

Interactive comment on “Land-use and greenhouse gas balances of peatlands in the Nordic countries – present knowledge and gaps” by M. Maljanen et al.

Anonymous Referee #1

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M. Maljanen et al. present a state of the art of measurements of the greenhouse gas exchange of peat lands in the Nordic countries focusing on the effect of land-use. They summarize the present knowledge based on about 100 articles. They divided the peat lands into different classes of land-use including: unmanaged peat lands, drained peat land soils for forestry, drained peat lands for agriculture, peat lands drained for peat extraction. Also restored drained peat lands and water reservoirs and artificial lakes above previous peatland are considered. They present the range of fluxes as presented in actual research from the different land-use of peat land and also identify gaps in the actual knowledge. The article has a clear structure.

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As the manuscript is the results of a literature study one of main questions is if the presented work is complete in respect to the actual state of the art. The article is focusing on the situation in the Nordic countries and gives the impression to be complete as it refers to a large number of Nordic publications. Although this is not easy to judge. It is clear that unmanaged peat lands are much more intensively studied than other land-use types and that there are many gaps in the knowledge, not only due to limited measurements over long periods, including winters.

The difficulty with this type of articles is to present the information in written form which is easy and attractive to read. It is important to present the data in figures, which give the overview of numbers presented in the text. I consider that the authors succeeded relatively well. In this respect Figure 1 should be enlarged if possible so that it is easier to read.

I would like to see a more extensive description or discussion on the definition of peatland in the introduction. Not easy, as definitions do differ, but it is important in relation to the estimated areas. For Sweden the description of peatland is taken from only two references, which describe soils with more than 20% organic matter as peatlands and that about 25% of the Swedish land area is considered as peatland. This sounds as an high estimate. Hånell is describing about 20% of the Swedish area as peatlands and wet mineral soils. Depth of the organic soil is however not given in the introduction, except for Denmark and Sweden. In eg Jan Eriksson (et al.) book on soil science (Wiklanders Marklära, ISBN 91-44-02482-7) peat-soils are described as soils with at least an organic layer of 40 cm and OM content of 40%, like the Finish definition. FAO is referring to peat soils when the depth is at least 30 cm and more than 40%. Compare also with eg 'The nature and properties of soils, Brady and Weil, Pearson International Edition, ISBN 978-0-13-513387-3, where they take up that at least 2/3 of the soil layer above rock should be organic.

Page 6281: lines 10-14: can you indicate the number of sites and how many of the annual fluxes were actually based on seasonal results.

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General comments:

Page 6273, line 6: add –s to soil: make soil plural. Page 6274, line 2: Solomon et al., 2007. Page 6276, line 15: please give affiliation of Hytönen in the text as this person is not one of the authors (all personal comments should give the affiliation of the person in the text). Page 6276; line 16: suggest removal of 'after use'. Page 6276; lines 21-23: please give a reference here on restoration of drained cropland. Page 6277, line 9: Oskarsson, 1998 is not given in the references. Page 6277, line 28: change 'in the atmospheric' to 'on the atmospheric'. Page 6278, line 9: suggest removal of ' , the third most important. . .reservoirs' (N₂O is also the thirdmost important for other land-uses). Page 6278, line 19: Huttunen et al, 2002; a or b as given in references?. Page 6280, line 13: remove 'high frequency' or add 'measured with high frequency'. High frequency gas concentration does not exist. Page 6281, line 3: add comma in Saarnio et al.(,) 2007). Page 6283, line 7: Change 'by the flux data available' to ' by the available flux data'. Page 6284, line 18: suggest changing 'and none' to 'but none'. Page 6285, line 3: correct word 'peatlands'. Page 6285, line 15: 3 g m⁻²; is this emission rate per winter or per year?. Page 6286, line 7: 'peatlands are highly'. Page 6286, line 10: change 'too' to 'to'. Page 6286, line 18: balance. Page 6292, line 7: suggest removal of '(Iiikanen et al., 2006)' as you start the sentence already with this reference. Page 6292, line 11: Kirkinen et al., 2007 is not in the references. I suppose it is 2004. Page 6293, line 17: Please add affiliation of C. Biasi to reference list, include also date. Page 6294, line 25: please add time in unit of the flux rate: 3.35 g CH₄ m⁻²yr⁻¹ (?). Page 6295, line 10. In reference list it is 'Yli-Petäys'. Page 6298, line 16-17: Óskarsson and Gudmundsson (2008a, b) as in reference list Page 6299, line 8: remove 'h' in authochthonous. Page 6299, line 12: Óskarsson and Gudmundsson (2008b) as in reference list.

Page 6326, table 1: SCB, 2007 is not in references. 2004 is given in references. Give affiliation of the persons giving personal information. Page 6335, table 6: Pihlatie et al., 2005 is 2004 in references?.

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Figure 1 is an important figure as it summarizes all values from different land-uses. I suggest that this picture is printed larger than it is now.

Check the alphabetic order in the references: at several locations the articles are not in alphabetic order given by the first author. For example: Djurhuus et al, Grelle et al, Hånell should be before Harby et al., V is before W in English alphabet.

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