

## ***Interactive comment on “Biogeochemical indicators of peatland degradation – a case study of a temperate bog in northern Germany” by J. P. Krüger et al.***

### **Anonymous Referee #3**

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The manuscript is actually an extended case study of the previous one (Alewell et al. 2011 Biogeosciences. 8:1769.). However, the authors in this study appear to over-interpret the results. The author indeed can carefully read the previous paper and discuss the results in a more balanced manner. (1) The title. The title is relatively vague. The authors claim that ‘Biogeochemical indicators of peatland degradation – a case study of a temperate bog in Northern Germany’. One could not understand what are biogeochemical indicators and how precisely these indicators could represent environmental disturbances. The new title is apparently needed in a straightforward manner. (2) The conclusion. The authors conclude that ‘All investigated biogeochemical parameters together indicate degradation of peat due to (i) conversion to grassland,

(ii) historical drainage as well as recent development and (iii) land use intensification." These statements are pretty vague and could be imagined without experimentation. This study is not a review as well. (3) Peatland degradation as the theme is not appropriate. It appears there is no solid evidence in support peat degradation in this study. As the authors mentioned, aerobic and/or anaerobic decomposition can occur in peatland, leading to degradation. However, the indicators, rather than solid evidence of peatland degradation were investigated. It remains uncertain whether these indicators could accurately reflect what is going on in peatland. In addition, it was said that the highest carbon loss was observed in the intensively managed grassland (GI). However, only the carbon in soils was concerned. It seems that a large amount of aboveground biomass will be removed by grazing. What will happen if this was taken into account? (4) The authors seem to draw no solid conclusion for the usefulness of isotope techniques as indicators of peatland degradation. One point that is interesting I guess is the slope of  $^{13}\text{C}$  with depth. This slope appears to be a better predictor, and the authors can relate it to previous studies (Alewell et al., 2011). In fact, the current manuscript needs to be presented in a manner similar to previous study by Alewell et al. 2011.

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