Storm Runoff Coefficient Estimation Using Adaptive Neuro-Fuzzy Inference System in Barariyeh Watershed, Neishabour

M. Jafari[1], M. Vafakhah[1*] and A. Tavasoli

Abstract

The rainfall-runoff process and flooding are hydrological phenomena that are difficult to study due to the influence of different parameters. So far, different methods and models have been provided to analyze these phenomena. The purpose of this study is evaluation of adaptive neuro-fuzzy inference system (ANFIS) for storm runoff coefficient forecasting. To that end, Barariyeh watershed was chosen in Neishabour and the data of 33 events were collected from 1952 to 2006. Factor analysis (FA) was used for determination of independent variables in storm runoff coefficient forecasting. Four variables were selected as independent variables, including average rainfall, third, first and fourth quartiles of rainfall intensity and also five other variables included φ index and first to fourth quartiles of rainfall intensity. Other variables combined based on their hydrological role were considered as ANFIS inputs. The results revealed that the ANFIS inputs including first to fourth quartiles of rainfall intensity, φ index, and total rainfall of five days before can predict storm runoff coefficient with R^2=0.91, RMSE=0.02506, MAE=0.0666 and CE=0.87.

1. Dept. of Watershed Management Eng., Faculty of Natur. Resour. and Marine Sci., Tarbiat Modares Univ., Noor, Iran.
*: Corresponding Author, Email: vafakhah@modares.ac.ir

177