

We would like to thank the reviewers for their valuable comments and finding our effort enough to decide the manuscript is ready for publication.

The Response to the Reviewers file provides complete documentation of the changes made in response to each comment. The document is designed so that the changes that have been made in response to each comment can be immediately read and understood, independent of the other comments and responses.

Reviewers' comments are shown in **bold**. The authors' response is shown in plain text. The text quoted from the manuscript is shown between quotation marks in *italics and new text is shown in green*.

### **Anonymous Reviewer**

**The manuscript highlights the significance of concurrent extreme events under the effect of different global warming levels. Climate change induced several extreme climatic conditions to occur at the same time leading to severe damage. The manuscript also offers the regional impacts of different concurrent events: heatwave-drought is most in the mid-high latitude regions and Rx1day-wind speed in the tropics. The manuscript is well-written and organized, with a clever representation of the results. The authors replied extensively to the comments addressed by the previous reviewers and made considerable changes in the methodology, going from monthly to daily analyses. According to my review, the manuscript is suitable for publication. I suggest the following optional minor comments for the authors' consideration:**

We would like to thank the anonymous reviewer for her/his positive evaluation and considering our previous efforts. We have addressed the minor comments through appropriate changes and hope that the revised manuscript satisfies the reviewer's concerns.

**(1) In the abstract, add a sentence to define the two types of concurrent events before jumping into the results.**

We thank the reviewer for pointing this out. We have now edited the following sentence in abstract to make this clear to the reader. The new text states:

*"We focus on the individual and simultaneous occurrence of the extreme events, encompassing heatwaves, droughts, maximum 1-day precipitation (Rx1day), extreme wind (wind) as well as the compound events heatwave-drought and Rx1day-wind in the pre-industrial period (1850-1900; reference period), for approximately present conditions (1 °C of global warming), and at three higher global warming levels (GWLs of +1.5 °C, +2 °C and +3 °C)."*

**(2) It would be great to add the locations of the 139 countries you are considering in this analysis on a map to see their regional distribution. You can add it to Figure 01 if you prefer.**

We thank the reviewer for this comment. Current version of the figure has all 139 countries considered in the analysis.

- (3) Although the authors justified using global warming levels to align with the IPCC reports, the socio-economic pathways (SSPs) add the socio-economic perspective besides global warming. SSP5-8.5 is the only adopted socio-economic scenario. I would appreciate a few sentences explaining why you did not use more socio-economic scenarios. A probable explanation could be that you focus on the cause-effect relationship between increasing temperatures and concurrent extreme events. Build on sentences around L435.**

Thank you for your suggestion. We would like to kindly bring to your attention that our analysis did not involve the use of any SSP population projection. Instead, we used the GPWv4 dataset's 2015 population because the timing of each model reaching certain warming levels varied in the projection period. We believe that the paragraph in question provides a comprehensive explanation of the potential population growth in the future without emphasizing any particular SSP scenario. We considered your suggestion regarding adding information around the highlighted sentence (L435). However, we think doing so may disrupt the paragraph's flow. Nevertheless, we agree that this information needs to be communicated. Therefore, we have added this information to the population counts section. The new text now states:

*“In our population exposure analysis, we use gridded population counts retrieved from the Gridded Population of the World version 4 (GPWv4) dataset (Center for International Earth Science Information Network - CIESIN - Columbia University, 2018). The GPWv4 dataset provides population distributions at various grid resolutions. For our analysis, we use the 1° resolution data, which we transform into 2.5° grid resolution to match the resolution of the climate data. The GPWv4 dataset covers the period from 2000 to 2020 at 5-year intervals. However, we only use 2015 population counts in this paper as they are representative of the world population at +1°C of global warming. To investigate the effect of climate change, we keep the population fixed at 2015 levels for approximately 1°C of global warming while allowing the counts of climate events to change at GWLs. This approach enables us to examine the cause-effect relationship between increasing temperatures and projected changes in extreme events. Furthermore, using climate change projections and population distributions in combination allows us to investigate changes in exposure to climate extremes at the regional and country levels.”*