

Dear Dr Clason and colleagues,

Thank you for your thorough response to the Reviewer's comments. For the next stage of review, I invite you to upload your updated manuscript.

I do find some of the responses a little defensive, and would urge you consider whether a few more of the changes requested by the reviewers can be incorporated into the text. Both reviews are constructive, and I think many of the suggestions will improve the understanding of the paper for a wider audience. For example, I ask you to consider the following:

*Reviewer 1*

L25-26 comment. Will you add the suggested paper to the text? It would be useful.

L62: why not 'fate of the radionuclides'?

Methods: please ensure the information about precipitation and the justification you have here is added to the text. It would also be useful to mention the rockfall, even though it could not be safely sampled, to demonstrate you have completely considered all sources.

L106 : I'm not clear that you have answered the reviewer's question: did drying at 100 drive off any of the organics?

L107: both reviewers request information about the mass of cryoconite. I understand that you cannot include this information, but please ensure you include justification of this in the text (e.g. just as you have in your responses).

L212-230: ensure this detail is clear in your text

L293: would it be useful to include the correlation matrix in the main text? It sounds interesting, and might not get seen if relegated to the appendix!

L372: it might be worth mentioning this justification in the text in some way

Figure 1: can you ensure that there is some kind of overview of Sweden if appropriate? Not everyone knows where Tarfala is, and it's very useful for visualising proximity to sources

Fig. 1 and 6: perhaps a note in the caption about the braided stream?

*Reviewer 2*

Study site: both reviewers ask for detail about the snow. Your response is clear, but it would be useful to mention this in the text: if both reviewers ask, then your readers will too.

L108: see above. Some mention of relative mass of different cryoconite types would be worthwhile.

L269: impact of sunlight. This is indeed interesting, would you like to add a sentence highlighting it (and providing justification for some future work?)

I look forward to reading the updated manuscript.

Best regards,

Dr Liz Bagshaw

TC Editor

