

Interactive comment on “Evaluation of a new inference method for estimating ammonia volatilisation from multiple agronomic plots” by Benjamin Loubet et al.

Anonymous Referee #1

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This study carried out are providing answers to the much discussed question about the effect of having many plots in the field on measured ammonia emission from manure applied on the plots. Exploring the effect of measuring average ammonia concentration for increasing time intervals, the numbers of measuring heights and the best heights for measuring the emission. The answers to these questions are most important and the issue is discussed by scientist in Europe especially after the publications of Sinterman et al. questioned the existing design of measuring ammonia emission.

The authors have developed a model for calculating emission of ammonia from as it varies over the day and year as affected by surface soil temperature, wind and atmo-

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spheric stability. Then, as I understand the paper, they calculate how much the emitted ammonia will contribute to atmospheric ammonia concentration at different heights above the soil surface as it is affected by climate and plot size i.e. the loss pattern over time after volatilization start is assessed using decay curves of source strength.

The atmospheric NH₃ concentration data, climate data are then used as input to model calculation of the emission from a plot and plots in a field as affected a range of different management of measuring ammonia concentration, height of the ammonia conc. Measurements, number of plots affecting ammonia concentration in plots downwind a plot, plot size etc.

This reviewer is not a specialist in micrometeorology so I can not evaluate the quality of the model calculations. In the following is my impression of the presentation and interpretation of the data.

Abstract

Line 9 NH₃ is presented but later the authors write ammonia – should be NH₃

Line 10: the abbreviation N for nitrogen should be given and N used in the text.

I am not familiar with the term inference method, the term inferring, inferred in this context? May be because my native language is not English.

L68: What is an intensive source?

L69-70: require hourly concentrations of what????

L87 Multiple-source inversion problem?

L121-124: Units are missing

L324-327: Has the data from this experiment been used in previous articles, reports, proceedings?

L355-356: Rewrite

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383: Condition number – what is this – referring to an equation S1 in annex, it is a number often used so a presentation of how it is calculated should be given in the article

P519: When discussing the effect of height for measuring the horizontal then the authors should relate the outcome of their study to that of Wilson et al. who showed on basis of micro-met. Calculations that there is a best height for measuring the horizontal flux at one height (This Zinst height is higher than the height recommended here)

L555: What is the highest source?

Figures: The font size of the Y and X axis and some of the legends are too small on most figures. On some figures there are too many lines (7 lines on fig 4) making it very difficult to see the individual lines.

Figure 5 & 8: I assume that prescribed is the emission data provided by calculation and inferred is emission calculated by knowing NH₃ conc. At 0.5 m and weather conditions.

Fig. 7: Need improvement

Fig 9; Why not mention the emission strength of the source instead of Treatment 1-3, at $\varphi = 104$ (what is the units?)

Fig 16: Is it correct that measured emissions are not included – if so then the measured results should be included?

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