Response to Anonymous Referee #1

August 27, 2025

General comment

The dataset description is excellent, and the dataset will prove to be very useful. The collection is in principle redundant, as all data are already available on ESGF. I do, however, find it very useful to collect this processed dataset in one place. Annual maxima of varying duration should be a very useful intermediate for plenty of potential studies.

Reply. We thank the reviewer for the overall positive assessment of the dataset, and the useful comments and suggestions.

Specific comments

- Would it be possible in the future to supplement the current data collection with relevant files from other EURO-CORDEX5 simulations with sub-daily precipitation data? Some simulations have published 3-hourly data, which may complete any analysis of temporal resolution below this period. In case you have plans to do this, please mention it in the text. -Otherwise you may ignore this comment.

  Reply. We indeed do not plan to add 3-hourly data for scientific reasons. Firstly, because we are primarily interested in precipitation durations of 1-3 hour for benchmarking experiments with convection-permitting simulations. Secondly, with regard to longer rainfall durations, sliding 24-hour accumulations will lead to an underestimation of 24-hour extremes.

- Please employ the alternative method mentioned in l155-157 instead of the one currently used. It is good practice to average additive quantities before taking ratios, in order to avoid undue weight for points with very small numbers in the denominator. Please revise the text accordingly

  Reply. We have used the suggested alternative method and arrived at similar conclusions, which will be included in the next submission. Equation 1 will be changed from

$$\text{Relative intensity change} = \frac{1}{(3\,^\circ\text{C} - 1.5\,^\circ\text{C})}\,\mathbb{E}\left[\frac{z_T^{(3)} - z_T^{(1.5)}}{z_T^{(1.5)}}\right], \tag{1}$$

  to

$$\text{Relative intensity change} = \frac{1}{(3\,^\circ\text{C} - 1.5\,^\circ\text{C})}\,\frac{\mathbb{E}\left[z_T^{(3)} - z_T^{(1.5)}\right]}{\mathbb{E}\left[z_T^{(1.5)}\right]}. \tag{2}$$

  Furthermore, Figs. 4 and 7 will be modified to use the values of relative intensity change calculated using the new method.

- Please mention exactly how you find the 1.5 GWL and 3 GWL periods (probably trivial, but nice for the documentation of methods). Your method for calculating change per degree GWL is a bit unconventional; please discuss how big an effect this has relative to the more frequently used one of taking changes from historical to end-of-century and dividing by whatever global warming happens between those two periods. I

do see advantages in you method related to avoidance of extreme periods in very sensitive simulations, but please add some discussion.

Reply. Periods corresponding to a particular GWL are identified as the first 30-year period for which the global average near-surface temperature of the forcing GCM reaches the GWL as compared to the pre-industrial period 1881–1910. The methodology with fixed global warming levels is supposed to be more robust than using fixed time periods as some uncertainty from the climate sensitivity of the GCMs is removed. The explanation of how and why GWL periods are determined can be found in Vautard *et al.* (2014) to which we will refer in the next submission. In the text, we add: *"The periods are taken from Vautard* et al. *(2014) and are listed in Table S4. Vautard* et al. *(2014) argue that this methodology with fixed global warming levels is more robust than using fixed time periods as some uncertainty from the climate sensitivity of the GCMs is removed."*

- Please consider using a more diverse colour palette in figs 1 and 2. It is currently very hard to distinguish levels.

  Reply. We will use a more diverse colour palette, `batlow`, which is a perceptually uniform, perceptually ordered and colour-vision-deficiency friendly (see https://www.fabiocrameri.ch/batlow/). As a result, for example, the relatively high values simulated by HadREM3 for the Mediterranean region are much more clearly visible.