RC1: 'Comment on amt-2023-48', Anonymous Referee #1, 26 Jun 2023

The authors have done a good job of answering my questions and providing updates to the text and figures.

My only remaining significant comment is with regards to their response concerning an evaluation of NH3 trends in their updated retrieval. I agree it is complicated by trends in NO_2 and SO_2, though we also do have some knowledge of what the latter were. Further, there are trends in bottom up emissions inventories that, while uncertain, are credible on appropriate scales. It would certainly strengthen the paper to demonstrate that their improved trends are in alignment with these factors. But if not, I would urge them to at least explain (as they have done in the response text, partially), why such an analysis is not provided at this time.

Lastly, one small detail regarding the updated (thanks) Figure 3: The text mentions non-uniform values of the normalization factor off the east coast of North Africa — to be honest I'm not sure where that would be, do they mean the Red Sea? I don't see any issues there… Rather, it seems the factor is most often greater than one off the west coast of South Africa, South America, and perhaps the Himalayas as well.

I don't foresee the need for this article to undergo further review after the authors address these two issues.

We would like to thank the reviewer for checking the previous revision.

To properly assess trends would require relying either on the intervention of a model (to link columns to emissions and to take account of the trend changes of other inorganic species) or evaluation with FTIR total column measurements (which is already foreseen as a large follow-up study). In view of this, we prefer to go for the second option that the reviewer suggests "to explain why such an analysis is not provided at this time". We have expanded the paragraph on trends now as follows (at the very end of section 6):

"…. Apart from validation of the columns in an absolute or relative sense, comparison with FTIR columns will also allow evaluating regional NH_3 trends derived from IASI data. Such an evaluation could also be made with bottom-up inventories or with data derived from in-situ measured concentrations. However, in that case, there is the additional difficulty that long term trends of other inorganic pollutants (NO_2, SO_2) affect NH_3 columns differently than emissions or local concentrations (e.g. Lachatre et al., 2019), necessitating the intervention of a (chemistry transport) model."

As for the second comment: thank you for this remark, we indeed meant to write "West coast of South Africa". This has now been corrected.