

Dear reviewer,

Thank you for taking the time to carefully review our manuscript, and thank you for your various comments. The latter will help us bring greater clarity and scientific rigor to our study and improve its overall quality.

First of all, when running sensitivity analysis in response to the other reviewer, we found an error in the dataset of amax we selected for the study. We repeated the analysis running different set of parameters for the analysis, and the one we selected turned out to be looser than expected. With this more selective dataset, we found 71 stations rather than 80. The conclusions that we found were similar regarding the regional majority of non stationarity and the temporal patterns. We only found 5 clusters. There is no more the precedent clusters 'Mixture' and 'Stationary' which included a few stations with missing data (removed in the updated results), but clearer patterns found in the updated Clusters.

This analysis helped us find an error and refine our selection.

We have addressed each comment below. Reviewers comments are shown in bold followed by our response.

First, the abstract is somewhat lengthy. Consider making it more concise by focusing on the key findings.

We agree and we will make it more concise to make appear clearly the relevance of the study .

Some paragraphs in the introduction are not entirely clear, and the connection to the central topic of the manuscript is occasionally difficult to follow. Improving the logical flow between paragraphs and more explicitly linking the background information to the study's objectives would strengthen the overall coherence of the Introduction.

We agree and we will be shorter to the contextual background. We will connect it more quickly to the scopes of the study such as the need to get robust information on hydrological extremes. We hope that it will improve the coherence of the introduction.

While the workflow is generally well described, some steps appear to rely on subjective decisions, such as the 2yr return period. To enhance transparency and facilitate reproducibility, it would be helpful for the authors to clarify the model parameters and clustering algorithm utilized.

We will provide the model parameters, the clustering parameters, and the analysis with the 10-year return levels in Supplementary material in order to improve the transparency and reproducibility.

The methodology presented the BIC metric; however, the result section only presents the results of the cluster algorithm and the analysis of the hydrological features. Then in the discussion section (lines 397 400) mentioned the result of this metric and the AIC. These results should be better described in the corresponding section.

We agree and for more clarity, we will provide the results of different model selections in Supplementary material.

The Discussion is well organized and easy to follow. However, it is rather lengthy, and a more concise presentation would improve readability. The section places considerable emphasis on the limitations, while acknowledging these limitations is important, balancing them with a clearer discussion of the study's strengths and broader implications would strengthen the manuscript.

We thank you for your comment and we will reorganize this subsection in Strengths and limitations of the study in order to strengthen the paper.

The conclusions should be shorter and informative. It could be improved by focusing on the key findings to provide greater clarity

We agree and we will try to shorten the conclusion as you mention.

In the Data section, lines 116-126, the authors describe the procedure of the extraction of the AMAX time series, which, for my understanding, is part of the Methodology. I recommend reorganizing this section.

We agree and we have had a discussion about where to place this procedure in the manuscript. We have chosen to put it in the Data section in order to lighten the methodology and only focus on the data used -which are the AMAX series-, and the flood frequency analysis. We will check if we could insert it in the methodology part.

The time period analyzed is confusing; in the abstract mention 1950 to 2018, then in the results section the period is up to 2020.

We decided to compute the result for the window 1950-2020 (rounded). We could have chosen 2018, but the difference between the two would be insignificant as we work on normalized return levels.

However, we will be more coherent choosing 2020 in both the abstract and the other sections.

We thank you again for your comments, and we hope that the upcoming corrections and the revised version will meet your expectations.