Methane super-emitter detection and identification combining TROPOMI with VIIRS

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Oral
(Virtual Talk)

Over the past few years we have developed a tip-and-cue approach using TROPOMI to detect methane super emitters globally, and then follow-up (zoom-in) with high resolution methane satellites such as GHGSat to identify the exact facilities responsible for the emissions. This approach has been succesful and has been extended to hyperspectral and band imagers (e.g. Landsat, Sentinel-2/3, EnMAP, PRISMA, EMIT) that were not designed to measure methane, but can nevertheless observe methane enhancements under favorable conditions [1-4]. This is the first step towards mitigation of these emissions, as also applied in the context of the IMEO Methane Alert and Response System. However, in particular for transient events, more high-frequency overpasses are needed for accurate characterization.

Here, we use the shortwave infrared bands of the Visible Infrared Imaging Radiometer Suite (VIIRS) satellite instruments to retrieve methane enhancements with 750 m resolution. We show that the three VIIRS instruments in orbit uniquely enhance the currently-employed capabilities of tracking methane super-emission events. The VIIRS instrument on Suomi-NPP and TROPOMI have overpasses that are only a few minutes apart, which allows for direct identification of methane super-emitter sources detected by TROPOMI using VIIRS data. Furthermore, the co-location also allows us to cross-validate VIIRS methane enhancements with TROPOMI. Finally, we show how the global multiple overpasses per day by VIIRS and Sentinel-3 give a unique insight in the timeline of emissions and can be vital in understanding and attributing transient emissions [5].

References

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Presentation file
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