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Accounting for uncertainty in distributed flood forecasting models

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Recent research investigating the uncertainty of distributed hydrological flood forecasting models will be presented. These findings utilise the latest advances in rainfall estimation, ensemble nowcasting and Numerical Weather Prediction (NWP). The hydrological flood model that forms the central focus of the study is the Grid-to-Grid Model or G2G: this is a distributed grid-based model that produces area-wide flood forecasts across the modelled domain. Results from applying the G2G Model across the whole of England and Wales on a 1 km grid will be shown along with detailed regional case studies of major floods, such as those of summer 2007.

Accounting for uncertainty will be illustrated using ensemble rainfall forecasts from both the Met Office's STEPS nowcasting and high-resolution (~1.5 km) NWP systems. When these rainfall forecasts are used as input to the G2G Model, risk maps of flood exceedance can be produced in animated form that allow the evolving flood risk to be visualised in space and time. Risk maps for a given forecast horizon (e.g. the next 6 hours) concisely summarise a wealth of spatio-temporal flood forecast information and provide an efficient means to identify 'hot spots' of flood risk. These novel risk maps can be used to support flood warning in real-time and are being trialled operationally across England and Wales by the new joint Environment Agency and Met Office Flood Forecasting Centre.