



Modulation of the Atmospheric-ocean Oscillations on Seasonal Cloud Fraction in China

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Currently, the studies of China's monsoon region are generally based on the relationship between the precipitation and circulation indexes. However, the skewness of precipitation's time series is obvious and of non-normal distribution, and the precipitation is inhomogeneous regionally and seasonally, it makes the analysis inaccurate. To avoid these limitations, our research uses the cloud fraction data from MODIS and EECRA (Extended Edited Synoptic Cloud Reports Archive) which is relatively stable. This research analyzes the mechanism of how the different atmospheric-ocean oscillations including ENSO, AMO, PDO, NAO and AO influence the monsoon region in China. We use EOF analysis to decompose the cloud fraction and get several significant modes which can contribute more than 50% of the whole ones, then calculate the correlations of the cloud fraction with the five circulation indexes in different regions of China seasonally. The analysis reveals that AMO, NAO and AO have high correlation with the cloud fraction in the whole year especially in the spring, the correlation coefficient may reach 0.8 in mode 3 of EOF analysis. Besides, ENSO and PDO are both highly correlated with the cloud fraction except in winter. To illustrate regionally, Northern China, Northeast China and Southwest China are influenced by NAO mostly, Northwest China is affected by AMO, and Eastern China is highly correlated with PDO and ENSO. It brings some new understandings of the monsoon region.