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## ***Interactive comment on “Reviews and Syntheses: Effects of permafrost thaw on arctic aquatic ecosystems” by J. E. Vonk et al.***

**Anonymous Referee #1**

Received and published: 22 July 2015

Review of Vonk et al, BGD 12, 10719-10815, 2015, Reviews and Syntheses: Effects of permafrost thaw on arctic aquatic ecosystems

This comprehensive manuscript reviews how permafrost thaw influences arctic aquatic ecosystems through their mostly first-order effect on water chemistry and quality. I found this manuscript to be very well put together – it reads well, it is well structured, it is timely and focuses largely on recent research. It ties together a wide variety of literature and ideas, and it offers good suggestions and guidance for future research. It is well suited for the readership of Biogeosciences, particularly given its placement within the special issue. I have relatively minor suggestions.

First, I suggest some attention to be paid to how or whether these processes are included in terrestrial ecosystem models and/or land surface models, or how the many

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processes described within can guide model prioritization. I recognize this is not the focus of this paper but it would be a laudable goal to at least reference. Using such a focus to wrap up may assist in the ending, which a bit strangely ends on a call to do eddy covariance measurements. These GHG-measuring ideas are fine suggestions but a slightly off-key way to end the manuscript, which would benefit from a slightly stronger wrapping up more focused on the core ideas of the review.

p. 10722, line 14 – it is important that the C stock numbers retain the indication that some of this organic carbon is well below 1 m, which is a traditional horizon on which to count these stocks.

p. 10726, line 6 – can you quantify how “widespread” is the disappearance of thermokarst lakes into rivers in Siberia?

p. 10757, line 6 – including the time scales of change at 30-40 years for this process prompts the question of what are the time scales of all of these processes described within the manuscript? In this context 30-40 years is described as “short” but elsewhere within 30 years the biological response to P-fertilization was already substantial. As much as possible I encourage the authors to go through the sections and assign likely or characteristic time scales of behavior.

Very minor technical corrections:

p. 10733, line 12, remove the comma after “decrease”

p. 10742, line 10, pluralize “distance”

p. 10769, line 20 “ocean-ward” seems slangy – perhaps ocean-bound ?

p. 10772, line 2, “organics” should be organic +noun – matter? Acids? Etc..

p. 10781, line 8, Probably “DOC” was meant for one of the POC’s.

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Interactive comment on Biogeosciences Discuss., 12, 10719, 2015.

