused modeling opportunities to elucidate the roles of various chemical and physical processes in the evolution of the primary trace gases and aerosol particles emitted in Mexico City over a period of 4-8 hours. Additionally, one long-range Lagrangian transport episode on March 18-19, 2006, as characterized by the Controlled Meteorological (CMET) balloon trajectories, presents an excellent opportunity to model evolution of Mexico City pollutants over 26 hours. The key tools in our analysis of these Lagrangian episodes include a comprehensive Lagrangian box-model and the WRF-chem model based on the new Model for Simulating Aerosol Interactions and Chemistry (MOSAIC), which simulates gas-phase photochemistry, heterogeneous reactions, equilibrium particulate phase-state and water content, and dynamic gas-particle partitioning for size- resolved aerosols. Extensive gas, aerosol, and meteorological measurements onboard the G1 and C130 aircraft and T0, T1, and T2 ground sites will be used to initialize, constrain, and evaluate the models. For the long-range transport event, in-situ vertical profiles of wind vectors from repeated CMET balloon soundings in the Mexico City outflow will be used to nudge the winds in the WRF-chem simulation. Preliminary model results will be presented with the intention to explore further collaborative opportunities to use additional gas and particulate measurements to better constrain and evaluate the models.