



## **Statistical Downscaling of Climate Data for the River Severn Basin: A Comparative Study**

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Global Climate Models (GCMs) are the main tools for the assessment of climate change impacts at a global level. However, they have a poor level of resolution, and to assess the impacts of climate change at a local-scale, their outputs need to be downscaled. In this paper, the ability of three well known statistical downscaling methods, namely, K-nn, SDSM and LARS-WG are compared in performing statistical downscaling over the future period 2020 to 2039 within the River Severn Basin in the UK.

The GCM outputs were obtained from the Hadley Centre's HadCM3 coupled model. To assess each method's skill at downscaling, observed station data within the River Severn Basin was calibrated and verified with historic GCM data over the period 1960 to 1999 drawn from the 20C3M experiment. In general, downscaling captured the seasonal trend for minimum and maximum temperature within the River Severn Basin. However all methods underestimated the observed weather information by up to 1.5 oC. LARS-WG showed the lowest annual and seasonal variation for temperature downscaling. Provided a sufficiently long period of historic data was available for calibration, this method captured the climate characteristics most effectively. Downscaling for precipitation was poor across all methods, but SDSM and LARS-WG were considered better than K-nn in their skill at downscaling. However, downscaling under SDSM showed a marginally closer match to the observed data.