

Challenges of Polarimetric Weather Radar Calibration

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The United States' Next Generation Weather Radar (NEXRAD) program has deployed a polarimetric upgrade to the WSR-88D network radars. This modification provides new base variables to the operational community and has opened exciting new possibilities for improved forecasts and warnings. One variable in particular, differential reflectivity, is critically important to improved precipitation estimates and hydrometeor classification. However, the quality of the differential reflectivity estimate is highly dependent on the removal of biases induced by the radar system hardware. These biases must be measured to an uncertainty of 0.1 dB in order to obtain maximum benefit from the polarimetric data and meteorological algorithms.

This paper will review the engineering challenges being pursued in our efforts to further improve the calibration the WSR-88D to the required level of accuracy with a focus on the use of microwave hardware measurements and solar scans. The paper reviews the challenges of implementing an external measurement method based on cross polarization signals from ground clutter. The ROC is also monitoring radar performance using radar returns from external targets such as precipitation and Bragg scatter. Finally, we will present a status on development of the efforts to improve operational maintenance techniques.