

Reducing the uncertainty associated with water resources planning in a developing country basin with limited runoff data through AI rainfall–runoff modelling

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Abstract A major bane of water resources assessment in developing countries is the insufficiency or total lack of hydrometeorological data, resulting in huge uncertainties and ineffectual performance of water schemes. This study reports on the application of the Kohonen Self-organizing Map (KSOM) unsupervised artificial neural networks in harnessing the multivariate correlations between the rainfall and runoff for an inadequately gauged basin in southwest Nigeria, for the sole purpose of extending the runoff records, and through them, reducing water resources planning uncertainty associated with the use of short data records. The extended runoff records were then analysed to determine possible abstractions from the main river source at different exceedence probabilities. The study demonstrates the successful use of emerging tools in reducing the uncertainty associated with lack or insufficiency of data for water resources planning assessment.

Key words water resources assessment; hydrological data; Kohonen Self Organising Map (KSOM); reliability; water abstractions; Nigeria