

Evaluating Added Benefits of Assimilating GOES Imager Radiance Data in GSI for Coastal QPFs

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The Geostationary Operational Environmental Satellites (GOES) provide high-resolution, temporally continuous imager radiance data over the West Coast (GOES-West, also known as GOES-11) and East Coast (GOES-East or GOES-12) of the United States. It was first demonstrated that a direct assimilation of GOES imager radiances from GOES 11/12 improved quantitative precipitation forecasts (QPFs) for three coastal storms over the northern Gulf of Mexico and the east coast (Zou et al., 2011). This study further evaluates the benefits of adding GOES 11/12 imager radiances to the satellite data streams in NWP systems for improved coastal precipitation forecasts. The Community Radiative Transfer Model (CRTM) is employed for GOES imager radiance simulations in the National Centers for Environmental Prediction (NCEP) Gridpoint Statistical Interpolation (GSI) analysis system. The GOES imager radiances are added to conventional data for coastal QPF experiments near the northern Gulf of Mexico and the derived precipitation thread score was compared with those from six other satellite instruments. It is found that the GOES imager radiance produced better precipitation forecasts than those from any other satellite instrument. However, when GOES imager radiance and six different types of satellite instruments are all assimilated, the score become much lower than the individual combination of GOES and any other instrument. Our analysis shows that an elimination of MHS data over areas where GOES detects clouds significantly improved the forecast scores from MHS data assimilation.