Hydrology and
Earth System
Sciences

Discussions

Interactive comment on "Replication of ecologically relevant hydrological indicators following a covariance approach to hydrological model parameterisation" *by* Annie Visser et al.

Anonymous Referee #2

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This manuscript presents a modified approach after Vogel and Sankarasubramanian's covariance approach and extend the scope from a single-variable problem to a multiple-variable problem. The authors found that the approach can reduce model uncertainty and also time consumption. Overall, I think this is a great idea and the proposed approach and the results are a valuable contribution to the hydrological community. I recommend its publication after the following comments are addressed.

General comments:

1. The work is very site-specific and model-specific, which needs to be tackled or at least acknowledged.

2. Research Question 1 is addressed in the manuscript with direct, quantitative analysis but Questions 2 3 are not. My recommendation to the authors is to (1) provide more in-depth analysis for these two questions or (2) modify their research questions in Introduction. I feel that Question 1 can be listed as the single research question of this work, whereas your questions 2 and 3 can be raised in the Discussion section.

3. I think it helps the readers a lot if the authors can provide some clarification on how the 54 years of data were used in their approach. Was there any split? If so, which part is used as calibration and which part for validation? Why were HIs calculated for each year?

4. There can be some relocation of the figures and tables. For example, I think Figure 2 and Table 1 can be moved to Appendix or Supporting Information, since the hydrological model is already published and it is not the goal of this work to investigate the model itself. To the contrary, some of the Appendix information is critical and should be placed in the main text, e.g., Figure A1, A2, Table B1.

Specific comments:

5. P1L9: Does Vogel and Sankarasubramanian's covariance approach need a citation in the abstract? At least the journal and year of that publication should be provided.

6. P1 Introduction: The first two paragraphs can be largely shortened. Some of the details are well known and may not be necessary.

7. P2L30: Can you be more specific on "many of these problems"?

8. P3L29: By definition, Q90 should be larger than Q10. So Q95 below should be Q5.

9. P5: The "IT approach" might be presented with more details.

10. P6: Figure 3 may be modified by highlighting the boxes or flows that represent your new approach, as compared with the original 2003 approach.

11. P6L16: Check for consistency in the tense of verbs.

12. P6L18: Fix "the of the"

13. P7: Figure 4, A dashed horizonal line at 0.0 may be added.

14. P8: Table 3, it is not readily clear to me what "p>0.05" represents.

15. P9: Some of the context in the Results section should belong to Methods, e.g., the description of HAF.

16. P9L21: "précised"?

17. P11: Note the error "increas" in Figure 8 caption.

18. P11: The first three subsections of Section may contain a bracket noting the correspondence to the Research Questions. 19. P19: Note the error in Table B2 caption.