Dear Editor,

Thank you for the instructions given to improve the quality of the manuscript. In addition to the previous changes in the manuscript, which we made based on previously submitted reviews, we also made new changes that were motivated by your last review of the manuscript. Therefore, we took into account the uncertainty in the precipitation data and examined their influence on the model calibration procedure (sensitivity analysis). For this purpose, we needed a little more time because we had to implement certain adaptations in the code and performed an additional 200 different model calibrations (we needed parallel programming to make this possible). Accordantly, the results of the calibration functions are now presented using box diagrams (statistical distribution of function values for each point of the domain). As the reviewers correctly predicted, it turned out that the uncertainty in precipitation is significant for the outcome of the calibration. At the same time, it is interesting to note that the significance of the uncertainty of the input data varies for individual segments of the domain of these functions, so the spread of possible values of the calibration functions is greater in some parts and less in some other parts of their domains (as shown in new figures). With these last adaptations in the code, the calibration procedure of the model became even more demanding computationally and more complex to implement in a computer code, but it made possible to identified the areas of relative water level differences that require additional in-situ research so that new conditions for the optimization of unknown functions could be imposed in calibration procedures. In any case, we think that we have shown that the application of the PSO method is very applicable for lumped semi-distributed karst models and we have systematically presented the calibration procedure of a very demanding karst system. We hope that with these last corrections, we have reached the criteria for publication.

As requested, we have also elaborated the innovative contribution of the study. For this purpose, it should be noted that lake Vrana has not yet been modeled in this way, mainly because the model in question (defined by a nonlinear system of ODE) was demanding to calibrate. With this paper, we wanted to show the results of exhaustive modeling activities that made it possible to model this karst area successfully (judging by the model calibration i.e. judging by the comparison of the modeled and measured water level in the lake over a time span of 6 years with a time increment of 1 hour). Moreover, this model is also useful for defining an adequate solution for lake protection (which is also commented on in the paper). By reviewing other available papers, we did not come across the same or similar application of the PSO method for the purpose of calibrating unknown functions used in lumped semi-distributed karst models. On the other hand, by taking into account the influence of uncertainty in the input data, we have integrated a complete calibration approach that can be applied in an analogous way for other karst systems described by systems of nonlinear differential equations. As we stated in the manuscript, the significance of this approach can be recognized by comparing calibration attempts of similar models with other calibration methods. Namely, the complexity of the model in this case requires a simultaneous global and local search of the search space of all possible solutions, for which the PSO method proved to be successful.

Finally, we would like to note that the manuscript has been significantly enriched in the text and in the bibliography, and I would also like to state that we have corrected other minor mistakes that we missed in the previous version of the manuscript. Parts of the manuscript that have been modified are marked with colored text (red and blue text) as indicated in the previous round of review (each color for one reviewer).

We are at your disposal for any additional questions.

Best regards,
Authors.