

An Analysis on the Determination of Climatic Drought Indices and Zoning in Khorasan Razavi Province

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Extended Abstract

Introduction

Drought is a creeping environmental phenomenon that has many damaging effects on the economy, agriculture and society. Drought is a situation of shortage of rainfall and incoming temperature increases that may occur in any climate. This phenomenon is in parts of eastern central and southern of Iran, due to dry and semidry weather will be more. The geographic distribution of droughts occurred in the percentage of the country shows that the southern and eastern areas of the country's is more extensive, and whatever from the southern and eastern parts of the country took distance the intensity and frequency of drought is also reduced. The reason for this is the impact of subtropical high-pressure systems that significant amount of the rainforest of South and Eastern parts in the country towards the northern and Western parts of the significantly reduced and prevents the effect of Northern and Western systems in these area.

Methodology

Khorasan Razavi with 143864.118 Km² is the fourth largest province in Iran. The highest point of the province is in the North of Nishabor with a height of Binalud heights 2116 m above sea level and the lowest point of the province is Sarakhs plain with a height of 300 meters above sea level which is located in Iran and Turkmenistan border. The average annual precipitation of Khorasn Razavi is between 75 to 390 mm. At the first data related to precipitation in the Razavi Khorasan Province was obtained from the country's water resources management organization. Precipitation data from 1980 to 2010 were averaged on an annual basis. This data is them prepared in note pad file, and by using DIP software, the index of SPI, PNI and ZSI was calculated for all situations. After the calculation of this indicator for each year, the data were entered into ArcGIS software and then used ordinary Kriging method for drought zoning for the end of the 11 years (2000-2010).

Discussion and result

The results indicated that changes in wet and drought year during the studied period didn't follow a regular process but changes in indicator are similar. Results also indicate that the year of 1992 and 2008 respectively are the rainiest and driest year during the studied period in all three indicators.

The results of drought indices zoning of PNT, ZSI and SPI in the period of case study suggest that changes in different years and parts of Province does not follow the regular process. The result of drought index zoning in Khorasan Razavi Province suggested that PNI drought index made the condition wetter and ZSI drought index drier. Also the results show that drought index SPI and ZSI

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are more consistent than PNI drought index. The result of drought index PNI, ZSI and SPI indicated that in 2008, 2001 and 2000 years respectively are the driest zoning year. SPI and ZSI drought index in 2003 were the wettest year drought zoning and drought index in 2003 in addition to 2004 and 2009 were the wettest year. API drought index calculated the minimum amounts of rainfall in the studied station in the years of happening dryness, which regarding two other indexes are more accuracy. The result also shows that ZSI and PNI index have the same accuracy. In total SPI drought index for dry zoning in Khorasan Razavi province is more accurate and this index is suggested for drought studies.

Conclusion

The results indicated that none of the index drought zoning followed the regular processes. The results suggested that SPI index is the best performance of other indices. Also PNI and ZSI indices have the same accuracy in determination of drought in Khorasan Razavi Province. This result had compliance with the results of Naserzade and Ahmadi (2012), Ansafi Moghadam (2007), Karimi et al (2011), Piry et al (2013) and Khoram bakht et al (2014) which in their studies determined SPI index as the best index. Besides the results didn't match with the result of Shokohi (2012) which SPI index was not the best index.

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