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# Using cloud resolving WRF-Chem simulations to explore the aerosol impact on numerical weather prediction and evaluate the aerosol aware Grell-Freitas convective parameterization

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A convective parameterization is applied and evaluated that may be used in high resolution non-hydrostatic mesoscale models for weather and air quality prediction, as well as in modeling system with unstructured varying grid resolutions and for convection aware simulations. This scheme is based on a stochastic approach originally implemented by Grell and Devenyi (2002) and described in more detail in Grell and Freitas (2014, ACP). Interactions with aerosols have been implemented through a CCN dependent autoconversion of cloud water to rain as well as an aerosol dependent evaporation of cloud drops. Initial tests with this newly implemented aerosol approach showed plausible results with a decrease in predicted precipitation in some areas, caused by the changed autoconversion mechanism. Here we compare and evaluate performance over a 10-day period using the SAMBBA test case of the Working Group for Numerical Experimentation (WGNE) on aerosol impacts on numerical weather prediction. A shorter period is also compared to fully cloud-resolving simulations using WRF-Chem.