# Final reply letter - Manuscript 2024-3261

Dear Associate Editor,

We want to express our sincere appreciation for the attention that you have dedicated to our study, and your prompt response to the submission of our revised version. Also, we are extremely glad that you appreciated and positively evaluated the additional analyses we performed.

We report our replies to your minor comments below.

## Associate editor, prof. Nadav Peleg

***Associate Editor:***

*Dear Andrea Magnini,*

*Thank you for providing the revised version of the manuscript and your detailed replies to the reviewers' comments. The reviewers are satisfied with your responses and the changes made to the text. However, upon reading the paper, I still have some minor comments that I would like you to address. I am confident that these revisions will not require extensive time and effort. Please find them listed below. Please note that the revised manuscript will be evaluated by me and will not be sent for further peer review. I look forward to receiving the revised version.*

*Sincerely,*
*Nadav Peleg*

*Minor comments:*

*1. In lines 50–54, you list the teleconnection indices and mention that they have a "proven influence on the rainfall regime in the study area". Could you please provide further details here (or in Section 3.1)? Specifically, not about the indices themselves, but regarding their relevance to the study area and whether they have also been used in the context of rainfall extremes in this region in previous studies.*

> **Reply of the Authors:** Many thanks for this suggestion, we have added more details about the teleconnection's relevance in Section 3.1 in the revised article.

***Associate Editor:*** *2. You use the notation "t" to mark tiles, indicating a spatial context. However, "t" is often used to denote time, and since you are also using "st" in the context of time, this might cause confusion. I suggest replacing "t" with "g" (for grid) or another notation that does not imply a temporal meaning and is not already in use in the manuscript. While not critical, this change could improve clarity throughout the text and equations.*

> **Reply of the Authors:** Many thanks for this suggestion, this has been addressed in the revised article.

***Associate Editor:*** *3. Please change the reference to the appendices in the text to "Supporting Material" (e.g., "Supporting Material A" instead of "Appendix A"). Additionally, the supporting material should be presented as a separate file and not included in the main text.*

> **Reply of the Authors:** Many thanks for raising this point, this has been addressed in the revised article.

***Associate Editor:*** *4. Lines 195–198: I would argue that one should select the tile distance in such a way that it would guarantee preserving the local climatology. Alternatively, users may consider not strictly following orthogonal grids, but defining analysis areas based on climatological similarity in rainfall extremes.*

> **Reply of the Authors:** We agree on this point, we inserted this consideration in the Discussion Section, where we think it can find a better place.

***Associate Editor:*** *5. Equation 7 and line 208: I am not clear on what is meant by "sign" in this context. Please clarify.*

> **Reply of the Authors:** Many thanks for raising this unclear aspect. In turn, by "sign" we mean the sign function (i.e., sign(-0.5) =-1; sign(0.5)=+1) on the +/- of a number. This has been clarified in the revised article.

***Associate Editor:*** *6. Figure 3: I recommend using white for the zero-correlation value, with positive and negative values ranging from zero to ±4, reaching dark blue and dark red, respectively. The current colour palette is not very clear. The same suggestion applies to Figure 4.*

> **Reply of the Authors:** Many thanks for this piece of advice, this has been addressed in the revised article.

***Associate Editor:*** *7. I strongly suggest adding a paragraph at the end of the manuscript regarding "Code availability" and sharing the codes used for the analysis, including an example demonstrating its application to one of the stations in your study area. This will enable users to apply your methodology easily and align with FAIR data principles.*

>**Reply of the Authors:** Many thanks for raising this point. We have uploaded a code that performs hierarchical RFA with both the stationary and the doubly-stochastic framework with 13 example stations. This dataset is publicly available in Zenodo (10.5281/zenodo.16610039). Since we do not have the right to publish the real data observed, annual maxima have been slightly altered. This is reported in the new section "code availability".

***Associate Editor:*** *8. Currently, you mention the potential implications of your findings in the introduction and conclusions only, briefly hinting at potential future implementation in the context of non-stationary extreme rainfall analysis. It would be beneficial to include a more detailed discussion (in the discussion section) regarding the implications and potential uses of your findings for improving or reducing uncertainties in extreme rainfall analyses.*

>**Reply of the Authors:** Thank you for this suggestion. A mention of this important topic has been included in the discussion section.

Again, we express our gratitude for the suggestions and the assistance received. We hope that the new version of our manuscript meets the requirements for publication.

Best regards,

The Authors