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Results on an Inter-model Comparison on Secondary Aerosol Formation

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This study aims at comparing the gas-to-particle conversion mechanisms adopted by regional chemical transport models (CTMs). We use the results from twelve regional CTMs from the third phase of the Model Inter-Comparison Study for Asia (MICS-Asia III). The simulations are conducted over East Asia for the whole year of 2010. The models used are WRF-CMAQ (version 4.7.1 and v5.0.2), WRF-Chem (v3.6.1 and v3.7.1), GEOS-Chem, NHM-Chem, NAQPMS and NU-WRF. Measurements from 54 EANET sites, 86 sites of the Air Pollution Indices (API) and 35 local sites, remote sensing products from AERONET and satellite data from MODIS are used to evaluate model performance on PM_{10} , $PM_{2.5}$ and its components and aerosol optical depth (AOD). To investigate the inter-model differences in secondary aerosol formation, we compare the Sulfur Oxidation Ratio (SOR) and Nitrogen Oxidation Ratio (NOR) values by different models with observations at the EANET sites. The preliminary results show that the inter-model differences in the oxidation ratio (50%) are almost of the same magnitude as those in simulating the concentrations of particles. The results suggest large uncertainties in the gas-particle conversion process in modelling secondary aerosol formation.