

Subtropical Oceanic Mesoscale Convective Vortex Observed during SoWMEX/TiMREX

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During the Intensive Observing Period (IOP) 6 of SoWMEX/TiMREX (04 Jun 1800UTC - 06 Jun 1200 UTC), a quasi-stationary Meiyu front stretched across the middle of Taiwan and Taiwan Strait. Mesoscale convective systems were active over the southern area ahead of the front. A distinct mesoscale convective vortex (MCV) related with the MCS lasting about 12 hrs and moving eastward was observed. The dropsondes data of 2 flight missions (around 0000UTC and 0600 UTC 5 Jun) and the soundings overland are used to examine the kinematic and thermodynamic structure of the MCV.

The oceanic MCV demonstrated upright structure of cyclonic circulation beneath 5km with diameter of 250 km. The maximum vorticity reached $5 \times 10^{-4} \text{ s}^{-1}$ within the inner core. The low tropospheric meso-low and the vorticity center roughly fell 50km behind the main convection and temperature ridge. The vertical wind shear was less than 5 ms^{-1} between 1-5km. Dry air advection and sinking on the mid-troposphere over the north and northwest of vortex was present. The MCS exhibited down shear left precipitation and the northwestern area was clear. Positive virtual potential temperature anomalies in the center and rear of vortex were associated with convective core and rear dry air entrainment, respectively. The convection was strong associated with moist air delivered by the LLJ, enhanced from the terrain effect and split by the dry air entrainment. The MCV became weaker and shallow while it toward the terrain.