

Interactive comment on “Stream flow simulation and verification in ungauged zones by coupling hydrological and hydrodynamic models: a case study of the Poyang Lake ungauged zone” by Ling Zhang et al.

Anonymous Referee #2

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This manuscript coupled the hydrological (i.e., SWAT) and hydrodynamic model (i.e., Delft3D) models to verify the simulation of ungauged streamflow taking the Poyang Lake as a case study. The streamflow simulation for ungauged zone is a hot topic in hydrology and the coupling of hydrological model and hydrodynamic modeling is interesting. However, the writing is very poor. Most of sentences are too awkward to be understood even though the grammar of the sentence is correct. After reading the whole of methodology, I could not proceed with the rest of the manuscript, not only because of the poor English writing but also because of the confusing, conflict, and unclear technical details. Based on my understanding, the methods in this study

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should be very clear: authors firstly simulated the streamflow of inlets for Poyang Lake using SWAT model; the parameters were calibrated using the observed streamflow from gauges located in the upper streams; then, the simulated streamflow were used as the inflows for hydrodynamic model to simulate the water level and other hydrodynamic characteristics of Poyang Lake; finally, modeled water level and discharge in outlet (Hukou) with and without SWAT simulated inflows were compared. If my understanding is correct, I don't understand why authors used more than five pages to describe this simple procedure and the procedure hasn't been clarified ultimately. For example, I didn't see any coupling of hydrological and hydrodynamic models in sections 3.3 but a lot of confusing water balance equations (i.e., Equation (2-4)), especially for equation (3). Where is the water level change (i.e., surface water storage) in equation (3)? If the water level change is too small to be negligible authors may need to verify it and clarify it in the manuscript. In my opinion, all the Equation (2-4) can be written in one if considering the Poyang Lake as the control volume:

$$QH_{\text{Hukou}} = P + Q_{\text{inflows}} - E - \Delta SWS_{\text{simulated}}$$

where QH_{Hukou} is the discharge in the outlet of Poyang lake; P is the precipitating in Poyang Lake; Q_{inflows} is the summation of the streamflow in all inlets of Poyang Lake; E is the evaporation in Poyang Lake; $\Delta SWS_{\text{simulated}}$ is the water level changes in Poyang Lake. Given the authors' methodology is correct, I have another two concerns: has the hydrodynamic model been calibrated? If yes, the bias and error of the simulated ungauged streamflow can be corrected during the calibration of hydrodynamic model which means the verification of simulated streamflow in ungauged zone may be spurious; the other concern is I don't think it's necessary to use SWAT simulation as the results shown in figure 4 since the discrepancy of two scenarios with and without SWAT is relatively small which may be smaller than the uncertainties in SWAT simulations as shown in Figure 3.

In my opinion, there are serious technical problems with this work. Hence, the results section is likely to be flawed. For this reasons, I couldn't proceed further in the

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manuscript as I consider the manuscript unsuitable for publication in HESS, at least, in the current version. My specific comments have been listed below:

1. Line 15: Is the water covered area of the ungauged zone the Poyang Lake? If yes, please revise or it is very confusing.
2. Line 18: how do you conclude “narrower discrepancy”? Please provide some quantification. The same for Line 23 “higher value”
3. Line 29-30: Please rewrite this sentence.
4. Line 40: Please delete the second “stream flow”.
5. Line 51-52: Please revise this sentence. Awkward.
6. Line 60: Where is the citation for Ma’s study?
7. Line 124: Please provide the spatial resolution for DEM.
8. Line 131: Please provide some examples about the topographic data.
9. Line 134-135: Please provide the temporal scales for water level and discharge.
10. Line 142: What does “sing” mean here?
11. Line 163: Where is the water level change (i.e., surface water storage change) in equation (1) and (3)? If the water level change can be negligible please verify it and clarify it.
12. I didn’t read the Result section word by word please carefully read it and revise it based on the revised methodology.
13. Line 440: Please delete Table 3.
14. Line 444: Please switch the Figure 1a and 1b; put figure 1a in left hand side; delete the “Meteorological stations” in legend of Figure 1b since there is no meteorological station; add the scale bar in Figure 1b.
15. Line 450: Figure 2 is confusing, and please revise it.
16. Please provide the line number for figure 3 and also the captions for the subfigures.
17. Based on the figure 4, I don’t think it’s necessary to use SWAT simulation. The discrepancy of two scenarios is relatively small which may be smaller than the uncertainties in SWAT model as shown in Figure 3.
18. Please delete the figures 5-7.

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