

Reply to Reviewer 2 (Anonymous Referee #2, 06 Apr 2026)

Dear Authors,

The paper 'Climate variability in Poland (Central Europe) in the 16th century based on multiproxy data' fits the scope of *Climate of the Past*.

A few comments are provided to enhance the manuscript:

It would be important to add a few sentences about the effects of proximity to the sea in the North and of continentality in the South, and to cross-reference them with the mentioned air temperature differences.

Reply: the following text was added to section 4:

One of the most important reasons for this variability is the increasing continentalization of the climate in Poland, which is progressing from west to east (Kozuchowski and Marciniak, 1985) and is caused by the decreasing influence of oceanic masses flowing eastwards from the Atlantic, particularly in winter. The influence of the Baltic Sea on the climate of Poland extends only several dozen kilometres inland, mainly along the coast in north-western Poland. The mentioned maritime air masses bring warming to Poland in winter and cooling in summer.

Kozuchowski, K. and Marciniak, K.: Zmiany kontynentalizmu termicznego klimatu Polski, Wiadomości IMGW, 1985.

This variation does not significantly affect the temperature differences between the 16th and 20th centuries, because the same climatic factors operated similarly in both periods.

Lines 62 – 65: Add references.

Reply. Thank you for this suggestion. We added the following supplement to the text, with some of the most important synthesis papers: (*Grove 1988; Hughes and Diaz 1994; White et al. 2018, and references therein*)

Grove, J. M.: *The Little Ice Age*, Methuen & Co., London, 498 pp., ISBN 0-416-31540-2, 1988.

Hughes, M. K., & Diaz, H. F. (Eds.): *The Medieval Warm Period*. Dordrecht: Springer Netherlands. <https://doi.org/10.1007/978-94-011-1186-7>, 1994.

White, S., Pfister, C., & Mauelshagen, F. (Eds.): *The Palgrave Handbook of Climate History*. London: Palgrave Macmillan. <https://doi.org/10.1057/978-1-137-43020-5>; ISBN: 978-1-137-43019-9, 2018.

Lines 100 – 103: Add references.

Reply. We added the link to the project: <https://extremeweather.umk.pl/pages/funding/?lang=en>

Line 111: Add references.

Reply: Thank you for this suggestion. We added the following references: Przybylak et al. (2005); Przybylak (2011, 2016).

Przybylak, R.: Changes in Poland's climate over the last millennium, *Czas. Geogr.*, 82, 23–48, 2011.

Przybylak, R.: Poland's Climate in the Last Millennium, in: *Oxford Research Encyclopedia, Climate Science*, Oxford

University Press, USA, <https://doi.org/10.1093/acrefore/9780190228620.013.2>, 2016.

Przybylak, R., Majorowicz, J., Wójcik, G., Zielski, A., Chorążyczewski, W., Marciniak, K., Nowosad, W., Oliński, P., and Syta, K.: Temperature changes in Poland from the 16th to the 20th centuries, *Int. J. Climatol.*, 25, 773–791, <https://doi.org/10.1002/joc.1149>, 2005.

Lines 484 – 486: This sentence is unclear, and it would need additional data and references to support arguments. Is this statement valid for Central Europe? How about other regions in Europe with very different climates (e.g. Southern Europe or Western Europe)?

Reply. Thank you for these suggestions. For greater clarity, we changed the sentence as follows:

Thus, it seems very probable that the winter temperature should also be used ~~to for~~ representing annual temperature in ~~some parts of~~ Europe, particularly in central Europe, instead of the more usual use of summer temperature for this purpose (see Ljungqvist, 2010).

Line 634: Explain and add references/data to support arguments, particularly when comparing Poland to other geographical areas.

Reply. Thank you for this suggestion. For greater clarity, we added the following references: Hernández-Almeida et al. (2017); Valler et al. (2024). The text was also slightly modified; see below:

On the other hand, summer temperature reconstructions are ambiguous (Hernández-Almeida et al., 2017; Valler et al. 2024). A reconstruction based on documentary evidence does not indicate a temperature drop in the second half of the 16th century, except for the decade 1561–70 (Fig. 5), whereas a chironomid-based reconstruction of August temperature does (Fig. 10G). Additionally, a global palaeo-reanalysis reveals a cooling at this time (Fig. 11, Fig. S1). The lower accuracy of information on weather conditions in historical sources for the last three decades of the 16th century, compared to the earlier period (Fig. 2), may be one of the reasons for the uncertainty of summer temperature reconstruction based on the documentary evidence.

Do the documentary sources mention the impacts of climate deterioration? It would be interesting to include a few examples/transcripts to highlight the impacts, such as on farming/crops or freeze-thaw cycles.

Reply. We constructed a new Table (Table S2) to supplement, with six such examples.

Include an image of one of the documentary sources for context and illustration purposes.

Reply. Thank you for this suggestion. One example of a documentary source was included in the supplement (Fig. S1).

Best wishes,

Reviewer

Thank you very much for all your constructive comments and suggestions, which definitely helped us to improve our article.