**Climate
of the Past**

Discussions

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Interactive comment on "Examining bias in pollen-based quantitative climate reconstructions induced by human impact on vegetation" *by* Wei Ding et al.

Wei Ding et al.

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We like to thank the Reviewer#1 for the valuable comment to our manuscript.

Reviewer #1

This is a very careful and thorough study that uses different type of pollen data-sets to establish the climate-pollen transfer functions. By selecting natural and human-impact pollen spectrum, the bias effect from human impact on the climatic reconstructions was clearly illustrated. The workload is extraordinary (synthesis on a 1600 pollen record) and the methodology is also robust. I thus highly recommended this paper and I trust

it will attract wide interest from paleoclimatologists and paleontologists.

I have only one suggestion on this manuscript. It is essential to reveal the relationship between modern pollen and climate, i.e. to illustrate how important the specific climatic variable (annual precipitation in this case) in explaining the pollen communities. This ms has given detailed numbers (in Table 1) but I think an ordination diagram (bi-plot, environmental variables vs pollen taxa, for both natural and human-impacted dataset) illustrating the importance, significance and the interactions among environmental variables will be preferable. That will also clear show the difference in pollen communities between natural and human-impact scenarios.

Our response:

We have added a suggested graph to show the pollen-climate and HII relationships. This newly created figure is marked as Figure 3 (see below).

There are 99 pollen taxa in the N-set and 93 in the H-set even after excluding some taxa for noise reduction, and it is becoming unreadable when all these information is presented in a plot. Hence, we have selected 15 major pollen taxa which also mainly identified in GH09B fossil sequence to make this biplot. It is clear to show the difference of pollen taxa-environmental variables relationships between two data sets, and it also helpful to understand the model-inferred optima of tree and herb taxa altered by human impact discussed in the text.

We also add a brief description in section 4.1.

"To better illustrate the modern pollen-climate relationships and their difference between natural and human-impact scenarios, 15 major pollen taxa, which also identified in GH09B fossil sequence (Fig. 2), were selected to reveal the relationship between modern pollen and climate (Fig. 3). It seems that general pattern of tree and shrub-herb group separation is maintained, but relationship of some pollen taxa (e.g. Picea, Betula, Poaceae and Chenopodiaceae) with climatic variables (e.g. Pann) is altered

by human influence. Greater ordination difference of Poaceae and Chenopodiaceae in two sets indicates that these two taxa are more sensitive to human impact."

Caption for Figure 3 : Ordination results of redundancy analysis (RDA) obtained for 15 major pollen taxa, four climate variables (Pann, Tann, Mtco, and Mtwa), and human influence index (HII) for (a) the natural set and (b) the human-induced set.
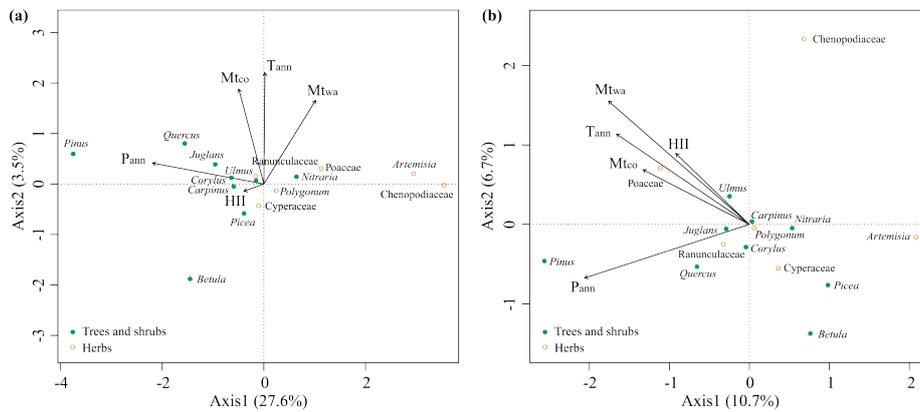
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Fig. 1. Figure 3 in the manuscript

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