

Answer to R1

I reviewed the manuscript by Sivelles et al. In this manuscript, the authors present the improvement of a karst modelling platform and show an application on two case studies in France. While this work could have potential for advancing karst modelling knowledge, I found that as is, the manuscript suffers from flaws that limit the understanding and the appropriation by readers.

Namely, I would like to mention:

- The manuscript structure
- The choice of the HESS journal and of submitting this manuscript in the Research article category
- The lack of comparison between the model structure and results, and a previous version, to show the “Improvement of the KarstMod modeling platform for a better assessment of karst groundwater resources », as we could expect from the manuscript title.

Altogether, this makes me think that there is a need for making choices, possibly conjointly with the journal editor:

- Should this manuscript remain a Research article in HESS? In that case, we need clear research questions, a thorough comparison of the “new” model against the “old” one.
- Should this manuscript be limited to a modeling platform presentation? In that case, the article could be submitted to GMD instead, and some of the platform features be further presented.

I cannot make that choice for the authors and I will not recommend any of these two choices, as I think that the authors (providing some further work) can reach both objectives.

Thanks a lot for this relevant comment/remark. Indeed, the manuscript was submitted as “research paper” while it is more suited for a “Technical note”. This paper is more relevant in HESS due to the large audience of this journal in the hydrology community. We are therefore favorable to a reclassification of the submitted manuscript as a “Technical note”.

I attach to this general review an annotated pdf version of the manuscript with “on-the-fly” comments. This pdf contains both general comments, whose main points I summarised here, but also some more specific questions or suggestions.

Thanks a lot for these comments that help us to improve the overall presentation of the manuscript. Most of the minor comments have been directly modified in the text. Additionally, some responses to more specific remarks are given here.

Line 92 : That is very unclear to me. I tend to understand that with the snow routine, the melt is calculated, and this is what the authors call P_{sr} . In my opinion P_{sr} does not replace observed P , but is a (delayed) part of P , the one that falls as snow and then is melted. Therefore, I do not understand the distinction the authors make in sentence 1.

P_{sr} is the output for the “Snow routine” and corresponds to the reconstruction of P and the delayed part of P (denoted P_{sr}^* , linked to snow processes). As described in the appendix, “ P_{sr}^* (liquid water leaving the routine) is estimated for each time step t based on the precipitation P and air temperature T time series for each sub-catchment. The total snow routine output P_{sr} is calculated as a weighted sum of P_{sr}^* time series.”

Line 160: The Pearson correlation is present in KGE, KGE and KGENP are very similar, KGE and NSE have strong common points in their formulation. I therefore recommend not to allow any combination of them.

The combination concerns objective function (NSE, KGE or other), variables (Q_s , Q_{loss} or Piezo), and transformation in the sense of $NSE(\sqrt{Q})$ as an example. KarstMod is made as flexible a tool, the user is free to try any combination even if, of course some are not relevant. In the manuscript, the reader is invited to refer to the literature to set up the suitable objective function for his modeling purpose.

Line 264: I thought you use a kind of Oudin formulation in this work.

The PET routine allows to compute an estimation of the PET based on the Oudin's formula, if the user provides a temperature time series. Nonetheless, as given in the "PET routine" section, the user is free to use any another PET provided elsewhere. Then, depending on the case study the user can use another PET estimation or can take advantage of the direct implementation of the Oudin formula by providing a temperature time series.

Figure3: Observed or simulated? I guess these are observed streamflows, but it is never mention why these are plotted here and whether they are used in any way in the model (which we could expect).

Information about these streamflows are given in the manuscript: "*The Touvre karst system is a karst system where the infiltration consists of (i) a delayed infiltration of effective rainfall on karstic recharge area and (ii) a direct infiltration of surface water from the Tardoire, Bandiat, and Bonnieure rivers. The latter are surface stream flows within metamorphic rocks that partly infiltrate to subterranean at the contact with sedimentary formations, mainly composed of Middle to Upper Jurassic limestones.*" The caption is modified to specify that here are observed streamflows.

Answer to R2

Line 12: as stated by White (1999) that "a karst aquifer is a triple porosity medium, consisting of the rock matrix (intergranular porosity), the fractures and bedding planes and the karstic conduits" (Gondwe, 2011, p. 25)

We also include the reference from White 1999.

Line 25: karst in a coastal or island geographic context where these contaminants in addition to salts are of significant concern. Is the concept of density difference flow regimes considered in this research/application of KarstMod?

KarstMod do not include any feature related to the concept of density difference. KarstMod has not yet been applied in context with potential salt intrusion. Therefore, costal or island geographic context are not mentioned in the text to avoid any confusion for the reader.

Figure 1: Figure 1 is not fully described in the caption? a,b,c & d?

We added some descriptions in the caption for figure 1.

Line 131: Ref?

We provided additional references.

Line 135: redundant from previous page....

We removed the redundant part in the manuscript.

Line 141: move Figure 2 up in text to page 6

We provided an additional figure with the complete KarstMod environment for the reference to the various options such that it appears clearer to the reader.

Line 175: are these tools described below, line 185? If so, insert a heading and ref in text....

The tools for model evaluation are presented in the complete section “3.3. Model evaluation”. We added the figure 1 to show the complete KarstMod software. The text now includes reference to this figure to indicate where the corresponding tools can be found.

Figure 4: scale for PET

Figure has been modified accordingly.

Figure 7: scale for PET

Figure has been modified accordingly.

Figure 8: legend + ref in the text

Legend has been changed.