

Interactive comment on “How are NH₃ dry deposition estimates affected by combining the LOTOS-EUROS model with IASI-NH₃ satellite observations?” by Shelley C. van der Graaf et al.

Anonymous Referee #1

Received and published: 16 July 2018

This study deals with dry deposition of NH₃ using the deposition scheme currently implemented in Lotos-EUROS model as well as the remote sensing retrieval from IASI. It is overall a neat work, although a bit limited in the applicability and range of conclusions. I suggest the editor to grant publication of this work as technical contribution to ACP, conditioned to some minor improvements:

- my main comment is related to the derivation of IASI concentration and fluxes. It seems to me that these quantities rely heavily on the modelled outcome. This is fine of course, but I wonder about the robustness of results such as: 'There appears to be some minor improvements in the IASI-derived NH₃ surface concentrations compared to

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the modelled NH₃ surface concentrations from LOTOS-EUROS on a monthly basis...'. I am might missing something here - or just haven't understood fully your approach - but from the paper it'd seem that you are comparing two highly dependent variables. If that is the case then the conclusion that the two sets of results are quite similar is kind of given; otherwise please consider restructuring the description of the methodology to leave no doubts.

- the examined periods (two warm seasons) might be a bit limited to screen out meteorology effects. and/or episodic event. Please comment on this

- please consider 'Modeled deposition of nitrogen and sulfur in Europe estimated by 14 air quality model systems: evaluation, effects of changes in emissions and implications for habitat protection' by Vivanco et al, 2018 (ACPD), which also includes deposition results from LOTOS-EUROS.

- please consider a careful reading and editing of the entire manuscript. Although overall comprehensible, some sentences are a bit obscure and/or too long and/or redundant/unnecessary. For instance in the abstract: 'The aim of this paper is to determine for the applicability and the limitations of this method for NH₃ using space-born observations of the Infrared Atmospheric Sounding Interferometer (IASI) and the LOTOS-EUROS atmospheric transport model.' Why not: 'The aim of this study is to determine the potential benefit of such a methodology to estimate the NH₃ budget. Space-born observations from the Infrared Atmospheric Sounding Interferometer (IASI) and the LOTOS-EUROS atmospheric transport model are used.', or something on that line.

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2018-133>, 2018.

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