

## **Pinpointing the errors in radar estimates of rainfall using minute-by-minute rainfall rates measured with very sensitive rain gauges**

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In spite of many years of research, the hourly rainfall totals inferred from operational C-band networks typically differ from gauge values by about 50%. Why is this? Measurement of drop size distributions suggest errors should be only 25%, falling to 13% if the normalised drop concentration is used to correct the Z-R relationship.

We report results of evaluations of radar rain rates over several months using very sensitive rain gauges which can estimate the instantaneous rainfall rate each minute to within 0.2mm/hr; rather than the tipping bucket gauges used in previous studies which need an accumulation over one hour to achieve an accuracy of 0.2mm/hr. The gauge is situated about 20km from the radar with good visibility and negligible ground clutter.

We will present results comparing these minute-by-minute gauge estimates with the rainfall estimated from low elevation PPI scans every five minutes. The analysis enables us to test the accuracy of interpolations schemes accounting for echo advection in the five minutes between scans, wind drift, and the representativity errors introduced by comparing a point gauge to the finite area sampled by the radar. We will also present results from a new technique for monitoring and correcting the effect of beam blocking.