

Review of AMT-2019-243

A scientific algorithm to simultaneously retrieve carbon monoxide and methane from TROPOMI onboard Sentinel-5 Precursor

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General comments.

The authors present a scientific algorithm to simultaneously retrieve carbon monoxide and methane from TROPOMI onboard Sntinel-5 Precursor. I understand that this activity is important to calibration and validate both of TROPOMI spectra and operational products. However, it is unclear that what is the object for developing the proposed algorithm or how is the difference between the proposed algorithm and the operational one. In this paper, a lot of demonstrated results are described. Unfortunately, it is hard to understand the usefulness of this algorithm. It is easy to understand, if this paper focus on the validation of TROPOMI operational products. Several topics are described in this paper but the relevance between these topics are poor. Of course, the individual topics are important. So, I recommend the authors will reconstruct the frame of this paper.

For these reason, I recommend this paper for publication with major changes to the technical content.

Specific comments.

Abstract

1. Describe the character of proposed science algorithm. Especially, the comparison between the proposed algorithm and the operational one.
2. Describe the motivation or object for developing proposed algorithm.
3. Describe a full word of “DOAS”.

4. Page 2, line10: What is a “reference data”.
5. Page 2, line13: Why emission sources have to be identified? Describe the object or back ground.
6. I understand that one of target for developing this scientific algorithm is to validate the operational TROPOMI XCH4 and XCO products. If so, it might be described in.

1. Introduction

7. Page 4, line 9 to line15: It is unclear what is the requirement of a scientific algorithm ? I understand that validation of operational products, calibration of TROPOMI spectra, and reduce the random and systematic error of XCH4 and XCO with scientific algorithm are first objects. Second is new findings with scientific algorithm. If so, describe more clearly.

2. WFM-DOAS retrieval algorithm

8. Figure 1, It is unclear the coverage of gray hatch. Add table for these coverages.
9. Table 2, Describe the meaning of “T”, “p”, “BL”, “R”, “ τ ”.
10. Figure 5, Describe the full word of “cum”, “cir”
11. Figure 6, Describe the meaning of numbers for surface type.
12. Page 12, line 8 to 15: In the other algorithm to retrieving the XCH4 and XCO used O2A spectra, to identify the photon path with precisely. However, this algorithm is not employed the O2A spectra to identify the photon path. Instead of O2A spectra, this algorithm used the ECMWF-Based mole fraction computation. The authors are concluded that the proposed algorithm is more faster and accurate than that of O2A based processing system. However, it is not quantitative. The authors have to assess more quantitatively.
13. Page 13, line 22: Make table for “all 25 features”.
14. Page 15, Figure 8: What is the meaning of “QUAL=1”

4. Results

15. Page 24, line 4: Correct the capital position.
16. Page 24, line 6: typo “amd”.
17. Page 25, Figure 15: Why the yield rate for XCH4 is drastically different between WFMD CO and Operational CO?

4.2 Detection of emission sources

18. Page 27, Figure 18: How is the operational products? Is it possible to identify the emission sources with operational products?
19. Figure 19 to figure 22 are almost same information. These figures are just illustration. Make more clear sentence.

5. Conclusions

20. Page 33, line 10, The sentence “ for example with respect to striping,” is not touched on this paper. Adding the reference or explanation

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