

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

Anonymous Referee #2

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Review of:

Mid-Holocene climate reconstruction for eastern South America By L.F. Prado et al

Summary; In this study, the authors aim to show whether the MH was wetter/dryer and cooler/warmer than present conditions in this region. Some effort is also made to place these findings in the great context of forcing mechanisms and driving circulation patterns in this region. To do this, they made an immense compilation of all available paleo-reconstructions in this area covering this time period. The resulting maps and findings are certainly of great interest to the audience of this journal and beyond. The strong points of this paper are: 1) a huge amount of previous studies were included in the current study, which probably makes this the most up-to-date, complete overview for this region, 2) the authors chose a relatively simple method to assign higher im-

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portance to records with lower chronological uncertainties, and 3) the maps provide a very useful quick overview of the findings in this paper. The major weak point of this manuscript is its language; substantial re-writing is required to meet to language standards of this journal. I would recommend the authors to re-submit a thoroughly language-revised version; the study is highly interesting and provides very useful insights on the characteristics and drivers of MH climate in this area.

Comments:

Abstract; the abstract should focus more on the findings of this study, including the observed MH dry conditions, found temperature patterns, and the implied link to the decreased land-ocean contrasts (and SAMS) as stated in the discussion/conclusion. The statement that further studies are required in this region can be omitted from the abstract. The second sentence (this happened . . . orbital parameters) is also redundant.

Introduction: the intro can be shortened substantially; the authors list all previous efforts on providing maps of past climatic conditions for the MH in a >2page introduction. However, in the final section of this part they conclude (correctly) that most of these studies reflect South America very poorly and that the MH period received much less attention than the LGM. Since this is the case, it seems to me a bit redundant to list all these previous studies with a range of details on used methodologies, time periods covered and full names of the initiatives (primarily page 5928). . . In the introduction, you should clarify the research aims more clearly. You (vaguely) state that the objective was to ‘obtain a climatic scenario to the MH in eastern South America’ (p5928, last line). I think that more specifically, you provide i) a spatial reconstruction of MH patterns of precipitation/moisture, ii) a spatial reconstruction of MH temperature patterns, iii) provide info on MH lake levels and ocean salinity, and in addition (iv) you use these data to draw conclusions on past climatic drivers (decreased SAMS due to decreased land-ocean contrasts).

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2: precip in south America In General: since the authors provide maps of MH precipitation/moisture patterns as well as temperature reconstructions (and properties affected by the ratio between these; lake levels, ocean salinity), this section should also include some statements about temperature drivers, and not just on precipitation. This section is important and aims to provide an overview of the main –contemporary- climatic drivers for precipitation. This section would benefit greatly from a map, for example showing the average position (or two maps, with ‘mean summer’ and ‘mean winter’ positions) of e.g. the bolivian high, the chaco low, the position of the ITCZ, and as far as possible the areas of influence of SACZ, SAMS etc. You should also add the main oceanic currents mentioned in the discussion (Brazil and Malvinas currents). In its current form, this section is hard to follow, and simplified overview maps/symbol maps would improve this I think. Page 5931, lines 10-15: this section requires a reference.

Page 3931, line 19-20: all proxies and all environmental archives are affected by noise. It indeed goes beyond the scope of this paper to discuss all strengths and weaknesses of all proxy-based reconstructions used in this compilation. However, since pollen data form the absolute majority of the input records, it would be good to add a few sentences on which climatic parameters pollen data reflect; in northern Europe, they are often used to reconstruct temperatures, whereas in this study, in your discussion it is mentioned that pollen on this region primarily reflect precipitation (or the moisture balance), but they are also included in the temperature records? This is confusing now.

Section 3.3, page 5933: you should re-phrase the title of this section; you don’t make any interpretation of the overall ‘quality’ of the used datasets, you only try to assess the ‘quality of dating’ or chronological uncertainty. Chronological uncertainty is not the same as ‘data quality’. So I would replace this terminology with the more specific term ‘dating uncertainty’, or ‘dating control’ or something similar, since you only look at this aspect of the data’s uncertainty. Page 5933, line 19-21: this should not be in the main text but can be added e.g. as a footnote to the table, or in the results section, and only once (its repeated on page 5934, line 11-13).

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The Results and the Discussion sections should be structured more strictly; either you interpret results geographically (if you do that, you should make sub-headings for each region), OR you discuss first the precip patterns, then the temperature patterns, etc. Currently, the text jumps from precip to temperature and then back again, which makes it hard to follow.

Page 5936, paragraph starting at line 22 (and the following paragraph); this is a very important section and is also very interesting. It would be nice if this interpretation of the records could be compared to modeling studies; are there any studies that support your interpretation of decreased land-ocean contrasts and the resulting changes that you describe here? Furthermore, as mentioned before, some of these interpretations could be highlighted in the abstract.

Page 5938; the last paragraph is not really needed, and does not add anything to your study. If you want to add a statement that further research is required, then be more specific; which regions are most sensitive according to modeling? Where would you expect the largest changes in the MH based on contemporary climatic processes? What type of data could be most suitable? Which climatic properties are most interesting to address the issue of climatic drivers; precip/moisture balance, or temperature, or ?

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