'Catchment scale assessment of drought impact on environmental flow in the Indus Basin, Pakistan' by Rahman et al.

This study entails the critical role of understanding drought impacts on environmental flows and contributes valuable insights into preserving the ecological integrity of rivers in the Indus Basin. In this study, the authors use a combination of various methods for analyzing drought and environmental flows. Their aim to inform and facilitate sustainable water resources management practices is vital in the region. With the projected increase in the frequency of future extreme droughts in the Indus catchment, this study could add valuable insights in understanding environmental flows in the catchment and be a good addition to the scientific literature. However, less focus should be put on the drought events and drought severity in the catchments (because this is already know in literature) and more on the novelty of the study which is the influence of drought on the magnitude of the extreme low flows and low flows. I suggest some improvements detailed below, that may help in bringing this message out more clearly before the manuscript can be viable for publication. I hope my comments can contribute to enhancing the quality of the paper.

Major comments

- First of all, the question of uncertainty in the datasets, and the IHA model used should be discussed in the discussion section. How this would have impacted the analysis? I understand that the research idea is to understand how droughts influence extreme low flows and low flows, but perhaps more details on the different methods used could be given in the methodology, for example, how did you select the threshold for the threshold regression analysis, what does the coefficient value represent and also further elaboration on the steps involved in the implementation of the range variability analysis could be provided instead of a list. Generally, the methodology on range variability analysis and threshold regression analysis could be elaborated further to enable easier understanding on the methods i.e. methods for performing threshold regression analysis is a bit lacking hence when one reaches the results section, understanding becomes difficult.
- Secondly, the authors performed further data quality tests on the hydro-meteorological datasets i.e. using kurtosis and skewnesss, these plots could be included in the supplementary materials, this may help with the question on uncertainty of the datasets. For example, Line 144: The authors state that the data was thoroughly analyzed and the period from 1980-2018 chosen. How was this analysis carried out? Additionally, the authors failed to discuss the limitations of the research and future recommendations. How does this research compare to other studies done in the Indus catchment? Generally, the discussion of the results could be improved and line 496-506 could be moved to introduction.
- On a side note, the authors could try using threshold-based indices instead of the standardized indices. This is to explicitly bring out the roles of temperature and precipitation on the occurrence of droughts and then make the conclusion on influence of temperature on drought occurrence as done in line 516: 'The analyses have shown that temperature plays a crucial role in the occurrence of droughts'.
- Additionally, in the results section, it is hard to differentiate what is moderate and what is extreme drought because this is not indicated. What is considered a low flow and extreme low flow? Is it possible to provide specific values for these magnitude of the low and extreme flows associated with each of the drought severities?

- In general, the quality of the writing and preparation should be improved. I found it hard to continuously scroll up to always look for the full meaning of the abbreviations. It is good practice to state the full abbreviations again especially when it comes at the beginning of the paper. What I would suggest to the authors is that they carefully review the text to avoid several grammar errors and typographical errors prevalent in the manuscript
- Line 165: How did the authors calculate the potential evapotranspiration or actual evapotranspiration used in the water balance equation?
- Line 178: How did the authors come to this choice of threshold value?
- Line 215-line 216: This statement doesn't make sense. Do you mean the no drought years are pre-impact and drought years post-impact? How did you come to select SPEI-12 for the analysis? Isn't that double counting or rather counterintuitive cause the drought years are already in the pre-impact period, if the whole period was considered? How does this impact your results? Or did you remove the drought years? If yes, then state this instead of saying the whole period was considered as pre-impact period
- Line 221: The numbers are very specific, is this based on something? If that is the case please cite or if not give reasons for the categories division

Minor comments

- The authors should carefully review the text to avoid several grammar errors and typographical errors prevalent in the manuscript for example;
    - Line 38: 'On a global scale…' instead of 'At a global scale…'
    - Line 56: '…sustainable management of surface and groundwater…'
- In Figure 1, it would be better if the authors combine the legends so you have a single legend to indicate the basin names
- Line 260: I would suggest to mention the list of names based on the figure alignments
- Line 279: It would be clearer if the authors indicated these years on the plots, otherwise it becomes difficult to look for the specific years within the each of the plots. I would suggest to do the same for figures 3-5
- Figure 4: Use the same scale for all the plots. It becomes quite confusing when they have different scales for example first look makes me think that Hunza catchment droughts are more severe. I would suggest to do the same for the rest of the plots (figures 3-5, 6)
- Line 294: I think this statement should be moved to the case study section
- Line 364: Jhelum Rive is also divided into three time periods
- Line 358: As a reader, I find using the term time zones confusing, is there a better term that could be used instead? e.g. time period?
- Table 2: Is it possible for the authors to Separate the catchments to UIB, MIB and LIB, otherwise one keeps going up to the case study section to check which catchments are where. Additionally, is it possible to indicate the specific thresholds for extreme low flows and low flows instead of combination?