

## ***Interactive comment on “Greenhouse gas emissions from rewetted bog peat extraction sites and a *Sphagnum* cultivation site in Northwest Germany” by C. Beyer and H. Höper***

### **Anonymous Referee #2**

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The article contains much new and interesting information about the gas exchange and the climate impact of bog ecosystems which were not investigated till now. The methodological approach chosen is convincing, and the results appear very trustworthy. A publication can be by all means recommended. However, the whole thing reminds more of an activity report than a scientific paper at the moment. In order to eliminate this impression, all the recommendations should be considered which are listed below.

#### Introduction

- Focus train of thought more clearly and more logically on the topic of the investigation.

C1188

Special attention must be for the following points.

- + Attune questions and hypotheses better to each other. Why do you not formulate all this only in the form of hypotheses?
- + Please give reasons why it makes sense to investigate the variants presented here together. What do they have in common?
- + Indicate exact figures gas about gas exchange rates and C losses of drained bogs.
- + Please clarify the connection between plants and bog rewetting (p. 4497, lines 14-16).

#### Materials and methods

- Please specify the name of *Drosera* and “mushrooms” (p. 4498, line 17).
- What was the purpose of the biomass determination and its separation? Please check and clarify.
- Did the mentioned authors really employ the same approach for modeling ecosystem respiration and GPP (p. 4500, lines 18-25)? Please clarify.
- Please clarify what shall be achieved with the reduction of the measured PAR values (p. 4500, lines 25-26).
- Please explain in greater detail how the monthly and annual balances were calculated (p. 4501, line 9).
- Remove the DOC literature value from your C balance calculation since you don't check if it also applies to your ecosystems.

#### Results

- In general, numbers which can be found in tables or figures are exceptionally represented once again in the text.

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- In order to promote clarity you should present the results in the following sequence:
  - + site factors
  - + control factors like weather and water table
  - + nitrous oxide and methane
  - + carbon dioxide
  - + carbon and climate budget
  - + Statistical analysis of the relations between control factors and gas exchange. This also applies to figures and tables.
- Instead of current table 1 create a new table which contains an overview of the most important site and control factors of all sites.
- Figure 3 must be revised so that the variants could be clearly distinguished.
- Remove the water tables from figure 4, since this is already shown in Figure 1. Instead of this, add the CH<sub>4</sub> fluxes of variant LM.

#### Discussion

- In order to promote clarity you should subdivide the discussion in the following sections:
  - + Reliability of the research methods
  - + Importance of site and control factors
  - + Evaluation of the effectiveness of the methods for bog revitalization (This also includes a direct comparison between drained and rewetted bogs)
  - + Can the results be generalized? (This also includes a comparison with other studies and a discussion about the long-term gas flux dynamics after reflooding).

C1190

- A meta analysis of own data and information's from literature is mentioned several times in the discussion (p. 4509, line 23, p. 4510, lines 16-17, p. 4512, line 13). However, it remains unclear what is meant since the results of this analysis are referred to nowhere. Please clarify.
- Why do you mention as controlling factor of GPP since it was not measured (p. 4508, lines 13-14)? Please clarify.
- Importance of autotrophic and heterotrophic respiration during the year: On which facts based your statements (p. 4509, lines 1-8). Please clarify.
- The strong impact of the dry period on GPP at the LS variant: Does this really show the efficiency of the model since PAR was the only independent variable (p. 4508, lines 15-22)? On the contrary, does this not reflect the correct choice of the measuring campaigns? Please clarify.
- Statement, that the own results fit more to natural bogs than of rewetted bogs (p. 4509, lines 27-29. P. 4510, lines 1-4). There are no real differences between the presented values. Therefore the statement must be checked.
- Statements about methane emissions from natural and rewetted bogs. Have you considered that AUGUSTIN and JOOSTEN (2007) only dealt with newly reflooded peatlands, whereas you investigated mostly sites with a long-term rewetting history (p. 4511, lines 1-4)? Please check your statement again.

#### Conclusions

Please formulate real conclusions instead of a summary.

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