**Biogeosciences
Discussions**

Interactive
Comment

Interactive comment on "The greenhouse gas exchange responses of methane and nitrous oxide to forest change in Europe" *by* P. Gundersen et al.

Anonymous Referee #2

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Review of the manuscript by Gundersen et al. submitted to Biogeosciences Discussions.

The paper presents results of a very well structured research from a comprehensive range of forest sites into the impact on GHG fluxes of climatic (temperature and precipitations), soil characteristics (type, pH, moisture), N additions (atmospheric and soil) and forest management (harvest and wood ash addition). The results, discussion and conclusions are well structured to capture interactions between these variables and GHG fluxes and therefore I recommend it for publication.

- In methodology section the authors indicate that flux measurements were made weekly to monthly intervals and (P6137, L25) and for a period of one or more years (P6138, L4). However all flux data are expressed per hour basis. It would be helpful

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Interactive Discussion

Discussion Paper

to express the result on per year basis so comparisons with other studies and in some cases the relationship with other environmental variables such C/N ration and NO3-leaching in Fig 6 (expressed as per year) would more appropriate. This would also be appropriate if the data to be expressed as Global warming Potential (as suggested by Referee 1 and I do agree with) for discussions of GHG responses. The measurement period for each site could be added to Table 2.

- I was confused at times with the site and code listing and agree with Referee 1 that the authors need to be consistent through the manuscript and also suggest delete Fig 2. In Table 2 it would be better to put site code in a separate column similar to Table 1.

- In the Abstract (first line) suggest to indicate that what you mean by air pollution here is N-deposition. Also the authors mention that "The impact of these changes on forest GHG balances is currently difficult to predict" but no explanation was given. Need a sentence to explain why e.g. due to methodologies or lack of comprehensive and reliable data for modelling?

- In the Discussion 4.1 (P6141, L3) change Fig 4 in (Table3, Fig 4) to Fig 3 as you are refereeing to N2O.

- There is a lot of discussion on the wood ash and its impacts effect on GHG fluxes but no mention of the measured pH. It is important to mention this so that readers that are not familiar with wood ash know that the pH could be as high as 12 or more. Suggest putting this in Table 3.

- P6140, L 11, you mention that "The mean CH4 flux for the treatment sites was -4. . .". Can you indicate what you mean by "treatment sites", I could not see how you came to the value of -4 ug CH4-C m-2 h-1 in Fig 4 ?.

- Suggest delete Fig.1 as all the information are shown in Fig 7 and mentioned in the text.

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