Dear Editor,

We thank you and the reviewer. The reviewer has raised some important concerns. We have tried our best to answer his/her concerns. Below are our point-by-point responses to the reviewer's comments.

Response to Reviewer #2

(1) The present manuscript introduces a description of the evolution of mid-channel bars (MCB) downstream of the Three Gorges Dam (TGD) in China. Authors used Landsat archive images in order to identify the MCB and describe their evolution in time. The study highlighted the impact of the TGD on sediment transport and also demonstrated that the small bars are more vulnerable and have the highest variability. The manuscript is quite easy to read and well structured, but it is mainly a qualitative study based on observations. I did not find a significant effort in the description of the dynamics driving the shift of the evolution of the bars. Given the macroscopic change induced by the construction of dam it would be interesting to give additional insights on the evolution of this system trying to understand how and when other bars will be affected. In this, a numerical analysis on the evolution of the river system may be extremely useful.

Response: We appreciate the comments and concerns, which indicate some unclarity in the manuscript that needs to be improved. Assessing whether the manuscript is a qualitative or quantitative study is relatively unimportant but the main findings of this study are based on straightforward but quantitative analysis. We elaborate on it as follows:

As in the Method section, we explained how the analytical data (i.e., the area and shape index of MCBs) prepared, how the analysis methods (regression and structural breaks test) were conducted.

As in the Result section, we firstly quantitatively assessed the accuracy of the area and shape index of the MCBs data (see Section 3.1). Secondly, we quantified the basic statistical parameters of the MCBs and classified MCBs into four categories based on their statistical area histogram patterns (see Section 3.2). Thirdly, we quantitatively stated the spatial variation (Longitudinal distribution) of the MCBs in Section 3.3. In section 3.4, we quantitatively analyzed the temporal variations of the MCBs in terms of number, area, and shape index (LWR) based on the regression and structural breaks tests.

In the Discussion section, an index named frequency of structural changes (FSC) was created to identify the impact intensity of the TGD on the dynamics (including both how and where) of MCBs. Although it is widely accepted that the dam operation can affect the evolution of MCBs, the locations and magnitude of such effects are largely unknown. Based on the FSC, this study quantitatively analyzed the impacts of TGD operation on the MCBs dynamics (in both area and LWR change). Our quantitative results show MCBs area and LWR both decreased as the distance to the TGD increasing. Our results also identified the furthest locations of the TGD influences, i.e., DT for the LWR dynamics and the NJ for area dynamics (Fig. 14a). In addition to the location affected by TGD, this study analyzed the way of structural changes of MCBs. Our results show that the majority of structural changed MCBs experienced an opposite trend change in the post-TGD period compared to the pre-TGD period. Specifically, 72 out 140 MCBs showed PR structural change in area (positive in pre-TGD and negative in post-TGD) and 79 out 140 MCBs experienced NR structural change in LWR

(negative in pre-TGD and positive in post-TGD). These quantitative results indicate that the operation of the TGD could be the driving force that makes over half of MCBs experience an erosion condition (decreasing area) and become slim (increasing LWR) in the post-TGD period.

We didn't additionally analyze "when" would the MCBs be affected by TGD. According to our understanding, the most likely time for the TGD started to affect an MCB's evolution could be the close time of the TGD (that is 2003).

To better present the quantitative research methods and results, we have improved relevant descriptions in the manuscript. I sincerely hope the reviewer can reconsider the comment.

(2) In my personal perspective, the manuscript does not contain any relevant conclusion. The results are quite obvious, the methodology is not innovative and the conclusion irrelevant. It is not surprising to observe that small fluvial bars are the most likely to disappear after a flood. Therefore, I do not understand what is the innovative contribution of the present manuscript beside the construction of the dataset.

Response: Thank again for the comment. We agree with that "it is not surprising to observe small fluvial bars are the most likely to disappear after a flood". However, this statement is not a conclusion but it was mentioned in the Discussion Section 4.1. In fact, the main conclusions are as follows:

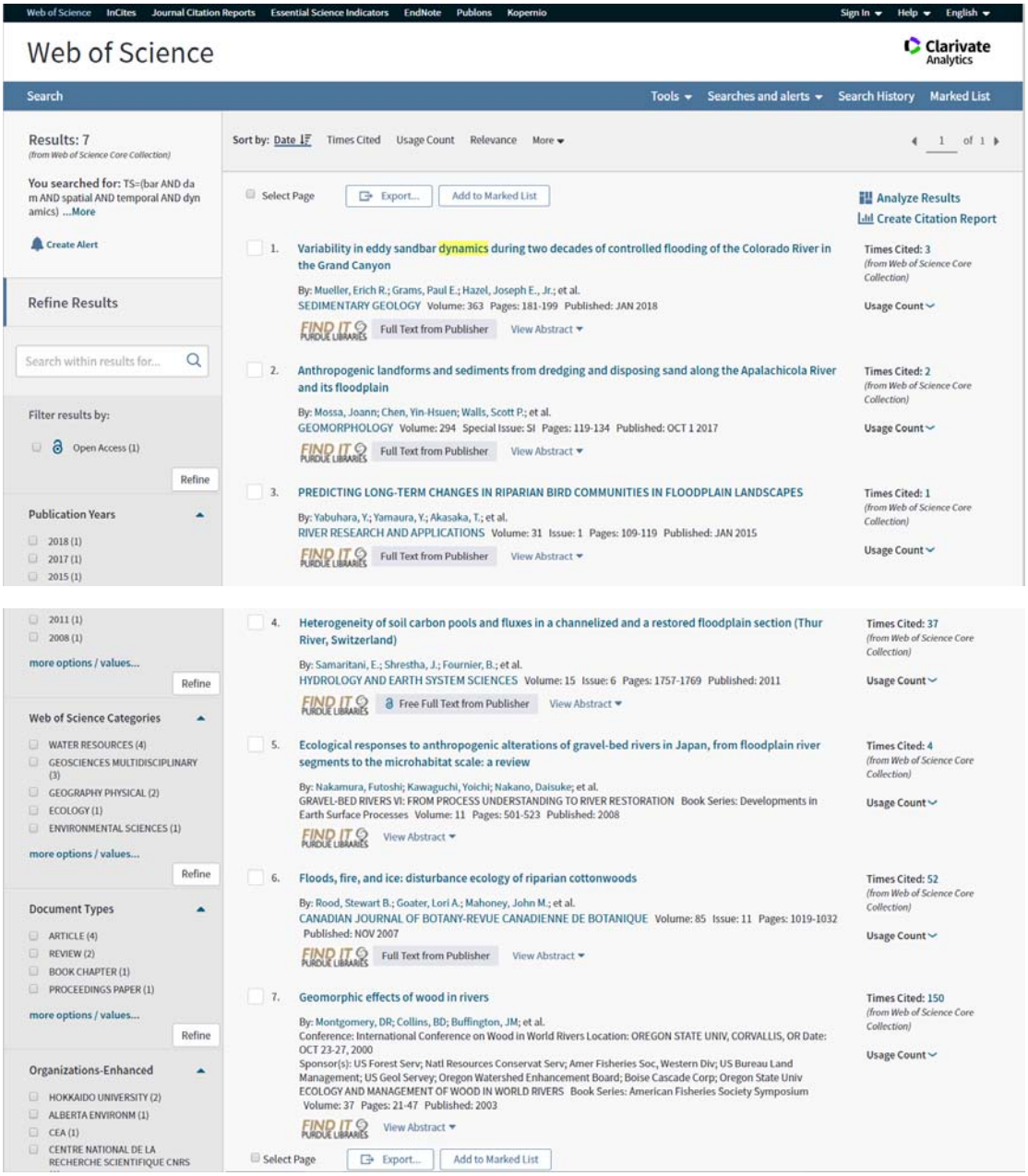
"Most of the MCBs in terms of number (98 out of 140) and total area (1172 km^2 out of 1291 km^2) were scattered in the lower reach (HK-EST) with an average interval of 10 km along the channel. The temporal dynamics patterns were revealed with annual MCBs data using a statistical classification system. This classification system grouped the 140 MCBs into four size-types based on their area histogram distribution pattern: T1 small size (area < 2km^2) (50% of total number), T2 middle size (area 2 - 7 km^2) (25%), T3 large size (area 7 - 33 km^2) (20%), and T4 extra-large size (area > 33 km^2) (5%). For each type, the MCBs' temporal dynamics in total number, area, and shape index (i.e., LWR) were comparatively analyzed pre- and post- TGD operation periods.

Overall, the total MCBs number increased before TGD operation and then declined substantially after the TGD operation. Regarding the different MCB types, only the T1 MCBs experienced big change in numbers and most of them happened in the lower reach. Although the areas of all types of MCBs showed overall increase trends, large size MCBs tended to experience larger change rates and fewer variations than those of the small size MCBs. In addition, large size MCBs seemed to receive fewer impacts of TGD on their area dynamics whereas the small size MCBs likely to have more influences from the TGD operation. As for the shape dynamics, small size and middle size MCBs tended to become relatively shorter and wider whereas the large and extra-large size MCB tended to become slim. Similarly, the shape dynamics of the large MCBs were more stable than those of small ones. This study implies that more attention is needed for the scale (size) effects of MCBs on their temporal dynamics in the future MCBs' analysis and MCB management such as channel dredging.

The operation of TGD could have significant effects on MCBs dynamics. The study shows that the strength of such effects decreased as the distance to the TGD increased, and minimized at HK (LWR dynamics) or JJ (area dynamics). In contrast, the driving forces of the MCBs dynamics in the lowest JJ-EST reach were more complex as more external influences such as sand mining activities were observed in the area and more additional analyses were needed in the future."

We have done a comprehensive search in Web of Science, we cannot find any similar studies in

the database. Please see the screenshot as follows:



As to innovations, this research made the first attempt to comprehensively estimate the longitudinal and temporal dynamics of MCBs during pre- and post-TGD periods, and their linkages to the TGD across the entire downstream reach based on quantitative data analysis.

(3) The main contribution that may have some value is represented by the dataset reconstructed about the morphological evolution of the river system. Such a database may be relevant and useful, but I believe that the author should consider to change journal and eventually propose the manuscript for Earth System Science Data or Data in Brief. I do not think that the manuscript can be accepted in HESS with any attempt to provide a physical explanation of the dynamics of fluvial bar and of their mutual interaction with the dam management.

Response: We appreciate the reviewer's acknowledgment of the new contribution of our data. We also thank the reviewer for the kind suggestion for different journal selections. As we emphasized in the previous responses, this piece of work is the first study that comprehensively estimated dynamics of MCBs and analyzed the influence the TGD on the spatiotemporal changes of MCBs. In addition to a new dataset, our study made a new contribution to understanding the impact of TGD on the MCBs. Therefore, HESS is the most suitable journal to disseminate our research.