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www.hydrol-earth-syst-sci-discuss.net/7/C662/2010/

Hydrology and Earth System Sciences Discussions

Interactive comment on "Investigating the relationship between subsurface hydrology and dissolved carbon fluxes for a sub-arctic catchment" *by* S. W. Lyon et al.

Anonymous Referee #2

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The paper discusses a very interesting topic. It shows how we can derive plausible results by using conceptual models of DOC/DIC release and transport. The structure of the text is good. The figures/tables support the text.

The title is misleading: Drop "Investigating", write "on the relationship...

You discuss the reaction of your system under future climate changes. This conclusion has no connection to the results of your study. A least you should mention how you possibly could include the effect of climate change in your model concept in order to give estimates for the future. Especially, you mention the permafrost, but its influence on transport processes becomes not clear. Permafrost reduces the transported volume

and the release von DOC from soils. Where do you include this in your concept?

In Detail: p. 1682: You mention long-term hydrograph separation: How is it done? please give formula. p. 1682: "We can compare.... with the product of ..." Please describe how you do it (formula?) Formula (4) and (5) are very similar. Please describe the underlying concept only once. Formulas (9)-(11) are also not necessary. Please shorten this paragraph

p. 1686: "... we can separate...", the methodology is not described in your text.

p. 1687: "we can use the estimated aquifer thicknesses from Eqs (1) and (2)... I do not understand how you derived qsh and qd?

p. 1687: "These estimated advective travels times..." how you derived travel times?

p. 1688: very short description

p. 1982 Where is the (conceptual) link of this paragraph to your approach. Please give at least ideas how to include thawing of permafrost.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 7, 1677, 2010.