Topics (T)
Earth Observing Missions and Systems to Address Climate Change and Its Impacts [2] (3B)

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SERVICES FOR DETECTION AND QUANTIFICATION OF METHANE EMISSIONS VIA SATELLITE

Abstract

The environmental agendas and the fight against climate change have certainly gained priority over the last years, and policies are being supported by Governments, Regulators and Environmental Agencies across the globe. Among the targets of such agendas, methane is placed at a top position, given it is the second most abundant greenhouse gas after CO2, and considering that a quarter of today's global warming is estimated to be caused by anthropogenic methane emissions, in particular by agriculture and oilgas sectors. Related to this, during the COP26 held in 2021, the Global Methane Pledge was launched, with the goal of reducing human-made methane emissions by at least 30% from 2020 levels by 2030. Focusing on the oilgas sector, it can be noted that CH4 emissions include methane leaks in gas assets, vents, incomplete combustion from flaring, among others, and smaller sources are considered to be responsible for almost half of the total CH4 emissions from this sector. That said, services able to detect fugitive emissions would be key to implement targeted and effective countermeasures. In this context, top-down or site-level monitoring using satellite data is emerging as a powerful tool, able to monitor emissions at different scales and provide a dedicated service over long periods of time on a continuous basis, in a hybrid format with in-situ sensors. By partnering up with industrial players of the energy sector - aiming at emissions regulation compliance and commercial revenues increase -, and thanks to its high specialization in Earth observation technologies, Satlantis has been developing a constellation, called GEISAT, consisting of satellites offering unprecedented capabilities. The constellation begins with a Precursor, a CubeSat measuring radiance up to 1700 nm with a spatial resolution of 13 m, to be launched in Q2 2023. A microsatellite will then upgrade the service providing SWIR images with a resolution of 7 m. The project makes use of the Multi-spectral Differential Photometry, a methane detection and quantification algorithm for point sources. The technology has been developed and tested with a series of progressively complex laboratory, field, and airborne measurement campaigns. This technology aims to detect and quantify fugitive emissions reliably and accurately, thus playing a major role in understanding the CH4 emissions phenomenon, to provide

services and directions for regulations. This work will showcase the results obtained so far from the technology development, and the commercial and public services benefiting industrial and governmental players.