

# **Analysis and Simulations of a Heavy Rainfall Event over Northern Taiwan during 11-12 June 2012**

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## **Abstract**

During 11-12 June 2012, heavy precipitation occurred over the northwestern Taiwan coast (~435 mm) and within the Taipei Basin (~477 mm). With the presence of a mid-latitude omega-blocking pattern, a persistent cold northerly wind component west of the NE China low and west of the Mei-Yu frontal cyclone extends all the way to the subtropics and up to the 700 hPa level. At 2000 LST 11 June, the total precipitable water ahead of the front is elevated ( $> 70 \text{ kg m}^{-2}$ ) with horizontal southwesterly moisture fluxes  $> 360 \text{ g kg}^{-1} \text{ m s}^{-1}$  at the 950 hPa level.

The rainfall maximum along the northwestern coast mainly occurs before 0200 LST 12 June as the convective activities in the frontal zone are enhanced by the localized convergence between the prefrontal southerly barrier jet and environmental airflow. After landfall, the relatively deep (~1.5 km) Mei-Yu front moves over the mountains (with peaks ~1,121 m) along the northern coast, and into the Taipei Basin. During 0200–0800 LST 12 June, it stalls at the foothills of the Snow Mountains (with peaks ~3,886 m) south of the basin under the postfrontal west/northwesterly flow. Rain cells associated with the Mei-Yu front are enhanced as they move southeastward toward the Snow Mountains.

The barrier jet and the rainfall maxima over the northwestern coast and within the Taipei Basin are well simulated using the high-resolution WRF model. With the model terrain removed, the simulated Mei-Yu front continues to move southward after landfall without reproducing the barrier jet and both observed rainfall maxima.

Key word: Orographic precipitation, Front-terrain interaction