

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

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Review of the manuscript Nitrous oxide fluxes from tropical peat with different disturbance history and management

J. Jauhiainen, H. Silvennoinen, R. Hämäläinen, K. Kusin, S. Limin, R. J. Raison, and H. Vasander The paper presents a potentially interesting dataset, result of several years of work in tropical peatlands with different managements. The work could be very welcome as it reports data which are scanty in the published literature and we are aware of the difficulty to have such kinds of data for many tropical areas. Unfortunately the paper presents first of all two main limits for publication in the present state. Firstly, the English is very poor and does not help the reader to follow the discussion. Secondly, the analysis of the dataset could be significantly improved and presented in a more efficient

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and convincing way. There are many points which could be significantly improved. Other that are not clear at all. Moreover also the design and methodology should be better explained.

Introduction The introduction is too general and reports well known concepts which do not add anything to the more specific problem of N₂O emissions in tropical peatlands. The introduction might be widened adding more specific comments and information related to what is known relatively to N₂O emissions in these ecosystems (no papers are mentioned although some work has already been produced), to mechanisms and processes which are expected to be involved in N₂O production and that might be modified by land use change, some more information in terms of impacts and numbers on peat management and deforestation. The objectives of the work should be stated more clearly.

Materials and Methods 2.2 Sample collection, analysis and data processing It is not well clear what you mean by “closed-chambers installed on low topography (hollow) surfaces. Also, if hummocks and hollows are both features of the peatland shouldn't they be both analysed? To select a specific area of the peat, which has very different characteristics compared with others might bias the results and lead to wrong conclusions. In hummocks the effect of roots decomposition following the cut due to chamber insertion might be solved inserting the base everyday in a different area as the decomposition process wouldn't affect the result in the first hours after chamber insertion in the soil. In any case given that measurements have been already taken you should discuss how the selection of specific areas of the site could affect your results in terms of site average flux. Some comments on the effect of keeping the internal part of the chamber without vegetation on N₂O fluxes. . . indeed you might get into the same problem you wanted to avoid in the hummocks. . . how do you avoid the growth of the vegetation inside? Cut the above ground biomass? Then you have decomposing roots? . . . just clarify. More information on the gas chromatographic technique should be provided. Carrier gas, flow rate, eventual traps for CO₂ or water, temperature of ECD

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and oven, etc. You state that chambers were closed for 20 minutes and gas was sampled every 5 minutes. Given that fluxes are quite low, were 20 minutes sufficient to have a good estimate of the flux? Can you give us some info on the detection limit of your methodology, i.e. which is the minimum flux you can detect being sure it is a flux and not a fluctuation around ambient values? You should better indicate how were your chambers distributed compared with the canal positions and also give us information on how do conditions change moving away from the canal.

Specify why water table level logger was installed at the most far-off gas flux sampling location from the canal at the DF and DBP sites. How many water table meters there were per site? How does the water table changes over the site (spatially)? Is one table logger representative? And how its position is able to be representative for the conditions under the chambers located in different spots over the field?

Lines 1-5 of page 5430 are not clear.

To select arbitrary flux level "cut off" points for dividing highly deviating fluxes from typical flux levels at the sites is an unclear passage. What do you mean by arbitrary? There are statistical approaches to define what is within a certain range of values with a scientific meaning. If this was just a mistake please clarify otherwise use a precise statistic approach.

Overall all the paragraph from line 1 to 10 of page 5430 is not clear and should be rewritten. Also lines 11-15, same page, should be rewritten in a better way.

Results Lines 18-19 page 5430: the concept is absolutely unclear. The data analysis of paragraph 3.1 could be improved. The "scatter" of data is somehow not interesting if the shape and characteristics of the distribution are not discussed.

Paragraph 3.2 shows interesting data however is so badly written that it is very difficult to follow the discussion. The arbitrary cut of data as previously discussed is not clear and should be either modified or better supported. In this paragraph transects of cham-

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bers from the channels inwards are mentioned and discussed. However, this design has not been well presented before. In this paragraph you could also better present the analysis of data for the quantification of cumulative fluxes, briefly presented in the methods section. This is crucial for a good interpretation of the cumulative data.

Data of paragraph 3.3 are poorly discussed.

Discussion

In the discussion the authors introduce a lot of details about the sites to try to give some explanation for observed fluxes (litter decomposition, peat quality, porosity and thickness, mineralization, etc). None of these data however is reported in the paper and we can only "believe" to what authors say. It would be advisable either to introduce ancillary data which are used for the discussion or to stick the discussion mostly on the information gathered in this study. Also some other study already published in the same plots which reports ancillary data might be mentioned if needed. The discussion basically makes a lot of speculation on data which are poorly presented in the results. Several comparisons are presented with previously published data. This is good but the comparison would have a better effect if the similarities/differences between this study sites and others are discussed as the fact that sites are tropical peatlands is not a reason to give expect similar results per se.

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