



Aerosols and Aerosol-related haze forecasting in China Meteorological Administration

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CMA Unified Atmospheric Chemistry Environmental Forecasting System (CUACE) is a unified numerical chemical weather forecasting system with BC, OC, Sulfate, Nitrate, Ammonia, Dust and Sea-Salt aerosols and their sources, gas to particle processes, SOA, microphysics and transformation. With an open interface, CUACE has been online coupled to mesoscale model MM5 and the new NWP system GRAPES (Global/Regional Assimilation and Prediction Enhanced System) in CMA. With Chinese Emissions from Cao and Zhang (2012 and 2013), a forecasting system called CUACE/Haze-fog has been running in real time in CMA and issue 5-days PM₁₀, O₃ and Visibility forecasts. A comprehensive ACI scheme has also been developed in CUACE. Calculated by a sectional aerosol activation scheme based on the information of size and mass from CUACE and the thermal-dynamic and humid states from the weather model at each time step, the cloud condensation nuclei (CCN) is fed online interactively into a two-moment cloud scheme (WDM6) and a convective parameterization to drive the cloud physics and precipitation formation processes. The results show that interactive aerosols with the WDM6 in CUACE obviously improve the clouds properties and the precipitation, showing 24% to 48% enhancements of TS scoring for 6-h precipitation.