Towards the operational assimilation of radar refractivity retrievals in the United Kingdom

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This collaboration between the University of Reading and the UK Met Office aims to robustly evaluate the benefits of assimilating radar refractivity retrievals from the operational radar network into the Met Office Unified Model. Refractivity retrievals offer a unique means of quantifying both spatial and temporal variations in near-surface humidity, potentially of great benefit for the forecasting of convective rain. The first step in this process is the operational monitoring of refractivity retrievals with surface observations in real-time. The next step is the inclusion of refractivity as represented in the operational forecast model (the Unified Model) in the monitoring system. Critical components of this project are the characterization of spatial error co-variances in both the model and the observations, and the development of a refractivity forward operator. Until recently, radar refractivity retrievals from the operational network have been developed on an as-is basis on the existing low-level operational scans. As these scans were designed for the detection of precipitation at far range (out to hundreds of kilometres), they are not optimised for refractivity retrievals. In parallel with the evaluation of the current refractivity capability of the operational network, we describe the development of a dedicated refractivity scan to ascertain the full potential refractivity capabilities of the radar network.