Review: essd-2026-718

The authors present the results from a comprehensive field campaign characterizing a mid-elevation snowpack over two winter seasons. The paper is well written and clearly organized, although there are a few points that need to be revised. Therefore, I recommend publication after minor revisions.

Main comments:

- The HR/LR uCT comparison and LR correction is quite new and interesting, and could therefore be introduced providing some more details / e.g. figures on chord lengths distributions and fits.
- Uncertainty evaluation: Uncertainties are mentioned here and there, but for a science data paper, a more rigorous discussion (maybe in a dedicated Section) would be helpful, e.g. also adding uncertainties to Table 1.

Detailed comments:

L16: Not sure if the link can be given directly in the abstract, or if it is better referenced normally.

L21: Maybe you can add a more recent reference to the one of Bader?

L50-51: Maybe briefly add more information about the IVORI project in general. What stands IVORI for? What are the goals of this project? Who is involved? What study sites are visited? What methods are used? Maybe reference existing papers from the project?

L57: Section 2 header should be “Methods” and then subsections.

L82: Same as L16 above.

L90: section should be Section

Fig. 5: It is hard to grasp the difference between HR and LR scan here, as the LR scan is shown much larger. I suggest to add the LR scan from the red box also in 3D as shown for the HR scan, so the reader gets a 1 to 1 visual comparison which I think would be very meaningful.

L157-158: What was the temperature inside the Scanner? Also -8°C? Could you avoid settling of fresh snow by reducing the temperature insider the Scanner or coldlab?

L188: Does the uncertainty of SSA determined with uCT not also depend on the absolute SSA value and snow type? For dendritic new snow with e.g. an SSA of > 90 mm-1, the 10 um uCT resolution may still not be high enough to capture the full complexity of the ice structure, and you may end up with SSA values ~60 mm-1? And the Kerberat analysis only used 30 um resolution. So the statement of 3% SSA uncertainty is likely a bit outdated or only valid for SSA < maybe 40 mm-1. But to be honest, I don’t know about a better uCT uncertainty analysis for SSA > 40 mm-1 for uCT measurements.

L195-200: This is quite interesting but some more details would be helpful: Maybe show an exemplary case of a CLD of a 1 mm layer for the HR and LR. How well do the distributions of Eq. 1 fit the CLD? How exactly are sigma_HR and sigma_LR determined and what is the uncertainty of these two values you provide? Overall, this is a very empirical correction based on a correlation without causation, similarly to the fact that the SSA typically inversely correlates with the density. So your correction may be partially applicable to the snow you studied but is not generally true for any snow

types. A short discussion on this would help. Also a short discussion why it works well for density (little contribution of fine structures to ice volume fraction) and why it does not work so well for SSA (large contribution of fine structures to SSA) would be helpful. Also providing some uncertainty values for the ultimately determined density and SSA values after correction would be helpful.

L212: “recent snow” = “new or fresh snow”?

L213: maybe: “remains larger after correction compared to the ice volume fraction”

L282: Why showing the SMP force profiles, rather than SSA and Density as for Dufisss and cutter?

L302: I cannot identify a remaining ice crust in the profile of Fig. 7c on 22nd Dec. Ice layers re-appear in the lower part of the snowpack. So I guess this is an observer dependent issue? Maybe discuss?

L332: “No significant temperature anomaly”. As the variability indicates the STD of the temperature variation throughout the winter and not an uncertainty, I think the 0.8°C higher mean temperature compared to the 30 years mean for this specific season is significant and in-line with climate warming, no?

Fig. 9: Why are there no grain types although manual profiles were made at the end of the season?

Fig. 12 &13: LR scan in legend rather than “fast scan” for consistency?

L369: Does the snowpack height vary up to 30% within 1 m? That seems to be quite a lot for a sheltered flat field research site. Can you the reason for the height variability? Wind drift? Ground?

L449+: Maybe you can discuss your findings with respect to these findings: https://egusphere.copernicus.org/preprints/2026/egusphere-2026-4846/ Fig 3.a also shows a density underestimation at high snow temperatures. Can also an SSA overestimation be observed in your data as in the TC preprint above?