



EGUsphere, referee comment RC2
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Comment on egusphere-2022-1103

Anonymous Referee #2

Referee comment on "Can the combining of wetlands with reservoir operation largely reduce the risk of future flood and droughts?" by Yanfeng Wu et al., EGU sphere, <https://doi.org/10.5194/egusphere-2022-1103-RC2>, 2022

The authors developed a method for integrating wetlands and reservoirs into a semi-spatially explicit modeling framework (PHYSITEL/HYDROTEL) to project the magnitude, duration, and frequency of future floods and droughts in a northeast China river basin.

This is a straightforward paper that will be a great contribution toward our scientific understanding of how wetlands and reservoirs mediate droughts and floods, as part of the push for nature-based solutions. It also emphasizes the importance of integrating wetland and reservoir hydrological processes into watershed-scale models for large river basins.

Two main points for the authors to consider:

- The authors need to recheck the results text and compare that to their figures. The statements in the text often do not correspond to the figures – particularly those discussion future flood risks. Please see my specific comments below. Also, some figures (e.g., Figure 6) are not labeled, which makes it difficult to following along with some of the results.
- The paper is generally well-written, but please re-review it for grammatical errors. I made a few specific suggestions below, but there are several others throughout.

I also have some general suggestions, including:

Line 43 – Delete "In the future" to make verb tenses correct.

Line 46 – Move “disaster-related” to before the word “loss”.

Line 107 – Change to “included”, not “including”.

Lines 107-112 – Not 100% following this statement: As I read it, it states that integrating wetland and reservoir hydrological processes in the calibration process increases model error and uncertainties but that integrating wetlands and reservoirs (without processes?) minimizes uncertainties and improved model performance? The studies cited *do* integrate some hydrological processes of wetlands and reservoirs, and overall these statements do not seem to align. Could you please clarify this statement?

Figure 1. The caption says the figure shows elevation, isolated wetlands, riparian wetlands, their drainage areas, and land-use types. Out of these listed, I only see lumped “wetlands” and nothing else in the figure legend indicating the other listed characteristics of the watershed. Please amend the figure or the caption.

Lines 240-241: Are only the pixels adjacent to the hydrographic network considered riparian and all others are isolated? Please include that information here. Also, in the subsequent lines, you may want to define for the reader what the HEW concept is and to specifically mention the “lumped” nature of HEWs. Just a few extra words are needed here for clarity.

Lines 256-261: Within the RHHU, isolated wetlands cannot hydrologically connect to RWs, correct, because of spatial lumping? May be worth mentioning here.

Lines 301-302: What did you do with the data once overlaid? Did the 2015 wetland distribution maps trump the land-use/land-cover data (meaning did you use that instead)? Please mention here how the wetlands were represented once the overlay with the lu-lc data happened.

Lines 320-322: So to be clear, you have two calibrated models: one with wetlands and one without? I read later (lines 367-369) that the wetland- and reservoir-integrated model is used for future flow projections. I would mention that here, too, since it’s not clear here why there were two model calibrations.

Line 340: Had you considered using a behavioral parameter set so that output uncertainty bounds could be produced?

Line 349: Why use the NSE here when in lines 340-342 you argued against it? Please add the rational here.

Line 351: Add "be" in front of unreliable.

Line 498: Replace "Specially" with "In fact".

Line 565: Add "and" in front of "increase"

Paragraph starting on 559 – It would be helpful to point to the exact figure (e.g., Figure 4b or Figure 5d) when describing results so that the reader can follow along closely with the text. It will also help to correct some of the errors listed below.

Lines 566-568: The near-future flood volumes appear to remain the same for the near future SP126 and SP370 pathways in Figure 4g and do not decrease in Figure 5c = the statement and figures do not seem to correspond. Also, what does varying contrarily mean? Check these statements and please clarify. Similarly...

Lines 568-569: Flashiness does **not** appear to follow the trends stated in the text, compared to Figure 5d. Flashiness also doesn't increase substantially for SSP370, as stated in the text, in the near future. It decreases in Figure 5d. Also, near-century needs to be changed to near future on Line 569.

Check sentence on line 571-572 – "...flashiness will experience a considerable increase of flashiness..."???

Figure 6: The SSPs are not labeled (I **think** the columns represent SSPs?), so it's difficult to interpret Figure 6. Please re-do the figure with labels and check/re-write, if necessary, the paragraph from 584-596 and the one from 603-612 to correspond with Figure 6.

Lined 615: Add "d" to increase.

Line 619: Delete "y" from clearly and add "be" in front of equivalent.

Line 625: Change "shorting" to "shortening".

Line 627: capitalize SSP in ssp126.

Figure 9: SSPs need to be labeled on the figure itself.

Lines 627-629: Definitely true, though that is unclear in the violin plots (Figure 7). I would suggest considering moving Figure 7 and Figure 4 to the supplemental. They don't really add much and can partially confuse the story because the results are visually clear at that resolution.

Lines 847-878: It seems the study explored how the integration of wetlands and reservoirs affect the streamflow test statistics for a river basin modeling framework and how climate-change induced floods and droughts can be projected using this wetland- and reservoir- integrated model. That's slightly more nuanced than what is currently stated and seems a bit more correct?