

Characteristics of Afternoon Showers in Northern Taiwan during Monsoon break

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Abstract

Afternoon rainshowers are the major rainfall producers during the late June monsoon break. Using Automatic Rainfall and Meteorological Telemetry System (ARMTS), Wu-Fenshan Doppler radar and the Weather Research and Forecast (WRF) model, the present study investigates the genesis mechanism of high rainfall areas associated with afternoon showers in northern Taiwan. The orographic effects of Linkuo plateau and Yangmin Mountain on northern Taiwan rainfall distribution is examined by WRF. High rainfall areas over sloped areas at 500 m in elevation south and southwest Taipei Basin caused by a limited number of events with daily rainfall accumulation exceeding 90 mm. High rainfall is associated with moisture transport to northern Taiwan by onshore flow through the northwest coast, Tanshui river valley, Linkuo plateau and Keelung river valley. Excluding Linkuo plateau and Yangmin Mountain, the Weather Research and Forecast model demonstrates that early development of onshore flow facilitated the early development of rainfall near coastal areas. Rainfall generated offshore flow near coastal areas reducing onshore flow in the early afternoon. As a result, rainfall in the Taipei Basin decreased compared to the experiment including Linkuo plateau and Yangmin Mountain. However, rainfall in the high slopes (above 500 m) was enhanced by upslope transport of moisture from upslope flow and the early development of onshore flow.