

## ***Interactive comment on “Climate variability and relationship with ocean fertility during the Aptian Stage” by C. Bottini et al.***

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Dear authors,

It was a pleasure to read your manuscript, which aims at comparing a series of biological and chemical proxies in order to reconstruct climate change throughout one of the most studied Oceanic Anoxic Event that took place in the early Aptian, the OAE1a. By combining trends in calcareous nannofossils species with  $\delta^{18}\text{O}$  and TEX86 data, you succeed in highlighting a succession of cooling - warming trends during this time period. I found this really insightful, important, and this represents an important contribution to the improvement of our understanding of the initiation, unfolding and remediation of such paleoceanographic crisis.

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Scientific significance and quality are good to excellent, the presentation quality is good. The manuscript is well structured and written, and I also appreciated the amount and quality of the literature that is used to support your work. My main concern would be the figures, which I found sometimes complex and with font size often too small to be read (when printed as it is from the downloaded PDF file).

Having said that, I have a couple of minor questions and suggestions that you may want to integrate in your manuscript:

1. Page 692, line 26: You use a duration of 12 Myr for the Aptian (Malinverno et al., 2012), whereas Gradstein et al. (2012) indicate a duration of 13.3 Myr for the same stage. Could you comment on this discrepancy?
2. Page 693, lines 17-19: You mention that the preservation of calcareous nanofossils provides information on the diagenesis of the studied carbonates. Also, Erba et al. (1999) gave some insights on the diagenetic state of one of the location you are including in your survey - Cismon. It may be worth mentioning their arguments.
3. Page 694, line 9: I suggest rephrasing as 'before, during and after the OAE1a', since your results from Cismon and DSDP Site 463 cover the latest Barremian / earliest Aptian time interval (segments C1 and C2).
4. Page 699, line 10: Although you described in the text how you refined the isotopic segments of Menegatti et al. (1998) and Herrle et al. (2004), and although you reported these schemes alongside with yours on your figures, I am wondering if an additional figure showing the stratigraphic extent and relationship of these three chemostratigraphic schemes with biostratigraphy would not be beneficial to the reader.
5. Page 699, line 20: Capital letter in 'Kilian Level Equivalent'.
6. Page 700, line 11: Ap4/C4, the second '4' is missing.
7. Page 705, line 4: How were these affinities defined? With respect to chemical, sedimentological proxies? It would be worth mentioning this in one introducing sentence, for readers who are not familiar with this type of approach.
8. Page 707, line 17: Usually,  $d_{18}O$  can be interpreted in terms of temperature or salinity fluctuations. Why do you think your record only reflect paleotemperatures? I would be more cautious and slightly rephrase this statement.
9. Page

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707, line 23: How did you come up with the duration of 35kyr? Is it from Malinverno et al. (2012)? Please specify. 10. Page 710, line 22: I find it hard to understand which part of the stratigraphy you are dealing with here. After using the isotopic segments Ap3/C3, you are now referring to intervals of temperature. Would it be worth reminding the isotopic segment between brackets, or having a synthetic figure somewhere with biostratigraphy, the different chemostratigraphic schemes and these paleotemperature intervals (see my previous comment 4)? It could be more reader-friendly. 11. Page 711, line 27: Would there be any other analysis that could be performed to assess this thermal maturation? Rock Eval pyrolysis? Abnormal d18O values? 12. Page 712, line 10-15: I like the fact that you propose three reasons for these unusual TEX86 values. However, is it possible to decipher which one had the strongest impact? I would like to see, even in one short sentence, why some of these mechanisms are unlikely to have impacted the reliability of your TEX86 signal. 13. Page 717, line 3: Are there any periods of the geological record where such a correlation between zooplankton evolution and volcanism can be observed? If so, I think it would make your argument even stronger.

Figures:

• Printed as they are, the figures are too small. Make sure they will be reproduced as full-page figures, if this is not your intention, then increase font size. Especially your figure 6 is not readable as it is. • Caption for Figure 8: you may want to add an 'h' to 'cyclochronology'. • Figure 8: you report a methane release just before isotopic segment C3. Since you have cyclostratigraphy, can you estimate the offset between these two phenomena?

Based on these comments, I suggest minor revisions of this manuscript before its final acceptance and publication.

Best regards, A. Godet.

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