

Reply to comment by Referee #1

Comment: This is my first time reading the manuscript. I checked the authors' replies to the first round of reviews and how they addressed the comments. All seems satisfactory, only a tiny suggestion would be to explicitly mention the word "regional" in the Abstract, sth like: "varying regional warming levels", which is later described and clarified on lines 280+

Reply: The authors greatly appreciate the reviewer's positive assessment and recommendation for publication. We have included the suggested change in the abstract.

Reply to comments by Referee #2

Comment: I have a minor comment: The following statement is creating confusion when addressing: What is the moving window size with respect to \pm how many days? In your revised tracked version, you mentioned L-303 -305, "We then applied a 30-day rolling window centred on each day of the year. For example, for 15 January, the window includes flows from 15 days before to 15 days after". In this case, it will be a 31-day moving average. Please see the following literature and write about your case. Please check this from the following article and mention accordingly:

1)<https://onlinelibrary.wiley.com/doi/full/10.1002/hyp.13417>

2)<https://iopscience.iop.org/article/10.1088/1748-9326/ad25a1> You can also refer to this literature for Line 54 while explaining the importance of seasonality in drought.

Reply: The authors sincerely thank the reviewer for the positive assessment of the manuscript and for recommending acceptance subject to minor revisions. We appreciate the helpful comments and have addressed them in the revised manuscript accordingly. We have incorporated the literature suggested by the reviewer and modified the text in **L290-296** as follows:

In the reference period, for each of the 12 ensemble members of each hydrological model, a 30-day moving window centred on each day of the year was applied. Several approaches exist for implementing rolling window smoothing; here, we adopted the method similar to Ahmadi and Moradkhani, (2019) and Van Loon and Laaha, (2015). For example, for 15 January, the window includes flows from 14 days before to 15 days after that date (including the centre day), resulting in a total of 30 days.

The suggested citation about importance of seasonal droughts has also been incorporated in **L47-48** as (Raut and Ganguli, 2024; Tanguy et al., 2023b) in the revised manuscript.

Reply to comments by Referee #3

Comment: I would like to sincerely thank the authors for providing relevant and quite detailed answers to all comments I made during the first round of reviews, including some with additional analyses. I would therefore want to congratulate the authors for the major improvements they made to the initial manuscript.

I still have a few minor comments that could be addressed before final publication:

Reply: The authors sincerely thank the reviewer for the careful evaluation of the revised manuscript and for the positive feedback on the improvements made in response to the previous comments. We appreciate the reviewer's time and constructive suggestions. Below, we provide point-wise responses to the remaining minor comments.

Comment 1: L379: I guess "severity" should replace "intensity" here.

Reply1: Suggested change has been incorporated.

Comment 2: Figure 3: This is unfortunately still a draft version of the target figure : there are no column name (or wrongly duplicated ones ?), there is no legend for colors, it is not in vector format, etc. Please update this figure before publication.

Reply2: Thank you for pointing this out. The figure has been corrected in the revised manuscript.

Comment 3: Figure 4: reading would be much easier if numbers in the legends are round ones. Please update this figure as well.

Reply 3: Thank you for the suggestion. We have modified the figure now. Additional color has also been added to the scale for better visibility.

Comment 4: L528-530: As such, this assertion is weakly supported by Fig. 7a,b. Please provide additional elements or refer possibly (in part) to Fig. 9. This is a crucial point that needs effective visual support.

Reply 4: Thank you for this suggestion. To strengthen this statement, we have now additionally referred to Figure 9 in the revised manuscript and modified the lines in the revised manuscript at **L530-533** as following:

Overall, the results demonstrate that neglecting temperature effects in modelling drought duration for longer return periods leads to significant uncertainty in projected return levels, as clearly evidenced by the pronounced differences between stationary and non-stationary estimates particularly for higher return periods (Figure. 9).

Comment 5: Fig.8: it is difficult to read as one wants to compare first values of the same return level across models, then across RWLs. So I suggest grouping first by return level (instead of models), then by models (instead of RWLs), then by RWL.

Reply 5: We have modified the figure according to the suggestion.

Comment 6: References require a rather important polishing effort, between url or dois, formatting, etc.

Reply 6: We have now checked the references and corrected wherever required.

Comment 7: Given the above comments, I would nevertheless recommend a minor revision to be made before publishing this very valuable manuscript.

Reply 7: The authors thank the reviewer for the positive assessment of the manuscript and the constructive suggestions. We have addressed the minor revisions as recommended and incorporated the corresponding changes in the revised manuscript.