

Clim. Past Discuss., author comment AC2
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Reply on RC2

Peter K. Bijl et al.

Author comment on "Maastrichtian–Rupelian paleoclimates in the southwest Pacific – a critical re-evaluation of biomarker paleothermometry and dinoflagellate cyst paleoecology at Ocean Drilling Program Site 1172" by Peter K. Bijl et al., *Clim. Past Discuss.*, <https://doi.org/10.5194/cp-2021-18-AC2>, 2021

Reviewer 2 (anonymous)

General comment

The manuscript presents new paleoclimatic data from high southern latitudes that is consistent with previous interpretations for the region. A strength of the manuscript is that it also evaluates the strengths and weaknesses of proxies for sea surface temperature (SST) including isoGDGTs and mean annual air temperature (MAAT) including soil-derived branched GDGTs. The authors conclude that MAAT is consistently lower than SST during the early Eocene, independent of the calibration chosen and moreover, that the proxies fail to document a rise in MAAT during the PETM and MECO. The factors contributing to this discrepancy (i.e., a change in GDGT source) are discussed, however the incorporation of mixing models may help demonstrate this now that new data (see Lauretano et al. 2021, *Nature Geoscience*, accepted) is available for the peat/coal of interest.

Response to reviewer: We thank the reviewer for this suggestion. As of today (Jul 14, 2021) the cited paper is not yet available, therefore we cannot use the information as yet but we invite the reviewer to contact us so that we can incorporate this suggestion.

Specific comments

The authors discuss the potential contribution of terrestrial material from Australia throughout the manuscript. As such, reference pollen-based vegetation reconstructions from southeastern Australia should be included in lines 94-96.

Response to reviewer: This is a good suggestion.

Proposed changes to the ms: we will incorporate an overview of pollen-based vegetation in the suggested section.

In lines 172-175 the authors detail the incorporation of "substantial terrestrial input". Could you please clarify whether the source of the terrestrial input is deemed contemporaneous or reworked or both?

Response to reviewer: The studies done on the Arctic Paleogene material (e.g., Willard et al., 2019; Sluijs et al., 2020) do not show any indication that the terrestrial OM is abnormally out of stratigraphic context to the marine sediments it was found in.

Proposed changes to the ms: we will add this to the section. We thank the reviewer for his/her review.