Islamic Azad University-Ahar Branch
Geographic Space
An Approved Scientific, Research-based
Quarterly

Farzan Mohajeri[1]
Seyed Mehdi Saghebian[2]
Mohammad Ali Ghorbani[3]
Sabereh Darbandi[4]
Esmaeil Asadi[5]

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

Date received: 23 February 2013 Date accepted: 18 January 2014

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

1- M.S.C. in Civil Engineering, Islamic azad university central theran branch.
2- Lecturer in Civil Engineering, Islamic azad university ahar ,branch.
3-Associate professor, faculty of agriculture, the university of Tabriz, Tabriz Iran.
4- Assistant Professor, Water Engineering Department, Faculty of Agriculture,. University of Tabriz, Tabriz, Iran.
5- Assistant Professor, Department of Water Engineering, Faculty of Agriculture, University of Tabriz, Tabriz, Iran.

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.