Development of a Real-time Data Quality Index for the S-Pol Radar

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A set of real-time quality control (QC) routines for radar data are currently under development to be initially applied to the NCAR S-Band, polarimetric research radar, S-PolKa. The goal of producing this QC package is the automated, real-time production of well-characterized, contamination-free data sets suitable for various analyses including assimilation into models and retrieval of 3D winds. The QC package goes beyond the standard data quality and calibration techniques routinely used at S-PolKa. It is planned to incorporate real-time clutter detection and removal, mitigation of range and velocity ambiguities using advanced waveforms and signal processing, velocity dealiasing and real-time data QC index to characterize the impacts of a number of sources of error that occur in reflectivity, Doppler velocity and dual-polarimetric data.

A separate data quality metric for each error source is being developed and verified, and a final QC index field will be computed by combining the different metrics using fuzzy logic. This QC index field will vary from 0 (lowest quality data) to 1 (highest quality data). Each radar measurement will have a separate QC index. An issue with any radar QC process, whether automated or manual, is the compromise between leaving some contaminated data in, versus editing some uncontaminated data out of the QC'ed data set. Inevitably more aggressively eliminating regions with errors results in more good data being removed, reducing the coverage. Different radar applications have different data quality needs. For example, accumulated rainfall estimates may not be very sensitive to measurement noise or transient artifacts due to the time integration, but wind retrievals and data assimilation may be negatively impacted by these issues. Therefore the QC package is being developed to be modular and flexible in order to meet the various requirements for different applications and users. The progress of the development of the QC routines and verification results will be presented.