

*Editorial Team*

**Notification to the authors:** Regarding figure 1: since ESRI aims to use “Powered by Esri” in any case, please include also this statement in the caption.

Done.

*Dr. Andrea Vergnano*

Dear authors,

I carefully read your revised version of the manuscript entitled "Evaluating Snow Depth Measurements from Ground-Penetrating Radar and Airborne Lidar in Boreal Forest and Tundra Environments during the NASA SnowEx 2023 Campaign".

I appreciated how you responded to the comments of the other reviewer and mine, and how you rearranged the paper structure. I think that the paper is suitable for publication after minor corrections.

*Dr. Andrea Vergnano,*

We thank you for your careful reading of our manuscript. You caught several issues, and your suggestions, both from the present and prior reviews, have helped to significantly improve our manuscript.

Sincerely,

Randall Bonnell, on behalf of co-authors

Specific comments:

I feel that - but this is my personal view you don't have to agree with - the abstract, while accurate on describing results, lacks an introductory phrase that explains the context and motivates the reader to continue reading. I would add something like lines 35-36 at the beginning of your abstract. Moreover, I would rephrase lines 18-19 better clarifying to the non-expert reader that you are evaluating biases in snowpack measurements by comparing a large-scale (lidar) technique and a local-scale technique on 44 transects. As it is written now, the non-expert reader could understand that also the lidar was performed just on the 44 transects.

Thank you for these suggestions. We have changed the first two sentences of the abstract to read:

“Snow is a vital component of high-latitude terrestrial systems, but environmental factors (e.g., permafrost) and complex vegetation challenge the accurate measurement of key snowpack properties. We evaluated local-scale ground-penetrating radar (GPR) and large-scale airborne lidar retrievals of snow depth collected during the NASA SnowEx 2023 campaign in tundra and boreal forest environments in Alaska along 44 short (3–12 m) transects.”

Line 109. After the full stop, I would go onto a new line, since you change topic from GPR to Lidar.

Done.

References.

I see that some of the references are not formatted according to <https://www.the-cryosphere.net/submission.html#references>

For example, line 331 does not include the location of the conference. Or line 335 is not clear what 29-2007 is, maybe missing the month?

I suggest you to do a general check of the references.

Thank you for catching these mistakes. We have corrected:

- A. Benson (1967)
- B. Berezovskaya and Kane (2007)
- C. Pruitt (1970)

Supplement and figures.

Line 50 of the supplement: add a whitespace after (ACP).

Done

Figure 6 corresponds to Table S4. Profile N760 of the figure is called A760 in the table.

Thank you for catching this error. We have changed A760 to N760 in the table.

*Dr. Matthew Sturm*

I commend the authors for truly embracing the prior criticism, digging back into their data, and coming out with a nice, concise, and useful paper. I actually have only one comment to address, which is the difference between snow depth and snow thickness. De-facto, snow depth is what people mean when they plunge a ruler into the snow. Even if that number includes a void space (which is rarely known), it is still snow depth. Snow thickness is the thickness of the true layer of snow minus the void space. To try to use these terms interchangeably is to just make things even more confusing. Most people, and most of the public, have neither a GPR, nor the time to shovel a trench. I suggest adding a little sketch and writing a sentence or two about this point. Despite the best intentions here, people wielding ski poles, rulers, magnaprobos and so are going to continue to plunge those into the snow and read off a number they call snow depth.

A last point defending the 30-year honor of the magnaprobe (no need to address this in revision): Like any tool, say a hammer, in the hands of an metal artisan, it can produce wonderful art, and in the hands of a novice one just gets a beat up piece of metal. The soft boreal substrate requires a magnaprobe artisan...one who can feel the first touch of the moss. I suspect if you were to color-code the plot that was provided of magnaprobe depth vs. profile depth by magnaprobe operator, you would find two classes...artisans and heavy-handers, the latter the ones who managed to measure 125 cm when there was just 60 cm of snow!

But back to the review: Very well done. I recommend publish as is, or perhaps better, with the new definition of depth vs. thickness laid out to avoid confusion.

Dear Dr. Sturm,

We thank you again for your expertise and for pushing us to explore the ACP lidar issues in further detail. We have taken your recommendations here: we have expanded our discussion of snowpack thickness vs. snow depth, and we included a brief description of the challenges of traditional snow depth measurements in Section 3.1:

“Typically, in situ snow depths are measured with little-to-no knowledge of void spaces within the snowpack. The surveyor uses the probe to identify the ground, which has a large range of potential conditions, (e.g., soft and mossy, hard and frozen, brushy), which can be challenging to interpret based on the ground-feel. The excavated snow depths are thus more representative of the true snowpack thickness, as demonstrated recently by Stuefer et al., (2025).”

We thank you for your time and we are excited to have this opportunity to highlight the fascinating and unique complexities of Alaskan snowpacks.

Sincerely,

Randall Bonnell, on behalf of co-authors