4a.7 Development of a CONUS radar data assimilation WRF-RTFDDA system for convection-resolvable analysis and prediction

Pan, Linlin, Yubao Liu, Yuewei Liu, *National Center for Atmospheric Research*, Peter Child, and Neil Jacobs, *Panasonic Weather Solution*

In this study, a capability for assimilation of radar reflectivity data, based on hydrometeor and latent heat nudging (HLHN), has been developed to improve WRF-RTFDDA system in creating dynamically and cloud/precipitation "spun-up" initial conditions such that very short-term convection forecasts can be more accurate. The model system runs with 12/4km nested-grid domains, both of which cover the contiguous United States region. RTFDDA continuously assimilates temperatures, winds and humidity from all available observation platforms, including conventional and unconventional observations available at synoptic and asynoptic times. In particular, complete TAMDAR (Tropospheric Airborne Meteorological Data Reporting) dataset operated by Panasonic Weather Solutions (PWS) have been included. Extensive numerical experiments are performed to evaluate the impact of radar data assimilation on 0–12 h RTFDDA forecasts for case studies with summer strong convection and winter severe weather cases. The tests are conducted for both 12-km and 4-km grids. Verification shows that the radar data assimilation technique significantly improves 0–12 h forecasts of precipitation and surface temperature statistically, and the impact on forecasting some convection clusters can last for 24 hours. Limitations of the current system and an algorithm for assimilating Doppler radar radial velocity with a nudging approach will also be discussed at the conference.