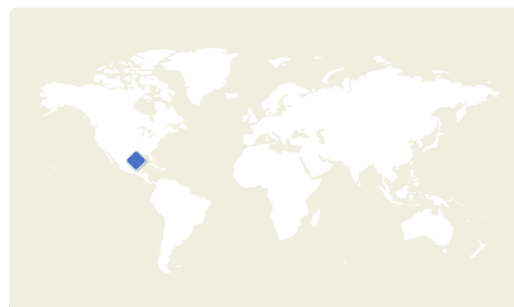


EMISSIONS FROM OFFSHORE PRODUCTION IN THE US GULF OF MEXICO



First direct measurements of offshore oil and gas emissions finds emissions to be double what inventories suggest.



DONOR:
OGCI



BENEFITTING COUNTRIES
OR REGIONS:
United States



SECTOR:
Oil & Gas



Subsector, if applicable:
Offshore

STATUS: **Published**

TIMELINE: **Measurements 2018 to 2018; Latest publication 2020**



IMEO SCIENCE
OBJECTIVE:

→ **Advance reconciliation and data
integration approaches for multi-scale
emissions data.**



KEY FINDINGS

The study highlights that offshore production in shallow waters emits at higher rates than that in deep-water, as well as indicates the significant contribution of super-emitters to overall emissions. The new estimates are consistent with the EPA inventory in deep water but appear higher for shallow water. The study's inventory, informed by regional airborne estimates, reports emissions to be twice as high as reported by the Environmental Protection Agency Greenhouse Gas Inventory (GHGI) with regional airborne estimates.

Measurements taken from ships of over 100 offshore sites found emission rates were highly variable – but the distribution is heavily skewed with the top two emitters accounting for 20 per cent of the total methane emissions. Ship-based measurements agreed that emissions appear greater from shallow water sites.

RATIONALE

Before this study, there were few to no empirical-based estimates of methane emissions from oil and gas offshore infrastructure. This study, undertaken in the US, is the first to provide offshore emissions assessment via direct measurement. This measurement data is necessary to understand the amount, locations, and sources of emissions to accurately assess and mitigate them.



RELATED PUBLICATIONS

- ▶ Methods paper on ship-based measurements ([Yacovitch et al., 2020](#))
- ▶ Airborne-based measurements ([Gorchov Negron et al., 2020](#))



SIGNIFICANCE FOR DECISIONMAKERS

For Policymakers:

The US EPA has started to incorporate empirical, site-level data into its national emission inventory. This study shows that the quality of reporting in the shallow waters of the US Gulf of Mexico is insufficient given the empirically demonstrated low bias of the inventory. Facility-level measurements by operators, e.g. through OGMP2.0, would be an opportunity to improve the inventory, and by doing so, monitor the mitigation accomplishments over time.

For Industry:

Oil and gas industry operators need to conduct facility-level measurements in shallow water production regions in the Gulf of Mexico to reconcile the EPA's inventories' bottom-up approach to methane reporting, which is shown to underestimate emissions. These inventories may not account for all major emission sources and operating states, which may be the underlying cause for their underreporting. Representative repeat measurements by the oil and gas industry will be useful to address this issue. Such measurements will be useful to understand the underlying causes of underreported emissions, which is a prerequisite for mitigating them.

OTHER SUPPORTERS/STAKEHOLDERS

Principal Investigator: **University of Michigan, US and Scientific Aviation, US under EDF/IMEO**

Revision History: **15 August 2024**



STUDY APPROACH/ACTIVITIES

Aircraft measurements of atmospheric methane around offshore oil and gas platforms were collected over the U.S. Gulf of Mexico in January 2018. A combination of facility-level samples, production data, and inventory estimates were used to generate a measurement-based inventory of methane emissions for the U.S. Gulf of Mexico. Results are compared from the determined inventory and the Environmental Protection Agency Greenhouse Gas Inventory (GHGI) with regional airborne estimates.

Shipboard measurements of offshore oil and gas facilities were conducted in the Gulf of Mexico in February 2018. Using a modified Gaussian dispersion methodology to estimate emission rates, over 100 sites were studied.



CATALYZING ACTION

The results of this study have been used in meetings with the US Bureau of Ocean and Energy Management (BOEM) as well as the US Environmental Protection Agency (EPA). These institutions are responsible for monitoring emissions offshore and maintaining a greenhouse gas inventory. The discussions highlighted the issue of observed, frequent, large and unaccounted methane emission sources and the need to better account for and mitigate them. This study was also the starting point for several additional IMEO projects to measure methane emissions offshore in the North Sea and off the coast of Central Africa. Such comparative studies are useful to characterize the minimum level of emissions achievable in an offshore environment.



Courtesy of Paulo Wilczak & University of Michigan

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.