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Megacity Impacts on Regional and Global Environments (MIRAGE) *Forecasts and analyses for the Mexico City case study*

Summary

MIRAGE-Mex is an extensive observational mission in the outflow of the world's second largest metropolitan area, Mexico City (MC), coordinated by the National Center of Atmospheric Research (NCAR). The project aims to characterize the extent, persistence, and potential impacts of the MC urban plume in the surrounding regions and to increase the understanding of the chemical volutions and interactions in the plume over the urban-to-regional-to-global scale transition. Numerous universities from the US and Mexico, US government agencies like NASA and NOAA and Mexican agencies will collaborate in this campaign. The field campaign is scheduled for 1 March - 29 March 2006, and will involve coordinated aircraft and ground-based measurements supported by satellite observations and extensive modeling activities. While many modeling activities are performed on the urban scale, the program coordinators have identified larger-scale modeling as an important missing part in their program. In particular, accurate forecasts are needed for the planning of the flights 2-3 days downwind of MC, which shall target the MC plume as it mixes into the global background. Also, in the post-mission analysis, such modeling activities are needed. While one of the applicants was working at NOAA, the Lagrangian particle dispersion model FLEXPART was identified as an ideal tool for similar purposes and the model was the main model used for the flight planning and analysis during recent NOAA measurement campaigns. Therefore, NILU was invited to join MIRAGE and fill the missing gap. NILU will provide FLEXPART forecasts and analyses of the dispersion of the MC plume into the global background. Detailed source-receptor-relationships of the measured air masses will be established using inverse simulations from the flight tracks. The observed chemical aging in the air mass will be related to age spectra information derived from the FLEXPART output in order to determine the global impact of the MC plume.

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