The Analysis of Cold Wave Severity between 6 to 15 January 2008 in Central provinces of Iran (Isfahan, Kerman & Yazd provinces)

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Extended abstract

1- Introduction
Temperature as a hot intensity indicator is one of the main elements for recognizing weather. It is more changeable regard to erratic receiving solar energy by earth that is caused another wide change in other climatology elements (Kamali, 1381). One of the temperature change problem is its untimely vibration, especially temperature drop for freezing point which called frost. Attention to the frost subject is needed, especially in agricultural fields. The occurred frost during 6-15 Jan 2008 in the world was included Iran with drastic cold. This study aims to analyze strict cold at central Iran on 6 to 15 January 2008.

In spite of statistical study of this cold period, this study has been analyzed factors of synoptic producing drastic cold. During this period, strict cold affected all of Iran areas regarding central Iran.

2- Methodology
There are various criteria for determining glacial intensity that many of them also are empirical. In this research, estimated the glacial severity based on agricultural products types of case study area that is often garden type. Whenever the weather temperature is -10 C and or less called sever glacial.

The needed statistical data related to minimum absolute temperature are provided from Meteorological Organization. Earth levels and temp data were provided from NCEP/NCAR databases depend on climatology and oceanography organizations and drawing earth levels' maps, 850, 500 and 300 hpa for 1200UTC and 0000 UTC times and omega maps for 850 and 500 hpa in Grads software. In order to subtle
studying of this phenomenon, also is used from above atmosphere data and parameters such as frost point temperature, mixture ratio, dry and humid potential temperature for assessment various days' air mass and air variable indicator, \((k_i, s_i)\) also are calculated on this day. For this purpose, it is used to temp data of Yazd synoptic station. The thermodynamic diagram (Skew-T) of cold climax day was drawn by Vayoming University site.

3- Discussion
Statistical analyzing of severe cold in January 2008:

With studying statistical glacial case 6 to 15 January 2008, it was recognized that this cold and glacial for frost, recording minimum temperature less than -10°C was pervasive in all country and weatherman said that cold with such intensity and widespread was precedence on 30 years ago.

In order to study cold intensity in this frost period, minimum air temperature statistic during 6 to 15 January 2008 was used for 5 Kerman and Esfahan stations and 8 Yazd stations. On these regions, phenomenon was rainfall approximately and in many stations during frost days was reported minimum and maximum temperature under zero.

In addition to temperature, report of synoptic stations in case study showed the reduction of air pressure for few days before starting frost. For example, on 3th pressure of Yazd synoptic station was 880/5 hpa, that this pressure at next day was raised to 820/4 hpa, i.e., so during 1day was reduced 40 hpa from air pressure. This is influx a strong low-pressure to region and on 5th January again with sudden pressure change. Yazd synoptic station reported the pressure 880/2.

Synoptic analyzing of severe cold in January 2008:

In order to analyze this cold period, has been drew air maps at 0000UTC and 1200 UTC for various atmosphere levels such as: earth level and 300 and 500 and 850 hpa and Omega maps of climax days. It was required to analyze various atmosphere levels roles from 6 to 15 January 2008.

On 7th January was more intensity day during frost in studied areas. Studying different atmosphere levels shown weather variable. Si variable indicator for Yazd synoptic station was showed number 3 on that day that signified air variable. It was recognized during next day’s also rainfall time, region atmosphere was variable and it was resistant in non-rainfall days together air frost. In 700 hpa level, temperature and mixture ratio were -15 and 1/2 that represented mA air mass. Studying effective synoptic factors in producing Severe Cold Wave on January 2008 which was clouded in all of Iran such as studied areas showed Sybri high-pressure activity and its rotation motions. This system was active more than 10 days on north Iran. Rotation mechanism governed with producing prevented system, which caused cold air over Iran. The maximum reported temperatures in 3 central provinces synoptic stations during frost also was less than 0 degree that showed severe cold wave was an advection frost.
4- Conclusion

Synoptic study of this less history cold signified cold air from Russian to country. During snow day and frost, high-pressure was put over Russia on Caspian north and orderly with its rotation motion that was directed cold air across above toward Iran. This stationary air mass were governed over Iran north for 10 days and resistant this order with producing blocking, cold weather moved toward south (Iran) and are caused to cold weather remain over Iran for a long time. Also in many cases, it can be caused, cold north European weather directed toward Iran. Drawing and analyzing Omega maps of frost days has been approved acquired numbers from variable indicators. On other hand, during these days, continuously low-pressures are formed over Mediterranean, Black sea, Africa north, and even Caspian east including Mediterranean and sea black low-pressure. This system with taking humid from water sources such as Red sea, Persian Gulf and Oman Sea caused many rainfall and snow fall in Iran and also case study region. High-pressure both was formed in Arabian and southwest Iran, reinforced this low-pressures and finally caused rainfall and snowfall and making frost throughout country. Also, studies showed that in many central Iran, maximum temperatures not arrived above zero during frost period which showed severe cold wave was an advection frost.

Keywords: Cold Wave, Synoptic Analysis, Frost, Synoptic Map, Central Iran

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