

Interactive comment on “Hydrogeological controls on spatial patterns of groundwater discharge in peatlands” by Danielle K. Hare et al.

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Received and published: 13 July 2017

“Hydrogeological controls on spatial patterns of groundwater discharge in peatlands” by Hare et al. describes a multifaceted approach to understanding two primary mechanisms for groundwater discharge in peatlands: matrix seepage and preferential flow path seepage. The research is primarily based in temperature observations (DTS, vertical temperature profilers, and infrared imaging), but also incorporates regional well data, ground penetrating radar, and coring information. The authors conclude that peatlands operate as part of the regional groundwater system, and that underlying basin curvature and peat thickness likely control patterns of discharge.

The article is certainly relevant for publication within Hydrology and Earth Systems Sci-

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ence as it yields a process-based understanding of peatland hydrology within the scope of regional hydrology. The methods used are cutting edge and provide strong support for logically-drawn conclusions. I found the paper to be of an adequate length with well-designed, highly relevant figures. Appropriate references are used throughout, with a very fulfilling discussion tying the findings of the research back to the literature.

I have a minor specific question/comment regarding the interpretation of drainage ditch areas as upwelling zones. The vertical temperature profiles appear to me to possibly simply be responding to diurnal fluctuations. Also, there is apparently no indication from DTS data that groundwater is emerging in these locations. Although a negative fluid flux is calculated I wonder if this flux is within the error of thermal conductivity assumed for the 1D heat transport equation. I think it would be useful to report on the parameters used in the 1D heat transfer equation and also to evaluate limiting conditions to determine whether the drainage ditches are actually upwelling zones. As this is somewhat of a minor point of the paper I do not feel it is necessary to go to great lengths to do this, but I believe it would help to firm up this interpretation.

There are some limited typographical errors, suggested changes to wording, minor points and questions, and a minor change to Figure 5. I detail these in the attached manuscript file.

I have recommended this article be accepted pending technical corrections, although additional 1D thermal modeling could be considered a minor revision. Overall, the authors have done an excellent job writing this paper. I look forward to seeing it published.

Regards, Neil Terry

Please also note the supplement to this comment:

<https://www.hydrol-earth-syst-sci-discuss.net/hess-2017-282/hess-2017-282-RC1-supplement.pdf>

