



The development of an hourly gridded rainfall product for hydrological applications in England and Wales

Sara Liguori (1), Fiachra O'Loughlin (1), Maxime Souvignet (1), Gemma Coxon (1), Jim Freer (1), and Ross Woods (2)

(1) University of Bristol, School of Geographical Sciences, Bristol, United Kingdom (s.liguori@bristol.ac.uk), (2) University of Bristol, Faculty of Engineering, Bristol, United Kingdom

This research presents a newly developed observed sub-daily gridded precipitation product for England and Wales. Importantly our analysis specifically allows a quantification of rainfall errors from grid to the catchment scale, useful for hydrological model simulation and the evaluation of prediction uncertainties.

Our methodology involves the disaggregation of the current one kilometre daily gridded precipitation records available for the United Kingdom[1]. The hourly product is created using information from: 1) 2000 tipping-bucket rain gauges; and 2) the United Kingdom Met-Office weather radar network. These two independent datasets provide rainfall estimates at temporal resolutions much smaller than the current daily gridded rainfall product; thus allowing the disaggregation of the daily rainfall records to an hourly timestep. Our analysis is conducted for the period 2004 to 2008, limited by the current availability of the datasets.

We analyse the uncertainty components affecting the accuracy of this product. Specifically we explore how these uncertainties vary spatially, temporally and with climatic regimes. Preliminary results indicate scope for improvement of hydrological model performance by the utilisation of this new hourly gridded rainfall product. Such product will improve our ability to diagnose and identify structural errors in hydrological modelling by including the quantification of input errors.

References

[1] Keller V, Young AR, Morris D, Davies H (2006) Continuous Estimation of River Flows. Technical Report: Estimation of Precipitation Inputs. in Agency E (ed.). Environmental Agency.