Application of the Artificial Neurons Networks for Runoff Forecasting in Sungai Kolok Basin, Southern Thailand

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Abstract

This study examined Artificial Neurons Networks model (ANNs) for forecast flash discharge at Southern part of Thailand by using rainfall data and discharge data. The Sungai Kolok River Basin has meant the border crossing between Thailand and Malaysia which watershed drains an area lies in Thailand 691.88 square kilometer from over all 2,175 square kilometer. The river originates in mountainous area of Waeng district then flow through Gulf of Thailand at Narathiwat Province, which the river length is approximately 103 kilometers. Almost every year, flooding seems to have increased in frequency and magnitude which is highly non-linear and complicated phenomena. The purpose of this study is to forecast runoff on Sungai Kolok at X.119A gauge station (Sungai Kolok district, Narathiwat province) for 3 days in advance by using Artificial Neural Networks model (ANNs). 3 daily rainfall stations and 2 daily runoff station have been measured by Royal Irrigation Department and Meteorological Department during flood period 2000-2014 were used as input data. In order to check an accuracy of forecasting, forecasted runoff were compared with observed data by pursuing 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. R^2 values for first day, second day and third day of runoff forecasting is 0.71, 0.62 and 0.49 respectively. The results confirmed that the ANNs model can be used when the range of collected dataset is short and real-time operated. In conclusion, the ANNs model is suitable to runoff forecasting during flood incident of Sungai Kolok river because it is straightforward model and require with only a few parameters for simulation.

Keywords : Artificial Neurons Networks model (ANNs), Runoff forecasting, Thailand

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