

Interactive comment on “Implications of surface flooding on airborne thickness measurements of snow on sea ice” by Anja Rösel et al.

Anonymous Referee #1

Received and published: 17 September 2020

This paper presents an assessment of the impact of flooding on radar penetration in the snow layer over sea ice and its consequence on radar-based ice thickness estimates. This study represents a valuable contribution to the field of sea ice remote sensing as it relies on both airborne and in-situ measurements to quantify the bias due to snow-ice formation in retrievals. However, I have some comments that need to be addressed first.

Major comments:

-My main concern has to do with the writing of some sections of the paper. Indeed there are several confusing long sentences throughout the manuscript that challenge the overall understanding of the paper. I have to point out paragraph 2.2 (Ground-based measurements), which is really dense and needs to be re-written. I suggest that

C1

the authors add sub-sections.

-The notation used for the different observation techniques and instruments is confusing. This results in equations using variables with too many subscripts (equation 6 for example). I suggest that the authors use only the name of the instruments in the definition of variables. This should greatly improve the quality of the paper.

Minor comments:

P2L39-42: the sentence “On the other hand . . . melting” needs to be rephrased. Perhaps add parenthesis between “compared to” L40 and Perovic, 1996).

P2L41: Remove capital letter on “Snow reflects”.

P2L56: Replace “snow/sea ice” by “snow/ice”.

P3L75: Please specify which freeboard you are referring to (snow/ice).

P4L101: I suggest adding a link or reference to Snow-Hydro.

P11L265: Add a comma between “site” and “the snow distributions”.

P13L289: Replace “0.00” by 0.

P14L305: Replace “asfor” by “as for”

P14L311: Avoid using “result” twice in the same sentence, I suggest to remove “the resulting”.

P14L311-311: Please revise: “Our results suggest . . . two-layer snow situation”.

P16, Figure 7: Please correct the legend: FB3 and FB4 are the same.

P17L345: replace “about the R/V” by “from the R/V”.

P18L352: Seems to be an extra space between “undergo” and “absorption”.

P18L364: Remove “of” in “of > 11 psu”

C2

P18L371-372: Seems to be an extra space between “thereby” and “impacting”.

P20:L415: replace “should to be” by “should be”.

Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2020-168>, 2020.