

# 國立中央大學大氣物理研究所書報討論

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## Examining Terrain Effects on the Evolution of Precipitation and Vorticity of Typhoon Fanapi (2010) after Departing the Central Mountain Range of Taiwan

### Abstract

Typhoon Fanapi (2010) made landfall in Hualien in Taiwan at 0100 UTC 19 September 2010 and left Taiwan at 1200 UTC 19 September 2010. Fanapi's eyewall was broken by the Central Mountain Range (CMR) of Taiwan and reorganized eyewall after leaving CMR. Designing three experiments of simulations by using Weather Advanced Research Weather Research and Forecasting (WRF) Model. One of those experiments is full terrain (CTL), another without terrain (NTR), and the other is weaker than CTL (NTW). Not only using the radar data of simulations classified into different subregions by convective–stratiform separation algorithm, but also using the vorticity budget analysis to assess the impact of precipitation structure on Fanapi's eyewall evolution.

In this study, the radar data of simulations were classified by convective–stratiform separation algorithm were analyzed. In CTL, the percentage of deep convection increased from 8% to 20% when Fanapi reorganized eyewall after leaving CMR. On other hand, there were moderate convection which occupied most of the convective regions in NTR. In vorticity budget analysis, the stretching of total vorticity at lower level in moderate convection was grater than in deep convection when typhoon reorganized eyewall. After eyewall organizing, the stretching in deep convection increased and became stronger than moderate convection. On the other hand, the stretching term dominated in moderate convection in NTR. Both of two analysis explained that the CMR played a key role in Fanapi reorganizing eyewall and changing the structure of precipitation.

### Keywords

convective–stratiform separation algorithm  
vorticity budget analysis

### Reference

Wu, Y. C., M. J. Yang, and R. F. Rogers, 2022: Examining Terrain Effects on the Evolution of Precipitation and Vorticity of Typhoon Fanapi (2010) after Departing the Central Mountain Range of Taiwan. *Mon. Wea. Rev.*, **150**, 1517–1540, <https://doi.org/10.1175/MWR-D-21-0205.1>.