

Interactive comment on “On the assimilation of environmental tracer observations for model-based decision support” by Matthew J. Knowling et al.

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Received and published: 4 October 2019

I provided an informal review previously, this serves as a somewhat more detailed formal review:

The authors continue to tackle one of the most important areas of applied hydrogeology with novel and insightful tools. Here, they challenge an accepted fact of hydrogeology – that more data, and especially more diverse data – will lead to better models for decision support. Their counterintuitive finding that isotopic data may have value little of no value for water resources is just the sort of result that could spark important conversations in our field.

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As with their previous work, this group takes full advantage of their position as leading hydrogeologic modelers to offer constructive criticism for the field. There is no question that this group can build and calibrate large, complex models and that they are as able as anyone to extract information from hydrologic observations. This lends weight to what could otherwise be criticized as a finding based on lack of response. In this case, the group makes the point that increased complexity has a place in assimilating more and more varied data while recognizing that this increased complexity has limits for some applications. Again, the group takes advantage of its abilities to provide useful guidance for the community.

Personally, I appreciate the terse format of presenting the case studies. There may be call for providing more detail as supplemental information. I believe that the accepted White paper supplies these details. But, I will leave that to other reviewers and the editor to comment on whether it is appropriate to provide more detail in this manuscript.

My only recommendation with regard to the authors approach reflects my own bias. As such, I completely understand if they do not address it in the paper! Regardless, I would like to hear the authors respond to the following question. From the perspective of a water manager or someone else tasked with assessing hydrologic risk, is a statistical reduction in the forecast the right measure of data value? Would the value of tritium, in this case, be viewed differently if decision-making were seen to be based on hypothesis testing of the plausibility of future high loading, for example? More generally, could the authors comment on the importance of considering the decision making context underlying the assessment of data worth?

Fantastic work – I look forward to reading more in the series!

Ty Ferre

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2019-436>, 2019.

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