

Response

We want to thank the anonymous reviewer for the constructive review. Below you can find our detailed responses (bold) to the comments:

Anonymous Referee #1

The topic of the manuscript is relevant for Biogeosciences. The paper present important additions to our knowledge on the peatland biogeochemistry. The language of the manuscript is very good except one misprint in the abstract (see below). However, I recommend some revisions before final consideration of this paper for publication.

General comments:

1. The plots for natural peatlands are somewhat inconsistent between Figs. 1 and 2. In the former Figure, $\delta^{13}\text{C}$ does not depend on depth. The relevant arguments are provided in Sect. 1. However, in Fig. 2, all three NW ('near-natural') plots show significant dependence of $\delta^{13}\text{C}$ on depth. The difference of $\delta^{13}\text{C}$ in these plots between the near-surface layer and the depth of ≈ 1 m (the deepest data presented in the paper) for the NW plots is even larger than the corresponding differences for the GE and GI sites. I guess, that this inconsistency should be addressed before considering the paper for publication in Biogeosciences.

Reply: The figure 1 is the theoretical concept for natural and degraded peatland based on literature research. In figure 2 the results of the $\delta^{13}\text{C}$ measurements of the three investigated sites are presented. The results show, that the $\delta^{13}\text{C}$ depth profiles of the NW site are different to the expected depth profile of natural peatlands in the theoretical concept (Fig.1). This indicates a degradation of the NW site. The differences of $\delta^{13}\text{C}$ values between the near-surface layer and the deepest investigated layer are higher for the NW profiles compared to the grassland sites, which is mainly due to the lower $\delta^{13}\text{C}$ values in the first 6 cm at the NW site compared to the grassland sites. The lower $\delta^{13}\text{C}$ values of the NW site are probably due the Suess effect (please see reply to short comment by E. Hobbie) due to the fact that these ecosystem has bound more C into the soil than the grassland sites.

2. An additional inconsistency is found between Figs. 1 and 3 is due to $\delta^{15}\text{N}$ for managed sites (GI and GE). In the conceptual Fig. 1 $\delta^{15}\text{N}$ changes from negative values in the near-surface peat layer to the positive values at greater depths. However, the respective plots in Fig. 3 show an opposite dependence on depth. Again, this matter should be resolved before publication.

Reply: As described in the reply to the first general comment the figure 1 is a theoretical consideration for the expected depth profiles of natural and degraded peatlands and the figure 3 presents the results of our measurements at the three different sites.

Specific and technical comments:

1. p. 16826, line 15: please remove comma after 'near-natural site';

2. Table 2: I would suggest to remove the superscript 'n.s.' and type the numbers with $p < 0.05$ (and with smaller p) in boldface; 3. I would suggest to break all Figures in parts (a, b, c, etc.). It would simplify reference to these parts in the body of the text.

Reply: We will change the specific and technical comments in the revised manuscript.