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Biogeosciences Discussions

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

Anonymous Referee #1

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The manuscript by Pihlatie et al. describes the applicability of EC techniques for measurements of N2O exchange in an old beech forest in Denmark. For their evaluation they compared EC derived fluxes with fluxes as obtained from static chamber measurements. The authors convincingly demonstrate that both techniques can come to comparable results. My main concern here is only that the EC set-up was running close to its detection limit and that the coefficient of variation is unexpectedly high (see Table 1). It would have been nice to see such a comparison for a site with higher fluxes and with a more pronounced temporal change in N2O emissions. However, I do agree with the author that for the given conditions the EC-TDL system showed its usefulness to estimate fluxes of N2O from the beech site. Also the conclusion that chamber based estimates of N2O emissions will have a higher uncertainty if scaled

to the ecosystem level as compared to EC measurements is correct and is due to the fact that chamber only cover small areas. Due to the inhomogeneity of soil properties, microbial processes, root system etc. chamber fluxes will therefore often show a huge spatial variability. The manuscript is well in the scope of BG, it is clearly written and represents a valuable study for encouraging other groups to use TDL-EC systems for measurements of Non-CO2 gases in various natural environments.

Some additional minor comments: A scheme showing the technical set-up of the entire EC-TDL system would be helpful. Is there any rational why to use a N2O reference gas with 2000 ppmv, which is nearly 4 magnitudes higher in concentration than ambient N2O concentrations. Give rational why diurnal variations should be expected in view of the fact that diurnal changes in soil temperature are rather low. Give additional reasons for technical failures and provide a statement on the visibility of such a set up for long-term studies (can you run the system for one year continuously and how much time for maintenance would be required). Fig. 5 is not strictly necessary, since this information (no correlation) can be given in the text. Have the different chambers be sampled for nitrate, ammonium etc. and does observed differences explain the spatial variability in chamber fluxes? Page 583, line 10: change “consequent” to “consequently” Page 583, line 17: change “in ecosystem level” to “on ecosystem level” Page 583, line 26: The authors should be aware of the fact, that chambers can also be operated automatically. Please reword this sentence Page 584, line 14: Please correct “Cristensen” to “Christensen” Page 584, line 22: Please correct “a five” to “the five”

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