Ali mohammad khorshiddoust [1]

Mojtaba nassaji zavvareh [2]

Bagher ghermez cheshmeh [3]

Time Series Reconstruction of Daily Maximum and Minimum Temperature Using Nearest Neighborhood and Artificial Neural Network Techniques (Case Study: West of Tehran Province)

Abstract

Long time series are needed for analysis of time variation, trend of extreme events, risk estimation and possible events. One of the most important time series in geographical and climatic science is daily maximum and minimum temperature. These two parameters use daily evapotranspiration estimation, determination of water balance and climate change study. Maximum and minimum temperature are measured in meteorological stations. However, different statistical years, deficiency in statistical data and error of measurement cause variation in time series. Therefore, reconstruction of time series is very important. This research evaluates reconstruction of daily extreme temperatures to nearest neighbor and artificial neural network methods for five stations in the west of Tehran Province. In the nearest neighborhood method correlation between respective maximum or minimum temperature is used. Whilst in the artificial

1- Associate Professor, Islamic Azad University, Ahar Branch.
2- PhD Student in Climatology, University of Tabriz.
3- PhD Student in Climatology, University of Tabriz.

neural network using meteorological stations network the minimum and maximum daily temperature are reconstituted. Neural network used in this research is a multilayer feed forward network with back propagation algorithm and hidden layer.

Results show that artificial neural network method had least mean absolute error for all stations compared to the nearest neighbor method. With increasing distance of the station the estimated error increases in the nearest neighbor method. Accuracy of the two methods in estimating daily maximum is more than the daily minimum temperature.

Keywords: Time series, Data reconstruction, Daily maximum and minimum temperature, artificial neural network method, nearest neighbor method.