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Automatic set up of SHETRAN for catchments in Great Britain

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Physically-based spatially-distributed (PBSD) models may provide a robust framework for simulating catchment processes in ungauged catchments and under climatic variability. However, they are often overlooked in catchment studies in favour of their conceptual or lumped counterparts. This is because conceptual models are easy and rapid to set up, and can be finely tuned using historic data to give excellent simulation results. On the other hand PBSD models, such as SHETRAN developed at Newcastle University, require much more input data and take weeks or months to set up. To overcome these problems and to promote the use of SHETRAN, this project has set up an easy-to-use, accessible system of hydrological models across Great Britain to be used for both catchment scale studies and countrywide analysis of river flows under present and future conditions. An interface for this system has been developed to make the usually long and tedious setup of PBSD models quick and easy. A non-expert user can now set up a robust and reliable model for a catchment within Great Britain within 10 seconds, a process which would usually take weeks. The user can select a catchment from one of the 1457 boundaries identified in the National River Flow Archive, or they can upload their own catchment boundary as a shapefile. The system therefore has great flexibility for use in setting up models of gauged and ungauged catchments.

PBSD models require a lot of data (DEM, geology, soil, land cover), often available in only an inappropriate format. The data behind this system is freely accessible under an academic licence and downloadable from various publicly funded bodies. These data layers have been converted into the correct format for use with SHETRAN, which is also freely available and is provided with every model set up.