

## ***Interactive comment on “Are ammonia emissions from field-applied slurry substantially over-estimated in European emission inventories?” by J. Sintermann et al.***

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Response to Referee 2

We thank the referee for his careful reading and commenting of the manuscript. We appreciate the generally positive evaluation of the manuscript and acknowledge the constructive critical comments for which our replies are listed below. For convenience, original referee comments are also included in italics. Individual responses start with '»'.

*I feel that not enough importance has been given to the conclusive discussion part of the paper. Especially regarding the work in section 3.5: I find the novel “check method”*  
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*for initial flux estimates very interesting, especially as it is applicable to all data sets (provided the parameters required). I think the discussion on the implication of the results needs to be expanded, providing more interpretation of the outcome, stating more explicitly what degree of difference in EFs is noted for the different datasets. I am aware of the results in table 2, but I think they should be further discussed in the text, maybe in section 3.5, or in the conclusions.*

»We agree that the Conclusion section in its present form is too short and incomplete and we will considerably expand it providing a more complete synopsis of the findings of the study. We will do that along the following bullet points:

- For the ammonia emission factors (EF) of slurry application by the common splash-plate technique, a considerable discrepancy between earlier medium-plot/IHF measurements and recent field scale measurements has been found (Fig. 2a).
- This discrepancy persists, if environmental (and slurry) parameters are taken into account with the help of empirical model parameterisations (Fig. 4).
- A careful evaluation of methodological errors in all field emission measurement techniques gave no sufficient sources of (systematic) uncertainty of the different methods to explain the observed discrepancy.
- The novel plausibility check method for initial fluxes indicates that the recent field scale results are more plausible than the earlier medium-plot/IHF results (Table 2 and Fig. 6), which seem to suffer from a yet undiscovered experimental bias.
- Since a mechanistic explanation for the observed deviation could not be found (up to now), a correction of the earlier measurements and corresponding parameterisations is presently not possible.
- A new series of measurements should be made in different regions covering different management practice as well as different meteorological and topographical conditions. It is essential that such new series do report all values needed to calculate e.g. the initial flux and to apply and develop process oriented models such as Volt'Air.

*In general, I think the reader would benefit from having some more “guided” conclusions, such as reporting for instance the amount of uncertainty linked to all aspects considered and reported in the first 4 sub-sections of section 3; expand and strengthen the general conclusions regarding the needs for improving inventories methodologies, for instance- but not necessarily by making an example on how different an EF from the same treatment with different method can get. Even if it is a repetition, it can be useful to summarise it again at the end. Same for the need for harmonisation of methodologies and protocols: it has been mentioned in the paper, but I think it would help to have it together in the concluding remarks.*

»As outlined above, we will expand the conclusion section including a summary of the uncertainties of the different measurement methods and mentioning again the need for harmonization in methodologies and protocols. As already stated in the conclusions, new series of measurements should be made at different places reflecting different management practice as well as different meteorological and topographical conditions. We started such a series in Switzerland but we hope that other countries do follow up.

*Specific comments (see original referee comment posting)*

»We are thankful for the many language corrections in the specific comments. They are well taken and will be implemented as far as possible in the revised version.

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Interactive comment on Biogeosciences Discuss., 8, 10069, 2011.