Data and Evaluating the Impacts on NWS Flash and River Flood Prediction

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Abstract

The National Weather Service (NWS)'s flash flood and river forecast operations rely on low-latency, High-resolution quantitative precipitation estimates (QPE). At present, this information is provided primarily by weather radar (WSR88Ds) and precipitation gauge networks; however, in regions where these networks are sparse, real-time GOES satellite QPE products have provided critical information for filling in these gaps. In the work proposed here, a current-GOES version of the official GOES-R Rainfall Rate algorithm relying on microwave rain rates as calibration data will be augmented to add Dual-polarimetric radar-based rain rates to the calibration data set. This augmentation is expected to complement the strengths of a radar-GOES fusion algorithm being researched at NSSL by improving the accuracy of the QPE products in regions where radar coverage is too sparse and fragmented to accurately determine the posterior (e.g., Alaska and Puerto Rico). The radar-calibrated GOES-R rainfall rates will then be fused with available gauge and radar QPE to create a low-latency, high resolution and spatially seamless data set using existing and emerging statistical multisensor fusion techniques. To facilitate the transition of the augmented GOESR rainfall algorithm to NWS river and flash flood operations, the resulting products will be evaluated in collaboration with scientists at Hydrometeorology Testbed and the National Water Center, and by NWS forecasters using NWS modeling tools. Comparisons will be made with the NSSL experimental radar-GOES fusion algorithm to understand their respective operational strengths and limitations under different rainfall regimes. Our planned path to operations is implementation of the modules in the Multi-Radar Multi-Sensor System (MRMS) that will become operational at NCEP Central Operations, and SCaMPR and fused QPE will be delivered via MRMS to the River Forecast Centers and Weather Forecast Offices.