

## Topical Editor review

Authors did not provide adequate response to all reviewer comments. I as editor should not need to intervene at this level. Please make or otherwise respond to each and every correction. Please ensure one full careful reading, with Copernicus guidelines in hand, of final manuscript.

Line 35: Western Europe is not a “temperate oceanic region”.

According to Köppen-Geiger-Peel climate classification (Peel et al., 2007), a large part of Western Europe is in a “Cfb” climate (i.e. Group “C” for temperate climate, Group “f” for without dry season and Group “b” for warm summer) which can be summarised as oceanic temperate climate, knowing that without the influence of the ocean some seasons could be drier. This term "oceanic" is indeed open to discussion. Furthermore, we can also discuss the definition of "Western Europe" which does not have a clear universal definition, for example, sometimes Spain is included in Western Europe sometimes not, and the eastern boundary of Western Europe is blurred and variable depending on the definition. Thus, to avoid any ambiguity, we have deleted the term “oceanic”, which allows us to really encompass as many countries as possible while remaining in line with the Köppen-Geiger-Peel climate classification.

Lines 131-132: This sentence, about ESMs, fails on both accuracy and clarity.

This sentence has been rephrased in two sentences:

*“However, as the ESMs are not able to represent general circulation changes (Eyring, V. et al., 2021), the use of one scenario or another will not cause more blocking anticyclones leading to more persistent heatwaves for example. Thus, whichever scenario is used will only reflect temperature changes in relation to its GHG concentrations.”*

Lines 136 to 147: This entire paragraph seems confusing at best, random and inaccurate at worst. Please start fresh on a clear rational paragraph. Define ‘computational’ needs or limits and “these issues”.

This paragraph has been rephrased in:

*“Hence, only the SSP5-8.5 scenario has been calculated and the other scenarios (SSP3-7.0 and SSP2-4.5) are derived from the MAR simulations forced by the ESMs using the SSP5-8.5 scenario since the warming rates from lower scenarios are included in the scenario SSP5-8.5 but for a different earlier time period. Thus, for each scenario (SSP3-7.0 and SSP2-4.5), the equivalent warming period in the SSP5-8.5 scenario has been found according to these 3 steps:*

*1) The raw 2m annual mean temperature of each ESM and each scenario has been aggregated over Belgium to the horizon 2100;*

*2) For each ESM, the equivalent 20 years period from the SSP5-8.5 scenario has been chosen as the period with the closest mean and the closest interannual variability of the 2m annual temperature compared to the future 20 years period (i.e. 2021-2040, 2041-2060, ...) from the two other scenarios (SSP3-7.5 and SSP2-4.5);*

*3) Once the equivalent warming period has been identified, the data of this period is extracted out of the SSP5-8.5 forced MAR simulations for both SSP3-7.5 and SSP2-4.5 scenarios. For example, the data of MAR-MPI for SSP3-7.0 over 2081-2100 are the outputs of MAR-MPI using SSP5-8.5 over the period 2066-2085.*

*This method is open to discussion for several reasons, firstly because the climate does not react in a linear way to an increase of GHG flowing through the different SSP scenarios. Moreover, with an equal warming rate but different periods, the Earth, Atmosphere and Ocean systems will not have the same (spatial and temporal) responses due to their inertia. Despite these precautions, this methodology allows us on the one hand to derive a quick estimation without additional computer*

*time. On the other hand, it remains valid as a first approximation, especially since the most interesting weather variable in this study is temperature, which is, by construction, the least sensitive to these issues.”*

Line 150: For a manuscript published in 2022, 1980 to 2014 does not represent “present”. It instead represents (as already defined) historical. I did not find authors’ answers to reviewer complaints on this dichotomy (present vs historical) clear or compelling. Also noted by at least one reviewer. Please resolve in a careful thoughtful useful manner.

We have changed this sentence in: “[...] *it is necessary to evaluate them over the overlapping period between the ERA5 reanalyses and the historical scenario (namely 1980-2014 ).*”  
And we have added in section 2.2.2 this sentence to avoid any ambiguity: “*Finally, it should be noted that the historical scenario mentioned in Section 2.1 is forced by the greenhouse gas concentrations observed over the period 1980-2014.*”

Line 153: a few lines earlier (line 147) a reader learned that only temperature mattered. Here we learn that 2m temp plus surface radiation represent the most important factors. Very confusing?

We have adapted this sentence to: “*As the most important variable for this database is the temperature at 2m above ground level (a.g.l.) and an important secondary variable is the incoming solar radiation, the mean and standard deviation of these data over the period 1980-2014 and over the Belgian territory are compared in Tab. 1 and Fig. 3.*”

Line 178: ‘parameter’ abbreviated as “para”. Odd, bogus, confusing, ineffective. Please remove and restore.

This term has been replaced in the whole manuscript without abbreviation.

Line 197: having visited many cities and regions in Belgium, this reader has yet to encounter what most of us would consider ‘highlands’. If authors want to use (mis-use?) this term, they at least need to define the elevations. Figure 2 does not help.

We have corrected in: “[...] *in the highlands (with altitudes above 300m in Figure 2) [...]*”

Geographic standards exist for city names in any/every country. Please assure that use of names here meets those standards, by cross-listing if necessary.

We have corrected some city names according to the city names employed by the National Geographic Institute of Belgium (<https://topomapviewer.ngi.be/>).

Line 225: dependent on the period preceding and/or following it (according to use of the files ... Please correct as suggested or otherwise change wording to make intention clear.

We have corrected this sentence in: “*Finally, the HWE files contain only the period corresponding to a heatwave event. However, depending on the purpose of the users, the effects of a heatwave can also be dependent on the period preceding and/or following it.*”

However we do not know which suggestion you are referring to as this whole paragraph was added after the 1st round of review.

Figure 2: Topography units in C? Please correct.

This is a surprising remark because we do not see any topography with a unit of degrees Celsius. To make sure we are using the same figure, we have corrected this Figure 2 according to the remark above (about city names) and we took the opportunity to add an "m" next to the colour scale to avoid any ambiguity.

Figure 3: unacceptable in present weak format.

Fig. 2, Fig. 3, Fig. A1 and Fig. A2 have been revised and the image format of Fig. 3, Fig. A1 and Fig. A2 have been changed in ".tiff" instead ".png". These new figures have been added at the end of the main document but also in a PDF supplement file as suggested.

Somewhere authors need to describe in full text the ESM sources: e.g Beijing Climate Centre, Max Planck Institute, etc. At least one reviewer already made this request.

We have added a Table A1 to summarize all these information.

Many typographical, punctuation and abbreviation errors, plus errors of meaning and context. Overall, not well written. Type setters will fix some of these errors but authors need to first conduct full careful review and edit following closely to Copernicus publication guidelines.

The whole text was checked for punctuation, grammar and other errors according to the Copernicus guidelines. We have noted that the Copernicus guidelines prohibit abbreviation in titles. We have removed these abbreviations except for one: the regional model MAR.

We absolutely want to keep this abbreviation in the title like all our articles (see Agosta et al, 2019; Doutreloup et al. 2019, 2021; Fettweis et al., 2013; Kittel, 2021 and many others) in order to make this model known. However, to be as explicit as possible we have changed the title to :

*"Historical and Future Weather Data for Dynamic Building Simulations in Belgium using the regional climate model MAR: Typical & Extreme Meteorological Year and Heatwaves"*.

We hope that this wish and this title modification can be accepted.

### **Notification to the authors:**

1. Appendix figures should have standard headers (not "A-2", but "A2")

We have corrected these references it in the figure captions but also in the manuscript.

2. For the next revision, please pay attention to the quality of the supplement images. In addition, I would recommend that you combine all images and their captions into a single PDF supplement file.

Fig. 2, Fig. 3, Fig. A1 and Fig. A2 have been revised and the image format of Fig. 3, Fig. A1 and Fig. A2 have been changed in ".tiff" instead ".png". These new figures have been added at the end of the main document but also in a PDF supplement file as suggested.

### **References :**

Peel, M. C., Finlayson, B. L., and McMahon, T. A.: Updated world map of the Köppen-Geiger climate classification, *Hydrol. Earth Syst. Sci.*, 11, 1633–1644, <https://doi.org/10.5194/hess-11-1633-2007>, 2007.