

Anonymous Referee #2

This manuscript attempts to interpret the interaction between the westerlies and monsoons in the arid regions of northwest China from the perspective of historical climate using tree-ring data from three locations. While it has some regional representativeness, upon reviewing the entire manuscript and comparing it with previous work, significant deficiencies are identified.

Firstly, the theme and content of the manuscript lack cohesion, failing to pose scientific questions for resolution.

Reply: While previous studies in this area are all single-point climate reconstruction studies, there is a lack of research on the interaction areas and driving mechanisms of the two major circulations (Westlies and East Asian summer monsoon). This paper aims to study the spatio-temporal heterogeneity of climate change and the driving mechanisms of the two major circulations using the dendroclimatological methods and three sample sites around the Alxa Plateau. It has been added in the Abstract and Introduction sections.

The discussion section is unclear, lacking coherence and substance.

Reply: We think the discussion section is closely related to the results section.

Secondly, the chosen theme has seen considerable innovative research, yet the manuscript fails to distinguish itself from similar studies or highlight intriguing aspects.

Reply: While previous studies in this area are all single-point climate reconstruction studies, there is a lack of research on the interaction areas and

driving mechanisms of the two major circulations (westlies and East Asian summer monsoon). This is the theme and highlight of this article.

Lastly, the entire document requires thorough language editing and improvement. Paragraph distribution should be compact and logical, unnecessary content should be removed, and detailed explanations should enhance content relevance.

Reply : It has been rewritten and reorganized.

Specific editing suggestions:

1) Line 24: "Qinghai spruce?" Use the Latin name for plant species, the same applies to line 284, etc.

Reply : We revised it accordingly.

2) Lines 45 and 51: Citation error, reference 2019a should precede 2019b.

Reply : We revised it accordingly.

3) Line 48: What does EASM stand for? Same for subsequent instances.

Reply : We revised to EASM (East Asian summer monsoon) accordingly.

4) Lines 49 to 52: Grammar errors, merge long and short sentences into one.

Reply : We revised it to: " This was true even before the onset of global climate change in the area, and it is even more pronounced in recent years. ", according to the comments of Reviewer 1.

5) Line 55: Unclear subject reference.

Reply : This sentence was deleted.

6) Line 72: Extra space.

Reply : It was corrected.

7) Lines 77 to 80: Does "which" refer to your team or dendrochronology? Clarify.

Reply : "which" refer to dendrochronology, and we revised it.

8) Subsection 1.2: Summarize previous research concisely, highlighting key points rather than listing references.

Reply : We have rewritten the introduction section.

9) Lines 122 to 123: Currently, there is no clear theoretical support for the impact of reconstruction results on desertification control.

Reply : Because desertification/environmental change processes in the Alxa Desert Region are strongly influenced by the regional climate, clarifying climate change processes is beneficial to desertification control.

10) Line 129: Unclear referent for "it." Merge sentences for clarity.

Reply : It changes as this area.

11) Line 130: Add reference.

Reply : We revised it (Xiao et al., 2017; Xiao et al., 2019).

12) Subsection 2.1: Streamline, remove irrelevant content.

Reply : Figure 1 has been redrawn to correspond to the relevant content.

13) Line 186: What standard method? Provide reference.

Reply : We added the references accordingly.

14) Line 190: Specify the method for constructing the chronology or provide a reference.

Reply : We have added the references and reasons for choosing the RES chronologies.

15) Lines 200 to 203: Reference for SPEI data source and justification for choosing SPEI over PDSI needed.

Reply : We have added the references.

16) Line 230: What is SD? Specify the full name if it is standard deviation.

Reply : We have added the full name.

17) Lines 238 to 241: Why use RES chronology?

Reply : In order to highlight the high frequency signal, the RES chronology is selected for later climate analysis.

18) Table 1: Statistical indicators should be based on synthetic chronology results.

Reply : At each mountain, we had multiple sampling points, and we first created a chronology for each sampling point and then used a weighted average to calculate a regional chronology representing that mountain. So, statistical indicators of all chronologies were used to illustrate the reliability of the chronology.

19) Subsection 3.2: Why no discussion of seasonal correlation? Which season does the radial growth signal indicate?

Reply : This paper does not deal with climate change reconstructions, so seasonal-scale correlations are not analyzed.

20) Table 2: Consider using a graphical representation for better clarity; tables appear disorganized.

Reply : We have merged Table 2 with Figure 3 as suggested by the reviewer.

21) Figure 5: Inconsistent color transparency in gray bands.

Reply : The difference in transparency is to distinguish between dry and wet years.

22) Line 479: Clarify the intended message.

Reply : We have merged this paragraph with the previous one.

23) Lines 511 to 534: Unclear discussion; is there a close connection to the manuscript's theme?

Reply : This section focuses on analyzing the global atmospheric circulation interactions including monsoon and westerlies and the driving mechanisms. It is also the subject of this paper.

24) Line 540: Extra space.

Reply : We deleted the space.

25) Lines 553 to 554: No significant correlation between DS and EASM; how can monsoon decline be interpreted as promoting tree growth?

Reply : On the interannual scale, the monsoon declined in the 1970s while the westerlies were strengthening. This is the new finding of this study.