

Interactive comment on “Contribution of oceanic and vegetation feedbacks to Holocene climate change in Central and Eastern Asia” by A. Dallmeyer et al.

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The manuscript by Dallmeyer et al. presents a systematic factor analysis of the mid-Holocene climate change for a large number of regions in Asia. The authors found that the large portion of temperature and precipitation simulated changes is explained by the direct response of the atmosphere to the orbital forcing, while the ocean modifies seasonality of climate change. I believe, the paper is of interest for the readers of the Climate of the Past and can be published after minor revision.

General comments

I believe, the paper would benefit from a more detailed and systematic comparison

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of the modeling results with paleoclimate reconstructions. In particular, in the section 3, the paleoclimate reconstructions are only mentioned in relation with the land cover changes, and then in the last section (page 2372) a rather vague statement ("simulated overall climate change by and large agrees with the reconstructions") is made. The same is true for the comparison with other models. The authors are right, of course, that no one performed before a similar factor analysis for Asia, but a number of simulations with A, AO and AOV configurations has been performed already, in particular, in the framework of PMIP2 project. The authors wrote "if applicable, our results are in line with recent studies". However, the authors themselves stated that this is not always the case, because previous studies disagree between each other, for example, in respect of the role of the interactive ocean for the strength of Indian summer monsoon.

Specific comments

The title. By any geographical definition, India, Pakistan and Bangladesh belong to South Asia. Therefore, I would suggest either to include "South" in the title or, alternatively, just skip "Central and Eastern" because the studied region covers most of Asia.

The authors defined studied region as (60-140E, 0-55N) but none of the regions under consideration is located south of 10N, and the Figure 9 caption indicates that the averaging was performed only between 10N and 55N. I would suggest to make latitudinal boundaries consistent through the entire paper.

Page 2553, lines 25, 26. It is not clear what "cross equatorial ocean-land temperature gradient" means.

Page 2353, line 28. I suppose it is "vegetation" rather than "land" because the latter was accounted for in any climate model.

Page 2355, lines 26, 27. The sentence "the ocean was integrated as monthly mean values of SST and sea ice" is not very clear. I would rather say that "the oceanic charac-

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teristics (SST and sea ice) were obtained by interpolation of monthly mean values. . ."

Page 2356, first para. The description of the model runs (A, AO, AOV) is not very clear and apparently inconsistent with that given in Otto et al. (2009). I would suggest to use more space to give a more clear description of the methodology used in the study to make the paper under consideration self-sufficient.

Page 2364, lines 2, 3. "Coincidental with the latitudinal gradient of the insolation change. . ." Summer insolation changes do not have a strong latitudinal gradient and therefore cannot explain latitudinal gradient in temperature response. I would guess that the major reason for a weaker warming in southern Asia is increase of the planetary albedo caused by increase of cloudiness.

Page 2370, lines 26, 27. The sentence "The Tibetan Plateau is a large elevated heat source. . ." sounds odd to me though I am aware that some authors did use this term before.

Fig 9. Remove "Monsoon" from the title in the panel b.

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