

## NHM-Chem, the Japan Meteorological Agency's regional meteorology - chemistry model: toward the consistent predictions of chemical, physical, and optical properties of aerosols and their regional budget

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A regional-scale meteorology - chemistry model (NHM-Chem) has been developed for the consistent predictions of chemical, physical, and optical properties of aerosols. Those properties are essentially important for the accurate assessment of air quality and health hazard, contamination of land ecosystems, and regional climate changes due to aerosol-cloud-radiation interaction processes. The consistency in regional budget, such as emission, transport, transformation, and deposition are also evaluated and discussed. Lack in the consistent evaluations might mislead interpretations of discrepancy between the model and observation. The improvement of model based on the misled interpretations will even alienate the model result from reality. A variety of aerosol category representations is a unique feature of NHM-Chem. Currently, three options are available: 5-category (Aitken, accumulation internally mixed with soot, accumulation not mixed with soot, sea-salt, and dust), 3-category (Aitken, accumulation, and coarse), and a bulk equilibrium chemistry (submicron, sea-salt, and dust). The three are supposed to be suitable for the predictions of regional climate, air quality, and operational forecast, respectively. The model performance in terms of the consistent prediction and the sensitivity of model performance to the selection of aerosol options are presented in the presentation.

Keywords: Air quality, Atmospheric chemistry, Aerosol microphysics, Aerosol optical property, Cloud condensation nuclei