

***RECONSTRUCTION OF TRAJECTORIES, MIXING, AND DISPERSION OF A
MEXICO CITY POLLUTION OUTFLOW EVENT USING IN-SITU OBSERVATIONS
FROM FREE-FLOATING ALTITUDE-CONTROLLED BALLOONS***

Voss, P , Zaveri, R , Hartley, T , Deonandan, I , DeAmicis, P , Martinez Antonio, O ,
Contreras Jiménez, G , Greenberg, D , Estrada, M , Flocke, F , Madronich, S ,
Kleinman, L , Springston, S , Hubbe, J , de Foy, B , and Mao, H

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 A41F-07]

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

RECONSTRUCTION OF TRAJECTORIES, MIXING, AND DISPERSION OF A MEXICO CITY POLLUTION OUTFLOW EVENT USING IN-SITU OBSERVATIONS FROM FREE-FLOATING ALTITUDE-CONTROLLED BALLOONS

Voss, P , pvoss@email.smith.edu , Smith College, Picker Engineering Program 51 College Lane, Northampton, MA 01063

Zaveri, R , Pacific Northwest National Laboratory, Atmospheric Sciences & Global Change Division MSIN K9-30, P.O. Box 999, Richland, WA 99352

Hartley, T , Smith College, Picker Engineering Program 51 College Lane, Northampton, MA 01063

Deonandan, I , Smith College, Picker Engineering Program 51 College Lane, Northampton, MA 01063

DeAmicis, P , Smith College, Picker Engineering Program 51 College Lane, Northampton, MA 01063

Martinez Antonio, O , Universidad Autonoma Del Estado De Morelos, Av. Universidad 1001. Col.

Chamilpa Cuernavaca, Morelos, Cuernavaca, 62209, Mexico

Contreras Jiménez, G , Universidad Autonoma Del Estado De Morelos, Av. Universidad 1001. Col.

Chamilpa Cuernavaca, Morelos, Cuernavaca, 62209, Mexico

Greenberg, D , Mohawk Trail Regional School District, 24 Ashfield Rd., Shelburne Falls, MA 01370

Estrada, M , Instituto Nacional de Ecología, Periférico 5000, Col. Insurgentes Cuicuilco Delegación

Coyoacán, México D.F., 04530, Mexico

Flocke, F , National Center for Atmospheric Research, Atmospheric Chemistry Division P.O.Box 3000, Boulder, CO 80307

Madronich, S , National Center for Atmospheric Research, Atmospheric Chemistry Division P.O.Box 3000, Boulder, CO 80307

Kleinman, L , Brookhaven National Laboratory, Atmospheric Sciences Division Bldg. 815E, Upton, NY 11973,

Springston, S , Brookhaven National Laboratory, Atmospheric Sciences Division Bldg. 815E, Upton, NY 11973,

Hubbe, J , Pacific Northwest National Laboratory, Atmospheric Sciences & Global Change Division MSIN K9-30, P.O. Box 999, Richland, WA 99352

de Foy, B , Department of Earth and Atmospheric Sciences Saint Louis University, 205 O'Neil Hall 3642 Lindell Blvd, St. Louis, MO 63108

Mao, H , Climate Change Research Center University of New Hampshire, Morse Hall, 39 College Road, Durham, NH 03824,

The phenomenal growth of megacities, particularly in the developing world, has fueled interest in their effects on climate and air quality on the local, regional, and global scales. During the MILAGRO 2006 campaign, aircraft, satellites, and ground stations were coordinated to make the most intensive measurements to date of the transport and transformation of emissions from a tropical megacity. Likely the most certain case of long-range transport observed during the campaign occurred on March 18-19 when the DOE G1 and NCAR C-130 aircraft made coordinated observations within the Mexico City Metropolitan Area and the C-130 then intercepted the remnants of this urban air 24 hours later and 800 kilometers downwind near the U.S. boarder. Confidence in this event was significantly increased by two free-floating altitude-controlled balloons that remained embedded in the airmass while making repeated profile measurements of winds, thermal structure, and humidity during the transport process. This time series of quasi-Lagrangian soundings is probably the most comprehensive set of in-situ meteorological observations made in a long-range transport event. The profile data from the balloons is used to reconstruct trajectories and estimate mixing and dispersion throughout an advecting slab of the atmosphere. When combined with aircraft, satellite, and surface measurements, the balloon data provide a unique view of an advecting megacity plume that can be used to constrain both meteorological and photochemical models.