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Interactive comment on “Imbalanced nutrients as triggers for black shale formation in a shallow shelf setting during the OAE 2 (Wunstorf, Germany)” by M. Blumenberg and F. Wiese

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Imbalanced nutrients as triggers for black shale formation in a shallow shelf setting during the OAE 2 (Wunstorf, Germany)

By Blumenberg and Wiese

This paper reports analytical results of OAE-2 black shales collected at Wunstorf, north Germany. Together with carbon isotopic composition of carbonate published before, they reported bulk properties including $\delta^{15}\text{N}$ and a series of hopanoids. I think OAE includes essence of biogeochemical processes on Earth and many piece is still missing. This manuscript is well written and data reported here are original. Interpretation

C3729

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of the data, especially for the final section of the manuscript is important and intriguing. I recommend the manuscript is acceptable for publication in Biogeosciences after minor revision. Below I describe some comments;

A previous study with SEM-EDS (Ohkouchi et al. 2003) suggested that organic matter in the OAE black shale exists mainly as micrometer scale organic “chunks” rather than spreading over the surface of clay minerals. Prof. Andrew Aplin at Newcastle University recently got a similar result. Therefore, There are more data to support the author’s view that protective mechanisms of the organic matter on clay mineral surfaces does not affect effectively in the black shale.

To my knowledge, sedimentary phosphorus in Cretaceous black shale is mainly associated with calcium phosphate, bone/teeth of organisms (Please see Kuroda et al. 2005 GCA, 69, 1479-). Did the authors check this in their samples? If this is the case, how it affects the author’s thoughts on biogeochemical cycles during OAE-2?

Based on the model results (of modern ocean), denitrification and N₂-fixation are regulated internally (Deutsch et al. 2007, Nature, 445, 163-). Do the authors think it the case during the OAE-2?

I cannot find van Bentum et al. 2012 in the list of references. Please check the list carefully.

Please also note the supplement to this comment:

<http://www.biogeosciences-discuss.net/9/C3729/2012/bgd-9-C3729-2012-supplement.pdf>

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