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Changes in UK extreme rainfall projected by the PRUDENCE regional climate models

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In the past decade, widespread flooding and landslides in the UK and Europe have focused attention on perceived increases in rainfall intensities. Climate model integrations predict increases in both the frequency and intensity of heavy rainfall in the high latitudes under enhanced greenhouse conditions. These projections are consistent with recent increases in rainfall intensity seen in the UK and worldwide. Here we present a regional frequency analysis of changes in UK extreme multi-day seasonal and annual rainfall using 6 models from the PRUDENCE set of experiments. The selection of models encompasses three different driving Global Climate Models and three different Regional Climate Models, thus maximizing the uncertainty range of response. The representation of UK extreme rainfall by the regional climate models is explored by comparing them with observational data for the 1961-2000 period from the UK Meteorological Office gridded 5km dataset. Further results for a future scenario are then analyzed to provide a comparison of changes projected by the models and new design estimates of extreme rainfall for different regions of the UK. This method provides more reliable high return period estimates for design purposes and a clearer understanding and quantification of uncertainty of changes that may occur in the future.