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Understanding the main uncertainties in hydrological ensembles of future climate change predictions

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In this paper we explore the potential for an ensemble of hydrological model structures coupled to Regional Climate Models to predict current and future changes in river flows. We develop this approach for a large number of catchments in the UK using the FUSE (Framework for Understanding Structural Errors) modelling framework. This ensemble of models is driven by observed data and Regional Climate Model (RCM) predictions to understand differences in predictions of hydrological responses. We include uncertainties by allowing for multiple model structures and parameters in FUSE and by using an ensemble of RCM outputs driven by ERA40 re-analysis boundary conditions. We discuss if such a modelling system can make useful predictions regionally and how much predictions overlap when such uncertainties in climate predictions are included.