Response to the Referee's comments:

We would like to thank the anonymous Referees for reviewing this manuscript again. Her/his constructive comments helped to further improve the manuscript.

Reviewer: This is my review of the revised version of this manuscript. Generally the authors have done a thorough job of responding to the reviewers' comments and the manuscript is substantially improved. I stand by my major comment on the previous version of this manuscript and am a little disappointed that the authors did not make an attempt to use Delta-V alongside Kappa to make a quantitative measure of the difference between vegetation maps and gridded maps and point-scale biomizations of pollen data. Even if the authors believe that the differences between mega-biomes are so substantial that Delta-V is not necessary, they effectively equate the difference between tropical rainforest and tundra as being qualitatively the same as that between temperate and boreal forests. At the very, very least, reference to Sykes et al. (1999) should be made in the manuscript, along with a call for using Delta-V in future studies (as the authors do in their responses to the reviewers document).
Our response: As noted in the previous response, we consider the kappa statistic to be appropriate for the purposes of this study. Therefore, we have not re-evaluated the results using a different method. However, we agree with the reviewer that a comment on other evaluation metrics would be helpful. We have therefore added the following statement to the manuscript:
At this point it should be noted that we have selected the metrics in accordance with the research question of this study. For other purposes, such as estimating changes in biome distribution between present and future climate states, other metrics may be more appropriate, such as the Delta-V method, which also weights changes in vegetation attributes (Sykes et al, 1999). The metrics used in this study do not differentiate how far the biomes deviate in their properties, e.g. differences between tropical forest and tundra are equated as being qualitatively the same as differences between temperate and boreal forest.

R: Nevertheless, the authors made a bona fide effort to respond to the rest of my comments and those of the other reviewer. While the manuscript is still rather long and tedious to read, and needs a thorough copyediting to improve the English language presentation, it should be acceptable for publication after minor revision. I have just two detailed comments on the revised manuscript below.
Our response: Climate of the Past will perform copy-editing by default.

R: Line 383-384
The statement "…warm-temperate forest shares most subtropical tree species with the tropical evergreen forest (Ni et al, 2010)" is simply not true, the reference to Ni et al. (2010) notwithstanding. Real warm-temperate forests are floristically very distinct from tropical evergreen forests, as I wrote in my previous comments. In the limited case of taxa that are commonly found in pollen spectra, there may be some commonality at the genera or family level, and in "model world" there may be overlap in the PFT definitions, but this statement is misleading and must be further qualified, or deleted.
Our response: We carefully discussed this statement again with experts for pollen-based biome reconstructions for China and further modified this sentences to:
The reconstructed biome 'warm-temperate forest' shares some subtropical PFTs with the tropical evergreen forest (Ni et al, 2010). These biomes are quite different in key species, but not on genus or family level, on which the pollen identification in the reconstructions is performed. Thus, these biomes tend to overlap in some regions and are sometimes mixed up in reconstructions (Chen et al, 2010).

R: Lines 528-533, 557-558, and Figure 6
It is interesting to note that the new PFT-based biomization method presented in this paper does not represent a large improvement over the traditional, offline climate-BIOME1/4-based method, except under certain circumstances such as the South American tropical forest area presented in Table D1. I suspect that in these places where there is a large difference between PFT-based and Climate-based may be because the vegetation models embedded in the ESMs are highly tuned to be adapted to the inherent biases in simulated climate present in the parent ESM, while an offline vegetation model is tuned to perform with the "observed" climate (e.g., from CRU). If the authors agree, it would be worth adding a sentence in the manuscript conclusions to acknowledge this point.
Our response: We agree with the Referee that DGVMs has been tuned, based on the climate simulated by ESMs, while the Biome-models such as BIOME1 or BIOME4 has been tuned to perform well with observed climate, so that DGVMs may better 'conceal' biases in the model, but we do not think, that this is relevant for this study. The PFT-based biomisation method and the Biome-models produce similar results because they use the same bioclimatic limits which define the biome belts quite well. The larger (more realistic) forest cover in the PFT-based biome distribution is related to the low limit of forest fraction needed in the assignment of the forest. We have already mentioned this in Section 4.3.
However, the impression seems to have arisen that we wanted to construct a better biomisation method than the classical method (via Biome-models). This was not our intention. We only wanted to develop a more direct method that could convert PFT distributions into biomes so that the additional information included due to the coupling with a DGVM would not get lost. And it is great, that this new method yield similar results as the classical, highly tuned method.
We further stress this by adding the following to the introduction (LL93):
The aim of developing this method was not to construct a better biomisation method than the classical method via diagnostic biome-models, but to develop a more direct method that can convert PFT distributions into biomes so that the additional information included due to the coupling of the DGVM will not get lost.