

Clim. Past Discuss., author comment AC2
<https://doi.org/10.5194/cp-2021-58-AC2>, 2021
© Author(s) 2021. This work is distributed under
the Creative Commons Attribution 4.0 License.

Reply on RC2

Arthur M. Oldeman et al.

Author comment on "Reduced El Niño variability in the mid-Pliocene according to the PlioMIP2 ensemble" by Arthur M. Oldeman et al., Clim. Past Discuss.,
<https://doi.org/10.5194/cp-2021-58-AC2>, 2021

Dear anonymous referee (RC2),

Thank you for your nice remarks and your feedback. We will answer your specific questions and comments here and indicate how we plan to make any changes in the revised manuscript.

This paper provides a comprehensive discussion of ENSO variability in the new PlioMIP2 ensemble. The changes in ENSO amplitude, frequency and spatial pattern and the relationship with mean state changes are all evaluated and compared with proxy records and other modelling studies. The results will be of wide interest. The paper is fluently written and well structured. The model evaluation uses a thorough and logical methodology in all sections. I recommend the paper for publication subject to minor revisions outlined below.

Specific comments:

Model names: The model names in Table 1 are not the same as the names in Table 2 and throughout the paper. I suggest using the standard CMIP5/CMIP6 names throughout to avoid confusion. – **Similar comment as RC1, my response here: It is chosen to follow the PlioMIP1/2 naming conventions and to be consistent with other PlioMIP2 studies. However, we will include CMIP vocabulary in the Table (if it is different from the PlioMIP naming).**

Introduction, line 24 onwards: The discussion of mid-Pliocene CO₂ levels is a bit misleading as the de la Vega study found that "CO₂ ranged from 394 (+34/-9) ppm to 330 (+14/-21) ppm: with CO₂ during the KM5c interglacial being 391 (+30/-28) ppm (at 95% confidence)." Therefore, for the PlioMIP2 interval, the new estimates overlap with the value of 400 ppm given in the earlier studies. Haywood et al. (2016) could also be cited

here for providing a discussion of the range of CO2 estimates – their discussion also concludes that the various CO2 estimates generally overlap. – **Agreed that this passage can be improved, we will rephrase it with your recommendations.**

Section 2.1: It should be mentioned here that the PlioMIP2 Eoi400 simulations are configured to represent the KM5c interglacial at 205 Ma, and that this interval has an orbital configuration close to the present day allowing models to use the same orbital parameters as for the pre-industrial simulation. – **Agreed, similar comment as RC1, we will make sure to include the configuration in the Introduction, when mentioning the PlioMIP2 ensemble.**

Technical corrections:

Line 37: change “increases with” to “increases by”. – **Will be corrected**

Line 67: change “accompanied with” to “accompanied by”. – **Will be corrected**

Line 106: change “will be” to “are” and delete “will” before “conclude” for consistency with tense in the rest of this paragraph. – **Will be corrected**

Line 217: Suggest change subsection 3.1.1 title to “Statistical moments” rather than “Moments”. – **We will take over this suggestion**

Line 371-372: Suggest summarize the comment on the MRI2.3 zonal SST gradient here, e.g. “due to the overly westward extent of the cold tongue in the MRI2.3 model discussed above”. – **Agreed, that might read better, will reformulate the sentence.**

Line 397: Change “alike” to “like”. – **Will be corrected**

Line 461: Insert “when comparing mid-Pliocene and pre-industrial ENSO” after “robust signals”. – **Will be corrected**

Line 512: Change “great similarity for” with “great similarity between”. – **Will be corrected**

Line 547: change “composition makes that” with “composition means that”. – **Will be corrected**

Figures: Axis labels are very small, consider increasing font size. – **Agreed, we will improve readability of the figures.**

Figures: The use of red-green color scheme may not be suitable for colorblind readers. Perhaps use red-blue instead. – **Similar comment as RC1, we will choose another colormap.**

Figure 1: Make Nino box lines thicker as they are hard to see. – **Will be corrected**

References: Check reference formatting as some information is duplicated. – **It seems that for some references the doi is duplicated, we will correct this.**