

We thank the anonymous referee #1: for his/her comments and suggestions to our manuscript.

Comment: After reviewing the article “Responses of natural runoff to recent climatic changes in the Yellow River basin, China” my decision is to accept this document with major changes. Below, you will find some of the elements that contributed to make my decision.

The pertinence and relevance of the study are high. The techniques are appropriate to the scope of the study and sufficient to accomplish the objective. The document is succinct and its organization is appropriate.

Response: We thank the reviewer for the comments and suggestions.

“In the following paragraphs I will describe some points I suggest the authors to address:”

Comment: In general the document identifies three periods of time characterized by flow regimes called base flow, low-flow, and recent flow. Though the document these flow regimes are taken as independent stages this leads to assume that there is a recovery of the flows in “recent” years. Although this is partially correct, the time span of the present study would better identify these conditions as shifts in regulatory processes that in both cases reduce flows with respect to the called base flow (rather than assume a recovery period in recent years). This may change the scope of the paper, since the main issue is what originates this variable regulatory process.

Response: We identified the three periods, i.e. base flow, low-flow, and recent periods, according to the frequency of the drying-up phenomenon in the lower reaches of the Yellow River mainstream. In the recent period, the frequency of the drying-up phenomenon went down to zero, i.e. no drying-up after 2003. This could not be a natural condition because there were drying-up events even in the base flow (potential high flow) period. Some studies (Yang et al., 2008; Hu et al., 2008; Cui et al., 2009) have addressed this issue and attributed it to the change in regulatory processes. The reviewer suggested that this study would better identify these conditions as shifts in regulatory processes. We agree and it was exactly what we tried to do in the manuscript. In the recent period (2003-2011), the regulatory processes must play a different role from the other periods so that there was no single drying-up event in the recent period. This study tried to answer: would climatic change help to avoid drying-up (there was a recovery) or make it harder (there was not a recovery)? There is no need to assume a period of the flow recovery although our findings show that in the recent period there was a runoff recovery comparing with runoff in the low-flow period. The recovery was small and the natural runoff in the recent period was below that in the base flow period. We have clarified the concerns in the revised paper.

Comment: In a similar context, the authors consistently mention the three flow regimes but poorly addressed the implications or the processes that produced those changes within the context of each particular section. In the Results section this is particularly evident due to the lack of discussion. The authors relay on the literature review to support their findings rather than contrast and discuss how similar they were. This discussion will leverage to a better understanding of how water-land-climate processes regulate surface flows in the area.

Response: We analyzed the observed climatic changes (e.g. precipitation, temperature, and wind speed) in the three periods. And we used the SWAT model and runoff elasticity analyses to establish the connections between the climatic changes and hydrological change. We have revisited the parts with references (literature review) in the Results section. Most references are related to the observed climatic changes. It was not surprising that our observations were consistent with the previous studies because they were all based on the same or similar observations. We did not provide a detail comparison between our observations with previous studies for two reasons: 1) those observations are provided by CMA and with good quality. 2) in general, the changes match well with the findings reported by previous studies. On the other side, there are few previous studies addressing on the climatic impacts on the disappearance of drying-up phenomenon at the lower reaches of the Yellow River. We could not find a matched previous study to perform an apple-to-apple comparison. We have tried to refer to the relevant studies and we believe the related discussions would lead to a better understanding between climatic change and hydrological change in this area.

Comment: As mentioned above, the elasticity technique used is able to provide some insights about why these reductions in flow occurred at different intensities according to the objective of the study. However, a number of questions arise due to the lack of a representation of spatial distributions of precipitation and runoff, as well as the other climate-related variables taken into account in this document.

Since SWAT performs relatively well, should be shown additional elasticity results up-stream of the Huanyuankou station. As reader, I would like to see whether those changes in runoff might be attributed to spatial changes in precipitation rather than climate variables. In addition to deeper spatiotemporal assessment of the hydroclimatological variables it is key to illustrate or describe a more elaborated time frame of the recovery projects and changes in land-use. These elements may provide more support to the elasticity assessment and the addressed contribution of the climate variables.

Response: Thanks for the suggestions. We have performed the elasticity technique at sub-basin scale using the SWAT simulated natural runoff. The spatial pattern of the contributions from the different climatic variables to changes in the runoff has been presented. We do not include the change in engineering projects and land-use change because we intend to focus on the impacts of climatic change rather than the impacts of human activities. We have no doubt that human activities have effects on the hydrologic processes as highlighted in the Introduction section. However, this study will focus on changes affected by the recent climatic change which is less studied before.

Comment: Between lines 15 and 25 in page 4498 the authors write a series of unclear statements about potential ET, Rn, T, RH and U2. The statements made, should reflect the results obtained; otherwise argue why those results may contradict theory.”

Response: We have rewritten the part following the suggestion of the reviewer. We have

removed discussion and just left the description of table 1 which shows mainly the observed changes.

Comment: It was unclear to me if statistical parameters were calculated with monthly or daily values.”

Response: The statistical parameters were calculated with monthly streamflow. We have clarified in the caption of table 2 and in the text as well.

Comment: The conclusions poorly address some of the climatic factors affecting the “smaller” reduction in the flows with respect to the baseline case.

Response: We have added the descriptions of the climatic factors with smaller effects and we think the conclusion and discussion are now balanced.

Comment: There are minor grammar issues that will become irrelevant if the authors address the comments and suggestions above.

Response: Thanks for the comments and suggestions. We have tried our best to address the comments and suggestions above. The English of this manuscript has been polished.