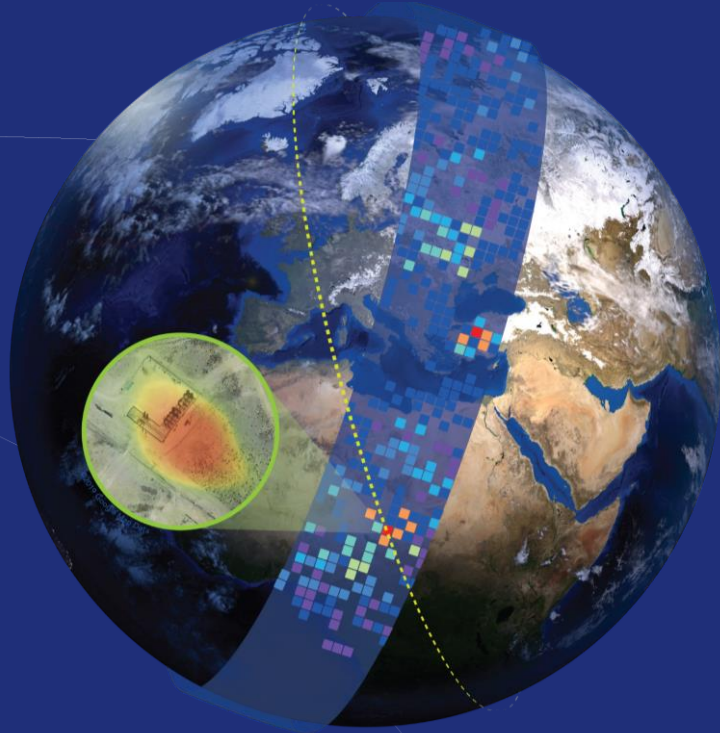




Satellite Data for Climate Change Decision Making: Measuring Greenhouse Gas Emissions and Air Quality Co-Benefits

HAQAST Massachusetts

Eric Choi
Director of Business Development
GHGSat

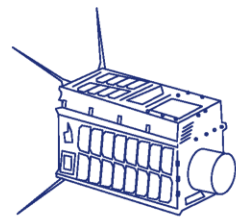
June 5, 2024

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.

2020
IRIS
First commercial satellite delivering 10 x better performance.



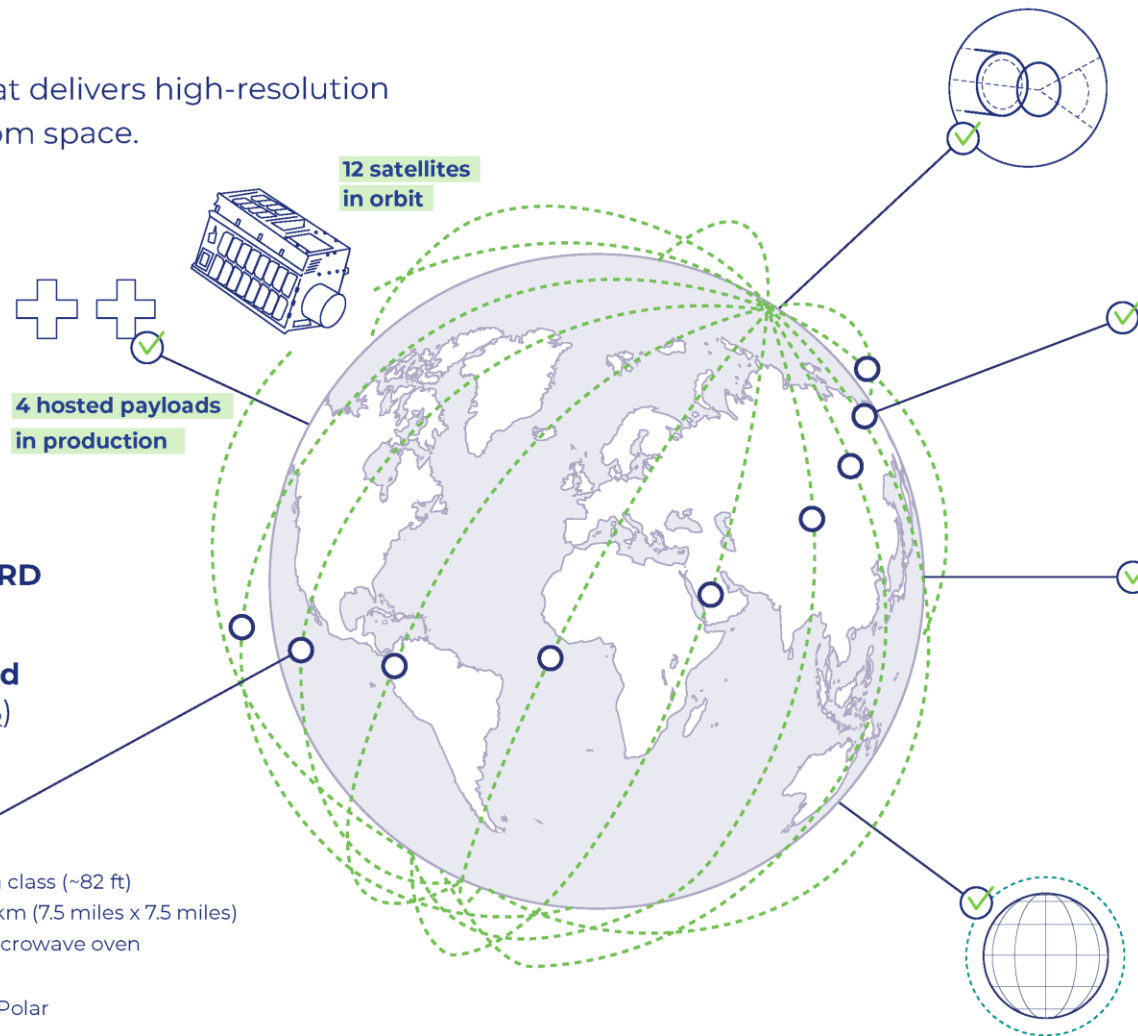
2021
HUGO

2022
LUCA, PENNY and DIAKO

2023
MEY-LIN, GASPARD and OCÉANE
ELLIOT, JUBA and VANGUARD (CO₂)

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

Oil & Gas	Coal Mining	Waste Management
Environmental Services	Agriculture	Financial Services
Governments and Regulators		

Our Commitment

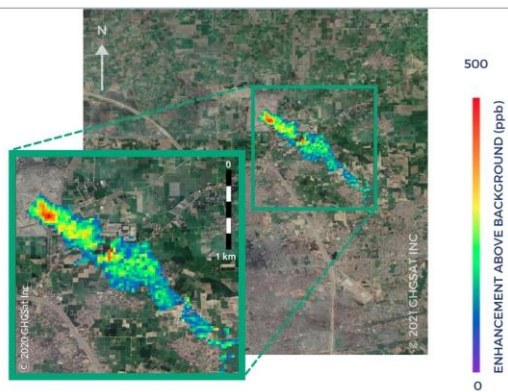
Bringing global transparency to greenhouse gas emissions, GHGSat is accelerating the decarbonization of our planet.



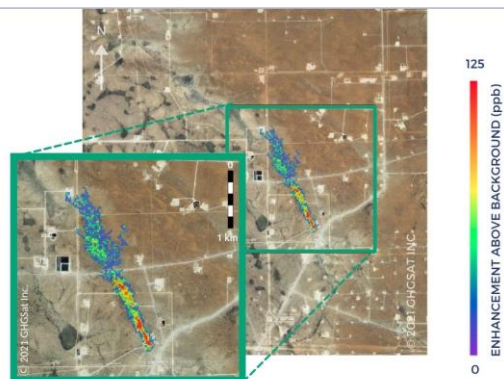
EXAMPLES OF GHGSAT SATELLITE OBSERVATIONS

Oil and gas, landfills, coal mines, and much more

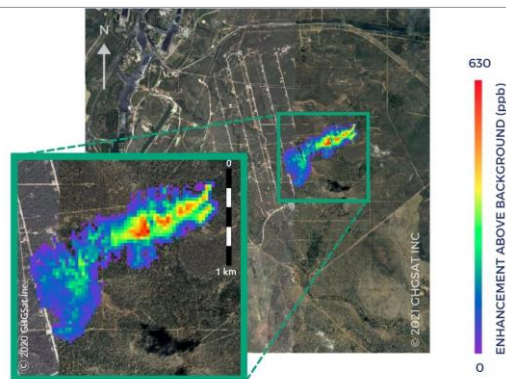
Landfill - Asia
CH₄ Measurement



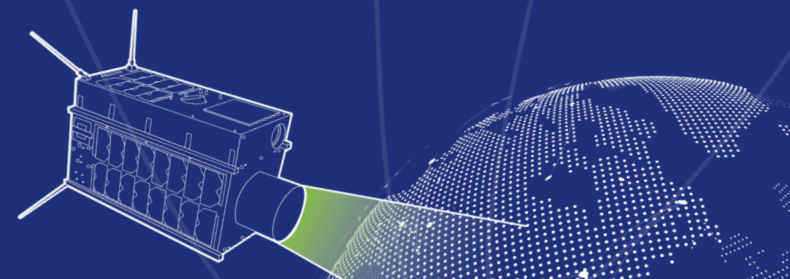
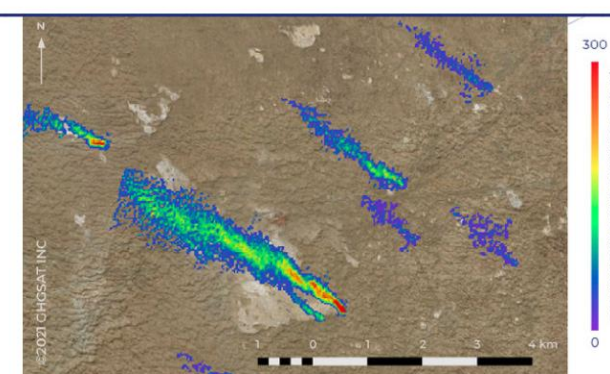
O&G - USA
CH₄ Measurement



Coal Mine - Australia
CH₄ Measurement

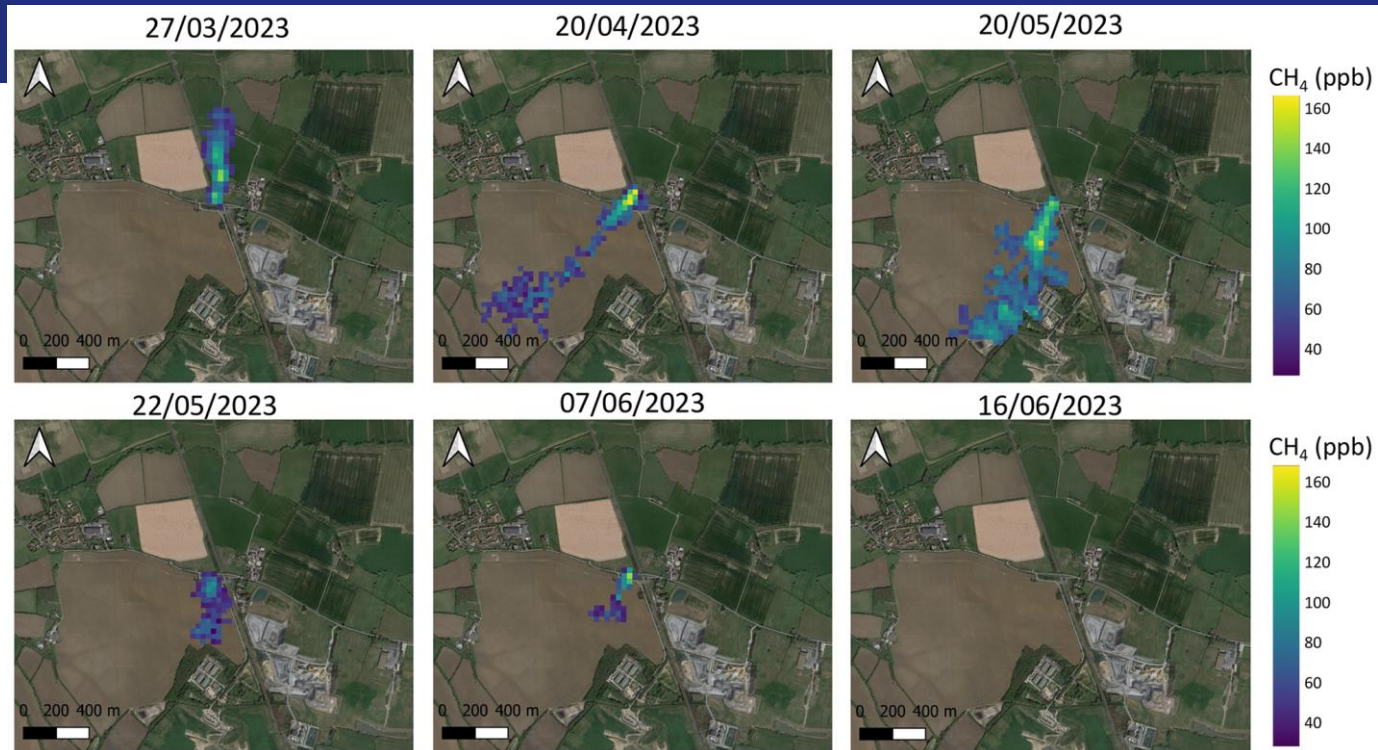


O&G - Central Asia
CH₄ Measurement



CASE STUDY

Major pipeline leak at Wales and West Utilities (United Kingdom)



“Satellites are getting smaller and more powerful, giving us an ideal vantage point from which to monitor global greenhouse gas emissions and inform decision-making on the path to Net Zero.”

- Dr. Paul Bate, CEO of UK Space Agency

<https://amt.copernicus.org/articles/17/1599/2024/>
<https://www.bbc.com/news/science-environment-66811312>

BBC

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Major UK methane greenhouse gas leak spotted from space

16 September 2023

By Esme Stallard, Climate and science reporter, BBC News

[Share](#)

A major UK leak of the extremely potent greenhouse gas methane has been spotted from space for the first time.

The leak - seen by satellite - occurred over a three-month period at a gas main operated by Wales and West Utilities. The amount leaked could have powered 7,500 homes for a year.

Emily Dowd, a PhD researcher at the university's School of Earth and Environment and the National Centre for Earth Observation, had been using satellite imagery to assess methane leaks from landfill sites.

But she noticed on the images the distinct marker of a methane leak some miles away, coming from a gas pipeline owned by Wales and West Utilities.

Identifying and tackling methane emissions is a crucial objective of the UK and other countries seeking to tackle climate change.

Upon discovering the leak Ms Dowd worked with GHGSat - whose satellites provided the original images - to take further surveys from space, while a team from Royal Holloway University of London made on-the-ground mobile measurements.

Wales and West Utilities said they became aware of the leak after a member of public reported the smell of gas. They said they were in the process of obtaining the necessary permissions for replacing the gas mains when the leak was picked up by satellite.

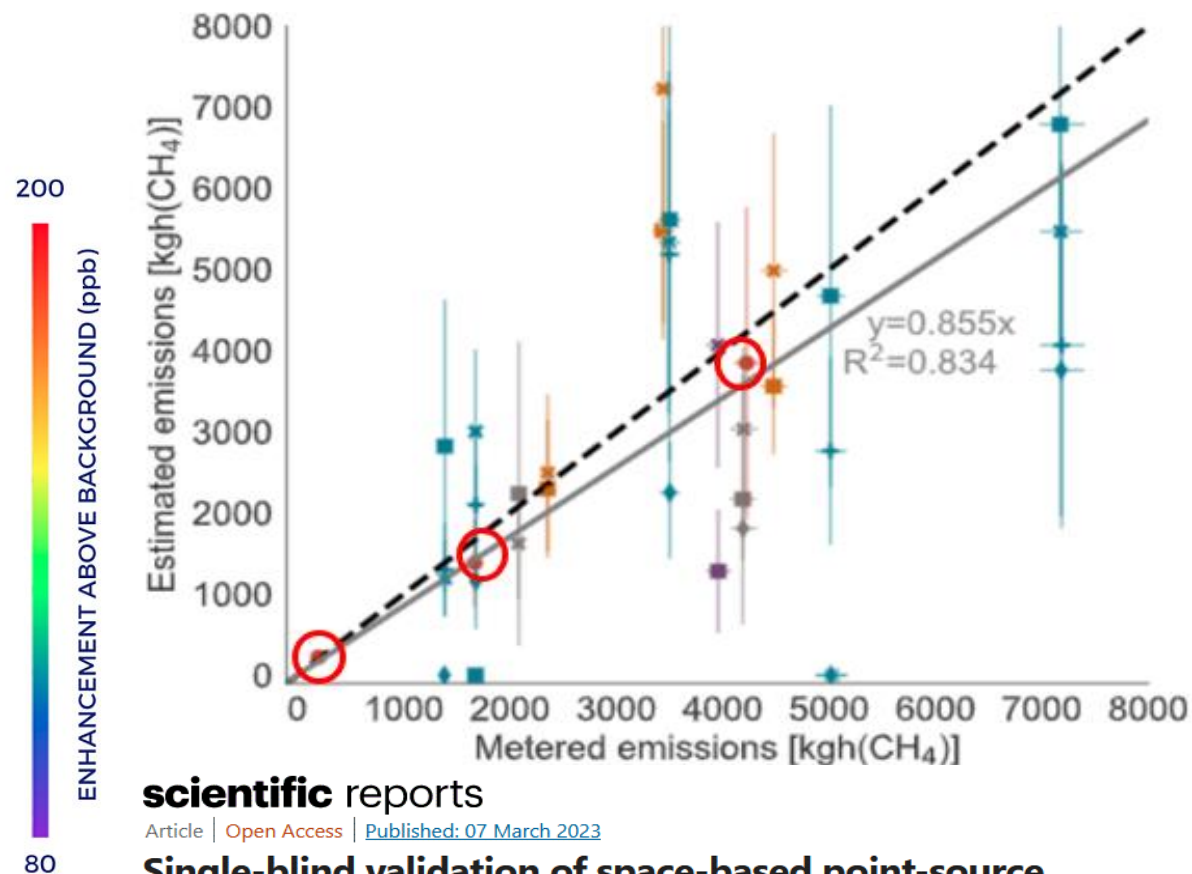
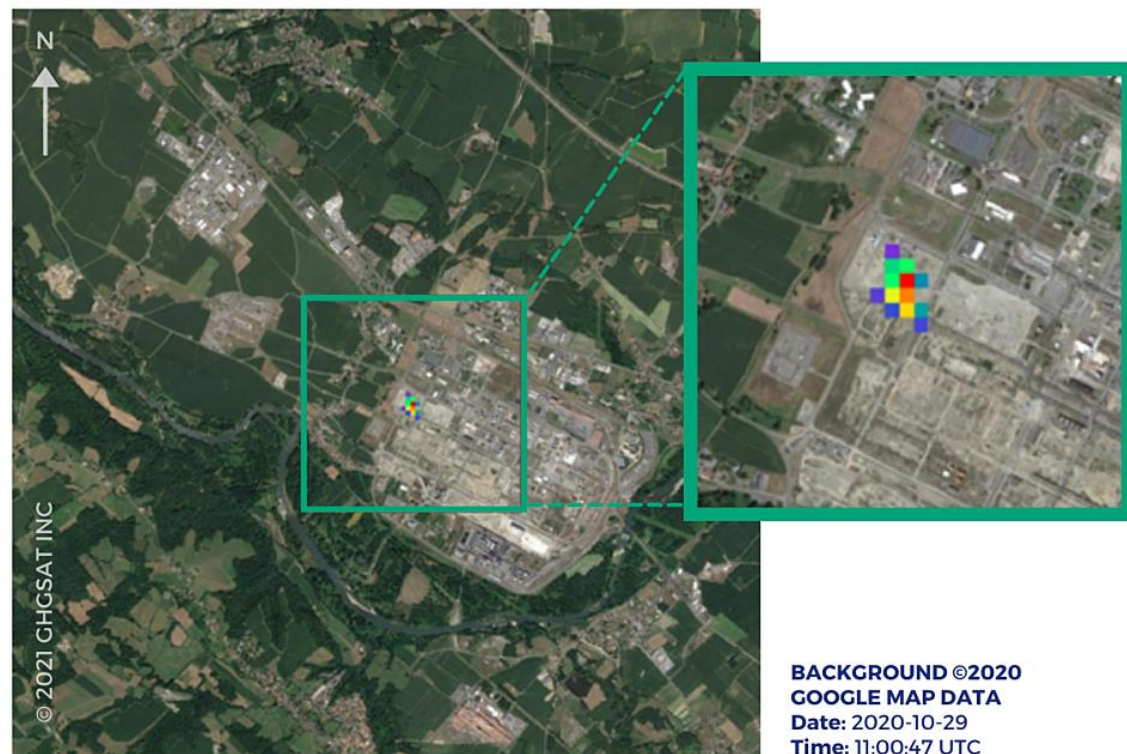


VALIDATED PERFORMANCE

Accuracy and detection threshold confirmed in single-blind trials

Satellite CH₄ Measurement

Controlled Release - France



scientific reports

Article | [Open Access](#) | [Published: 07 March 2023](#)

Single-blind validation of space-based point-source detection and quantification of onshore methane emissions

[Evan D. Sherwin](#) , [Jeffrey S. Rutherford](#), [Yuanlei Chen](#), [Sam Aminfard](#), [Eric A. Kort](#), [Robert B. Jackson](#) & [Adam R. Brandt](#)

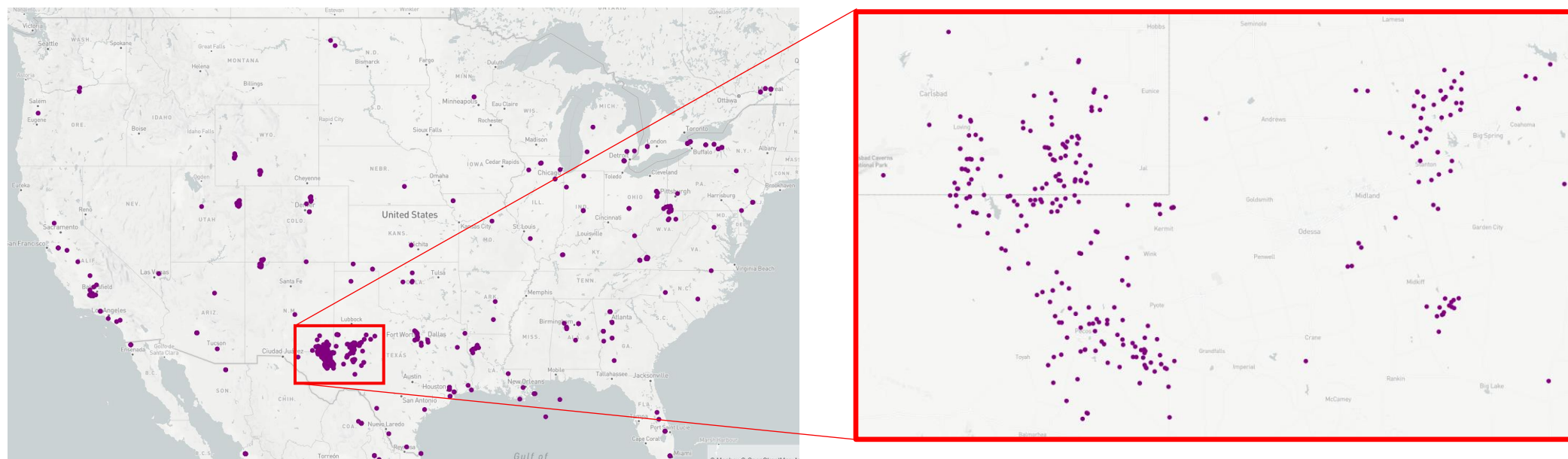
[Scientific Reports](#) **13**, Article number: 3836 (2023) | [Cite this article](#)

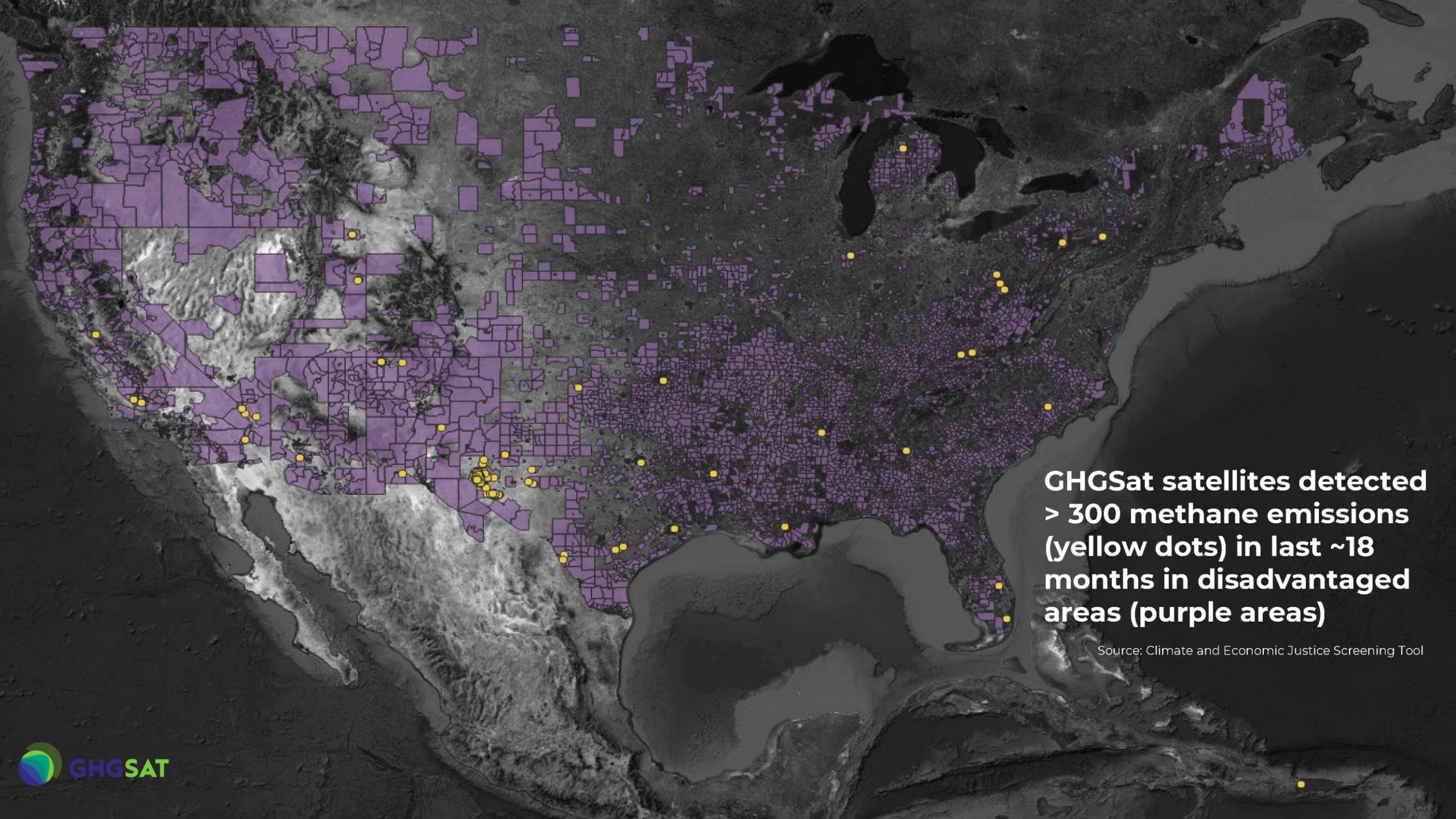


U.S. OBSERVATION STATISTICS

November 1 to December 14, 2023 (Annual totals for 2023)

- 838 successful observations (4,592)
 - Adding up to 255,000 square miles ~ Size of Texas
- 84 observations with plumes – >15% of the time (687)
- 146 plumes total, up to 12 plumes in a single observation (1,137)
- Observations – and plumes measured – are increasing with the size of the constellation





**GHGSat satellites detected
> 300 methane emissions
(yellow dots) in last ~18
months in disadvantaged
areas (purple areas)**

Source: Climate and Economic Justice Screening Tool



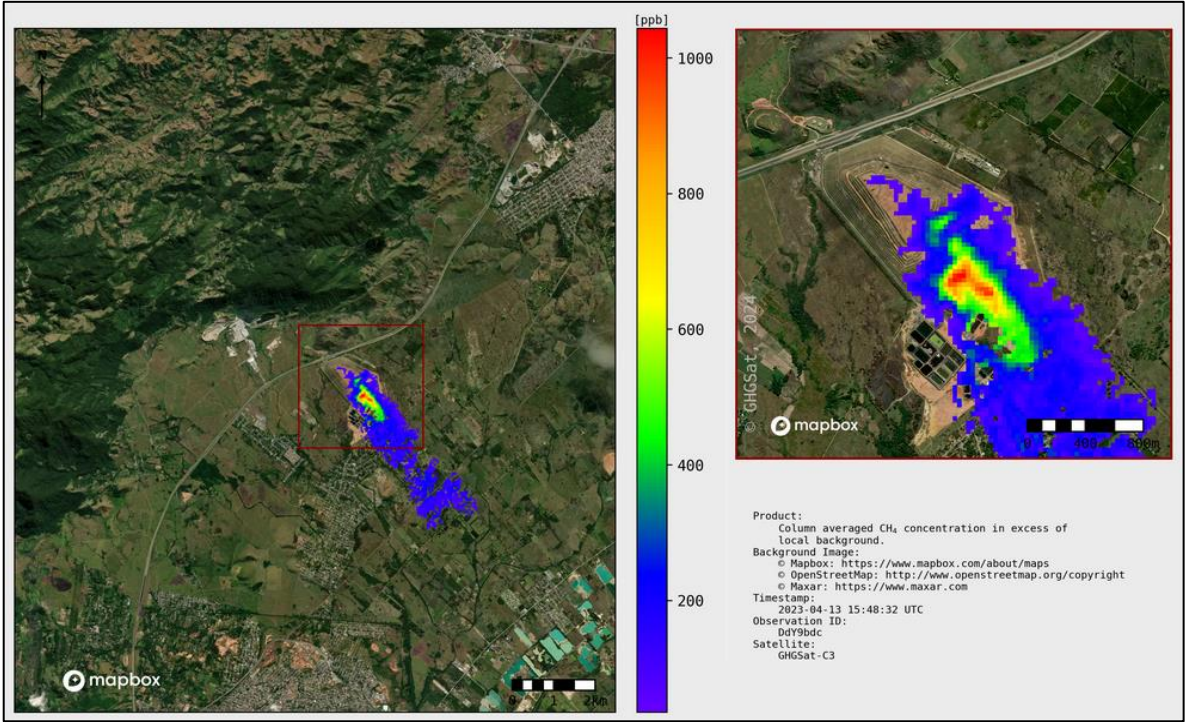
NASA COMMERCIAL SMALLSAT DATA ACQUISITION

GHGSat data available soon following successful completion of CSDA evaluation

- GHGSat data will soon be available through the NASA Earthdata portal following a rigorous year long CSDA evaluation process
- Evaluation criteria for CSDA assessment:
 - ✓ Utility of the data for advancing Earth system science research (primary criteria)
 - ✓ Quality of the data
 - ✓ Quality of user support services
- GHGSat data is already available through the ESA Third Party Missions (TPM) program and the U.K. Satellite Applications Catapult

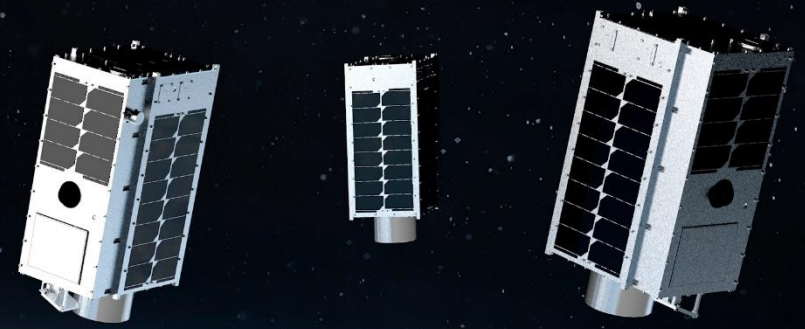


<https://www.earthdata.nasa.gov/esds/csda/commercial-datasets>



PI	Institution	Project Description
Clayton Elder	NASA JPL	Evaluating GHGSat methane datasets with respect to EMIT methane plume data
Ben Poulter	NASA Goddard	Evaluating GHGSat for monitoring natural ecosystem methane fluxes
Max Krause	EPA	Evaluating uncertainty of remote sensing landfill methane emission assessments
Daivda Streett	NOAA	Evaluating GHGSat data offshore in the Gulf of Mexico
John Worden	NASA JPL	Evaluating GHGSat plume data for updating CH ₄ emission inventories and trends
Nicolay Balashov	NASA Goddard	Evaluation of GHGSat point source quantification in an urban environment
Danielle Wood	MIT	Assessing accuracy of greenhouse gas emission inventories in a multi-municipality metropolitan area

Thank You! Questions?



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