EGUsphere, referee comment RC3
https://doi.org/10.5194/egusphere-2022-1103-RC3, 2023

Comment on egusphere-2022-1103

Anonymous Referee #3

Referee comment on "Can the combining of wetlands with reservoir operation reduce the risk of future floods and droughts?" by Yanfeng Wu et al., EGUsphere, https://doi.org/10.5194/egusphere-2022-1103-RC3, 2023

General comments:

The paper entitled "Can the combining of wetlands with reservoir operation largely reduce the risk of future flood and droughts?" is an interesting work that integrates wetlands as nature-based solution for mitigation of flood and droughts in modelling. This work helps improve the understanding of how to integrate wetlands into hydrological models as well as how wetlands can be used for hydrological assessments. I believe it deserves publishing but with major revisions.

This paper is a long and sometimes repetitive read in which it is easy to lose track of all the given information. Overall, the article could be more condensed and straightforward. Moreover, some clarification concerning the modeling approach, more explicit description of the methods as well as better connection to the aim and research questions is needed. For instance, the work of future projection of flood and droughts are given more space than could be understood in the aim and research questions and also compare to what the reader initially would think regarding the focus on wetlands with reservoir operations as mentioned in the title. It is not clear how this study comes to the conclusions regarding how wetland and reservoir operation reduces the risk of future floods and droughts. I believe this should be the main aspects of the results and discussion. In addition, the results and discussion should better reflect the fact that this work is based on a case study and that local conditions/mitigations from wetlands combined with reservoir operation could vary between river basins.

Specific comments

Introduction- very long and repetitive introduction that can be condensed to the most important and relevant aspects of the study.

Line 47:what do you mean by cascade up the flood risks to a great extent?

Line 53-68 if you are referring to wetlands as NBS, why not write it in a same unifying paragraph?

Line 74-75 what do you mean by hydrologic equivalent wetland

Line 76-77: instead of typing all the references, you could shorten and simplify the reading to " multiple studies (e.g., references)"

Line 93-95: sentences that could be rewritten into previous sentence inline 91-93

Line 95-96: how is this information relevant to the study?

Line 115: what is meant by the expression " 1+1=2" simulation effect?

Line: 137: I think it is worth mentioning and clarifying that you use the Nenjiang river basin as a case study to answer the aim of the effect of wetland and reservoir operations into hydrological modelling for mitigating future flood and drought.

Line141: the main research questions are not clear enough. My understanding is that you want to analyze how the combined wetland and reservoir operation can mitigate flood using modelling. So the (a) question should be written in that direction and the question (b) might be oriented towards the mitigation of wetlands and reservoir operations of future flood and drought.

Methods- To many sections that are repetitive and could be deleted/incorporated into eachother and with fewer sections.

Line 160: what is meant by “the wetlands and their contributing areas within the reaches”?

Line 164-165: you should delete that information. You already mention that the lower NRB is an important agricultural area.

Line 166: what is meant by “ecological integrity”?

Line 168-171: these two sentences could be shorten into one.

Line 177: Could you give a percentage of the total catchment instead? It would give more understanding of how important the area that drains into the reservoir if it was in percentage of the total catchment.

Line 181: It would be easier to read the figure 1 if less background information was there. Also, the (b) and (c) part of the figure is missing.

Line 190: In relation to Table 1, could you use the ID of the hydrological stations in figure 1 as well? It could be good to have a link between figure 1 and table 1.

Line 193. Section 2.2 might be superfluous in the paper and not really relevant as the study approach should be clear from the beginning. You should consider integrating this information in coming sections.

Line 213: Section 2.3 is too short for the reader to understand how the hydrological modeling coupled the wetlands and reservoir operation.

Line 220-221: please clarify “The simulated runoff simulated by hydrologic- wetland model at the reservoir outlet was replaced with the estimated reservoir outflow, thus integrating

reservoir operation into the hydrological modeling (i.e. hydrologic-wetland-reservoir model)”

Line 226: section 2.3.1 could be integrated to the overall section of 2.3.

Line 229-231: this sentences could be integrated and refereed to above sentence in line 227-229.

Line 243: Please clarify the concept of a “hydrologically equivalent wetland”?

Line 255 & 257: You quite some abbreviations in the text, could you delete some and use the full word instead? For instance RW and IW could just be fully written out in order to facilitate the reading.

Line 263: To better understand how you set the model, could you consider to more explicitly describe how you integrate the reservoir operation into one common section, ex: 2.3 together with the coupling of wetlands? Your section 2.3 is very long and could be more condensed into one section about the set up of the model.

Line 266: What are the three algorithms?

Line 291-294: as the water level limit is always 216 m, could this sentence be rewritten in order to better understand the thresholds?

Line 294-295: I sis not clear what the 25.3 % of the daily streamflow? Is it the average daily streamflow of the year or of the dry season?

Section 2.3.3 could be better integrated into the overall section of the model set up together with the other above sections.

Section 2.4 and its subsection could also be better streamlined into one section describing the projection of future flood and drought.

Line 383-389: Information that might be to detailed and should be mentioned rather

swiftly than given too much attention.

Line 433-434: repetitive sentence

Line 457-459: repetitive sentence of information already given before.

Results- Your result should better reflect the modelling work. Instead of referring to the result figures in the supplementary materials, you should integrate them into the main text. In that way you should give more credit to how the model perform with couple wetland and reservoir operation that focusing on the projection of future flood and droughts.

I would also recommend to use figure 5 &8 in text and leave figure 4 &7 in supplementary.

Figure 6 should be better explained and the explanation of the different plots (a-f) is missing.

Line 619: please clarify the statement "droughts will equivalent to the historical period"

Discussion- Overall, your discussion section is less focused on the results of the work. You give statements that reflect the results but you tend to use that as reference to other research work. Sometimes, the discussion is too general and should be better connected to the aim and research questions and notably to the case study.

Line 714: you state that " such model performance improvement can minimize uncertainties" but is this the case for this analysis?

Line 736-744: It is not clear how this is related to the results of this work.

Section 4.5 could be deleted and integrated in the overall discussion of the results.

Line 831: "1 km resolution DEM" is information that should be mentioned earlier in the method part.

Technical corrections: typing errors, etc.

Line 219: delete "simulated"

Line 432: delete "characteristics"

Line 454: delete "The cumulative number of days during a drought event" as you repeat it just after the "i.e.," .

Line 759: "needs an extensive assessment"