Convective Scale Data Assimilation at the Australian Bureau of Meteorology

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Over the past 3 years, the Australian Bureau of Meteorology has been assessing the potential of a convective scale numerical weather prediction (NWP) system capable of assimilating radar data – both Doppler radial winds and precipitation data. The aim is for the new NWP system to bridge the gap between purely observation based precipitation nowcasting and existing regional scale NWP systems. The system is being developed as part of the broader modeling effort of the Australian Community Climate and Earth System Simulator (ACCESS, [1]). The NWP component of this model is in turn based on the UK Met Office Unified Model and variational assimilation system – specifically the 1.5km UKV system [2].

An important part of this system is the ability to provide a rapid update to forecasts by using a short (hourly or 3-hourly) assimilation cycle. Extensive trials have been carried out from September 2011 to July 2012, as well as for specific periods over 2010-11. Despite the differences in observation networks and weather conditions between Australian and the UK the system is providing guidance far superior to existing global and regional NWP systems. This presentation will discuss some of the challenges in applying this system to tropical or semi-tropical conditions as well as an overview of the performance of the 1.5km system relative to other systems. These issues cover many aspects of data assimilation: from quality control, error covariances, dealing with large scale errors from the host model and the limitations posed by model errors, particularly as they impact on short term prediction of intense rainfall events.

References

[1] K. **Puri et al. "Implementation of the initial ACCESS Numerical Weather Prediction system",** ***Australian Meteorological and Oceanography Magazine*****. Accepted, to appear 2013.**

[2] Dixon, M. et al. "Impact of Data Assimilation on Forecasting Convection over the United Kingdom Using a High-Resolution Version of the Met Office Unified Model" ***Monthly Weather Review*** **vol. 137 pp. 1562-1584. May 2009.**