

國立中央大學大氣物理研究所書報討論

Data : 2025/10/31

Speaker : HSIAO,YI-HUNG

Advisor : Pay-Liam Lin

The relationship between the boundary layer moisture transport from the South China Sea and heavy rainfall over Taiwan

Abstract

Analysis of Climate Forecast System Reanalysis (CFSR) data, rain gauge observations, and case studies identified two widespread heavy rainfall events ($>80 \text{ mm day}^{-1}$) over Taiwan during the South China Sea Two-Island Monsoon Experiment (1–4 and 14–18 June 2017). Both events were closely linked to strong moisture transport within the marine boundary layer (MBL) from the northern South China Sea [integrated vapor transport (IVT) $>220 \text{ kg m}^{-1} \text{ s}^{-1}$]. The moisture mainly traveled via the marine boundary layer jet (MBLJ). The MBLJ intensified when the mei-yu trough deepened and/or the western Pacific subtropical high extended westward. Extreme rainfall ($>500 \text{ mm day}^{-1}$) occurred on 2–3 June when IVT reached $\sim 300\text{--}315 \text{ kg m}^{-1} \text{ s}^{-1}$, while weaker MBLJs (IVT $\sim 220\text{--}280 \text{ kg m}^{-1} \text{ s}^{-1}$) produced rainfall peaks ($>300 \text{ mm day}^{-1}$) on 14 and 17 June. Moisture-laden MBLJs lifted by terrain or mei-yu systems triggered heavy rain, highlighting the importance of MBL moisture transport from the northern South China Sea for forecasting rainfall over Taiwan.

Keywords

Marine Boundary Layer Jets (MBLJ)

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>.