Responses to the referee #2:

We thank the referee #2 very much for the comments on our manuscript. The comments are valuable during the revision process and will further guide our research. We have studied the comments carefully and revised the manuscript accordingly, which we hope will meet with your approval. The comments (bolded) and responses are fully addressed as follows.

This paper aimed at evaluating the hydrodynamic and water environment effect of back water jacking and intrusion of the main reservoir on the tributary bay. The topic is novel and of high interest for the relationship between main reservoir and tributary bay. The results are valuable for water environment treatment of the tributary bay. This paper is innovative and suitable to publish in HESS. However, there are also some comments that need to be addressed. After the revision, the paper can be accepted.

Authors' response: Thank you for your positive and constructive comments. Below we present our responses to each comment.

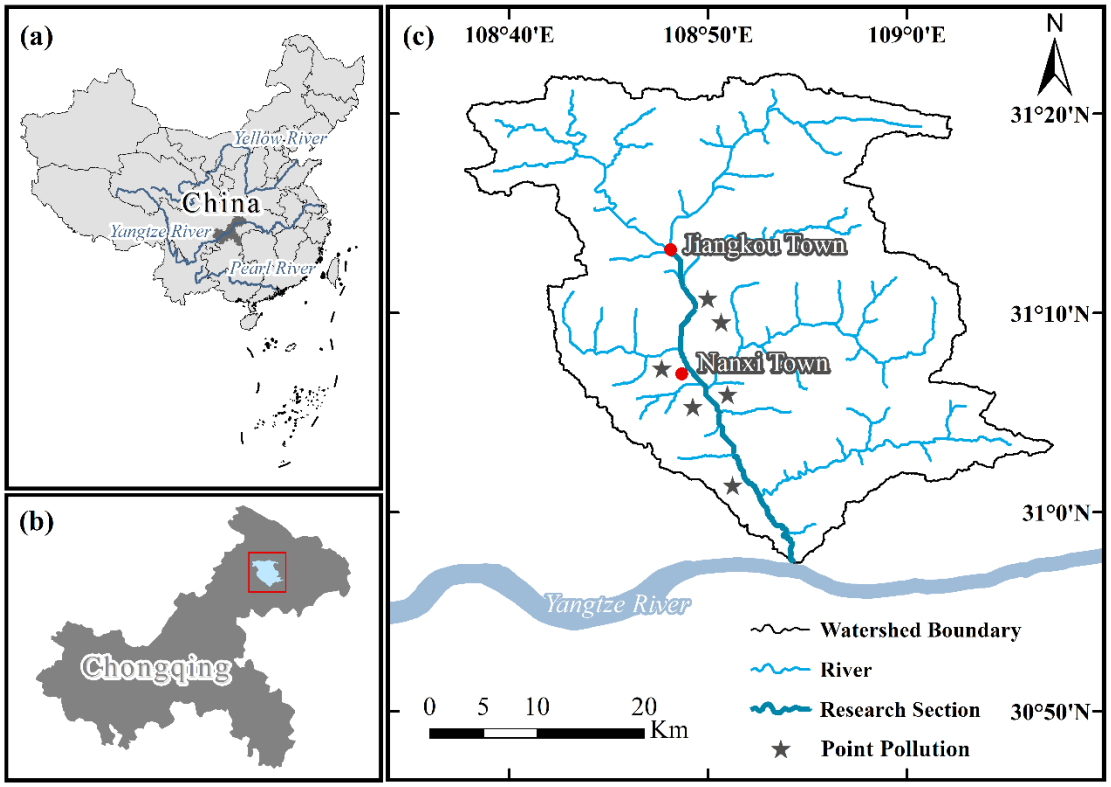
Specific comments:

1) Section 1 Introduction: Some sentences in Introduction need references to support.

Authors' response: Thank you for your suggestion. According to other reviewers' comments, we have added the studies of Ji et al (2010) and Wang et al (2014) to support the statement of Line 59- Line 61, added the studies of Hu et al (2013) and Yin et al (2013) to support the statement of Line 61- Line 63, added the studies of Fu et al (2010), Holbach et al (2013) and Yang et al (2013) to support the statement of Line 64- Line 66, and added the studies of Zhao (2017) and Long et al (2019) to support the statement of Line 91- Line 94.

2) Fig.1: The gray area in the upper left picture of Figure 1 should be the area of the picture in the lower left picture. Some irrelevant places in the upper left picture are marked as gray. Please modify them again.

Authors' response: We have revised the Fig.1 according to your comment. The new Fig.1 is shown as follows.



3) Line 131-139, the reason of selection CE-QUAL-W2 is better to put in introduction part.

Authors' response: We have moved the sentences in Line 131 - Line 139 to the last paragraph of the introduction part according to your suggestion.

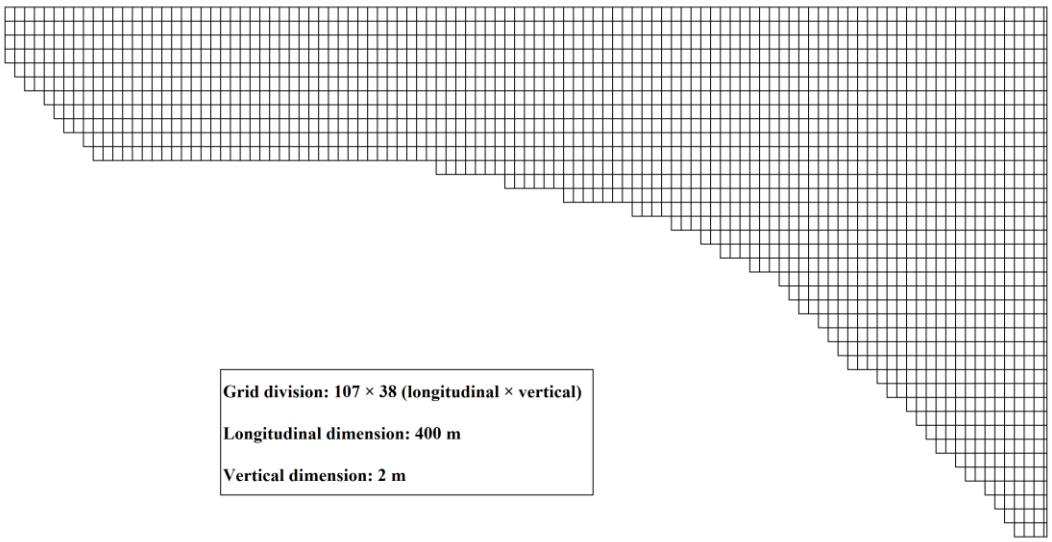
4) Section 2 Materials and methods: For the mathematical applications, it is necessary to illustrate the grid division of your study area. It's better to add some explanations.

Authors' response: Thank you for your suggestion. The research river was divided into

107 × 38 (longitudinal × vertical) rectangular cell grids with the longitudinal dimension of 400 m and the vertical dimension of 2 m. The figure of grid structure we added in the revised manuscript is shown in response 5.

5) A figure of grid structure in Section 2.

Authors' response: We have added the figure of structure in Section 2 in the revised manuscript as follows.



6) Table 1, the format of the temperature unit is messy code. Please correct.

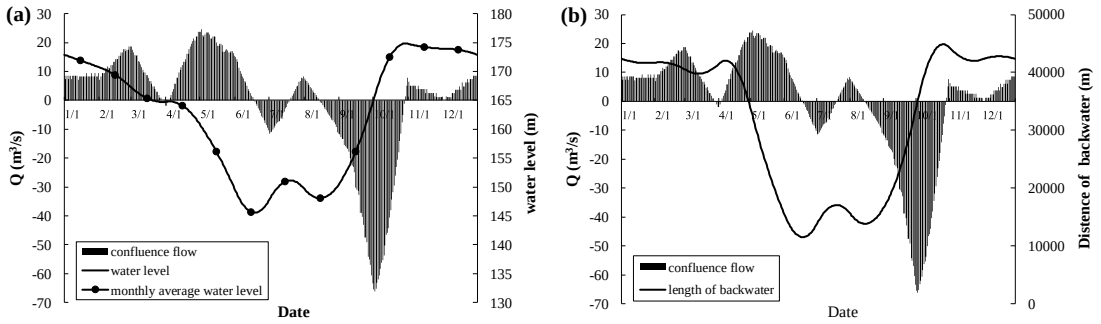
Authors' response: We have corrected the format of temperature unit in the revised manuscript.

7) TLI (∑), please uniform the format of ∑, in roman or in italics.

Authors' response: We have uniformed the format of in roman in the revised manuscript.

8) Fig. 4, the legend is necessary to be added.

Authors' response: We have added the legend of Fig.4 as follows.



9) Section 2.2.3 Boundary conditions: What was the period of the boundary conditions used for simulation? Is it the data of a certain year or the average value of multi-year data? Please specify this in the corresponding section.

Authors' response: Thank you for your suggestion. The boundary conditions used for simulation were the daily average data of multi-year. This information has been added in Section 2.2.3 in our revised manuscript.

10) Section 3.1 Hydrological situation: To my knowledge, density driven water can intrude into the tributary bay in the process of TGR impoundment at the end of flood season in autumn, and you specific the backwater intrusion time is from July to October. Do you consider the density driven water in your simulation? The intrusion time you specific needs some references to support.

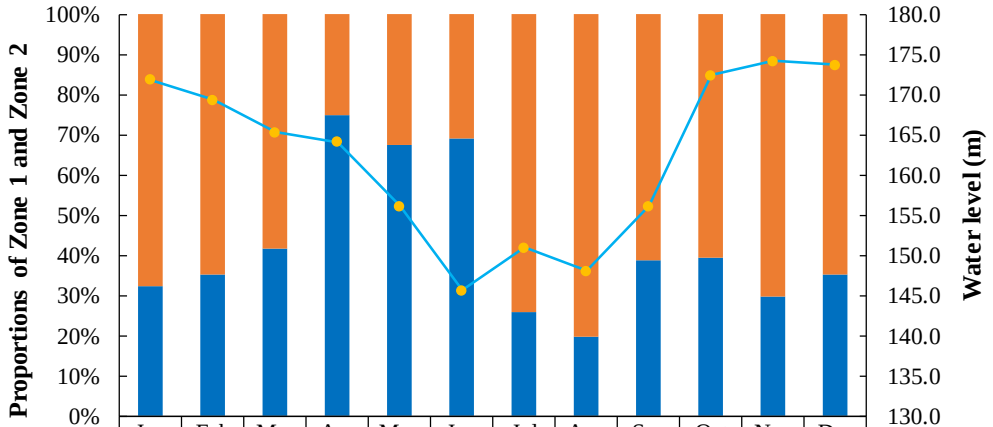
Authors' response: During the simulation, we considered the influence of density flow, and we have added references to support the intrusion time we specified. The following sentences were added in the revised manuscript.

The periods of intrusion occurred in other tributaries were investigated in previous studies. The backwater intrusion was mainly concentrated in low water level operation period and impoundment period in Daning River (Zhao, 2017). The water of the mainstream of TGR flowed backward into the Xiangxi Bay in density current in different plunging depth during the process of TGR impoundment at the end of flood season in autumn, the intrusion was weak when the water level fell (Ji et al., 2010; Yang

et al., 2018). Compared to the results of previous studies, the backwater intrusion showed obvious seasonal changes and the main intrusion time was almost the same.

11) Fig. 6: You'd better add titles to the vertical axes to make the figure easier to understand.

Authors' response: Thank you for your suggestion. We have added titles to the vertical axes in Fig.6 and the revised figure is shown as follows.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Zone 2	68%	65%	58%	25%	33%	31%	74%	80%	61%	60%	70%	65%
Zone 1	32%	35%	42%	75%	67%	69%	26%	20%	39%	40%	30%	35%
water level	171.9	169.4	165.3	164.1	156.1	145.7	150.9	148.1	156.1	172.4	174.2	173.7

12) Section 3.5 Water eutrophication: In your conclusion, the risk of eutrophication in the tributary bay was highest in the section within 0.5 km of the confluence from May to June. Any facts or references in tributary bays of the TGR that can support your conclusion?

Authors' response: Thank you for your suggestion. We have added the study of Wu et al (2010) to support our conclusion. The following sentences were added in the revised manuscript.

Wu et al (2010) had monitored the eutrophication in Daning River constantly, a tributary bay of the TGR, and found that the algal blooming frequently occurred in the area close to the confluence from March to June, which was similar with present study.

13) Line 502- Line 508: You calculated the backwater intrusion time in Section 3.1 and it is a meaningful result. I think you should add this result in the first conclusion.

Authors' response: We have added the result of the backwater intrusion time in the first conclusion in the revised manuscript.

14) Line 552 - Line 555: What is the interaction between the main reservoir and the tributary bay? As the tributary is a much smaller water body compared with the main stream, so it's easy to understand the influence of main reservoir on tributary. But can the tributary bay affect the main reservoir conversely? I think there needs more details.

Authors' response: The interaction between the main reservoir and the tributary bay means their hydrodynamics and water environmental characteristics can influence each other. One tributary bay can affect a small section of main reservoir near its confluence, maybe many tributary bays can influence the main reservoir together. A main reservoir's operation may have common influences on its tributary bays. We have added the following sentences in the revised manuscript.

A main reservoir's operation may have common influences on its tributary bays, and tributary bays may influence the main reservoir together conversely.

15) The conclusion part is better to be condensed and proposed some specific conclusion, or some quantify result.

Authors' response: Thank you for your suggestion. We have condensed the conclusion part and put the most quantify results in the conclusion part in the revised manuscript.

16) Future work: You mentioned some existing measures to improve the environment of tributary bays, can you propose some possible new methods in your future work section?

Authors' response: Thank you for your suggestion. We introduced some possible methods in the future work section. At present, the method of "double nutrient reduction", ecological methods, and manually controlled operation method have been proposed by some scholars. We added this information in the future work section in our manuscript.

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