



First-Guessing User-Contributed Weather Data

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The rise of automated weather stations which are both affordable and easy to set up has led to an influx of meteorological data from members of the public, with websites such as the UK Met Office's Weather Observations Website (WOW) acting as hubs for sharing such data. With the number of UK amateur stations in their thousands, this network is an alluring potential source of local observations for high resolution numerical weather prediction (NWP). However, user-contributed data is often notorious for biases and gross errors. Having a reliable estimate of the weather at the locations of the amateur stations is crucial to decipher the accuracy of their observations. Here we detail two approaches undertaken to provide this first guess in the context of 2m air temperature and humidity: firstly using observations from the Met Office's professional MMS network, interpolated to the locations of the amateur network using a semi-parametric regression modelling approach, and secondly using output from the high resolution UKV NWP model. The merits of each approach are discussed, with a comparison of the two sets of estimates helping to identify flaws within the interpolation and NWP models themselves. In particular we consider issues including: the representativity of observations; the impact of micro-, local- and meso-scale contexts on observation bias and uncertainty; the impact of the synoptic situation on the bias and uncertainty; and the structure of the model errors in surface temperature and humidity fields. This exploratory work has relevance to estimation of observation quality and model error structure, both essential to optimal data assimilation. We outline how we propose to take the work forward to learn about the observation biases and uncertainties in a more formal setting.