

Comment on hess-2022-253

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Community comment on "Estimation of hydraulic conductivity functions in karst regions by particle swarm optimization with application to Lake Vrana, Croatia" by Vanja Travaš et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2022-253-CC1>, 2022

This paper presents an iterative method based on the application of particle swarm optimization for estimating the hydraulic conductivity functions associated with the semi-distributed lumped karst model in lake Vrana, Croatia. In my opinion, the topics of this paper might be of interest to the readers of this journal, but it cannot be considered acceptable for publication in its current state. I suggest that the authors consider a major revision of their work along the following comments.

1. An important concern is that the paper does not appear to be significantly innovative, but demonstrates a complex exercise that applies some approaches well established in the literature. The novelty of this paper should be reinforced to illustrate the scientific and academic findings in the study.
2. Another major concern relates to the estimate of the hydraulic conductivity functions of the karst aquifer. Although the mathematical model for simulating the exchange of fresh water and salt water is generally well calibrated, the uncertainty associated with precipitation recharge should be considered in model calibration. I strongly recommend authors investigate the sensitivity analysis regarding the inflow from precipitation recharge within the lake watershed.
3. Fig. 7 should be explained in detail. Nowhere can be found the description of groundwater level in the domain of interest.
4. If there are some measurement data of water salinity over time available, it's better to consider the mass exchange of salinity between fresh water in karst aquifer and salt water in lake/sea coupled in the conceptual model.
5. Some specific typos are below:
 - (1) Line 53, salt water instruction --> salt water intrusion
 - (2) Line 75, can by used to --> can be used to
 - (3) Line 312, is consider as --> is considered as