

Influence of the Monsoon Trough on Westward-Propagating Tropical Waves over the Western North Pacific

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The present study investigates the possible linkage between the monsoon trough and the interannual variability of the activity of westward-propagating tropical waves (WTW) over the western North Pacific (WNP) during July–November for the period 1979–2007. It is shown that the interannual variability of WTW activity is closely related to the location of the monsoon trough. During the years when the enhanced (weakened) monsoon trough extends eastward (retreats westward), the lower-tropospheric WTW activity is above (below) normal within the southeastern quadrant of the WNP. Furthermore, this study evaluates different wave structures and dynamics of two types of WTWs, equatorial Rossby (ER) waves and mixed Rossby–gravity (MRG)–tropical depression (TD)-type waves, in strong monsoon trough (S-MT) and weak monsoon trough (W-MT) years over the WNP. There is a significant change in the three-dimensional structure as those waves propagate westward to the east of the monsoon trough. For the TD–MRG waves, an apparent transition from MRG waves to off-equatorial TD disturbances is identified in the region of the monsoon trough. For the ER waves, their amplitudes have a faster growth, but their structures and propagation characters have no marked change. Differences in the location of the monsoon trough may lead to an east–west contrast in the WTWs.

Key words: westward-propagating tropical waves, monsoon trough, western North Pacific, interannual variability

References

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