

The Cryosphere Discuss., referee comment RC1
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Comment on tc-2021-135

Anonymous Referee #1

Referee comment on "Impacts of snow data and processing methods on the interpretation of long-term changes in Baffin Bay early spring sea ice thickness" by Isolde A. Glissenaar et al., The Cryosphere Discuss., <https://doi.org/10.5194/tc-2021-135-RC1>, 2021

The presented manuscript by Glissenaar et al. tackles the very interesting topic of quantifying the variability in sea-ice thickness estimates from altimetry data based on the snow depth data used for the sea-ice thickness computation. This topic is timely and relevant to the scientific community and definitely within the scope of TC. The study takes a deeper look into one of the several marginal seas outside the central Arctic, and additionally to evaluating different snow depth products and processing methodologies, also summarizes very well the differences between the various altimetric data products for this region.

I was surprised how large the differences between the different products in this region actually are, also when comparing data from the same sensor (e.g., CCI vs LARM). Which as the authors suggest should definitely be worked on by the respective data providers to improve their data also for these outside central Arctic areas.

The manuscript is overall very well written and good to follow for the reader as it has a very good overall structure and outline. Therefore, I recommend publication after some very minor revisions that I want to outline within my comments below.

L314: "different for different" suggest to change to "vary for different"

Figure 6/8: While from what I understood, the CryoSat-2 CCI product mainly plays a role in the supplementary data, and I could probably guess correctly which uncertainty envelope belongs to which data set it can not directly be identified from the Figure or the legend as at least in my print out, they look exactly the same. I would encourage the authors to change this in some way or at least add a hint in the figure caption for clarification.

L354 and L379: In several occasions, I find a change between "east-west" and "west-east" asymmetry in sea ice thickness in the manuscript. Now I am unsure whether I missed something or this is the lack of me being not a native speaker but this appears inconsistent to me and I suggest to change this.

L366: I assume this refers to the CS-2 LARM product? Please clarify.

Figure 9c: I find the colormap choice not ideal with white at the high end and the general range up to 25 weeks. The resulting maps already appears to be rather "step"-ish, hence, I would suggest to use either something more qualitative or limit the number of classes depending on the exact values to week ranges for an overall better readability.

L416: Same as comment for L366.