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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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The topic of the paper is of potential interest for HESS readers. However, I found the paper confused regarding both the exposition of the study and the methodological framework. I suggest a complete revision of the presentation. Some specific comments are as follows: 1) Uncertainties includes climate scenarios (external source), the model itself and some of its parameters. However, considering 2 alternatives for the model and climate scenario does not mean that these are uncertain. Are these alternatives associated with different probabilities? It seems that when the model and climate scenario are fixed uncertainty reduces to parametric uncertainty. I think the authors should explain better how the proposed approach is able to really cover all the sources of uncertainty. 2) To me, uncertainty in climate scenarios should be linked to

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uncertainty in climate variables, that should be treated as random variables or random fields. Here, it seems that climate time series are only used to establish two deterministic scenarios. I don't think this is a remarkable innovation for the research in this field. 3) I'm not sure that analysis of variance is the right tool to tackle modeling uncertainty. One could combine GSA with e.g. model discrimination criteria to effectively understand the diverse performance of different models. 4) The discussion of the results is very weak and does not help understanding the physical findings that the study brings.

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