Assimilation of Doppler Radar Radial Wind in the UK Met Office

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Abstract

There is an increasing demand for high resolution weather prediction, which in the UK has an emphasis on accurate forecasts/nowcasts of strong convective storms which in recent years have been responsible for major flooding events. In response, the Met Office is developing a numerical weather prediction system using a 1.5km version of the Unified Model for short range NWP and nowcasting. Such a system requires the assimilation of high temporal and spatial resolution observations. One potentially vital observation is provided by weather radar in the form of radial wind.

Currently 4 radars in the UK radar network provide Doppler radial winds which can potentially be used for NWP data assimilation. Work has been undertaken to assimilate the Doppler wind, initially in the UK 4km model then subsequently in a southern England version at 1.5 km resolution. VAD from PPI scan were tested and are now part of the Met Office operational system, and from 2007 the effort has been concentrated in assimilating PPI scans directly. We will show the state of Doppler Wind assimilation in the Met Office in a high resolution numerical weather prediction model. Using case studies we will discuss the impact of assimilating Doppler wind PPI scan in 3D-Var assimilation framework. This will include a detailed description of the Doppler wind pre-processing including the Super-Observation schemes used to deal with the extremely large number of observation points and associated errors. The heart of the presentation will examination in detail the impact on verification scores of assimilating Doppler wind PPI scan in the 1.5km version of the Unified Model.