Public Abstract

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Title:MEASURING AND MODELING RAINFALL WITH TERRESTRIAL SENSORS AND RADAR: IMPLICATIONS FOR RAINFALL HETEROGENEITY AND DISCHARGE

Quantitative precipitation estimates are fundamental for hydrometeorological analyses. Radars provide a superior spatiotemporal advantage over terrestrial-based precipitation gauges to provide such measures of rainfall. However, many regions of the Continental US (CONUS) reside outside of the optimal range of weather radar surveillance (i.e., 100 km), with few studies analyzing the performance of radar rain rate estimates beyond this range. Several years' worth of radar rain rate estimates were analyzed from distant S-band Weather Surveillance Radars – 1988 Doppler (WSR-88D) series, demonstrating poor performance in quantitative precipitation estimates (QPE's) at distances beyond 150 km. Furthermore, these S-band radar rain rates were determined to be significantly ($p < 0.10$) less accurate in Quantitative Precipitation Estimates (QPE's) when compared to a locally-sited X-band dual polarimetric radar. In general, S-band radars were best utilized when implementing R(Z,ZDR) algorithms, with the bulk of QPE errors due to missed precipitation, whereas the X-band radar was superior overall with either R(Z,ZDR) or R(ZDR,KDP) with errors primarily due to false alarms. These radar QPE's were then used as input to a physically-based hydrologic model, Vflo, which showed superior performance over spatially-averaged rain gauges, which sometimes missed precipitation events. The results presented demonstrate the importance of choosing the proper radar QPE datasets for hydrometeorological studies.