Exploring, quantifying and incorporating observational uncertainties into the evaluation of environmental model predictions

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There have been a considerable number of developments in the techniques we use to assess the prediction uncertainties in environmental models. These techniques vary widely in their complexity, assumptions and mathematical/statistical rigour. No matter which technique is employed the commonality of the approaches is to be more realistic about our ability to predict observed responses whilst being mindful of our limitations and errors in the modelling process. At a PUB-IAHS workshop in 2004 (see http://www.es.lancs.ac.uk/hfdg/uncertainty_workshop/uncert_intro.htm) the need for further/additional developments of uncertainty analysis techniques was questioned at this time (some 30 plus techniques were identified). This was concluded from a realisation that what we were lacking most was data/experiments that better characterised the nature of our observed data (and associated uncertainties) used to both drive and evaluate our models of the environment.

In this paper we explore what the potential for errors in commonly used hydrological/environmental datasets are and how these can be characterised and fed into our uncertainty analysis techniques. We provide some examples of defining observational uncertainties from a variety of studies and use the extended GLUE approach to evaluate these for a model application.