

## ***Interactive comment on “Monsoon response to changes in Earth’s orbital parameters: comparisons between simulations of the Eemian and of the Holocene” by P. Braconnot et al.***

**P. Braconnot et al.**

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We have modified our manuscript according to the comments of the reviewers. The major comments concerned the presentation of the results in section 3 and a revision of section 4. We revisited the presentation of the simulations (section 2). The model is now presented before the simulations (section 2.1) and the insolation changes (section 2.2). We reworded section 3.1, so as to adopt a more logical presentation of the results. According to reviewer 1 we also added two figures (figure 8 and 9) to better discuss the changes in the surface ocean, the mixed layer depth and the link with the continental runoff in the Bay of Bengal. We decided to make the minimum changes in section 4. Indeed including analyses of all the feedbacks is out of the scope of this paper and would deserve an entire manuscript. However, the reviewers pointed out that this

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section was difficult to follow. Then we suppressed section 4.1 on the energetics of the dry atmosphere, and focus the discussion on the descriptions of figures 10 to 12. We revisited the writing of this part, trying to better justify the normalisation done for figure 12. To our knowledge, this type of analysis has not yet been, and highlighting the fact that different regions may drive the tropical energetic depending on the period and precession is something we think is of interest and opens new discussions. However, we are aware that more analyses should be done. This is why we are very cautious in the text. The also change accordingly the end of the conclusion, so that we do not seem to claim that ENSO is responsible for the changes we show in the east Pacific.

Specific answer to reviewer 1. (Akio Kitch) :

We hope that the revision of section 3.3 on the seasonality in the Indian ocean addresses your comment. We added figure 8 and 9. Several references were done in the text to the changes in the mixed layer and to the river runoff, and your comment made us realise that the figures where needed. We also revisited part of the text accordingly. Section 4 is indeed in a more premature state than the other sections. However it shows new results that are worth mentioning, event though we do not have all the explanations yet. As stated above we decided to make the minimum changes. We also realised that the end of our conclusion was misleading, by putting too much emphasize in telling that changes in ENSO could be at the origin of the energetic changes seen in the East Pacific. We then reworded the conclusion so that ENSO is now only a possibility, and we mention, as you suggested, that changes in the mean annual cycle, the location of the ITCZ and clouds are several factors that need to be analyse in more depth to understand the signal we have.

Specific answer to review 2 (Sam Levis) :

As indicated in the introduction we follow your comments to prepare the revised version of the manuscript. In particular, we revisited section 2, to better present the simulations, and reworded part of section 3.1, trying to avoid the confusion between all the time

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periods. We also decided to keep section 4 at a minimum, even though we added some text to better explain what was done. We would like also to thank you for the editorial issues. Here are the answers: 1-4 : we adopted 5. Thank you there was confusion in the text. Now it is clear that the degrees represent degrees of obliquity. 6 adopted 7 The word 'important'; was not the good one. We reworded this part : 'Even though evaporation is reduced over the ocean, the change in the atmospheric circulation is such that moisture is depleted over the ocean at the expense of the continent.'; 8-10 adopted 11. We kept 4.c in figure 4, because it is the only way to make sure that all the figure are on the same page and that the reader can analyse them together. 12 adopted 13 mention of density lines added in the legend 14. legend added. The PW is correct because we integrated over the box.

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Interactive comment on Clim. Past Discuss., 4, 459, 2008.

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