Abstract

Due to limited water resources, preventing water loss through evaporation as an important component of the hydrological cycle plays an important role in the development and management of water resources. To estimate the evaporation pan, various methods and empirical formulas have been proposed, most of them requires several input parameters that are either difficult to access or measure they need to spend a lot of time. Today, smart models with respect to their ability to solve complex phenomena, have found a lot of problems. Therefore, due to the nature of the problem of evaporation, using artificial intelligence techniques to determine them is new. New methods for the preparation of models can be planning method (GEP) and neural induction system - fuzzy (Neuro-Fuzzy) cited The aim of this study was to compare methods for estimating evaporation Gen Expression neuro-fuzzy and planning method is the South Khorasan province. For this purpose data collected from six synoptic stations during 1990-2010. Implementation of neuro-fuzzy model in MATLAB and implementation planning Exp model GeneXproTools 4 used in the program. Finally, to evaluate models and compare them coefficient of determination (R^2) and Mean Bias Error (MBE) and root mean square error (RMSE) were used Among the factors affecting evaporation pan average daily temperature Chaen stations, Boshrooyeh, Ferdows and Birjand and the average minimum temperature Nehbandan stations and Khurbyrjnd had the highest correlation coefficient in both models. Comparing GEP results showed that the models perform better than ANFIS model to estimate the daily evaporation pan. So that the best results of GEP en station with coefficient of 0.87 and RMSE=2.04 for Nehbandan with a coefficient of 0.76 and RMSE=2.76 for Birjand station with coefficient 0.70 and RMSE=2.6 Ferdows station paradise with a coefficient of 0.73 and RMSE= 1.2Boshrooyeh station with coefficient 0.8 and RMSE =1.44 Khurbirjnd station with a coefficient of 0.72 and RMSE=3.42 respectively.

Keywords: Evaporation, water resources Management, Gene Expression Programming, Nero-Fuzzy

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Comparison of neuro fuzzy and gene expression programming approaches for estimating pan evaporation in South Khorasan

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