

Specific comments to manuscript TC-2021-125 by Buchmann et al.:

Page 1, lines 22-24: I don't understand the meaning of that sentence, consider rewriting.

Page 2, line 41: 1-km scale

Page 3, lines 78-79: Please explain. Measurement routines for new snow are not familiar for all readers and it may remain unclear, why solely taking the difference of to subsequent snow depth measurements is regarded as wrong.

Page 3, lines 70-90: Here you introduce a lot of abbreviations for your measurands and calculated variables. I am not sure, if all those abbreviations are necessary. Their unfamiliarity is severely hampering the reading flow later in the manuscript. At least, consider a table which you often refer to, to help the reader finding easily back to your definitions throughout the text or (and) simply try to use less abbreviations. I personally think that you also could just continue using "average snow depth" instead of "HSavg" during the entire text. Of course you probably still want to use abbreviations in figures with limited space.

Page 6, line 122: why do you refer to equation 2 here?

Page 6, line 123: this equation is probably not necessary. I suggest writing: Absolute changes defined as the difference between the fitted value at the end and the fitted value at the beginning of the time series.

Page 6, line 127: Also here I do suggest to just explain in writing, I don't see any increased value in this equation, it may actually confuse a bit (I pondered sometime about the meaning, as I could not find the time period of 60 days you describe in the sentence before).

Figure 1: Figure captions should be more stand-alone. Either refer to a table which explains the abbreviations your simply restate their meaning in the figure caption here.

Page 8-9, Section 4.2:

- I do find this entire section difficult to read because of the (already mentioned) extensive use of abbreviations. As mentioned before, add an easy to find and cite table or reconsider the use of some of the abbreviations.
- I suggest the use of "panel" or "panels" instead of "plot/s" whenever you refer figure parts
- line 184: consider writing: "...analysis due to median winter seasons shorter than 60 days" – I assume that is the threshold you have set?
- Line 192: Did you find this "empirical value" during this study or earlier? Or is it in use elsewhere, please elaborate or cite.
- Line 194: please add some concrete numbers to explain "smaller" – also some of the median differences for the ablation period are very high compared to the majority of the lines, I can't find this mentioned anywhere in the text.

Figure 2: Please use A,B,C,D in the figure caption, maybe add also top and bottom panels, left and right panels where appropriate.

Page 12, Line 211ff: Beside the mentioned exception PIO, I also see that GSS, RIE and ZER (the latter two to a smaller extend) show larger variations in spring than autumn. Also, the non-typical large difference of 18 days at 5KK remains uncommented. I'll suggest commenting those in the text.

Page 12, line 215-216: Here you write the stations are aligned from shortest to longest periods in Figure A2, while you state an alignment according to elevation in the figure caption of Figure A2, please correct

Page 12, lines 217ff: Even if belonging to the minority; I do think it is worth mentioning the non-typical behavior of BEV and MVE. Are there any reasons why those stations are so different?

Page 12, line 225: Could you describe the different definitions of snow onset and disappearance?

Page 12, line 227: I disagree that the absolute changes for especially Dstop by this study and by Klein et al (2016) are "very similar" in all cases. While some numbers are differing just by a decimal day, differ some by a factor two or in one case (BOS) even by more than a factor 3. Even if it just "days", I do think this justifies a more accurate description of the size of the differences.

Figure A2: mismatch between description of alignment in figure caption and describing text. Please correct.

Page 14, line 243: This sentence sounds strange as it reads that 64 hours amount to 1 hour a day, Please consider rewriting.

Page 14, line 248. Which abbreviation do you use for the station pair Klosters? Would you have any material to illustrate the "no difference on the first glance" and the differences you nevertheless describe? It is difficult to understand that it is not possible to see the difference between stations that close to building constructions. Please give an example on the metadata you do have and the findings you obviously have made on-site.

Page 16, line 262: I think the referral to figure 5, can already be added to first sentence in section 4.5.

Section 5, conclusions:

In case you are keeping the abbreviations in the rest of your paper (see comments above), I would really recommend the use of complete variable descriptions here in the conclusions, to accommodate readers which start their reading with the conclusions.

Page 17, line 275: which engineers are you referring to here?

Page 18, lines 301-302: Is that speculation or do you have any research on that?

Page 18, lines 304-307: while this is an important factor to consider for the analysis of past time series, it is nowadays possible to get a better set of metadata. Why don't you recommend a set of metadata which ought to be recorded for each station and what kind of locations should be avoided.

Page 18, line 306-307: What exactly do you mean with your last sentence? Is that a wish for sites in Switzerland, worldwide? Only parallel sites? Is it enough with one of the sites in case of parallel measurements?

The numbering of the tables and figures are somewhat odd, but it seems that some of the figures/tables are supposed to be in the annex despite they appear mixed with the "normal" figures/tables of the paper. Some of the figures numbered with A* are not less used than these "normal" figures, please consider to add those figures in the main document. Also, even if not stated

on each figure/table, please insert all necessary information for understanding the figures/tables directly in the caption, independent from the describing text in the manuscript.