Monthly Evaporation Estimation using SARIMA and BiLinear time series models in Idanak Station

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Received date: 2017-11-09
Reception date: 2018-09-25

Abstract

Proper planning for the optimal use of water resources with the goal of sustainable development is of particular importance. Awareness of the exact amount of evaporation, which is one of the important parameters for water resource planning, irrigation management and crop production, is inevitable. On the other hand, the inadequacy of evaporation stations and ambiguity in data quality have led researchers to model estimates. In this paper, the monthly were estimated using SARIMA and BiLinear time series models at Idanak station located in the Maroun basin of Khuzestan province. For time series modeling, the monthly evaporation data of the Idanak station with a length of 32 years (1396-1392) was used. The Port Manteau test, and the remainder of autocorrelation and partial autocorrelation functions, were used for validation of fitted SARIMA time series models and the Schwartzs Bayesian Criterion (SBC) were used to select the best SARIMA model. Also, the Port Manteau test was used for validation of BiLinear time series models. The best SARIMA and BiLinear time series models for monthly evaporation estimation in Idanak station were SARIMA$(1,0,1)*(1,0,1)_{12}$ and BL(7,0,1,1) respectively. Comparison of the values of the statistical criteria of the two models showed that the BL(7,0,1,1) model with a coefficient of determination (R2) equal to 0.89, Root Mean Square Error (RMSE) equal to 2.945 mm, Mean Absolute deviation (MAD) of 0.618 mm is more accurate than the SARIMA $(1,0,1)*(1,0,1)_{12}$ model for estimating monthly evaporation at the Idanak station.

Keywords: Monthly evaporation, BiLinear model, SARIMA model, Maroun basin.