Multi-scale convection system simulation during Meiyu season in Taiwan

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The first front of Mei-yu rainy season passed through Taiwan area on May 1, 2019. Although the front did not reach rainfall intensity of the typical Mei-yu front, but the multi-scale convective system triggered by it revealed important clues that caused the Meiyu front to produce severe precipitation. Diagnostic analysis of this case, we found that the position of overseas development of convective clouds were closed to the 700hPa convergence zone position. The analysis of 850hPa and 700hPa shows that there are obvious low-level jets that continuously supply vapor, so that 850hPa has a significant vapor flux, which improves the mixing ratio, resulting in low-level convergence and sufficient vapor. It is easy to make convection develop local rainfall. At the same time, during the rapid movement of the frontal system to the southeast, the frontal system was damaged by the terrain. Although this case has a large-scale linear convection system in northern Taiwan, there is no severe precipitation. In the small-scale convection system in central and southern Taiwan,, precipitation is more obvious. In addition, we use WRF V3.9.1.1 version, two nesting domain design to simulate the frontal system on May 1, 2019, where the horizontal spatial resolution of the outer grid and the inner grid is 3 km and 1 km. The simulation experiments found that the number of grid points in the outer grid will affect the radar echo and precipitation intensity simulated by the inner domain. At the same time, the sensitivity of different microphysical parameters and boundary layer parameters will be tested to simulate the intensity of precipitation. Significant differences also occur in the rainfall intensity simulations.

Keywords: Mei-yu front, Low Level Jet, Severe Precipitation, sensitivity test

