Climate
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Discussions

# Interactive comment on "Mid-Holocene climate reconstruction for eastern South America" by L. F. Prado et al.

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We really appreciate the comments and suggestions made by the anonymous referee #2. Our replies can be found below separated by topics.

*Language problems (also suggested by the anonymous referee #1): Agreed. The first version of our manuscript indeed showed problems with the language, which are attributed to the fact that all co-authors are non-native speakers. Therefore, we submitted our manuscript to a professional language editing service (Elsevier Office). We are sure that the revised version of our manuscript fulfills the quality requested by Climate of the Past.

Specific sections of the manuscript:

*Abstract: Agreed. The abstract was restructured, as suggested, with a greater focus on the findings of the study. And the second sentence "this happened... orbital parameters" was removed, as suggested.

*Introduction: Agreed. The introduction has been shortened and the description of the "data-models" efforts has been removed to "clear" the introduction. We have also modified the objectives to present them clearly, as suggested by the referee #2.

*Section 2: It was was restructured: 1) section 2 was renamed as "Climate of South America", to fit better with the changes made in it; 2) it was included a subsection 2.1 called the South America Monsoon-like System that was complemented with figure 1 (austral summer DJF) to illustrate the spatial distribution of precipitation during the occurrence of the SAMS (wet season); 3) we have included information about the South Atlantic Ocean, creating a subsection (2.2 South Atlantic Ocean Circulation) that now includes figure 2 (main aspects of the surface circulation of the South Atlantic Ocean). The reference required (page 5931, lines 10-15) is cited in the first line of the paragraph (line 5): Vuille et al. (2012) A review of the South American monsoon history as recorded in stable isotopic proxies over the past two millennia, Clim. Past 8, 1309-1321.

*Section 3: There are some pollen species which are sensible to temperature and precipitation changes. A good example comes from southern Brazil: the Araucaria forest requires at least 1400 mm of rainfall per year, dry season of up to one month, and minimum temperature of -10°C (Behling, 1997). Ledru et al. (2009) relate the dominance of Poaceae and Asteraceae in the pollen spectra of Colonia, Brazil, at ca. 39 kyr. BP to a dry and cool climate; they also argue that a decrease in arboreal pollen in favor of Asteraceae tubuliflorae during the Mid-Holocene is related to a drier climate; finally, they conclude that there is a very rapid response of the tropical rainforest to changes in precipitation and/or seasonality, reflected in the pollen spectra. Page 5933, title: Agreed. The title of the section was replaced by "Dating uncertainty", as suggested. Page 5933, line 19-21: Agreed. The comment about archiving our dataset on

the Pangaea database was added as a footnote to the table 2, as suggested. We have also complemented the footnote with other information that will be available through Pangaea.

*Section 5: As suggested by the referee #2, the Results and Discussion/Conclusions sections were restructured according to the variables analyzed: precipitation/moisture (precipitation, lake levels and salinity), and temperature (air temperature and sea surface temperature), and we have included subheadings in the Results section. Page 5936, line 22 (and the following paragraph): In the manuscript, we mentioned the study by Cruz et al. (2009) (section 4.1), in which they used the ECHAM4 model to simulate the MH climate that was compared to their speleothem records. The MH scenario described in our compilation fits to the atmospheric circulation features presented in Cruz et al. (2009). In our manuscript, we intended to provide a multiproxy compilation that could be readily used in model validation, and this is the reason why it does not include any numerical comparison. However, we are already working in this issue in a full separate manuscript (Prado et al., The Holocene, subm.), i.e., objectively comparing our compilation of records with seven PMIP3/CMIP5 models outputs. Besides some differences among the models outputs, they generally fit with the records. Page 5938; the last paragraph: Agreed. We have added a new Discussion/conclusions last paragraph, as suggested. However, it is hard to infer information about modeling experiments, since this paper does not deal with numerical models. We have used the study of Cruz et al. (2009) only to show that the spatial pattern we found for the MH was also described in previous studies. In the revised version of the manuscript, we also included results by Dias et al. (2009) and Valdes (2000) to the discussion.

References

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