

## Review of the *Climate of the Past* manuscript:

### **Climatic extremes and their social impact in 17th-century Transylvania. A climate-historical reconstruction in the context of the Little Ice Age**

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#### **General comments:**

I appreciate the efforts of the authors to compile this impressive historical data base. However, there remains a lot to do concerning the presentation of the results and – in particular – the language of the paper.

(1) Many scientific terms used in this paper are either unusual – or not fully correct. Below you find some examples, but this list is not exhaustive.

Line 14: “thermal values” – why not “temperatures” ? (“thermal values” are used to quantify insulating properties)

Line 47: “individualized” is generally understood as a synonym for “personalized” – that’s not what you wanted to say about the MM.

Line 91: What are “centralised studies” ?

Line 94: “when meteorological observations were not available” I would suggest to use “measurements” instead of “observations” – since observations (described in historical archives) are in fact the basis of your analysis.

Line 97: “experiential dimension of climate”. I would understand “experiential” as “based on experience”, like in “experiential learning”.

Figure 1, caption: “territorial expansion”. “Expansion” means an **increase** in size – that’s not what you want to say.

Figure 1: “Altimetry” is the science of the **science** of measuring altitudes/elevations ... I would suggest to use “elevation” instead.

Line 131: I am aware that “Pontic” refers to the “Black Sea”, however, I have never seen “Pontic air mass” mentioned in scientific literature.

Line 136: “fohn movements” I guess that you mean the “Föhn effect”

Line 257: “glacier in the Scarisoara cave”. The ice in this cave is certainly not a glacier. Glaciers are formed by compression of snow – and they move (by definition).

Figure 10: “solar points” should be “sunspots” (and not “sun spots”).

(2) The presentation of the results needs to be improved. Several examples are included in the (again non exhaustive) list of specific comments below. I understand that acronyms are necessary, but the inconsistent use (see specific comments) makes it particularly hard to follow the argumentation. Another example: In Fig. 4 “violet” means “cold” and yellow”

means “warm” (which is fine). However, in Fig. 3 immediately above “yellow” means “cold” **and** “warm”. Similar in Fig. 5: Please use different colors for cold, warm, dry and excess (precipitation). In Fig. 6 “no data” is represented by “green” in (b) and by “yellow” in (a) – please avoid! Figure 7 is particularly hard to read.

(3) The attribution of the climate variations to solar forcing is too exaggerated (e.g., “The most plausible explanation for the high frequency of very low temperatures during the 17th century is low solar activity.”, line 594) and not backed by the results shown. This attribution is also not really supported by the cited references. E.g., Stangl and Foelsche (2022) conclude: “This comparison suggests a certain solar influence but the agreement is not very pronounced.” And they found “an unusually **small** number of severe winters during the last decades of the MM” (for the same study area) – which does not speak for a strong solar influence.

(4) Please provide references for all the software packages used.

(5) References: Please provide DOIs for all the references.

### **Specific comments:**

Line 20: “of which 36 occurred during the Maunder Minimum (1645-1715).” Do you actually mean in the period 1645-1715, or in the period 1645-1700 (which would be the end of your study period)?

Line 23: “from the natural archive” --> “from natural archives” (there is not just one).

Line 40: “In this regard, Perşoiu et al. (2017) mention that in the first part of the Holocene ...” Is the first part of the Holocene really relevant for your study period?

Line 48: “2°C” --> “2 °C” – you should always use space between number and unit.

Line 60: “cores” – do you mean “ice cores” ?

Line 83: “The hypothesis from which it was started is that, in agreement with western and central Europe, the territory of Transylvania must have been characterized by a similar climate ...” Is this really true? It is contradicted by the statements in the following lines. And isn’t one of the values of your study, that you can characterize differences to the climate in Western and Central Europe?

Figure 1: The color bar for the elevation (“altimetry”) is a bit misleading, since the colors don’t match those of the map. Furthermore, it starts with “-20 m”. I am aware that parts of the Danube Delta are below sea level – but the map doesn’t show this part of modern Romania.

Figure 1: “Localities referred to in the” There is something missing.

Methods: Apparently, the method applied is (understandably) very similar to the one used by the same authors (Gaceu et al, 2025) for the 16<sup>th</sup> century. I wonder why this is not mentioned in the text.

Line 177: “literate people, with writing concerns.” I would understand “Writing concerns” as “Writing difficulties”. I don’t think that you wanted to say this.

Figure 2: “Climat” --> “Climate”; “regim” --> “regime”

Line 215: “cold (CY) and warm (HY) years”. According to Fig. 2, HY should stand for “hot” year (not “warm”).

Line 215: “cold (HW) ... winters”. According to Fig. 2 “H” stands for “harsh” – and this not a very good choice, since “H” can also mean “hot” sea above.

Line 220: “heavy precipitation (AP)”. According to Fig. 2 this would be “abundant” precipitation. If it should stand for extreme precipitation then I would suggest to use “heavy precipitation” with the acronym “AP”.

Line 225: “high prices and famine (IH)”. According to Fig. 2 “IH” stands for “inflation and hunger”

Line 257:  $\delta^{18}\text{O}$  have been used – as a proxy for what?

Line 276:  $\delta^{13}\text{C}$  have been used – as a proxy for what?

Figure 4: “no data”. This is a bit misleading. As you described before (and after), this can also mean that nothing was mentioned, because the weather was “normal”. If there should be real data gaps, I would suggest to mark them in a different color.

Figure 4: How is, e.g., the “Winter 1601” to be understood. Is this the winter 1600/1601 or the winter 1601/1602 ?

Line 321: In the second half of the century, when the cooling was more pronounced, winters were reported as being extremely cold, 36 out of the 55 winters ..”. This is a bit misleading- The second **half** of the century should not include more than 50 winters, right?

Line 326: “the winter of 1645”. Is this 1645/46 ?

Line 359: “In this century, 64 years, testimonies of these types of climatic phenomena were recorded.” What does this mean?

Line 366: “.. anticyclones, most often united in winter,” What does “United” mean in this context? Do you mean that different anticyclones merged?

Figure 9, caption: “b – famine and famine” ?

Figure 10: I cannot distinguish the colors for “warm spring” and “warm summer”. The figure shows more a “comparison” than a “correlation”. If you would indeed compute a correlation, it would likely be small (e.g. 3 cold winters in the decade with lowest solar activity, but 4 in the decade with highest solar activity ?).

Figure 11: The description of the comparison with proxy data is not very clear. If I understand it correctly, low  $\delta^{18}\text{O}$  from Scărișoara Cave shall reflect cold winters (line 621: “a sharp decrease in winter temperature starting ~800 years ago, with a minimum during the MM and LIA, when  $\delta^{18}\text{O}$  values reached their lowest levels”). However, according to Fig. 11 the lowest  $\delta^{18}\text{O}$  values within the 17<sup>th</sup> century occurred **after** the MM – when the winters were **not** particularly cold. The absolute minimum occurs in 1619 – together with a warm winter.

Figure 12: As the discussion related to this Fig. is not clear enough. First you report on  $\delta^{18}\text{O}$  values from stalagmites – but you don’t show the data. Nevertheless, you find that “The data from these natural reconstructions fit perfectly with the data obtained in this study from historical documents”, line 661). Then you jump to  $\delta^{13}\text{C}$  data – without explaining what they are supposed to tell us – which are actually shown in Fig. 12. If the “perfect fit” refers to this

Fig. – I cannot see it. And how could there be a perfect fit, when the  $\delta^{13}\text{C}$  data change only gradually, while the historic data show much higher variability.

Line 734: I wonder if this “data availability statement” will be satisfactory for *Climate of the Past*.

Please note that this are just some examples. Any careful copy-editor will find more.

After all this criticism I want – nevertheless – to conclude that I regards this as an important study, which deserves to be published, if it is properly revised.