Biogeosciences
Discussions

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Interactive comment on "Methane and nitrous oxide exchange over a managed hay meadow" *by* L. Hörtnagl and G. Wohlfahrt

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We appreciate Reviewer #2 taking the time to look at our manuscript and communicate his / her concerns. We will consider this input to prepare a revised version of the manuscript.

Comment: "This is an interesting study of the actual greenhouse potential from CO2, CH4, and N2O from an European Hay meadow. The authors used the eddy covariance method to measure fluxes of these three gases and calculated their individual warming contributions. An interesting result is that N2O seems to be as important as CH4 in the overall scheme. This may be in opposition to American studies which have found that the highly episodic character of N2O emissions tended to minimize their overall impact. While I would normally recommend publication of this work, the fact

that the authors used multiple linear regression analysis to explain their flux numbers makes this impossible. It is well known that CO2 and CH4 both show distinctly non-linear temperature dependencies. In addition, several of the authors conclusions are supported by mean values with uncertainties that are sometimes five or six times the mean value. This is very risky! Because of these issues, I recommend that the authors re-analyze their data and re-write this manuscript."

Reply: As suggested by Reviewer #2, we will re-analyze our data and re-write the manuscript. For this we will follow the suggestion by Reviewer #1 and use LN trans-formed concentration values for CH4 and N2O in the multiple linear regression to account for non-linear dependencies. Unfortunately Reviewer #2 does not detail which number he / she refers to when addressing the topic of uncertainty. We would like to point out that eddy covariance measurements over a site that is possibly characterized by CH4 and / or N2O hot spot emissions will result in fluxes with a high degree of uncertainty. This uncertainty is further enhanced by generally low fluxes and by CH4 / N2O exchange alternating between emission and deposition. One of the objectives of this paper is to describe the grassland ecosystem in respect to GHG fluxes, and according to our findings this high degree of uncertainty is one of the characteristics at the investigated measurement site (and probably other similar sites). At an annual time scale, we address systematic uncertainty by giving numbers for different FIR filtering approaches. We will follow up on concerns raised by Reviewer #2 by addressing and clearly pointing out additional sources of uncertainty in a revised version of the manuscript.

Interactive comment on Biogeosciences Discuss., 11, 8181, 2014.