

Interactive comment on “Palaeoenvironmental response of mid-latitude wetlands to PETM climate change (Schöningen lignite deposits, Germany)” by Katharina Methner et al.

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This manuscript presents an interesting dataset, but there several problems that need to be solved before it can be published, including: 1. Raw palynological counts must be presented (rather than percentages) 2. Because D13C values of bulk sediments can be affected by the total organic carbon of a sample (Wing et al Science 310, 993, 2005), the Wing residuals method (Wing et al Science 310, 993, 2005) needs to be used rather than the actual bulk value. In other words, the residual rather than the bulk needs to be plotted against the stratigraphy. I did a plot of TOC and D13C, see attached, and there seems to be a TOC-D13C correlation at both high and low TOC

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values. 3. Something is not quite right about the PETM thickness. There are 180 meters for the Lower Eocene in the section (fig 2, and fig 3 of Brandes et al paper). Early Eocene spans 8.2 my, that would give 45Ky per meter, and 10 meters would be about half a million years, that is twice to three times the span of the PETM. Brandes did a basin modeling analysis and ages for the modeling were derived from “interpolated from literature data” (Table 2). And the “literature data: in the paper refers to “According to these sources, a sample from slightly above the Main Seam has been assigned to dinoflagellate zone D5b (Ahrendt et al. , 1995), the base of which is dated to about 54.8 my b.p. (Kothe, 2003). The latter age may thus serve as an approximation for the base of the Main Seam (Gurs et al. ,2002) and the Schoningen Formation. A radiometric age of 46 my b.p. and dinoflagellates indicative of zone D9na have been derived from slightly below the Heidberg unit by Ahrendt et al. (1995) and Lietzow Ritzkowski (1996, 2005a), but a discrepancy is caused by the fact that according to Kothe (2003), dinoflagellate zone D9a ranges from 50.51 to 48.5 my b.p”. It seems that 1) the Brandes modeling is not independent as it relies on the ages, and 2) ages themselves have discrepancies. If zone D5b is slightly above Main seam, it would imply for the PETM to be below, not above the Main Seam. The most difficult task when working the PETM is having strong evidence of the precise stratigraphic location of the PETM. It should be fully demonstrated. This manuscript requires a much stronger argument to support the position of the PETM. For instance, it would very useful to have the D13C1 record of the entire early Eocene to see if the long-term negative excursion of the EETM is recorded. 4. A simple inspection of the pollen data is not enough. The palynological analysis requires a statistical test to support the conclusion that there is little change across the PETM. For example, a multidimensional scaling could be run using the Chao-dissimilarity index to test if the differences within PETM samples are as high as differences among pre, post and PETM samples.

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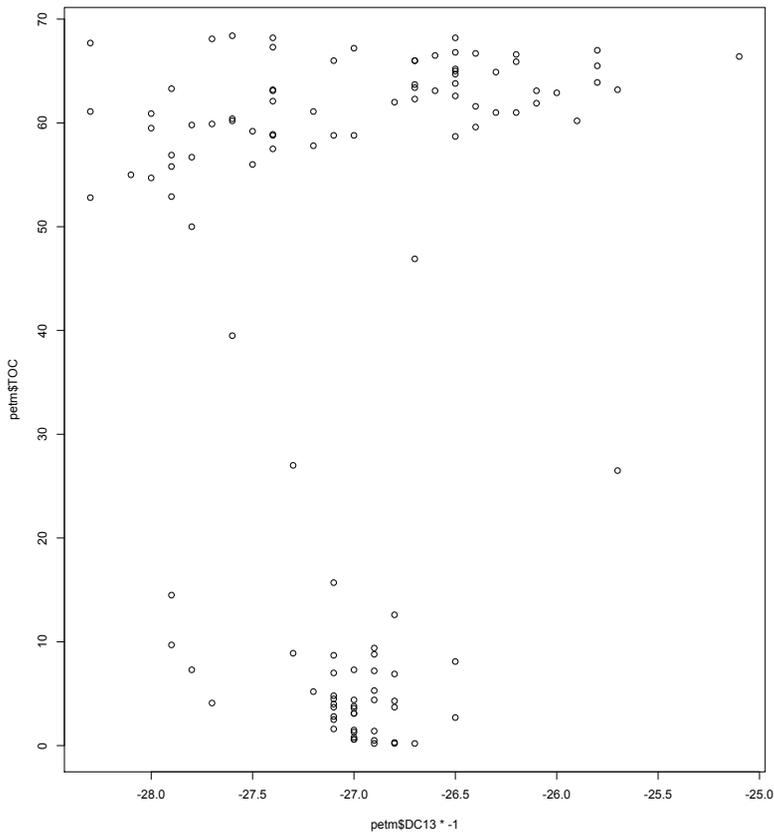


Fig. 1. toc vs d13C

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