

The Changing Impact of Pacific Decadal Oscillation and Central-Pacific El Niño on Northern Taiwan and Southern China spring Rainfalls after 1980s

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Abstract

Decadal variability of the spring (February-April) rainfall in Northern Taiwan and Southern China was related to the Pacific Decadal Oscillation (PDO) during 20th century. However, this interdecadal relationship weakens, conversely, the Central-Pacific El Niño Index (CPEI), exerts an increasing influence on the decadal variation of the spring rainfall in the Northern Taiwan since 1980s (Figure 1 and 2). The effect of CPEI associated SST on the decadal variation of the spring rainfall in the Northern Taiwan and Southern China was investigated. It reveals that, in the view of decadal time scale, the positive CPEI associated warm sea surface temperature in the eastern North Pacific forced an east-west overturning circulation anomaly in subtropical North Pacific, which in term the descending motion may generate an anti-cyclonic circulation anomaly in Philippine Sea and maritime continent during 1980-2000. Simultaneously, an anomalous trough, extending southwestward from Japan to Northern Taiwan was triggered in northwest of the anticyclone anomaly (Figure 3, 4 and 5). The anticyclone-associated southwesterly anomaly and the trough-associated northeasterly anomaly merged in North Taiwan and that contributes substantially to a decadal rainfall surplus in Northern Taiwan and Southern China during 1980-2010. Our study suggests that the spring rainfall in Northern Taiwan and Southern China might be influenced by CPEI, particularly in a transition phase of PDO.

Key word: Pacific Decadal Oscillation, Central Pacific El Niño, spring rainfall

