

The latest version of the manuscript leaves much better impression when compared with the previous one. I appreciate authors' efforts to improve the manuscript based on both reviewers' suggestions. It obviously required a lot of work, but the manuscript now has significantly improved structure and consequently, notably improved readability. Also, a newly added validation chapter crucially contributes to the quality of the manuscript. However, I still find there is a space and need for further improvements, so my observations and suggestions in this regard are as follows:

1) The title does not correspond adequately to what is presented in the manuscript. It seems to me that the data set is developed with intention to be used in paleo-ecology (at least the introduction indicates so), therefore, there is no reason not to put that into the title. Also, I would remove "V1.0" from the title, I find it useless. I would rather put "high-resolution data set" or even more specifically: "1-km data set" if that is something what will differentiate it from other potential similar datasets. A suggested title could be: "CHELSA-TraCE21k high-resolution (or "1-km") data set - downscaled transient temperature and precipitation data since the last glacial maximum – development, validation and application in paleo-ecology", or something similar, maybe shorter. If you want to maintain the current title, then I am afraid you would have to change the bigger part of the introduction.

2) It was really an unfortunate decision to name equally both the data set and the algorithm/model - CHELSA V1.2. Regrettably, I don't see significant progress in clarification in that context throughout the manuscript. Only between the lines 60 and 121, a reader can find the next phrases: "CHELSA V1.2 **algorithm**", "CHELSA V1.2 **climate data set**", "CHELSA V1.2 **mechanistic downscaling model**", "CHELSA V1.2 **procedure**", "CHELSA **downscaling model**", "CHELSA V1.2 **model**". It is just unacceptable and extremely confusing. I find it necessary to add a paragraph, for example, somewhere at the beginning of chapter 2, clarifying that and informing the reader there are the dataset and the algorithm/model with the same name. It has to be very clear. And try to use only 2 words in its description throughout the text, for example "data set" and "model/algorithm". In addition, once again, please, maintain consistency throughout the text and decide whether you want to use "TraCE21k" or "TraCE-21k".

3) In abstract, you say: "*High resolution, downscaled climate model data are used in a wide variety of applications across environmental sciences*". Then in chapter 6, you start with: "*Transient long-term climatic data have a wide range of possible applications*". Please, add 2-3 examples where exactly, for example, just continuing the sentence by: "..., such as A, B and C, for example".

4) Are there other comparable downscaled data sets available on the market? If yes, then, what is the advantage of CHELSA-Trace21k, why is it different/better than the other ones, why it should deserve attention, why is it unique? Please, clarify in a sentence/paragraph, in conclusion, for example.

5) Before submitting a final version of the manuscript, I suggest a thorough inspection regarding the consistency of the use of terms throughout the manuscript, as well as typing and other errors

Specific comments:

Line 8:

High-resolution

Lines 9-10:

Here we introduce a new, high-resolution **dataset**, named CHELSA-TraCE21k. It is obtained by downscaling TraCE-21k data, using CHELSA V1.2 **algorithm** with objective to create global monthly climatologies for temperature and precipitation at 30-arc sec spatial resolution in 100-year time steps for the last 21,000 years.

Line 18:

Validations show that CHELSA-TraCE21k V1.0 **dataset** reasonably represents the distribution...

Line 27:

GCM states for **general** circulation model, not global

coarser grain=>coarser resolutions

Line 34:

has been bridged, or had to be bridged

Line 59:

Here we present paleo-climatic data, downscaled from the **CCSM3_TraCE21k model output (or TraCE21k dataset)** to a 30-arc sec. resolution using the CHELSA V1.2 algorithm

Line 67:

in various parts of the world **from**

Line 68:

The TraCE-21k simulation has T31_gx3v5 resolution (.....)

Line 70-71:

Which resolution??

Please, specify the resolution per model component, for example CAM has resolution 3,75°x3,75°, which is important information for this manuscript, because you are downscaling atmospheric variables

Line 76:

It includes **mean monthly daily 2m mean**, minimum, and maximum temperature ?!

Line 78:

ERA stands for 'ECMWF Re-Analysis'

Lines 332-335:

Figure 2, axis labels not very clear, should be improved

Line 361, 364, 373:

RMSE, not RSME

Lines 444-450:

Figure 6, a) and b) missing on the figure; a) is also missing in the legend

Line 455:

...**if** the transient...

Line 498:

Separate Figure 7 legend from the text below