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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Modeling Atmospheric Ammonia using Agricultural Emissions with Improved Spatial Variability and Temporal Dynamics" *by* Xinrui Ge et al.

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Thanks for your feedback on our paper.

During the comparison of annual averaged columns, we filtered the measurements based on relative error (and other criteria) to ensure that we used observations with smaller uncertainties. We think you have a point that if we do so, the averaged columns will be most likely overestimated because smaller columns tend to have larger relative errors and to be excluded. As a matter of fact, filtering based on either relative error or absolute error will lead to biases in the outcomes.

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Therefore, we adopted your suggestion and used all measurements (including negative columns) for validation. As can be seen in Figure 1, the background level in annual averaged columns has been eliminated. Subsequently, we calculated overpass modeled columns that are closest to measurements in space and time from the original and updated models. Compared to Figure 7(a) and (b) in the paper, the scatter plots in Figure 2 here show better linear correlation and less randomness between observations and simulations. However, the general characteristics remain the same, namely the updated model tends to overestimate ammonia in the south and underestimate in the north, while the original model has the tendency to underestimate regardless of latitude.

As a result, we can conclude that the use of all IASI data will greatly help to eliminate the background level of ammonia and improve the linear correlation between observed and model columns, but it does not have a large impact on what has been discussed in the paper. The plots here will be updated in the final version of the paper. Thanks for your time!

Interactive comment on Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2019-979, 2020.

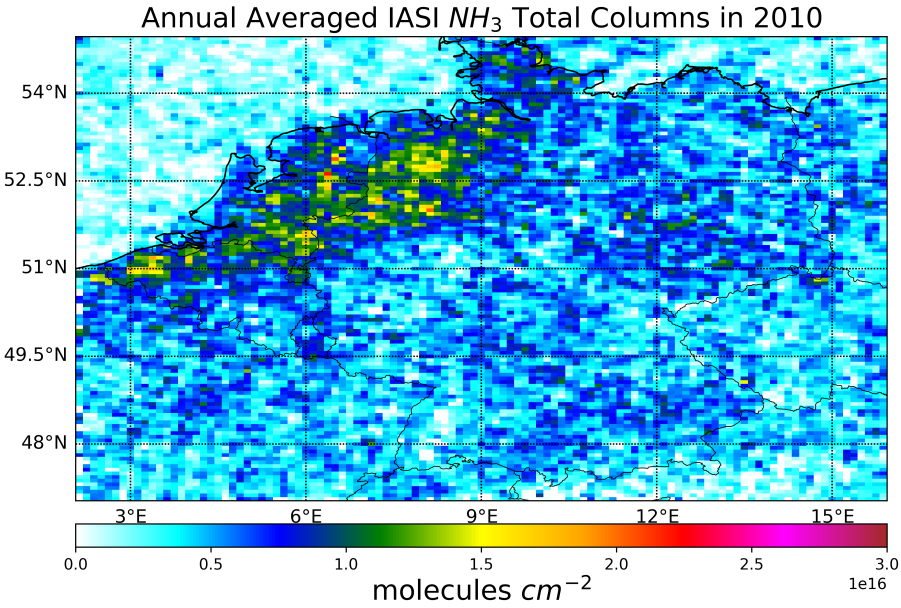

Fig. 1. Annual averaged IASI columns using all data.

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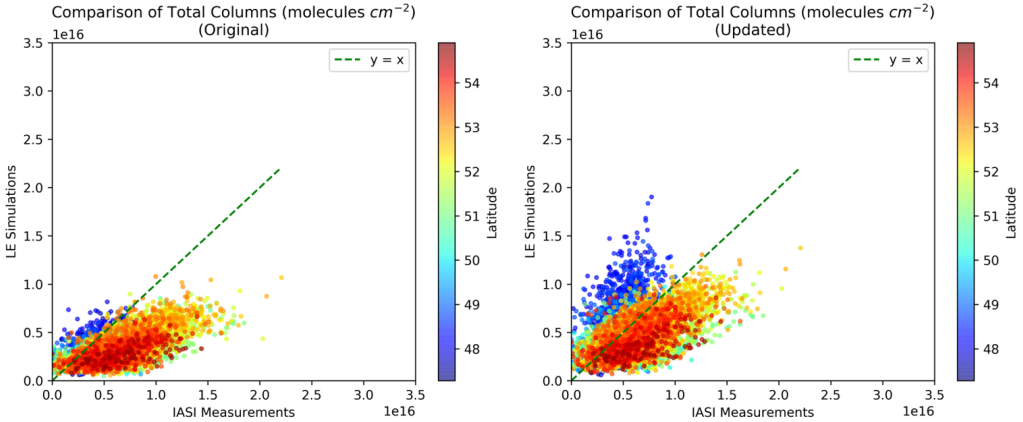

Fig. 2. Scatter plots comparing IASI annual averaged columns with simulated results from the original model (left panel) and the updated model (right panel).

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