

Interactive comment on “Hierarchical Sensitivity Analysis for Large-scale Process-based Hydrological Modeling with Application in an Amazonian Watershed” by Haifan Liu et al.

Anonymous Referee #1

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General comments: 1. The authors did a lot of work, but I think the writing needs a great improvement to highlight their work. The current writing reads more like a report rather than a scientific paper. The scientific motivation is not very clear to me. 2. The authors said the aim of this work is to provide a pilot example of comprehensive global sensitivity analysis for large-scale PBHMs, then what lessons can the audience learn from this pilot example? Please provide a detailed discussion. 3. In the introduction, please highlight the objective, contribution and novelty of this work, and justify its significance. 4. I think the authors need pay more attention to the writing. The logic is not very clear and sometimes the conclusive sentences pop out without justification. Specific comments: 1. The grammar of the title is not right. 2. I think the abstract

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needs to be rewritten. Right now, it reads like a report instead of a scientific paper. I did not see a scientific motivation but a description of what the authors did. 3. I think the logic of the introduction needs an improvement. 4. Line 47-50, I found this last sentence is confusing. SA “becomes” important? Limited resources? 5. Line 59, this sentence is confusing. “Using” large-scale PBHMs? Why the computational cost is high? 6. Please justify why the authors chose the PAWS model as the pilot example. 7. It seems that the authors have some methodology development on the basis of their previous work. Please highlight these contributions and novelty, and justify that this new development is necessary for the complex and large-scale model sensitivity analysis. 8. Line 221, why 600 samples? 9. Line 223-224, in what sense the LHS greatly reduces the required sample size compared to MC sampling? To achieve the same estimation accuracy? Please provide evidence or reference. 10. Line 265, when does the binning method not work? Please comment. 11. Line 410, how do the authors justify the results accuracy? 12. Line 417-419, the sentence is confusion. 13. Line 419-420, the sentence comes out of nowhere. 14. Line 430, “all” is a strong work, be careful of using it. 15. Line 434, the method can largely reduce the computational cost associated with complex, large-scale hydrological models. From which aspects to reduce the cost? Does it reduce the forward simulation time? Please be specific here. 16. The words in Figure 2 are hard to read.

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