

Dear anonymous referee,

Thank you very much for your valuable comments and constructive suggestions. Having carefully reviewed your feedback, we have gained significant insights and benefited greatly. We believe that revising according to your suggestions will greatly enhance the quality of our study. For instance, following your advice, we thoroughly polished the abstract again, adding points such as the significance of drought research in our study area and the feasibility of reconstructing drought processes and severity using historical literature. We carefully considered and corrected sentences with unclear semantics and insufficient emphasis, as mentioned in your feedback. Additionally, we supplemented and corrected the maps in the manuscript as per your suggestions, such as adding a larger background map and modifying the Digital Elevation Model (DEM) color gradient. Moreover, we corrected other inappropriate aspects pointed out by you in the manuscript. It is an honor for us to receive your review and guidance. The following are detailed point-to-point modifications made, with all changes already incorporated into the original manuscript. Once again thank you for your review and feedback!

Anonymous referee, 18 Jan 2024

The authors Hao et al., present a reconstruction of the 1759 drought and the social response to such an extreme event in Northeast China. The article is well-structured, showing that the authors have dedicated a lot of time to documenting this event and its impacts on society. I missed, however, an analysis, or at least an hypothesis of the potential causes of such drought, I am not suggesting the use of climate models for this. However, I would have liked to see how their results are reconciled with those proposed in the Asian Monsoon Drought Atlas (Cook et al., 2010), which is supposed to be a reference in the region for reconstructing hydroclimate with annual resolution, and where it is shown that the period analyzed in that region is rather wet.

Upon careful consideration, we have identified several factors that may account for the discrepancies between our research results and Cook's *Asian Monsoon Drought Atlas*:

1) Our study focuses on droughts which affected crops, and the growth period of crops is not year-round but primarily spans from late spring to early autumn, that is from May to July in Northwest China. Therefore, drought impacts on crops may not fully reflect the annual precipitation in this region.

2) The rugged terrain and significant elevation variations in Northwest China result in agricultural areas being predominantly situated in low-lying river valleys. This means, the agricultural areas are at different elevations from the forested areas where Cook's study utilized tree-ring proxy data. Drought conditions at lower elevations could lead to increased temperatures, facilitating upward air movement and convective precipitation in high-altitude mountainous forested areas, thereby maintaining relative humidity in the forested areas. Conversely, more moisture may precipitate in windward slope forests, potentially leading to water scarcity on leeward slopes and making low-lying farmland more susceptible to drought.

In summary, our study is based on reconstructions of drought beginning times and durations using historical documents, which primarily document the impacts of climate on human agricultural production, rather than the direct observations of natural vegetation growth, such as forests. Thus, differences in the temporal and spatial aspects of human-dependent crops and naturally growing vegetation may contribute to the deviations between our study and the *Asian Monsoon Drought Atlas*. Following your suggestions, we incorporated the above discussion into our manuscript and provided supporting references.

1.The abstract needs a lot of polishing. First line doesnt make sense.. you need to write one or two lines giving some context on why this study is important for the region, etc. Then, you state that you were able to reconstruct droughts using historical documents, etc.

A: Comment accepted. We have added sentences regarding the significance of the study for this area and the use of historical literature in studying drought.

2.Line 10- Remove "of".

A: Comment accepted. The above-mentioned mistake has been corrected as suggested.

3.Line 15. 1759 is not needed here.

A: Comment accepted. The above-mentioned mistake has been corrected as suggested.

4.Lines 19-20 are confusing... You mean "with WORST?" Otherwise i dont understand the sentence.

A: Thank you for pointing out the ambiguity. The original statement “*With better climatic conditions in the 18th century, China had higher agricultural harvest levels in the 18th century than in the 19th century.*” meant that the climatic conditions in the 18th century were better compared to the 19th century, resulting in overall higher agricultural yields in 18th-century China. Based on this, in the year 1759 of the 18th century, benefiting from good crop yields in regions outside of Northwest China, the government mitigated the impact of drought in the Northwest region on society through interregional grain allocation.

5.Line 23. You need a couple of references there to support such a strong argument.

A: Comment accepted. We have added a reference to support the viewpoint expressed in this sentence.

Haug, G., Gunther D., Peterson L., Sigman D., Hughen K. and Aeschlimann B.: Climate and the collapse of Maya civilization, *Science*, 299, 1731–1735, <http://doi.org/10.1126/science.1080444>, 2003.

6.Line 25. I did not find Sapir, 2017 in the references.. is it Guha-Sapir?

A: Thank you for pointing out this error. We have corrected the citation.

7.Figure 2. The maps could be improved by a lot. First, even though China is a big country, it would be helpful to include a location context map, within China. Then the DEM legen chosen is not informative at all (from 0 to 4000 m. asl), the colors are pretty similar. Either you want to

show that there are huge relief differences, or if not, maybe is better not to include the DEM at all. You already have an ok DEM in Figure 1. I would consider removing it from Figure 2.

A: Comment accepted. We have changed Figure 1 to include a larger map, illustrating the location of our study area within a broader region. Additionally, we have removed DEM in Figure 2.

8. Figure 5. Cities, not Citys.

A: Comment accepted. The above-mentioned mistake has been corrected as suggested.

9. Figure 6. If its the same location as in Figure 2, why doing a different DEM? consider removing it.

A: Thank you for pointing out this confusion. We have removed the DEM from Figure 6.

10. The manuscript is already too long, but I honestly believed it would have more impact and would be more useful for the scientific community if 1) you try to reconcile your findings with those reported in the MADA, and 2) you try to give a potential cause for having such a drought.

Thank you for highlighting this confusion. Our study relies on meteorological drought records extracted from historical literature, along with assessments of drought severity inferred from crop failures and relief efforts in affected areas. Therefore, the differences between our study results and Cook's *Asian Monsoon Drought Atlas* may be attributed to the rugged terrain of Northwest China, which resulted in varying elevations between agricultural and forested regions, leading to differences in drought and flood conditions. Additionally, the short growing season of crops may contribute to the inconsistency in climate conditions between agricultural areas, represented by crops, and forested areas, represented by tree rings.

In summary, our research is grounded in historical records, which offer direct accounts of climate impacts on human activities, aligning with the ultimate goal of climate change research: to save lives and property, and achieve sustainable societal development. Historical climate records primarily focus on regions with intense human activity and significant human disturbances, complementing studies using proxy data from natural sources like tree rings, stalagmites, and ice cores, which are less impacted by human interference.