Biogeosciences
Discussions

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Interactive comment on "Bacterial production in subarctic peatland lakes enriched by thawing permafrost" *by* B. N. Deshpande et al.

Anonymous Referee #1

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This paper characterized particle size, DOC quality, chemistry, and nutrients from permafrost cores and a suite of thermokarst lakes. Permafrost cores contained high amounts of C, nitrate, and SRP. Bacterial characteristics (abundance, production and growth rates) of the lakes were determined. Most lake water bacterial cells were associated with particulate material. Particles in lakes overlapped in size with soil particles measured from cores. Interestingly, these thermokarst lakes had high bacterial growth rates, but average to low abundance. An experimental component determined that enrichment of soil extract, or of DOC and P combined increased bacterial growth rates. After 5 days of incubation, bacterial abundance decreased in all treatments. These data suggest certain top-down controls, such as bactivory, regulate bacterial abundance.

This is an interesting paper, and the size fractionation aspect of the study is novel. This

will make a very interesting contribution to the literature.

I have some general suggestions to improve the manuscript:

1) The manuscript would benefit from some clearer statements of goals, questions, and rationale, from the abstract to the end. It reads very much like a descriptive study and somewhat of a list of analyses and results. I think anything you can do to more clearly articulate goals, questions and rationale will improve the impact of your paper.

2) There is a great deal of data in this paper, which is nice but it makes it a bit hard to follow main points and also seems that much of the data are underused in some cases. You may want to distill some of this down further to improve clarity of presentation. For example, I'm not sure the Fig 4 really illustrates anything key, and Fig 8 has some results that don't really seem to be discussed much. I would suggest trying to highlight the real nuggets, or at least guide the reader more through it.

3) I found it very unclear what the lake categories were in the statistics (I understand the location designation, but you allude to SAS versus the other two lake categories). How were the categories established and why? To address a particular question?

4) Main points: I would suggest you try to revise to make these clearer. For example, your final paragraph gets to the really interesting inferences and implications- it would be great to see some of that earlier and better developed.

Specific comments: Line 21: define CT Line 34: delete one of the "no" Line 145: remove "," Line 167: should it be ug/L? Line 218: change sub-title to Bacterial abundance to match later terms Line 330: give p-value, and in this section, averages for all categories should be provided, not just for SAS lakes Line 339: can you provide some stratification data? Line 343: change "2and" to "and". Line 389: insert "bacterial" before "cell" Line 407: include "%" to the value of 50.1. Line 488: change "Less 30%" to "Less than 30%". Line 501: change "resulted" to "result" Line 523: may want to be consistent with notation, different in Results, and I think the usage here (all x106) is

better Line 529: change "from." to "from" Line 555: include citation after "limitation"

Table 1: I would suggest switching the order of chemical constituents so that they are organized from highest to lowest, not lowed to highest.

Figure 8: the order of the treatments listed in the legend should match the order that they appear in the figure.