

Interactive comment on “A case study of eddy covariance flux of N₂O measured within forest ecosystems: quality control and flux error analysis” by I. Mammarella et al.

Anonymous Referee #2

Received and published: 7 September 2009

Reviewer's comments The article submitted by Mammarella et al. discusses the methodological issues involved in making accurate measurements of N₂O exchange employing a tunable diode laser absorption spectrometer and eddy covariance technique. This is an important contribution as such measurements are rare. There is an urgent need to compile experiences from well organized campaigns of such measurements from different ecosystems. Currently, biogeochemical model validation for N₂O exchange is being done primarily with the data measured using chambers. Chamber methods although very useful are limited by how often the exchange is measured. Most

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of the data presently available is gathered through manual chamber measurements and as such, the time resolution associated with the data available for model testing is too coarse to allow a proper validation of the model performance. To overcome this disparity in the time resolutions of model validation and observations available for validation, continuous eddy covariance measurements are indeed needed. In this context, the present submission is relevant. The paper is well written. I recommend that this paper be accepted for publication after the following specific comments are addressed.

1. The authors mention in second section that the instrument was calibrated once during the set up time. Was this the only calibration done? Could the authors elaborate on why they thought that one time calibration is sufficient?
2. Simultaneous transfer of the entities is an important consideration in the EC data processing. The authors mention that WPL corrections were not done as a dryer was used to dry the incoming sample. How effective was this drying process? Can the authors quantify this from their own data? This is important because N₂O fluxes are of small magnitude.
3. The authors observe at the end of the section 3 that the fringe effect was less frequent for the SORO site. Can the authors investigate more on this issue as to why the effect was less frequent at this site compared to the other site? What part of the set up at the two sites was different so that the SORO site showed less effect?
4. In the section on co-spectra, lines 23-25 are not clear ('with opposite direction'). Please clarify.
5. The authors indicate that N₂O uptake was evident at their site. Please provide magnitudes of uptake rates. Were the site averages shown in the tables inclusive of these uptakes? If yes, the magnitude and deviation from the mean of uptake rates should be discussed.
6. Editorial correction – line 25 page 6950- change 'the one' to 'that'.
7. Make sure that all abbreviations used in the paper are properly assigned at the first instance they occur in the paper.
8. Page 6960, line 17 – change 'become equal to' to 'occur at'.
9. Not all references referred to in the text are listed in the references section and some of those mentioned therein are not referred to in the text.

Interactive comment on Biogeosciences Discuss., 6, 6949, 2009.

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