利用剖風儀雷達長期觀測資料研究臺灣的低層噴流與降雨

Low Level Jets and Heavy Rainfall Events Over Taiwan Revealed from Wind Profiler Radars

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The 499 MHz wind profiler is used to study the relationship between low-level jet (LLJ) and heavy rainfall over Taiwan and Dongsha island during the mei-yu season of 2018~2020. The LLJ day is defined as LLJ that occurs more than 6 hours in a day. On the LLJ day of northern Taiwan, the low layer wind speed extreme appears on the northwest side of Taiwan, and Taiwan locates at the front edge of the frontal system. On the LLJ day of Dongsha island, the extreme low layer wind speed appears on the southeast side of Taiwan and the South China Sea, and the frontal system locates over Taiwan. The boundary layer jet (BLJ) is defined as LLJ occurs below 1000 m, and the synoptic system-related low-level jet (SLLJ) is defined as LLJ occurs above 1000 m. On the SLLJ day of northern Taiwan and SLLJ day of Dongsha island, water vapor transportation mainly comes from the coastal South China to the South China Sea in the boundary layer. On the BLJ day of northern Taiwan and BLJ day of Dongsha island, water vapor transportation mainly comes from the coastal South China and the South China Sea in the boundary layer, respectively. When the strong BLJ events occurred in northern Taiwan, the average hourly extreme rainfall happened in the southern mountains and the northwest coast from Hsinchu to Taichung. When the strong SLLJ events occurred in northern Taiwan, the average hourly extreme rainfall happened on the northwest coast from Taoyuan to Hsinchu. When the strong BLJ events occurred on Dongsha island, the average hourly extreme rainfall happened on the southwest coast to the mountains and the northwest coast of Miaoli to the mountains. When the strong SLLJ events occurred on Dongsha island, there was no significant precipitation in Taiwan.