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THE AVIATION WEATHER FORECASTING COMPONENT OF THE 2010 NOAA HAZARDOUS WEATHER TESTBED SPRING EXPERIMENT

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1. INTRODUCTION

The 2010 NOAA Hazardous Weather Testbed Spring Experiment was conducted from May 17 – June 18 at the National Weather Center in Norman, OK. The Storm Prediction Center, the Aviation Weather Center, and the Hydrometeorological Prediction Center collaborated on evaluating high resolution numerical model data to create experimental forecasts for severe weather, aviation weather, and quantitative precipitation forecasting. The main purpose of the experiment was to share new ideas, methods, and tools for examining and evaluating both deterministic and ensemble forecast models. Operational meteorologists, academic researchers, and private sector personnel participated.

The annual "Spring Experiment", first conducted in 2000 (Kain 2010) as a collaboration between the Storm Prediction Center and the National Severe Storms Laboratory, has grown over the past decade and now is seen as a model for transferring research to operations, and operations to research, especially for emerging numerical weather prediction (especially convection allowing) models.

2. EXPERIMENT DESIGN

The aviation component of the spring experiment was designed to test new and innovative next-generation aviation weather forecasts, using experimental high resolution numerical weather model data. Specifically, the model data used consisted of both deterministic and ensemble forecasts, generated by the NCEP Environmental Modeling Center, the Center for Analysis and Prediction of Storms, the National Center for Atmospheric Research, and the NOAA Global Systems Division.

During each day of the experiment, participants of the aviation component examined the model output and issued forecasts designed to provide enhanced decision support for national air traffic impact. Several forecasts were created along with subjective evaluations of the previous day's forecast and model forecast data.

Air traffic, when impacted by convective weather, is usually most impacted when the intensity of convection reaches a threshold of reflectivity at 40 dBZ (or greater) as observed by radar, and 25,000 feet in altitude. In addition to these values, the models were examined for the ability to forecast the coverage, porosity, timing, and location of convection. The aviation component was designed to produce forecasts that focused on these particular impacts.

The forecast teams, which consisted of at least one member from the Aviation Weather Center, produced two sets of forecasts during each operational day, creating graphics that outlined particular threats, along with a text discussion. The initial forecasts, issued in the morning, were valid at 2100, 2300, and 0100 UTC with probability contours drawn at 25% (slight risk), 50% (moderate risk) and 75% (high risk) of coverage of convection with reflectivity at 40 dBZ. In addition, the probability of convective tops greater than 25,000 feet were also generated, using contours at the same values of 25% (slight), 50% (moderate) and 75% (high). These same forecasts were then updated during the afternoon, using updated model data. In addition to those Day 1 products, a Day 2 product was issued for the probability of convection valid from 1800 – 0000 UTC, again using the same probability contours and for reflectivity greater than 40 dBZ. Figure 1 contains an example of both an initial and final forecast issued for 2100 UTC on May 24th, 2010.

The forecast teams also completed on-line survey and evaluation forms, examining both the issued forecasts and the utility of the numerical weather prediction models. The six survey subjects included an evaluation of the previous day's forecast, a comparison of the NCAR and EMC deterministic model forecasts, comparison of the reflectivity field between the WRF deterministic forecasts, comparison of the HRRR forecasts for temporal continuity, evaluation of the CAPS SSEF products, and evaluation of lightning data and products.

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4. REFERENCES

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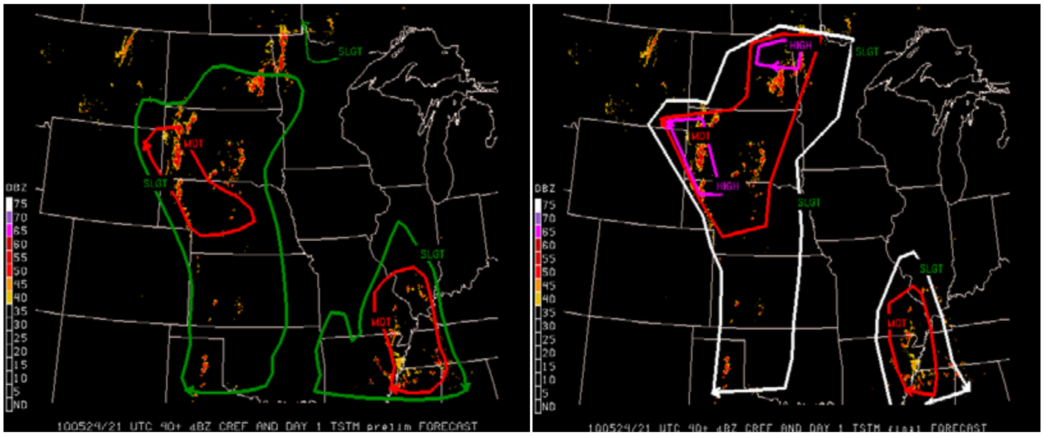

Figure 1. 2100 UTC forecasts of the probability of reflectivity greater than 40 dBZ, issued on May 24th, 2010 with validating reflectivity. The graphic on the left is the initial forecast (issued in the morning), and the graphic on the right the final forecast (issued in the afternoon).