A new Radar Data Post-Processing Quality Control Workflow for the DWD Weather Radar Network

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In association with the ongoing replacement of the German weather radar network with dual-polarization radar systems, also the post-processing radar data quality control has been renewed. New dual-polarimetric algorithms have been implemented and existing single-polarization techniques have been improved to enhance the quality control of horizontal reflectivity and radial velocity measurements, as well as the new dual-pol measurements, primarily ZDR, PHIDP, and KDP.

For each individual reflectivity and radial velocity measurement, separate quality products are produced, in which for each range bin a quality bit mask is encoded. Each bit refers to one phenomenon affecting the data quality at that range bin, like, for instance, spoke or ring artifacts, clutter, bright band or attenuation. Moreover, such quality products contain global quality flags marking quality issues affecting the whole data set. A new feature is the capability to also provide corrected reflectivity and radial velocity measurements adjusted according to the priorly detected spurious parts and potential specific or differential propagation path attenuation biases. Subsequent schemes may then take the quality flag products into account when using radar data or may directly use the adjusted data. For ZDR, PHIDP, and KDP only corrected versions and no quality flag products are provided.

The intention of this paper is to highlight the structure and organization of the data quality control component and how it is embedded into the radar data processing chain at Deutscher Wetterdienst (DWD). In particular, it is explained on what kind of input data the individual algorithms are based, which basic techniques are used, what kind of output is produced, and in which common workflow the schemes are organized. Moreover, some information about the software technical framework in which the methods are implemented is given. Visualizations of relevant example input and output data at the individual steps of the scheme will be presented.