P27 Simulation of the July 2011 Korean Flood using the NCAR RTFDDA modeling system with radar data assimilation

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A heavy rainfall event occurred during 25 - 27 July 2011 in the Korean Peninsula, which caused flash floods in the South Korean provinces of Seoul and Gyeonggi and left 70 people dead. As much as 99.5 mm of rain fell in just one hour in the capital, Seoul, the third highest hourly rate recorded in the country since rainfall data collection began in 1907. In addition, this heavy rainfall event caused power outages and left more than 34,500 houses submerged and caused transport problems with roads being cut off and bridges having to be closed. Favorable large-scale synoptic conditions for this event included: i) vorticity maximum moving over the Korean Peninsula; ii) low-level frontal boundary; iii) warm and moist southerly flow. The operational models at the Korean Meteorological Center (KMA) did not predict this event very well. In this paper, the NCAR WRF-based real-time four-dimensional data assimilation (RTFDDA) and forecasting system was employed to study the physical and dynamical processes and the predictability of this heavy rain event. Initial experiments with RTFDDA using conventional observations (Dx = 3.3 km) showed that the WRF-RTFDDA captured some aspects of this heavy rainfall event. Further study with advanced RTFDDA modeling capabilities, including incorporating satellite radiance data assimilation with GSI and radar radial wind and reflectivity with WRF-3DVAR and NCAR/RAL Hydrometeor and Latent Heat Nudging (HLHN) in order to improve the forecast of this event.