

Identification and Analysis of Synoptic of Heat Waves in West of Iran (Case Study: Ilam, Khuzestan, Lorestan, Kermanshah)

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Abstract

Heat wave has harmful effect on environment and human life. First of all, this research identifies the heat wave of four provinces of Ilam, Kermanshah, Lorestan, and Khuzestan, for the period between 2000 and 2010. This study uses the heat index, and the return period of this wave using the Gambel distribution function. According to obtained results, total redundancy of extracted heat waves was detected as 143, which 70 waves of this amount have been in warm period and 73 waves in cold period of the years. Monthly process of thermal waves shows that the highest wave was occurred in the month of Farvardin. Process the maps of surface pressure of the earth during warm period of the year shows that low pressure tabs of Ganges had pulled near the central Iran, even its tabs in to north east of Iran and the center of Iran is low-pressure heat. In time of occurrence of this wave, there was pressure heat occurred in the earth surface from Horn of Africa, Europe, Iraq, and Saudi Arabia. Hence, the low pressure tab of Saudi Arabia has been affected southern, south-western, and western parts of Iran. Synoptic Process of the heat wave condition shows that area is located in front of the hot air and the influence of hot air on the area has caused the temperature rise at this time of the year.

Keywords: heat wave, synoptic analysis, heat index, west of Iran.

1. Introduction

Heat wave is one of the most important natural disaster and weader conditions. That has harmful effect on environment and human life. heat wave is a warm period that is stable for several days to several weeks and maybe com with violent wet. Generally, increasing the temperature degree in extreme heat waves can cause the destruction of agriculture product and loss communities of the plant societies and ecosystems and also human death. Heat wave with Decrease the Photosynthesis

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measure in farm plants cause decreases the plants performance in measure product of the seed and fruit. One heat wave in could period of year can have violent Damage on garden product from the way of hasty awaking in fruit tree and decreases of Fertility of tree. according to the importance and effect of temperature on environmental condition and also the roles on big and small plans, pattern modeling the Temperature behavior, science circle specially in the recent year had a great attention.

2. Methodology

In this research first of all identify the heat wave of the west of Iran area, that consist of four states: Ilam, Kermanshah, Lorestan and Khuzestan. That we identify and return period of this wave with the using of Gumbel distribution function and finally similar pattern concentrated on area in days who introduce heat wave for this reason. Thereupon we receive the data on surface of earth from the Meteorological Organization for the period of time we receive between 2000 to 2010 and then by this data and the using of heat index and humidity index (this two index in order to using given apparent temperature is by Meteorological Service of Canada). identified heat wave. In Excel spreadsheet software for this period of time is and statistic Analysis is done by Gumbel distribution function that is suitable Distributive in order to study Phenomena climate extremes. Then the Synoptic Analysis of wave of statistic we Analysis of the similar heat wave for this work we need a Representative days for per period of heat wave that we choose this Representative days at the middle of the wave. Because for each wave has a peak day that after that the temperature decreases again. Approximately 85% of this threshold or the peak temperature that day was the middle. after assignment of represent day we start make the maps of different level of the atmosphere by receive of the data of the NOAA website. this maps consist of geo potential height and moving temperature.

$$\begin{aligned} \text{Index heat} = & -42/379 + 2.04901523T + 10/14333127Rh - 0/22475541T a Rh \\ & - (6/83783 \times 10^{-3} T a^2) - (5/481717 \times 10^{-2} Rh^2) + (1/22874 \times 10^{-3} T a^2 Rh) \\ & + (8/5282 \times 10^{-4} T a Rh^2) - (1/99 \times 10^{-6} T a^2 Rh^2) \end{aligned} \quad (1)$$

$$\text{Humindex} = T_a + H$$

$$H = \frac{5}{5555}(e-10)$$

$$e = \frac{6}{11} \exp\left(5417/7530 \times \left(\left(\frac{1}{273/16}\right) - \left(\frac{1}{T_d}\right)\right)\right) \quad (2)$$

3. Results and discussion

Total heat waves extracted wave was detected in the study statistic period 144 that this numbers 70 in warm period and 73 waves in cold period of the years had happened. The durability of these waves distinguished wave two to 25 days. most occurrence waves of two, three, and four all of ten day wave with return period of 25 year with the average of apparent temperature of 55.5 °C period return of the wave of 15 day and upper 50 year and more was calculated. Monthly process of therm waves shows that during of 11 year statistic (2000-2010). Highest of waves

occurrence was in farvardin month and also in The event heat waves in could period of year and more event is in winter season. Plenty of waves in this season more is in day and esfand month. Process the maps of pressure of surface of the earth during the warm period of the year shows that Low pressure tabs of Ganges had pulled near the central iran, even its tabs in to north east of iran and the center of iran is low-pressure heat. In time of occurrence of this wave in the earth surface of the –pressure heat on the branch of the Africa, Europe. araq and saudi Arabia had been closed. That are from the kind of termal and showing the violent heat that is excit at the surface of the earth. Low pressure of Saudi Arabia one of the most important effective of wave occurrence of the heat That are from the kind of termal and showing the violent heat that is excit at the surface of the earth. Low pressure of Saudi Arabia one of the most important effective of wave occurrence of the heat That tabs effectet the south southwest and the parts from the west of iran. Synoptic Process of the heat wave condition shows that plan pattern pressure surface of the earth and height topografhy in the west of iran is ahigh-pressure pattern. Also, shows that area is located in front of the hot air and the influence of hot air on the area has caused the temperature rise at this time of the year.