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Speaker: Xian-Zheng Huang

Advisor : Prof. Ching-Yuang Huang

Performance Evaluation of TGFS Typhoon Track Forecasts over the Western North Pacific with Sensitivity Tests on Cumulus Parameterization

Abstract

In this study, using the new generation Taiwan global forecast system (TGFS) focuses on forecasting tropical cyclone tracks of Western Pacific typhoons during 2022 to 2023. Compared with the Central Weather Administration (CWA) global forecast system. The TGFS demonstrated better forecasting performance in typhoon track. The track error at 120hr of TGFS is large which is found those typhoons at the early stage are in mid intensity. In TGFS, those typhoons track towards northeast and southeast due to inadequate environmental steering guidance resulting from the failure to capture synoptic environmental features. This study also found the track of the New Tiedtke (NTDK) Scheme can replace the original new simplified Arakawa–Schubert (NSAS) scheme such like the Typhoon Khanun which occurred in 2023 and Typhoon Bolaven which occurred in October 2023. Using vorticity tendency analyzed the periods where divergence in typhoon tracks between control (CTRL) and NTDK experiments occurred. In the NTDK experiment, the different synoptic environmental fields affected the wavenumber-1 vorticity distribution in the horizontal advection term, thereby enhancing the accuracy of typhoon translation velocity forecasts. This study suggests that utilizing the NTDK scheme might improve the forecasting skill of TGFS for typhoon tracks.

Keywords

Vorticity tendency analysis

Referenc

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