عنوان مقاله:

Dynamics and Thermodynamics Analysis of Tropical Cyclone Haiyan

محل انتشار:

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خلاصه مقاله:

Tropical cyclone Haiyan (TCH) that formed over the West Pacific Ocean during ۳-۱۱ November ۲۰۱۳ has been investigated using three datasets produced by Japan Meteorology Agency, ECMWF and NCEP. Strength of TCH has been studied using two synoptic parameters of ۱۰-m wind velocity and mean sea level pressure (MSLP). Following, three dynamic parameters including vertical wind shear (VWSH) vector, helicity and potential vorticity (PV) together with the thermodynamic parameter of convective available potential energy (CAPE) have been calculated and analyzed during TCH life cycle. VWSH vector was analyzed in three classes of weak, moderate and strong shear, having northeasterly direction for the most of TCH lifetime. Moreover, the helicity parameter was intensified to the tornadic instability (at about ۶ hours later than the time of maximum ۱۰-m wind speed), and its anomaly was located in the downshear quadrants for the most of TCH life span. In addition, no significant PV anomaly was detected near TCH, but a subtropical PV anomaly was extended to the Philippines Islands before TCH eye reached this region. Also, CAPE parameter was intensified to the strong instability class at about ۴۸ hours earlier than the time of maximum ۱۰-m wind speed and its anomaly was equally displaced in both up- and downshear quadrants. Finally, it can be concluded that ۳۰-hourly lag between the time of CAPE maximum value and VWSH one let TCH to be intensified to category ۵.

کلمات کلیدی:

Tropical Cyclone Haiyan, CAPE, Helicity, Potential vorticity, Vertical Wind Shear Vector

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