Inter-comparison of Precipitation Estimates from Radar, Satellite and Gauge during Yancheng Tornado over Eastern China

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This study assesses the performance of the quantitative precipitation estimation (QPE) using the S-band weather radar (RQPE) and satellite products in the era of Global Precipitation Measurement (GPM) over eastern China. These satellite precipitation estimates products include the latest version 5B (V5B) Integrated Multi-satellite Retrievals for GPM (IMERG) and the version 6 (V6) Global Satellite Mapping of Precipitation (GSMaP) products. The IMERG products include Early run (uncalibrated) and Final run (calibrated and uncalibrated) products (IMERG_ERCal, IMERG_FRCal and IMERG_FRUncal, respectively). The GSMaP products include near-real time product GSMaP_NRT, standard product GSMaP_MVK and gauge-corrected product GSMaP_gauge. The gauge-corrected satellite precipitation product Climate Precipitation Center Morphing (CMORPH) was used as reference data for performance evaluation with respect to spatiotemporal variability, probability distribution of precipitation rate and volume, and contingency scores. The results show that: 1) GSMaP_NRT is better than IMERG_ERCal, 2) all IMERG products based on IR algorithm misplace the rainfall center area; 3) GSMaP_gauge shows high correlation with the CMORPHGC while the calibrated satellite-based product of IMERG (IMERG_FRCal) have poor improvement.

Keywords: Weather radar, IMERG, GSMaP, tornado