**Responses to the reviewer: Reviewer #2**

**Thank you very much for the helpful comments. We addressed all the comments as described below.**

Line 189 – Suggest changing to – ‘To further evaluate the accuracy of the airborne DEM, …’

**Changed (Line 189).**

Line 193 – Change – ‘GPS’ to ‘DGPS’

**Changed (Line 193)**

Line 202-203 – The stated horizontal positional accuracy of 0.5m is far less than that reported on the Snow Hydro manufacturer’s webpage. The error associated with these GPS units can vary from day-to-day. Was the value of 0.5m calculated in comparison to the DGPS for this campaign? What is the source for this level of accuracy? Please check all references to this accuracy within the text if it needs to be updated (Line 666).

**The accuracy of 0.5 meter was reported by our collaborators, but we agree that we should have checked ourselves. We corrected this value to 2-10 m according to the company’s website. This value was corrected in (Line 203). In our campaign, we corrected the coordinates according to the DGPS measurements at the ends of each transect.**

Line 205 – suggest changing to – ‘measurement was associated with latitude/longitude positional information recorded by the Magnaprobe’s built in GPS receiver’.

**Corrected (Line 206).**

Line 208 – suggest changing to – ‘the built-in GPS’ to ‘Magnaprobe GPS’

**Corrected (Line 208).**

Line 215-217 – The authors state that along the 500m transects only 8 points were measured along each line - Is this correct?

**Yes, this correct. These points were used to validate the snow depth from GPR.**

Line 216 – Change – ‘title’ to ‘tile’

**Corrected (Line 216)**

Line 309-310 – I’m not sure that excluding areas of high topographic variability is appropriate here. With the GPR data you did not want to include reflections from near-by terrain that could introduce errors in the GPR measurements. In the case of accurately georeferenced PhoDAR, areas of high topographic variability do not introduce instrument related errors in the snow depth estimates. Agreement between snow depth probe measurements and PhoDAR may be less in these areas, but that is likely due to the complexity of the environment and the lack of representativeness of a single snow depth probe measurement in this area. When presenting the RMSE values of the PhoDAR snow depth product vs the measurements, I think it is important to present both RMSE values for all ice-wedge polygon regions, as well as RMSE values for if you limit the application to less complex terrain (such as presented on Line 506 - Please updated Lines 740).

**We included this procedure (i.e., removing the point measurements in the region of high submeter-scale topography variability), since both GPR and PhoDAR suffer from the positioning errors of snow probe measurements. To clarify this point, we included “Since we assume that the PhoDAR snow depth estimates would suffer from the same positioning errors associated with the snow depth probe data as GPR …” (Line 309).**

Line 611 – Suggest changing ‘procedure’ to ‘Bayesian snow depth estimations’

**Changed (Line 612)**

Line 611 – Suggest changing to – ‘The snow depth data not used in the estimations included 100 points randomly selected…’

**Since only 100 points were excluded from the estimation, using “included” may cause a confusion. We still agree that this sentence was not well written and we changed this sentence to “We selected 100 points randomly from the snow depth probe data”. (Line 612)**

Lines 640-641 – suggest changing to match with Lines 246-247 – ‘we indeed found some layers of ice created by winter rain events that were not detected by the GPR or with probe measurements, but rather were noted (describe method of how these layers were ‘found’ i.e. while excavating snow pits?)’.

**We changed, and included “from snow coring” (Line 640).**

Line 659 – note spelling error

**Corrected “as” (Line 659)**

Line 689 – suggest changing – the term “average” to ‘median’ in the following couple of sentences to match the boxplots in figure 5 and the text later on (Lines 694).

**Changed “average” to “median” (Line 689, 692). In the first sentence, we may prefer to keep “average”, since average and median snow depths were fairly similar in this domain, although the box plots show median.**

Also suggest changing ‘Plot’ to ‘Plots’ in Line 689.

**Changed (Line 689)**

Line 1067 – Suggest adding – ‘represents the 183 snow depths…’

**Changed (Line 1068)**