

Investigating the Lagrangian evolution of microphysical characteristics of convective precipitation systems using dual-polarimetric radar

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ABSTRACT

The mesoscale convective systems (MCSs) play essential role in contributing heavy precipitation in Taiwan. A storm identification and tracking technique (SMART: Storm Motion Analysis by Radar Tracking) was applied to NCAR SPOL data of SoWMEX/TiMREX. The developing and dissipating stage were identified by vertical integrated reflectivity by SMART. Thus, the Lagrangian evolutions microphysical and structural characteristics of convective cells thus were investigated by the vertical slop of various dual-polarimetric measurements (DPMs). The results indicate that all DPM values increase (decrease) during the developing (dissipate) stage. The vertical slop of DPM remains positive values (increase with increasing height). This feature suggest that the large raindrop (Z_{DR}) and high liquid water content (K_{DP}) remain aloft during developing and dissipating stage. On the other hand, the temporal tendency of vertical slope of DPM vary from positive to nearly zero during the developing stage of the storm. Subsequently, the tendency varies from positive to negative during dissipating stage. This indicate that the large raindrop and high liquid water content gradually decent to surface from developing and dissipating stage. The analysis has shown the potential of diagnosing the storm development by utilizing dual-polarimetric parameters.

Keywords: Lagrangian evolution 1; Dual-polarimetric radar 2;