

## **Annual emissions of CH<sub>4</sub> and N<sub>2</sub>O, and ecosystem respiration from eight organic soils in Western Denmark managed by agriculture**

Response to Anonymous reviewer #1 (*Authors' comments are italicized*)

*We thank the reviewer for the suggestions for improvement of our manuscript. Below we have addressed the various concerns, and how we intend to react to better explain the scope and novelty of this study.*

The paper reports on annual emissions of CH<sub>4</sub> and N<sub>2</sub>O from organic soils managed by agriculture in Denmark. Overall the manuscript is well written and carefully justified. However, a few shortcomings should be addressed: the first is the fact that only one year was used. The authors highlighted this problem and presented the average temperature and precipitation of the reported year compared to the 20 years average in Table 1. Some of the precipitation (for example at Vildmose) in 08/09 is very different from the 20 years mean: there should be mention in the discussion and/or conclusion about this. Moreover, some more statistics (min max, sd) should be presented also for the Tann of 08/09, not only for the 20 year, so that the reader could understand how atypical were 08/09. Another major point of the manuscript is the lack of originality: from the conclusions it seems that the results presented are just confirming previous results. I would suggest to the authors to think about and better highlight the novelties of their study. This would make the paper a more relevant contribution to the field.

*To support a more detailed discussion of deviations from normal climatic conditions in each region we have compiled plots showing mean monthly temperature in each region against averages for the period 1961-1990 that will be included in Supplementary Information, see bottom of this response letter. These statistical data represent the entire region, and not a specific climate station near the field sites, and the reference period is different from that represented in Table 1 of the manuscript; still these data point to specific deviations, like an unusually wet month of August 2008, which will be highlighted in the Discussion of a revised manuscript.*

*The concluding section will be revised to emphasize stronger the novel aspects of this study.*

Specific comments:

Page 10019 Line 16: I would guess Lohila et al., 2003 were not the ones to discover this: include more appropriate reference

*We will replace Lohila et al (2003) with the following reference: Lambers, H., Chapin, F.S., Pons, T.L., 1998. Plant physiological ecology. Springer Science + Business Media Inc., NY, NewYork, 540 pp.*

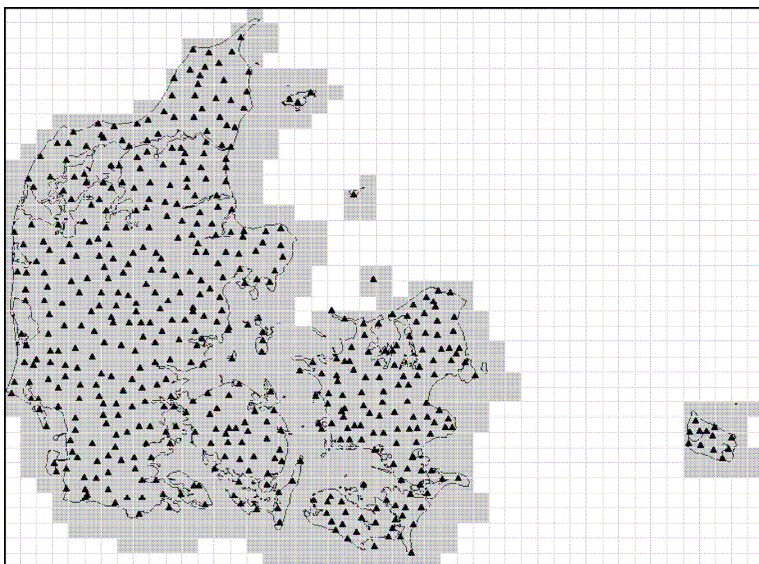
Page 10020 Line 21: "but also" replace with "and consequently" CH<sub>4</sub> emission is connected to the C turnover, not in opposition

OK

Page 10023 Line 18-19: how far are the meteo stations from your sites? Indicate.

*All data gaps were filled using data from the closest neighbouring site within ~100 m away. PAR data were used directly from neighbouring sites, whereas soil temperatures were derived from the air temperature at neighbouring sites and site specific correlations between air and soil temperatures. In one instance (July 2009) a series of thunderstorms across Jutland probably*

*stopped the data loggers. These missing data were replaced by data for the relevant 10 x 10 km grid cell based on the network of climate stations of the Danish Meteorological Institute (DMI), see grid cells and climate stations below.*



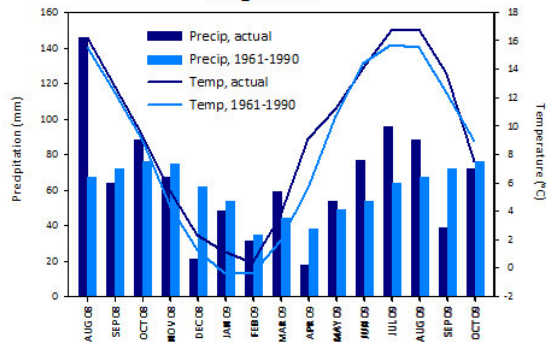
Page 10031 Line 24: “resourece”? correct

OK

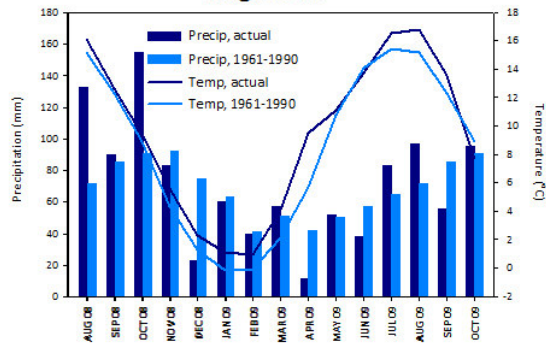
Page 10040 Line 3: why did you measure SO<sub>4</sub>? Explain the goal of these measurements.

*Elevated SO<sub>4</sub> concentrations in the groundwater indicate that there is a potential for interactions between S transformations and processes leading to emissions of N<sub>2</sub>O, as briefly discussed in this paragraph. We will elaborate a little on this, but with the information available at this time it is not possible to determine the involvement of SO<sub>4</sub> reduction and oxidation in any detail.*

### Region N



### Region W



### Region E

