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## ***Interactive comment on “Decadal variability of soil CO<sub>2</sub> NO, N<sub>2</sub>O, and CH<sub>4</sub> fluxes at the Höglwald Forest, Germany” by G. J. Luo et al.***

**Anonymous Referee #1**

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### *General comments*

A very interesting paper on long term exchange of trace gases between forest soils and the atmosphere. The obtained data are rightly presented as the most complete and long lasting data set on this kind of data. They allow to point out the intra and inter annual variability and highlight the importance of NO fluxes in comparison with N<sub>2</sub>O and the very probable effect of N input in this kind of ecosystem. These results are particularly usable for the evaluation and inventories of trace gas emissions.

The methodology is classical. However I suggest to the authors to add a comment on their experimental approach : their measurements are developed with a subdaily resolution (hourly/2-hourly for N<sub>2</sub>O emissions and CH<sub>4</sub> consumption), i.e. the soil surface is covered during 50 % of time. What is the impact on soil moisture and on gas

C5357

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fluxes ?

*Specific comments*

P 12199 : Henkel et al, 2000 rather Henkel, 2000

P 12205 : “which could explain...” rather than “which could explained...”

P 12206 :

- “Though simulated values generally tended to underestimate measured soil moisture values by 1 % “ can be completed by “in accordance with the fitted curve (Fig 1)”.

P 12208 :

- “CO<sub>2</sub> emissions were also slowly but significantly increased” rather than “CO<sub>2</sub> emissions were also significantly increased”
- “The mean annual emissions of N<sub>2</sub>O were ... 0.80 +/- 0.20 kg N” : with the given data we can calculate a mean annual emission of 0.97 +/- 0.25 kg N . Checking is necessary.
- This meant that out of 15 observational years of N<sub>2</sub>O emissions : in fact 14 observational years are presented.

P 12210 : Table 3 : cf remark on P 12236.

P 12211 :

- “the last two lines summarized ...” rather than “the last two columns summarized”

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P 12215 : “The high fluxes of both N<sub>2</sub>O and NO at our site are a consequence of high nitrogen deposition ...”. I suggest “The high fluxes of both N<sub>2</sub>O and NO at our site are most likely a consequence of high nitrogen deposition ...” as mentioned in abstract.

P 12219 : Steinkamp et al., 2001 : not mentioned in reference list

P 12220 : Ormeci et al., 199 : not mentioned in reference list

P 12223 :

- Butterbach-Bahl et al, 1997 rather Butterbach-Bahl, 1997

P 12225 :

- “The high fluxes of N traces gases and reduced rates of CH<sub>4</sub> uptake are a consequence of high nitrogen ... “. As previously, I suggest “The high fluxes of N traces gases and reduced rates of CH<sub>4</sub> uptake are most probably a consequence of high nitrogen ... “

P 12228 : Dimitriadou, et al : not in the right order.

P 12229 :Groffmann, Brumme, .... Mosier (rather than Moisier)

P 12231 : Rothe et al : not in the right order.

P 12234 : The precipitation standard error has to be checked : with the given data I obtained : 932 +/- 42

P 12235 : Annual mean and standard error have to be checked for N<sub>2</sub>O emission : with the given data I obtained : 0.97 +/- 0.25.

P 12236 : Regression equations have to be more clearly presented : understanding is a little bit difficult for this table.

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P 12238 : The scale has to be completed for the lowest values of N<sub>2</sub>O flux.

P 12241 : The scale has to be adjusted for the highest values of N<sub>2</sub>O flux.

P 12241-12242 : I suggest to change the order between tables 5 and 6.

***In conclusion this MS is acceptable with minor corrections.***

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Interactive comment on Biogeosciences Discuss., 8, 12197, 2011.

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