

Hydrol. Earth Syst. Sci. Discuss., referee comment RC1
<https://doi.org/10.5194/hess-2021-146-RC1>, 2021
© Author(s) 2021. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on hess-2021-146

Francesc Gallart (Referee)

Referee 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-RC1>, 2021

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

- 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).

-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 ^3H with MTT expected for samples collected in 2020 and 2030." should be substituted by something like "The blue mixing curves show the variations in ^3H expected for samples collected in 2020 and 2030, with the MTT represented by the year."

- 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.

- 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.

References

Małosiński, P. and Zuber, A.: Determining the turnover time of groundwater systems with the aid of environmental tracers: 1. Models and their applicability, *J. Hydrol.*, 57, 207–231, [https://doi.org/10.1016/0022-1694\(82\)90147-0](https://doi.org/10.1016/0022-1694(82)90147-0), 1982.

Stewart, M. K., Morgenstern, U., Gusyev, M. A., and Małosiński, 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., Deinhard, 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.