

General comments

The authors have made quite significant changes to this paper since the original reviews. In particular, they have addressed the issues raised by both Reviewer 1 and myself that they needed to make a case for the significance of this new record in terms of regional palaeoclimate and dynamics. I found the consideration of the changes in the intensity of the CLLJ particularly interesting (new Fig. 6). It is also now much clearer why studying a core (PI-2) with a higher sedimentation rate than the previously published PI-6 was valuable. New Fig. 4 makes clear how the two sequences relate to each other.

There are a few minor changes I would like to suggest and a couple of things to check, but subject to doing this, I believe that this is now a valuable contribution to our understanding of this interesting period.

Minor changes/checks (in order in the ms):

Abstract

Line 11. Although this refers to the LGM in general, the paper (lines 62-66) actually says that by 19 cal ka conditions were drier, so I suggest some minor redrafting to deal with this.

Lines 24-25. Two uses of 'whereas' in close proximity. Could change the second one to 'While'

Introduction

Lines 36 and 38. I would insert 'the' before Hudson Strait in both cases.

Lines 62-63. Surely the point here is that the stable isotope measurements indicate dry conditions, which in turn lead to low lake levels. The low lake levels are not shown by the isotope measurements.

Line 70. I'd delete 'a' from before 'higher mean long-term...'

Line 74. influences

Line 87. Elsewhere you refer to rainy season (not rain)

Line 96. This is a narrow view of the timing of the monsoon, it migrates north and south between July and September.

Figure 1. Where does this definition (mapping) of Neotropical come from.

Methods

Line 141. I believe these 20 radiocarbon ages come from PI-6 so make that clear here (you state that the dated tephra layers are from PI-2).

Results

It isn't clear to me why the text about Mn/Fe ratios (lines 237-242) is separate from all the other text about the CLR values (on p.8). I'd put them all together.

Discussion

Lines 303-304. This reference to winter rains is very different from any of the other mechanisms invoked in this paper, but passes without comment. If you believe this to be true, then I think you should at least point out that this period is exceptional during the period of record (given the ITCZ to

S is normally dry), but presumably the presence of the very large LIS may potentially have driven winter cold fronts this far south.

Line 340-341. As our 2015 paper only deals with the last 12,000 years I am not sure where this interpretation of what it says has actually come from! The paper does, of course, make the point that warming of the NH triggered a marked strengthening of the NAM. There is clear evidence for change in the NAM strength prior to 12 cal ka., including suggestions of a stronger NAM during MIS3.

Line 412. 'high nutrient input'

Line 428. Insert space between PI-6 and (Fig.4...)

Line 438. Reference to Unit 4. Now that the original Table 2 has gone from the main text, I struggled to find the ages for Unit 4. Is this information still going to be given somewhere?

Line 439. I have looked again at the paper by Donders et al. (2011) and cannot see how/where it says what is claimed here. It is focused on H events (wet in Florida), but I cannot see the case made there for drying 39-23. The modelling was only for the LGM, H0 and variants of H1 I think. Please check.

Figure 7 and Line 496. Sorry to come back to this, but I am still unhappy with the interpretations of the Babicora record. The diatoms (Metcalf et al., 2002) clearly show persistence of a relatively deep and freshwater lake through the LGM (if shallower and more turbid than previously). There is evidence for catchment instability. As noted previously, the big change (drying) here occurred about 15 cal ka.

Lines 496-497. As noted previously the LGM was **not** dry at either Patzcuaro or Babicora. Just less wet/deep than earlier in the records. I also see you are still referring to the Bradbury 1997 paper which is now rather old. For La Piscina de Yuriria dry conditions leading up to the LGM are confirmed in the more comprehensive paper of Holmes et al. 2016 (JQS).

Lines 496-498. Are the square brackets deliberate?