

同化雙偏極化雷達觀測在極短期天氣預報之評估： 颶線系統個案分析

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摘要

臺灣氣象雷達網近年正逐步升級成雙偏極化雷達，使得未來雷達資料的分析與應用日趨重要。本研究利用美國大氣科學研究中心於臺灣西南部架設之S波段雙偏極化雷達，於2008年西南氣流實驗IOP8(intensive observation period #8)期間6月14日的颶線個案，在系集資料同化系統架構下，測試同化徑向風與回波外，額外同化雙偏極化參數(ZDR, KDP)，對於對流尺度劇烈天氣系統之影響與分析。透過CFAD(contour frequency by altitude diagram) 分布圖，累積雨量等分析結果，驗證同化對於極短期預報的表現。進一步，藉由數值天氣預報模式搭配不同雲微物理參數化方案，檢視簡化與較為複雜之微物理方案在同化過程以及極短期天氣預報上所帶來的效益。

關鍵字：雙偏極化雷達觀測資料；對流尺度資料同化

Evaluating the Very Short-term Forecast by assimilating polarimetric radar observation: a Case Study on Squall Line System

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Abstract

The Taiwan Meteorological Radar Network is gradually upgrading into polarization radar, which enables the use of radar data in different aspects. In this study, a polarimetric radar observation operator, which provides a connection between model and observational variables, was established for high resolution model verification. This study used the National Center for Atmospheric Sciences (NCAR) S-band dual polarized radar which deployed in southwestern Taiwan during Southwest Monsoon Experiment (SoWMEX). A squall line case occurred on June 14, 2008 (IOP #8) was selected. The impacts are evaluated in storm-scaled severe weather system by assimilating the radial wind, reflectivity and polarimetric radar observation under the ensemble-based framework. The performances of very short-term forecast are evaluated by utilizing the contoured frequency by altitude diagrams (CFADs) and accumulated rainfall comparison. In additional, different microphysics schemes are applied to the numerical weather forecast to analyze the impact of using simplified and complicated microphysics schemes as well as the benefit on the very short-term forecast.

Keywords: Polarimetric radar observation, convective scale data assimilation