

Numerical Simulation of Subgrid-scale Convective Cloud and Aerosol Interactions using a Regional Climate Modeling System

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A double-moment convective cloud microphysical scheme is implemented directly into a subgrid-scale convection parameterization scheme using the Weather Research & Forecasting (WRF) model coupled to the Community Multiscale Air Quality (CMAQ) model to facilitate convective cloud-aerosol interactions and study their climate impacts.

To understand aerosol indirect effects (AIE) on subgrid-scale convective clouds, two numerical simulations (one with background concentrations of aerosols and the second with aerosol concentrations predicted by CMAQ) are performed for the month of August 2006 covering the northern hemisphere using 108 km grids. These results along with the comparisons of the simulated cloud micro- and macro-physical and radiation parameters as well as other meteorological parameters with observations and reanalysis products will be presented.

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