

Interactive comment on “Changes to the tropical circulation in the mid-Pliocene and their implications for future climate” by Shawn Corvec and Christopher G. Fletcher

Anonymous Referee #1

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The authors present an analysis of changes in tropical overturning circulation from the PlioMIP1 simulations to show both Walker circulation and Hadley circulation were weaker during the mid Piacenzian relative to the preindustrial. This has relevance for projections of future climate.

Since my expertise is not in line with the primary discussion section of this paper, my comments are mostly confined to the data cited and general aspects of the paper. While it is good to see the PlioMIP products being used to better understand Pliocene climate and inform us about future climate, there appears to be a poor familiarity with Pliocene literature. There are a number of citations that are poor choices and others simply are incorrect. The lack of familiarity with the relevant data may or may not affect

C1

the analyses presented, but it makes for difficult reading. While the authors make use of the PlioMIP simulations and the PRISM3 boundary conditions, I do feel there are many other references outside of the PRISM group, that could be used to help support the authors arguments.

I hope the editors have chosen other reviewers better suited to comment on the analyses themselves.

Specific corrections/suggestions:

Page1/line3: stratigraphic convention is oldest to youngest; reverse your ages and use “Ma” not MY BP.

Page1/line3: I don't think you will find anyone calling it an “analogue” anymore. Several papers have been written on the topic. Maybe “scenario” or “imperfect analogue” would be a better choice.

Page2/line1: Don't use "epoch" since it is a formal stratigraphic term which would refer to the Pliocene as a whole i.e. Pliocene Epoch. Maybe "interval" would work better?

Page2/line1: 3.3 to 3.0 MA, NOT 3-3.3 MY BP; Again, “Analogue” needs to be replaced.

Page 2/line2: “relatively minor difference” | relative to what? What is considered minor?

Page 2/line4: I don't think any of the three references you cite are adequate for the first half of the sentence.

Page2/lines4-5: Even if you want to call a past interval of time an "analogue" to future climate, just having that interval does not guarantee the availability of data. The availability of data depends upon a number of factors. I think you are trying to say something along the lines of 'having a wealth of paleoclimate data available for an interval not unlike what has been projected for the future is useful for validation of climate simulations.' Or something along those lines.

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Page2/line9: The way this is written it sounds as though Kamae et al. produced paleo-climate records, and there are a number of other citations, in addition to Dowsett et al. (1996), that could/should be noted.

Page 4/line13: You need to cite the actual PRISM3 reconstruction which appeared in the journal Stratigraphy in 2010. These were the boundary conditions used. Neither Lunt et al. 2012 nor Dowsett & Robinson (2009) are citations for PRISM3.

Page4/line19: Again, as written it appears you are citing Haywood et al. (2010, 2011) for PRISM3. These might be good citations for the PlioMIP experimental setup but not for the PRISM3 boundary conditions themselves.

Page4/lines22-23: It would appear you need a reference here for “warm peak averaging.”

Page4/line26: delete “mini”

Page10/line27: How do the CPLD and PRISM3 SST's differ? Could you show a Δ SST map. How about the actual data points PRISM3 used and not the SST field which is highly interpreted and certainly not that accurate? This would be an interesting addition.

Page10/lines27-28: these citations are not correct for the PRISM3 boundary conditions (specifically the SST's) that were used for experiment 1 of PlioMIP phase 1. Maybe you mean a different Dowsett et al. (2013)? Either Dowsett et al. (2009) or Dowsett et al. (2010) would be appropriate for the PRISM3 ocean.

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