BNL-68587-AB

SIMULATION OF THE INFLUENCE OF AEROSOL MICROPHYSICAL PROCESSES ON PROPERTIES OF SULFATE AEROSOLS IN THE EASTERN UNITED STATES 1: MASS AND NUMBER CONCENTRATIONS AND SIZE DISTRIBUTIONS

S. Yu, P. S. Kasibhatla, D. L. Wright, R. McGraw, and S. E. Schwartz
Atmospheric Sciences Division
Brookhaven National Laboratory
Upton, NY 11973-5000

July 2001

Presented at the
American Geophysical Union Spring Meeting
Boston, MA
May 29-June 2, 2001
[Paper A52C-07]

ABSTRACT

We investigate the influences of aerosol microphysical processes on geographical and vertical distributions of mass and number concentrations and size distributions of sulfate aerosols in the eastern U.S. during the summer 1995. The host 3-D regional model is the Multiscale Air Quality Simulation Platform (MAQSIP) for transport, driven by MM5 meteorological model. Aerosol dynamics and microphysics are simulated by the Quadrature Method of Moments (QMOM, Wright et al., GRL, 2000; Wright et al., JGR, 2001). The QMOM simultaneously tracks the six lowest-order radial moments of a particle size distribution directly in space and time without the need for explicitly representing the distribution itself. We compare modeled aerosol number and mass concentrations and effective radius with those obtained from the field measurements in the eastern U.S. during summer 1995 including IMPROVE (Sisler and Malm, 2000, J. Air & Waste Manage. Assoc.), CASTNeT (Holland et al., 1999, Atmos. Environ.), SEAVE (Andrews et al., 2000, J. Air & Waste Manage. Assoc) and measurements on Mt. Mitchell, NC (Yu et al., JGR, 2000). The relative contributions of various processes to the properties of sulfate aerosols are discussed.

Research by BNL investigators was performed under the auspices of the U.S. Department of Energy under Contract No. DE-AC02-98CH10886.