Dear Dr. Kim Pilegaard,

We would like to acknowledge you for your interest and the evaluation of our study.

You will find hereafter our answers that will improve this work.

Sincerely yours,

Patrick Stella, on behalf of all co-authors.

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p. 4462, l.10: "direct NO_2 emission": from where?

From the vegetation. It was added.

p. 4466, l.21: How was the JNO_2 measured

It was measured by a filter radiometer (Meteorologie Consult GmbH, Königstein, Germany). To avoid any confusion, the bracket "(for details see Table 1)" was moved at the end of the paragraph.

p.4468, l.4: If the conversion efficiency was not constant, how often was it measured and how did the variation influence the calculated fluxes?

This is probably a misunderstanding. This was not written in the text. The conversion efficiency was relatively constant throughout the campaign (about 33%, see text).

p.4478, l.10: NO emission from the soil is not discussed. I would assume that if it is a fertilized meadow some NO soil emission must occur. Maybe it quickly reacts with O_3, and maybe it is so small that it has no influence on the O_3 and NO_2 fluxes. However, for completeness, I suggest that it is included in the discussion.

First it has to be mentioned that the meadow has not been fertilized directly before or during the experiment. We have no direct in-situ measurements of the NO soil emission available, but we performed laboratory incubation experiments with soil samples from the site. Thus for completeness we added in the revised version the estimate of soil NO emission from the laboratory experiment and its discussion. Since the laboratory derived NO emission was considerably higher than the corresponding eddy covariance flux, we add additional evidence (including a new Figure showing the in-canopy gradients of NO and NO_2) for the non-existence of an in-canopy NO_2 source.

The following parts were added:

1-A new section in the materiel and method ("2.5: Soil NO emission from laboratory"):

"A composite soil sample (0-5 cm depth) was taken from the Hohenpeißenberg meadow site end of September 2005 and biogenic NO emission of the meadow soil was subsequently quantified in the soil laboratory of MPIC. Applying a method, which is described in full detail by Feig et al. (2008) and Bargsten et al. (2010), sub-samples (80g) of the composite soil sample have been sieved through a 2 mm mesh and have been incubated (at soil temperatures of 15 and 25°C) and fumigated (with zero and 58 ppb NO) over the full range of 0.05 to 0.6 gravimetric soil moisture (in steps of 0.002). These laboratory studies resulted in the determination of the so-called net potential soil NO flux as function of soil temperature and moisture. From that, the actual surface net NO flux of the meadow soil is calculated using soil temperature (2 cm depth) and soil moisture (5 cm depth) data obtained by continuous measurements at the meadow site during the field experiment."

2-A discussion in the existing section "3.4 Impact of chemical reactions on NO_2 fluxes":

"In the following we discuss the possibility of the existence of a significant NO_2 source near the soil surface that would cause a difference between the observed above-canopy NO_2 flux and the total NO_2 deposition. It would imply the existence of a non-zero canopy or soil compensation point in the resistance model.

The potential reason for an NO_2 source is a soil NO emission that is higher than the NO eddy covariance flux observed above the canopy (Fig. 2). There are no direct in-situ measurements of soil NO emissions available in the present study but we estimated the soil emission potential by laboratory incubation measurements (Section 2.5). For the period of the field experiment, the laboratory derived soil NO flux ranged from 0.08 to 0.35 nmol m^{-2} s^{-1} (median: 0.2 nmol m^{-2} s^{-1}). The values are on average higher than the corresponding above-canopy flux, and a large part of it may have been converted to NO_2 already in the lower part of the canopy (see Mayer et al., 2011; Foken et al., 2012b). However, it has to be considered, that the laboratory measurements have been performed with sieved soil. The absence of the usually dense active grass roots (as competitive sink for mineral nitrogen) may have enhanced the soil microbial processes and led to an overestimation of NO emission compared to an intact plant-soil system, similarly to the effect of grassland tillage (see e.g. Pinto et al., 2004). Another argument against a significant NO_2 source in the lower canopy are the observed in-canopy gradients between 5 cm and 20-28 cm. As shown in Fig. 8, the NO_2 concentration always increased with height indicating a general downward flux inside the canopy. This is even true for the chemically conserved NOx concentration indicating that the soil and the air layer above (0-5 cm) were generally a net sink for NOx. It cannot be discarded that chemical conversion occurs just above or in contact to the soil surface, but it obviously does not significantly affect the present analysis."

p.4479, l.13: "and" in stead of "an"

Done

p.4487, l.13: I suggest "would only explain" in stead of "would only le(a)d to"

Done

p.4487, l.15: "an" instead of "the"

Done

p.4488, l.22: Either "In contrast to ..." or "Contrary to ..."

Done

*p.4489, l.4: "60% **of** the total leaf resistance"*

Done

p.4489: l.11-12: "The higher the concentrations of ascorbate and nitrate reductase are,the higher ..."

Done

p.4489, l.19: "maximum" in stead of "maximal"

Done

p.4489, l.23: "minimum" in stead of "minimal"

Done

p.4490, l.1-6: Can be deleted - not part of a conclusion

We shortened this paragraph.

p.4490, l.13: "an" in stead of "the"

Done

p.4491, l.10: I suggest "vegetation type" rather than "land use"

Done

Fig.2: The figures are too small to be readable

We increased the size of the figures

Fig.3: What are the different coloured areas? It is very difficult to see the footprint countours

The code for the colored areas is shown below the map. The width of the footprint contours was increased.

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