

## ***Interactive comment on* “The quantitative reconstruction of the paleoclimate between 5200 and 4300 cal yr BP in the Tianshui Basin, NW China” by N. Sun and X. Q. Li**

### **Anonymous Referee #2**

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General comments: Charcoal records are rare and are of general interest as they in contrast to pollen provide a more detailed view on the local vegetation history and its species-specific composition. However, I have major concerns with the presentation and discussion of the results. In summary my concerns are: (1) the scientific scope of the study is somewhat unclear; (2) the depositional environment has not been critically assessed; (3) the method for climate inference from charcoal data has not been properly presented; (4) the construction of the age-depth-relationship is problematic; (5) the results were not sufficiently compared to other quantitative climate information for the mid-Holocene

Specific remarks are: 1. Introduction: This part needs to be improved – much more details are necessary to indicate the relevance and challenge of this study and finally specific research questions need to be formulated. Also why particularly the time frame from 5200 to 4300 is of interest is unclear from that introduction.

p.2, 25: What are the specific open palaeoclimatic questions that need to be answered with quantitative climate data from the loess plateau? Please provide a short review with references that are up-to-date.

p.3, line 13: summarize all results that were published on quantitative climate reconstructions from the loess plateau – also those from pollen data

p3., 20: provide more details on the limiting climatic factors for vegetation in your study area – how about human impact

p. 4, line 27: provide some more details on the potentials and limitations of charcoals – and indicate what studies have already been published from China/Central Asia

## 2. Study area

Provide more information on how the sedimentary environment looked like during the mid-Holocene

p. 4 line 15: Why do the authors consider the study area to be sensitive to climate change? Provide explanation! p. 4 line 16: What is the origin of these very detailed climate data? How is it possible that such detailed climate area provided (e.g. 491.6mm/a) for such a large area. How about further climatic parameter – evaporation, growing day etc.

3. Methods I do not understand how the age-depth-models for the single sample in the Xishanping section was constructed. As no AMS results were available for the investigated horizons and the sections is characterized by distinct sediment changes and also by age-inversions an interpolation is not appropriated with that record. It is just possible to give a rough estimate of the age as late-Mid-Holocene. Why the

data were not investigated with ordination technique to see whether there occurred significant changes in the vegetation composition? It seems that this aspect of the charcoal results could be illuminated in more detail. Much more details are necessary on how the tolerance ranges of the single taxa have been calculate – as I suppose distribution ranges are not easily accessible.

4. Results Why the charcoal composition was not described in more detail for the single sites?

5. Discussion How did the transportation processes affect the material composition and how might this influence the climate reconstruction – this needs to be discussed.

What caused the deposition of such a rich charcoal flora? Would it be possible that these fragments originate from a single event?

A critical assessment of the CA method specifically for your example is indispensable here – describe what potential error occurred.

The results should be compared to other quantitative reconstruction and modeling results.

What are the implications from your findings for the development of the Asian monsoon system during the mid-Holocene – the results should be discussed with a broader view.

p.9 line 17: I could not follow, why the authors assume that the subtropical vegetation expanded northward between 5200 and 4300.

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Interactive comment on Clim. Past Discuss., 7, 2741, 2011.

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