

**P22** A simple lightning assimilation technique for improving retrospective WRF simulations.

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Convective rainfall is often a large source of error in retrospective modeling applications. In particular, positive rainfall biases commonly exist during summer months due to overactive convective parameterizations. In this study, lightning assimilation was applied in the Kain-Fritsch (KF) convective scheme to improve retrospective WRF simulations. The method has a straightforward approach: Force KF deep convection where lightning is observed and, optionally, suppress deep convection where lightning is absent. WRF was run over the CONUS with 12 km grid spacing for July 2012, July 2013, and January 2013 to test the impacts of the assimilation technique. We evaluated the WRF runs against NCEP stage-IV precipitation data and MADIS near-surface meteorological observations. In general, the use of lightning assimilation considerably improved the simulation of summertime rainfall. For example, the July 2012 monthly-averaged bias of 6-h accumulated rainfall was reduced from 0.54 mm to 0.07 mm and the spatial correlation was increased from 0.21 to 0.43 when lightning assimilation was used. Statistical measures of near-surface meteorological variables also were improved. Consistent improvements were seen for July 2013. Our results suggest that this assimilation technique has the potential to substantially improve simulation of warm season rainfall in many retrospective WRF applications.