The Philippine Sea Atmospheric Quasi Bi-Weekly Oscillations during the Asian Monsoon Spring to Summer Transition Season and May-June South China Sea Tropical Cyclone Activity

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Abstract

In this study, we analyzed the Outgoing Longwave Radiation (OLR) data during March-June from 1991-2023 and found that the strongest sub-seasonal variability is with the periods of 10-30 day (QBWO) over the Philippine Sea(125°E-135°E, 10°N-20°N). After applying the band-pass filter to OLR data, we selected 71 strong QBWO cases and performed composite analysis to reveal the circulation and precipitation patterns associated with the QBWO. The results show clear alternation of the enhanced and suppressed phases of the deep convection of the Philippine Sea and the associated anomalous southwesterly and northeasterly winds across the South China Sea (SCS) and the Philippine Sea. The southwesterly anomalies form a favorable condition for the tropical cyclone (TC) genesis to occur over the SCS, while the northeasterly anomalies create a favorable condition for the western North Pacific TCs to propagate westward into the SCS. Another important finding in this study is the identification of two contrast periods of 1996-2008 and 2012-2022. During the former period, the TC activity over the SCS during May and June was quite active and so was the Philippine Sea QBWO. The majority of the TCs were born over the SCS during May, while the majority of the TCs were born over the western Pacific during June. In contrast to 1996-2008, the entire period of 2012-2022 did not see any TC activity during May over the SCS. The TC activity resumed in June, but the majority are the SCS-born TCs.

Key words: QBWO, Quasi-biweekly Oscillation, Asian-Australian Monsoon, South China Sea Tropical Cyclone