

***Interactive comment on “Vertical structure and diurnal variability of ammonia exchange potential within an intensively managed grass canopy” by B. Herrmann et al.***

**Anonymous Referee #1**

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The present study has a novelty in the point that the vertical and diurnal changes in the compensation points and the in-canopy air concentrations of NH<sub>3</sub> in grassland were simultaneously determined. The article satisfies the scope of Biogeosciences.

The following are specific comments.

P.2898, L.5 and P.2901, L.11: 'Micrometeorological techniques'. Do the mini wet effluent denuders measure any micrometeorological items, e.g., wind velocity, temperature, humidity, and/or radiation? If not 'micrometeorological' should be revised.

P.2902, L.8: 'a pressure of 16 bar for 5s'. It is of reference to other researchers if more

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details of the apparatus to achieve this infiltration technique were described.

P.2902, L.10: '20 min in the daylight'. How were the samples treated in nighttime?

P.2902, L.14: 'Apoplastic pH'. The measured pH corresponds to the pH of the diluted apoplastic solution by the infiltrated sorbitol solution, which may differ from the original apoplastic pH. How did the authors treat it?

P.2904, L.24: 'apoplastic pH was higher during the night than during the day'. Many plant species close their stomata and the gas exchange is then strongly inhibited in nighttime. The reviewer, therefore, would question whether the comparison of the compensation points with the air concentrations in nighttime had a point or not.

P.2907, L.8: What is the 'attached leaves'? A detailed explanation is informative.

P.2908, L.4-6: 'In most of these studies the bioassay approach yielded smaller estimates of  $x_s$  compared to the micrometeorological of cuvette measurements'. Is there any possibility that the derived  $x_s$  was correct but the effects of the gas exchange through plant bodies other than the stomata, e.g., cuticle and leaf sheath, on the  $NH_3$  exchange were out of consideration?

The following are technical corrections.

P.2900, L.18: 'leaf tissue  $NH_4$ '. It is better that 'bulk' is added.

P.2903, L.5: Mistype. 'o' in the definition of the enthalpy of dissociation of  $NH_4^+$  is replaced by '('.

P.2903, L.6: Mistype. 'g' in the definition of the enthalpy of vaporization of  $NH_3$  should be deleted.

P.2903, L.11: Why does '( $NO_3^-$ )' have the parentheses?

P.2906, L.18: 'fertilisation' should be 'fertilization'.

P.2907, L.17 and 19: '10 nmol  $m^{-2}$  leaf area  $s^{-1}$ ' and '80 ng  $m^{-2}$   $s^{-1}$ '. The unit should

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be unified. According to the relevant studies, a unit of weight is better.

P.2908, L.17: 'a plant g but in contrast'. 'g' should be deleted.

P.2908, L.23: 'apoplastic (NH<sub>4</sub><sup>+</sup>)'. The parentheses should be deleted.

P.2915: NH<sub>3</sub> and atmospheric [NH<sub>3</sub>] in Fig. 3 are replaced by xs and xa, respectively, which are used in the text.

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**BGD**

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