

Interactive comment on “The Eocene–Oligocene transition at ODP Site 1263, Atlantic Ocean: decreases in nanoplankton size and abundance and correlation with benthic foraminiferal assemblages” by M. Bordiga et al.

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Reply to comments by P. Pearson

We are very thankful to Paul Pearson for the helpful comments and suggestions on the stratigraphic terminology and recognition of the Eocene/Oligocene boundary at Site 1263. They helped improve our manuscript, especially defining important concepts (as Oi-1) and improving the placement of the EO boundary. Below we respond to all points raised (summarized, see original comment by P. Pearson for details).

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Comment 1) The first issue relates to the isotope shift and the term 'Oi1'. [...] In my opinion, the several ambiguities associated with the term Oi1 are not conducive for clarity in discussion hence I recommend abandoning the term Oi-1 by which I mean no disrespect to the work of Miller et al. (1991) which is one of the seminal papers in the field.

Response: It is true that some confusion and misuse of the term Oi-1 occurred in the text. This was also related to a graphical mistake in the figures: the placement of the term “Oi-1” was intended to highlight a 400-kyr interval (rather than an “event”), including the positive peak in $\delta^{18}\text{O}$. We recognize that this use of “Oi-1” in the figure leads to misunderstanding and that it does not add more information to the figure. For this reason we will omit it from the revised figures. We adopted the most recent definition reported in Ladant et al. (2014), as suggested by the referee G. Villa, for the two steps of cooling during the EO transition: Step 1= EOT-1, and Step 2= Oi-1. We clarified this definition in the text. As suggested by P. Pearson, we used Step 2, to avoid any confusion with previous definitions of Oi-1.

Comment 2a) Correlating the EOB. [...] Given the fact that the Hantkenina / Cribrohan-kenina extinction occurs clearly and sharply between the steps in Tanzania (Pearson et al., 2008), my suspicion is the EOB is best correlated to Site 1263 using a combination of the Tanzania constraint and the isotope stratigraphy to about 93.5 mcd. The lack of Hantkenina fragments in the few metres below this could be sampling. A formal correlation to Site 522 would be an interesting exercise.

Response: We agree that the position of the boundary based only on the Top of Hantkenina may not be correct in this case. Indeed, Hantkenina has been affected by dissolution, and placing the top just on the basis of the spines presence may not be reliable. On the other hand, we cannot rely on the isotope stratigraphy either because at this site the $\delta^{18}\text{O}$ signal did not record clearly both steps of the cooling (i.e. Step 1 or EOT1, as called by Ladant et al. 2014, and Step 2 or Oi1). Only the strong positive $\delta^{18}\text{O}$ peak of the Oi-1 (Step 2) is clearly identifiable. We can say that the boundary

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should be placed in between these two datums: above the Top of Hantkenina (96.27 mcd) and below the peak in $\delta^{18}\text{O}$ (93.75 mcd). An indication that the boundary could be placed in between these two depths comes also from the acme of *Cl. subdistichus*, which occurs just above the boundary (Agnini et al. 2014), and at Site 1263 at 94.9 mcd (just below the Step 1 as defined by Peck et al 2010, but again, Step 1 is not clearly identifiable). We also revised Figure 2 by plotting the absolute and relative abundance of *Cl. subdistichus* together with the smoothed curves on 5 samples to help the identification of the acme. We also inserted in Fig. 2 the biozones of Agnini et al. (2014). We compared in the text our data also with the Site 522, as suggested by P. Pearson.

Comment 2b) However there are other ways to improve the planktonic foram biostratigraphy, which is to find the level of the *Pseudohastigerina* size reduction and the *T. cerroazulensis* group extinctions in Site 1263, not done in this study. I would like to know where these are in the core before confirming correlation of the boundary. My prediction is they would be found at a higher level than the top Hantkenina so far found. This seems not to have been attempted in this study, but could be very important for the interpretation, correlation and geohistory of the events under consideration.

Response: We agree that the suggested analysis would indeed solve this issue of the placement of the EOB, and narrow down the interval where we can place the boundary. This analysis will be done shortly and will be reported in the revised manuscript. We will focus on identifying the size decrease in *Pseudohastigerina* and the extinction of *T. cerroazulensis*.

Comment 3) One Minor comment: the Tanzania cores in Fig 1 seem to have been transposed to Somalia.

Response: Figure 1 has been modified as suggested.

References

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Fig. 2

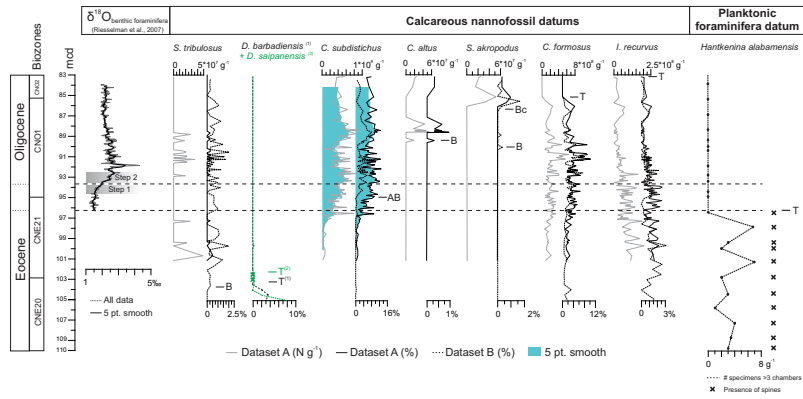


Fig. 1. Fig. 2 modified

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