**Biogeosciences
Discussions**

Interactive comment on "The influence of land cover change in the Asian monsoon region on present-day and mid-Holocene climate" *by* A. Dallmeyer and M. Claussen

Anonymous Referee #1

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General comments:

I think the study of Dallmeyer and Claussen is of high quality. The Asian monsoon domain covers a wide range of climate zones and vegetation types, which makes the study highly interesting within the field of vegetation-climate interactions. I have a few questions and comments, which hopefully could be useful in order to improve the clarity of the paper.

Specific comments:

I miss a method section describing the land surface component JSBACH. Is it a standard component in ECHAM5 or is it a land surface/ecosystem model in its own right?

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Since the role of vegetation is the key feature in the article, it would be good to know a bit more about how it is treated in JSBACH. What components are included; phenology, biogeochemistry, vegetation dynamics etc.? Has JSBACH been coupled to other GCMs?

I wonder whether it would be relevant to include some kind of coupling scheme or perhaps equations that actually describe how the vegetation is coupled to the climate in these two specific models.

I find it a bit difficult to distinguish between the afforestation and deforestation experiments in the results and discussion sections. My suggestion is simply to describe all the (major) vegetation related influences on climate under each experiment. It would improve the readability of the paper. Now, I have to jump back and forth in the text to get the full picture. The results and discussion section are also very detailed. My suggestion is to focus on the main results and leave out weaker signals to improve the clarity of the paper.

Given that you have focused on drastic shifts in vegetation cover (complete afforestation/deforestation), what is the generality in your results? I mean, why is it important to study these two extremes? On P1696 L5-15 and also in the discussion section you mention a number of previous studies on land cover – climate interactions in the Asian monsoon region. What is the added value of your study compared to these?

P1698, L13: What does 1.875 correspond to in km?

P1698, L19: "The models have been tested against observations and reanalysis data"... – in this constellation, i.e. ECHAM5-JSBACH?

P1699, L3: How is the natural land cover of CTRL determined?

P1700, L1: Is there a reason to why the simulations span 100 years? Could it be less or more?

Technical corrections:

Overall I think the paper reads well. I have not specifically looked for spelling and grammar mistakes, but they do occur, for example in:

P1702, L24-L25: ...”though vegetation change can also indirectly influences the other parameters.”... - also indirectly can influence

P1707, L3: ...”precipitation change than model studies”... - it should read "as" and not "than" or do I misunderstand?

P1709, L19: ...”afforestation and control experiment with same boundary conditions”... - with "the" same

P1709, L22: ...”then defined as difference”... - as "the" difference

P1710, L23: ...”to the decrease of summer monsoon”... - decrease "in"