Hydrol. Earth Syst. Sci. Discuss.,
https://doi.org/10.5194/hess-2020-539-AC1, 2021


Hydrology and Earth System Sciences
Discussions

# *Interactive comment on* "Upscaling land-use effects on water partitioning and water ages using tracer-aided ecohydrological models" *by* Aaron A. Smith et al.

**Aaron A. Smith et al.**

smith@igb-berlin.de

Received and published: 11 January 2021

General Comments: The paper presents substantial new results on the effects of model resolution on ecohydrological flux simulation using supplementary isotope data. The overall quality of the paper is very good, but some key aspects of the methodology are unclear in the main manuscript, and are only outlined in the supplementary material. Other than a few details, the paper is clear and well supported. I see no reason not to accept the manuscript for publication in HESS, subject to a few minor corrections.

Response to General Comments: The authors thank the reviewer for their comments. We will clarify the methodology presented in the manuscript to reduce dependencies



on the supplementary material.

Specific Comments

R1C1: 74-80: The research questions are clear enough but three fairly complex questions seems excessive for a single research paper. Having read through the manuscript, all the questions are addressed to some degree, but they are an unfocused introduction to the aim and scope of the presented research.

Response to R1C1: The authors thank the reviewer for their suggestion. Through the revision, the authors will refocus the research questions to better present the aims and scope of the research conducted.

R1C2: 86: Describing a 66 km2 catchment as 'mesoscale' is dubious; it falls short even of your previous definition of 100km2. Let the area speak for itself, as was done in the abstract.

Response to R1C2: The authors will clarify 'mesoscale' as a descriptor in the manuscript. We wanted to differentiate the site as being larger than a small experimental catchment (typically <10km2 and often <1km2).

R1C3: 210: Is 'climate zone' the best word choice? It doesn't necessarily bring weather stations and Thiessen polygons to mind.

Response to R1C3: The authors thank the reviewer for their suggestion. The authors will revise the wording to "...forcing data were included as representative polygon areas from five local climate stations".

R1C4: 233: It is stated that NRMSE is used, but not what is used to normalize the error. The justification for using the NRMSE is also insufficient to explain why the NSE was rejected (the NSE is fundamentally a normalized squared error) for the isotope simulations. Either a better justification in text or a reference is needed.

Response to R1C4: The authors apologize for the error in the manuscript. The RMSE

and NRMSE were exclusively used for the sensitivity analysis. Calibration efficiency was measured by NSE and normalized mean absolute error (NMAE). The authors agree that there is limited usefulness of NRMSE if NSE is used. The NMAE was used because the authors did not want to over-emphasis peak values when data collection had inconsistent time-steps and the isotope response was quite subdued. The authors will revise the description here to clarify the use of MAE, not RMSE.

R1C5: 258-260: The multi-criteria calibration methodology is a key part of this research, but it would not be possible to replicate the method with the description provided here. Too many significant details on the method have been relegated to the supplement.

Response to R1C5: The authors thank the reviewer for their suggestion. To keep the manuscript streamlined, the authors will move the most significant details of the multi-criteria calibration from the supplementary material to the manuscript. However, we are mindful of maintaining a balance between detail and excessive manuscript length and using the supplementary material to achieve this.

R1C6: 374: Unless there is some kind of character limit on the manuscript, the readability might be improved by using actual process terms rather than contractions. Tr and Re were defined but in a different section.

Response to R1C6: To aid with readability and maintain consistency, the authors will update the Tr and Re terms throughout the manuscript to only use the actual process terms.

R1C7: 66: Squared kilometres is not properly superscripted. This occurs irregularly throughout the manuscript.

Response to R1C7: Through the revision, the authors will check for proper sub- and superscripts and update accordingly.

R1C8: 81: Likely grammatical error, unsure what the subject of 'sought' is.



Response to R1C8: The authors will revise the wording to improve clarity.

R1C9: 207: Is there too many 'of' in the length description?

Response to R1C9: The authors will remove the erroneous extra words in the description.

R1C10: 236: Supplementary material referenced by letter, but the supplement is numbered. Not the only location this occurs.

Response to R1C10: The authors apologize for this confusion. The supplementary material lettering will be updated to numbers to be consistent with the appended supplementary material.

R1C11: Figure 1: There is no scale on the main map in (a)

Response to R1C11: The authors will add a scale to the main map of Figure 1a

---

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2020-539, 2020.