



Improving Estimates of Flood Magnitude using better Information on Spatial and Temporal Variability of Rainfall

Giulia Giani (1), Miguel Rico-Ramirez (2), and Ross Woods (2)

(1) Water and Environmental Management Research Centre, University of Bristol, Bristol, United Kingdom (gg16916@bristol.ac.uk), (2) Water and Environmental Management Research Centre, University of Bristol, Bristol, United Kingdom

Flood forecasting and flood estimation commonly rely on catchment-average rainfall estimates. Reasons for the use of coarse-resolution data include (i) a lack of information about the specific conditions in which higher resolution data provide useful information (ii) the prevalence of lumped conceptual hydrological models which cannot fully exploit spatially-varying rainfall data.

However, rainfall variability has been identified to be one of the most influential factors in shaping flood magnitude. Therefore, ignoring rainfall variability can cause significant bias in the resulting flood estimates for some catchments.

High-resolution rainfall data in both space and time are now routinely available on a national scale, based on weather radar, satellite products and interpolated rain gauge data. Yet some of these data (e.g. radar rainfall) are not routinely used in operational hydrology. In fact, the rainfall-catchment interactions for which high resolution radar rainfall data can produce a significant improvement in flood magnitude estimates are still unclear.

In this study we analyse the impact of different spatial resolutions of rainfall data on flood estimates. We use a set of 137 pristine catchments across the UK with different characteristics, and two different rainfall datasets from the UK national weather radar network and spatially-interpolated rain gauge data, both at 1km-1hr resolutions.

We compute a set of spatial rainfall statistics to estimate the variability of rainfall on each catchment for different rainfall events that occurred during the period 2006-2015. This paper discusses the preliminary results of this analysis and the implications of the results in terms of hydrological modelling.