

Interactive comment on “An evaluation of IASI-NH₃ with ground-based FTIR measurements” by E. Dammers et al.

E. Dammers et al.

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We would like to thank Referee #2 for his/her time, constructive and helpful comments, edits and suggestions.

One overall point that should be stated clearly is that the IASI observation sensitivity is not taken into consideration in these comparisons given the IASI retrieval approach, which limits the information available to explain the differences seen between the IASI and the FTIR.

This point was already shortly mentioned in section 2.3.2. We've added a section in the discussion following a comment of Referee nr 1. In addition, we would like to point out that the IASI retrieval product does come with uncertainty estimates which characterize IASI's sensitivity. These depend on the thermal contrast and total column of NH₃. We

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decided to use a filter for on TC, which captures the main sensitivity component to prevent introducing any biases.

1) Section 2.3.1: This section talks about the important spatial and temporal differences between the FTIR and IASI, which is very well done. However, due to the IASI retrieval approach the sometimes equally important vertical sampling difference are not taken into consideration. One sentence should be added stating that this difference cannot be determined due to the IASI retrieval and is thus ignored in this comparison.

Line added to the end of the section: Vertical sampling differences are not taken into consideration in this study however the IASI selection criterion on the thermal contrast is conservative and only those measurements for which IASI has a good sensitivity to surface concentrations are selected.

2) Line 246 change the “which” to a “that”.

Changed as suggested.

3) Section 2.3.2 lines 292-292: It might be more clear to the reader if the following was added to the end of the sentence, “The effect of the lack of the satellite averaging kernel is hard to predict so the satellite vertical sensitivity is not taken into consideration in this comparison.

We have added: “... so the satellite vertical sensitivity is only taken into account through the selection criterion on the thermal contrast.”

4) Also, in this section the authors provided a good response in regards to explaining where the x_{sat} IASI profiles are coming from, however, this information was not explicitly added to the text. It would be good to add in some the response provided: The IASI profiles are not fully retrieved profiles but the fixed shape profiles used as an assumption in the IASI retrieval, see Van Damme et al., 2015. These fixed profiles are used for scaling purposes to be able to account for the FTIR averaging kernel. Van Damme, M., Clarisse, L., Dammers, E., Liu, X., Nowak, J. B., Clerbaux, C., Flechard,

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C. R., Galy-Lacaux, C., Xu, W., Neuman, J. A., Tang, Y. S., Sutton, M. A., Erisman, J. W., and Coheur, P. F.: Towards validation of ammonia (NH₃) measurements from the IASI satellite, *Atmos. Meas. Tech.*, 8, 1575-1591, doi:10.5194/amt-8-1575-2015, 2015.

Sentence was added to line 296, The IASI profiles are not fully retrieved profiles but fixed shape profiles used as an assumption in the IASI retrieval, see Van Damme et al., 2015a. These fixed profiles are used for scaling purposes to be able to account for the FTIR averaging kernel.

5) It would be nice to added in the rationale for why total column averaging kernels were not used as discussed in your response. Just a simple statement acknowledging that total column AK could be used, but this should in principle be the same as the procedure used here . . .

Line 297; added: A total column averaging kernel could be used instead, but in principle is similar to the procedure described here.

6) Line 509: the reference “Shepherd” should be “Shephard” to match the reference list.

Changed Shepherd to Shephard.

Interactive comment on *Atmos. Chem. Phys. Discuss.*, doi:10.5194/acp-2016-141, 2016.

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