

Review of Erhardt et al ESSD manuscript by Bess Koffman

This data description paper presents full-resolution aerosol data from the NGRIP and NEEM ice cores. Although these data have contributed to multiple high-impact papers over the past decades, the full-resolution data have not yet been published. The paper presents the datasets, along with a historical overview of melting and analysis methods used by the Bern ice core lab and associated groups. The full-resolution datasets are likely to be useful for future studies, and I support their publication.

Overall, the paper is straightforward and worthy of publication. I have a few minor suggestions for the authors to consider in the revised version (please see below).

The CFA dataset links work; however, the datasets themselves appear to be under moratorium until March 2022, so I am not able to assess them. The timescale links worked successfully to access text and/or Excel files.

Minor points:

Line 35: “have been built” not “build”

Figure 1: I suggest making it bigger, as the text is barely readable in the current format.

Line 106 and Figure 3: Please add an overhead view of the melthead itself to the figure, rather than having two views of melting with ice sticks. It would be more useful for people reading the paper to see the actual configuration of the top of the melthead.

Lines 121-127: Paragraph could use re-organizing.

Line 129: Please clarify the length of day here – is this 8,10, 24 hours?

Lines 159-160: This is an odd one-sentence paragraph. Please revise.

Line 196: It would be helpful to readers to have more information about the debubblers. Can you add a few more sentences describing how it is built and how it works?

Line 222: should be “analyses” plural

Line 224: “drillliquid” should be two words

Line 275: “the that the” at end of line. Please revise.

Line 320: What exactly is the “strict protocol” used? It would be helpful to readers to have a bit more detail, so they can learn from your well-established approaches.

Line 339: Similar comment to above. A bit more information would be helpful.

Line 352 and related sentences: Dispersion not only affects the resolution of the record, but also the time at which signals arrive (i.e, peak lead phenomenon), with implications for signal deconvolution. A more thorough discussion of dispersion, citing the study of Breton et al., 2012, would be appropriate here.

Line 423: “of of”

Section 6 on data availability:

Just a note that the links seem to work, but the pages that open do not seem unique to each ice core. For instance, the NEEM links go to pages that list “NGRIP” as the project, even if the NEEM data are also linked. I found this confusing.

References cited:

Breton, D.J., Koffman, B.G., Kurbatov, A.V., Kreutz, K.J., Hamilton, G.S., 2012. Quantifying signal dispersion in a hybrid ice core melting system. *Environ. Sci. Technol.* 46, 11922-11928.