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Biogeosciences Discussions

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.

Anonymous Referee #2

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General comments:

The paper examines the influences of plant, soil and climatic factors and management practices on the so-called ammonia exchange potential of an intensively managed grassland. Very careful measurements were made of nitrogen fractions in plant parts, in the soil and in the litter. While these might indicate potential ammonia sources or sinks in the canopy, the paper does not offer a way of combining them to form a canopy emission potential. The authors have done this for the leaves in the canopy through calculation of leaf stomatal NH3 compensation points using the ratio of the

apoplastic NH4+ and H+ concentrations in the tissues. These can be compared with atmospheric concentrations within the canopy to indicate the possible direction of NH3 exchange, and if appropriate measurements of exchange parameters such as stomatal resistance and leaf area index are made, plant ammonia exchange rates can be calculated. However, it is difficult to do the same for the litter and the soil in the canopy. I appreciate that other papers in this special issue will deal with micrometeorological measurements of canopy NH3 exchange, but it would be useful to compare this essentially biophysical approach with the micrometeorological one. Given some attention to this last point, I recommend acceptance of the paper by BGD.

Specific comments:

p.2758, paras. 1and 2: 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?

p.2767, Table 2: Is chi-NH3 a weighted combination of the stomatal and litter compensation points? I can not find a definition for it in the text.

Technical comments:

p.2752, line 26: practice for practise

p.2754, line 3: stubble for stubbles

p.2768, Fig.1: The print on the axes is very small in my downloaded copy of the discussion paper. Suggest enlarge.

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