Biogeosciences Discuss.,
https://doi.org/10.5194/bg-2018-192-RC3, 2018

Biogeosciences Discussions
Open Access
EGU

Interactive comment on "Management matters: Testing a mitigation strategy for nitrous oxide emissions on intensively managed grassland" *by* Kathrin Fuchs et al.

Anonymous Referee #3

Received and published: 5 June 2018

GENERAL QUESTIONS AND COMMENTS

The paper is well structured and written, it presents a comparison between two differently managed grasslands, to evaluate the impact of the addition of clover as a mitigation strategy for N2O emissions. In my opinion, it is suitable for publication in Biogeosciences. See below for some minor comments to the paper.

The focus of the paper is the evaluation of the integration of legumes as a mitigation strategy, but that does not appear explicitly in the title: I think it should be part of it.

To what extent do you think soil properties are needed (frequency of sampling, etc) to interpret flux data? Why daily or bi-weekly? Why many 20cm samples? Would you

Printer-friendly version

Discussion paper

have any specific suggestions for long term measurements? This is not necessary, of course, but I think it would add value to the discussion to know what you found out to be the most useful variable for your parameterisation, beside the interpretation of your results, of course.

Could you also report the GWP of the N2O measurements to express the mitigation induced by the grassland composition change?

The eddy covariance tower in this experiment is placed at the edge between two differently treated fields. Could you explain a bit better the way you tackled the advection issues between the two treatments/crops? Two years is an impressive duration for such dataset, and I would guess all conditions (time of the day, stability, etc.) have been met in such long time for both fields, but it would be good if it were expressed more clearly through the results. Also, for what concerns the special events, do you have a suitable coverage for both fields in terms of footprint?

BY SECTIONS:

MATERIAL AND METHODS

P5 L1> Replace “fertilised” with “added”.

Section 2.2:

What is the reason to use two different fertilisation rates in the 2 years? Is it for simulating the business as usual behaviour of the farmer, or did you increase the amount to enhance the effects of the contrast? I see that the clover abundance difference between the two years is quite relevant: is it solely due to the additional grazing? Was the field over sown at the same rates? In connection to the conclusion that up to 44% of clover addition does not lead to further N2O emissions, it could be useful to suggest how to achieve such abundances. Perhaps you could expand on this. Section 2.7: could you specify and motivate what method you used to calculate the time lag for the different GHG species?

Printer-friendly version

Discussion paper

RESULTS

P12 L6-7. From figure 4, it almost looks like this is not the case in the last 2 events of 2016, “41,33”. The value of NH4+ after these events seems to be almost double compared to the period before. Could you comment on this, especially addressing the N deposition issue? P13,L2: it could be helpful to quantify this similarity, e.g. providing a ratio of C content in biomass between the 2 different treatments directly in the text.

DISCUSSION

P17,L3-4. “Grazing had only a minor influence on the overall N2O budget of the Chamau site and data analysis showed that N2O fluxes did not significantly respond to the presence of animals (Fig.7c)”. I think that a quantification would be better here than referring to the plot only, i.e. the relative % in contribution on the total N2O budget, for example.

TABLES AND FIGURES

Figures 1 and 6 seem to have the appropriate resolution, the others tend to be a bit blurry: would it be possible to increase the image resolution?

Figure 2. The caption under the image needs correction. “(b) Footprint climatology of the year 2016 with footprint contour lines of 10% to 90% in 10% steps using the Kljun et al. (2004) footprint model” belongs to previous figure; explain panels a, b, and c.

Figure 4. Albeit the treatments with slurry were not applied on the clover field, I think it would be useful to introduce the days of treatment also on the North field charts (perhaps the same dotted lines, no arrows). If no slurry was directly applied, the amount of N in the air during the fertilisation events has certainly changed, and potentially increased the amount of BNF on the clover field.

Interactive comment on Biogeosciences Discuss., https://doi.org/10.5194/bg-2018-192, 2018.

Printer-friendly version

Discussion paper