

Interactive comment on “Evaluation of CloudSat snowfall rate profiles by a comparison with in-situ micro rain radars observations in East Antarctica” by Florentin Lemonnier et al.

Anonymous Referee #2

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The authors present a study comparing vertical profiles of snowfall rates obtained from two different radar sensor systems: the CloudSat space-borne platform carrying the Cloud Profiling Radar, and ground-based Micro-Rain Radars (MRRs) installed at two research bases located on the Antarctic continent. A total of four snowfall events are investigated, two for each site where CloudSat overpasses coincided with the operation of the MRRs. Results show good agreement between CloudSat and local MRRs for these four events over the region of ~960 m to 2500 m. The manuscript is generally very well written and presented.

Specific comments:

C1

1) It appears as though the terms 'dataset' and 'data set' are used interchangeably, please standardise

2) What is 'seconds-short-time'?

3) More explanation is needed about the number of overflights (CloudSat) vs the number of events investigated. I assume that the other overflights that coincided with MRR operation occurred outside of precipitation events? Maybe state this explicitly, the current wording on P3 / 15 was unclear as to whether there was another reason.

4) The 'Methods' sub-section for CloudSat is quite short, it might be useful for the readers if more information such as the revisit time for each station was included. Conspicuously absent is the height AGL of the lowest CloudSat bin used - 1200 m is mentioned in the introduction but it appears as though 960 m is used in Figure 3 a/b but maybe 1050 m is used in c/d.

5) It would be worth adding the 2500 m ceiling used in the MRR data to the MRR method sub-section. It would also be useful to know the spatial extent of the MRR data used for comparison with CloudSat (was it the entire 10 km radius circle used or a subset along the CloudSat track or something else?) Note that it was not abundantly clear what the range of the MRR sensor was, this had to be inferred (assuming it was 10 km).

6) On P12 / 8, you already allude to the fact that these calibrations are different, and the supporting references used elsewhere in this paper (primarily Souverijns et al 2018b) state this. Please clarify the wording here.

7) P12 / 13 It would be very useful to verify whether this is the case, is data on this available? It would also be useful to see whether these values continue further up the CloudSat profile or at other times when the MRR reports 0.

Technical corrections:

P1 / 9 : ', respectively' not needed here

C2

P9 / 9 : 'first lowest' did not make sense to me, maybe pick one?

P12 / 7 : what do you mean by 'higher dispersion'?

Figure 1: Colour scheme of inserts of antarctic continent make it a bit hard read, it would be better if these stood out more (maybe blue for land mass and/or circular semi-transparent background?)

Figure 2: a/d/g/j inserts of antarctic continent are small and hard to read, given Figure 1 exists these could probably be removed

Figure 3: Altitude often refers to height above MSL, but in this case appears to refer to height AGL, please clarify

Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2018-236>, 2018.