

ProbSevere: Upgrades and Adaptation to Offshore Thunderstorms

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Abstract

Accurate and timely severe weather warnings are critical for protecting life and property. In severe weather warning operations, quick decisions must be made, which limits the amount of data that NWS forecasters can manually interrogate, particularly when many storms are present. With the advent of GOES-R the NWS is truly entering the era of “big data.” For severe weather warning operations only a small fraction of the value of a huge, but information rich, data set like GOES-R can be realized through manual analysis, especially when combined with existing large data sets such as NEXRAD, ground based lightning, and NWP. As outlined in the Science and Technology Plan of the NWS’ Weather-Ready Nation Roadmap, the development of data fusion techniques is critical for distilling the “fire hose” of data into the timely, actionable, information needed to make quick operational decisions. In an effort to support severe weather warning operations through data fusion, the ProbSevere model was developed under a previous GOES-R Risk Reduction project. ProbSevere utilizes NWP, GOES, NEXRAD, and ground based lightning data to estimate the probability that a developing thunderstorm will produce severe weather up to 90 minutes in the future. ProbSevere has been shown to add 14 minutes of additional lead-time compared to traditional radar interrogation techniques. The lead-time is largely a result of the satellite component of ProbSevere. The spatial, temporal, and spectral attributes of the Advanced Baseline Imager (ABI) and the Geostationary Lightning Mapper (GLM) will allow the satellite component to have an even greater positive impact on accuracy, lead-time, and the ability to forecast storm severity in the absence of radar data. The proposed research seeks to mitigate important limitations of ProbSevere for severe weather warning operations over land and develop a version of ProbSevere that improves the Ocean Prediction Center’s (OPC’s) warnings to mariners in the offshore zones, which lack radar coverage. This effort would help expand the role of GOES-R in the protection of life and property and ensure that GOES-R is strongly contributing to the toolkit being developed in support of the future probabilistic warning paradigm (FACETS).