

Preparing for Rainfall Nowcasting in the GOES-R Era using SEVIRI and Polar-Orbiting Microwave Data over Africa

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The Advanced Baseline Imager (ABI) onboard the Geostationary Operational Environmental Satellite (GOES)-R platform will offer improved spatial and spectral resolution and temporal sampling over the current-generation GOES, which should lead to enhanced capabilities for satellite-based rainfall estimation and nowcasting. The process of testing and demonstrating rainfall nowcasting algorithms for GOES-R has included extensive use of data from the Spinning Enhanced Infrared Visible Imager (SEVIRI), since it provides 11 spectral bands that are similar to bands that will be available on GOES-R with comparable spatial resolution, albeit with a slower refresh rate.

The rainfall nowcasting framework selected for implementation in GOES-R starts with estimates of current rain rate that are derived from visible and infrared data using an algorithm calibrated against microwave-based rain rates from data on polar-orbiting platforms. This current rain rate estimate and its immediate predecessor are analyzed using a K-Means feature detection technique to determine the motion of the identified precipitation features, and these motions are extrapolated forward in time to produce nowcasts of both accumulated 0-3 h future rainfall and the probability of measurable rainfall during the same time period. The selection and development of this algorithm framework and its performance using SEVIRI data over Africa will be discussed.