

Dear editor, dear referee,

The referee has provided useful and constrictive feedback on our previous responses to the first round of reviews. This has allowed us to strengthen the clarity of our manuscript. Comments have been taken into account and are discussed below.

Review:

I have now assessed the revisions conducted by Botté et al. The authors have sufficiently implemented most suggestions from the reviewers. However, a few (mostly technical) corrections should still be taken care of. I hope the manuscript can soon be accepted, as this is an important part of the PhD thesis of the first author.

-The supplementary figures (S1-S5) were not uploaded by the authors and could therefore not be assessed. S4 is not referred to in the main text.

We forgot to upload the file containing the supplementary figures, this has now been corrected. The missing in-text reference to S4 has also been corrected.

-The validity of the correlation of the magnetostratigraphy to the GPTS was critically addressed by both reviewers. They both asked to be more cautious while simultaneously acknowledging that the interval between the hiatuses likely spans the EOT. Their request was mostly implemented in the manuscript, but (i) still does not allow for the marine limestones to be of Priabonian age, so please draw the correlation to the base of C17 from the bottom of the marine limestone (ca. 40 m) and (ii) the precision of the age model is still overstated in Fig. 8 (particularly the central panel; see the uncertainty in the correlation to the GPTS in Fig 7). It would be more appropriate to remove the numerical age scale at the bottom of the central panel. Referring to the central panel with 'Late Eocene warming' with the question marks suffices.

(i) We have updated the text and the figure to allow the marine limestone to be of Priabonian age, as requested. However, note that we do not draw a correlation to the base of C17, because the base of C17 is of Bartonian age. We now draw a correlation from the base of the Priabonian to the layer that has yielded the Priabonian marine fossil assemblage.

(ii) The Figure 8 has been updated.

-Anonymous Reviewer 2 asked the authors to include a dedicated discussion about the post-depositional alteration of the pedogenic carbonates. Whereas the authors included a substantiated discussion in the response to the reviewers, its incorporation in the manuscript is fragmented. This needs to be fixed.

We have added a dedicated section, "5.3 Preservation of the primary Δ_{47} signal," immediately before our paleotemperature interpretation, addressing the post-depositional alteration of the pedogenic carbonates. This section incorporates our interpretation of the thin sections and of the clumped isotope temperatures as a whole.

We chose not to include the discussion of soil water $\delta^{18}\text{O}$ in this section, as it is addressed later in the manuscript, and felt that including it here could be confusing for the reader.

-Fig. 7: remove the grey bar with unknown polarity at the bottom of the polarity column. There are only three 'outliers' in this entire interval.

This has been corrected

-Fig. 2: the geological map still does not include coordinates.

This has been corrected

-Within Fig. 4: outliers--> outliers

This has been corrected

-l. 257: paleomagnetisme.org--> paleomagnetism.org

Done

-l. 470: U-pb--> U-Pb

Done

-Fig. 5 and text: These are not Zijderveld plots, as they require dec and inc to line up. Remove the name 'Zijderveld' or show actual Zijderveld plots.

This has been changed: "Zijderveld diagrams"->"orthogonal demagnetisation diagrams"

-Response to comment by Reviewer 1 (Meijers) on l. 471 in original manuscript: I cannot find the thin sections that the authors mention. Have they been uploaded? Same for other supplementary materials.

The thin section figures are included in the previous missing "Supplementary Figures" file. This has been corrected.

-The new table that synthesizes EOT paleotemperatures (following the suggestion of anonymous Reviewer 2) is not included in the track changes version, nor in the revised version (it can be found in the response to the reviewers though). Make sure to include it in the manuscript. Also see if there is a possibility to condense it by playing with the width of the columns and reducing text. early oligocene --> Early Oligocene

This new table has been added as a supplementary material as "Supplementary table 6" and is mentioned l. 535.

We intentionally put it as a supplementary material to not overcharge the manuscript.

-l. 650: Kaiseri-Özer--> Kayseri-Özer; $\delta^{18}\text{O}_{\text{wate}}$ --> $\delta^{18}\text{O}_{\text{water}}$

Done

-The Lüdecke (2013) reference should be Lüdecke et al., (2013). They were not the single author of the paper.

Updated

I recommended that the authors conduct a final thorough proofreading of the manuscript before uploading the files for production.

Done

Maud Meijers