

Reviewer #1 (Naomi Mazzilli)

This study examines the information content of water quality data for a karst simulation model. The Varkarst model is applied to a Spanish watershed. An initial 500,000 random parameters set is confined using discharge and water quality data which are either taken separately or together, using the whole time series or focusing on specific flow stages. The reduction in the 25th to 75th percentiles range is used to estimate the information content of the data.

The methodology is clear, the results are commented with adequate references to related works, the illustrations are sufficient and informative. In my opinion, the manuscript deserves to be published after minor revisions.

Our response: We thank Dr Mazzilli for her positive and valuable review.

General comments

- *The model equations are detailed in annex but for more clarity some information about the solute model should appear in Section 3. The lack of NO₃-specific parameter is surprising and should be commented.*

Our response: The model description and an elaboration of the NO₃ dynamics will be improved in the revised version of the manuscript.

- *Parameter kE seems insensitive. Is this related to some specificity of the flow processes on the test site?*

Our response: The parameter KE often interacts with the parameter VE . A discussion of the consequences of this interaction will be added to the revised manuscript.

- *The KGE is nicely defined as a combination of linear correlation and the ratios of the mean and standard deviations of the simulations and observations. Have you had a look at whether the parameters have more influence on r , α or β ?*

Our response: This is a very interesting remark. An analysis of the influence of r , α and β was partially done in Hartmann *et al.* (2013). In the case of this study, we omitted the analysis of the individual components of the KGE as we already considered three different variables (discharge, NO₃ and SO₄) and we did not want to confuse the reader by adding more dimensions to this evaluation (also we believe that the results we get is sufficient to make our point). However, we agree that now having quantified the information content of the different data types, a follow up study should analyse in more detail how the model performs for r , α and β individually.

Technical comments

Our response: All technical comments will be applied.

- *p 5 | 14 "wtaer"*

- *p 7 | 16 "the fore" instead of "therefore"*

- *p 10 | 14 "the unsaturated state ($VE Kc$)" should be corrected in ""the saturated state ($VE Kc$)"*

- p12 l 10 *"is provide"*
- p 12 caption of Figure 6: *"the he 25th"*
- p 15 l 26 *something is missing in the sentence "discharge thresholds from wich different compartments (...) of the behaviour"*