

Estimate Method for Typhoon Radius: by using Drogsondes and ASCAT Data Separately

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Abstract

The size of Tropical cyclone (TC) is an important parameter to describe TC structure. However, because of the lack of surface wind observation over the open ocean area, TC size estimation relied strongly on satellite observations, especially the QuikSCAT data (up to 2009). Unfortunately, the currently-operating active satellite, the Advanced Scatterometer (ASCAT), has two narrow beam-widths of 500km, making it less possible to scan the whole TC area. Thus, it is challenging to estimate the TC gale wind radii (R15) using the previous approach to estimate TC size. This study uses a new approach to estimate TC size by using drogsondes observation and ASCAT observations separately.

The environmental surface flow is likely to cause a wave-number one asymmetry of the TC wind field. By eliminating environmental winds from observed winds, we can obtain the symmetric TC vortex winds at various radii. These TC vortex winds are then used to rebuild a radial profile of symmetric wind. The total wind field around the TC center (and the gale-wind radius) can be obtained by combining this symmetric TC wind field and the environmental wind field. Results show that this approach can improve the estimated gale wind radii, especially for those TCs with weaker intensity and a smaller radius of maximum wind speed. This approach provides a method to estimate TC radius when only has incomplete observation data.