

Dear Dr. Bennett and colleagues,

Thank you for the changes to your manuscript. The reviewers were supportive of the paper and its methodology, so I am more than happy to iterate the changes with you at this stage. More detail is needed in a few of the amendments to the manuscript as outlined below, and there are a few typos to correct:

Line 129. Remove distance to Nome airport: it's already stated in line 113 and the value is rounded up / inconsistent between the two lines.

Response: [this has been removed.](#)

Line 161 states there is uncertainty in the density. Please describe the methodology used to assess this, and the value of the uncertainty estimate.

Response: We did not quantify the uncertainty that was added to our analysis when estimating the density at each of the snow depth points. That would require data about the density distributions that we did not collect. Because of this, we wanted to recognize that using IDW to estimate density at each of the snow depth points adds some amount of uncertainty to the analysis without explicitly giving an error value for the uncertainty. However, we can characterize the variability of the observed density measurements, using the range and standard deviation values of the density dataset. We have added the variability metrics to the manuscript, and we added some citations to the original IDW interpolation methods articles, see the new sentences added to the track changed version of the manuscript and new references (below).

References (added to manuscript):

Franke, R., 1982. Scattered data interpolation: tests of some methods. *Mathematics of computation*, 38(157), pp.181-200.

Zimmerman, D., Pavlik, C., Ruggles, A. and Armstrong, M.P., 1999. An experimental comparison of ordinary and universal kriging and inverse distance weighting. *Mathematical Geology*, 31(4), pp.375-390.

Figure 5 / section 2.3.2 / line 202 'We assessed vegetation types' needs a methodological description. The response to reviewer 1 is fine: it just needs to be added to the paper.

Response: We edited the word assessed to 'binned' in the sentence and altered and edited the sentence. See track changed version of the document.

Line 364 suggests Figure 5 shows the results of the ANOVA and Tukey test, but does not. These results need to be added (probably in Table A1)...Line 205 suggests ANOVA and Tukey's test statistics are included in Table A1, but appear to be missing.

Response: We have adjusted the text in the manuscript in this section.

Line 420. It's not clear to me why greater variability and error can be expected with more measurements here as this will depend on the semivariogram. Have you plotted this for the study

years / sites? Were the other years undersampled? I would say that the spatial extent of 2019 is similar to the other years (fig A3) but the spatial resolution is higher.

Response: We have changed spatial extent to spatial resolution and edited these sentences to read as follows:

Errors are higher in the years where there was higher SWE in the basin, such as in 2018 compared to the lower SWE year of 2017 in the Teller watershed, when the survey resolution was similar (Figure A3). In 2019, the survey captured a finer spatial resolution and thus we expect greater spatial variability and higher error.

Line 524. Typo: Melosche -> Meloche. Please could you comment on why vegetation is of high importance in this study but low importance in Meloche et al?

Response: We corrected this topographic error in the text. In response to your second question, we think that this is also our finding with regards to NDVI as being an important variable to snow. We talk about this the opening paragraph to Section 5.3, what NDVI represented, and how they were similar in response in our work when we compared them directly in our model. We also discuss what we think NDVI represents (taller shrubs). We do intend to look deeply at NDVI and what it represents in another study that is being undertaken with data we collected in 2022. However, the paragraph of Section 5.3 summarizes all of this.

Figure 6 and 9 typo: Microtopography -> Microtopography

Response: Corrected. Thank you for catching this!

Description of wind factor: line 040 refers to figure A1, but should be A2.

Response: Corrected.

Figure A7, A8 are not referred to in the text but seem really interesting. Please describe in the text or remove if they add no information.

Response: We correct the references to these figures, and others, that were not updated when we added several figures to the Appendix in our last edit. We checked all Figures references through the text as well.

Many thanks and with best wishes,
Mel

Thank you.

Sincerely,

Katrina and co-authors

