**Investigation of Foehn phenomena Mechanism in the western Alborz Mountains**

**Abstract:**

This study was conducted to investigate the mechanism of warm-wind(foehn) in the Western Alborz Mountains.At first, daily minimum, average and maximum temperature data, daily minimum, average and maximum relative humidity, hourly wind direction and velocity were collected at 8 selected stations over a 10-year statistical period (2006-2010). To derive the sum of frequency of occurrence of foehn, warm days are extracted using Baldy index and taking into account wind direction relative to station position (southwest, west and northwest) and temperature rise compared to previous days (in some cases twice Or even more so) were identified as days associated with foehn. Then, NCEP / NCAR database data for different atmospheric alignment maps were obtained for selected samples and plotted in Grads software environment. Then, the position of high-pressure and low-pressure adjacent cores on the maps was determined. The results showed Masouleh station with 41 days frequency and Astara station and Bandar Anzali station with 18 days had the highest and lowest events of foehn phenomenon. The frequency of foehn between stations increases significantly during the cold season of the year compared to the warm period of the year. Investigations on the synoptic maps of 35 foehn events showed that a total of three groups of Anti-cyclone or high-pressure centers were affected by the synoptic pattern of the region in the days involved. The first group is the Siberian High Pressure Tabs, whose cores are located in the Baikal, Lake, Balkhash, and northern Pakistan, depending on the season synoptic conditions. The low pressure cores are located on the Caspian Sea and the pressure difference between the high-pressure tab of the outer slopes of Alborz and the Caspian Sea causes a compressive stress. In this model, Cyclone currents with increasing moisture of the Caspian Sea on the western slopes of Alborz Heights cause precipitation and warm flow due to warming under windward slopes. The second group is the anticyclone of Saudi Arabia, in which specimens with spin cores are deployed on southwestern Iran. With the expansion of the north side of the high-pressure tab of Saudi Arabia to the northwest of Iran and the presence of low pressure near the polar region in the Caspian Sea region, the intensification of the pressure shuffle has caused the currents to flow south-west perpendicular to the heights. Western anticyclone currents in the Arabian Sea circulate the moisture of the southern warm seas to northwestern Iran. The third group is a combination of African anticyclones, immigrants, Siberian highs and its tabs that create a thermal and compressive style over the study area and west of the Alborz Mountains. And provide the setting for the formation of the foehn phenomenon.

**Keywords**: warm wind, synoptic, anticyclone, cyclone, western Alborz mountains