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Climate of the Past Discussions

Interactive comment on ""OAE 3" – a low- to mid-latitude Atlantic oceanic event during the Coniacian-Santonian" *by* M. Wagreich

Anonymous Referee #2

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General comments

The manuscript by Michael Wagreich builds on previous studies on the Coniacian-Santonian interval to obtain a picture of the geographical and stratigraphical distribution of organic-rich horizons that has been attibuted to Oceanic Anoxic Event 3.

Comparison of results from different localities shows that - contrarily to 'mid' Cretaceous OAEs - Coniacian-Santonian black shales are time transgressive and confined to marginal depositional settings in the Atlantic.

OAE3, therefore, should not be regarded as a global oceanic anoxic event rather representing a long time interval when Atlantic depositional settings continued to be prone to enhanced fluxes/preservation of organic matter on the sea floor, differently than other

marine settings worldwide.

The summary presented in the ms. is useful in that it clears out some confusion existing in the literature and the topic is suitable for publication in CP. However, the ms. is largely a "repetition" of Wagreich (2009). Also for this reason, I would expect the author to include a more detailed discussion of the paleoclimatic and paleocenographic scenarios accompanying the supposed OAE3 event(s) and how these relate to mid-Cretaceous globally distributed OAEs.

Specific Comments

1) There is a series of points/questions that need to be further elaborated:

Why does the Atlantic remain prone to organic-carbon burial much longer than other basins?

Are the 0.5 ‰ positive excursions confined to the Atlantic? If yes, this suggests that the Atlantic was (largely) isolated from other basins. If not (you do seem to have similar geochemical profiles at Contessa), is 13C-depleted carbon burial alone sufficient to explain the 0.5 ‰ positive d13C excursions observed given the very restricted geographic and bathymetric setting where burial occurred? Comparison of the amplitude of carbon isotope excursion suggests burial of a mass of organic matter across OAE3 events equivalent to 1/4th – 1/6th of the carbon burial across globally distributed 'mid' Cretaceous OAEs (i.e. 0.5 ‰ vs. 2-3 ‰. This discussion would help in discriminating causes and effects in the process(es) leading to the observed sedimentary and geochemical anomalies. In particular, Above points should be addressed (maybe just a matter of putting them down in a few lines of discussion given the data available) before suggesting that the deposition of black-shales across OAE3 is not a consequence of a global climate event (pages 1218-19).

2) Hypothesizing a late Turonian OAE3 would need more data than the carbon isotope record and it also sounds a little bit at odd with the general discussion.

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3) I would avoid introducing the term “Atlantic Anoxic Event”. The large literature on Mediterranean sapropels seems to stand pretty well in spite of the lack of a term like “Mediterranean Anoxic Event”.

Technical comments

Page 1211 line 13 : subsequently;

Page 1211 line 28 : Not clear. Please rephrase

Page 1211 line 29 : ‘greenhouse conditions’

Page 1211 line 29 : Earth

Page 1212 line 2: extent

Page 1212 line 1 : reference(s)?

Page 1212 line 8: More recent investigations confirmed. . .

Page 1212 line 27: Santonian

Page 1214 Line 1 : Millenial- to centennial-scale (and?) precession cycles.

Page 1215 Line 17 : to be dealt with with caution

Page 1216 line 15: excursions

Page 1216 line 16: look at

Page 1216 lines 17-18 : may help identifying OAE3 at different sites and evaluating its paleogeographical distribution.

Page 1217 line 21: supra-regional

Page 1219 line 18: , if any

Interactive comment on Clim. Past Discuss., 8, 1209, 2012.