

Response

We want to thank the anonymous reviewer for the constructive review. The comments are a great help to improve the manuscript. Below you can find our detailed responses (bold) to the comments:

Anonymous Referee #5

This is a concise and clearly presented paper that draws upon a number of biogeochemical indicators to consider peat degradation at three sites of contrasting management history, in northern Germany. The research is generally described well, and although the results are presented in a descriptive manner, they illustrate the potential to use this approach more widely when assessing peatland degradation. However, it would have been useful if the authors had reflected more on this latter point in the paper (specifically the wider significance of this research). While I feel that the paper is very close to publishable quality already, I suggest that the authors consider the following suggestions to improve the manuscript further: Throughout the manuscript the authors refer to increases (or decreases) in isotopic composition. I would prefer to see isotopic compositions described as enriched (or depleted).

Reply: Thank you. We will alter the conclusion and reflect more on the potential to use the approaches. The increase (and decrease) of isotope values refers to the depth profiles and the change of $\delta^{13}\text{C}$ or $\delta^{15}\text{N}$ with depth. So what is really meant is a “increase in enrichment” or a “decrease in enrichment”. We will be clearer on this point and will either state the development of enrichment or trend of depth profile.

Site Description: In the light of subsequent comments on the importance of drainage, it would be helpful to see a fuller description of the ‘intensive drainage’ that occurred (page 16830; line 10);

Reply: We will go back to the literature and present a more detailed description of the drainage that occurred at the Ahlen-Falkenberger peatland.

A location figure would be helpful – to identify the (9) points where samples were located – and the relative size and distribution of the three categories of peatland (wetland; extensively managed grassland; intensively managed grassland);

Reply: Sampling points are the same locations where other investigations were done which are described in Beetz et al. 2013 and Frank et al. 2014. We will add a figure with the study site to the supplementary material.

Soil sampling and analysis: Why were samples only collected to 50cm depth; and how close were the replicate samples collected at each plot?

Reply: Samples were collected down to approximately 100 cm depth (Page 16831; line 9). All three replicates were sampled within about 5m radius close to the investigations plot of Beetz et al. 2013 and Frank et al. 2014.

What depths were selected for radiocarbon dating ? (page 16832; line 4)

For each site, three depths were selected for radiocarbon dating and samples at these depths were investigated for each individual core. Samples for radiocarbon analyses were selected after evaluation of ash content and stable isotope depth profiles and were taken where a clear change in depth pattern was indicated (Page 16832; line 6-7).

Minor points: Abstract: line 21: 'in retrograde' – should this be 'retrospectively'? Page 16829: line 12: 'a posterior' – rephrase. Page 16839: line 24: remove 'been'.

Reply: done