7.7 EVALUATION OF MULTIPLE DOPPLER RETRIEVALS OF CONVECTION IN DARWIN

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Wind retrievals from multiple scanning Doppler radars have numerous uncertainties related to factors such as the vertical and temporal sampling of the scanning radar data, the assumptions made in the wind retrieval regarding the mass continuity equation and particle fall speeds, as well as being only applicable where there is enough returned power from scatterers, which can potentially cause the retrieval miss important features of the convective core such as upper level divergence and weak echo regions. Few studies that have attempted to quantify such uncertainties. However, packages such as the Cloud Resolving Model Radar Simulator (CR-SIM) applied to Weather Research and Forecasting (WRF) model simulations to emulate radar data provides a methodology for quantifying the uncertainty in multiple doppler retrievals.

In this study, CR-SIM is used on WRF simulations of monsoonal convection over the Tropical Western Pacific Atmospheric Radiation Measurement Climate Research Facility site in Darwin. CR-SIM provides simulated velocities over the C-band POLarization Radar (CPOL) and Berrimah radars. Multidop, a Python package that uses the three dimensional variational wind retrieval technique to retrieve winds, is executed on the simulated velocities. The resulting vertical velocities in deep convective cores from the Multidop retrieval is then compared against those from the original WRF simulations. The results show that the vertical velocity w in updraft cores from those retrieved by Multidop are biased low compared to the original WRF data. The framework of using simulated radar measurement will be used to improve the retrieval framework by configuring the retrieval parameters to minimize such biases.