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**Biogeosciences Discussions**

# *Interactive comment on* "Exchange of reactive nitrogen compounds: concentrations and fluxes of total ammonium and total nitrate above a spruce forest canopy" *by* V. Wolff et al.

**V. Wolff et al.**

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We thank the anonymous referee #1 for the comments and will adress them one by one, quoting the comments in italics for convenience.

*The introduction could be shortened somewhat, leaving out information on subjects that are less relevant such as throughfall.*

» We agree with the referee that the introduction is quite long. However, as the subject of the paper touches several topics in micrometeorology, forestry and ecosystem research, we feel that it is necessary to address these research areas individually. Throughfall measurements are still commonly applied in forest management and a



comparison therefore seems to be of high interest to the authors. However, we shortened the introduction about 1/2 of a page.

*p. 8. The precision of the measurements was investigated. It would be useful here to give some results and not only refer to another paper.*

» In section 2.3 of the paper, where the measurement method is described, only a short reference on how the precision was investigated is given with a reference where the method is described in detail. We have given the precision values of tot-$NH_4^+$ and tot-$NO_3^-$ in the results section '3.2 Detection limits, precision and mean concentrations' (page 10 or page 10674, line 23, respectively).

*p. 11. There should be given some reasons if possible for the observed variations (apart from a list of processes).*

» On page 11, section '3.3 Diel variation' (page 10675 of the discussion paper) the results are presented and described. We included some more details. The results are discussed in section 4 (page 10680 (page 15) onwards).

*p.12 It should be documented how the Damköhler number is calculated, especially the characteristic equilibrium time and the underlying assumptions about the particle size.*

» We summarised the description of the method and results previously distributed between the end of section 2.2, sections 2.4, and 3.4 are now all summarized in section 3.4 and we also added some more details.

*p. 17 and following. I do not think the measurements for September should be used to make a (highly uncertain) estimate for a whole year and compare it with other estimates. There are too few measurements to do this. For that reason Fig. 8 should also be left out.*

» To account for the uncertainty of an annual input derived from a single month measurements we left out figure 8. There are few studies that report monthly deposition values such that we keep some comparison with annual deposition values. Never-

theless, we shortened the respective paragraph. We like to note here, that although our measurements only cover 1 month, the accuracy is much higher than for throughfall measurements, such that the upscaling uncertainties are probably comparable to throughfall measurement uncertainties (Lovett and Lindberg, 1986).

References:

Lovett, G. M., and Lindberg, S. E.: Dry Deposition of Nitrate to a Deciduous Forest, Biogeochemistry, 2, 137-148, 1986.

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Interactive comment on Biogeosciences Discuss., 6, 10663, 2009.