**Climate
of the Past**

CPD

Interactive comment on "Mid-Holocene climate change over China: model-data discrepancy" *by* Yating Lin et al.

Yating Lin et al.

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We greatly appreciate the constructive comments and suggestions on the previous version of the manuscript from Reviewer #1. We have attempted to address every point raised. The following is the outline of the changes we have made, with reference to the order of the comments made by the referee.

Comments from Reviewer #1: The model-data comparison of climate change during mid-Holocene (MH) is an important issue to validate the results from Global Circulation Model (GCM) against the proxies gathered from dataset. Based on the new pollen dataset and Inverse Vegetation Model (IVM). This study provided a quantitative reconstruction of climate variables during MH over China was provided and compared to the

simulation results from 13 models in PMIP3. A large discrepancy on the temperature anomaly between model-data at both annual and seasonal scale was depicted, mainly due to the failure of capturing vegetation change during MH by models, which is very helpful for better understanding the climatic changes during MH, and also pinpoints the possible way to reconcile model and data by accurately simulating the non-linear responses of vegetation and hydrology in GCMs. The manuscript can be accepted for publication after minor revision. A few basic comments and some issues to deal with as follow: 1. Since it's a quantitative model-data comparison based on pollen dataset, in which 91 records were digitized from published papers. More detailed information about the data should be provided, like the age control, pollen assemblages from around 6 ka at each site.

RE: the required information has been added in the Table 1 (page 42-45) and Table S4 (page 5-12 in Supplementary Information).

2. As mentioned in the manuscript, there is a difference in vegetation inputs for the MH period among models in PMIP3, a table for detail information should be given.

RE: we added a new Table S5 in the supplementary information (page 13 in Supplementary Information).

3. The disparity of temperature anomaly during MH among models could be resulted from the difference in pre-industrial (PI) simulation. Authors should prove that there is no any clear relationship between PI temperature and temperature change (MH-PI).

RE: Fig.R1, as attached below, demonstrates that there is no any clear relationship between PI temperature and temperature change (MH-PI), for both annual and seasonal scale, which means the disparity of temperature anomaly during MH among models doesn't come from the difference in PI simulation.

4. Some references are missing in the reference list. Such as the citations in Table 3.

RE: we have added the citations from Table 3 in the reference list (line 888-890, 536-

539, 803-808, 581-583, 632-636, 437-441, 740-753, 504-508, 515-525, 836-839, 540-548, 918-922 in revised version) .

The revised version of manuscript and supplementary information are enclosed below as supplement zip.

Please also note the supplement to this comment:
https://www.clim-past-discuss.net/cp-2018-145/cp-2018-145-AC2-supplement.zip

Interactive comment on Clim. Past Discuss., https://doi.org/10.5194/cp-2018-145, 2018.
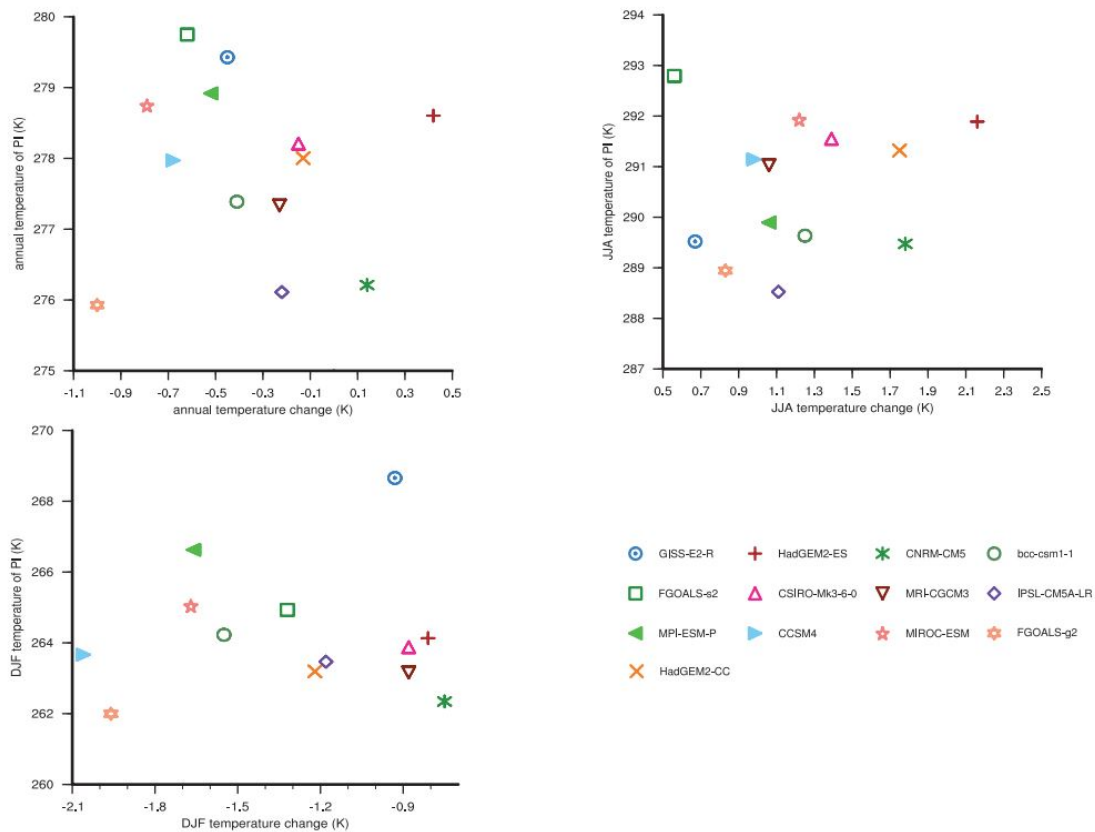
Fig. 1.

Table S5. Vegetation setting for the mid-Holocene among models in PMIP3

Model	L A I	Stomatal Resistance Function Of	Vegetation Time Variation
CCSM4	Prognostic	CO_2 | Light | Temperature | Water availability	Prescribed (varying from files)
MIROC-ESM	Prescribed	CO_2 | Light | Temperature | Water availability	Prescribed (varying from files)
BCC-CSM1.1	Prognostic	CO_2 | Light | Temperature | Water availability	Prescribed (varying from files)
CNRM-CM5	Prescribed	Light | Temperature | Water availability	Fixed (not varying)
CSIRO-MK3.6.0	Prescribed	Light | Temperature | Water availability	Prescribed (varying from files)
GISS-E2-R	Prescribed	CO_2 | Light | Temperature | Water availability	Fixed (not varying)
IPSL-CM5A-LR	Prognostic	CO_2 | Light | Temperature | Water availability	Prescribed (varying from files)
MPI-ESM-P	Prognostic	CO_2 | Water availability	Fixed (not varying)
MRI-CGCM3	Prescribed	CO_2 | Light | Water availability	Prescribed (varying from files)
HadGEM2-ES	Prognostic	CO_2 | Light | Temperature | Water availability	Dynamical (varying from simulation)
HadGEM2-CC	Prognostic	CO_2 | Light | Temperature | Water availability	Dynamical (varying from simulation)
FGOALS-g2	Prescribed	no data	Prescribed (varying from files)
FGOALS-s2	Prescribed	no data	Prescribed (varying from files)

Fig. 2.