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Interactive comment on “Agricultural peat lands; towards a greenhouse gas sink – a synthesis of a Dutch landscape study” by A. P. Schrier-Uijl et al.

A. P. Schrier-Uijl et al.

arina.schrier@wetlands.org

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Dear referee 1

Thank you for the very useful comments. Myself and my co-authors have tried to answer all of your questions and we have implemented the suggestions you have given us, which has greatly improved our publication. Since both referees mentioned the incompleteness of the materials and methods section, we have tried to, as short as possible, add all information you have asked for, while in the meanwhile we have referred to publications that previously have used similar methods. Please find below a more specific overview of what we have changed according to your comments.

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General comments The subject matter of this article (the effects of land-use/ land management changes on the greenhouse gases budget of a site) is interesting and relevant to Biogeosciences. Three sites with varying degrees of management were studied for several years and greenhouse gases budgets derived. The clarity of the paper leaves a little to be desired at times as does the quality of the language (we have improved the English). The paper refers to related literature quite extensively and does not provides an adequate overview of the methodology used (we have rewritten the materials and methods paragraph, including the suggestions you mention below, and not just referring to other publications). One would have to read several other papers pertaining to studies made at the sites of interest in order to gain a full understanding of the experimental setup and methodology.

Specific comments

1. The paper, and the results section in particular, was at times confusing and the information difficult to tease out. Better use could have been made of tables. The budget terms (sections 3.1 - 3.5) could have been summarized in one table for ease of reference and comparison. It would also help if units were standardized throughout the manuscript. (we have tried to standardize units, also we have improved Fig 7 (new Fig 8) where we show the complete GHG balance for all three gases for the three sites. Also we give the total GHG-balance in GWP's; Tables 2, 3 and 4 give the separate balances for CO₂, CH₄ and N₂O). 2. Section 2.1: provide ranges (winter/summer) for WT depth at each site. We have created a new figure that shows monthly averages for water table and soil temperature in Oukoop (Ou), Stein (St) and Horstermeer (Ho) for the four years of measurements. 3. Page 9702, line 11: define "top layer" and substantiate the statement that it is aerated. Ok. Done. 4. Page 9703, lines 11-14:

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Interactive Discussion

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more details about the derivation of the weighting factors and the non-linear regression algorithms are needed here. We have improved the paragraph on 'small scale flux measurements', including the information that is being requested. 5. Page 9703, line 20: Elaborate on footprint calculations (what model is used, what time resolution...?). We have added information on what footprint analysis we have used (we have done all EC measurements and quality assessments and gapfilling following the EUROFLUX protocol of Aubinet et al 2000). 6. Page 9705, line 21: provide value or reference to substantiate the approximation that carbon inputs and outputs from feed and milk/meat are indeed negligible. We have added references. 7. Page 9706, line 1: is the C emitted as CH₄ only from ecosystem sources or were animal contribution taken into account? We have separated between CH₄ fluxes from the ecosystem (ditches, ditch edges and fields) and CH₄ fluxes from the farm itself (farm fluxes were excluded for CH₄ EC flux measurements, since the location of the EC masts was such that the footprint of the mast was not covering these hotspots). See also fig. 2 and 3 (new figs 3 and 4) for the schematic overview. 8. Page 9706, line 1: define "production efficiency". We have added explanation in the text. De production efficiency is the amount of energy intake is being transferred to meat and milk. 9. Equation 2: the emission factors seem to have become subscripts, and coefficient Ed is actually missing. Agree, somehow one of the subscripts missed Ed, we have added this to the equation. 10. Page 9712, line 18: this sentence is unclear. What does succession mean in this context? We have added explanation and have described in a slightly different way what we meant. We have partly changed 'succession' to 'natural development of vegetation' or 'natural succession'. 11. Page 9713, line 8: same comment as under point number 8. We have added explanation in the text. 12. Page 9713, lines 26-28: this last sentence seems unfinished. Agree. We have rewritten this sentence. 13. Page 9717, lines 23-26: does this mean that the GHG emissions from the farm are much greater than those of the ecosystem? Fig 7 (new fig 8) shows an overview of the emissions from the ecosystem alone (on the left) and from the ecosystem + farm-based emissions (on the right). 14. Tables: use consistent notation; use either

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Interactive Discussion

Discussion Paper



the full site name or the abbreviated version. OK 15. Table 7: I don't understand how open water areas can be rewetted or how their management can be downgraded. We have added a remark that we mean 'rewetting of the surrounding land or management of the surrounding land' 16. Figures 3, 5 & 7: the font size is too small and the text unreadable. Ok. We have improved the figures 5 and 7. In Fig 3 we have added the text 'intensive, extensive and unmanaged' to be more clear in what figure belongs to which site. Technical comments Below are some technical comments but this list is far from exhaustive. 17. Page 9699, line 20: "10 mmyr-1" to "10 mm yr-1". OK 18. Page 9699, line 21: "30yr" to "30 years". OK 19. Page 9701, line 6: "-1.8 ma.s.l." to "-1.8 m a.s.l.". OK 20. Page 9701, lines 12-13: poor English; replace "with dynamic mean annual ground water tables at 0.55 m..." with "dynamic WT of mean annual depth of 0.55 m" or similar. Done 21. Page 9701, line 18: "fertilizers are" to "fertilizers have been". OK 22. Page 9701, line 23: "water table is dynamic since 2006"; poor English, please rephrase. OK rephrased. 23. Page 9703, line 15: "Additional" to "In addition". OK 24. Page 9703, line 24: I don't understand "...were over the entire landscape". We meant that the footprint of the masts includes different land form elements: ditches, ditch edges and fields (that was what we call 'the entire landscape'. We have made this more clear in the text. 25. Page 9704, line 12: I would prefer Wdir or Wd to denote wind direction rather than D. OK 26. Page 9705, line 22: the year of publication of the Hensen et al. paper is 2006 and not 2005 according to the reference list. OK 27. Page 9710, lines 10-11: reshuffle this sentence. E.g. "Measured cumulative NEE of N2O was previously determined over a three year period at the intensively managed site". OK 28. Page 9712, line 18: here again I wonder what "succession" means. We have explained this and rephrased this sentence. 29. Page 9712, line 24: replace "synchronous to" with something like "synchronised with" or "consistent with". OK 30. Page 9713, line 8: meaning of "succession" here again! We have explained this and rephrased this sentence. 31. Page 9715, line 1: "application has stopped" to "application stopped". OK.

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10, C5091–C5095, 2013

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Please also note the supplement to this comment:
<http://www.biogeosciences-discuss.net/10/C5091/2013/bgd-10-C5091-2013-supplement.pdf>

Interactive comment on Biogeosciences Discuss., 10, 9697, 2013.

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10, C5091–C5095, 2013

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Interactive Discussion

Discussion Paper

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