



Neural network solutions to flood estimation at ungauged sites

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Although artificial neural networks have been applied successfully to problems within hydrology for over a decade, there has been limited attention to their use for flood forecasting in ungauged catchments. Flood forecasting in ungauged catchments is a non-trivial problem as there are a number of complex environmental, man-made, natural and physical factors affecting a catchment's flood response. Artificial neural networks would appear well-suited to problems of this nature as they are able to model complex relationships between variables and can deal with ambiguous, missing and noisy data.

This study uses data from the Centre for Ecology and Hydrology's Flood Estimation Handbook to predict T-year flood events and the index flood (i.e. the median of the annual maximum series) for 850 catchments across the UK. Neural network models are compared with a conventional statistical modelling technique (step-wise linear regression) and an algorithmic model presented in the Flood Estimation Handbook.

The results show that neural network models are superior to the conventional statistical approach for all catchment types, they are superior to the algorithmic model in

predominantly rural catchments and are comparable to the algorithmic model when applied to urban catchments in which data were somewhat limited.