



## **Estimation of extreme river flows over the UK using rainfall and potential evaporation estimates from both a Regional Climate Model and observations**

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A grid-based hydrological model, the Grid-to-Grid model, has been used to estimate current and future natural river flows on a 1km grid covering the UK. Rainfall and potential evaporation (PE) used as input to the model are estimated in two ways: from observations and from Regional Climate Model (RCM) output. The Grid-to-Grid model calculates natural river flows by maintaining a water balance continuously over time and employing a 15 minute time-step. The distributed model uses a single set of parameters for the whole domain of coverage. It is reliant solely on digital datasets of elevation, slope, soil-type and urban land-cover to incorporate the spatially-varying effects of the landscape on river flows. Flow directions required by the routing component of the model define the drainage direction of water from one model grid-cell to the next and have been derived from high resolution (50m) digital terrain data. Output from the Grid-to-Grid model consists of time-series of grids of estimated river flows across the UK. At particular locations corresponding to river gauging stations, estimated river flows are compared with observed flows using observation-based rainfall and PE estimates as model input. The model is then used to obtain a preliminary assessment of the effects of climate change on extreme river flows for locations across the UK. This assessment makes use of RCM rainfall and PE estimates for a future climate as input to the Grid-to-Grid model and allows the change in flood risk to be

estimated for locations of interest.