Biogeosciences Discuss.,
https://doi.org/10.5194/bg-2017-507-RC1, 2018

Biogeosciences Discussions

Interactive comment on "Physical and chemical evolution of dissolved organic matter across the ablation season on a glacier in the central Tibetan Plateau" *by* Lin Feng et al.

Anonymous Referee #1

Received and published: 11 January 2018

The chemical evolution of snow is an interesting subject, and the authors provide some novel results to add to the research field. The paper outlines multiple analyses into the DOM, and find links between DOC and snow evolution, DOC and UV and changes in biologically related DOM components. The lack of statistics is worrying and needs to be addressed as a priority, however, taking the descriptions of values at face value, the story is complex and more effort needs to invested in picking out the likely reasoning behind these changes. I come away with a haze of knowledge about which components increase and decrease in concentration with ageing snow state, but some well rounded sentences in the conclusion, and a good schematic of the overarching findings could make this learning experience all the better.

Major concerns: 1) STATISTICS. My greatest concern with this manuscript is the severe lack of statistics to show the relationships between different sets of values. From the presentation of standard deviations, to performing appropriate comparative or correlation analyses, this element of the paper is worryingly poor. Without it, there can be no way for either the authors, not the reader, to interpret the results meaningfully. Looking at figures 2 and 3, and assuming that error bars are the SD (please include this in the legend alongside the n values), it's hard to imagine that significant differences would be found between these groups. Statistics would make this more convincing, and until these are included the rest of your arguments / conclusions / hypotheses cannot be considered.

2) The INTRODUCTION needs to be sharpened up to priorities the background information that is relevant to this subject area (see below for specific details)

3) The DISCUSSION should attempt to draw out and summarize the findings of the study. This is a complex story with concentrations going up and down between different sample groups at different times. A schematic could be the ticket here to imprint the hypothesized story in the head of the reader; pulling together a narrative of snow melt, freeze-thaw enrichment, exogenous sources and microbial activity.

Minor concerns:

Title: I think this should be reconsidered. The snow is physically evolving, the resulting effect is changes to the chemistry. Perhaps this is a good chance to be bold and pull in the concept of biology into this title. In general the title would be more appealing as a statement of the findings, rather than a description of the study.

Introduction:

The introduction seems a little off-track and unhelpful for getting into the subject matter. You start your ms about water supply, however this is very tenuously linked to the purpose of the project. The same is true for lines 43 - 48. Please remove these

sections / replace with another concept of why this subject is important to study / make clearer the links between water supply and your study. Lines 29 - 31 also seem a distraction, as do lines 36-38

Line 42 - please include appropriate references to this statement

line 47 Just in this area? What about other glaciers world-wide?

Lines 50 - 52: state why this is of importance to know

Lines 55 - 61: Again this moves away from the specificity of the paper. Either remove, or make links as to why this information is important to assimilate in the introduction.

RESULTS:

line 86 - I don't see any sample lines with five in them.

Line 87 - better to describe this sampling strategy as being done along transects of similar elevation?

Line 91 - what was the filtrate collected into?

Line 92 - Did you freeze after filtration?

Line 96 - include a figure to show the different ice types so that others can replicate these methods with more confidence. Is there a reference to use for the evolution of snow types?

Line 105 - I think these mixed samples would be of interest. Surely they help to add to the story. Please include them.

Results:

Line 242 - "from " instead of "in"

Lines 244 - 245 and 249 - 250 - why show the maximum values, why not mean with SD? Surely this is more representative of your samples.

Lines 247 - 248 - use correlation analysis to prove this.

Line 251 - what does "exhibited significant absorbance" mean? How significant?

Lines 255 - 275 - Every time a comparison or correlation is made, you need to state the statistical significance of these. There are numerous cases of this in this section. All need to be dealt with.

Line 281 - can you include the 4 components from this study into the table as C1- 4.

Line 286 - 288 - stats - are these changes significant? - include in the discussions what such increases / decreases actually mean biologically.

Line 294 - it's not a clear trend unless you use statistics to analyze the trends

Line 295 - what does "generally" mean?

Line 302, 303, 309 - 313 - stats

Line 305 - unsure what this means

Line 316 - state as a percentage. When looking at these unique components does it say anything about the flow of molecules?

DISCUSSION:

Line 349 - I dont see the need for the discussion on cryoconite - consider removing

Line 373 - find a better term than "fresh nature"

Line 379 - I'm unsure what you mean by "intense" but given how these cryoconite samples were prepared, I dont think that this is a fair comparison. I'd suggest removing it and finding a more appropriate comparison if necessary.

Line 385 - please be more clear about what you are discussing here - which analysis / result does this relate to? In general, condense this paragraph and stay focused on the discussions that matter. Line 389 - 394 seem redundant, Lines 394 - 400 seems

extensive given this was not found in the sample.

Line 407 - can you link changes in DOM with changes in the compositions of the biomolecules? Perhaps using a redundancy analysis. What can you tell from this? This ms discussion needs a deeper look at the biological component of this process if you deem it to be an important aspect.

Provide a discussion on the correlation between DOC and UV.

CONCLUSION: rather than a repeat of your results, summarize it in an amenable manor.

Line 436 - this is a discussion not a conclusion of your work. Either bulk it up and place it in the discussion or remove altogether. It otherwise it is redundant.

Interactive comment on Biogeosciences Discuss., https://doi.org/10.5194/bg-2017-507, 2017.