

Predicting a long-lasting heavy rainfall event in Taiwan during the Meiyu season

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Strong convections associated with Meiyu fronts often result in heavy precipitation in Taiwan and can bring disasters like flood or mudflow. Meiyu front is a multi-scale interactive weather system, which includes small-scale convection, a mesoscale front, and large-scale southwesterly monsoonal flow. In Taiwan, a WRF-based Ensemble Kalman Filter system has been established to study the predictability of the heavy rainfall during Meiyu season. Specifically, the WRF-Radar Local Ensemble Transform Kalman filter aims to improve the rainfall nowcasting and it is performed at a horizontal grid-resolution of 3km. Based on a long lasting heavy rainfall case on 16 June 2008, results suggest that the impact of radar data rainfall prediction can be extended beyond 12 hours when the initial ensemble carries a reasonable large-scale moisture transport and associated flow-dependent uncertainties in the environment.

The covariance inflation and localization schemes can further optimize the performance of the convective-scale analysis and forecast. With appropriate error covariance inflation scheme, the issue of precipitation spin-up can be alleviated and the temporal variation of precipitation is close to the observation. A terrain-dependent localization scheme can also reduce the unrealistic corrections over the terrain areas.