



## **How well do ENSEMBLES 25km resolution RCMs represent the influence of the large scale atmospheric circulation on UK precipitation extremes?**

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Extreme precipitation is a major natural hazard in the United Kingdom. Local communities require reliable high resolution estimates of future changes in the magnitude of precipitation extremes to adapt to potential impacts. In this context, it is crucial how state of the art regional climate models (RCMs) simulate the temporal variability of precipitation extremes. Instead of only evaluating the variability itself, we propose to also evaluate the relationships with large scale processes that control the variability of extreme precipitation.

In particular, we model the monthly maxima of daily precipitation using a generalized extreme value (GEV) distribution, and represent the influence of the atmospheric circulation by airflow strength, vorticity and direction, which act as covariates upon the parameters of the GEV distribution. This statistical model is applied to gridded observational data as well as to control climate simulations from a range of 25km resolution RCMs used in the EU ENSEMBLES project.

Based upon these analyses, we evaluate the RCM representation of relationships between the synoptic scale atmospheric circulation and local precipitation extremes. Compared to evaluating the representation of variability alone, evaluating such physically motivated relationships increases confidence in the simulation of future variability of precipitation extremes.