

## ***Interactive comment on “Benthic foraminifera at the Paleocene/Eocene thermal maximum in the western Tethys (Forada section): variability in climate and productivity” by L. Giusberti et al.***

**L. Giusberti et al.**

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### MAIN ISSUES/SPECIFIC COMMENTS

1) Title: it is not fully indicative of the work here presented because the Authors combine new high resolution benthic foraminiferal results with published calcareous plankton, mineralogical and biomarker data to document climatic and environmental changes across the PETM. I suggest to change the title accordingly.

We thank both reviewers for the suggestion and we will follow their advice modifying the title.

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2) Introduction. This paragraph is very long and too condensed. I suggest to reduce it. Some parts could be preserved for the discussion sections (e.g. from 4208-line 26 to 4209-line 26).

We agree with the reviewer and will try to modify the introduction accordingly, but see note above about including too much material in the discussion.

3) Materials and methods. - Subparagraph 2.2.1: I fully agree with Speijer's comment about how the ecological overview has been assembled. Please give more details of your explanation. Moreover, this subparagraph is too long and descriptive making it dull reading. I suggest to synthesize the benthic foraminiferal ecology into two tables deleting the descriptive parts. Some suggestions: the first table could report the main ecological preferences and microhabitats of the most common taxa recorded in the studied section; for each benthic taxon the table could include a first column with the known paleo-depth range, a second column with the mode of life (deep or shallow infauna and epifauna), a third column with the food supply (quantity, quality and periodicity), a fourth column with the oxygenation, a fifth column with the type of substrate and eventually a sixth column with other remarks. The second table could report the grouping taxa (R1, R2, O1, O2) and their occurrence in coeval records from the studied Forada section to other land sections or oceanic sites. Both tables should include a last column with the most relevant reference papers used to infer the ecological preferences. The descriptive parts (only when strictly necessary to the discussions) could be available as supplementary material.

Having re-read the manuscript in light of the comments by referee #1 and #2 on paragraph 2.2.1 (the benthic ecology overview), we appreciate their concern. We also agree with the reviewers that the paragraph is too long. We thus propose to eliminate the entire paragraph 2.2.1, and with it any reference to taxa ecology as inferred from the Forada record (e.g., the clustering into the categories R1, R2, O1, O2). We propose to discuss part of these aspects in the Discussion paragraph. In place of paragraph 2.2.1, following the referees' suggestion, we will provide a table summarizing the ecology of

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the most common taxa at Forada based on published literature.

4) Conclusions: this paragraph could be significantly streamlined omitting a few generic statements and organising it into point bullets reporting only the main concluding remarks.

We can modify this part into bullet points.

5) References: the references list is consistent and updated, but some references cited in the text are missing or incorrectly reported in the reference list (e.g. different year of publication), conversely some references reported in the reference list are absent in the text. Please see below in the “Technical corrections” for further details. Moreover, some references in the reference list do not follow the guide of the CPD (non-abbreviated journals, missing Author’ initials, misspellings). The reference list should be carefully checked, completed and corrected accordingly.

Ok. Please note that in some cases the journals are not abbreviated because they do not occur in the ISI Journal Title Abbreviations Index. In any case, we will carefully check the entire reference list.

Technical corrections

- 4206-line 14 and elsewhere: The term “agglutinant” is not fully appropriated, maybe “agglutinated or arenaceous”. Please correct throughout the MS accordingly.

Ok, we agree. We will substitute agglutinant with agglutinated.

- 4207-line13: “Roehl” please replace with “Röhl”.

Ok

- 4207-line 23: “Dickens et al. 1995” in the ref. list is reported as “Dickens et al. 1997”, please correct/uniform.

Ok - 4208-line 7: “Zachos et al. 2005” in the ref. list is indicated as “Zachos et al.

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2015”, please correct/uniform or add.

Ok

- 4208-line 10: “The profound paleoceanographic:” new item.

See response to reviewer 1 for the same comment.

- 4208-line 16: Boscolo-Galazzo et al. 2014 is missing from the ref. list.

Ok

- 4208-line 20 “Paelike” please replace with “Pälike”.

Ok - 4209-line 7: “Krauss” in the ref. list is cited as “Kraus”, please uniform.

Ok

- 4209-line 29 “Sluijs et al. 2007”, is it 2007a or 2007b?

Ok. It is Sluijs et al. 2007a.

- 4212- line 22: “Foster et al. 2013” is missing in the ref. list. Please add it.

Ok

- 4213-line 20: “Hayward et al. 2012” is missing in the ref. list. Please add the ref.

Ok

- 4214-line 2: “: based on their abundance pattern in the studied and other PETM sections” please add some reference paper to support this sentence.

Ok. As stated above, the subparagraph 2.2.1 will be removed and the information presented in a Table.

- 4215-line 21: “Alegret et al. 2011” is reported in the ref. list as “Alegret et al. 2010”. Please correct or add the missing ref.

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Ok. The correct citation is Alegret et al. (2010).

- 4216-line 1: "Ishman & Domack 1994" is missing in the ref. list. Please add the ref.

Ok

- 4216-line 29: "Steineck & Thomas, 1996" is missing in the ref. list. Please add it.

Ok

- 4218-line10: "Mancin et al. 2014" please replace with "Mancin et al. 2013".

Ok.

- 4218-lines 11 to 18: "Caution is needed:" I would move this sentence at the beginning of the subparagraph dealing with the foraminiferal ecology.

We will move it at the end of the previous paragraph as our intention would be that of eliminate paragraph 2.2.1

- 4218-line29: "Roehl" please replace with "Röhl"

Ok.

- 4220-line 11 and elsewhere: The AA use the terms "morphotypes, morphogroups and morphologies". Please uniform throughout the MS.

Ok.

- 4221-line5: "opportunists" please replace with "opportunistic taxa".

Ok.

- 4225-line1: I suggest to change in "Discussion" removing "environmental reconstruction" because redundant.

Ok, we agree.

- 4225-line13: Please change in "Alegret et al. 2009a".

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Ok.

- 4225-line 20: I suggest to change the subtitle in “Environmental reconstruction during the late Paleocene”.

We agree.

- 4225-line 21: Please change in “The Belluno Basin deep-sea environment (Assemblage A)”

We will change it as suggested.

- 4226-line6: “Jorissen et al., 1995” is missing in the ref. list. Please add it.

Ok.

- 4226-line 11: “Fontanier et al 2005” is reported in the ref. list as “Fontanier et al. 2008”. Please correct or add the missing reference.

Ok. The correct citation in the ref. list is Fontanier et al., 2005.

- 4227-line 4: previously you said the surface waters were “oligotrophic” and now “oligo-mesotrophic”. What is the correct one?

We will use consistently "oligo-mesotrophic".

- 4227-line 9: Please change in “The precursor climate change (Assemblage B)”.

Ok.

- 4228-line 20: I suggest to change in “Climate and marine life during the PETM”.

Ok.

- 4229-line 2: Both the references “Higgs et al, 1994 and van Santvoort et al. 1996” are missing in the ref. list. Please add these references.

Ok

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- 4229-line 11: I suggest to change in “The early peak PETM (Assemblages C and D).

Ok

- 4229-lines 16 and 19: “Zachos et al. 2005” in the ref. list is indicated as “Zachos et al. 2015”. Please correct/uniform or add.

Ok

- 4231-line 16: I suggest to change in “The core of the CIE and Recovery (assemblages E and F)”.

Ok

- 4235-line 15 “de-oxygenation” this term is not proper. Please replace with “scarce oxygenation” or “sub-oxic conditions”.

We disagree – the term deoxygenation is used widely in the literature of recent oceanic environments – see e.g., <http://www.oceanscientists.org/index.php/topics/ocean-deoxygenation>.

- 4237 to 4258 References. The following references are reported in the ref. list but they are missing in the text: Fenero et al, 2012 Hess & Jorissen, 2009 John et al., 2012 Jones & Manning, 1994 Ortiz et al., 2011 Pearson & Thomas, 2015 Sluijs et al., 2009 Sluijs et al., 2008 Smith et al., 2007 Thomas et al., 1999 Winguth et al., 2010 Zeebe et al., 2009.

We will provide appropriate corrections removing references missing in the text.

- 4262 caption of Figure 3. Is F-index from Luciani et al 2010 or 2007 as previously said in the text? Please uniform.

Ok. The correct citation is Luciani et al., 2007.

- 4263 caption of Figure 4. Is F-index from Luciani et al 2010 or 2007 as previously said in the text? Please uniform.

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Ok. The correct citation is Luciani et al., 2007.

- 4264 Caption of Figure 5. *Bulimina* spp. should group only different species of the genus *Bulimina* and not other similar genera as *Buliminella* etc. Please replace *Bulimina* spp. with “buliminids”.

Ok. See answer to reviewer 1.

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Interactive comment on *Clim. Past Discuss.*, 11, 4205, 2015.

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