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Atmospheric Measurement Techniques Discussions
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Interactive comment on "First characterization and validation of FORLI-HNO_3 vertical profiles retrieved from IASI/Metop" *by* Gaétane Ronsmans et al.

Anonymous Referee #2

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This study compares IASI HNO3 data for 2011 with correlative data from multiple ground-based NDACC stations from across the globe. The results are well founded and are relevant to an AMT reader, and the paper is very well written. I would recommend the paper for publication pending some minor corrections, detailed below.

Minor issues

Line 67 – Does Wang et al. 2007 actually state that ACE-FTS is measured with a 3% accuracy, or does ACE-FTS HNO3 agree with correlative data from other instruments to within 3%? Because ACE-FTS does not have official accuracy/precision estimates for their data sets.

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Discussion paper

Lines 69-70 – Please explain what is meant by “less used”.

Lines 81-82 – “suffers” might be a bit harsh. I would suggest rewording to something like, at the time of Wepse et al. 2009, the FLORI algorithm only allowed for total column retrievals, and it wasn’t possible to do a rigorous validation study.

Line 89 – Why are you limiting to just one year of data? Please explain why 2011 was chosen. As well, perhaps in the Conclusions section (or wherever you feel it fits best), it would useful to mention if 2011 are representative of other years, or how results from other years might differ.

Lines 134-135 – Hurtmans et al. 2012 does not actually go over how sensitivity is calculated, nor the total column averaging kernel. There should be a quick one or two sentences (either here or in the discussion of Fig. 2) on how these are calculated, just so there’s no confusion.

Line 138 – Please briefly explain how water vapour is accounted for in the retrieval, and what is the effect on HNO3 uncertainty?

Line 151 – Please explain what is meant by “suspect” averaging kernels.

Figure 1 caption – I’d suggest changing “variability” to “1σ variation” (i.e. square root of the diagonal of the covariance), unless this is not what is shown.

Line 179 – “close to one” is vague, please give a typical range.

Lines 180-187 –How do increased surface temperatures increase DOFS when there is no or little sensitivity at near-surface altitudes (it is not immediately clear to me)? Does this mean that where you have higher surface temperatures you also have increased sensitivity to HNO3 at near-surface altitudes? If this is the case, can you please show this in a plot?

Lines 242-243 – In what way are the data sets updated?

Lines 283-287 – as discussed above, this discussion may be more useful when Fig 2

is first mentioned

Line 364 – here and table 4 state that the overall mean difference is 11.5%, but the legend in Figure 7 states that it is 10.8%. Which value is correct?

Lines 373-374 – It should be stated that the biases at both stations are still within the uncertainties of both IASI and the FTIRs. Hence, the “different behaviour” isn’t of great concern.

Line 382-382 – How is one year of data enough to be able to reliably comment on the trend in the bias?

Line 488 – What factors in the retrieval codes lead to biases?

Technical issues

Line 10 – DOFS should have a space after it, and should be defined.

Line 68 – “the ODIN instrument” should be “the SMR instrument on the Odin satellite”.

Figure 3 – colour bar labels should be on the right hand side, next to the colour bars. The labels on the left hand side should be “Latitude (deg)”, and the x-axis should be labelled as longitude.

Figure 4 – legend label “covariance” should read “variance”.

Line 255 – by “regardless” do you mean “independent of”?

Line 299 – should be “use the method of Rodgers. . .”

Figure 7 – the coloured dashed lines are not easily visible (and perhaps could be omitted).

Figure 9 – Many of the shaded regions are covered, diminishing their usefulness. I would suggest perhaps not shading, instead using coloured dashed lines at the extremes.

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