

***Interactive comment on* “Transit times from rainfall to baseflow in headwater catchments estimated using tritium: the Ovens River, Australia” by I. Cartwright and U. Morgenstern**

Anonymous Referee #2

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In the submitted manuscript Cartwright and Morgenstern present an isotopic analysis (Tritium) of the headwaters of the Ovens River, Australia. Monitoring discharge and sampling the tritium activities of discharge at the headwaters and further downstream they are able to estimate mean transit times to range from 5 to 31 years. In addition, positive correlations are found when comparing tritium activities with the runoff coefficients and negative correlations when comparing them with Na and Cl concentrations. There were no significant differences of transit times for streams upper or lower down the Ovens River. Therefore, the authors conclude that the transit times are not dependent of the location and scale of the catchment but rather on the infiltration rates as

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indicated by the runoff coefficient. Furthermore, they conclude that NA and CI can be used as qualitative proxy to estimate transit times.

The data and results presented in this study are of high relevance for HESS readers. Generally, the manuscript is structured well and the analysis is well described. Except from some specific and technical comments that can be found in the attached commented pdf, there is one point of criticism that should be taken into account:

The section “sampling and analytical methods” thoroughly describes the sampling campaign and analysis. But a section describing the general approach, the choice of the particular methods to evaluate the results, and their application is missing. This makes the results and figures (e.g. the grey shading in Figs 4 and 8) difficult to understand and to evaluate for the review.

I strongly recommend collecting the method descriptions provided at various parts of the manuscript (introduction, results, discussion) in a separate methods section including a description of the workflow to elaborate why the methods were chosen and why in this particular order. I would be glad to review the paper again when this is done.

Please also note the supplement to this comment:

<http://www.hydrol-earth-syst-sci-discuss.net/12/C2597/2015/hessd-12-C2597-2015-supplement.pdf>

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