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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Estimating groundwater recharge from groundwater levels using non-linear transfer function noise models and comparison to lysimeter data" *by* Raoul Collenteur et al.

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The manuscript entitled "Estimating groundwater recharge from groundwater levels using non-linear transfer function noise models and comparison to lysimeter data" presents an interesting contribution on time series modelling (TSM) for hydrological purposes. Time-series modeling is an elegant way to treat monitoring data without the complexity of physical mechanistic models, still underused by the hydrological community.

I think the study is relevant and should be interesting for HESS readers. I agree with the first reviewer, the article is well written, well structured, the English is easy to read

and understand and the figures have quality. I compliment the flowchart: I have asked the authors of the works which I am invited to review to include when it is missing. Dr. Schäffer's review made my job easier, as he has already pointed out most of the points that I also noted and I will not keep repeating his words, but rather praise his review. Dr. Schäffer pointed out that my opinion should be the point on which the authors should pay more attention, which is the valuation of the work. What is it for? What is the advantage? Should I dedicate myself digest Hipel and McLeod (1994) text book and jump into time series models or master the modflow manual? There are several advantages about time series modelling that can be highlighted, Dr. Bakker is experienced with the subject and a paragraph about it can be easily incorporated.

Specific comments: - Introduction: highlight the problem and the advantages of TSM. Just an example: Line 35: "In recent decades, the use of a specific type of TFN models using predefined response functions (von Asmuth et al., 2002) has gained popularity for the analysis of groundwater levels (Bakker and Schaars, 2019)". Bakker and Schaars (2019) mention it, but if you present more studies, worldwide, with references from Australia, Brazil, Europe (there is a lot of studies in international journals with those cases studies), the readers could be convinced easily that it is one of the paths to follow. I recommend do add more references. And paint the whole picture about it (at least the last 10 years). - Study site and field data: a map of the study is welcome. Lysimeters as well, unless they are commercial as sounds like. - Software: is that available at GitHub? Are you publishing the code? It would be great, consider it. Section 4: I did not like the small graph under the others at Figure 6, too polluted. Section 5: the text of the items are too small to be individual items, consider changing the numbers (5.1, 5.2. . .) by bullets. - Conclusion: too long, still with references, still sound loke discussion to me. Be mo direct to the point, staying just with the finds of your study and move back to the previous item the remaining text. - Appendix: I don't think the whole appendix is needed. The formulas and the test is described in the literature, just plots and tables are fine.

I would like to thank you the opportunity to comments on this paper, it was my first public discussion review and I think it is a very exiting procedure. I hope I had contributed to improve the paper in a constructive way and wish good lucky to the authors, reviews and editors in their carriers.

Best wishes,

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