

## ***Interactive comment on “Regulation of N<sub>2</sub>O emissions from acid organic soil drained for agriculture: Effects of land use and season” by Arezoo Taghizadeh-Toosi et al.***

### **Anonymous Referee #1**

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This manuscript investigated N<sub>2</sub>O emissions and concentrations in peat soils under 2 agricultural crops: grassland and potato) at 2 distinct site locations during spring and autumn season of one year only. All combination (site x crop) treatment received different management in terms of fertilisation and harvesting etc. The N<sub>2</sub>O production measurements were characterized with static chambers and soil N<sub>2</sub>O diffusion probes placed at 5, 10, 20, 50 and 100 cm depths. All potential environmental factors (climatic or edaphic) were also monitored during this period. This manuscript has been re-submitted and is substantially improved and conclusions are now validated. It would appear that a lot of fieldwork and indeed field data have been processed and are not equally discussed here but is focused on the title of the manuscript. It is well written

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and sufficient information provided to allow their reproduction. Some minor comments below would help clarify some details of the experiment and the results.

Line 11: rephrase or change word ‘extensively’ or ‘intensive’; there is nothing extensive about growing cereals or potatoes on organic soils given the cultivation/fertilisation inputs. Perhaps it was meant to be ‘widely’ used? Line 24: emissions could be given per unit of time, either day or season. Where are those days in terms of season?

Line 79-83 belongs to methods; go straight to your hypothesis questioning the role of crop type and seasonal variation Line 130; the fertilisation treatment is different in each site and therefore do not act as replicate but different treatment. L149 each field trip being a day sampling so 2 sites were sampled per day maximum but all were sampled during the same week? Rephrase please. L258 it is not clear that cumulative N<sub>2</sub>O emissions are here total or on a daily average. Line 301 : average deviation of soil temp from air temp is given; could it be better described in terms of sign L304. It stats in Lin 166 that soil samples were taken at the start of each season April and Sept? Depth of total peat layer should be shown in Table 1 as it seems that RG2 is very shallow peat (<25cm). Also von post figure should be given for each peat layer. Line 350. The WT reported in Figures 5 & 6 is confusing; what are they if you are not showing your continuous measurements (which shows higher WTL?) Line 407: there in previously in this paragraph, it would help to add the DOY (as per line 410) or else include the month in your Figures. Line 415: this is the first time that the monitoring period is mention; this should be explicitly shown in Table 2 at least and therefore rather than total a per day average would be better to compare treatment.

Figure 3-6: the WT is visible in blue not in grey. Figure 7 : the statistical number on the graphics should be explained in the legend since it is not clear to which lines they apply (especially 7a).

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