

## #10 The Development and Testing of a Day 4-7 Probabilistic Winter Weather Forecast at the Weather Prediction Center

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Society wants to know the potential occurrence of winter precipitation as far in advance as possible. To help address this societal demand, the Weather Prediction Center (WPC) has developed and begun internal testing a probabilistic forecast for medium range winter precipitation. In addition to snow and ice forecasts for days 1-3, WPC winter weather forecasters now generate a probabilistic forecast for winter precipitation greater than 0.10 inches (2mm) for the entire continental United States (CONUS) for each 24-hour period of the medium range forecast period ( days 4 through 7). This talk will discuss the development and testing of this new probabilistic winter weather outlook in the testbed environment.

Experimental guidance developed at WPC accounts for both the quantitative precipitation forecast (QPF), thermal fields to predict precipitation type. The QPF component is addressed by using the WPC day 4-5 and day 6-7 deterministic QPF. The 48-hour QPF is disaggregated into 24-hour periods for each of the four days of the medium range forecast using the most recent available Global Ensemble Forecast System (GEFS) forecast. To determine the probability of the WPC 24-hour QPF being equal or greater than 0.10 inches (2mm), the 24-hour QPF from multiple ensemble systems members are used as variance to calculate a cumulative distribution function (CDF). The thermal component is addressed by using the precipitation type fields from each of the 20 GEFS members and 50 ECMWF ensemble members. An ensemble probability of frozen precipitation is then created using a winter precipitation type mosaic for all 70 ensemble systems members. The probability of the WPC deterministic QPF exceeding 0.10 inches (2mm) is combined with the ensemble probability of frozen precipitation to arrive at a probability of winter precipitation exceeding 0.10 inches (2mm).

The Hydromet Test Bed (HMT) at WPC examined this methodology in the recently completed 2014 Winter Weather Experiment. The experiment provided multiple insights into how to improve the guidance, suggested the use of alternative data sets, and brought forth several areas of training that will be need to be addressed for operational forecasters going forward.