

Interactive comment on “An Extended Radar Relative Calibration Adjustment (eRCA) Technique for Higher Frequency Radars and RHI Scans” by Alexis Hunzinger et al.

Anonymous Referee #1

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Authors: Alexis Hunzinger, Joseph C. Hardin, Nitin Bharadwaj, Adam Varble, and Alyssa Matthews

This paper extends the Relative Calibration Adjustment (RCA) technique originally developed by Silberstein et al. 2008 for an S-band radar at a tropical oceanic site at Kwajalein, Republic of the Marshall Islands. Wolff et al. 2015 showed the method also worked well over land at several mid-latitude sites using NASA's S-band NPOL radar. Louf et al. 2019 used the RCA technique and NASA satellite-based radar retrievals to correct a nearly 20-year period of C-band CPOL observations in Darwin, Australia

The primary advancements that this paper provides are: 1) extension to using RHI

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as well as PPI data; 2) additional robustness of the clutter map by combining multiple maps over different days to produce a composite map that is more representative of true clutter (and thus not so strongly affected by more transient returns from sea-spray et al.); and, 3) adaptation of the technique to higher frequencies, including X-band and Ka-band. The paper is well written and concise and contributes significantly to the radar community in that it allows for a posteriori calibrations to radar reflectivity data, as well as near-real-time health monitoring of radar systems.

The eRCA was first applied to the CSAPR2 (C-band) radar that was recently deployed during the CACTI field campaign in Argentina. CSAPR2 was able to perform both PPI and hemispherical PPIs over several angles. Conventionally, the authors use the 0.5 elevation scan in the PPIs to calculate the RCA, but also develop a novel approach to the RCA by using the lowest 5 of the RHIs to calculate an independent RCA estimate.

This paper does provide a substantial contribution to scientific progress in that it extends a very powerful method to monitor the relative calibration of radars at higher frequencies than have been used. They also improve the robustness of the method by proposing a composite clutter map whereby they use multiple days for determining the clutter area reflectivity. They also extend the original PPI-based method to RHIs, which is an important improvement for radars that do not routinely perform PPI scans.

The discussion in the Appendices is very useful, particularly Appendix 1 that discusses PIA filtering necessary for utilizing the RCA at higher frequencies. Overall this is an exceptional paper that should be published.

Minor comments:

1) Table 1 in Appendix 1 should probably be labelled Table A1.1 to prevent being confused with Table 1 in the main text. Similarly so for Table 1 in Appendix 2 to be labelled Table 2A.1

2) Appendix 1: Can you please provide some more detail on how the co-mounted and

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co-located radars are configured? Are they independently scanning? Maybe a picture would help.

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