Manuscript Number: Preprint egusphere-2024-3545
Title: Leveraging Snow Probe Data, LiDAR, and Machine Learning for Snow Depth Estimation in Complex Terrain Environments
Subject: Response to Manuscript Review Comments

Thank you again for your further comments and feedback on our manuscript. We have addressed the minor comments to improve figures, include suggested considerations and to improve clarity and readability. We hope the revisions adequately address the comments and remain open to further suggestions or questions.

Response to Editor:

Comment 1:

My own suggestion is to improve the site locations in the topography shown in Fig. 5. Some of the sites appear to be obscured by the topographic lines. Could you please enhance that figure?

Response to comment 1:

Thank you for the comment, Figure 5 has been altered to better show the sites above the topographic lines.

Response to Reviewer #2:

Liljestrand et al. have made significant improvements to the manuscript and satisfactorily addressed my comments. Below, I list some minor changes that should be addressed prior to publication. I do not need to see the manuscript again prior to acceptance by the journal.

Comment 1:

Line 65: High cost is also a significant drawback to lidar data. I would mention it in this paragraph.

Response to comment 1:

The text has been adjusted to highlight the cost constraints of LiDAR

Comment 2:

Line 82: Suggest deleting 'with the increase of users… remote snowpack information.' This seems unnecessary. It would be fine as "Thus, it is imperative to…"

Response to comment 2:

Incorporated

Comment 3:

Line 85: This paragraph could be improved. The topic sentence should describe how SWE is the variable that is most important in snow sampling. Then you can describe how improved SD improves SWE. I would also more explicitly mention that SD is the variable you can reliably measure 10 times in a field day as well as the variable which is measured by lidar. As such you are mostly constrained to lidar. But, you could potentially model/extrapolate density to get estimates of SWE.

Response to comment 3:

Thank you for the suggestion. We have reworked this paragraph to better highlight SWE, as well as to better justify the application and benefit of snow depth in snow sampling.

Comment 4:

Line 90: 'broader' is vague, maybe 'more spatially extensive.'

Response to comment 4:

Incorporated

Comment 5:

Line 153: Add the year to the date.

Response to comment 5:

Incorporated

Comment 6:

Fig. 3: Make the normal distribution lines thicker or change the color. Difficult to see.

Response to comment 6:

Incorporated

Comment 7:

Line 187: Delete 'e.g. 12 hours.' Seems unnecessary.

Response to comment 7:

Incorporated

Comment 8:

339: Wording could be improved here. Do you mean: there is variation in performance when few samples are used, but the variation is limited with larger sample sizes?

Response to comment 8:

We have modified the sentence for clarity.

Comment 9:

Fig. 10: suggest add a line where y=0 to make the graph easier to interpret.

Response to comment 9:

Incorporated

Comment 10:

341: delete 'highly'

Response to comment 10:

Incorporated

Comment 11:

Line 353. Suggest deleting the two commas surrounding 'or human error in the depth probe measurements.' Current iteration is clunky to read.

Response to comment 11:

Incorporated