

**The mechanisms of the evolution of a Mei-Yu frontal rain band
revealed from multiple Doppler radar observation in the torrential rain event**

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Abstract

This study utilizes the radar network observations to investigate an extremely heavy precipitation event over northern Taiwan during the Mei-Yu season. In this case, the strong convection stayed and lasted for several hours at the same place after the weather system landed Taiwan. By using a variational algorithm, three dimensional wind fields are retrieved over the ocean and the complex terrain of Taiwan Island. Furthermore, pressure and temperature structure are derived based on the retrieved wind fields. With the high resolution of dynamic and thermodynamic fields during retrieval period, the interactions among frontal system, south-west flow and terrain effect are studied in different stages of the weather system. The barrier jets, the place of the cold pool and the mountain area explain why a quasi-stationary strong convection formed after the system landed and brought over 400 mm rainfall within 10 hours.