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The calibration of single-polarization ground-based radars (GRs) requires knowledge of the true reflectivity at well-defined locations and times during a volume scan. Observations from the Ku-band precipitation radar (PR) on board the Tropical Rainfall Measurement Mission (TRMM) satellite have previously been shown to be suitable for this purpose. However, care must be taken when comparing PR and GR measurements to account for differences in sample volume, frequency, and radar sensitivity, as well as to ensure a precise spatial and temporal matchup. Here, the volume-matching method (VMM) of Schwaller and Morris (2011) is adapted and used to quantify historical calibration errors for four GRs around Brisbane, Australia. In the first part of this presentation, the VMM will be introduced and its sensitivities discussed, with recommendations provided for future applications using TRMM and the Global Precipitation Measurement (GPM) satellite. The second part will then describe how the GR bias estimates provided by the VMM can be combined with radar maintenance records to derive optimal estimates of calibration error through time. The efficacy of this approach is confirmed by comparing reflectivities from the GRs in regions of overlapping coverage.

References

Schwaller, MR, and Morris, KR. 2011. A ground validation network for the Global Precipitation Measurement mission. *J. Atmos. Oceanic Technol.*, 28, 301-319.