5.17 IMPACT OF THE ASSIMILATION OF THE DUAL-POLARIZATION DOPPLER RADAR DATA FOR A CONVECTION SYSTEM USING THE 4DVAR ALGORITHM ON QUANTITATIVE PRECIPITATION NOWCASTING

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The dual-polarization Doppler radar can provide the more accurate precipitation estimation compared with the traditional Doppler radar. In this study, the horizontal reflectivity (Z_H), specific differential phase (K_{DP}), and radial velocity (V_r) collected by two Taiwan Central Weather Bureau (CWB) operational S-band traditional Doppler radars and the S-band dual-polarization Doppler radar (S-Pol) of the National Center for Atmospheric Research (NCAR) are assimilated for a frontal convection system observed during intensive operation periods (IOP) 8 of the 2008 Southwest Monsoon Experiment (SoWMEX). The warm-rain radar forward operator for K_{DP} data assimilation is based on the observational relationship between KDP and water content from the data collected by all disdrometers during the entire period of 2008 SoWMEX. The four-dimensional Variational Doppler Radar Analysis System (VDRAS) and its 4DVAR data assimilation algorithm are used in this study. The impact of assimilating polarization data on the quantitative precipitation nowcasting (QPN) is demonstrated. The experimental results show that Z_H and K_{DP} data assimilation provides better QPN performance compared with the original Z_H-only data assimilation.