

Analysis of Synoptic and Dynamic Structure of Heavy Snowfall over Northern coast of Iran during February 2014

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Abstract

Heavy snowfall occurred in February 2014 in North coast of Iran, Which was an extreme phenomenon in its special way. This snowfall caused huge economic loss for government and people. Although this phenomenon was predicted, but its intensity wasn't estimated accurately, so for analyzing this phenomenon, atmospheric Parameters regime in large scales, synoptic scale and mesoscale was analyzed and investigated. Synoptic weather station and atmospheric reanalysis data from NCEP/NCAR is used. The analysis of sea surface temperature is done by AVHRR satellite data. Mean sea surface pressure, temperature, geopotential height, sea surface temperature, and their anomalies in long period of 30 years (1981-2010) are analyzed. Vertical motion, relative humidity and relative vorticity are analyzed for the days that the phenomena occurred. The results of this investigation show a sudden warming of stratosphere and the move of polar cold air into Caspian Sea. In this period a blocking system of Omega type is located over the region and for few days caused a trough over the Caspian Sea. Also heavy snowfall in Caspian Sea coast is an interaction between large scale and mesoscale systems that the Lake effect and the warmness of sea surface caused intensifying of snowfall in the coast. After achieving the regime of snowfall of 2014, the regime of other heavy rainfalls is studied and compared with the 2014 snowfall. Although the warming of stratosphere hasn't occurred in all years, but in all of them the Blocking regime especially in couple type is seen. The regime of surface pressure is caused by spread of Siberian high pressure or Balkan and in some cases the combination of these two. Overall, we can say that

the heavy snowfall of southern Caspian Sea coast is a result of interaction between large scale systems with mesoscale effects that causes lake snow in this region.

KeyWords: Extreme Event, Anomaly, Heavy Snow, Blocking, Snow Lake Effect.