

Interactive comment on “S5P/TROPOMI NO₂ slant column retrieval: method, stability, uncertainties, and comparisons against OMI” by Jos van Geffen et al.

Anonymous Referee #3

Received and published: 24 January 2020

General Comments:

This paper describes the slant column density retrieval for the TROPOMI satellite instrument and gives a detailed assessment of uncertainties and comparisons with OMI. The paper is well written and despite the topic being very technical, I found the paper very clear and easy to follow. The details will be of interest to a limited set of scientists (retrieval algorithm developers mostly) but it is a thorough record of the uncertainties and preliminary temporal behaviour of the TROPOMI slant column retrievals. I recommend it be published following a few minor revisions.

The paper focussed almost entirely on an analysis of slant columns from tropical ob-

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servations over the clean remote Pacific. I would have liked to have seen some slant column retrieval comparisons over an entire orbit, as some of the differences between retrieval approaches or instruments might be exaggerated at the highest solar zenith angles. Perhaps adding just a sentence or two describing how well the conclusions drawn about uncertainties, retrieval algorithm comparisons etc extend to cases other than the remote Pacific could be useful.

Specific Comments:

Page 3, Line 11: Give units of conversion factor.

Page 5, Line 31: I'm a bit confused by the wording describing a satellite latitude range. How is this changing between these two end points of 1 Jan and 1 July?

Page 9, Line 25: Comparing to OMI but no OMI results shown, so could you give a number indicating the magnitude of OMI variations?

Page 19, Line 12: define "India and China" latitude/longitude region

Page 21, Line 2: degradation of 1-2% relative to what? Is this degradation in throughput per year?

Figure 7: I find the colors of b and c very hard to follow in my mind. I think it's more common to be looking at a solid line that represents the average and a dotted line of the same color that represents a standard deviation or similar. Here they are different colors but the same pattern for a single orbit (backwards to what I'm used to). Not a significant issue but I just find it a bit confusing.

Page 25, Line 3: Define VRS earlier if not done already

Section 5.2, 5.3: These sections seems a bit tacked on to a very detailed earlier analysis. Is there any recommendation about how to deal with the high-NO₂ data? Is there a limit at which the data is questionable? Are these cases flagged?

Technical Comments:

Abstract, Line 16: Change “ ~ 2 ” to “a factor of ~ 2 ”

Page 2, Line 14: change to “in both the troposphere and stratosphere”

Figure 3 caption: I think “d,f” should be “c,f”.

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2019-471, 2019.

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