The Cryosphere Discussions

The Cryosphere Discuss., author comment AC1
https://doi.org/10.5194/tc-2022-18-AC1, 2022

Reply on RC2

Marie Bergelin et al.

Author comment on "Cosmogenic nuclide dating of two stacked ice masses: Ong Valley, Antarctica" by Marie Bergelin et al., The Cryosphere Discuss., https://doi.org/10.5194/tc-2022-18-AC1, 2022

Thank you for your comments. We agree with all of the comments and will make the appropriate changes and additions as suggested. Please find our specific responses in the below text.

Specific Comments

At several points, I had questions on various things (density, grain sizes, steps in a process), but they all ended up getting covered later in the manuscript. However, the number of notes I had like this might mean that there is some reorganisation that could help.

L221-222: already introduced cosmo terminology (including proper superscripts), so probably easiest to follow that here.

This has now been fixed.

L277-278: The description of the factors that the supraglacial debris layer depends on clearly lists 4 factors, including concentration of debris in ice. The forward model presented immediately after this mirrors these factors except for the debris concentration. This was confusing until it gets explained significantly later in the paper. It would be useful to explain why this is not considered here (or that the 'missing parameter' will be explained later?).

Yes, we will address this in the text

Description of eqns (starting ~300): Not quite sure what all the subscripts were (E_T, Z_T) and the text wasn't consistent on parameters in italics, etc. (not huge, but slightly confusing). Could explain meaning up front (if relevant)

We agree that this was not consistent and this has now been fixed

L489: Describing two observations – 'the set of samples that display monotonically decreasing nuclide concentrations' was a bit confusing because I didn't initially realise that these were being considered across the entire profile and not just within the different layers that had been identified (albeit identified using the nuclide concentrations?). Might help to specify.

We agree and will amend the text accordingly.

Figure 7: I absolutely love this figure! I did wish that I could see the zoom in of the S1 somewhere (to see the profile there). Also, the horizontal/vertical boxes (clearly visible in Ne the best) are not explained (I assumed horizontal width was uncertainty, but not sure what the different horizontal lines are? Divisions between samples that were combined?).

Thank you for pointing this out. We will add the description of the horizontal/vertical boxes to the figure caption. Yes, these do represent the measured uncertainty and division between samples that were combined.

L524: Not sure what the surface sample is referring to – S1, E1 and E2 are all perfectly clear here. Perhaps refer back to the appropriate section/table since this hasn't been recently discussed.

The surface sample is included in S1 and should not be listed individually. This has been fixed now

L546: Are there samples that are not used for forward model fitting that are NOT in the recycled surface material? Not sure if I missed something here...

No samples are excluded. Any samples not used for model fitting are used as burial constraints. We will add a statement to clarify this.

Figure 11: The red dots are very hard to see (tiny and almost covered by label text).

Thank you for pointing this out, it has been fixed.

The majority of the paper is very easy to understand, but there are some sections where a bit of editing might help readability (extra commas needed, small edits to grammar: e.g. L529 'as follows' instead of is following). Nothing huge, but a few times where I had to read a sentence twice to figure out clauses, etc.