

## **Response to RC1 on nhess-2023-91**

NOTE: Reviewer's comments are in black, our responses to the comments are given in blue below.

The manuscript presents a study of the heat wave characteristics in Germany by using several RCM models and a WRF-based high-resolution downscaling dataset.

The topic is fascinating and fits the journal's aim and scope. Moreover, due to the last-year droughts, a general audience can be interested in such type of study. The manuscript is well-structured and organised. The English is fluent and understandable. Before considering the work for publication, I have the following points to raise with the authors:

1. I understand the purpose of only comparing RCMs. Still, it might be interesting to exploit the newest version of ECMWF Reanalysis ERA5 as boundary conditions, increasing the spatial resolution to 0.25°. It means waiting until the new EURO-CORDEX simulation is performed, but at least WRF can be run in future studies comparing the previous and latest versions. In general, I would appreciate some discussion about that since one of the conclusions is that the RCM does not significantly improve performance.

We agree that the use of ERA5 as unified model forcing would possibly yield to more sophisticated models and that a comparison of an ERA5-driven WRF simulations with the current version would be interesting and may be conducted in future works.

We will elaborate on that in the discussion section.

2. Is downscaling with WRF performed with two nested domains due to coarse ERA-Interim resolution (0.50° -> 15km -> 5km)? It should be explained in the data section; I didn't find the reference paper (Wagner and Kunstmann 2016).

Correct, two nests were used due to the coarse ERA-Interim resolution. We will add a sentence in the data section to make this clearer: "A two domain setup with one-way nesting was employed to downscale the ERA-Interim reanalysis of approx. 75 km."

The reference paper for the WRF simulations is actually Warscher et al. (2019). It is openly accessible under this link: <https://www.mdpi.com/2073-4433/10/11/682>.

3. Figure 2. I need help seeing all the distribution, especially the reference E-OBS, which is completely missed. I suggest rethinking this.

We agree. We will work on the visibility of this figure, especially making the E-OBS reference more visible.

4. Typos: L530 "are better"; L572 missing comma "(Petrovic et al., 2022), in which"; L611 "an average intensity"

We will correct all the typos mentioned.