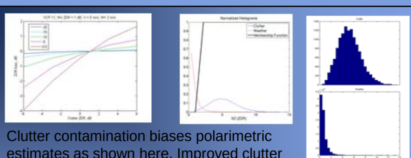
3 Enhancing the Foundational Data from the WSR-88D: Part II, The Future

WSR-88D Data Quality Greatly Improved…More Possible!

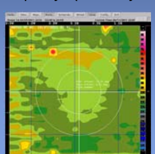
Since 1993, the Radar Operations Center (ROC) has led a joint project with the National Severe Storms Laboratory (NSSL) and the National Center for Atmospheric Research (NCAR) for improving the foundational radar data quality. The work is focused on the transition of new science research to operations, and has resulted in many significant improvements. This poster highlights plans for the future of foundational radar data quality improvements expected to result from a continuation of this work.

Potential areas for future work include improvements to the quality of dual polarization variables, including novel clutter identification and removal techniques. Other improvements can be achieved with over sampling and whitening, decreasing radar volume scan times while improving radar data quality. On-line noise estimation can improve weak signal detection.

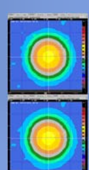
Improving Polarimetric Data



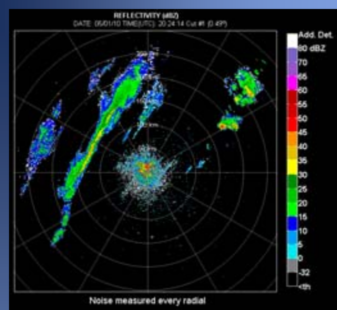
Clutter contamination biases polarimetric estimates as shown here. Improved clutter detection and removal will enhance data quality. (Courtesy Scott Ellis, NCAR)



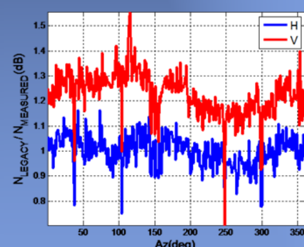
External targets can be used to improve calibration and monitor stability. Shown here are H and V solar power scans. (Courtesy Mike Dixon, NCAR)



On-line Determination of the System Noise Level

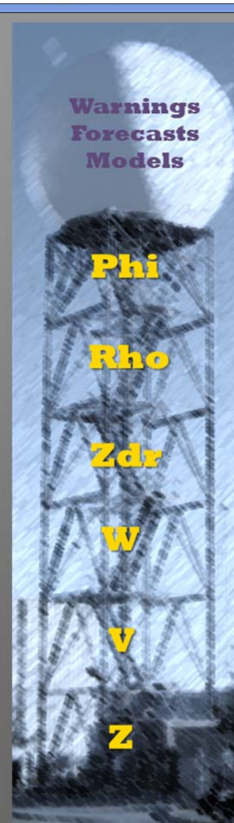


Reflectivity field obtained using the radial based noise measurement with additional detections highlighted in white.



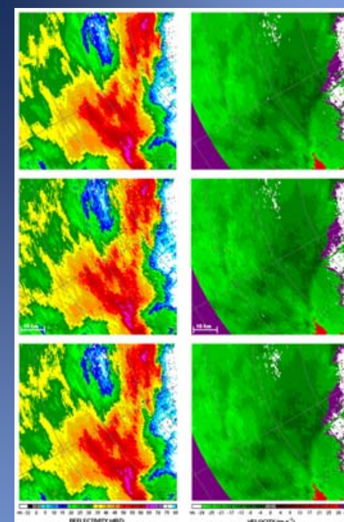
Legacy to radial measured noise ratio in the horizontal (H), and the vertical (V) channel.

(Courtesy Igor Ivic, OU/CIMMS/NSSL)



Foundational Radar Data

Oversampling and Adaptive Pseudo Whitening



PPI displays of reflectivity (left panels) and velocity (right panels) fields from data collected with the National Weather Radar Testbed on 2 April 2010 at 10:54 UTC. Data is from the 0.5° elevation scan. The top and middle panels correspond to the original acquisition parameters (long dwells) with adaptive pseudo whitening and matched-filter processing, respectively. The bottom panels correspond to the (simulated) modified acquisition parameters (short dwells) with adaptive pseudo whitening processing.

(Courtesy Sebastian Torres, OU/CIMMS/NSSL)

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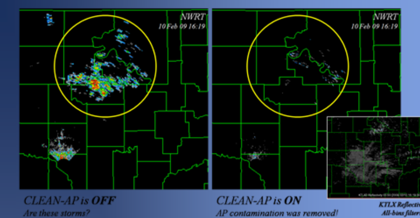
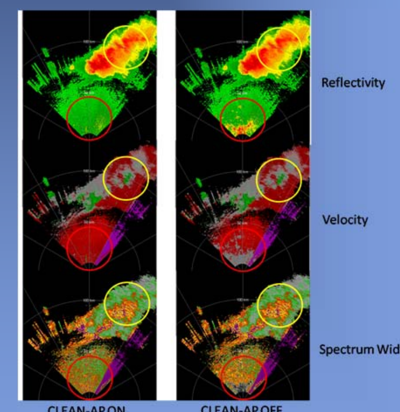
CLEAN AP



The AP image shows a comparison of the KTLX radar with the NWRT PAR. The environment exercised the capability provided by the CLEAN-AP filer to automatically mitigate (detection and removal) ground clutter in both AP (yellow circle) and NP (near radar) conditions. The KTLX radar ran all bins clutter filtering to remove the AP ground clutter.



The RVW image shows how the moments (R,V,&W) with near-zero velocities from a meso-cyclone (yellow circles) are not harmed by the CLEAN-AP filter; while, ground clutter near the radar is mitigated quite nicely.

(Courtesy Dave Warde, OU/CIMMS/NSSL)

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