

Review of ESSD manuscript version [essd-2023-116-ATC1.pdf](#).

Quality-controlled meteorological datasets from SIGMA 2 automatic weather stations in northwest Greenland, 2012– 3 2020

by Nishimura and others

General

As all previous reviewers, I want to honor the authors for their high efforts in maintaining weather stations in a harsh environment and for providing the data to the scientific community. I also acknowledge their attempts to increase the quality of the dataset by removing erroneous measurement values and discussing the time series.

While I have the impression that the authors spent substantial work in making use of the already available reviewers' and editor's comments, I found a few points that might be considered/ revised before the paper is being published.

Best wishes

Wolfgang Gurgiser

Comments:

On section 3.2

- Do you correct SWd (incoming shortwave radiation?) at SIGMA-B for the 4° slope angle? If yes, does this mean that your station/CNR4 is not mounted horizontally but in parallel to the slope?
- I'm not sure if you use the corrected data (SWd/u_slope) for calculating the surface albedo because in equation ix, there is no "slope" subscript
- Might the lower sensors of the CNR4 at SIGMA-B be markedly influenced by the station, also by the solar panels? If yes, you should also mention this influence at the end of the section

By line(s), figures or tables

Line 24: "A proxy of cloud formation frequency" – I would just write a "A proxy of cloudiness" because incoming longwave radiation just indicates if clouds are there or not

Lines 24-29: While I find a comparison per-se interesting, it's in my opinion not necessarily needed in the abstract of this paper. If you keep it, I would recommend revisions because in its current form, it's hard to understand.

Line 65: Maybe change to "...support the evaluation and development of numerical models"

Line 66: I suggest to delete the second part of the sentence starting with "and..."

Line 69: I suggest to change the text as follows "...or technical issues (e.g. Zero Offsets, faulty sensors)"

Line 70: "quality" instead of "accuracy"?

Line 71: I would remove “which is a process ...” because e.g. detecting a drift in a sensor or detecting unrealistic constant values over time would for me also be part of quality control

Line 88: “...and the sensor...”

Lines 88-90: Please split the sentence in two.

Line 93: “...an accumulation area of the ice sheet...”

Line 95: “...located near...”

Line 98: “...vary”

Line 98-99: e.g. “...surface lowering...” (surface height decreasing is not a good expression)

Line 99: “...is located...”

Line 135: “...below...”

Line 206: “... and when the...”

Line 244: Maybe change to “...of simple statistics based on maximum, minimum, and mean values derived from ...”

Lines 249-251: Sorry, but I don't get the meaning of the added text.

Line 270: “...from the entire (???) observation...”

Equation 1.4.3: I wonder if there could be conditions (e.g. fog) where LWd and LWu could be very similar in your environment? Then, maybe not all time steps with LWd very close to LWu should be flagged.

Line 359: “...of correct values...”

Table 5: % SWu is higher in Level 1.3 than in Level 1.2? This might be an error.

Line 394: “...is shown...”

Line 398: “...calculated only from the...”

Line 403-404: Wouldn't riming or icing cause shading of the sensor and thus, rather an underestimation of the SW values?

Line 421-422: Do you mean “...that passed the second control”?

Table 4: Might it be that you do not show the threshold values but the min/max values that you use to determine the threshold values? In other words, is e.g. the threshold of wind speed at U2A 25.5+15 m/s? If yes, I would add the real thresholds in the table.

Lines 467-468: What differences between LWstd and the measured LW values is allowed for not flagging a value?

Equation 2.7.1: Please add the unit (cm?).

Line 528: This text sounds very subjective, maybe you can explain more about potential valid records that would be masked.

Line 536: “The maximum was slightly positive at SIGMA-A site”- which maximum? In case you refer to the +7.2°C, I would not write “slightly positive” but just provide a number.

Fig. 4: In the legend, please replace snow height with surface height.

Fig. 7: The subplot showing the lapse rate is not described in the figure caption any more. Please correct.

Line 630: I'm not familiar with "occurrence frequency" but rather "frequency distribution" – you may check again.

Lines 639-642: This text could be shortened.

Line 653: "...indicates a higher frequency of clear...."

Line 655: Isn't the sentence starting in this line replicating the information in lines 649-650?

Lines 689-691: Please revise the description of (1)

Line 691: Maybe you find a better description instead of "dramatic"

Line 693: Maybe change to "(3) Observed atmospheric conditions in JJA..."

Line 694: "(4) Frequent clear-sky..." or even "(4) Low cloudiness" which might be a more accurate description than "clear-sky" throughout the paper