The Challenge of Expressing Forecast Uncertainty for a Winter Storm in Densely Populated Southern New England

Frank Nocera and Michael Ekster
NOAA / National Weather Service
Taunton, MA

National Weather Service (NWS) forecast products such as the Hazardous Weather Outlook (HWO), Area Forecast Discussion (AFD), and Winter Storm Warnings and Watches contain probabilistic and forecaster confidence information. NWS' conference calls to emergency managers and other state and local decision makers also utilize this type of information. The purpose of providing uncertainty information is to improve decision-making, help in the assessment of risk, and reduction and loss of life and property damage, while enhancing the national and local economy. The winter storm of 10 February 2010 will be an example of the challenge the NWS and its partners (including the general public) face in expressing forecast uncertainty and associated decision making – specifically, large snowfall gradients across large population centers.

Multiple model data sets were used in the forecast process leading up to this winter storm, including probabilistic projections of snowfall amounts and precipitation type from the SREF model. These data supported the idea that the poleward edge of the heavy precipitation shield, along with the rain-snow line, would likely set up across Southern New England.   In addition, deterministic snowfall forecasts from NWS Taunton and HPC conveyed a large gradient in snowfall from north to south, slicing through the densely populated Boston to Providence to Hartford corridor.

While our deterministic snowfall prediction was wrong for much of the region, the uncertainty of precipitation type and amounts were clearly documented in NWS Taunton's products days in advance and including the day of the event. This uncertainty was also communicated via conference calls to emergency managers and other state and local decision makers. However the public backlash was large and intense with a high level of outrage toward both private and public meteorologists, despite NWS Taunton providing well documented probabilistic and forecaster confidence information throughout its products. There comes a point close to an event where conveying uncertainty is not good enough, i.e., decision makers want a concrete answer. This was a challenge in this case since we were highly uncertain in the outcome right up until the event started, but still had to issue a more deterministic snowfall forecast that, for the most part, was based on a rather strong model QPF consensus -- but ultimately wrong.

PRESENTER'S BIO

Frank Nocera is a Senior Forecaster at the NWS Forecast Office in Taunton, MA. His primary duties include managing the Office Weather Event Review program and the Marine Forecast program. He received a Bachelor of Science in Meteorology from the State University of New York at Albany in 1992. He was born in Brooklyn, NY and raised in the nearby northern suburbs (Mahopac, NY) before leaving New York in 1998 for the NWS office in Taunton, MA. Frank has conducted research on a variety of topics, including: tidal flooding from extratropical cyclones, non-convective high wind events, severe weather, rip currents, marine verification and precipitation distribution in mid-latitude cyclones.   Frank also serves as an instructor since 2009 at the COMET/MSC Winter Weather course in Boulder, CO. Frank resides in Cumberland, RI with his wife and three children. In his spare time he enjoys coaching youth sports, playing softball, golf and running.