18.01.2023

"Dear Authors,

The reviewers are now happy that our considerably revised manuscript addresses many of the concern they have and both suggest we should move (with some minor corrections) to the publication stage. Thank you for your time on developing the manuscript and answering comprehensively the reviewers main points. I have just noted that I will review the final revised manuscript just to help check for any small changes required (if any). Congratulations for your paper... best wishes, Jim"

Dear editor,

We are very pleased that the reviewers evaluated the revised version of our manuscript so positively. We implemented the changes as requested by referee #2. Below you find our point-by-point response (also see the track-changes version of the manuscript enclosed to this resubmission).

Thanks again for your patience and kind regards,

Andreas Hartmann on behalf of all co-authors

The referees' comments are provided in *ITALIC*, our response in regular style.

Comments of Referee #1

The authors thoroughly revised the manuscript with more explanations on the model calibration procedure and how inclusion of tracer data helped to constrain model parameters and simulations. They now present and explain the tracer data used as end members to calculate % source contributions to streamflow, which was an additional criterion to select or reject model simulations. The latter was substantiated by additional performance criteria to assess different aspects of the simulated hydrographs, such as high flow and low flow performance, which was important for context in the case of the 2014 study year. Therefore, I am pleased to recommend publication of this paper!

We thank Christian Birkel for his very favourable review of the revised manuscript and for his constructive and thoughtful comments on the previous manuscript version.

Comments of Referee #2

The authors thoroughly revised their manuscript and provided detailed responses to the comments by both reviewers. In particular, adding section 2.4 has been very helpful in understanding the geochemistry and context of the catchment. In my opinion, the manuscript can be accepted after some very minor edits.

We thank the referee for their positive evaluation.

The authors use the term "streamflow contributions" throughout the manuscript. It may not be clear that this refers to "contribution of water originating from different sources such as direct runoff from precipitation, subsurface stormflow or groundwater to total streamflow at variable flow conditions", so I wonder if this should be made clearer in the introduction.

We thank the referee for this suggestion and rephrased some sentences in the introduction (p. 3, L 3-4; p. 3, L 26-33 in the revised version of the manuscript).

More importantly, I am at a loss as to the meaning of the "observed streamflow contribution" (first mentioned in line 8 on page 5). How is this determined? Is this based on the tracer data? If so, this should be specified.

We agree that this may have been misleading and have replaced this expression by "experimentally derived contributions to streamflow" throughout the manuscript.

Figures: in most of the new figures, the different data are indistinguishable in a greyscale printout. This is particularly the case for the end member markers in Figure 5, and the timeseries in Figures 4 and 6. These could probably be improved easily without much effort by using different symbols.

Symbols were adjusted and symbol size and font size increased to improve the clarity of the figures.

Page 9, lines 12-14: "based on EC values,…, streamflow was primarily composed of groundwater". I think this reasoning may be correct, but requires some more explanation.

We rephrased the sentence to "Based on EC values and Mg concentrations in the stream (Figure 4) and also general streamwater chemistry, we concluded that from DOY 160 to DOY 187, i.e. also during the wet-up period, streamflow was primarily composed of groundwater" to clarify that this statement was based on our observations of streamwater chemistry (EC and Mg as presented in the manuscript and additionally also other tracer concentrations that were analyzed but not presented in this manuscript).

Page 14, line 7: I think this should be 10% rather than 20%

Thank you for spotting this, it was meant to be "10%". We corrected this in the revised version.

Page 14, lines 6 & 11: "deviation compared to the hydrograph separation" Meaning unclear, do you mean "deviation FROM the hydrograph separation"?

The sentence was rephrased accordingly.

Page 14, line 8-10: The sentence structure appears to be tangled.

We rephrased the sentence to "Since reliable hydrograph separation results are only available for the 2013 monsoon season, we use this year for model calibration, whereas the monsoon season of 2014, for which only discharge observations are available, was used for the validation of the model."