

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

Anonymous Referee #2

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The manuscript “S5P/TROPOMI NO₂ slant column retrieval: method, stability, uncertainties, and comparisons against OMI” provides a detailed description of the DOAS slant column fitting for TROPOMI NO₂ measurements and discusses important issues related to the method, instrument, and verification. The stability and uncertainty analysis is particularly interesting. The manuscript is well organized and written. I recommend publication after a few minor revisions.

P4 L7 Is there a particular reason that the VIS band stops at 496 nm? While quite a few literatures numbered the TROPOMI VIS band until 500 nm.

P4 L20 Please give the full name of ATBD.

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P4 S2.1.2 Please give a short description of the saturation (perhaps also blooming) effect for TROPOMI, which is mentioned and analyzed in the result section and important for TROPOMI NO₂ measurements.

P5 L12 What would be the implication of increasing the size towards the edge when comparing the OMI and TROPOMI measurements?

P6 Table 1 I recommend to add the retrieval processor, namely TROPOMI (if no other name) vs QDOAS, before the date version. Please also add information of OMI/OMNO2A (almost same as TROPOMI) in the title or as table footnote etc.

P9 L23 Please give rough numbers of the magnitude for OMI?

P11 Eq 9 The intensity offset term shall not be placed in the same parentheses with lamda.

P12 L10 Please give the full name of VCD.

P12 L15 What is the implication and how large is the impact of changing the LM solver to OE method with Gauss-Newton?

P14 L17 & P15 L20 Following the previous question, is the difference between TROPOMI and OMNO2A (Fig 3c and 3f) mainly resulted from the difference in the wavelength calibration window (I assume not the mathematic solver)?

P15 L6 Previous introduction has mentioned that TROPOMI measurements suffering from saturation are filtered out. But the residual saturation is still affecting the retrieval (even not strongly) in Fig 3d-e. Is there any recommendation of further removing the effect during retrieval or data using?

P25 L3 Please give the full name of VRS (introduced already in Sect 3).

P26 L13 Even the air pollution is reduced in China, it is still very possible to see columns of a few 10e16 molec/cm² (not optically thin), particularly in Winter. With this pollution level, the boundary AMF will also show spectral features, and this nonlinearity will

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contribute a few percent difference to the retrieval during pollution episode. Please rewrite the statements and perhaps also provide the example for Winter for China (at the moment is July for Africa).

P28 L3 Do you mean case QDOAS case 4?

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