357 Enhanced Warning Verification Techniques for FACETs

Gregory J. Stumpf, NOAA NWS OST-MDL, Norman, OK; and C. Karstens and L. P. Rothfusz

The new Forecasting a Continuum of Environmental Threats (FACETs) initiative is the evolution of the current binary watch/warning paradigm into a system comprised of rapidly-refreshing high-resolution digital probabilistic hazard information (PHI) grids from which a number of new user- and location-specific alerting and product services can be derived (i.e., exploiting geo-locatable device technology). One of the first steps toward transitioning to PHI is the inclusion of the concept of Threats-In-Motion (TIM). TIM warnings continuously follow the severe weather threats and are cleared automatically when threats have passed over a location. This contrasts to the current warning paradigm in which polygons are issued at set intervals (usually every 30-, 45-, or 60-minutes), and new polygons are issued downstream of former polygons. TIM also allows for additional new location-specific products such as threat times of arrival and times of departure. Eventually, TIM will include continuously-updating probabilistic grids which will follow each threat, where warning thresholds can be chosen at any probabilistic threshold depending on the end-users' vulnerability to the threats (e.g., exposure, response time, etc.).

TIM hazard grids cannot necessarily be scored using the current traditional methods that the National Weather Service uses to verify severe weather warning polygons. For one, the hazard grids are rapidly-evolving, capturing the intermediate evolution of severe weather threats between traditional warning issuance and expiration times. These would appear in the present verification system as multiple individual warnings. Second, location-specific warnings demand location-specific metrics, including a system which considers lead time based on the difference between warning issuance and severe weather occurrence for individual locations in the warning, not just for the warning itself.

One of the facets of FACETs is an enhanced verification technique which addresses these issues and is essential for highlighting the advantages of the new warning paradigm. The technique places both the forecasts (warnings) and observations (storm reports) on the same coordinate system. New metrics such as false alarm area, false alarm time, and location-specific lead time and end time are calculated. This new technique will be used to illustrate the advantages of a rapidly-updating TIM information stream as applied to the afternoon and overnight severe weather events of the 27 April 2011 southeast U.S. super tornado outbreak, a total of 15 hours of data across MS, AL, GA, and southern TN.