5.5 X-NET BASED RADAR DATA ASSIMILATION STUDY OVER SEOUL METROPOLITAN AREA

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The ability of a high resolution (500 m) Weather Research and Forecasting (WRF) model in simulating a convective precipitation case with X-band radar network (X-Net) data over Seoul metropolitan area is studied. To understand the convective storm initiation process over the urban area, we performed sensitivity tests using different initial condition (IC) times. Despite simulating the same case, the quantitative precipitation forecast (QPF) varied widely among the experiments, depending on the timing of the ICs. The difference in timing of convective rainfall among the experiments are related to the atmospheric boundary layer (ABL) growth. Rapid growth of the ABL enabled moist convection to occur early in the presence of outflow, resulting in less rainfall amount. An overestimated maximum ABL height by the model also led to earlier collapse of the ABL compared to observations, which contributed to a reduction of convective available potential energy over the urban area in late afternoon. The sensitivity tests showed the importance of accurate simulation of ABL growth for reasonable prediction of timing and intensity of convective precipitation. When assimilation of surface observations and radar data was performed, the simulation reproduced the location and amount of rainfall reasonably well within the first 6 hours. This shows that high resolution WRF model with data assimilation can predict convective storm initiation in the first few hours and improve precipitation forecast skill in the very short-term forecasting range.