A HYBRID NOWCASTING SYSTEM: RESULTS AND CHALLENGES

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ABSTRACT

1. BACKGROUND

Automated systems providing real-time, rapid update Nowcast guidance for the 0-6 hour time period are well documented in the literature (cf. Xue, 2011, Dudhia, 2011). These systems provide highly resolved and rapid update forecasts for a variety of meteorological variables including temperature, QPF, precipitation rate, visibility, and wind speed. At The Weather Channel Companies (TWCC), a system known as "Trupoint" has been built and deployed to produce a full complement of weather forecast parameters for the 0-6 hour Nowcast time period to fulfill the needs of consumer and business-to-business weather clients. The Trupoint system is an extension of "The Observation Engine" system described by Neilley and Rose (2005).

2. SYSTEM DESCRIPTION

The Trupoint system is capable of producing 15 minute (6 hours into the future) Nowcast forecasts for a variety of meteorological variables at arbitrary points on the earth's surface. The system is built around a layered approach where a first-guess field is derived for most forecast variables from an hourly updating model (e.g. NCEP Rapid Refresh, TWCC RPM) that is downscaled using high resolution, terrain-based climatological gradients. Forward Error Correction is then applied to the fields for meteorologically continuous variables such as temperature and wind speed to minimize differences between observations and the very short term (0 to 2 hours) forecast.

More importantly, the handling of precipitation forecasts in Trupoint occurs through a separate process whereby a Lagrangian persistence forecast of precipitation (or "future radar" called MAPLE [Conway, et. al, 2005]) is blended with the model precipitation forecast as a function of several weighting parameters. These parameters include forecast lead time, and a scoring of the performance of the future radar forecasts over time through a process called "calibration".

As Zawadzki (2011) described, in many cases real-time calibration systems provide little improvement in skill over a climatologically-developed blend between Lagrangian persistence and NWP. This paper will describe our experiences with calibration and the challenges it poses.

Our results show that the Trupoint forecasts generally provide more skillful forecasts for both temperature and precipitation compared with individual Nowcast inputs only. Examples of Trupoint output will be presented, along with results from statistical comparisons between Trupoint and several NWP and Lagrangian high-resolution forecasts.

3. REFERENCES

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