Atmospheric Measurement Techniques Discussions

Atmos. Meas. Tech. Discuss., referee comment RC1
https://doi.org/10.5194/amt-2022-261-RC1, 2022


# Comment on amt-2022-261

Cristina Ruiz Villena (Referee)

Referee comment on "Understanding the potential of Sentinel-2 for monitoring methane point emissions" by Javier Gorroño et al., Atmos. Meas. Tech. Discuss., https://doi.org/10.5194/amt-2022-261-RC1, 2022

## General Comments

In this work, the authors have developed a new benchmarking framework for the validation of Sentinel-2 methane retrievals, including an estimation of detection thresholds for various scenes with different characteristics, and an analysis of the uncertainties. Existing work on Sentinel-2 methane monitoring has demonstrated the usefulness of this sensor to detect and quantify large methane emissions at a global scale, but mostly focused on examples of real plumes. Though similar work has already been done for other sensors such as PRISMA or WorldView-3, to my knowledge, this is the first time that such a benchmarking framework has been developed for Sentinel-2 with simulated methane plumes and the detection thresholds and uncertainties characterised in a more systematic way. This work is valuable as it will aid the validation of future S2 quantification of real-world methane plumes, which is challenging and/or costly to do otherwise (e.g. with ground-based or aircraft observations).

The manuscript is well written and its contents are of high quality and scientific interest. Methane monitoring is currently a hot topic, given the high potential to mitigate further warming by reducing methane emissions, particularly from the oil and gas sector, where it is most cost-effective. The Global Methane Pledge signed by more than 100 countries at COP26 last year is a testament to the current relevance of this topic.

## Specific Comments

My comments are mostly focused on making things clearer for the reader in the manuscript. A detailed list can be found in the annotated manuscript.

## Technical Corrections

I have spotted a few typos and other technical details to correct, which, in my opinion, would improve the quality of the manuscript. A detailed list can be found in the annotated manuscript.

Please also note the supplement to this comment:
https://amt.copernicus.org/preprints/amt-2022-261/amt-2022-261-RC1-supplement.pdf