



Uncertainty in User-contributed Weather Data

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Websites such as Weather Underground and the Met Office's recently launched Weather Observations Website encourage members of the public to not only record meteorological observations for personal use but to upload them to a free online community to be shared and compared with data from hundreds of other weather stations in the UK alone. With such a concentration of freely available surface observations the question is whether it would be beneficial to incorporate this data into existing data assimilation schemes for constructing the initial conditions in Numerical Weather Prediction models. This question ultimately relates to how closely the amateur data represents reality, and how to quantify this uncertainty such that it may be accounted for when using the data.

We will highlight factors that can lead to increased uncertainty. For instance as amateur data often comes with limited metadata it is difficult to assess whether an amateur station conforms to the strict guidelines and quality procedures that professional sites do. These guidelines relate to factors such as siting, exposure and calibration and in many cases it is practically impossible for amateur sites to conform to the guidelines due to a tendency for amateur sites to be located in enclosed urbanised areas.

We will present exploratory research comparing amateur data from Weather Observations Website and Weather Underground against the Met Office's meteorological monitoring system which will be taken to represent the 'truth'. We are particularly aiming to identify bias in the amateur data and residual variances which will help to quantify our degree of uncertainty. The research will focus on 3 case periods, each with different synoptic conditions (clear skies, overcast, a frontal progression) and on observations of surface air temperature, precipitation, humidity.

Future plans of the project will also be introduced such as further investigations into which factors lead to increased uncertainty, highlighting the importance of quantifying and accounting for their effects. Factors may include the degree of urbanisation around the site as well as those that may vary temporally such as the prevailing synoptic conditions. Will we also describe plans to take a Bayesian approach to assessing uncertainty and how this can be incorporated into data assimilation schemes.