

臺灣周圍飆線系統動力場特性演變分析與預警研究— 2021年5月30日個案

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摘 要

過去研究發現環境風切與對流系統內的動力特徵，對於影響飆線系統的發展強弱和生命期長短扮演重要角色。2021年北海岸動力觀測驗證實驗期間，除臺北站00和12的每日例行觀測外，另在新屋站有加強探空觀測，幫助了解環境風切變化。臺灣環島作業雷達網提供臺灣周圍地區空間與時間密集的觀測資料，透過多雷達風場分析可有效整合雷達資料，得到合理且完整的三維風場結構，可對於劇烈天氣系統進行持續追蹤分析診斷，幫助我們更清楚掌握天氣系統的發展情況，結果發現底層強正渦度的產生早於對流急遽發展前，在對流系統發展期，中低層輻合區、上升運動和正渦度區的區域隨著時間，垂直厚度均增加，其內部動力特徵演變，可作為即時趨勢的判讀和劇烈天氣警示的參考工具之用。

關鍵字：飆線、雷達、多雷達風場分析

Abstract

Previous research has found that environmental wind shear and the dynamic characteristics within convective systems play important roles in influencing the development intensity and lifetime of squall line systems. During the experiment of northern coast observation validation and investigation of dynamics 21, it is not only the regular daily observations at Taipei Station at 00 and 12 UTC, but also more sounding observations were conducted at Xinwu Station to help understand variations in environmental wind shear. Taiwan's island-wide operational radar network provides high spatial and temporal resolution wind observation. WISSDOM provide a reasonable three-dimensional wind field and it is helpful us to better understand the development by tracking, analysis, and diagnosis of severe weather systems. The results show that the strong positive vorticity at low-level occurred earlier than the rapid development stage of convection. during the development stage, the vertical thickness of the convergence, updraft and positive vorticity zone increased in the middle and lower levels over time. The evolution of these internal dynamic characteristics can be used as index to monitor and nowcast the development of severe weather system.

Key words: squall line, radar, WISSDOM