

Interactive comment on “Oligocene TEX₈₆-derived seawater temperatures from offshore Wilkes Land (East Antarctica)” by Julian D. Hartman et al.

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This is very good new organic proxy dataset from offshore Wilkes Land. The authors present a near field palaeotemperature record that although is much lower in resolution compared to other proxy datasets it sheds light for the first time consideration of the long term sea surface temperature evolution of this Wilkes Land margin.

I have made extensive comments and suggestions in the attached annotated text to this paper.

I would like to add the following to the discussion:

Reference to EAIS volume changes in line 70 page 3: As I iterated in my review of the Bijl et al submission to this volume: I appreciate the utility of using isotopes

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to interpret Antarctic Ice Sheet variability as summarise by Liebrand et al (2017) (www.pnas.org/cgi/doi/10.1073/pnas.1615440114) and this approach is used extensively when discussing the Cenozoic greenhouse icehouse transition. However, there are other sections that have been interpreted using backstripping and stratigraphic data in the Gippsland and New Jersey margins that reflect glacio-eustasy in the Oligocene and relative ice volume (Gallagher et al., 2013), it would be useful to consider the significance of these near field and far field sections in any section reviewing ice volume variability. This paper also considers the apparent instability of the EAIS during the Oligocene and presents a sea level curve with Oi events (Figure 6 in Gallagher et al; at slightly higher resolution than the present study) that bears striking similarity to the temperature curve presented in this paper (Figure 4 in this submission).

Gallagher, S. J., G. Villa, R. N. Drysdale, B. S. Wade, H. Scher, Q. Li, M. W. Wallace, and G. R. Holdgate (2013), A near-field sea level record of East Antarctic Ice Sheet instability from 32 to 27 Myr, *Paleoceanography*, 28, doi: 10.1029/2012PA002326.

More specific comments are below:

Line 95: The core recovery in the Wilkes Land section is certainly not “complete”

Line 145 page 5: These are modelled plate tectonic reconstructions.

Line 160 reference to Bijl et al paper in *Jl Micro* to be cited?

Line 315 I agree to a certain extent about the lack of identification of Oi events due the gaps in the record (not unexpected during glacials near Antarctica), however, Oi2 is not near 32 Ma (Figure 4) it is actually near 30 Ma and it is possible there is core of this event in the section (see possible correction of Figure 4).

Pages 13 and 14: This section is very interesting yet requires significant clarification, I have suggested ways to enhance the message and tone down the “speculation” in this section hopefully these suggestions help.

In conclusion, once the text has been clarified and the suggestions considered

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this will be another useful addition to the relatively sparsely documented Antarctic (palaeo)climate and oceanographic records.

Please also note the supplement to this comment:

<https://www.clim-past-discuss.net/cp-2017-153/cp-2017-153-RC3-supplement.pdf>

Interactive comment on Clim. Past Discuss., <https://doi.org/10.5194/cp-2017-153>, 2017.