The Effect of Global Warming on the Cyclogenesis Zone of Eastern Mediterranean and its Relationship with Precipitation Anomalies in West of Iran

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Extended Abstract

Introduction
Variability is one of inherent properties of the climate system. In addition to the dynamic nature, the climate system is extremely intertwined nature also, so that its components interact with each other and eventually they are changing each other. In general, the climate of a geographic location is controlled by various factors, including Atmospheric Action Centers (AAC's). AAC's behaviors have an effective role in short and long term changes in weather and climate conditions and components. AAC's of Mediterranean Sea especially its cyclogenesis centers in east side of sea have an effective role in Iran precipitation regime. From this point of view, this study is looking forwards the effects of temperature and pressure components of east Mediterranean cyclogenesis centers in rainfall anomalies of west of Iran.

Material and methods
In this study, two data sets have been used: first, database of Meteorological Organization of Iran, based on 1961 to 2010 data series and then, database of U.S. Environmental Studies Organization based on 1948 to 2014 data series. Among the total of months which were concerned in this study, 55 months have been selected because of their abnormalities. By using Pearson method the correlation between precipitation amounts of Iranian stations and temperature and pressure on atmospheric levels of MSL, 850, 500 and 300 hpa was calculated for east of Mediterranean Sea. Then significant correlations were interpolated for whole of west of Iran using IDW methods in ArcGIS and map monthly rainfall anomalies correlation was presented with changes in temperature and pressure of center East Mediterranean.

Discussion and Results
Based on results of research the widespread abnormalities of rainfall in west of Iran have correlated more with temperature and pressure changes of upper level rather than lower level of synoptic patterns of east section of Mediterranean Sea. Likely, the changes in behaviors of upper levels patterns in east Mediterranean AAC's in cold season and their effects on deepening of Mediterranean Trough and creation the positive vortices advection in eastern parts of trough have more important than the patterns in lower levels of atmosphere. In addition, because upper and mid level patterns (300, 500 hpa) are far from reach of local ones in low levels, their impacts is more activeness in long distances from east Mediterranean to west of Iran. Also based on results of this study the changes of pressure and temperature components in eastern part of Mediterranean Sea are increasing and significant especially in case of upper levels ACC's. Vertical profiles of abnormalities in all levels of atmosphere confirm increasing of troposphere temperature and geopotential height over the past three decades (1981-2010) than the normal period (1949-1980). On this basis the different levels of atmosphere from MSL to 300 hpa have experienced an increase range from 11 to 15 gpm, that for level of 300 hpa it reach to 35 gpm. But upper parts of atmosphere in levels of 20 to 10 hpa the feature of
decreasing is dominant. In case of temperature of atmospheric levels it was shown that in lower-to-mid levels exists an increase about 0.3°C whereas in upper levels was seen a decrease approximately 1°C.

**Conclusion**

Based on the results of widespread anomalies of rainfall in west of Iran shows a strong inverse correlation with temperature and pressure changes in Mid-east AAC's of Mediterranean sea at all atmospheric levels. In the northwest of Iran, the above mentioned correlations are weak and insignificant. Also the significant increasing trend of temperature and pressure in east of Mediterranean area in relation with its powerful and inverse correlation with the anomalies of rainfall of west of Iran and with concern to developing trend of Global Warming, justifies the more probability of drought occurrence in whole of Iran by researching. Although according to results of other researches, the rainfall of Iran hasn't already showed any significant trend, but the synoptic studies on mentioned factors especially the cyclogensis centers in east part of Mediterranean Sea, shows an increase in atmospheric pressure and consequently more occurrence of droughts in Iran. In this context, it's necessary to perform environmental programs to control bioclimatic consequences.

**Keywords:** AAC's; East of Mediterranean Sea; rainfall anomalies; Global warming; west of Iran.
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