# 微物理參數法水象粒子變數與雙偏極化雷達觀測變數之相關特性評估

# Evaluating Relationship between Hydrometeor Variables and Simulated Polarimetric Signatures with Different Bulk Microphysics Schemes in WRF

江琇瑛[1,3] (Jiang S.-Y.) 洪景山[2] (Hong J.-S.) 張保亮[1] (Chang P.-L.) 周仲島[3] (Jou B. J.-D.)

[1]中央氣象局資訊中心 [2]中央氣象局科技中心 [3]國立臺灣大學
[1]Meteorological Information Center, Central Weather Bureau
[2]Research and Development Center, Central Weather Bureau
[3]Department of Atmospheric Sciences, National Taiwan University

## 摘　要

雙偏極化雷達觀測之ZDR與KDP除了在觀測應用上提供許多助益，也可應用於校驗模式微物理參數法的預報表現以及資料同化；不過，使用系集資料同化方法同化ZDR與KDP觀測資料時，須先建構與釐清流場相關背景誤差協方差矩陣（background error covariances）中回波、ZDR與KDP三者觀測變數與模式水象粒子變數的相關特徵。在本研究中，將選取WRF模式中不同的單矩量、雙矩量與三矩量總體微物理參數法進行對流尺度模式預報，藉以分析水象粒子預報變數，包括混合比、總數量濃度等，與回波/ZDR/KDP觀測變數之間的相關特性，為資料同化應用方面奠定基礎。

**關鍵字**：雙偏極化雷達、微物理參數法、資料同化

## Abstract

The ZDR (differential reflectivity) and KDP (specific differential phase) through dual-polarization radar observed contribute to better understanding the atmospheric and model microphysical processes. Many benefits in observation applications are provided, for example, improving the radar data quality control, enhancing the accuracy of quantitative precipitation estimation, and implementing hydrometeor classification. For the numerical model, the ZDR and KDP observations can apply to verify the model microphysical processes and data assimilation. To more accurately correct the model hydrometeor forecast error through the data assimilation, the relationship between dual-polarization radar observation variables and different microphysics schemes need to understand. In other words, it is necessary to construct and clarify the characteristics of background error covariance of dual-polarization radar observation variables and hydrometeor variables. In this study, some forecasts will be executed from a convection-permitting model with different single-, double-, and triple-moment microphysics. And, the correlation characteristics of hydrometeor variables and dual-polarization radar observation variables will be investigated from these forecasts. Among them, the hydrometeor variables include mixing ratio and total number concentration, etc.

**Key words:** dual-polarization radar, microphysics schemes, data assimilation