Climate of the Past Discussions

Clim. Past Discuss., referee comment RC1
https://doi.org/10.5194/cp-2021-131-RC1, 2022

Comment on cp-2021-131

Anonymous Referee #1

Referee comment on "Eocene to Oligocene vegetation and climate in the Tasmanian Gateway region were controlled by changes in ocean currents and pCO_2" by Michael Amoo et al., Clim. Past Discuss., https://doi.org/10.5194/cp-2021-131-RC1, 2022

General comment

This well written manuscript presents new palynological insight from high southern latitudes from the Eocene-Oligocene transition that is consistent with previous proxies and interpretations for the region. A strength of the manuscript is that it details palynofloral change from a continuous section across the transition and uses the NLRs of palynotaxa to estimate temperature shifts across the Eocene-Oligocene boundary. The authors conclude cooling of ~2-3 C occurred across the Eocene-Oligocene boundary. I recommend publication following minor revisions.

Specific comments

The authors conduct diversity analysis on samples with counts >75. It would be useful for the authors to elaborate on why they chose this number of individuals as opposed to higher counts, i.e., >100 or >200 palynomorphs.

In lines 197-199 the authors mention that Microcachryidites antarcticus forms an important component of the gymnosperm assemblage. Can you please detail the percentage of the gymnosperm proportion this species makes up?

In lines 268-274 the authors detail why they assign Myricipites harrisii the NLR Gymnostoma. I recommend they cite Hill et al. 2020 "Fossil evidence for the evolution of the Casuarinaceae in response to low soil nutrients and a drying climate in Cenozoic

Australia" during this discussion as it will strengthen their argument.

The authors mention in lines 111-112 that non-pollen palynomorphs were recorded. Where is this data? It would be particularly useful to support their suggestion for increasing environmental disturbance (line 353) in PZ 2 which also requires further explanation. I recommend that the authors discuss the type of disturbance they think would result in fluctuations in gymnosperm/cryptogam abundances?

In line 361 the authors again interpret a period of disturbance, this time due to an increase in fern spores. Do the NPPs, perhaps charcoal records, support this suggestion? Please elaborate on what kind of disturbance you think this might represent (i.e., environmental or climatic).

In line 344 the authors mention an endemic-Antarctic dinoflagellate cyst. Please include the species name in the text.

In line 333 the authors discuss that the cooling indicated by both independent proxies is not reflected by the lipid biomarker-based terrestrial MAT estimates and that the reason for this disparate trend remains unknown. Earlier in the manuscript (line 89) the authors mention Permo-Triassic reworked elements. It would be interesting for the number of Permo-Triassic reworked elements, if quantified, to be provided to see if this could be contributing to the disparate trends.

Please also acknowledge that pollen and spores can also be transported in water in Line 357.

Technical corrections

Line 83 – please add 'the' after 'an'

Line 149 – please add 'the' after 'considers'

Line 150 – please change 'varies' to 'ranges'

Line 162 – please remove this sentence and add 'from the 57 productive samples' to Line 163

Line 195 – please add ‘are’ after ‘abundance’

Line 205 – please replace ‘approximately’ with ‘~’ for consistency

Line 209 – please remove ‘while’

Lines 212 and 227 – please replace ‘about’ with ‘~’ for consistency

Line 290 – please add ‘and’ after ‘parvus’

Line 293 – please replace ‘an’ with ‘at’

Line 328 – please add an ‘s’ to angiosperm

Line 363 – please replace ‘of shift in vegetation’ to ‘vegetation shift’

Line 391 – please add ‘and a’ after Gleicheniaceae

Please also note the supplement to this comment:
https://cp.copernicus.org/preprints/cp-2021-131/cp-2021-131-RC1-supplement.pdf