

ACG004-06

会場:104

時間:5月26日 17:45-18:00

Influence of the Indian Ocean Dipole on the interannual variability of precipitation over the southern part of Iran Influence of the Indian Ocean Dipole on the interannual variability of precipitation over the southern part of Iran

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The interannual variability of precipitation in the southern part of Iran and its links with the Indian Ocean Dipole (IOD) during 1974-2005 rainy seasons (October to May) are examined using daily data from 183 meteorological stations. The Zagros Mountain in the west, Persian Gulf and Oman Sea to the south, and two very dry deserts in central Iran have helped to shape precipitation regimes in the southern part of Iran. For this reason, the region is first divided into four subdivisions based on six factors (standard deviation, skewness, kurtosis, mean, coefficient variation, and maximum precipitation) using principal component and cluster analyses. It is found that the interannual variations of rainfall in October and November in all four regions have significant positive correlations with the IOD and El Nino/Southern Oscillation (ENSO). However, if a partial correlation analysis is used to extract the sole influence of the IOD or ENSO, a significant positive partial correlation is found only with the IOD. Also, when composites of sea surface temperature (SST) anomalies are constructed for the wet (dry) years, SST anomalies associated with the positive (negative) IOD are captured. To investigate the mechanism, moisture flux anomaly is calculated. It was shown that the southeasterly anomaly over the Arabian Sea turns cyclonically and transports more moisture to the southern part of Iran from the Arabian Sea, Red Sea, and Persian Gulf during the positive IOD. In contrast, the moisture flux has a southward anomaly over Iran during the negative IOD, which indicates that the moisture supply from the south is reduced.

キーワード: Precipitation, Indian Ocean Dipole, Iran, Interannual variation

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