Analysis of the Environmental Parameters between Developing and Non-developing Cloud Clusters in Typhoon Formation Stage

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Abstract: Tropical cyclone (TC) formation occurs often when there is persistent, organized convection. It is often to observe that a developing cloud clusters before TC formation. This gives us a motivation to study that those environment parameters between developing and non-developing cloud clusters during this stage. In this study, we analyzed the typhoon cases over the Northwest Pacific Ocean from 2000 to 2009. Using JTWC best track and ECMWF Interim Reanalysis Data to identify the environmental parameters' thresholds for typhoon formation. The parameters are further verified and tested for typhoon cases from 2010 to 2012. The result shows that the 850hPa vorticity, 850hPa-200hPa vertical wind shear, 925hPa divergence, and sea surface temperature present higher correlations to tropical cyclone formation. There are some tropical cyclones forms in an unfavorable TC formation environment. We further adopt Box Difference Index (BDI) weights method to decrease the false alarm rate, because BDI can present typhoon formation in the view of probability. These improve the hit rate of the typhoon formation to approximately 95%, while the false alarm is decreased to around 24%.

Keyword: Tropical cyclone, Box Difference Index, Typhoon formation