The Evolution of a Merger-Formation Bow Echo in Southeast China

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ABSTRACT

This study is the first to document the evolution of a non-classical bow echo, termed merger-formation bow echo (MFBE), in southeast China, which evolves from a subtropical squall line merging with a pre-line convective cell. The kinematic, thermodynamic and microphysical structures are investigated using the Variational Doppler Radar Analysis System (VDRAS) analyses and polarimetric radar observations. Key factors of this MFBE event including the rear-inflow jet and cold pool exhibit different characteristics from those in classical bow echoes and other limited MFBE cases. Particularly, the rear-inflow jet weakens and becomes elevated during the merger, which is associated with the lack of surface damaging winds. The surface cold pool jumps forward and protrudes a bowing shape near the merger area due to the intensive rain evaporative cooling.