

Precipitation Forecasting at the Weather Prediction Center

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Precipitation is unique among forecast variables. It is discontinuous, and can be viewed as an “event” with a beginning and end. Model forecasts may differ greatly as to the existence, timing, location, and magnitude of a precipitation event, with many, if not all, of these forecasts being plausible. To produce skillful forecasts that serve users with a consistent and actionable message, therefore, requires a good deal of manual adjustment.

Forecast shifts at the Weather Prediction Center (WPC) are structured similarly to a local Weather Forecast Office, flowing from analysis and model evaluation to a collaborative production process and then dissemination. Forecasters “draw” isohyets representing predicted areal average rainfall (or liquid equivalent) at 20 km resolution. Post processing scales the forecast to 5 km resolution using, in part, the Parameter-Elevation Regressions on Independent Slopes Model (PRISM) from Oregon State University. WPC draws rainfall forecasts for each 6-hour period comprising days 1-3, while the WPC Medium Range desk draws a single forecast for each 48-hour period representing days 4-5 and 6-7.

For continuity, forecasters may edit isohyets inherited from the previous shift, or include a percentage of the previous forecast in a graphical blend of new model output. As is true with any model source at WPC, output of the blend may be traced or loosely traced, allowing for discretion of the forecaster in drawing any given contour. As graphical underlays to their drawing template forecasters have access to a very comprehensive set of observational data and model plots, including output from all the widely recognized deterministic and ensemble modeling systems (global and mesoscale) in the United States, Canada, and Europe. WPC has also developed a number of in-house tools, some experimental, which attempt to extract model signal, add value, and maintain better continuity to give the forecaster the best possible starting point.

Many WPC forecasters specialize in precipitation forecasting, and are well calibrated to model strengths, weaknesses, and biases. It is hoped that an eventual move to production in AWIPS II will allow WPC to move away from contouring by hand. Using software such as the Graphical Forecast Editor (GFE), WPC could more easily move toward a forecaster-over-the-loop style of operation employing regional blends, smart tools. This would allow the forecaster to focus on quality control and targeted manual edits in areas that may be impacted by high-impact events such as flash flooding. The Metwatch Desk is designed with this in mind, utilizing an around-the-clock shift coverage to diagnose the performance of the mesoscale precipitation guidance in order to highlight areas where flash flooding is expected to begin or continue in the short term.