A Trend Analysis of Area Suffering from Climate Changes in Iran During: 1960-2004

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1. Introduction

As strongly accepted among climatologists, climate change is a result of human activities. There is disagreement about how to define climate change, because of tremendous difference of climate changes in scale, intensity and occurrence time in various regions. Recently there have been several observation analyses involving daily and extreme daily temperature trend and variability in regional and global scale. Analyses In global scale (Caesar & Alexander, 2005; Alexander et al., 2006; Brown, 2008) show an increasing trend in the lower end of the maximum and minimum temperature distributions with regional differences. **For instance, i**n south America, analyses showed a general warming trend in the region (Aguialar et al., 2005) also analysis results indicate no consistent change in the indices based on daily maximum temperature while significant trends were found in the indices based on daily minimum temperature (Vincent et al., 2005). Therefore in this paper, using gridded daily temperature data (Mean, maximum, minimum), we have analyzed the trend of the area which is affected by climate warming in Iran.

2. Study Area

Iran is a country located on North latitude 25°07″to, 39°8″East longitude, 44°2″to, 63°05″ on subtropical region. The minimum and maximum of Iran's temperature is 11°c and 25°c.respectively.

3. Material and methods

Analyzing extreme indices, we used the temperature data from Asfezari’s national gridded database which dates from 23.5.1961 to 31.12.2004.

The temperature database, were collected from 664 climate and synoptic stations using Kriging interpolation method. In this database a matrix of 7187×1599 is defined for each climatic variable in which rows represent spatial cells and columns represent time (per day). The coordinate system of the database is Lambort conformal conic and the dimensions of each grid is 15×15 sq. meter.

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1. In this research, warming is defined as the ratio of temperature rise in the long-term regional average. Since in this study gridded data were used, long-term average of each grid is considered as the regional norm.
2. In the second step the number of the grids with a higher amount than the long-term average in the same grid and the same day was recorded and the area percentage of each grid was calculated.
3. Finally the output trend of the second step was calculated.

4. Results and Discussion

In this study, spatial behavior of temperature analyzed using minimum, maximum and mean temperatures that each represents a different structure of a region's climate. The minimum temperature results from the output of the solar radiation and daytime temperature results from the input of solar radiation. On the other hand, green gases such as vapor and carbon dioxide are the basic effective elements in a balance of the output of the solar radiation, whereas the balance of the input of solar radiation depends on atmosphere radiation characteristics such as atmospheric transparency.

Therefore, the minimum and maximum temperatures are affected by different factors and may have different trends. The mean temperature of each region can be the representation of the changing structure and provides features of temperature behavior, according to time and location and gives a background of the region. Therefore, due to temperature rise in the current century, and due to development of the regions with rising temperature and also temperature importance as a basic element in climate system, it is important to know in what velocity the temperature is rising and what areas it affects in each period. The results show the areas that their minimum temperature increase are more than the areas that their maximum temperature increases. The time series of AI also shows the mean of this index increases in more than 50 percent of Iran in recent years.

Therefore, sorting temperature rising value and AI increasing trend adds to the importance of the subject. The 54% increase of AI is an alarm for ecosystems and natural resources in a country like Iran whose climate structure adds to its sensitivity. According to previous studies (Masoodian, Loarie et al 2009) such changes affect mountain areas less and therefore future programmers should pay special attention to such areas.

3. Conclusion

The results show the areas that their minimum temperature increases are more than the areas that their maximum temperature increases. The time series of AI also shows the mean of this index increases in more than 50 percent of Iran in recent years. Minimum and maximum temperatures play a decisive role in different features of man's life, such as agriculture, social and fundamental issues and are considered as irritable thresholds for all man's activity which is a reason why it is of such importance to governors and programmers. In studies performed on climate changes, it is obvious that plant and animal habitats are affected more than that of humans. According to studies, it seems that Iran's climate is tending towards a warmer climate with less precipitation. In studies performed on climate change, it is obvious that plant and animal habitats are affected more than that of humans. The 54% increase of AI is an alarm for ecosystems and natural resources in a country like Iran whose climate structure adds to its sensitivity. Moreover, an important feature of management against climate change is to mark vast, vulnerable areas such as arid and semi-arid regions and deserts, which constitute an extensive part of Iran. Due to the high sensitivity of such areas, protection of their ecosystem is of great importance.

Key words: Iran, Climate change, Area index, Trend.

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