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Biogeosciences Discussions

Interactive comment on "Nitrous oxide fluxes from tropical peat with different disturbance history and management" *by* J. Jauhiainen et al.

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GENERAL COMMENTS 1. Overall this paper contains useful information on N2O emissions from tropical peatland under different land uses and degradation. It also reviews previous published work. However, it should not be published in its present form MS TEAM REPLY: Compliments on data usefulness are appreciated. Provided critics is applied to improve presentation quality (added information), fluency and information content (restructured content) in revised MS.

2. The manuscript needs to be checked by a native English speaker. English grammar and presentation requires major improvement. In its present form the rationale is difficult to follow and the importance of much of the work described is lost. MS TEAM REPLY: Most of the commented paragraphs and sentences pointed out by the ref-

eree, and sentences alike are moved to more appropriate locations and/or rephrased in order to increase clarity of the presentation. Modified version will be checked by professionals (native English speaker) at the University language services centre. In most cases, the pointed out issues were acceptable and the referee is thanked for detailed inspection on the work.

3. The manuscript also needs to be restructured. Some parts of the text need to be realigned from methods to discussion, from results to discussion, from results to methods, etc. MS TEAM REPLY: Restructuring has been made for most pointed out issues, and on some other text sections that were found necessary to relocate for comparable reasons. In some cases, requested additions in the text or tables necessitated restructuring of paragraph structure. One new sub-section was added in discussion (4.5 Challenges and opportunities in N2O data collection and processing) which summarises potential weaknesses in the existing present(ed) data, challenges met in data collection in the field, and possible important study lines on the subject in the future.

For example: a. P. 5430, l. 10-15 & l. 18-27 – move to discussion MS TEAM REPLY: Section P. 5430, l. 10-15 is moved into Discussion under new sub-title 4.5 which deals uncertainties of the approach, method, site selection etc. Section P. 5430 l. 18-27 is moved to methods.

b. P.5431, l.18 – 20 – move to methods MS TEAM REPLY: Moved and rephrased.

c. P. 5432, l. 1-3 – move to methods MS TEAM REPLY: Omitted from restructured text.

d. P. 5432, l. 24-27 – move to discussion MS TEAM REPLY: Moved and rephrased.

e. P. 5433, l. 1-6 – move to discussion MS TEAM REPLY: Moved and rephrased.

f. P. 5436, l. 27-29 – move to introduction MS TEAM REPLY: Moved.

g. P. 5437, l. 1-7 – move to introduction MS TEAM REPLY: Moved. 4. There are numerous places where the text meaning is unclear, confusing or ambiguous. More details are provided below. MS TEAM REPLY: See our feedback to referee points 2

and 3 (above), and specific comments below.

SPECIFIC COMMENTS The following are examples of areas that need to be addressed and there are many other lesser points that should be picked up in the redrafting of the manuscript. 1. Mention of possible N2O formation pathways and microorganisms involved should be made in introduction. MS TEAM REPLY: This information was in the original version and can be found at 2nd paragraph in Introduction.

2. There is confusion between study sites (based on land uses) and gas monitoring locations (how many per site and where). On p. 5427 5 gas flux monitoring sites (land uses) are mentioned but there are in fact 6 (see Fig. 1). MS TEAM REPLY: Number of flux monitoring sites was 6, which is now corrected in the text. Number and distribution of monitoring locations, i.e. gas flux monitoring spots at each site, is provided in Table 1.

3. Under Methods, 2.2., p. 5427 et sequel it would be clearer if different sub-sections were allocated to the various topics, e.g. 2.2.1 gas sampling, 2.2.2 water table monitoring, 2.2.3 data analysis. At present they are rather mixed up and overlapping. Temperature measurement is referred to in methods but does not feature in either results or discussion. Leave it out. MS TEAM REPLY: Sub-tiles for sub-topics are created and the content is rearranged accordingly under these topics. Some of the content was found better suited in Discussion under created sub-title “4.5 Challenges and opportunities in N2O data collection and processing”. MS TEAM REPLY: Note to temperature monitoring is omitted.

4. P. 5427, l. 26-28. I wouldn’t expect the agriculture and burned locations to exhibit hummock and hollow microtopography. MS TEAM REPLY: Differences in microtopography at the sites are described in more detail in revised text (location is: 2 Methods/ 2.1 Study sites).

5. The presence of canals is mentioned in a few places (e.g. p.5428, l.27, p.5431, l.8, p.5431, l.20) and it is not clear where these are, on which sites, or what their

significance is. They should probably be mentioned in description of the study sites. It seems that in some of the drained sites gas measurements were taken at different distances from canals but this is not mentioned in the methods. MS TEAM REPLY: Presence and significance of canals at some gas monitoring sites is described in more detail in the text (location is: 2 Methods/ 2.1 Study sites). Impact of canals on water tables along gas flux monitoring locations along established transects on these sites is clarified in Methods, Results and Discussion.

6. Much of the results sections is discussion. There needs to be a clearer presentation of the results, preferably in a table that includes, ranges, means and SD/SE. Some statistical comparison to identify differences would be useful. MS TEAM REPLY: New table (Table 3 in revised text) is added where summary statistics on N2O fluxes for each monitoring site are presented. This statistics on Table 3 include; number of observations, mean $\pm$ SD, minimum, and maximum fluxes, and limits for 25%ile, 50%ile (Median), and 75%ile fluxes. Statistical comparisons on fluxes are provided in the text when possible. Additional background information concerning the sites’ peat and water characteristics is provided in anew table (Table 2 in revised text), and this information is related with flux data in discussion.

7. Figure 2 is too small and difficult to read. It is not clear why there are two diagrams for site DF with different scales on the X-axis and different points. What do the upward pointing arrows signify? MS TEAM REPLY: Scaling of Fig 2 depends partly on final layout. Two graphs were drawn for the DF site data in order to provide sufficiently large y-axis scale for the data. Arrows point to an additional graph where DF side data is shown in full scale. If same scale would have been applied to all sub-graphs, the scale would be about 10 times smaller. Additional graph and arrows are explained in the Graph title.

8. The legend to Fig 3 mentions five gas flux monitoring locations. Are these at different distances from a canal/drain or are they random? MS TEAM REPLY: Information concerning gas monitoring locations distribution is added into Methods section.

9. Also in Fig 3 arbitrary lines are drawn to indicate 'arbitrary cut off points' to delineate 'highly deviating fluxes' from the rest. Some explanations should be provided on how these were chosen especially since they differ on the two sites. MS TEAM REPLY: As it was pointed out by the referee and also by the other 2 referees, use of arbitrary cut points are difficult to reason. Therefore, new cut points for the highly deviating emission values, based on statistical criteria, are applied. The new selection is based on 75% quartile limit i.e. the highest 25% of the emission values are included in the group. Results, graph and discussion is based on the new approach. New added table (Table 3) includes these cut point values among other summarized main flux characteristics.

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