

Trend Analysis of the Maximum and Minimum Temperature Variations in Iran Desert Plateau

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Extended Abstract

Introduction

Climate change, as one of the most important global challenges, has focused on the minds of many scholars, scientists, planners and politicians. Indeed, global warming, melting of polar ice masses, rising water levels in the oceans, and its similar phenomena have led climate change to become the special attention focus of scholars and scientists in recent decades. Since temperature is a key element in the formation of the climate, and its changes can alter the climate structure of each region, therefore, studying the trend of temperature in different temporal and spatial scales have been attributed a large part to climatological studies. In fact, temperature as one of the most important and determinants of climatic elements is a suitable index for tracking climate change. Recent studies on climate change also highlight the centrality of temperature variations in these studies. In this regard, numerous researches has been carried out on the trend of global and regional average temperature increase, and the identification and analysis of the behavioral patterns of temperature has been considered by different methods in numerous studies. Here, we can be mention researchers such as Willett (1950), Yue & Hashino (2003), Feidas et al (2004), Bani-Domi (2005), Arora et al (2005), Turkes et al (2007), LaDochy et al (2007), Dhorde & Gadgil (2009), Chaouche et al (2010), LukoyeMakokha & Shisanya (2011), Toros (2011), Cordero et al (2011), Nayak & Mandal (2012), Safari (2012) and in Iran, Kaviani & Asakereh (2001), Azizi et al (2004), Masoudian (2005), Ghayour & Montazeri (2005), Asakereh (2007), Massoudian et al (2008), Akbari & Masoudian (2009), Hejazizadeh & Parvin (2009), Massoudian & Darand (2010) and Montazeri (2011). Since the identification of temperature behavior and its changes is very important for management and planning, this research seeks to evaluate and analyze the variations of maximum and minimum monthly temperatures in Iran plateau. In this regard, statistical methods are considered useful and effective in describing these changes.

Materials and Methods

In this research, the data of CRU database with resolution of $0.5^{\circ} \times 0.5^{\circ}$ geographical longitude and latitude during 64 years during 1951- 2014, have been employed to analyze the trend of maximum and minimum temperature changes in Iran plateau. This data is available on the site's website at (<https://crudata.uea.ac.uk/cru/data/hrg/>) in the nc format. For data processing and extraction of this database, internal functions were used in MATLAB software. In order to extract data on Iran, the inpolygon function was used and the nread command was used to read the data. Then, the mean monthly minimum and maximum temperature matrices, were constructed on Iran plateau. The dimensions of each of these two matrices were 768×2400 , with rows representing the months and columns, representing spatial pixels. Then, using programming in MATLAB software, each month of the year, they were arranged in separate matrices, and the Mann-Kendall nonparametric test was applied to the data in order to detect the temperature trend.

Discussion and Results

The results indicate that in all months of the year, maximum and minimum temperature of Iran plateau have increasing trend, but this trend is more pronounced in the hot months than in the cold months; in summer, more than 90% of the area has a rising trend of minimum temperature. At the same time, in the hot months of the year, 65-85% of the study area is also evident increasing in

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the maximum temperature. In the hot months of the year, the study area is under the domination of Azores subtropical high pressure, which causes predominance of the dry and warm weather on Iran plateau. In the months of April, May, June and July, there is no decrease trend in any part of the region. The least extent of temperature increasing trend observes in January, February and December.

Conclusions

The results of this research indicate that in general, the maximum and minimum temperature of the Iran plateau has an incremental trend, and the temperature decreasing trend is negligible. Also, it has been revealed that increasing trend of temperature in hot months have high extent. The least extent of trend areas observes in January, February and December. Totally, the results of this research indicate that increasing trend of temperature observe, not only in Iran but also on all of Iran plateau, that this temperature increasing together decreasing trend of precipitation in recent years can result unpleasant consequences in this region. Thus, the increasing trend of temperature along with the reduction of precipitation in recent years is a serious danger to residents of this important plateau, including Iran. The results of this research appear to have strong evidence of the continental pattern and the prevailing warming of the Iran plateau.

Keywords: Analysis, Variations, Temperature, CRU, Mann-Kendall, Iran.

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