

## Impacts of dense surface observations on predicting torrential rainfalls on September 9, 2015 around Tochigi and Ibaraki prefectures

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To investigate the impact of dense surface observations on a severe rainfall event occurred on September 9, 2015 around Tochigi and Ibaraki prefectures, we perform a series of data assimilation (DA) experiments using the Local Ensemble Transform Kalman Filter (LETKF) with the SCALE regional NWP model. In this event, an active rainband was maintained for an extended period and caused torrential rainfalls over 500 mm/day with catastrophic flooding.

Two DA experiments were performed: the control experiment (CTRL) at 4-km resolution with only conventional observations (NCEP PREPBUFR), and the other with additional every minute surface observation data (TEST). CTRL showed general agreement with the observed rainfall patterns, although the intensity was smaller, and rainfall area was shifted westward. By contrast, TEST showed stronger rainfall intensity, better matching with the observed precipitation. Dense surface DA contributed to improve the moisture field in the lower layer, leading to intensified rainfall amount. The results suggest that the dense surface DA have a potential to improve the forecast accuracy for severe rainfall events.

Keywords: Data Assimilation, Surface weather observation