

Interactive comment on “Comparison of simulated and observed vegetation for the mid-Holocene in Europe” by S. Brewer et al.

Anonymous Referee #1

Received and published: 9 July 2009

This manuscript presents an interesting attempt to understand the distribution of vegetation during mid-Holocene and to test how different climate models reproduce it. It provides complements to previous studies by using the CARAIB global vegetation model forced by the climate simulated by four different coupled GCMs. The manuscript is clearly presented and well written and the results are in good shape for publication. I see however a number of points that would benefit from clarification. I list them below and hope that they will help the authors to better highlight a few points in the manuscript.

1. The first author already published a model data comparison over the same region considering bioclimatic variables (Brewer et al. 2007). I suppose that the choice of the 4 climate models used here is issued from this analysis otherwise I don't understand

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why all the models of the PMIP2 database were not used. An indication of how those models perform in Brewer et al 2007 compared to the other PMIP2 simulations and of the reasons of the selection would be welcome.

2. The CARAIB model is used to simulate the vegetation. Such simulations have also been done using the BIOME4 model. Therefore some of the conclusions of the paper could be linked to the choice of the vegetation model. Could you tell how the CARAIB simulations for the modern climate compare to the BIOME4 simulations in case substantial differences in the simulated vegetation are found over the region considered here?

3. It would be interesting also to have a rapid idea of how the simulated vegetation for mid-Holocene compares with previous work. The reason is that a difference vegetation model is used, but also that previous studies considered either atmosphere alone simulations or coupled ocean-atmosphere simulations that were run prior to the PMIP2 set of simulations. I suppose in particular that a rapid check could be done with the results of Wolfart et al. 2008.

4. Similarly since there is now several simulations in the PMIP database for which the vegetation was computed online by the climate models, it would be interesting to know what are the differences between the vegetation reconstructed using CARAIB and the on line vegetation. I agree that this could add a substantial amount of work and may be outside the scope of this paper, but some indications would be welcome and of help for future work. . 5. Simulations with the GISS model show a high sensitivity of the results to the CO2 level. If this was applied to the simulations with the output of the other climate models is there a chance that some thresholds are reached and that this lead to a different vegetation reconstruction?

6. The conclusions on the atmospheric circulation on the Mediterranean part of the region are interesting. Can you tell if the coupled models provide systematic different responses than the atmospheric models used in Masson et al. 1999 or in Bonfils et al.

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2004?. A systematic change in the Atlantic sector, due to the response of the SST to the insolation forcing was reported by Zhao et al. 2005.

Interactive comment on Clim. Past Discuss., 5, 965, 2009.

CPD

5, S302–S304, 2009

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