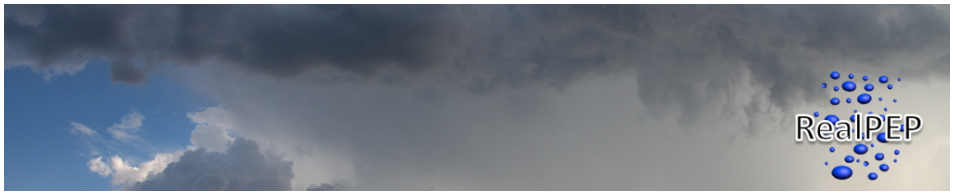

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A specific attenuation based radar QPE for operations

Monday, October 5, 2020 2:25 PM (20 minutes)

Polarimetric weather radar have provided improved depictions of the size, shape, phase and concentration of various scatterers in the atmosphere over the single-polarized weather radar and a more accurate quantitative precipitation estimation (QPE). A number of studies using disdrometer data indicated that specific attenuation, a polarimetric radar derived variable, was more linearly related to the liquid water content than reflectivity and was less sensitive to systematic biases in reflectivity and differential reflectivity observations. A specific attenuation-based QPE ("RA") was implemented across the United States NEXRAD network in a real-time experimental system at the National Severe Storms Lab in Oct. 2016. A key parameter in the RA scheme, , was assumed to be a relatively uniform in space but dynamically updated to reflect the temporal change of drop size distributions (DSD). The RA QPE was evaluated and refined for 2 years and a relatively stable version was implemented in mid-Sept. 2018.

The new version of RA was evaluated against quality controlled gauge observations and compared with a reflectivity-based QPE ("RZ") for over 50 events from different regions of CONUS. RA provided consistent improvements over RZ for moderate to heavy rain. RA also showed less sensitivity to partial beam blockages and calibration biases than RZ. For light to very light stratiform rain, RA had a dry bias due to weak attenuation signal. RA scheme also had some local under- and overestimation errors where the spatial variations of DSD were large. A spatial adjustment of RA rates was developed and was shown to further reduce the local biases.

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