

A Double-Moment version of the SBU_YLIN Microphysics Scheme in WRF

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Since its release in WRF in 2011, the SBU-YLIN scheme has been widely used and tested, but its usage to convective systems has been limited. A double-moment (DM) version of the scheme is introduced and tested for mid-latitude squall line and typhoon simulations. Compared to other schemes, the DM scheme improves the spatial distribution of precipitation as well as the strength and morphology of the simulated squall line, which is attributed by more realistic rain evaporation rates over both stratiform and convective regions of the squall line. This is mainly due to the flexibility of the DM approach to capture different rain drop size distributions over stratiform and convective regions. Aerosol impacts on the intensity and structure of typhoon Nuri was investigated using the scheme. It was found that aerosols tend to reduce the storm intensity with expanded wind fields. This DM version of the scheme has more flexibility and capability for the simulation of aerosol-cloud-precipitation interactions within convective storms.