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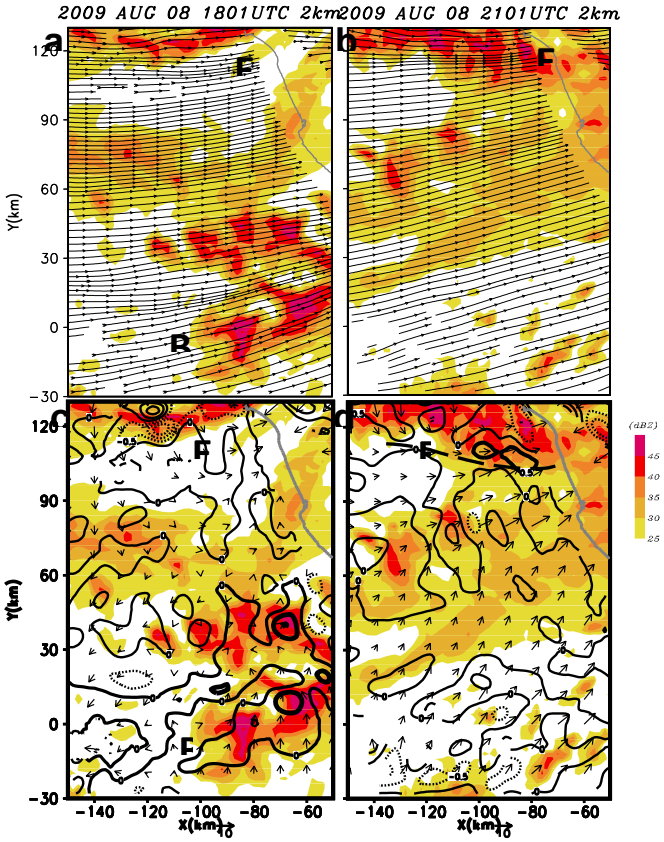
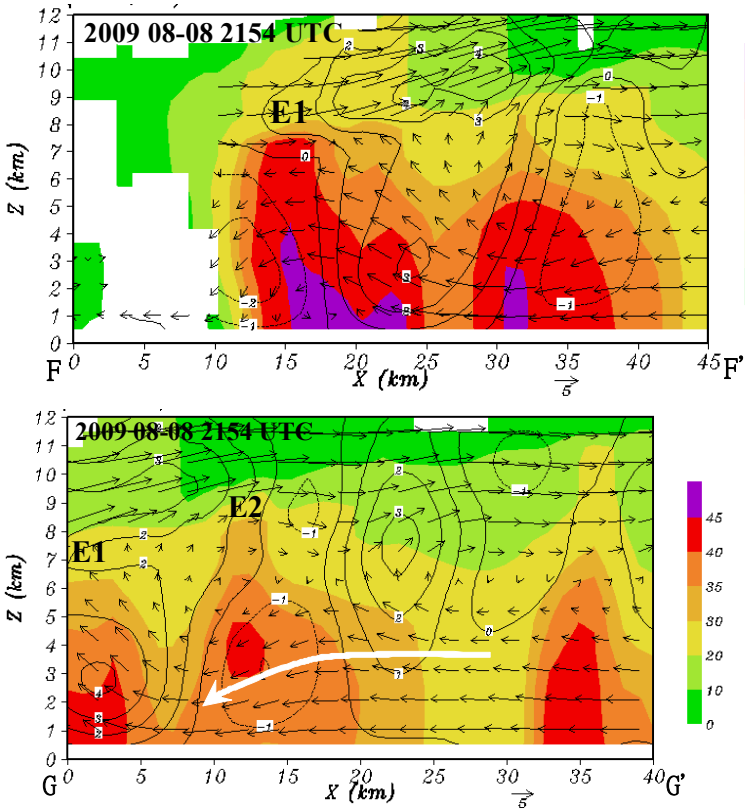


↑ Fig. 1: Dual Doppler synthesis wind from Kenting and Chiku radar data at (a) 1801 UTC and (b) 2101 UTC on August 8, 2009 at 2 km level. Panels (c) and (d) are at the same timeframe as (a) and (b), respectively. Contribution from the typhoon circulation has been removed, based on the VAD wind of Chiku radar.

↓ Fig. 2: The vertical cross-sectional view of (a) the convective cell E1 and (b) convective cell E2 at 2154 UTC 8 August 2009. The color shading depicts the rainfall echo (dBZ). The horizontal and vertical coordinates represent the radial distance of cross-sectional lineand the height, respectively. The wind field (m s^{-1}) is relative to the convective cells. The black solid contours represent the upward motion and the black dashed contours stand for the downward motion. The white arrow indicates a streamline for the downdraft.



- This study focuses on the characteristics and evolution of convection embedded within the principal band during the impact of the southwesterly monsoonal flow on the circulation of typhoon Morakot (2009) over Taiwan by analyzing Doppler radar data. The retrieved 3 dimensional wind field depicted that the southwesterly monsoonal flow was impinging upon the typhoon circulation. The speed of southerly component of the SW flow decreased and formed a convergence zone which led to the initiation and development of convection in the rainband (Fig. 1).
- The vertical kinematic characteristics of the rainband revealed that two types of downdrafts, inner-edge downdrafts (IEDs) and low-level downdrafts (LLDs), were found (Fig. 2). The IEDs coupled by the radially inward tilting convection were initiated by the precipitation drag. Dynamically, the existence of the perturbed high at 1.5 km altitude in the IEDs supported the finding. Furthermore, it is evident that the distribution of two perturbation highs in the vicinity of the rainband could lead to the SW flow deformation locally and fortify the mechanism of convergence, resulting in the merging of convective cells into the rainband.
- In summary, the characteristics of the typhoon rainband and the embedded convection, which developed in the circumstances that the environmental flow impinged on the typhoon circulation, were similar to previous concepts of the hurricane rainband, except that the triggering mechanism of the convective downdrafts might not be the same. Additionally, the consecutive volume radar data showed the evolution of convective cells at different stages and the maintaining mechanism of the rainband.