**Climate
of the Past**
Discussions

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Interactive comment on "Effects of atmospheric CO$_2$ variability of the past 800 ka on the biomes of Southeast Africa" by Lydie M. Dupont et al.

Anonymous Referee #2

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The manuscript by Dupont et al. uses pollen assemblages and other multi-indicator data from a marine sediment core in order to look at vegetation and climate change in southeastern Africa over multiple glacial-interglacial cycles. They extend a previously published dataset to 800k and also include analysis of older mid and early Pleistocene sections in order to disentangle the effects of temperature, precipitation, and pCO2 on vegetation.

I find this paper to present a very well done and important dataset from a data-sparse region of the tropics. I am really happy to see the pollen analyses extended to older sections of the core and appreciate the data-rich multi-indicator approach. I also support the end-member analysis conducted by the authors, which seems to be able to be used to tease apart assemblages through time. I also really appreciate the comparison

C1

of the carbon isotope data with pollen data, which I find enhances the interpretations from both datasets.

I do however have a few concerns about the paper, these are mostly minor. In particular, I find that the main conclusions about pCO2 and its impact on vegetation over time is a bit thinly supported. No further data analysis supports this argument and in fact I find that the section which describes the patterns attributed to CO2 is very brief given the prominence of this driver in the abstract of the paper. My most pressing suggestion for improvement of this paper then is to further develop this section of the paper and perhaps include a plot showing major vegetation types under differing CO2 thresholds discussed. The wiggle plots which represent the bulk of this argument in Figures 4 and 5 are not sufficient for really teasing apart the impact of CO2 or illustrating the authors' interpretation.

Page 1

-Please switch to sequential line numbering for the whole paper, rather than per page, if that fits with journal formatting.

Line 26: I think this isn't quite accurate, because C4 vegetation is by its very nature arid adapted in that C4 metabolism is an adaptation to increase water use efficiency. I think instead you should change this sentence to imply that the risk misinterpreting the bioclimatic controls on the expansion of arid adapted vegetation. -Which studies? Also this phrasing is awkward, I think "last Glacial-interglacial transition" or Pleistocene-Holocene transition might be better

Line 27: "Glacial" glacials?

Page 2

Line 4: "cycle" should be cycles

Line 11: Yin and Berger, what did they find?

Line 11-12: This sentence is confusing, I am unclear if they are still talking about causes of the MBT or if they are now talking about drivers of vegetation change

Line 23: This sentence doesn't quite make sense as is.

Line 28: Castaneda and Johnson refs, These two are not pollen records, as stated above. Should also add Bosumtwi pollen record maybe.

Page 3

Line 23: impacts on Southern Hemisphere, why is this?

Line 30: what are the bergwinds and how do we know that they don't transport much materials?

Page 5

Line 25: Is this referring to $\delta Dwax$?

Page 6

Line 7: represented, not presented

Lines 17-19: low sediment transport could also be because of less erosion with denser vegetation and root networks, rather than drier conditions. Maybe some discussion of seasonality, particularly as regards the expansion of woodland could be useful.

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Lines 11-12: what is the evidence for this?

Line 15: elemental not element

Line 27: what is the physiological mechanism here? miombo is more drought adapted, you would think the opposite might be true?

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Line 31: development of what?

Interactive comment on Clim. Past Discuss., https://doi.org/10.5194/cp-2019-18, 2019.

C4