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Multi-scale evaluation of the IFloodS radar-rainfall products

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Rainfall products estimated using ground-based radars are often used as reference to assess capabilities and limitations of using satellite rainfall estimates in hydrologic modeling and prediction. During the spring of 2013, NASA conducted a hydrology-oriented field campaign called Iowa Flood Studies (IFloodS) in the central and northeastern Iowa in the United States, as a part of the Ground Validation (GV) program for the Global Precipitation Measurement (GPM) mission. The purpose of IFloodS was to enhance the understanding of flood-related rainfall processes and the predictability in flood forecasting. While there are multiple types of rainfall data sets (e.g., satellite, radar, rain gauge, and disdrometer) available as the observational assets of IFloodS, the authors focus on the evaluation of multi-scale rainfall products observed from ground-based radars. The radar-only products used in the evaluation are the NEXRAD single polarization products (i.e. Stage IV, NMQ Q2, and Iowa Flood Center rainfall maps) and products generated using dual-polarization procedures (i.e. the U.S. National Weather Service operational and Colorado State University experimental blended precipitation processing algorithms) with comparable space and time resolution. The NASA NPOL S-band radar products are also evaluated and compared with the aforementioned NEXRAD products. The uncertainty for different temporal and spatial resolution products is characterized using ground reference data of dense rain gauge and disdrometer networks. This multi-scale characterization is required for hydrologic modeling frameworks that assess model predictive abilities as a function of space and time scales.