

Hydrol. Earth Syst. Sci. Discuss., author comment AC1  
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## Reply on RC1

Michael Kilgour Stewart et al.

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Author comment on "Comment on "A comparison of catchment travel times and storage deduced from deuterium and tritium tracers using StorAge Selection functions" by Rodriguez et al. (2021)" by Michael Kilgour Stewart et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-146-AC1>, 2021

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Reply to Francesc Gallart (Reviewer #1, R1)

R1: My opinion is that the Stewart et al. "Comment" is opportune as it provides adequate and valuable scientific discussion following the commented article.

Authors: We thank Reviewer #1 for constructive evaluation of our work.

R1: Nevertheless, I had some questions while reading it, and therefore I suggest some small changes.

- The article by Rodriguez et al., (2021) does not claim a "general rejection of the truncation hypothesis" but it is true that a quick diagonal reading of that paper might give the reader this impression. The "Comment" should be more consistent with the actual content of the commented article.

Authors: We agree that we may have overstated the case here, and will clarify this statement. We were drawing attention to the fact that the Weierbach Catchment may not be the ideal catchment in which to test the truncation hypothesis.

R1: - The "Comment" makes sometimes a use of the TTD concept that, in my opinion, is confusing and MTT should be used instead in several instances. Strictly, the TTD term refers to the shape of the distribution, which cannot be obtained from a single tracer observation. Traditional use of single tracer dating needs the assumption of a given TTD (usually represented by a mixing model), so that a subsequent MTT can be estimated (Maloszewski and Zuber, 1982).

Authors: Agreed, we will revise our use of TTD and MTT.

-The caption and the corresponding text of Fig. 1 (incorrectly indicated as Fig. 1a) are not sufficiently clear. At least the text "The blue mixing curves show the variations in  $^3\text{H}$  with MTT expected for samples collected in 2020 and 2030." should be substituted by something like "The blue mixing curves show the variations in  $^3\text{H}$  expected for samples collected in 2020 and 2030, with the MTT represented by the year."

Authors: Agreed, we will revise this.

- The fact that the work by Visser et al. (2019) was conducted in the Southern Sierra Nevada should be stated closer to the beginning of its mention, to make easier the understanding of the differences between the tritium inputs there and in Trier.

Authors: Agreed.

- By the end of section 4, some short comment on the different roles of aggregation effects on TTDs when stable isotopes and tritium are used, based on Kirchner (2016) and Stewart et al. (2017), would be welcome.

Authors: Agreed, we will do this. Aggregation effects cause MTTs to be underestimated by both stable isotope and tritium measurements if the catchment is heterogeneous. The younger (of two components) has a disproportionate effect.

#### References

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Stewart, M. K., Morgenstern, U., Gusyev, M. A., and Maloszewski, P.: Aggregation effects on tritium-based mean transit times and young water fractions in spatially heterogeneous catchments and groundwater systems, *Hydrol. Earth Syst. Sci.*, 21, 4615–4627, <https://doi.org/10.5194/hess-21-4615-2017>, 2017.

Visser, A., Thaw, M., Deinhart, A., Bibby, R., Safeeq, M., Conklin, M., Esser, B., and Van der Velde, Y.: Cosmogenic Isotopes Unravel the Hydrochronology and Water Storage Dynamics of the Southern Sierra Critical Zone, *Water Resour. Res.*, 55, 1429– 1450, <https://doi.org/10.1029/2018WR023665>, 2019.