

We want to thank the reviewer and editor for the positive feedback and constructive comments on our manuscript. All comments have been taken into account, and a list of answers and actions undertaken is given below. Answers are marked in “blue”. Snippets of the updated manuscript are cited using “...”

Editor comments:

Dear Thorsten and colleagues,

Apologies for the very long delay, caused by the summer break and in particular by a referee who accepted to review your manuscript, but never did despite several reminders. I reviewed the manuscript myself with the comments of the reviewer in mind, and am happy to inform you that, in my opinion, you have addressed their concerns satisfactorily, although I would like to ask you to implement the following two changes:

Dear Bert. Thanks for all your efforts, and do not worry about the delay; I just returned to office.

- Artificial gap experiments. I understand the motivation for using circular gaps. However, the reviewer’s concern was primarily that their geometry differs from the actual along-track sampling structure of ICESat-2 and thus the gaps are typically not circular-like. Please explicitly acknowledge this limitation in the text

We added the following statement to explicitly acknowledge this issue:

“There is to note that the omission of individual ICESat-2 tracks would cause elongated gaps. Thus, the sensitivity of the GPR model to such gap geometries might be different from that for circular gaps.”

- ATL15 comparison: I believe the point of the referee is that a smooth surface is fitted in the ATL15 to account for data gaps, also for the 1 km product. This means although the posting of the product is at 1 km, the effective spatial resolution can be larger in places. Please add a note about this, if this is correct.

Yes, you are right; there are some limitations. That is a good point to add. We added the following test in the methods section:

“However, the nominal 1 km grid spacing of ATL15 does not necessarily correspond to an effective spatial resolution of 1 km. ATL15 is generated using a spatially regularized solution to obtain a spatially continuous height-change field from the irregular ICESat-2 sampling. Consequently, where the underlying ICESat-2 observations are sparse, the spatial scale over which information is effectively averaged can exceed the nominal 1 km grid spacing. The effective resolution therefore varies spatially with the density and geometry of the ICESat-2 observations and may be substantially coarser in areas with limited sampling. “

and the following in the results section:

“We attribute this to the applied spatial smoothing when generating the ATL15 product and coarse effective spatial resolution in regions with sparse ICESat-2 sampling.” (talking about the signal attenuation and missing of small-scale features)

As you may have seen in the report of the other referee who DID respond, they suggest to include the ATL15 volume change as a comparison, and I agree that this would further strengthen our manuscript, but this isn't necessarily a deal-breaker.

According to the editor and reviewer suggestion, we added the ATL15 volume estimates and a brief discussion:

“ATL15 total volume change estimates amount to $-4.57 \text{ km}^3 \text{ a}^{-1}$ and $-3.34 \text{ km}^3 \text{ a}^{-1}$ for Svalbard and Larsen-B, respectively. Compared with the GPR-derived estimates (Section 5.1), ATL15 captures 94% of the GPR-derived volume loss at Svalbard and 73% at Larsen-B. The larger underestimation at Larsen-B may partly reflect the lower magnitude of the average elevation-change signal, combined with the spatial regularization and coarser effective resolution of ATL15, which smoothed out the strong thinning at the termini of Hektor, Green, Evans, and Crane glaciers. This is also evident in the difference maps between ATL15 and our GPR fields (Fig. 11). ...“

Kind regards

Bert

We want to thank the reviewer and editor for the positive feedback and constructive comments on our manuscript. All comments have been taken into account, and a list of answers and actions undertaken is given below. Answers are marked in “blue”. Snippets of the updated manuscript are cited using “...”

Reviewer comments:

I thank the authors for their consideration of and response to my previous comments. I think that the revisions to the methods, along with the additional figures (Figs. 2, 3), are excellent additions that help clarify and illustrate the methods. I am satisfied with the changes/responses given, and am happy to recommend that the manuscript be accepted as-is.

Thank you very much for the positive feedback.

While reviewing the re-submitted manuscript, I did have the following thoughts/suggestions, but do not think they need to be addressed with a re-submitted manuscript (line numbers are for the revised manuscript):

Fig. 1 caption: "glacier outlines from the Randolph Glacier Inventory" (outline -> outlines, insert "the"). End the caption with a period/full stop.

Corrected.

l. 127: Insert Pyles et al. (2026) as a reference, rather than in-text information.

Done.

l. 145: remove "Therefore"

Corrected.

l. 183: Hurkmans et al.

Corrected.

l. 416-418 [previous l. 381-382]: my thought here was that there appear to (still) be large offsets between the TDX and GPR elevation at lower elevations on Hektoria Glacier, and that this might be related to uncompensated radar penetration. However, upon re-reading this section and thinking about it further, I think this is most likely due to the dynamic change, as was already explained in the text.

Yes, the impact by radar penetration is at the lower elevations rather small due to the missing firn-pack and low snow accumulation.

l. 438: what is the volume change estimated from the ATL15 products for your study area, and how do this compare to your GPR-based estimates?

According to the editor and reviewer suggestion, we added the ATL15 volume estimates and a brief discussion:

“ATL15 total volume change estimates amount to $-4.57 \text{ km}^3 \text{ a}^{-1}$ and $-3.34 \text{ km}^3 \text{ a}^{-1}$ for Svalbard and Larsen-B, respectively. Compared with the GPR-derived estimates (Section 5.1), ATL15 captures

94% of the GPR-derived volume loss at Svalbard and 73% at Larsen-B. The larger underestimation at Larsen-B may partly reflect the lower magnitude of the average elevation-change signal, combined with the spatial regularization and coarser effective resolution of ATL15, which smoothed out the strong thinning at the termini of Hektor, Green, Evans, and Crane glaciers. This is also evident in the difference maps between ATL15 and our GPR fields (Fig. 11). ...“