

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

Anonymous Referee #1

Received and published: 27 November 2020

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.

Specific comments

74-80: The research questions are clear enough but three fairly complex questions

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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.

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.

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

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.

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.

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.

Technical corrections:

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

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

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

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

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

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