

## ***Interactive comment on “Spatial and temporal variability of snowfall over Greenland from CloudSat observations” by Ralf Bennartz et al.***

### **Anonymous Referee #3**

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This paper aim to improve the CloudSat-derived snowfall over the GrIS by removing the ground clutters, if any. Further, snowfall rate from CloudSat and ERA-Interim data are compared over the GrIS region. Trend of snowfall rate is also discussed. The results are interesting and suitable for publication in ACP after some revisions.

P2, Ln 12: van den Broeke et al. (2016) point ... This is a complex sentence. Please rewrite.

P3, Ln 13: ...however, only daytime scene... The author considered daytime data only after 2011, while both daytime and night-time data are considered between 2006 and 2011. Is there any bias in the results due to diurnal data?

P6, Ln 19: To compare CloudSat CPR and the MMCR,... It is not clear what is

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compared, reflectivity or snowfall rate.

P6, Ln 24: ... allow transferring results between the two bands. The sensitivity of CloudSat CPR and MMCR may be different. What is the sensitivity of MMCR. In comparison analysis, do the authors considered sensitivity of both radars. Ln32: (2011))0. Check it.

P8, Ln 20: re-derive the snowfall rates based on the 5th radar bin above the surface. Any specific reason for choosing 5th bin .

P 9, Ln 5: ...significant number of high reflectivities associated with very high... Any role of Mie-scattering?

P12, Ln14: Vertical resolution of CloudSat is 240 m as mentioned in Page 3.

P12, Ln 15: How the equivalent radar reflectivity measured at W-band compared with Ka-band measurements? Sensitivities of both the radars are different and thus the comparison of reflectivity is not so straightforward. The authors mentioned about the spatial averaging but didn't mention about the temporal averaging for performing the radar reflectivity comparison?

P13: How eq(1) is derived?

P13: Ln 18: -20 dBz. I couldn't see -30 dBz in the figure 7.

P17: Ln 6:... effective density... Please elaborate “effective density”. If effective density is higher what it mean?

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