The Long Term Features of Tropical Cyclones Nearby Taiwan

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Tropical cyclone (TC) activity is affected by several factors. The variability of TC activity over the western
North Pacific (WNP) has been examined in the past decade. Previous studies showed that TC activity (such as
TC number, intensity and tracks) has multiscale variation or affected by natural oscillation of different scales.
However, most of these studies focused mainly on the entire WNP. Very few studies examined the variability of
annual TC track or the variability of TC number in the area nearby Taiwan, which caused severe economic loss
and life damage to Taiwan in the typhoon season. The main purpose of this study is to analyze the variation of TC
activity nearby Taiwan to address its long term features, and also the possible relationship with the associated flow
patterns.

Preliminary results of wavelet analysis showed that the TC number nearby Taiwan during 1970-2014 had multi-
scale variations. The following analysis focused on the scale about 4- and 11-year signals, in the targeted area of
118o-125oE, 20o-27oN. The positive phases of both scale 4 and scale 11 showed a tendency of TC tracks toward
Taiwan area, while the negative phases showed a lower tendency toward Taiwan. An empirical orthogonal function
(EOF) analysis was applied on the 4-yr and the 11-yr filtered 500-hPa wind fields and geopotential heights.
Results showed that the 4-yr signal was mostly dominated by the 500-hPa U- and V-wind fields, suggesting that
the TC track patterns were affected mainly by the midlevel steering flow. On the other hand, the 11-yr signal was
mostly dominated by the 500-hPa U-wind field and geopotential anomalies, indicating that the main cause of the
difference in TC occurrence nearby Taiwan was the location of TC formation.