Atmospheric
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Discussions

Interactive comment on "A scientific algorithm to simultaneously retrieve carbon monoxide and methane from TROPOMI onboard Sentinel-5 Precursor" *by* Oliver Schneising et al.

Anonymous Referee #1

Received and published: 10 August 2019

General comments :

The paper describes the first results of an algorithm to simultaneously retrieve CO and CH4 from TROPOMI radiance measurements using an error analysis based on synthetic data and a cloud filter based on a machine learning for XCH4 data. The paper is well written with a clear presentation of the retrieval algorithm as well as a careful consideration and analysis of the results and their validation. I only have a few minor remarks and questions. The paper is interesting for the scientific community of TROPOMI data, CO and CH4 retrievals and should be published in AMT.

Specific comments :

- p.4. line 15 : Details of the goal and the contribution of this new algorithm are missing in the introduction. Also, as you mentioned in your abstract EGU 2019, you should said something similar about "We present first results for both CO and CH4 trace gases obtained using the new version v1.2 of the scientific retrieval algorithm WFM-DOAS".

- p.6, line 9 : "the look-up table is only covering direct nadir conditions". Why ?

- p.8, line 10 : The scenario class of profiles are extracted from the radiative transfer model MODTRAN. Why from this RTM ?

- p.8, line 11 : "which differ from the US Standard Atmosphere" but how much ?

- p.13, line 20 : "20% of the training data are randomly drawn and retained as test data". How did you choose 20 % ?

- p.31, line 5 : how did you measure the plume width perpendicular to the wind direction ?

Technical comments :

- p.2, line 19 : "Moreover, it" -> "Moreover, CO" as you are talking about O3 just before...

- p.3, line 22 : I would add a reference on this sentence about the high precision of TROPOMI.

- p.4, line 18 : is a linear-least squares method

- p.4, line 19 : vertical profiles of trace gases.

- p.5, line 27 : where T is the matrix transpose.

- p.8, line 14 : acronym of ASTER and USGS should be mentioned here and not after.

- p.11, line 11 : have also to be implemented -> have to be implemented

- p.11, figure 6 : what is the meaning of the label for the surface type (range from 1 to 20). I did not find the information in the references mentioned in the paragraph 2.4.

- p.13, line 12 : acronym of VIIRS is defined pages 15 and 30 but must be mentioned here too

- p.27, line 11 : do you have a reference for this percentage ?

- p.33, figure 23 : we do not see very well the cyan color on this figure. Same case for "Edwards" in red letters.

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