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The Effect of Spot and Regional Rainfall in Estimating the Runoff of Balkhlouchay Basin

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Abstract

During recent decades, because of the importance of the rainfall-runoff process, developing suitable models to estimate the runoff from the rainfall data has become an important issue. Rainfall is considered as one of the most important input data in hydraulic systems, which is considered to have two types: spot and regional. In order to model the rainfall-runoff process, intelligent models, which do the mapping task using the input and output data and have accurate results, are used. In this study, in order to estimate the output runoff from the Balkhlouchay basin located on the west of Ardebil Province, the amounts of previous rainfalls and discharges till three days earlier are used, and the rainfall also is considered in two types of regional and spot which is

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related to 6 rain-measurement stations. In order to estimate the rainfall-runoff in the Balkhlouchay basin, intelligent models, artificial neural network(ANN) , genetic programming (GP) and adaptive neuro fuzzy inference system (ANFIS) are used. and The results were compared using evaluation criterion. The amount of the coefficient of determination, root mean squared error and the Nash–Sutcliffe efficiency coefficient for ther egional rainfall test data are 0. 854, 0. 573, 0. 935 respectively. In the most accurate model for the spot rainfall in the test data the mentioned values are 0. 852, 0. 578 ,0. 932. The results of this study show that the regional rainfalls have better results compared to the spot rainfall.

Keywords: Rainfall-Runoff, Regional Rainfall, Spot Rainfall, Balkhlouchay Basin, Intelligent Models.

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