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Time Trend in the Mean Annual Temperature of Iran

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Abstract: Many researchers around the world have reported a gradual increase in mean annual temperature. Yet, there are some reports of a reduction in this parameter. In this study, we investigated the long-term trend of mean annual temperature at 34 synoptic stations in Iran (2 stations in cool humid climates, 14 stations in temperate humid climates, 11 stations in steppe climates, and 7 stations in desert climates, based on the Koppen climatic division) with a minimum record of 30 years by Student's t-test. Results showed that there was a positive trend in 50% of the stations, while 41% of stations had a negative trend. Considering the significance level (α = 5%), there were 3 trend zones for mean annual temperature in Iran, i.e. positive trend, negative trend, and zero trend; however, it was difficult to define a specific spatial scheme for such a division. The results were supported by the Mann-Kendall method, while low harmony was found with the Wald-Wolfowitz test. As far as record length is concerned, during a common time period (1968-1998), 65% of the stations showed a positive trend, while 32% of them followed a negative trend. There were some shifts from one trend to another for some of the stations in the study, yet with no well-defined spatial structure. In this case, and at the 5% level of significance, 44%, 15%, and 41% of the stations had a positive trend, a negative trend, and zero trend for the parameter of the study, respectively. In general, the behavior of trend direction was different for different climates and no specific pattern was found. Based on the results, one may hypothesize that in the future more regions will experience higher temperatures. Some stations did not show any significant trend, yet their positive trends may be indicative of future warming. Including the years 1999-2002 in the data verified the results of our trend analysis. All of the stations showed higher average mean annual temperature compared to the average of the period 1968-1998.

Key Words: Temperature, climate, time trend, Iran

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