

# SATELLITE DATA TO METHANE ACTION: REDUCING EMISSIONS IN ALGERIA



Through the Methane Alert and Response System (MARS), UNEP's International Methane Emissions Observatory has facilitated concrete methane action in Algeria.

MARS is the first global satellite detection and notification system providing actionable data on major methane emissions around the world.



The Hassi Messaoud oil field is known to be the largest and oldest oil field in Algeria. In 2024, UNEP's International Methane Emissions Observatory (IMEO) analyzed emissions from an oil well where continuous emissions were detected. A review of historical satellite data revealed the source was emitting since at least 2013, when the earliest high-quality satellite data is available from Landsat-8 – with evidence of emissions at the site dating as far back as 1999 from observations via Landsat-5. Based on the large number of images observed and the presence of a plume in every high-quality image, it is highly likely that the source was continuously emitting methane emissions.

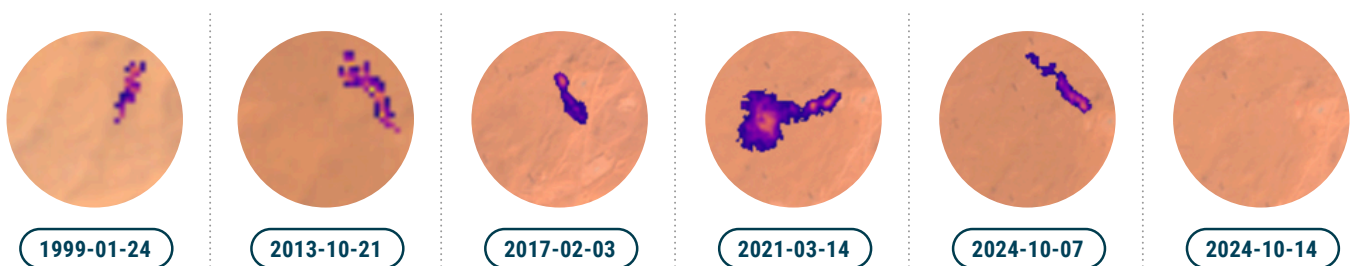
MARS, managed by UNEP's IMEO, exists to identify large emissions like this and enable targeted action to resolve them. IMEO sent several MARS notifications throughout 2024 with information on the emissions to the Government of

Algeria. Through 2024, IMEO further engaged with the Algerian government and its national oil company, Sonatrach, on methane emissions reduction more broadly.

At a methane training organized by IMEO in Algeria in September 2024, the emission source was brought to the attention of government and company representatives. Subsequently, on 14 October 2024, IMEO no longer detected emissions from the location for the first time ever.

The elimination of this emissions source is a significant demonstration of climate action, as the leak was one of the oldest persistently emitting sources on record. It is estimated to have emitted approximately 27,500 tonnes of methane per year. That amount of methane has the same near-term climate impact as almost 500,000 passenger vehicles driven for a year.

**Figure 1**  
The first five satellite images identify plumes detected in the Hassi Messaoud oilfield between 1999 and 2024. The final image shows the same location in October 2024 with no plume detected for the first time ever.



## MARS HAS FOUR COMPONENTS



1

### METHANE Detect and Attribute

UNEP's IMEO works with global mapping satellites to identify very large methane plumes and conducts further analysis with high-resolution satellites and datasets to identify the source of emissions. After detecting a plume, IMEO also investigates archival satellite data to provide context about how long and at what rate emissions have been occurring. Additionally, IMEO requests further satellite images from space agency partners to confirm details and status of the emissions.

In 2024, UNEP's International Methane Emissions Observatory (IMEO) analyzed emissions from an oil well where continuous emissions were detected. In the Hassi Messaoud oilfield. According to historical satellite data, the source was emitting since at least 2013, when the earliest high-quality satellite data is available from Landsat-8. However, evidence of emissions at the site dates as far back as 1999 from observations from another satellite, Landsat-5.



2

### ALERT Notify and Engage Stakeholders

UNEP's IMEO works to notify governments and companies of large emissions events happening across their jurisdictions or operations. It continues this engagement as more information becomes available.

IMEO sent several MARS notifications throughout 2024 with information on the emissions to the Government of Algeria.

In addition, UNEP's IMEO engaged with the Algerian government and Sonatrach, the national oil company, including two in-person events in September 2024 where the emission source was brought to the attention of government and company representatives.



3

### RESPONSE Stakeholders Take Abatement Action

It is up to notified stakeholders to determine how best to respond to the notified emissions and share their actions with UNEP's IMEO to demonstrate verifiable climate action.

Subsequently, on 14 October 2024, IMEO no longer detected emissions from the location for the first time on record.



4

### SYSTEM Track, Learn, Collaborate, Improve

UNEP's IMEO continues to monitor notified locations for future emissions as mitigation efforts proceed. Data and analyses are made public 30 days post detection on the MARS data portal.

Since the initial notification, UNEP's IMEO has continued to monitor the site and confirmed via subsequent satellite imagery from multiple satellites that major emissions are no longer detected at the location.

IMEO is continuing its engagement with the government of Algeria and Sonatrach to raise awareness on MARS, collaborate on methane action, and to address new emission events as they arise.



In implementing MARS, UNEP's IMEO collaborates with various institutional partners, including the World Bank, International Energy Agency, the Climate and Clean Air Coalition, Universitat Politècnica de València, the Netherlands Institute for Space Research and the Committee on Earth Observation Satellites.

Based on satellite data used by MARS, it is not possible to confirm the presence of minimal methane emissions at a given location. Rather, this data can confirm the absence of emissions at levels higher than a given satellite's detection limit, which varies based on the technology, ground conditions and the weather. Algeria's bright and homogeneous desert surface is optimal for methane detection and lowers the detection limit to the range of 0.5 tonnes per hour of methane.