

Interactive comment on “Can liquid cloud microphysical processes be used for vertically-pointing cloud radar calibration?” by Maximilian Maahn et al.

Anonymous Referee #1

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The manuscript is well written but it is tremendously too long and the explanation is fragmented with a very inappropriate amount of details. In all the manuscript there is not a single equation that explain how to perform the radar calibration. To be honest I have to say that I am not familiar with calibration procedures using Cloudsat and ground cloud radar cited by the Authors but I am confident enough with radar calibration in general. However, I feel that the manuscript requires some strong major revision in particular in the presentation form trying to makes the material shorten and giving a procedure that others can follows to calibrate cloud radars. I suggest use appendixes to put in it all the material that is needed to deepen the discussion leaving in the main text the material that go directly to the point.

C1

Major

- Figure 7, which is discussed in the summary and conclusion tells me that the Offset is tremendously variable in time. Even though without considering 5 to 7 dB variation in June 2016 due to radar configuration changes I can see peaks up to 5dBZ from a month to another. Based on this figure the technique proposed seems to be not reliable or hardly applicable also due to the requirements in terms of needed data points.

- While for the skewness vs. Z_e and W vs. Z_e relationships, you used a model set up able to identify the transition between cloud droplets and drizzle, the Authors have used a different approach when dealing with LWP vs. $\max(Z_e)$. In this latter case are you sure to consider data samples in the similar environmental conditions as for the previous relationships (i.e. when during cloud to drizzle transition)?

- How long should be the calibration period to have a reliable statistic of the offset?

Minor

pag. 3 line 25, Aquistapace et al., is not accessible at the moment. How yo get her figure 1. pag 5. line 10. Which radiative transfer model (RTM) do you use to convert radiosoundings into brightness temperature and in particular which is the water vapor scheme used by the RTM? Pag 5, line 33, please specify the meaning of singleSIP initialization method. Pag. 5 and 6, Box model section. Which is the typical time interval needed by the box model to reach its asymptotic state? Is this time consistent with the sampling time of the cloud radar? Pag, 7, figure 1. The explanation of figure 1 can be improved I guess. Everything seems to be compressed and a lot of details a given losing the general sense. In addition, it is not clear to me why you have negative skewness when the spectrum is dominated by drizzle drops (i.e. larger drops than cloud droplets). Pag 15, line 20. The motivation given to do not use the box model to derive LWP- $\max(Z_e)$ is very unclear to me. Why the LWP vs $\max(Z_e)$ on one site should be more reliable than those at the other site?

C2

