

***Interactive comment on* “Estimation of permafrost thawing rates in a sub-arctic catchment using recession flow analysis” by S. W. Lyon et al.**

S. W. Lyon et al.

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Overall, this reviewer gives a quite favorable review of this study. The reviewer points out the utility of using a long-term flow record in our analysis as being ‘a very important objective as very few [research studies] have been taken in such long-term conditions’. In the following, we address the general comments brought up by this reviewer. We begin each response with a short version of the reviewer’s original comment.

1. The abstract, which [has] appropriately summarized the manuscript, should pinpoint [that] permafrost thawing is likely to change alone with climate change.

This has been done such that the abstract now states: ‘While permafrost thawing due to climate change has been observed in the arctic and sub-arctic, direct observations of permafrost depth are difficult to perform at scales larger than a local scale.’

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2. *In introduction, the authors are exceptionally clear about how carbon and other biogeochemical cycling changes build on permafrost thawing in this permafrost region. In my opinion, the permafrost interaction with climate and frozen soil hydrology process in this region is also important. The authors should provide ... a review of this [literature].*

This is consistent with the comments of Reviewer 1 and the editor. We have addressed this issue in the revised manuscript to include a better literature review of previous process-based permafrost research with emphasis on previous recession work.

3. *The methodology, recession flow analysis, should be more clearly explained.*

We have added a figure (Figure 1a) to better and clearer explain the methodology of the recession flow analysis. This is in conjunction with comments made by the editor.

4. *p65 L15: 'DIC' should be 'DOC'.*

Appropriate correction made.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 63, 2009.

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