



Interactive comment on "Nitrous oxide emissions from a beech forest floor measured by eddy covariance and soil enclosure techniques" *by* M. Pihlatie et al.

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Comments to referee 3

The authors wish to thank the anonymous referee 3 for valuable comments to improve the manuscript. We have addressed below each of the comments point by point. Whenever the referee is cited, the text is written inside quotation marks.

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"This study reveals the possibility to use Eddy Correlation method to estimate N2O soil emissions in the trunk space of a forest and can hence be the substitutive technique to estimate soil forest N2O emission. The scientific methods and assumptions are clearly outlined and the overall presentation is well structured and clear. Nevertheless I have minor's comments about this paper:"

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"- Page 583, line 27 I'm not truly all right with the authors. '.. and the EC fluxes are usually measured continuously allowing to obtain information on the temporal variation of fluxes' The automatic chambers allowed also to measure continuously emissions and we are also sure that the measurements are always related to the same areas."

The authors agree with the anonymous referee 3 about the information given by both the automatic chambers and the EC. Thus, we have discussed this in the revised introduction section.

"- Page 584, line 7: The authors indicate that EC method 'has recently 'been used to measured gas fluxes for trunk space but they give just after an old reference ˇE1986. It's in contradiction Are there more recent references¿'

We have added several more recent references on the EC measurements in the trunkspace.

"- Page 585, line 9 In the site description paragraph, the phrase 'the average tree height of the beech trees is 25 m and the diameter ' you must specify that it's the trunk diameter."

The text was corrected as suggested.

"- Page 586, Equation (1). I believe that the definition of the equation terms is insufficient. What are the absorption tube and short reference lengths (Lr, Ls)?. I don't understand the equation and what is the R ratio? Is it possible to have a scheme of the TDL optical pathways?"

We have removed the equation (1) since all the information in it is already given in Edwards et al., (2003). We have also included a simple setup scheme of the TDL measurements since this was separately suggested by the anonymous referee 1. Again, more detailed information on the TDL instrumentation is given in Edwards et al., (2003).

"- Page 586 line 15 In the TDL descriptions: The authors don't indicate the sample cell volume it's important to know what could be the sample rate of the atmospheric gas."

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The sampling rate of the atmospheric gas is 17 l min-1 out of which approximately 14 l min-1 is directed to the TDL analyzer and 3 l min-1 as the purge flow back to the atmosphere. This information is given in the manuscript.

"- Page 586 line 15 and 16 replace l/min-1 with I min-1"

This was corrected.

"- Page 587 line 4 in the paragraph 'EC data processing' the authors indicate that the erroneous data caused by electronic were removed ' It will be interesting to indicate what were the electronic causes of this noise and what were the circumstances of this malfunction."

The source for the occasional spikes in the raw data is not known and they seemed to occur in more or less random manner.

"- Page 587 line 24 to determine the flux detection limit the authors give a mean  sW value of 0.15 m s-1. What are the values using to estimate the detection limits during night and day periods."

As the data was filtered by removing the data with sdt(w) < 0.07m/s, the estimation of the detection limit was not conducted separately for day and night. Instead the detection limit was estimated using a typical sdt(w).

"- Page 590, line 12 and table 1 How many fluxes are used to estimate daily coefficients of variation for the manual chamber and how many fluxes are available per day (idem for automatic chamber and EC methods) What does it mean when the authors give (nEC=12-38)?"

The number of measurements used for each daily mean or coefficient of variation value was clarified in the revised manuscript. Here also specific answers to the referee questions: In total six measurements, one from each manual chamber, were used to estimate daily coefficients of variation for the manual chambers. This was the maximum available per day for the manual chamber measurements. For the automatic chamber

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the number of chamber enclosures ranged from 2 to 8. During the intensive measurement period, 7th - 14th May, 5-8 automatic chamber measurements were used for daily mean and daily coefficient of variation calculations. In the EC, the number of half hourly flux values ranged from 3-44 during the whole measurement period, and from 12 to 38 during 7th -14th May. The nEC=12-38 refers to the range of the number of half hourly EC flux values.

"- Page 594, lines 14 to 17. The paragraph starts with an explanation of the relationship between N2O flux and the WFPS increases they give after a description of the tree leave development linked to the fulfilled of the EC method during this period, but what is the link between these two assumptions?"

During the first weeks of the measurements the N2O emission was at its highest. Also at the same time the soil moisture (wfps) was at its highest and also the trees were leafing, which affected the micrometeorological conditions below the forest canopy. The linkage between the soil wfps and the tree leafing is that they are parallel reasons for higher N2O emissions during the measurement period. We addressed this linkage in the revised manuscript.

"- The Figures 3 are too small - For The figures 5 and 6 there is typography problems with the abscise axis labels. The figures are too big compared to the figures 3."

The technical corrections were made as suggested.

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Interactive comment on Biogeosciences Discussions, 2, 581, 2005.