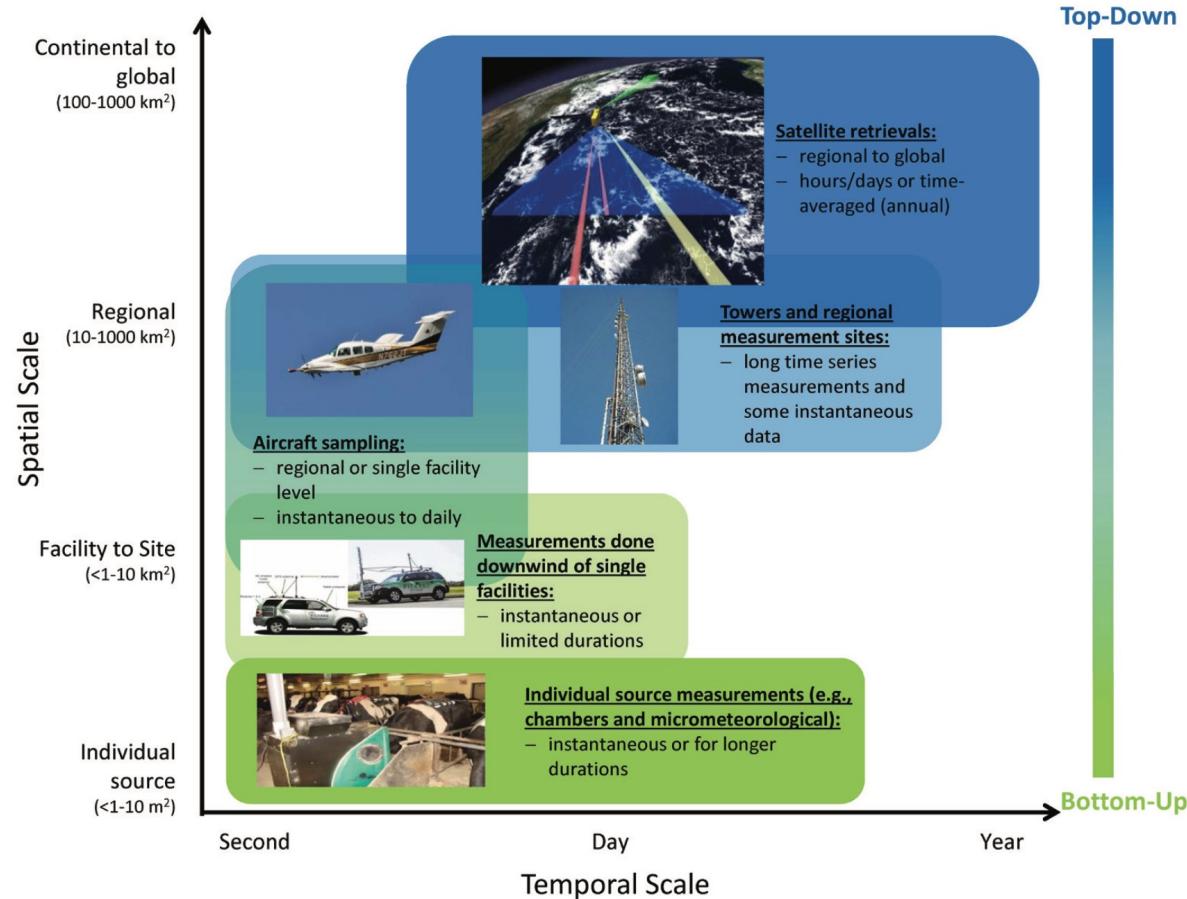


# Methane Emissions Monitoring

Using satellites and aircraft to detect and quantify methane emissions from various facilities



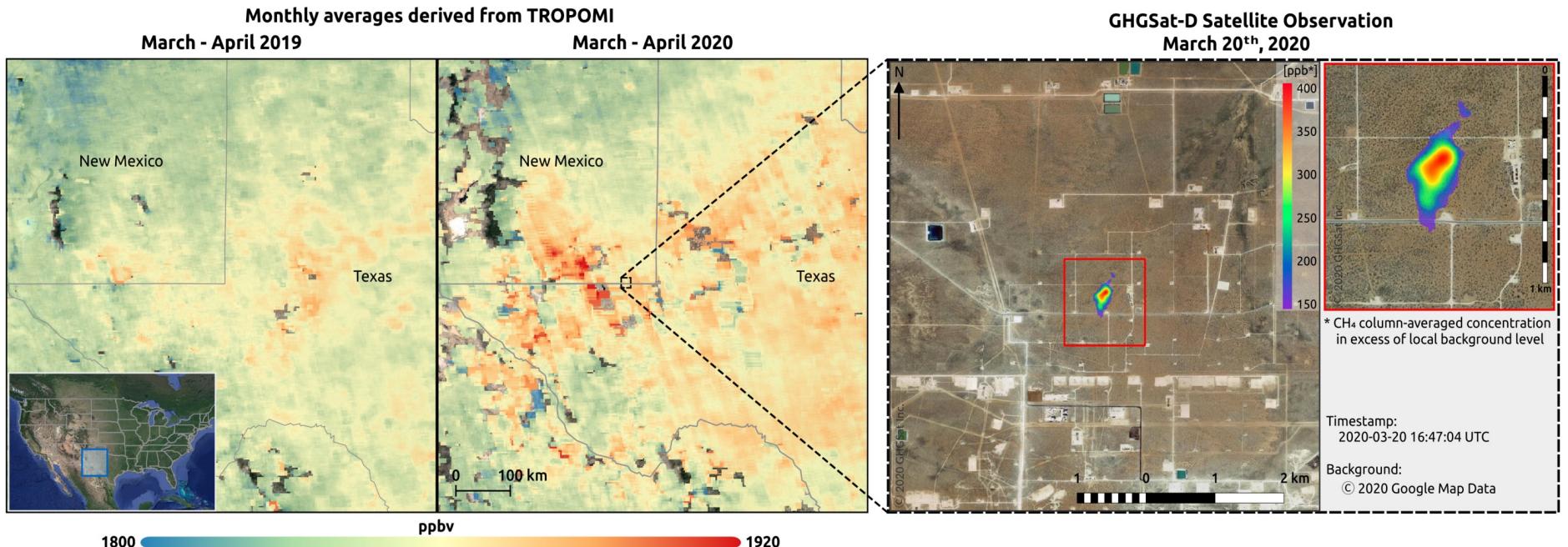


Examples of methane measurement platforms operating across a variety of spatial and temporal scales  
 (Source: National Academies; *Improving Characterization of Anthropogenic Methane Emissions in the United States*; 2018)

# Satellite Methane Observations

**Area Mapping:** Quantifying emissions at regional (and national) scales.

**Point Source Mapping:** Detection and quantification of large emission sources at fine spatial resolution



Above example: Using ESA Sentinel-5P/TROPOMI to “tip and cue” GHGSat satellites

# GHGSat Constellation

1<sup>st</sup> high-resolution emissions monitoring constellation



## In Orbit Today

GHGSat pioneered the technology that delivers high-resolution data on greenhouse gas emissions from space.

2016  
**CLAIRE**  
Technology demonstrator proving GHG can be detected and measured accurately from space.

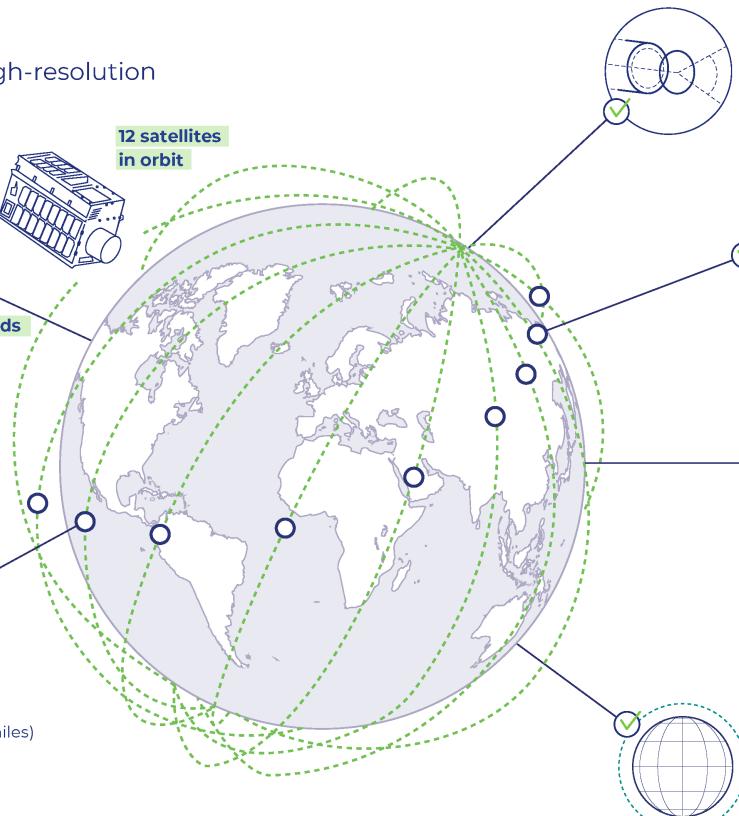
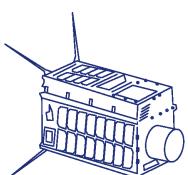
2021  
**HUGO**  
4 hosted payloads in production

2022  
**LUCA, PENNY and DIAKO**

2023  
**MEY-LIN, GASPARD and OCÉANE**  
**ELLIOT, JUBA and VANGUARD (CO<sub>2</sub>)**

### Coverage

**Spatial resolution:** ~25 m class (~82 ft)  
**Field of view:** 12 km x 12 km (7.5 miles x 7.5 miles)  
**Size:** Comparable to a microwave oven  
**Weight:** 15 kg (33 lbs)  
**Orbit:** Sun-Synchronous Polar



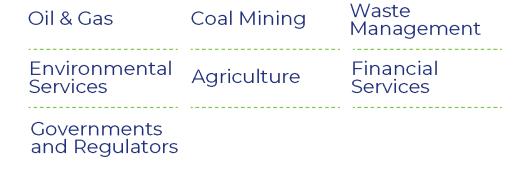
## Instruments

GHGSat commercial satellites are designed and dedicated for methane and carbon dioxide observations. Each satellite is equipped with a wide-angle imaging spectrometer for measuring the vertical column density of greenhouse gases.

## Capability

With proprietary patented sensor technology, GHGSat satellites are capable of measuring methane emissions from onshore and offshore platforms, attributing those large or small emissions directly to individual facilities, down to 100 kg/hr, worldwide.

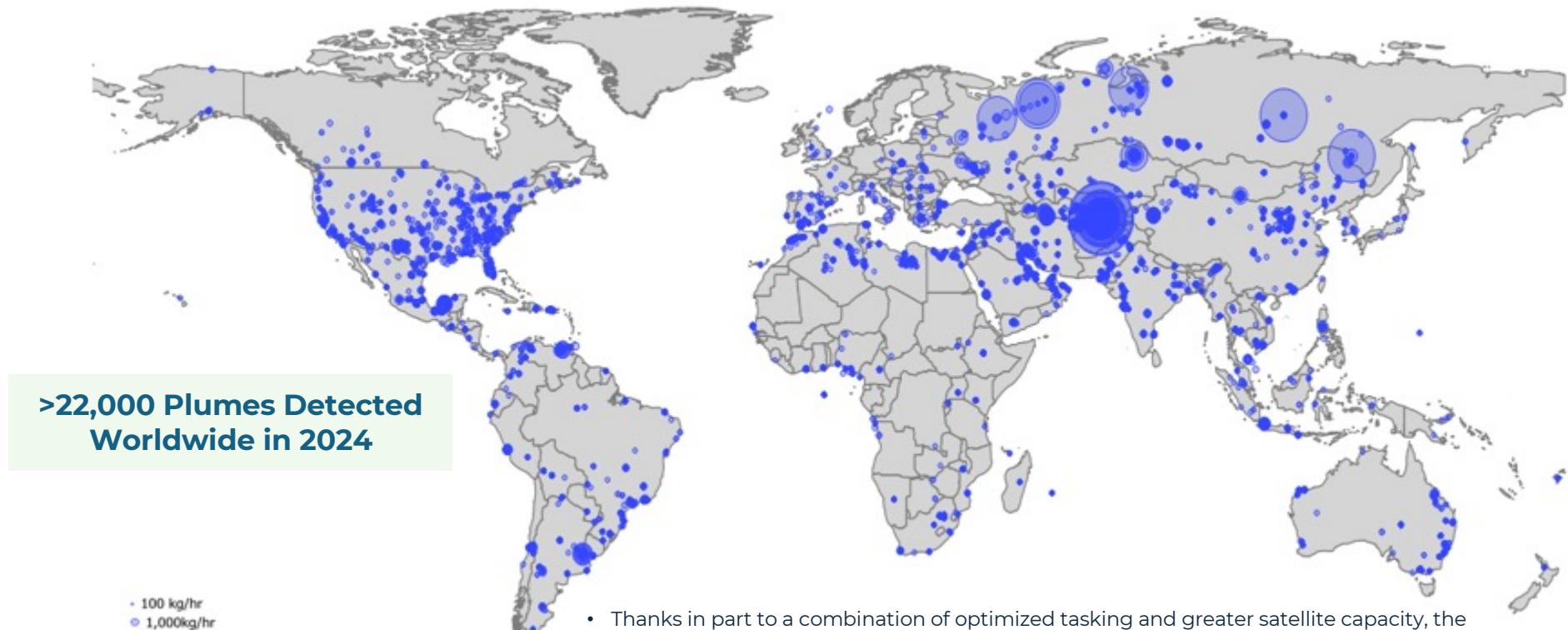
## Emission Intelligence for Markets



## Our Commitment

Bringing global transparency to greenhouse gas emissions, GHGSat is accelerating the decarbonization of our planet.

# METHANE DETECTIONS FROM GHGSAT SATELLITES: 2024

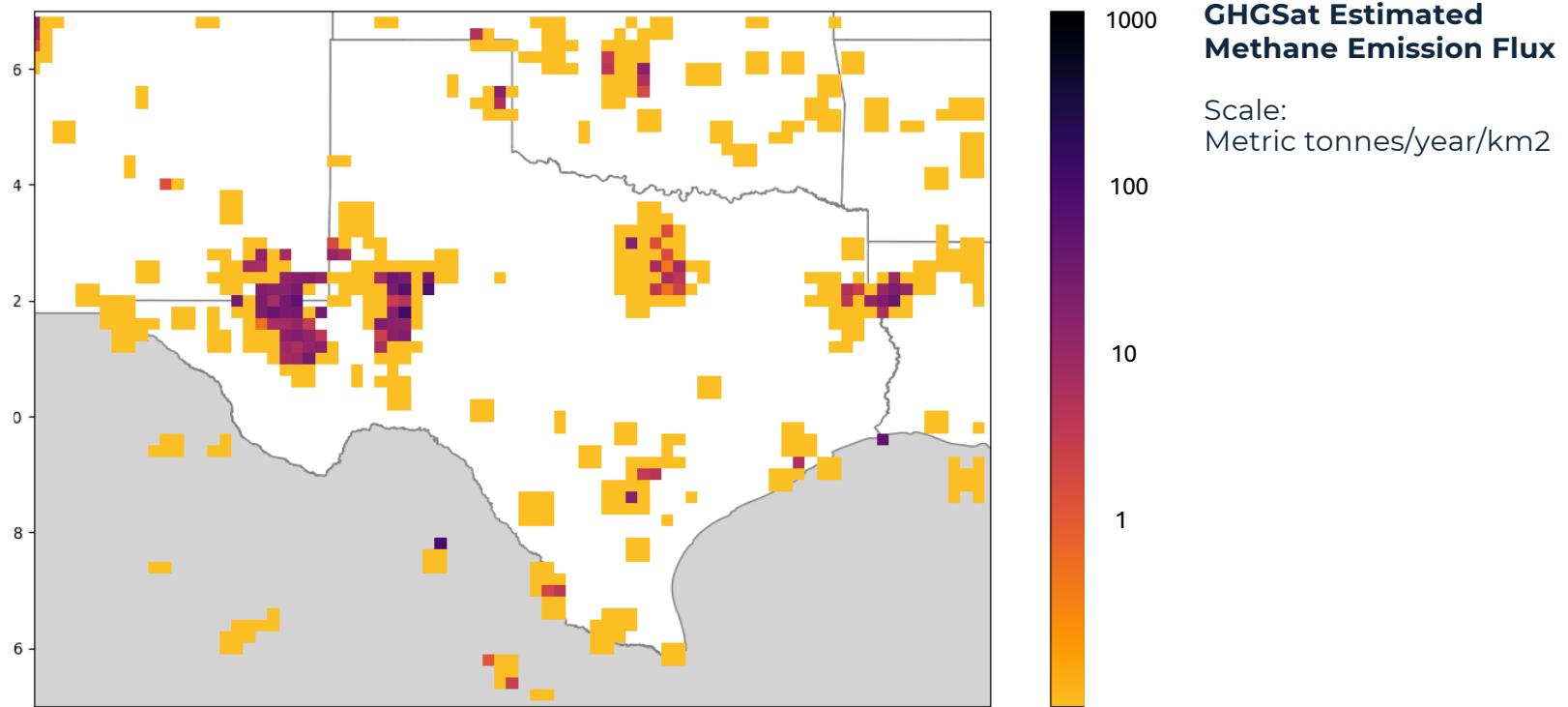


- Thanks in part to a combination of optimized tasking and greater satellite capacity, the CO<sub>2</sub>e total of **observed emissions increased by 40%** year on year.
- Our satellites also saw **emissions from a larger number of countries**, with detections from 110 countries in 2024, an **increase of 30%**.
- The **Oil & Gas sector accounted for the majority of total detected emissions, at 54%**, followed by **the Waste sector, at 29%**.

# Methane Emission Flux Estimate: Texas, 2023

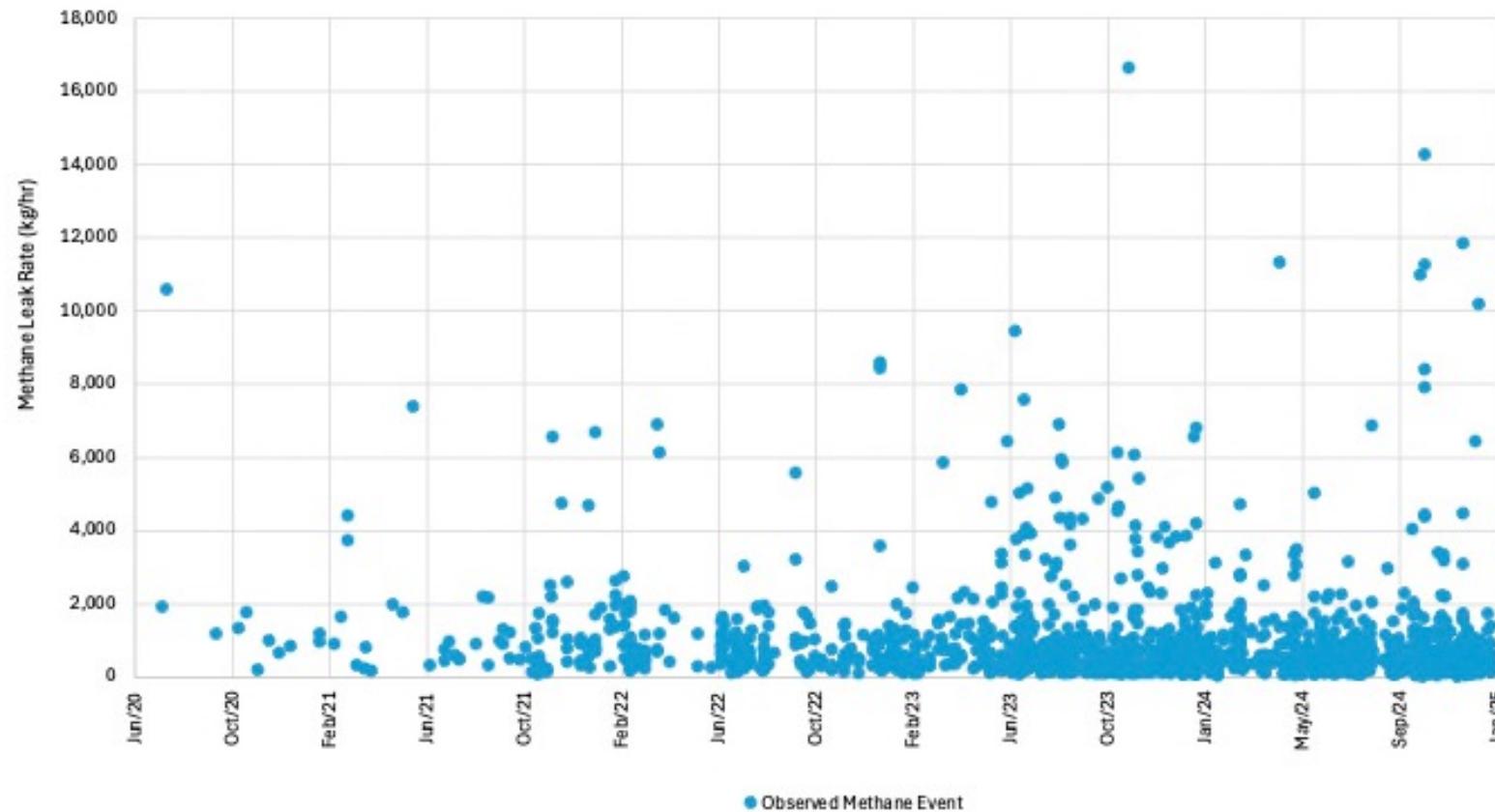
Methane Emissions Estimate from Satellite for Texas for 2023

- The figure below is an estimate from only the Oil & Gas sector.
- This emission flux estimate averages both observations with and without plumes at a given location (i.e., not just a simple sum or average of plume detections)
- Total annual emissions flux for Texas for 2023: approx. 0.5 Mt



## Leak Mitigation Opportunities in Permian Basin (Texas area)

Methane Emission Rates Observed in this region from 2020-2025; in kg/hr





**Product**

Column averaged CH<sub>4</sub> concentration in excess of local background

**Observation ID**

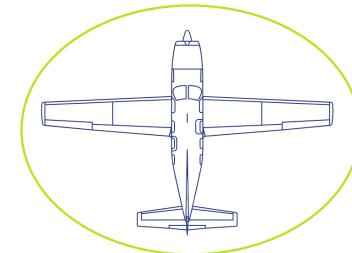
20241216T185402.782787Z-line321#frames\_002543-003141

**Sensor**

GHGSat AV-Gen2

**Background Source**

Colour image from AV auxiliary camera



Aerial Observation: California, Dec 2024  
Emission Rate: 35 kg/hr