

Hydrol. Earth Syst. Sci. Discuss., referee comment RC2  
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## **Comment on hess-2021-537**

John Selker (Referee)

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Referee comment on "HESS Opinions: Chemical transport modeling in subsurface hydrological systems – space, time, and the “holy grail” of “upscaling”" by Brian Berkowitz, Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-537-RC2>, 2022

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Review by John Selker of HESS Opinions manuscript 2021-537 by Brian Berkowitz.

The article provides an engaging and well-presented personal perspective on the science of transport of materials in natural porous media.

The article is well titled in using the word “opinion,” in that it reads as how the author thinks about these problems rather than seeking to provide a compelling case for his perspectives. I understand that the author and journal may see value in presenting opinions, which is their choice, but I must admit that I would have far preferred to spend my time reading a scientific article which provided compelling evidence and a well-rounded treatment of the diverse perspectives found in the literature. The lack of reference to the prominent and relevant work of Benson and Le Borgne, among many others, indicate to the reader that this is not a treatment of what has been shown in the literature, but rather what is believed by the author based on his own observations. I am not sure what I can do with such a presentation which straddles presentation of an opinion (which could have been well achieved in a very few paragraphs) and demonstration of principles, which would need to view the science as a community process rather than an individual sport.

Overall, I find the article more emphatic than convincing – I did not count the exclamation points, but suppose there are on the order of 25. To this reader this elicited a sense that the author was too closely affiliated with his ideas to remain objective. Cooler arguments based on a broader reading of the literature would have been more convincing.

I have not studied the goals of HESS in presenting such opinions. From the article we get the sense that there are tight page limits, which is fine. I believe that the article would be far more effective and balanced if it were just one page long – just state that due to the

fundamental role of time in spreading processes, combined with the multi-scale heterogeneity of geological media, that extrapolation in either time or space beyond a factor of two is an unreasonable expectation.

While I am well aware that the Holy Grail concept represents a reference to the unattainable to the author, in modern parlance this phrase is frequently employed to represent a remote, but potentially eventually attainable, objective. Such is language that there are multiple interpretations of a phrase. If the author wishes to be well understood, I would recommend including his intended meaning immediately following the first use in the text.

I provide many additional observations on the PDF of the paper (attached) which present significant concerns I have, but do not rise to discussion in this over-arching consideration of the work.

Please also note the supplement to this comment:

<https://hess.copernicus.org/preprints/hess-2021-537/hess-2021-537-RC2-supplement.pdf>