

The Role of Saudi Arabian Sub-Tropical High Pressure on the Rainfall Systems on South and Southwest Iran

Hasan Lashkari *

Associate Professor of Geography and Climatology, Shahid Beheshti University, Tehran, Iran

Zeinab Mohamadi

PhD Student in Climatology, Faculty of Earth Science, University of Shahid Beheshti, Tehran, Iran

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Introduction

Subtropical high pressure is one of the main elements of the general circulation of the atmosphere. Annual motion of the circulation plays an important role in movement path of pressure systems and westerlies. Hence, large parts of the planet are affected directly and indirectly by this system. Sometimes the high pressure called the subtropical high pressure belt. It's shown as several cells within 15 - 35 north and south latitudes on the atmosphere map. According to the seasonal changes, the high pressure could be divided into 5-6 single cells. Saudi Arabia cell is one of the high-pressure cells in the cold period. It is generally an independent cell over the Red Sea to the Indian subcontinent and appears in warm period over the North-West of Arabian Peninsula, South West Iran and southern Iraq independently or as merged cells with Africa desert and Azores.

Materials and Methods

To determine the role of Saudi high- pressure on the rainfall in the southern part of Iran, daily rainfall data for all synoptic stations in Khuzestan, Kohkilooyeh, Char Mohall Bakhtaran, Fars, Busher and Hormzgan provinces were extracted in 10 years period (2000-2009). In southern parts of the country rainfall is generally regional. Up to 41 extremely rainfall systems have been determined, as 50% of selected stations have precipitation. Then, position of the Saudi high pressure center were determined in peak rainy day of the system on the 500,700, 850, 1000 h Pa level maps.

To determine the more precise high pressure centers, contour distances of 5 geopotential meters were selected on geopotential maps. To analyze the dominated patterns in system arrangement, and the Saudi high pressure role on the precipitation area, one synoptic patterns

* E-mail: dr_lashkari61@yahoo.com

Tel: +98 9123273715

type more similar to other systems was analyzed. In this analysis, 500, 700, 850 hpa sea level pressure and elevation maps, and 500.700.850.1000 hpa zonal (U) and meridinal (V) wind components and specific humidity quadruplet level maps were used.

Results and Discussion

The overall results of the study are as follows:

1. Saudi Arabian high pressure, on the Sea Level Map, just in half of cases had closed center and for other cases doesn't appear on the map and mostly shown as ridge of high pressure on Tibet.
2. Saudi Arabian high pressure is specified on the 500, 700, and 850 hPa maps level and sometimes comes with 4 - 5 closed counter.
3. Generally high pressure centers are in 15 - 30 north degree latitudes and 75-60 east degree longitudes (on the Oman and Arab Sea).
4. vertical axes show the center of anticyclones from 1000 hps to 500 hpa declination over south east.
5. Abetment anticyclones are the prevailing machomise in the air subsidence from upper level of trophosphere to lower level and caused the air temperature by debating heating with increased potential.
6. By Eastward movement of Saudi Arabian pressure, Eastern Mediterranean trough is developed in lower latitudes and often extended to 10 north degree latitudes.
7. Zonal currents had east and meridinal current in all levels on Arabian... These conditions show adductive moisture by Arab and Oman warm seas into Sudan systems.
8. U wind over Saudi Arabia is west and V wind is in the south. This flow indicated a humid flux in upper level.
9. In all case studies, the high humidity cells are located on Etoupi and south Sudan. This flow of humidity is diverged from Oman warm sea towards west and then by convection has suddan low so that specific humidity map showed that this humidity suddan low trough is advected over Iran.

Conclusion

Saudi Arabia high pressure is one of the subtropical high pressure systems affecting rainfall areas and periods in Iran. Zonal (west - east) and meridional displacement (North- South) is a very important factor in the development, strengthening and accession of Sudan system in cold period. When the pattern of Saudi Arabia high pressure system movement is prevented from formation, strengthening and accession of, the main parts of Iran is prevented and the country is faced with decreasing rainfall. However, its good position will result in deepening ability of Mediterranean trough and strengthening of Sudan system.

Keywords: *Iran, rainfall systems, Saudi Arabian sub-tropical high pressure, south and southwest.*