Dear Editor and Reviewers,

Thank you for the opportunity to revise our manuscript entitled **"Using LIDAR and SNOTEL Data for Evaluating the Performance of Snow Water Equivalent Retrieval Using Sentinel-1 Repeat-Pass Interferometry"**. We appreciate the constructive comments and suggestions provided by you and the reviewers, which have helped improve the quality and clarity of the manuscript.

We have carefully considered all reviewer comments and revised the manuscript accordingly. We hope that the revised manuscript is now suitable for publication in *The Cryosphere*.

Thank you again for your time and consideration. We look forward to hearing from you.

Sincerely,

Shadi Oveisgharan
(on behalf of all co-authors)

Please find our responses below.

Report 1, Anonymous Referee #1

They answered all my comments and I recommend the paper for publication.

- We thank the reviewer for their careful evaluation of the manuscript and for their positive assessment. We appreciate the reviewer's recommendation for publication.

Report 2, Anonymous Referee #2

The authors have substantially addressed my previous comments. In particular, the revised manuscript now discusses sensing geometry, spatial resolution, SWE vs snow depth differences, density assumptions, and SNOTEL representativeness more clearly. The added sections on 6 a.m. versus 6 p.m. acquisitions and on uncertainty also improve the manuscript. I therefore consider my main concerns largely resolved. I have only one follow-up comment.

- We also agree this revision improved the paper significantly, so thank you.

In Fig. 9a, the in situ snow density appears to increase over time during the season. Is a comparable temporal-density effect also visible in the ratio between the SAR-derived SWE and LIDAR-derived snow depth, where multiple LIDAR/SAR comparison dates or sites are available? This would help assess whether the effective density inferred from SWE/SD behaves consistently with the expected seasonal evolution of snow density.

- We appreciate the reviewer's thoughtful suggestion. We agree that evaluating the temporal evolution of the inferred snow density would provide an additional consistency check. Such an analysis would require repeated LIDAR snow depth measurements over the same site throughout the snow season. The inferred snow density could then be computed at each acquisition date as the ratio of the Sentinel-1–retrieved SWE to the corresponding LIDAR snow depth and compared with the expected seasonal increase in snow density observed in the in situ measurements. Unfortunately, only a single LIDAR acquisition was available for each study site, preventing this temporal analysis. Because this limitation is due to the availability of the validation data rather than the retrieval methodology, and because no additional analysis can be performed with the current dataset, we have not added a discussion of this point to the manuscript. We agree that this would be a valuable direction for future studies utilizing repeated LIDAR observations.

In addition, for Fig. 9b, please discuss whether the spatial distribution of the estimated effective snow density is physically reasonable, not only whether the estimated values fall within a plausible numerical range. This would make the density analysis more convincing as a physical consistency check rather than only a range check.

- We cannot evaluate the spatial pattern of snow density as it depends on many factors and we don’t have such a dataset. I added this to the text: “While the in situ measurements in Figure 9(a) show that snow density generally increases throughout the winter season as the snowpack compacts and metamorphoses, this temporal evolution should not be interpreted as a spatial relationship. At a given time, snow density is controlled by several factors, including snow history, wind redistribution, temperature, and metamorphism, and therefore does not necessarily increase with local snow depth. Consequently, it is difficult to assess the physical realism of the retrieved density map solely based on its spatial distribution. Nevertheless, the estimated snow densities provide two additional indications of the physical consistency of the retrieval. First, the distribution of the retrieved snow density, including its mean and standard deviation, is consistent with the range and variability observed in the in situ density measurements shown in Figure 9(a). Second, the estimated density map exhibits a smooth and spatially coherent pattern rather than noisy pixel-to-pixel variations, despite being derived from two independent datasets (Sentinel-1 SWE and LIDAR snow depth). Comparison with the LIDAR snow depth map in Figure 5(b) further suggests that regions of deeper snow tend to correspond to slightly lower estimated densities. Although this pattern appears physically plausible for this site, a more rigorous assessment would require independent spatial measurements of snow density, which were not available for this study.”