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Hydrology and Earth System Sciences Discussions

Interactive comment on "What can flux tracking teach us about water age distributions and their temporal dynamics?" *by* M. Hrachowitz et al.

Anonymous Referee #2

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General Comments: The manuscript deals with the analysis of tracer data to derive information about different age distributions related to catchment hydrological processes. It gives an excellent review not only about former and current research on flow path distributions, but also on different mixing model concepts including complete, static and dynamic partial mixing. Both parts are very helpful, especially to a reader that is not 100% familiar with the general topic presented. In the following the authors analyse 3 hydrological different catchments in Scotland, using 2 different mixing models and considering three different age distributions. While this makes absolute sense in principle, the consequence is a very extended section 4 that has been difficult to read and to follow. I would prefer seeing that paper to be split up into at least 2 papers, however I cannot make a good suggestion where to cut and would therefore also accept this

long version. A general question that occurred to me was the following: Authors state that they have applied an extensive Monte Carlo –type optimization approach using 5 measures of goodness of fit in order to come up with one suitable/feasible model version. To what extent would different (but almost equally good) (hydrological) model structures and parameters have an impact on the derived age distributions. This would be interesting to see in comparison to the variations produced "simply" by different mixing model, and would possibly strengthen the robustness of conclusions drawn. I know this step would even extend the paper, but might be an interesting topic for a split up version or future extensions.

Minor Comments p.11372, l1: should be ....DYNAMIT (DYNAmic MIxing Tank) p.11372, l24: what is this cursive i for p.11378, l12: I would argue that while wetting up the matric potential(!) is increasing (from very negative to less negative values) p.11379, l14-16: I am not sure what this sentence in that context means p11387, l21: Where is the third model (Dynamic Partial Mixing)? If not used, why is it introduced? p11394, l14: What is a median distributions? This is also not explained in the Figure caption.

So, in summary I would like to suggest the acceptance of the manuscript with only minor corrections as outlined above.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 11363, 2012.