

# The Study on the Interactions between Meigi (2010) Typhoon Outer Circulation and Topography in Northeast of Taiwan

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This study uses WRF (Weather Research and Forecasting) model to simulate the heavy precipitation events triggered by Typhoon Meigi on October 21, 2010 in Yilan area. The results showed that the low-level wind speed increases as a result of prevailing northeasterly monsoon and Meigi typhoon outer circulation convergence in Yilan area. The more inland, the more wind speed increase. Water vapor caused by the terrain rapid lifting before the heavy rainfall. According to past scholars' research, water vapor across hill may cause precipitation on the top of a mountain, and even the entire precipitation system may pass to downstream direction. This simulation also has a similar situation. Therefore, the location of heavy rains is highly correlated with the topography around the Lanyang Plain.

The terrain of the bell mouth of the Lanyang Plain enhances the strength of the northeast monsoon. Affected by the terrain, low-level convergence occurs when the low-level airflow produces returning flow. Convergence of the lifting effect makes significant precipitation in the area. This study summarizes the heavy precipitation produced by Meigi typhoon in Yilan area, which may be mainly dominated by two kinds of physical mechanisms. The first is the elevation of the terrain and the effect of low-level returning flow in front of mountains. This mechanism has been successfully simulated and analyzed in this study. The second one is the mechanism of quasi frontogenesis. We can see the existence of this mechanism in this study.

Keywords: WRF Model, Typhoon Meigi, Northeasterly Monsoon, Returning Flow

