

Interactive comment on “East Asian monsoon climate simulated in the PlioMIP” by R. Zhang et al.

Anonymous Referee #1

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The authors have analyzed the wind, temperature and precipitation over China based on model simulations of PlioMIP. This study may contribute to more knowledge about the mid-Pliocene climate in China and about the differences in regional behaviors of the PlioMIP models. However, my general impression is that this paper is too descriptive and lacks in-depth analysis/explanation about how the mid-Pliocene boundary conditions have caused the climate anomalies which are described in this paper. I strongly suggest the authors to give more analysis and discussion on processes and mechanisms.

Other major comments:

1. Abstract gives only the description of the modeled results. The reader would expect some explanations on the causes of these climate changes. Also, no real “conclusion” is given. The last paragraph of this paper is just repeating the abstract.

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2.I suggest giving the detailed information about how the topography and land cover are modified in the mid-Pliocene experiments.

3.The vegetation during mid-Pliocene must have been very different from today due to the changes in climate. Discussion on the possible impact of lack of vegetation feedbacks in the models on the monsoon is welcome.

4.The authors have observed differences between the AGCMs and AOGCMs. It would be interesting to extend their discussion to the impact of ocean on the East Asia monsoon.

5.The East Asian monsoon climate has strong seasonal behavior. Why is lengthy discussion (5.2, 5.3) given to the annual changes but nothing for the changes in seasonal temperature and precipitation? I also suggest to include figures of winter and summer temperature and precipitation changes (similar to figure 3).

6.Statistic significance should be given in the figures of anomalies (including those in the supplementary). By the way, the size of figure 3 and 4 is two small.

More specific comments:

1. P1137, L15: How about the last interglacial? Is it not a more recent warm period than mid-Pliocene?

2. P1139, L6-8: The East Asian monsoon is basically a whole system whatever over China or over other East Asian countries. Therefore I do not think it is appropriate to use the argument that “China is the largest country in East Asia, . . .”.

3. The argument about the changes in wind strength is not sufficiently convincing. P1139, L23: These geological records do not necessarily indicate weaker winter wind. They could also reflect stronger weathering caused by the warmer and wetter mid-Pliocene climate. P1140, L1: Why does stronger weathering suggest intensified summer wind? It could simply result from the globally warmer and wetter climate during mid-Pliocene, nothing to do with changes in summer wind. Also, the dust record of Rea

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et al 1998 could reflect a wetter condition in the source region instead of weaker wind.

4. Section 4: The difference in CO₂ is about 100ppmv between preindustrial and today. So I am wondering whether it is plausible to compare the simulated preindustrial climate to observation, which would lead to an artificial bias in the model evaluation.

5. P1147, L9: Why “in particular in boreal winter”? Is it not in boreal summer?

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