

## **Dispersion Characteristics of Summertime Synoptic-scale Disturbances over the Western Pacific**

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It is well known that summertime synoptic-scale waves often provide the initial disturbances for tropical cyclone genesis. In this study we examine the three-dimensional dispersion of those waves in the western Pacific, using a phase-independent formulation of wave-activity flux for an easterly basic state. The dominant mode of variability for the 2-8 day low-level vorticity over the off-equatorial western Pacific has an east-west oriented wavetrain pattern with westward phase propagation. The associated zonal group velocity of the wave packet is negative, and convergence of wave activity is found where the growth rate of the waves is strongest. Such convergence can be attributed to the contraction of wave scale in the westward direction. Convection is found to be more coupled with the circulation as one goes to more western locations of the “stormtracks”. Vertically the wave exhibits a tilted structure, with the sense of the tilt depending on the vertical shear of the background zonal flow. Downward injection of wave activity from the upper levels is found over the central Pacific, which could be important for the initiation of the synoptic-scale wavetrain. Case studies reveal that strong upper-level PV anomalies intruding into the subtropics can cause downward development, leading to low-level circulation structures which subsequently move westward and grow.