Authors Response to Interactive comments on **"Shallow water table effects on water, sediment and pesticide transport in vegetative filter strips: Part B. model coupling, application, factor importance and uncertainty" by C. Lauvernet an*d* R. Muñoz-Carpena et al.**

RC1- M Vanclooster (Referee)

Thank you very much for the careful review and edits to the initial submission. Below we address the comments raised on the initial submission and we have also revised the manuscript accordingly to accommodate these. Please note that we uploaded the revised manuscript as a supplement to these response comments. [RC1-#: Reviewer 1 comment #; AR-#: Authors response to comment #).

RC1-1: […]The paper enters in the scope of HESS, is well written and it follows a logical approach. It is therefore a significant contribution to hydrological science.

Yet, the added value of 2 sensitivity analysis approaches is not clear. Authors implement the Morris and eFast approaches that clearly are consistent and coherent. There seems to be little added value of implementing 2 sensitivity analysis approaches. The paper therefore loose some focus by complicating this analysis. It could be suggested to eliminate the Morris analysis which does not add new information as compared to the eFast analysis.

AR-1: Yes, our rationale when including both GSA approaches was to ensure the robustness of the results. Admittedly, under common conditions, both types of analysis provide comparable results. However, methods have not been compared often in studies with complex environmental models where non-linearities can be high, although doing this allows for testing the robustness of the sensitivity indices (Pianosi et al. 2016). We should not ignore that initially Morris is a "qualitative" method since it is based on a sparse sampling (in our case with r=10 and k=18 (no WT) and 20 (with WT), N=r(k+1) =190 and 210 samples for each scenario) that could lead to inaccurate results when the model is highly non-linear or discontinuous in some region of the input factor space, compared to variance-decomposition methods like eFAST based on dense sampling (M=497, N=Mk=8946 and 9940). To increase the reliability of Morris, improved sampling techniques have been developed (e.g. Khare, Muñoz-Carpena et al., 2015) that intend to increase the robustness of the method and approximate more quantitative, comparable to those of variance methods results. This opens important opportunities for application to large models where only Morris might be feasible (e.g. see Srivastava, Graham, Muñoz-Carpena et al., 2014). In addition, we believe that the Morris plots provide an intuitive and clear way to assess the importance of the input factors and their interactions. On the other hand, the dense variance-based sampling allows for a follow up quantitative uncertainty analysis. Thus, the inclusion of the two methods in this work and the results obtained further corroborates the Morris efficiency for complex models and confirms the sensitivity of the input factors of the model.

In spite of this rationale, we agree that the inclusion of both methods shifts the main focus away from the main objective of the paper related to analysis of WT effects in the coupled processes that occur in a vegetative filter strip. We now focus on the Morris in the revised manuscript and moved the eFAST figure to Supplementary Materials. For the interested reader, we leave a brief comment in the GSA results section (with reference to Supp. Mat.) on the robustness and insights that eFAST results lend to the work.

RC1-2: Further, the manuscript suffers from some editorals that should be considered in a minor revision of the manuscript before it can be accepted for publication.

AR-2: We revised the manuscript to include all the suggested editorial comments.

References

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