

Analysis of the Iran Droughts in the Past Half Century

R. Doostan*

1. Ph. D. of Climatology, Assistant Professor of Climatology in Ferdowsi University of Mashhad, Iran

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Introduction

The History shows that human life from the beginning has always been exposed to natural hazards. Drought is one of the most important risks in Middle East. This Climate risks different to other disasters such as floods and earthquakes, and differences is in the impact of a slow, quiet and creep (chronic) this event over a long period. It is impossible to determine the exact start and end time, and the range is expanding it. Rainfall is the most important parameter in a drought so that the overall decrease in precipitation of long-term than normal is called drought. Iran is located in the region that many of the droughts have occurred in this area, as in the classical texts of prayers for rain and drought relief can be seen. Drought effects of drought is reducing water flow, as a study period of 1987 to 2007, Moderate to severe drought period (1996-2007) in Gonabad is Drying 51 Aqueduct, Rate reduction of 48% in the aqueduct and 41% of the wells and 31 percent of the region's springs and drop the Underground water tanks 2 meters and 10 cm (Behnyafar et al, 2011). In this study, using long term data (50 year) from the stations of Iran identify the behavior and the spatial distribution and homogeneous regions of long term drought.

Materials and Methods

In this study to determine the long-term drought in Iran was used Monthly rainfall data from 31 synoptic stations with the 50-year period from 1961 to 2010. The Standardized Precipitation Index (SPI) was calculated on the scale of 24 months (Mc Kee et al, 1993). The time series of standardized precipitation index, real drought index score of negative one or less was determined. IN The following were drawn time series of drought 50-year for each station that shows the severity and duration of drought. To determine the spatial homogeneity of long-term drought was used the principal component analysis (PCA) and clustering (CL). As well to better explain droughts in the region, time series stations in each group were together in a format.

Results and discussion

Classification results in a time-series standard index of 24 month showed seven homogeneous area of long term drought in Iran (table 1). Long term Drought area in Iran have spatial trend – northwest to southeast.

Table 1: homogeneous area of long term droughts of Iran

area	Homogenous station
1	Tabriz- Khoy- Gorgan
2	Ramsar- Rasht- Bandar Anzali
3	Ghazvin- Saghez- Kermanshah- Hamedan- Sanandaj- Oroomiah-Zanjan- Tehran-Babolsar
4	Khoramabad- Arak- Esfahan
5	Mashhad- Sabzvar- SHahrood- Torbat Heydariah- Birjand- Bandarabas
6	Abadan- Boushehr- Ahvaz- SHiraz
7	Kernman-Bam- Zahedan

The correlation results (Figure 3) is indicate the High correlation of stations with station of saghez, The main track of entry the wet air mass of this region to Iran. Correlation of stations from South West to North East, respectively, in groups of 5 and 6 is shows next track of wet air

*. Email: doostan@um.ac.ir

mass to Iran of Mediterranean and Persian Gulf. One region of homogeneous drought included of the North West, Tabriz and khoy and the south-east, gorgan. Among all areas of drought in this area has experienced most real drought period, nearly three decades (25 years). As in all three stations droughts of 1982 and 2010 continued. Tow region of the homogeneity drought are the stations of Bandar Anzali, Rasht, Ramsar that are in the western Caspian region. In the past two decades, the actual frequency of droughts and less wet periods have experienced. In the three region is consist of stations in North Zagros and Western south of Alborz(9stations). This region has experienced the most real droughts and dry periods in the late 90s and 2000s. Fourth region are including the Central and East Zagros stations, Khorramabad, Isfahan, Arak. The actual frequency of droughts and dry periods in this group in the past three decades has shown to increase. So, that since the mid-80s to early 90s, a period of drought in the region has occurred. Fifth group includes stations in North East Iran. Time series in the 60s and early 70s shows that the actual drought occurred in this area and after this period, the late 90s maximum frequency there is with real wet and drought actual frequency of less frequency. In the late 90s and 2000s maximum frequency of drought and drought period are obvious. Six region locate in south-western Iran that including stations of Ahwaz, Abadan, Iran's Bushehr. In this area there is the continuing actual drought in the 60s and 2000s. Seventh region is included stations of east south in iran, zahedan, kerman,bam. The late 90s and 2000s, a long period of drought in the past half century has occurred in this area. As Drought Severity in Zahedan station in 2002 is -3 Index score.

Conclusion

The Long-term droughts are in the orderly and natural behavior, this behavior can be seen as a homogeneous space droughts. The spatial trend of drought of Iran is northwest – southeast and this trend is relations to tracking of moisture air mass and this corresponded placement of Trough in East Mediterranean at cold half. This trend is consistent with the cyclone tracks of Iran (Alijani, 2007). The most severe drought in half a century happened in the North West (first area) and West (third area). The next degree, zones 5 and 7 in order, North East and South East, has experienced real and severe droughts in the 2000s. So, the whole of Iran in Past half century (2000s), the drought periods of and the extreme droughts have experienced. So, prioritize areas of the risk management and planning to reduce the consequences of the recent droughts is the region of 1, 3, 5, 7, 6, 2 and 4. The regional plan and Programs is essential in Deal with the consequences of drought.

Keywords: Long Term Drought, Drought Region, Standard Precipitation Index, Iran.