**A Statistical Analysis of the Relationship between Upper-Tropospheric Cold Lows and Tropical Cyclone Track and Intensity Changes over Western North Pacific**

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**Abstract**

The geographical and temporal characteristics of upper tropospheric cold lows (UTCLs) and their relationship to tropical cyclone (TC) track and intensity changes over western North Pacific during 2000-2012 are examined using the best track and global meteorological re-analyses data. An analysis of the two datasets shows that 73% of 346 TCs were accompanied by 345 UTCLs, and 21% of the latter coexisted with TCs within an effective interaction distance of 1,650 km. By selecting those TCs and UTCLs within the effective distance, it is found that TC track and intensity changes were highly correlated with UTCLs, and the statistical influences of UTCLs depended on larger-scale flows and the sectors of UTCLs, in which TCs were embedded. Results show that some UTCLs could even facilitate the abrupt turnings of, and the slow (especially during their abrupt turnings) or rapid (in northern sectors) movements of TCs. Results also show that more intensifying (weakening) TCs, including some rapid intensifying (weakening) storms, were likely to occur during the early development stages and in the southern (northern) sectors of UTCLs, which is consistent with previous observational studies of UTCLs showing maximum (minimum) cloudiness in the southern sectors (northwest quadrant). Despite the abovementioned high correlations, the percentages of the TC track and rapid intensity change cases in the selected TC sample only differ slightly from those in the total TC sample, indicating that most of the these cases were caused mainly by other environmental conditions, and facilitated by interacting with UTCLs.

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