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Speaker : Jun-Yan Li

Advisor : Prof. Pay-Liam Lin

On the Rapid Weakening of Typhoon Trami (2018): Strong Sea Surface Temperature Cooling Associated with Slow Translation Speed

Abstract

In this work, the Rapid Weakening (RW) of typhoon Trami is investigated by examining the sea surface temperature (SST) cooling based on air-sea coupled simulations during typhoon passage. The cold wake and the RW of Trami occurred when the storm was moving at a very slow translation speed. During the RW stage, an obvious structural change of Trami is found in a three-dimensional ocean-coupled model experiment. That is, the convective clouds and convective bursts in the inner core of the simulated TC dramatically decrease, resulting in the loss of diabatic heating and leading to weakening of the TC.

In the simulation, the enthalpy flux sharply decreases in the inner core because of the SST cooling during the RW period, while a stable boundary is formed in the TC's inner-core region. The expanding SBL coverage stabilizes the atmosphere and suppresses convection in the inner core, bringing about weakening of the storm. A more stable atmosphere in the cold wake is also identified by the inner-core dropsonde data from the field program of Tropical Cyclones-Pacific Asian Research Campaign for Improvement of Intensity Estimations/Forecasts.

Keywords

Rapid weakening (快速減弱)

TC induced ocean cooling (熱帶氣旋誘發海洋冷卻)

Reference

Chang, K., C. Wu, and K. Ito, 2023: On the Rapid Weakening of Typhoon Trami (2018): Strong Sea Surface Temperature Cooling Associated with Slow Translation Speed. *Mon. Wea. Rev.*, **151**, 227–251, <https://doi.org/10.1175/MWR-D-22-0039.1>.