

Interactive  
Comment

## ***Interactive comment on “Temporal variability in bioassays of ammonia exchange potential in relation to plant and soil nitrogen parameters in intensively managed grassland” by M. Mattsson et al.***

**M. Mattsson et al.**

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We thank Reviewer II for the evaluation and comments. In consideration of the suggestions given by the reviewer we have made the following changes:

#1 General comments: 'It would be useful to compare the stomatal NH<sub>3</sub> compensation points derived from the biophysical approach (tissue measurements of gamma values, i.e. the ratio between NH<sub>4</sub><sup>+</sup> and H<sup>+</sup>) with the micrometeorological one'. We have inserted the following paragraphs in the text: (i)'Before cutting, the tall grass had low ammonium concentrations in both leaf apoplast and bulk tissue (Fig. 1a, 2a). This resulted in NH<sub>3</sub> compensation points so low that the grass was not likely to emit NH<sub>3</sub> before

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cutting which is in agreement with atmospheric NH<sub>3</sub> concentration gradients above the canopy showing predominantly deposition fluxes (Milford et al., Biogeosciences Discuss., 5, 4699-4744, 2008); (ii) 'After fertilisation, all plant N pools increased with peak values already on the first day after fertilisation. Micrometeorological measurements also showed high ammonia emissions after fertilisation with some contribution from the fertiliser itself during the first 2 days (Milford et al., Biogeosciences Discuss., 5, 4699-4744, 2008)'. Other comparisons have been extensively made in several of the papers in the special issue. For instance in Hermann et al., Biogeosciences Discuss., 5, 2897-2921, 2008, the calculated compensation points are related to in-canopy measurements of ammonia concentrations.

#2 p.2758, paras. 1 and 2: Reviewer comment: 'I can understand that senescent leaves still attached to the plant would exhibit changes in chemical composition with cutting and fertilisation, but do we expect that for unattached senescent leaves on the ground?' Reply: We collected litter both from attached and unattached leaves together and can thus only report the overall changes. The pool of unattached leaves would probably also still be able to absorb some fertilizer nitrogen dissolving on their surface and cutting would add new leaf material to the pool of unattached leaves.

#3 p.2767, Table 2: Is chi-NH<sub>3</sub> a weighted combination of the stomatal and litter compensation points? Reply: No, chi-NH<sub>3</sub> is only the stomatal compensation point according to Eq. 1. A comment specifying this has been inserted in the heading of Table 2.

#4 p.2752, line 26: Change practice for practise. The change has been made.

#5 p.2754, line 3: Change stubble for stubbles. The change has been made.

#6 p. 2768 Fig 1: The print on the axes is very small in my downloaded copy of the discussion. Response: Font size of axis labels and tick labels have been enlarged in order to improve the readability.

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#7, Table 1. During the preparation of the response to reviewers we detected an error in the calculation of gamma values in Table 1. The values have now been re-calculated and the Table revised.

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Interactive comment on Biogeosciences Discuss., 5, 2749, 2008.

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