

# 國立中央大學大氣物理研究所書報討論

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## **Analysis and Simulations of a Heavy Rainfall Event Associated with the Passage of a Shallow Front over Northern Taiwan on 2 June 2017**

### **Abstract**

From 0200 to 1000 LST on June 2, 2017, the shallow mei-yu front (approximately 1 km in height) was unable to cross the Yang-Ming Mountains (with peaks around 1120 m) upon arrival. The postfrontal cold air near the surface was deflected by the Yang-Ming Mountains and flow through the Keelung River and Tamsui River valleys into the Taipei Basin. The shallow northerly winds remained stationary along the northern side of the Yang-Ming Mountains for about 8 hours. The southwesterly barrier jet in the 900–950 hPa layer transported abundant moisture, converging with the northwesterly flow on the southwestern flank of the mei-yu frontal cyclone. This resulted in torrential rainfall on the northern Taiwan. From 1100 to 1200 LST, as the postfrontal cold air deepened, the front eventually crossed the Yang-Ming Mountains and reached the Taipei Basin, forming an east–west-oriented rainband with maximum rainfall over the northwestern coast and the Taipei Basin. After 1400 LST, the frontal rainband continued moving southward, with rainfall concentrated on the northwestern slopes of the Snow Mountains, resulting in heavy rainfall on windward side.

Using high-resolution model simulations indicate that if the (RmY run) Yang-Ming Mountains were removed, the mei-yu front would move rapidly southward, and no significant rainfall maxima would occur over northern Taiwan.

### **Keywords**

MBLJ (Marine boundary layer jet)

### **Reference**

Tu, C., Y. Chen, P. Lin, and Y. Du, 2019: Characteristics of the Marine Boundary Layer Jet over the South China Sea during the Early Summer Rainy Season of Taiwan. *Mon. Wea. Rev.*, **147**, 457–475, <https://doi.org/10.1175/MWR-D-18-0230.1>.