



Statistical and dynamical downscaling of GCM output to estimate future flood hazards for the Upper Severn catchment in UK

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The problems of using Global Climate Models (GCMs) in local impact studies are well known, especially concerning events on tails of the distribution. The development of GCMs in terms of resolution and physical processes is progressing, but there is still a need today to downscale the output from the large scale to the local scale. The two main tools for this are classically dynamical downscaling through Regional Climate Models (RCMs), and statistical downscaling (SD) through a transfer function. However, also RCMs have biases in their output variables, originating both from the driving GCM and from limitations in the model itself, and the output often has to be modified before it can be used in impact studies, so called model output statistics (MOS). SD methods are usually good at capturing the statistical properties, but it is not straight-forward to model spatial and temporal correlations between variables.

In this study, RCM and SD methods were applied to precipitation from the HadCM3 ensemble runs from the UKCP09 under the future scenario A1B from 1950-2099. A simple MOS was also applied to the RCM. The precipitation together with modeled temperature was then used to drive two hydrological models, LISFLOOD-RR and HBV to analyse future flood producing patterns in discharge. The results show the benefit of using two methods, and thereby assessing more of the uncertainty in climate impact studies.