The Influence of Global Sea Surface Temperature Anomalies on Droughts in the East Asia Monsoon Region

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Abstract

The East Asia monsoon is one of the most complex atmospheric phenomena caused by Land - Sea thermal contrast. It plays essential role in fulfilling the water needs of the region but also poses stern consequences in terms of flooding and droughts. This study analyzed the influence of Global Sea Surface Temperature Anomalies (SSTA) on occurrence of droughts in the East Asia monsoon region (20°N - 50°N,103°E - 149°E). Standardized Precipitation Index (SPI) was employed to characterize the droughts over the region using 30-year (1978 - 2007) gridded rainfall dataset at 0.5° grid resolution. Due to high variability in intensity and spatial extent of monsoon rainfall the East Asia monsoon region was divided into the homogeneous rainfall zones using cluster analysis method. Seven zones were delineated that showed unique rainfall regimes over the region. The influence of SSTA was assessed by using lagged-correlation between global gridded SSTA (0.2° grid resolution) and SPI of each zone. Sea regions with potential influence on droughts in different zones were identified based on significant positive and negative correlation between SSTA and SPI with a lag period of 3-month. The results showed that SSTA have the potential to be used as predictor variables for prediction of droughts with a reasonable lead time. The findings of this study will assist to improve the drought prediction over the region.

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