Geophysical Research Abstracts
Vol. 14, EGU2012-11146-1, 2012
EGU General Assembly 2012

Cascading rainfall uncertainties into conceptual hydro-meteorological models for flooding applications.

M. Souvignet (1), J. E. Freer (1), N. Odoni (1), H. Cloke (2,3), G. De Almeida (1), and P. Bates (1)

(1) University of Bristol, United Kingdom (max.souvignet@bristol.co.uk), (2) King's College London, Department of Geography, United Kingdom, (3) European Centre for Medium-Range Weather Forecasts (ECMWF), United Kingdom

There is an on-going discussion in catchment modelling regarding the effect of different spatial and temporal patterns of precipitation on the predictions of storm sequences. A number of precipitation products have been developed, but they often have differences in their spatial and temporal distribution. Several studies have presented how these differences influence the predictive capability of hydrological responses. However, most studies focused on short periods or for single flood events and the predictive uncertainty linked with rainfall input data is seldom explored in detail and between available products.
We suggest a better understanding of the uncertainties in hydrological predictions needs to consider the differences in rainfall products improving the evaluation of our predictive capacity.

In this explorative study, we propose to address this issue by i) exploring the effects of perturbations in rainfall on predictive capacity within an uncertainty framework, and ii) testing hydrological predictive capability against different comparable meteorological conditions. To do so, the hydrological model Dynamic TOPMODEL was set-up for the upper-Severn catchment (580 km2) in southwest England. Rainfall data captured by three different measurement techniques - rain gauges, gridded data and numerical weather predictions (NWP) models and these are used to assess the associated uncertainty of input data.

Changes in model performance and resultant uncertainty in hydrological predictions are analysed. These results will also demonstrate if rainfall input uncertainty effects the resultant set of behavioural models and if certain rainfall products produce more robust predictions within an uncertainty analysis framework by improving the enveloping of storm responses.