Interactive
Comment

Interactive comment on "Assessing parameter importance of the Common Land Model based on qualitative and quantitative sensitivity analysis" *by* J. D. Li et al.

Anonymous Referee #2

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General comments

This study aims at evaluating five sensitivity analysis methods on a complex land surface model applied on a basin in China.

The article is well presented and easy to follow. I think it could make a valuable contribution to HESS. However, the authors could improve the presentation of existing studies that compared sensitivity analysis methods and better discuss to which extent their results corroborate previous findings. Minor revision is requested.

Detailed comments

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1. Introduction: I think the article could better review the existing studies that compared sensitivity analysis methods in the case of complex models, in environmental fields or others. Indeed, the authors only mention a few comparisons, but there are many other existing ones (Patil and Frey, 2004; Ravalico et al., 2005; Pappenberger et al., 2008; Confalonieri et al., 2010; Massmann and Holzmann, 2012; Neumann, 2012; Sun et al., 2012, to name but a few). Which insights are provided by these previous comparisons on the relative merits of sensitivity analysis methods? Are some of them more reliable than others? Are results from these previous comparisons all in agreement? This discussion could provide a more general state-of-the-art on performance of sensitivity analysis methods. The studies analysed could be presented in a table to give a better overview of these past comparisons (reference, tested methods, target model, number of parameters, target variables, case study, main conclusions, etc.).

2. Methods: The presentation of methods is interesting but it may be interesting to shortly discuss the existing applications of each of them to complex models (see e.g. Nossent et al., 2011; Zhang et al., 2013, for the Sobol's method). This could give some information of the known applicability/performance of these methods to such complex models.

3. Page 2254, Line 3: Give basin size.

4. Conclusion: The authors could better discuss to which extent their own results corroborate or contradict the results of previous comparisons of sensitivity analysis methods. If there are differences, how can they be interpreted? This could also help better discussing the generality of the conclusions provided here (would the relative merits of the tested methods be the same if another model had been used? If another case study area had been selected?)

5. Table 1: I did not understand the definition of P7. Why mentioning "between 0 and 1" for P13 whereas the range is specified in the last column.

6. Table 1: An extra column could be added in the table to mention the category

(canopy, soil, snow, as mentioned in the text, page 2253, line 7) to which each parameter pertains.

7. Tables 3 and 4 could be merged.

8. Table 5: What deltaz refers to in the caption?

9. Page 2245, Line 22: "Saltelli et"

10. Page 2245, Line 23: "relatively" (?)

11. Page 2251, Line 23: "response"

Cited references

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