

Interactive comment on “Global distributions and trends of atmospheric ammonia (NH₃) from IASI satellite observations” by M. Van Damme et al.

Anonymous Referee #1

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This is valuable contribution to the growing area of remote sensing of ammonia. I recommend that this manuscript be published in Atmospheric Chemistry and Physics after addressing these minor points.

1. It is important and challenging to assess quantitatively the error in satellite measurements. The authors are to be commended for their work in this area. However, the scheme described in Section 4.2 has some shortcomings that should either be addressed or discussed in the text. On lines 10-15, page 24315, the authors point out that by excluding data with high error, the resulting averages will be biased high, because high values have lower relative error. While the weighting scheme presented may mitigate this some, on page 24316, line 7 states "the weighted averaging approach using Eq. 3 gives a high contribution to measurements with low relative error and this ex-

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plains the large impact of fire plumes..." It seems the resulting calculated averages are still overly impacted by high values and are not good estimates of the actual mean. I think this approach could be significantly improved if the absolute, rather than the relative error was used to define sigma in Eq. 3 and Eq. 4. This would reduce the impact of large values with high absolute error, while increasing the contribution from low values.

2. It is not clear to me how Equation 4 gives you the actual error in the resulting average. It would be useful to explain more. Or empirically show that it works by dividing the dataset into two time periods, calculate the average and relative error for the first dataset, and then see how often the average of the second dataset falls within the relative error bounds calculated using the first dataset.

3. Are their other errors are not included in the error assessment? Could these be described at the end of Section 3?

4. The relative error shown in Figure 6 and 10 is the average relative error, not an assessment of the error in the mean. Is this correct? Please clarify.

Editorial comments:

* Consider replacing "trends" in the title with "error characterization". While seasonal differences are discussed, a quantitative trends assessment is not performed. However, the error characterization is very useful. Also, consider changing "distributions" to "distribution".

* Page 24318, line 11, remove period after Nr

* Page 24304, line 21, replace "instrumentations" with "instruments"

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 24301, 2013.