The new version of the manuscript entitled 'A comparison of catchment travel times and storage deduced from deuterium and tritium tracers using StorAge Selection functions' by Nicolas B, Rodriguez et al. clearly improves the quality of the previous version in several aspects.

From my point of view, this manuscript may be accepted for publication in HESS if minor changes are done for improving its clarity and scientific soundness.

Major comments:

- In the abstract it is resolutely claimed that deuterium and tritium provided similar aging of waters in Weierbach, but the time span of the results is not stated, so the reader may erroneously understand that this result is valid for any catchment with any MTT value. It is necessary to clearly state there that one of the conditions for this result is that "in catchments with limited residence times, radioactive decay may give information that is redundant with the natural variability of the tracer in precipitation" (line 481).

- line 142: the sentence "The model's ability to simulate stream ^{2}H dynamics helped to further confirm that these flow processes are active in the Weierbach" is not acceptable. "Model performances measure the correctness of estimates of hydrological variables generated by the model and not the structural adequacy of the model vis-à-vis the processes being modelled, i.e. the hydrological soundness of the model" (Klemes, 1986).

- Although my opinion is that input and output concentrations should be mass-proportional or -weighted to be processed in a mass balance model, I deem that the methods used in the paper may be acceptable if the way in which concentrations and masses are managed is fully explicit and the possible consequences of the methods used on the results is appropriately discussed.

Indeed, as precipitation samples for ^{2}H are taken at fixed precipitation intervals, the resulting concentrations yield the same result than a mass-weighting. But nothing is said about how the bi-weekly bulk samples (time-proportional) are managed and merged with the mass-proportional automatic samples. I do not mind if mass-proportional concentrations are interpolated to produce a 'continuous' signal because the mass is conserved. Furthermore, nothing is said about the ^{3}H sampling; were differences in monthly precipitation taken into account to weight input ^{3}H activities as usually done?. Therefore, were ^{2}H and ^{3}H concentrations managed in the same or in different ways (precipitation weighting for ^{2}H and time weighting for ^{3}H)?.

Respect to stream water sample concentrations, nothing is said in the manuscript but it should be clearly stated whether these were managed as unweighted discrete irregularly taken samples or were time- or flow-weighted. Furthermore, something about flow-weighting the available concentration samples should be included in the interesting discussion in lines 647-652 where the possible advantages of flow-proportional sampling are commented.

-line 562: "Our conclusions are valid because the model captures accurately the travel times in the Weierbach" is really an inappropriate statement. This seems to claim that the model is

hydrologically sound (in the sense of Klemes, 1986) because it reproduces well something that cannot be validated.

Minor comments:

- Line 295. I understand that model efficiency assessment and subsequently the efficiency thresholds for selection of behavioural models might be different for deuterium and tritium, but nothing is discussed afterwards on the possible role of this difference on some of the results obtained. For instance, more parameter sets are accepted as behavioural for tritium than for deuterium; this may be reasonable because sampling is much intensive for deuterium, so model rejection may be stricter for it, but some comment about this issue would be welcome.

- Line 432: As written, the reader may understand that Stewart et al (2010) found or reported travel time differences up to 5 years at Weierbach.

- line 440: "First, we treated ^{2}H and ^{3}H equally by calculating TTDs using a coherent mathematical framework for both tracers (i.e. same method and same functional form of TTD)" though sampling and model efficiency were differently managed (as discussed later).

- line 524: "Performance measures E_2 and E_3 are" not identical but are "both based on minimizing a sum of..."

Klemes, V. (1986) Operational testing of hydrological simulation models. Hydrological Sciences Journal, 31 (1), 13-24