

SATELLITE-BASED DETECTION AND QUANTIFICATION OF OFFSHORE PLUMES



Improving satellite detection of offshore emissions to increase rapid alert and response capabilities.



DONOR:
United States



BENEFITTING COUNTRIES OR REGIONS:
Worldwide



SECTOR:
Oil & Gas



Subsector, if applicable:
Offshore

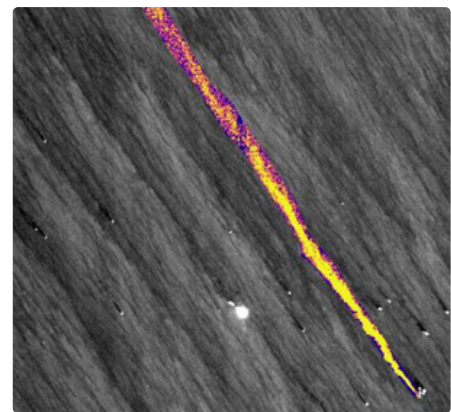
STATUS:
Analysis ongoing

TIMELINE:
Validation of measurement-based approaches



IMEO SCIENCE OBJECTIVE:

→ **Initiate scientific studies in support of data assurance and to characterize regions/sources with high uncertainty or discrepancies in the integrated data.**



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KEY FINDINGS

The study will determine which offshore areas of the world are eligible to be monitored with multispectral satellites and identify the angular requirements to detect an offshore emission with hyperspectral satellites.

RATIONALE

The study aims to further facilitate the implementation of offshore plume detection methods for use in IMEO's Methane Alert and Response System (MARS), which notifies governments and companies of major emission events detected by satellites. Offshore oil and gas production is a sector with significant emissions uncertainty. Enabling improved satellite monitoring of offshore sites is necessary to enable better understanding and mitigation of emissions.



RELATED PUBLICATIONS

In progress



CATALYZING ACTION

The methods and toolbox generated will support MARS in maximizing its ability to detect emissions in offshore areas. It will give a better understanding of the operational potential of satellites for offshore areas and, ultimately, of the emissions occurring in offshore areas.



SIGNIFICANCE FOR DECISIONMAKERS

The results derived from this project will provide a better understanding of the emissions occurring in the offshore oil and gas extraction areas, a sector where there is still significant uncertainty.

OTHER SUPPORTERS/STAKEHOLDERS

Principal Investigator: **Universitat Politècnica de València**

Revision History: **25 October 2024**



STUDY APPROACH/ACTIVITIES

The study will first look at methods of detecting and quantifying offshore methane emissions with multispectral and hyperspectral satellites and analyze their potential to observe emissions depending on their viewing and solar zenith angle. In parallel, an algorithm will be generated to identify the specific location of global offshore platforms using Sentinel-1 SAR data. Combining the above activities, it will be possible to obtain a global map with precise locations of offshore platforms that are suitable for monitoring with multispectral satellites and the potential for observing emissions with hyperspectral satellites depending on the angular configuration of the image and its radiance. Information extraction methods will be demonstrated through case studies in pre-selected offshore areas.

The UN Environment Programme's International Methane Emissions Observatory (IMEO) exists to provide open, reliable, and actionable data to the individuals with the agency to reduce methane emissions. IMEO does this by integrating and reconciling data across sources, including its global methane science studies. IMEO supports measurement and research studies around the world to close the knowledge gap on methane emissions and provide policy-relevant insights to decisionmakers.