Geophysical Research Abstracts
Vol. 15, EGU2013-13578, 2013
EGU General Assembly 2013
© Author(s) 2013. CC Attribution 3.0 License.

The impact of El Niño-Southern Oscillation on the Water Vapor Transport over East Asia-Western North Pacific Region

Xiuzhen Li and Wen Zhou

Guy Carpenter Asia-Pacific Climate Impact Centre, School of Energy and Environment, City University of Hong Kong

The summer moisture circulation over East Asia-western North Pacific (WNP) couples well with the El Niño-Southern Oscillation (ENSO) in its four-year period. The moisture circulation is dominated by two well-separated modes. One exhibits an anomalous anticyclonic (cyclonic) moisture circulation over tropical-subtropical East Asia-WNP, with the westward (eastward) transport anomaly lying to the south over the tropical WNP and the Indian Ocean; the other displays a sandwich-like pattern with an abnormal anticyclonic (cyclonic) moisture circulation over subtropical WNP, layered between two cyclonic (anticyclonic) circulations located to its south and north. These two modes couple well with the ENSO signal in the four-year period. During the four-year ENSO cycle, when a warm episode is developing continually, +EOF2 tends to play a key role, while in the transitional summer between a decaying warm phase and a developing cool phase, +EOF1 tends to take effect. In the summer of a developing cool episode, -EOF2 tends to play an important role, while –EOF1 tends to take effect in the transitional summer between a decaying cool episode and a developing warm episode.
The lower atmospheric circulation is regressed to investigate the possible maintenance mechanism for this four-year coupling. The establishment of an anticyclone (cyclone) over the Philippine Sea region and its eastward extension play an important role in the moisture circulation variation over East Asia-WNP. Conversely, the westward (eastward) wind anomaly to the south of the anticyclone (cyclone) is beneficial to the formation and the eastward propagation of the Kelvin wave and hence to the development of the four-year periodic ENSO episode.