

Using MM5 3DVAR System to Improve Photochemical Modeling during MCMA-2003 and MCMA-2006

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A three-dimensional variational data assimilation system for MM5 (MM5 3DVAR system) has been applied to numerical weather prediction to improve photochemical modeling in Mexico City during MCMA-2003 and MCMA-2006 campaigns. Three experiments have been conducted in this study, including pure forecast with GFS analysis data, simulation with assimilation of conventional meteorological observations, and simulation with assimilation of conventional and unconventional meteorological observations during the two campaigns. The results show that both magnitude and horizontal distributions of ozone and its precursors are improved by using data assimilation in the meteorological simulation. In addition, the secondary aerosol simulation results are especially sensitive to the meteorological fields used. In general, more observation data used in the meteorological simulation achieve more improvement in the photochemical simulation. Therefore, the 3DVAR data assimilation system is an effective method to provide better meteorological fields for air quality forecast.