383 Assimilation of the CHUVA Project's Dual Polarization Radar Data with WRF 3D-VAR and Its Impact on the Short-Range Precipitation Forecast

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Breckenridge Ballroom (Peak 14-17, 1st Floor) / Event Tent (Outside) (Beaver Run Resort and Conference Center)

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It is being conduced in Brazil the CHUVA (Cloud processes of the main precipitation systems in Brazil: A contribution to cloud resolving modeling and to the Global Precipitation Measurement - GPM) project which aims to map the main precipitating systems in the country. So far, experiments have been performed at four sites with various measures including those with a dual polarization radar, lidar, microwave radiometer, disdrometer, radiosonde, rain-gauge and various other instruments. During the experiments it was observed that the operational forecast did not show gooc performance. It is also known that some developments have been made in the concern of radar data assimilation and many previous work point out some good improvements on forecasting the precipitation amount when assimilating radar radial velocity and reflectivity. However, Wang et al. (2013) have showed that better results are achieved when assimilating retrieved rainwater and estimated in-cloud water vapor instead of reflectivity directly. The authors argue that the new schem avoids the linearization error of the Z-q (reflectivity-rainwater) equation. In the work presented here, the reflectivity indirect assimilation is applied and compared to the original code (direct reflectivity assimilation). Then the original Z-q equation parameters were replaced by those estimated by fitting an exponential relationship between the radar and the disdrometer datasets from the CHUVA experiment. The Fractional Skill Score (FSS) is applied to compare quantitatively the performance o the precipitation forecast. The results show that the Wang's scheme improved the short-range forecast of precipitation, and it also proved to be more stable when some tunes were applied. Moreover, the best result was achieved when using the indirect assimilation with the new Z-q equation parameters, showing the importance of tunning these parameters for each location when data are available.

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