

Application of the Artificial Neurons Networks Model uses under the condition of insufficient rainfall data for Runoff Forecasting in Thailand

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Abstract

To estimate and forecast runoff by using Artificial Neural Networks model (ANNs), it has been studied in Thailand for the past 10 years. The model was developed in order to be conformed with the conditions in which the collected dataset is short and the amount of dataset is inadequate. Every year, the Northern part of Thailand faces river overflow and flood inundation. The most important basin in this area is Yom basin. The purpose of this study is to forecast runoff at Y.14 gauge station (Si-Satchanalai district, Sukhothai province) for 3 days in advance. This station located at the upstream area of Yom River basin. Daily rainfall and daily runoff from Royal Irrigation Department and Meteorological Department during flood period 2000–2012 were used as input data. In order to check an accuracy of forecasting, forecasted runoff were compared with observed data by pursuing Nash Sutcliffe Efficiency (NSE) and Coefficient of Determination (R^2). The result of the first day gets the highest accuracy and then decreased in day 2 and day 3, consequently. NSE and R^2 values for first day of runoff forecasting is 0.76 and 0.776, respectively. On the second day, those values are 0.61 and 0.65, respectively. For the third day, the aforementioned values are 0.51 and 0.52, respectively. The results confirmed that the ANNs model can be used when the range of collected dataset is short and insufficient. In conclusion, the ANNs model is suitable for applying during flood incident because it is easy to use and does not require numerous parameters for simulating.

Keywords : Artificial Neurons Networks model (ANNs), Insufficient rainfall data, Runoff forecast, Thailand

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