We thank Reviewer # 1 for the constructive feedback to our manuscript and the helpful comments which help to further improve the presentation of our findings. In the following sections, for our responses we use blue font while for reviewer's comments we use black italic font.

Response to Reviewer #1 Comment

Authors estimate reservoir impacts on hydrological drought using a catchment hydrological model combining with reservoir routing approach in a tropical river basin in Central Vietnam. The topic is interesting as it gives how extent of the reservoir operation affects seasonal variation of streamflow and thus drought occurrence in the extremely uneven distributed precipitation region. The used approaches are able to quantify the reservoir effects on streamflow. However, some conclusions need to further illustration.

(1) Generally, the construction of reservoirs is to reduce the drought by smoothing streamflow variations (increase water release in the dry season and decrease the release in the flood season). However, it could shift the drought occurrence (e.g. Fig. 9). So I don't agree with authors' conclusions "we found a stronger hydrological drought risk for the anthropogenically impacted reconstructed streamflow".

We regret that our argumentation has not been clearly formulated. The purpose of our study was to assess the impacts of hydropower operation and other human alterations of the hydrological system on downstream discharge. You are right and the quantified decreases in streamflow under human influence for the historical observed period do not imply a "risk" per se. However, hydropower generation at the Dak MI 4 reservoir implies a diversion from Vu Gia to Thu Bon and therefore it reduces the discharge in Vu Gia at Than My and Ai Nghia stations under hydropower operation ("reconstructed" streamflow). For the Thu Bon an increase in discharge was observed.

We now reformulated the concluding sentence: In accordance with the reports from local stakeholders, we found a stronger hydrological drought risk for the Vu Gia river supplying water to the City of Da Nang and large irrigation systems especially in the dry season. Vu Gia river experiences the most adverse effects in terms of number of drought days compared to its natural condition, with an increase of 37 % and 17 % at Thanh My and Ai Nghia station respectively.

(2) In the study region, one of the main effect on streamflow in the two streams is the water division from VuGia to Thu Bon. The division increases streamflow at Nong Son station and decreases streamflow at Thanh My station (Fig 7 A and 8a). So I am very interested how this water division influence drought occurrences at two streams in addition to reservoir operations. Authors need to give clear illustrations.

The diversion of the river from Vu Gia to Thu Bon at the upper part is mainly due to the construction of Dak Mi 4 dam. Although the Dam is built on the Vu Gia river, but its turbines are located at the Thu Bon catchment, therefore, any release of Dak Mi 4 through the turbine is discharged to the Thu Bon river. This lead to the increase of the discharge towards the Thu Bon

river. Therefore, any changes of the water from Vu Gia to Thu Bon is always associates with the reservoir operation, which in our case is the reconstructed streamflow.

In order to assess the drought risk, we have presented Figure 9, which shows how the number of drought days changed due to the diversion and the reservoir operation. However, we failed to properly illustrate this. Therefore, we have added one more table in the discussion section, Table 4. The results reveal that Thanh My and Ai Nghia station experienced 37.08 % and 27.20 % more drought days, while Nong Son and Giao Thuy station had a reduction in drought days of 17.17 % and 30.43 % respectively. We also found that there is a strong seasonal variation in in hydrological drought. For example, in the dry season, the streamflow is reduced almost 45 % for Thanh My, however, for Ai Nghia, this reduction is only 7.9 %. This phenomenon is mainly because of other hydropower e.g., A Vuong, Song Bung 4,5,6 and Song Con release water during the dry season for producing energy which is located other side of the Thanh My station, but contributing the flow at the Ai Nghia station. The detailed explanation will be incorporated in the revised manuscript in Section 5.1

		Nong Son	Giao Thuy	Thanh My	Ai Nghia
a) Drought duration (%)		-17.17	-30.43	37.08	27.20
b) Changes of flow (%)					
	Ann	19.46	10.09	-37.82	-17.41
	Dry	43.3	27.23	-44.67	-7.91
	Wet	10.84	3.61	-35.03	-21.10
c) Changes of flow (in m^3s^{-1})					
	Ann	51.52	38.32	-51.66	-52.14
	Dry	45.65	42.51	-26.43	-9.97
	Wet	63.25	29.93	-102.12	-136.47

Table. 4. Impact of human alterations on drought intensity and changes of flow in the VGTB for the period 1980-2013 on an annual and seasonal scale. a) Drought duration is calculated based on percentage changes of the number of drought days from naturalized conditions to reconstructed conditions (Fig 9). b) Changes of flow (%), are calculated based on the percentage changes of the mean flow between the Naturalized and Reconstructed streamflow for the corresponding time frame. c) The changes of flow are calculated based on mean differences of reconstructed streamflow from the naturalized mean flow. Positive values indicate increasing flow or less drought intensity compared to the naturalized discharge values.

(3) Authors only described "the reservoir should release a minimum of 25 m^3s^{-1} water from the reservoir to the Vu Gia river (MOIT, 2011) (Page 9). How much the division amount between the two streams was used in the study?

According to our observations (2011-2013), only a maximum of 12.5 m^3s^{-1} is released to Vu Gia. We therefore used the actual diverted amount in this study.

(4) The whole study is focused on the reservoir operation including water division influence on drought. So I suggest that the topic should change to be "reservoir impacts on hydrological drought: : :.". Human impacts are too broad as authors don't quantify other human influences, such as land use and land cover.

Thank you very much for your observation and suggestions which we duly appreciate. However, we kindly ask you to leave it as "human impacts" than "reservoir impacts" given that the installation of reservoir is a human built infrastructure to serve solely human purposes such as energy generation and flood protection. Consequently, we demonstrated how such an infrastructure can influence hydrological drought. We agree that human dimension is too broad; however, it is used more as a metaphorical dimension of human activities.

(5) So in introduction, descriptions of the previous studies on modeling approaches for quantifying human activities on hydrology should be focused on mostly reservoir operations and regional water division.

We appreciate this comment. During our research, we evaluated previous studies regarding the possibilities to assess hydrological drought in dependence of a diversity of anthropogenic alterations. We therefore presented a comprehensive state of the art dealing with modelling and statistical approaches to assess hydrological drought. As we kindly ask you to keep it as "human impacts", therefore, we would not modified significantly the introduction section. However, we have incorporated more studies related to reservoir operation and regional water division in our introductory section in the revised manuscript.

(6) rainfall-runoff model J2000 should be calibrated and validated by using observed streamflow discharge before reservoir operation.

Thank you for this comment and we apologize that our explanations have not been clear. The J2000 model was calibrated and validated using observed streamflow before hydropower came into operation in 2009. The model was then used to simulate naturalized discharge.
In section 3.1, we changed the sentence: The J2000 model was calibrated and validated for the gauging station Nong Son for the period of 1996-2005 (Calibration and validation), an undisturbed period before the reservoirs were constructed in 2009.

(7) Line 20 on Page 11: "The flow during the rainy season decreased by -2 to -38%" refers to which stream?

Please apologize for not making this clear: here we summed the flow of Ai Nghia and Giao Thuy stations to provide an overview about the overall water availability at basin scale as shown in Fig 7b.
We changed the sentence:
The water availability in the entire basin during the wet season decreased by -2 to -38 % (Fig. 7b). This might lower the flood risk in the region.

(8) In discussion, it is not necessary to describe generally known uncertainty of the modelling. Authors can discuss uncertainty in lack of more observation data in sub-basins, e.g. calibrated parameters from one sub-basin (station) used for other sub-basins.

Thank you for the remarks. We agree that a description of potential uncertainty analyses is not very helpful. Our intension was to discuss potential analyses which could be carried out in a further step. Now, we have included the uncertainty analysis graph for the J2000 hydrological model as a supplementary information in the paper and include parameter estimation as well (please see our detailed response to Reviewer #3 about uncertainty and parameter estimation). In addition to this, Reviewer # 2 also raised the question about the uncertainty part (4.2 and 4.3). We therefore decided to merge and shorten sections 4.2 and 4.3.

(9) Conclusion should be revised to focus on how extent of the reservoir operation affects seasonal variation of streamflow and thus drought occurrence in the extremely uneven distributed precipitation region.

We have revised the conclusion focusing on how the human modified system impacted seasonal variation of streamflow and drought occurrence as suggested. However, a more detail description of this impact will be incorporated in section 5.1 as well as in the conclusion at section 6.