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Observations of the Eyewall Structure of Typhoon Sinlaku (2008) during the Transformation Stage of Extratropical Transition

Abstract

In this study, observations of the transformation stage of the extratropical transition of Sinlaku are analyzed. Research flights using the Naval Research Laboratory P-3 and the U.S. Air Force WC-130 aircraft were conducted in the core region of Sinlaku from THORPEX Pacific Asian Regional Campaign (T-PARC) in 2008. Data from the Electra Doppler Radar (ELDORA), dropsondes, and aircraft flight level were analyzed using the recently developed Spline Analysis at Mesoscale Utilizing Radar and Aircraft Instrumentation (SAMURAI) software. The SAMURAI analysis reveals pronounced asymmetries in the core region's structure, evident in both radar reflectivity and three-dimensional wind field. The highest radar reflectivities were found in the left of shear semicircle, and maximum ascent was found in the downshear left quadrant. Convection initiation was in downshear right quadrant; precipitation increased in downshear left quadrant; the upshear left quadrant exhibited the stratiform precipitation; and older stratiform cells appeared in upshear right quadrant. This observed structure is consistent with previous studies of tropical cyclones in vertical wind shear, supporting the hypothesis by Klein et al. that eyewall convection is primarily influenced by increased vertical wind shear during the transformation stage.

Keyword

Extratropical Transition (ET)

Reference

Foerster, A. M., M. M. Bell, P. A. Harr, and S. C. Jones, 2014: Observations of the Eyewall Structure of Typhoon Sinlaku (2008) during the Transformation Stage of Extratropical Transition. *Mon. Wea. Rev.*, **142**, 3372–3392, <https://doi.org/10.1175/MWR-D-13-00313.1>.