ADVANCING METHANE EMISSIONS OBSERVATIONS IN EUROPE

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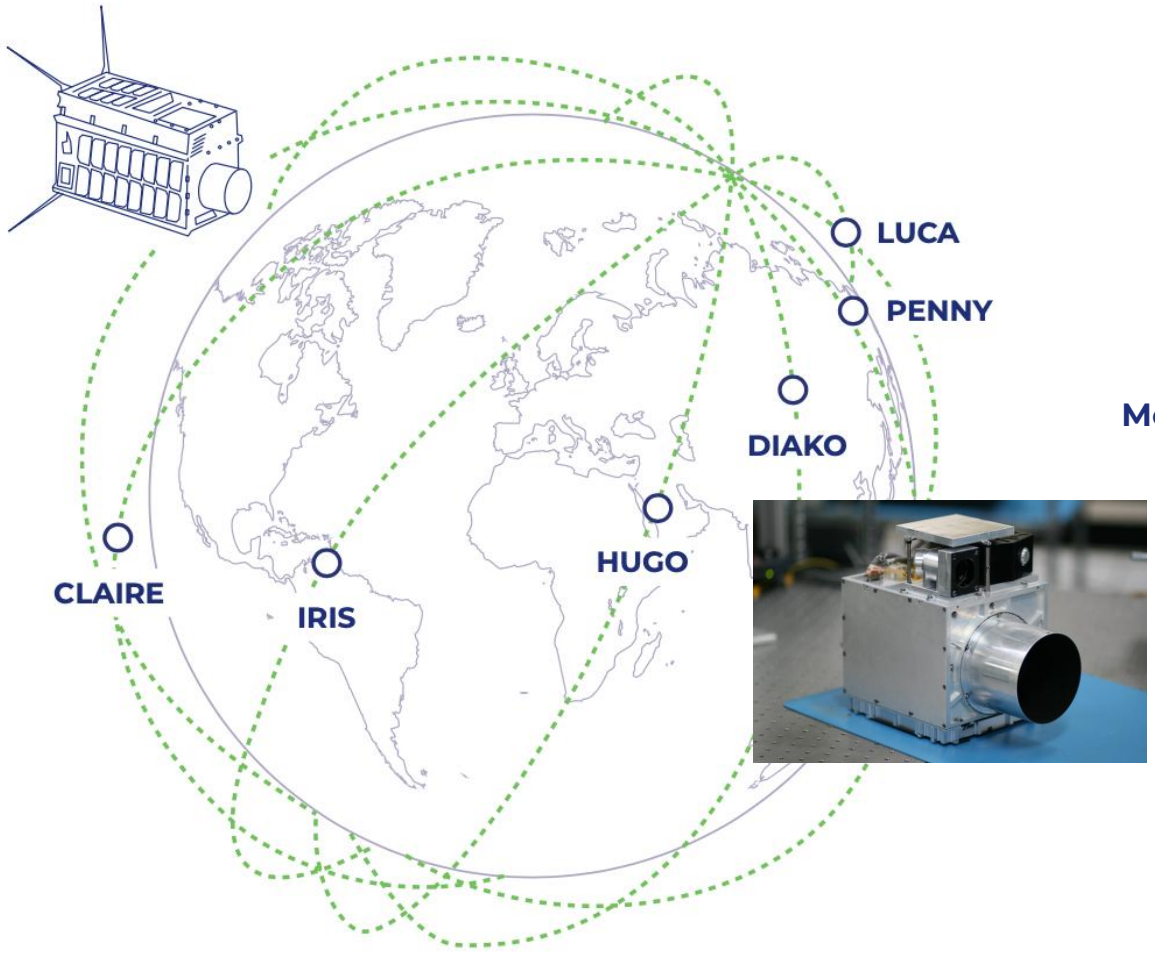
9th December 2025

GHGSAT - OPERATIONAL CONSTELLATION

Worlds Largest Dedicated CH4 emission detecting satellite constellation



	2023	2024	2025	2026
Satellites in orbit	6	10	15	18
Facility Measurements per Year	1M+	3M+	5M+	8M+

- Measures facilities **anywhere** in the world
- Daily revisit in 2025, **sub daily** by 2026
- **6h delivery** time
- Can detect **CH4** as low as **100kg/h**

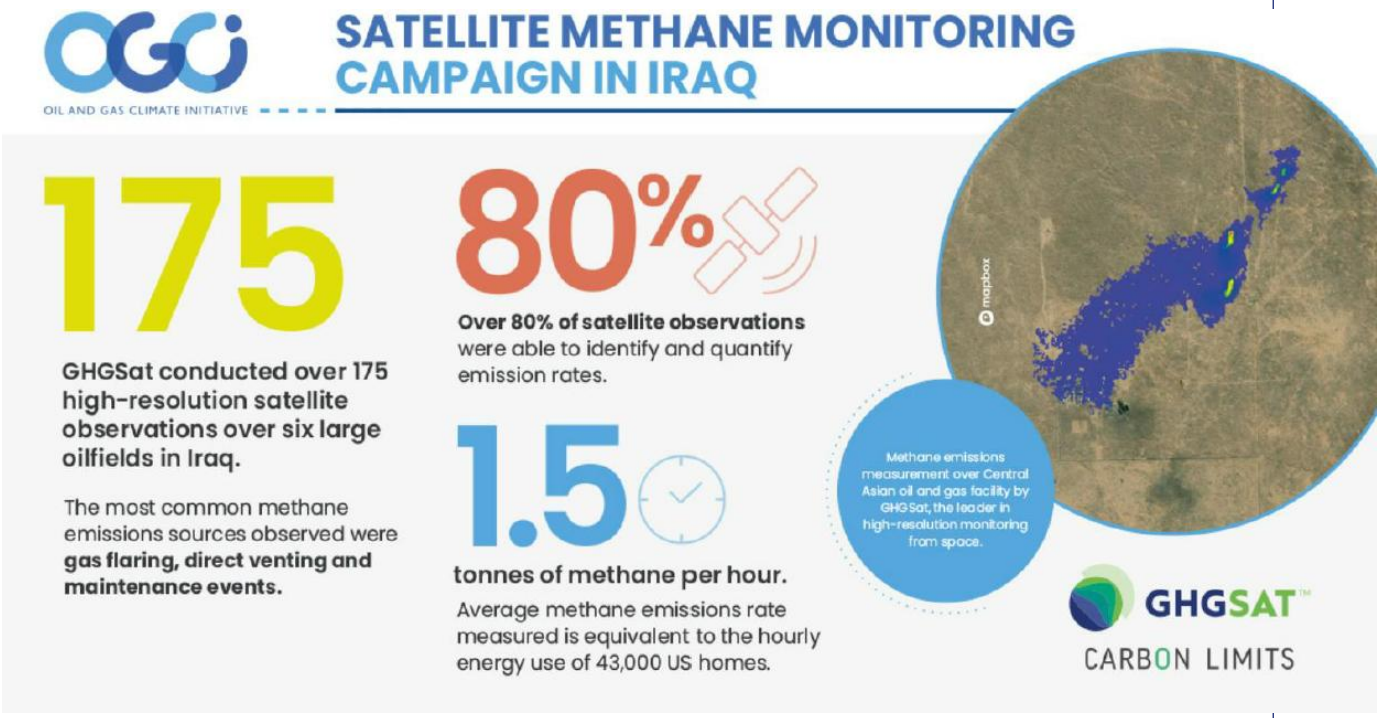
GHGSAT – MODEL OF COLLABORATION

Collaboration as fastest way to enable investigations & mitigations

- **With the research community**
  - SRON
  - University of Amsterdam (VU)
  - University of Leicester
  - Harvard University

- **With Space Agencies**
  - European Space Agency (ESA)
  - UK Space Agency (UKSA)
  - NASA

- **With Institutional Partners**
  - European Commission (via CCM)
  - UNEP IMEO
  - German Government
  - UK Government
  - OGCI, CATF, CARBON LIMITS

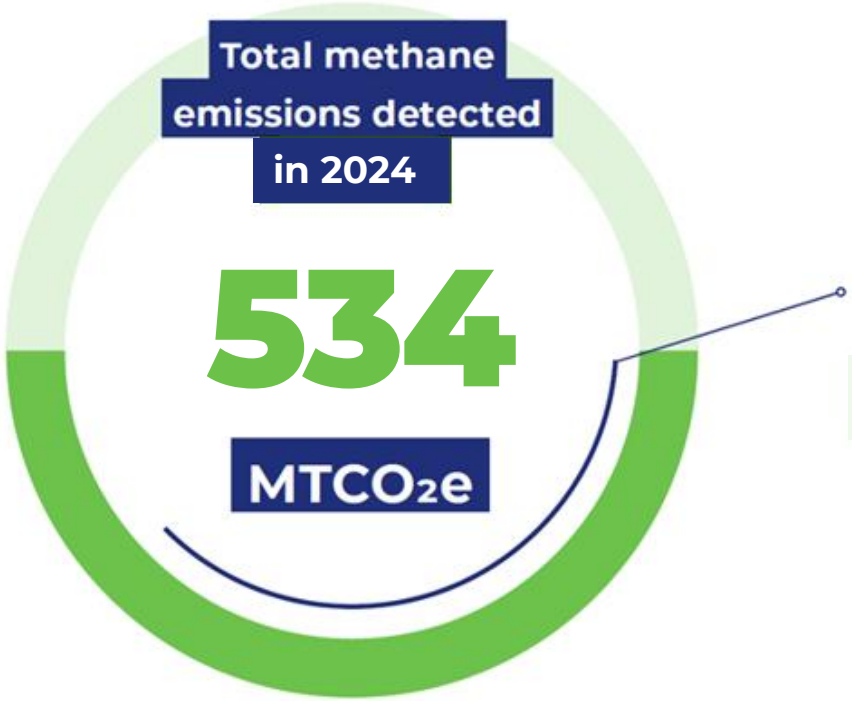


umweltbundesamt

Federal Agency for Cartography and Geodesy

Government of Canada · UN environment programme · NOAA · European Commission · GMP Oil And Gas Methane Partnership 2.0 · esa · UK SPACE AGENCY · NASA · CATF CLEAN AIR TASK FORCE · Australian Government · Environment Agency · KSAT KONGSBERG SATELLITE SERVICES · HARVARD UNIVERSITY

OUR METHANE EMISSIONS SNAPSHOT: 2024



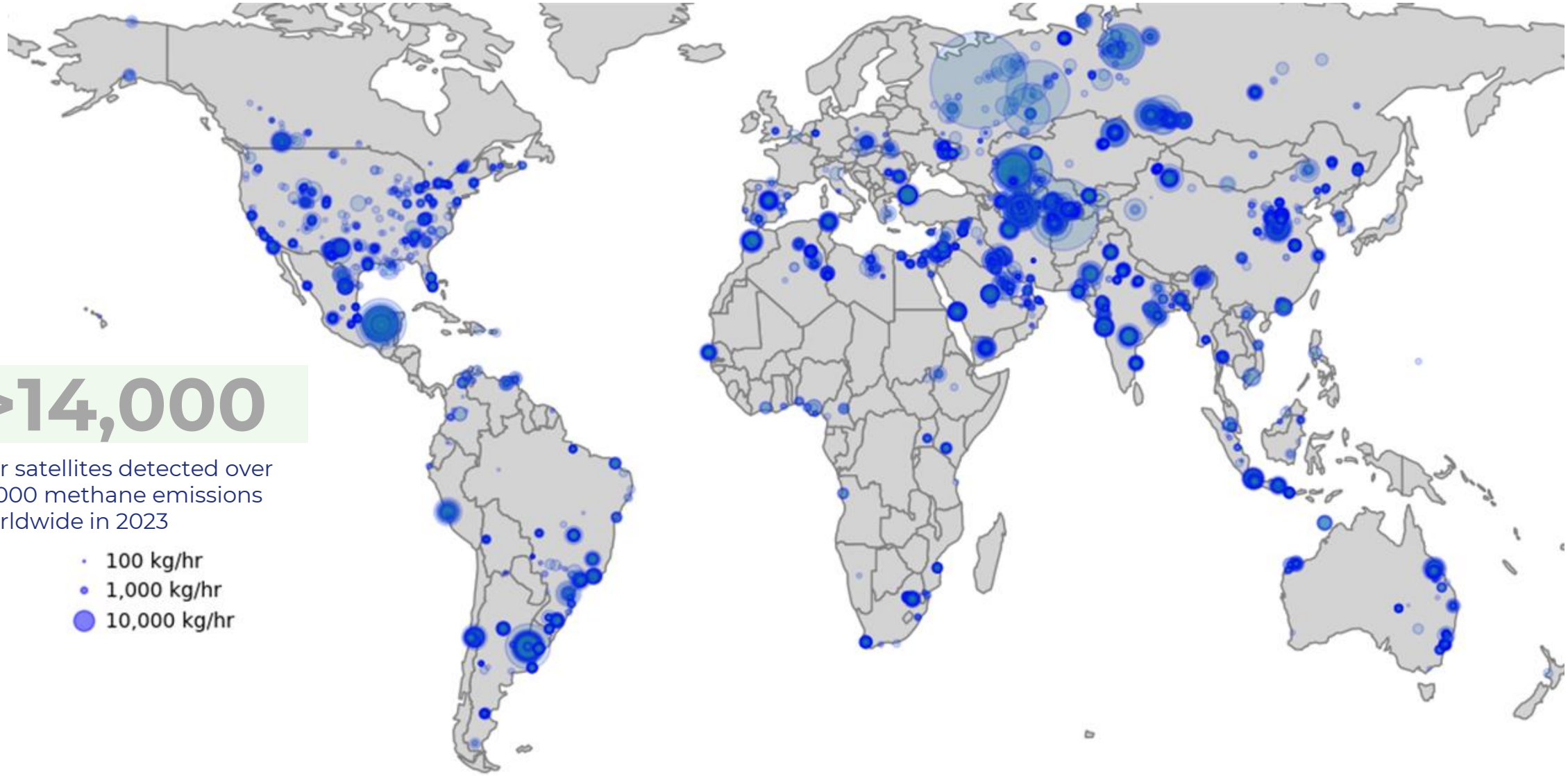
40%

Increase on 2023

Proportion of 2024 Emissions Detected

Oil & Gas	54%
Coal	13%
Landfill	29%
Other	3%

METHANE DETECTIONS FROM GHGSAT SATELLITES: 2023



>14,000

Our satellites detected over 14,000 methane emissions worldwide in 2023

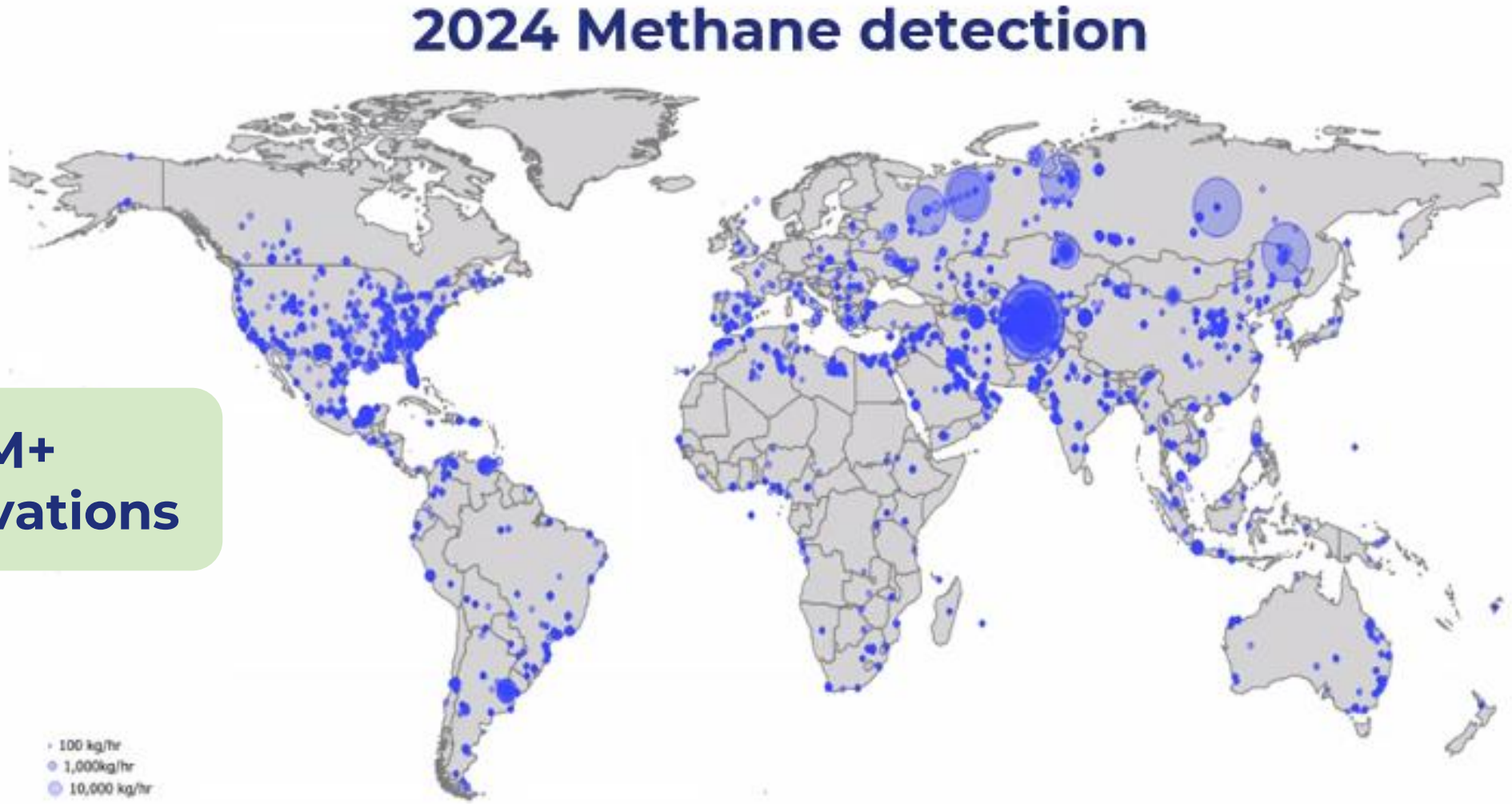
GHGSAT™

Reduce emission risk.
Increase business profitability.

GHGSAT – CAMPAIGNS RESULTS

What did we see in 2024?

3M+ Observations



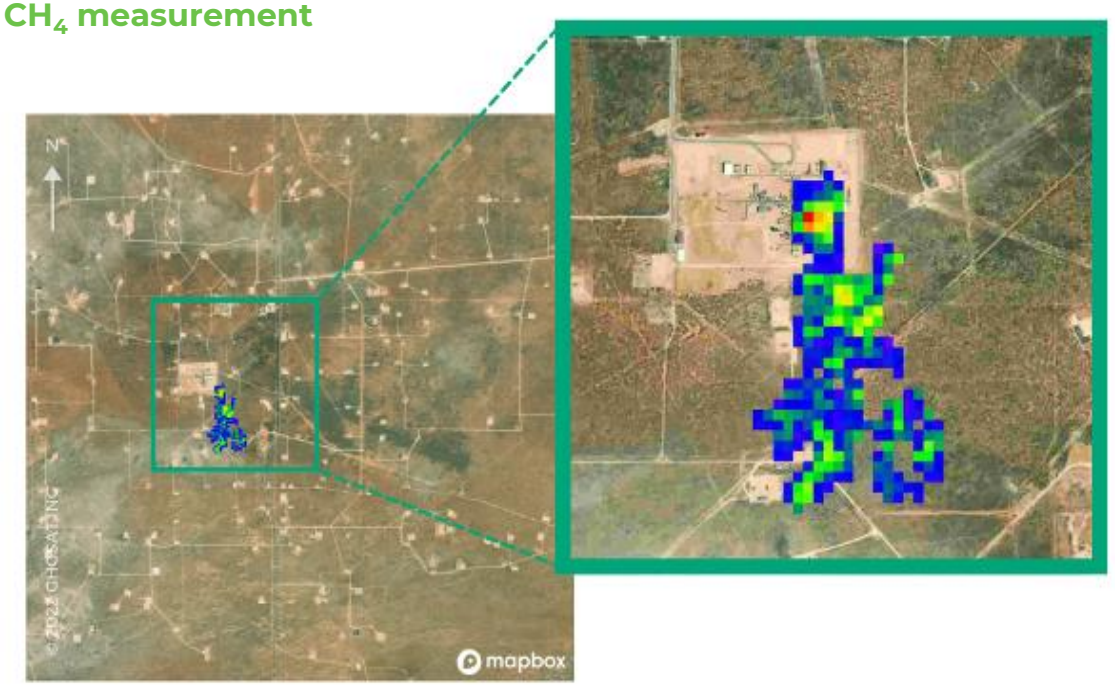
> 20,000 detected plumes

Data.SAT

Satellite monitoring with DATA.SAT

Delivers facility-level emissions data fast so you can reduce risks and meet emissions regulatory reporting requirements and goals.

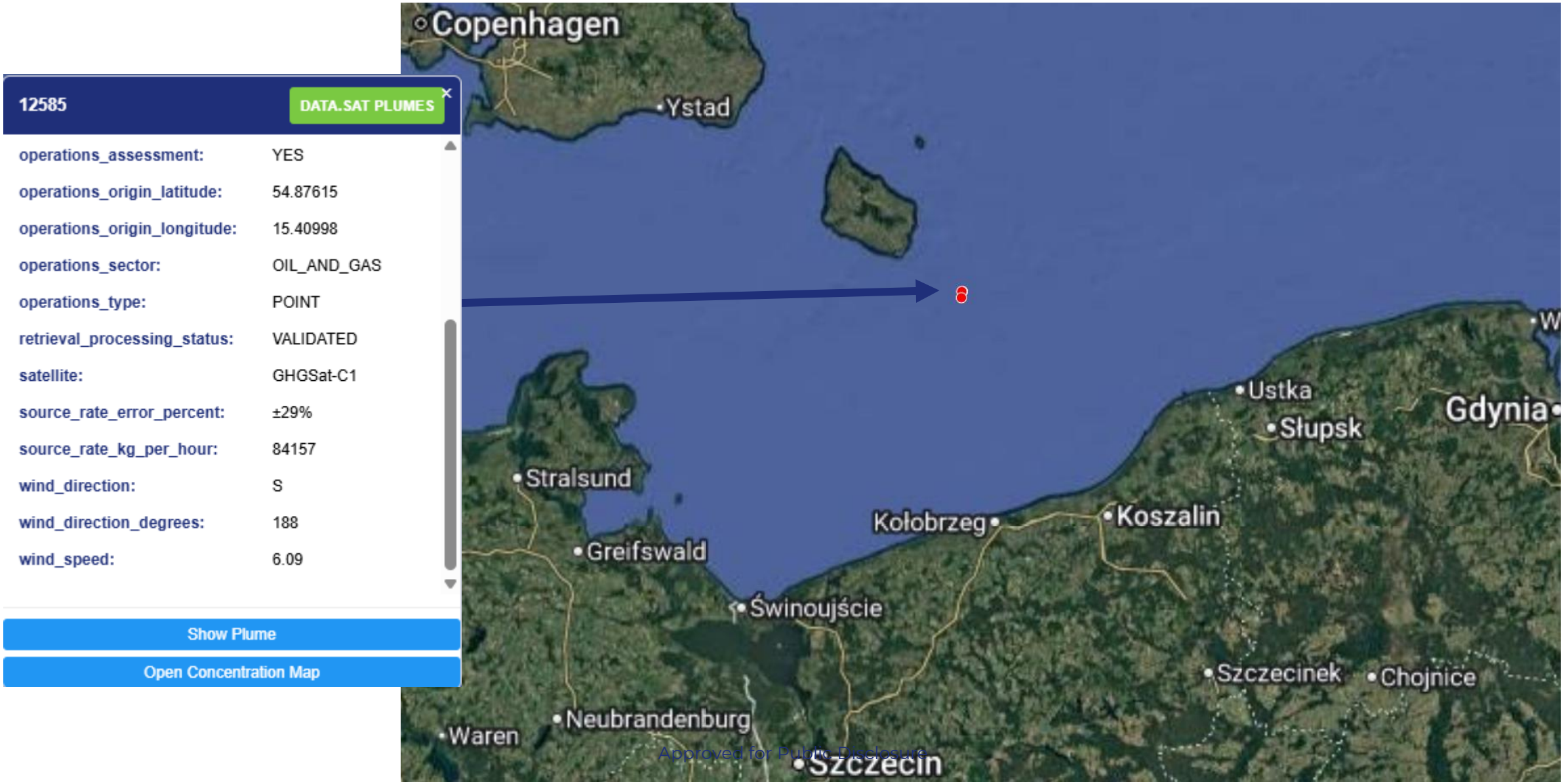
Satellite
CH_4 measurement



- Detection minimum threshold of 100 kg/hr
- Revisit time: 1-2 days
- Spectrometer type: Short-wave infrared
- Gases measured: CH4
- Image size: 12km x 12km
- Spatial resolution : 25m

GHGSAT – GERMANY OBSERVATIONS EXAMPLES

Nordstream Incident



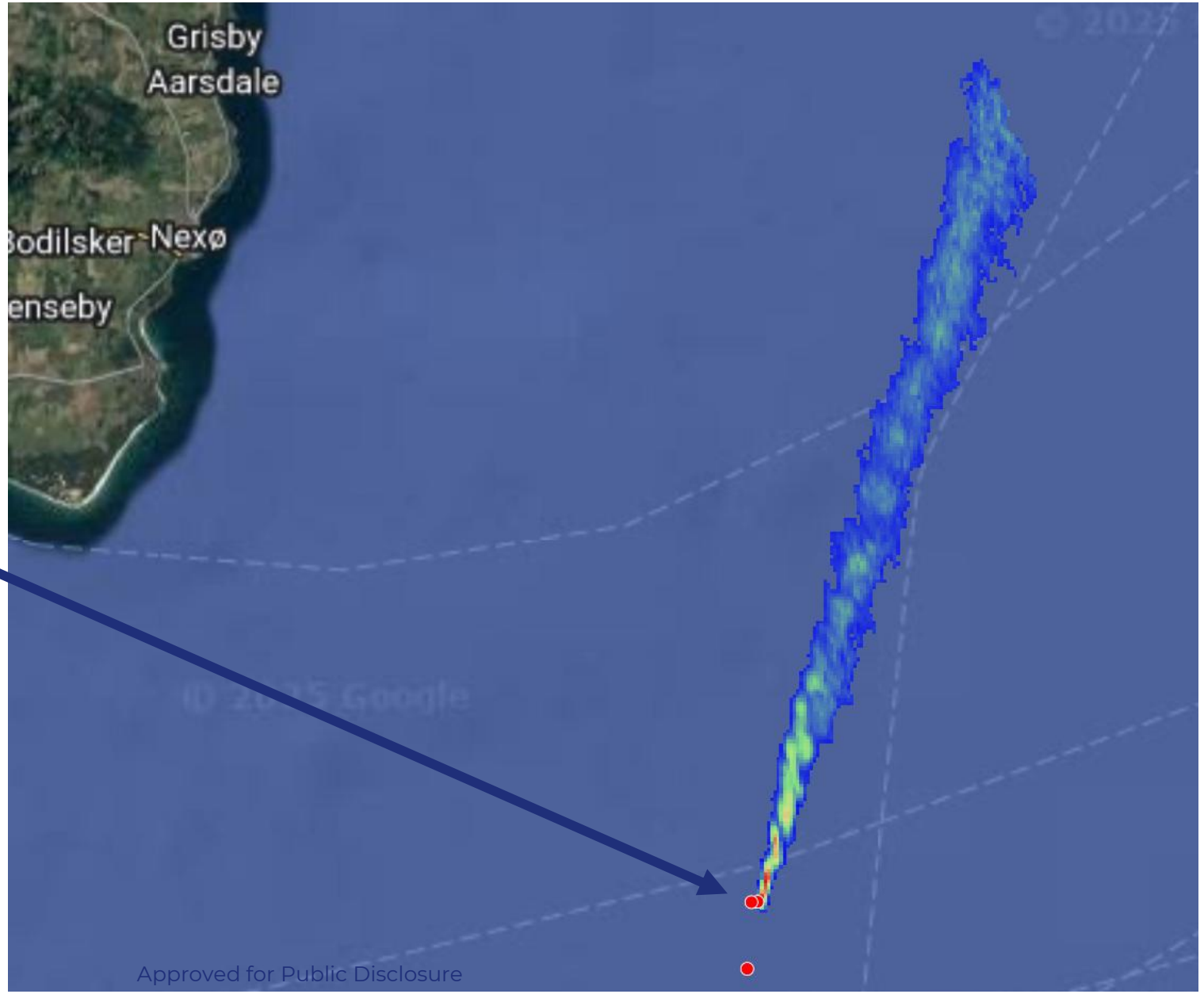
GHGSAT – GERMANY OBSERVATIONS EXAMPLES

Nordstream Incident

12585	DATA.SAT PLUMES
operations_assessment:	YES
operations_origin_latitude:	54.87615
operations_origin_longitude:	15.40998
operations_sector:	OIL_AND_GAS
operations_type:	POINT
retrieval_processing_status:	VALIDATED
satellite:	GHGSat-C1
source_rate_error_percent:	±29%
source_rate_kg_per_hour:	84157
wind_direction:	S
wind_direction_degrees:	188
wind_speed:	6.09

Show Plume

Open Concentration Map



GHGSAT – GERMANY OBSERVATIONS EXAMPLES

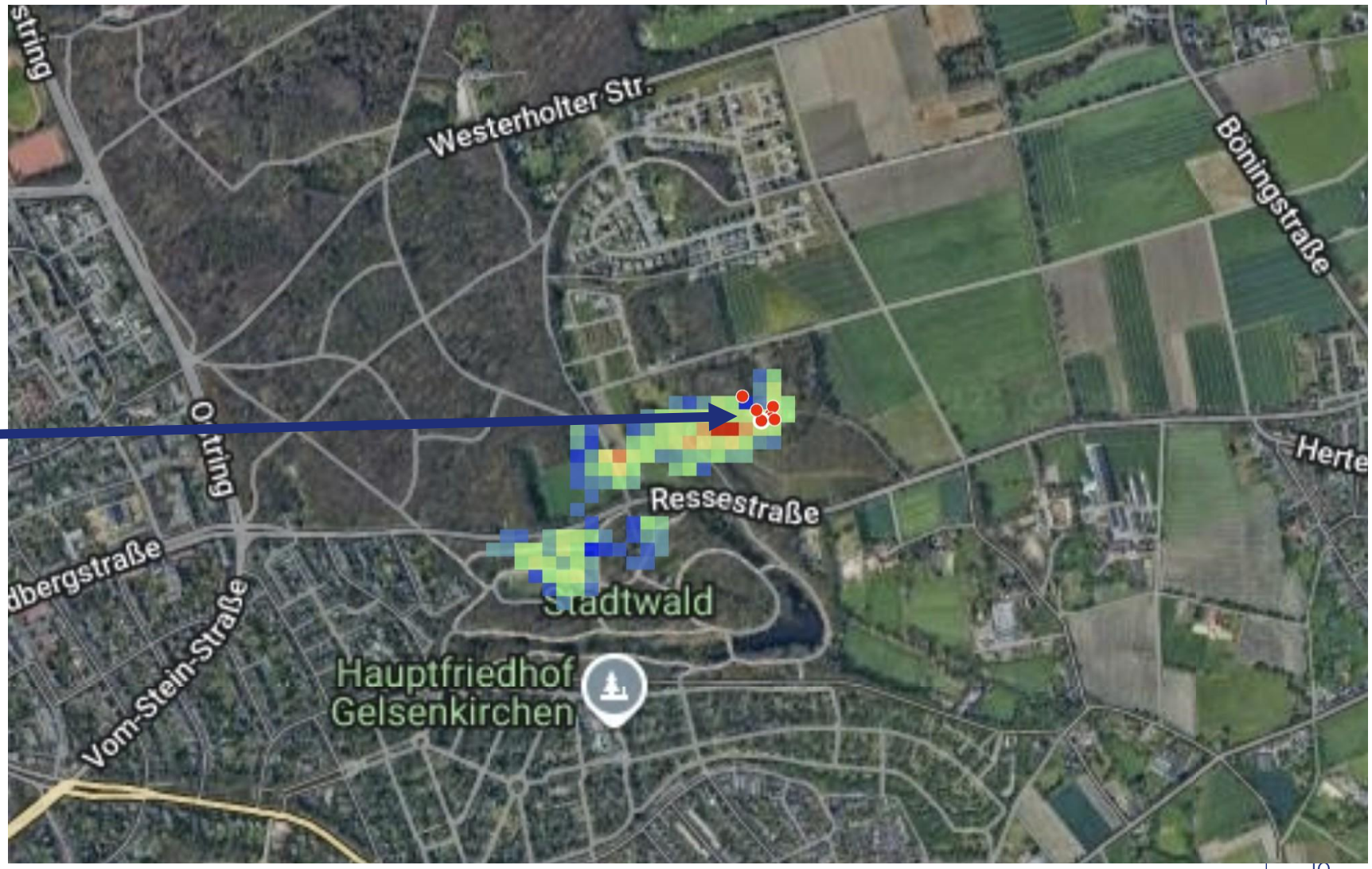
Stadwald, Northern Germany

16538	DATA.SAT PLUMES
operations_assessment:	YES
operations_origin_latitude:	51.58221173
operations_origin_longitude:	7.0836488
operations_sector:	OIL_AND_GAS
operations_type:	POINT
retrieval_processing_status:	VALIDATED
satellite:	GHGSat-C6
source_rate_error_percent:	±40%
source_rate_kg_per_hour:	971
wind_direction:	ENE
wind_direction_degrees:	60.58
wind_speed:	3.55

Hide Plume

Open Concentration Map

Show Automatic Origin Region



GHGSAT – GERMANY OBSERVATIONS EXAMPLES

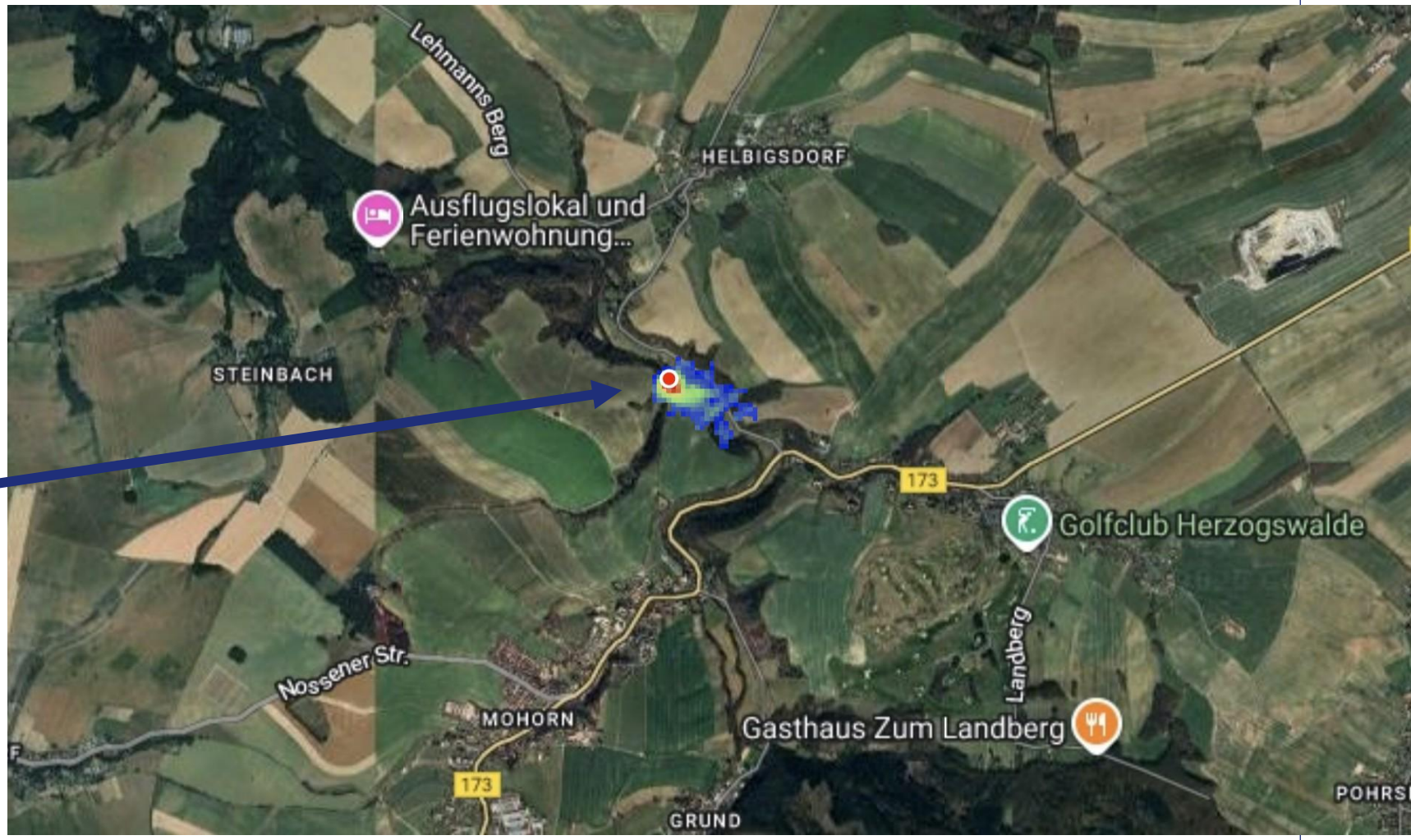
Near Dresden, Eastern Germany

4353	DATA.SAT PLUMES
operations_assessment:	YES
operations_origin_latitude:	51.01804
operations_origin_longitude:	13.46883
operations_sector:	OIL_AND_GAS
operations_type:	POINT
retrieval_processing_status:	VALIDATED
satellite:	GHGSat-C2
source_rate_error_percent:	±43%
source_rate_kg_per_hour:	1376
wind_direction:	NW
wind_direction_degrees:	326
wind_speed:	2.9

Show Plume

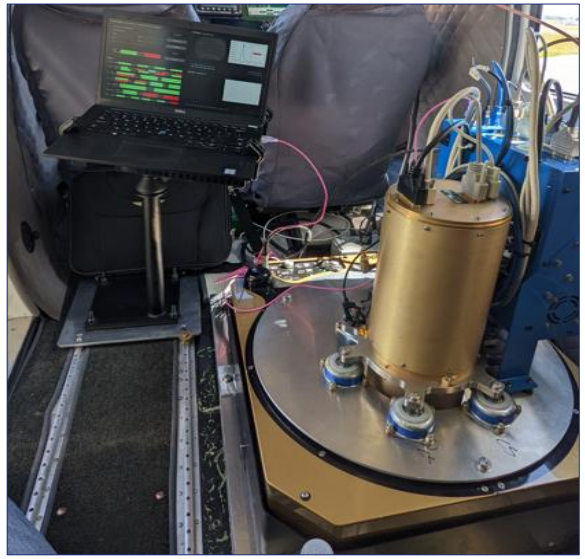
Open Concentration Map

Show Automatic Origin Region



AIRCRAFT PROVIDERS

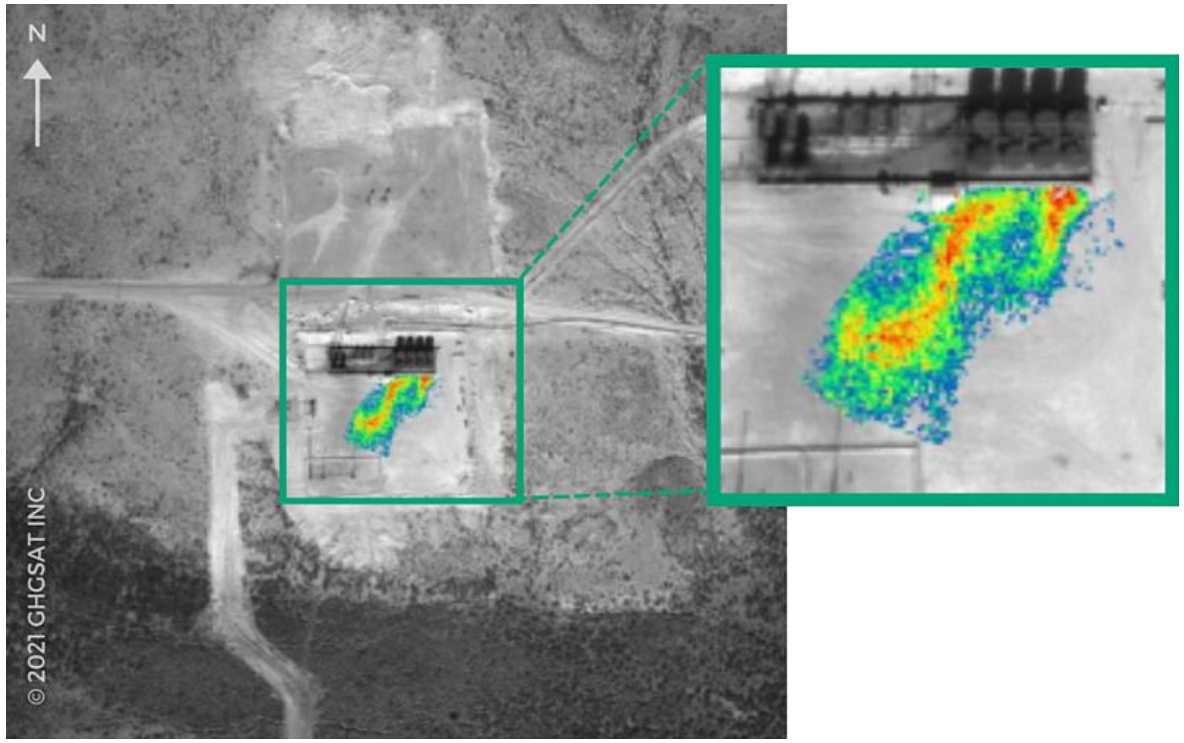
- Preferred operator in Europe (Bioflight is in Roskilde, Denmark)
- Primary plane is Partenavia P.68, now Vulcanair P68, and always keeps a plane on standby.



Data.AIR

Aircraft monitoring with DATA.AIR

Empowering you to quickly assess specific facilities, investigate potential emission sources, and effectively prioritize remediation efforts.



- Minimum detection threshold of ~5-10 kg/hr
- Flight altitude: 3,000m above ground level (AGL)
- Spatial resolution (GSD) <1 m (<3 ft), altitude dependent
- Gases measured: CH4
- 500m swath width, >350km2/day

GHGSAT

KEY TAKEAWAYS

METHANE EMISSIONS ARE A KEY EARLY INDICATOR OF POTENTIAL ACTIVITY

CH4 SATELLITE & AIRCRAFT TECH IS OPERATIONAL NOW

COLLABORATION WITH EXISTING PLATFORMS IS NECESSARY

EARLY DETECTION IS THE GOAL

Pete Hampton

Account Director of Government, Europe

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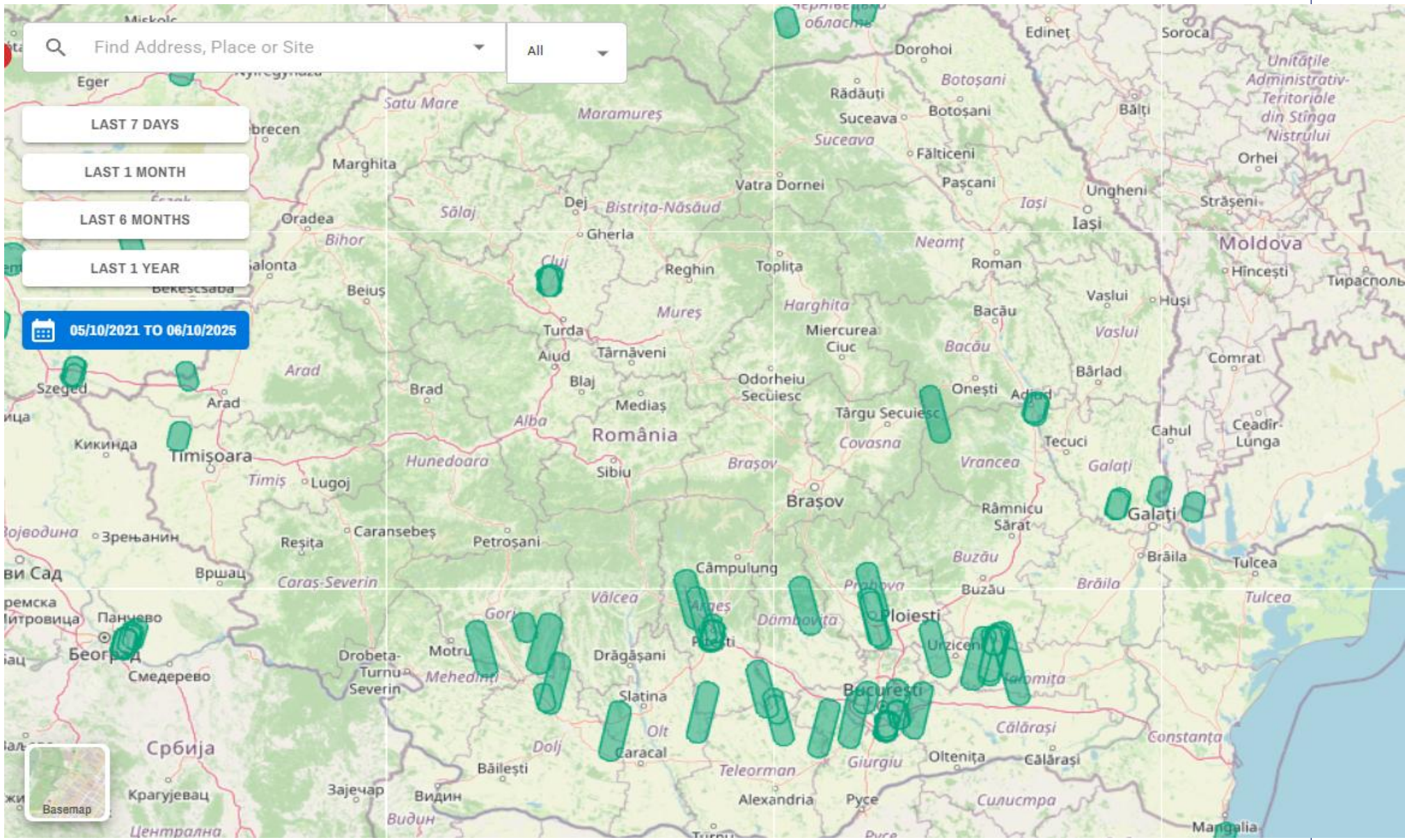
9th December 2025

GHGSAT – CAMPAIGNS RESULTS ROMANIA

Where have we observed since 2021?

- **324 Observations**
  - 12 (2021)
  - 33 (2022)
  - 125 (2023)
  - 153 (2024+)

- **Targeting**
  - Oil&Gas
  - Landfills
  - Unknown



GHGSAT – CAMPAIGNS RESULTS ROMANIA

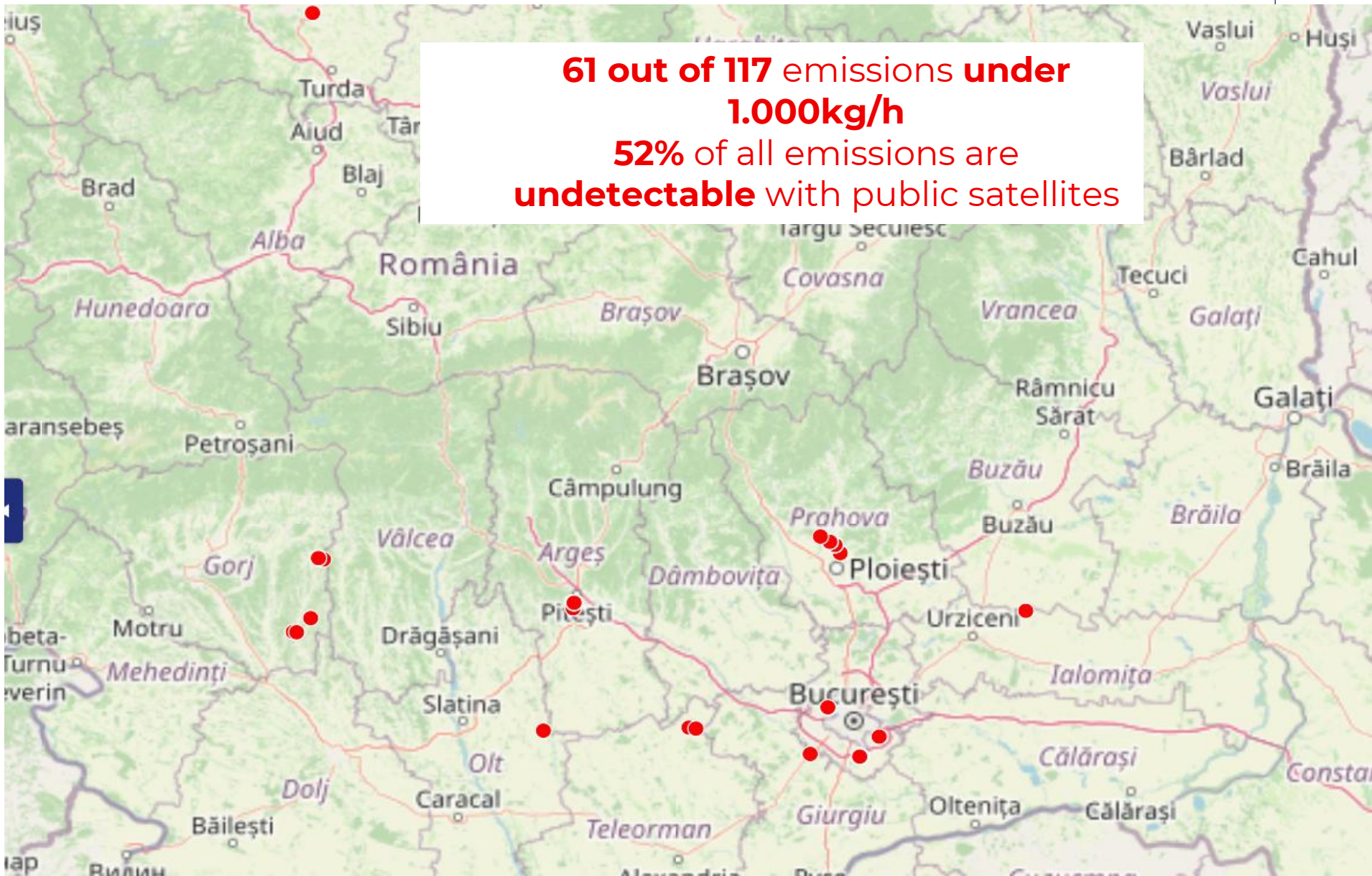
What have we detected since 2021?

- **117 Emissions**
  - **3** (2021)
  - **9** (2022)
  - **50** (2023)
  - **55** (2024+)

- **Sector**
  - **29** - Oil&Gas
  - **82** - Landfills
  - **6** - Unknown

- **Average CH4 rate**

- **560 Kg/h** - Oil&Gas
- **1600 Kg/h** - Landfills
- **320 Kg/h** Unknown

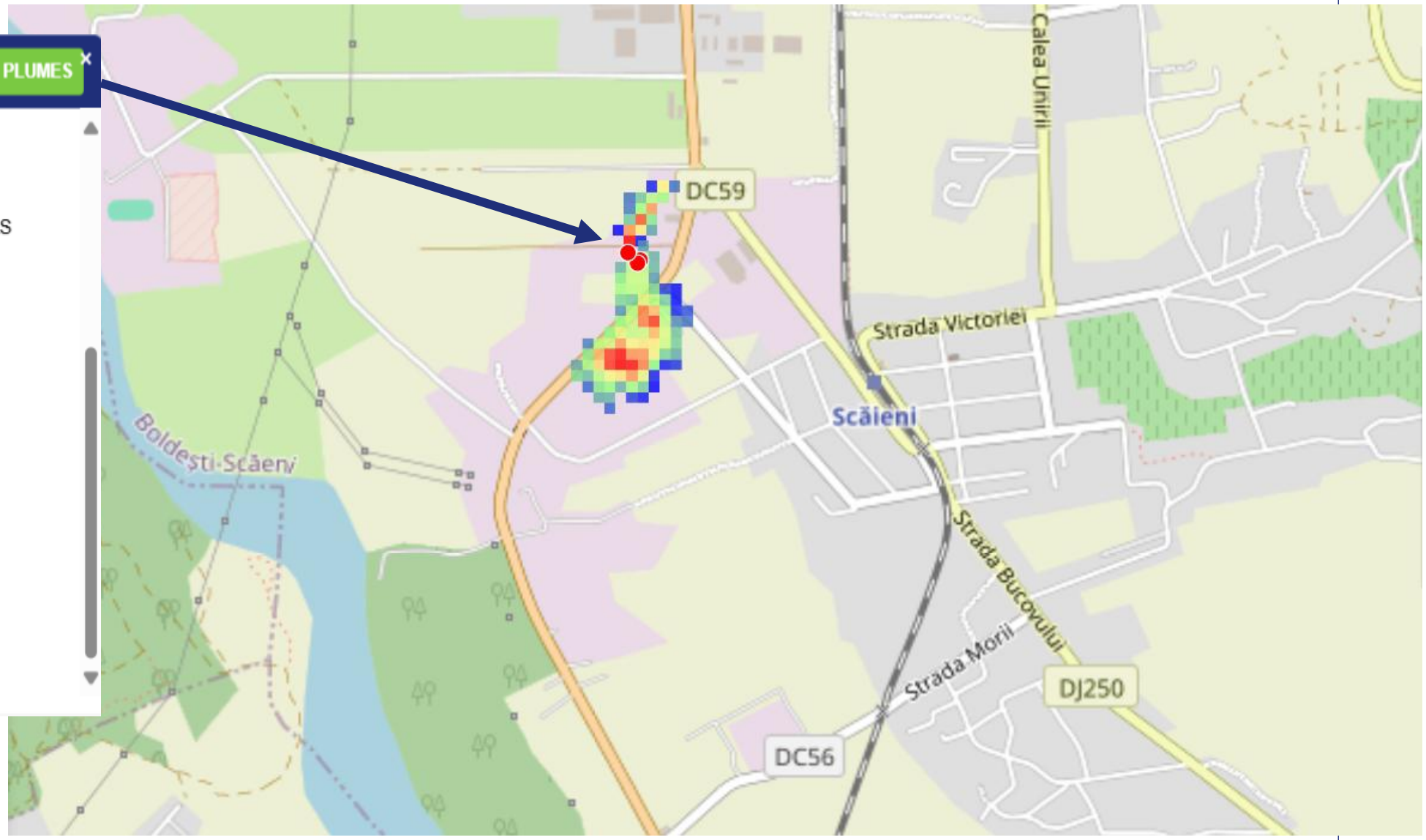


61 out of 117 emissions **under 1.000kg/h**
52% of all emissions are **undetectable** with public satellites

GHGSAT – ROMANIA DETAILS

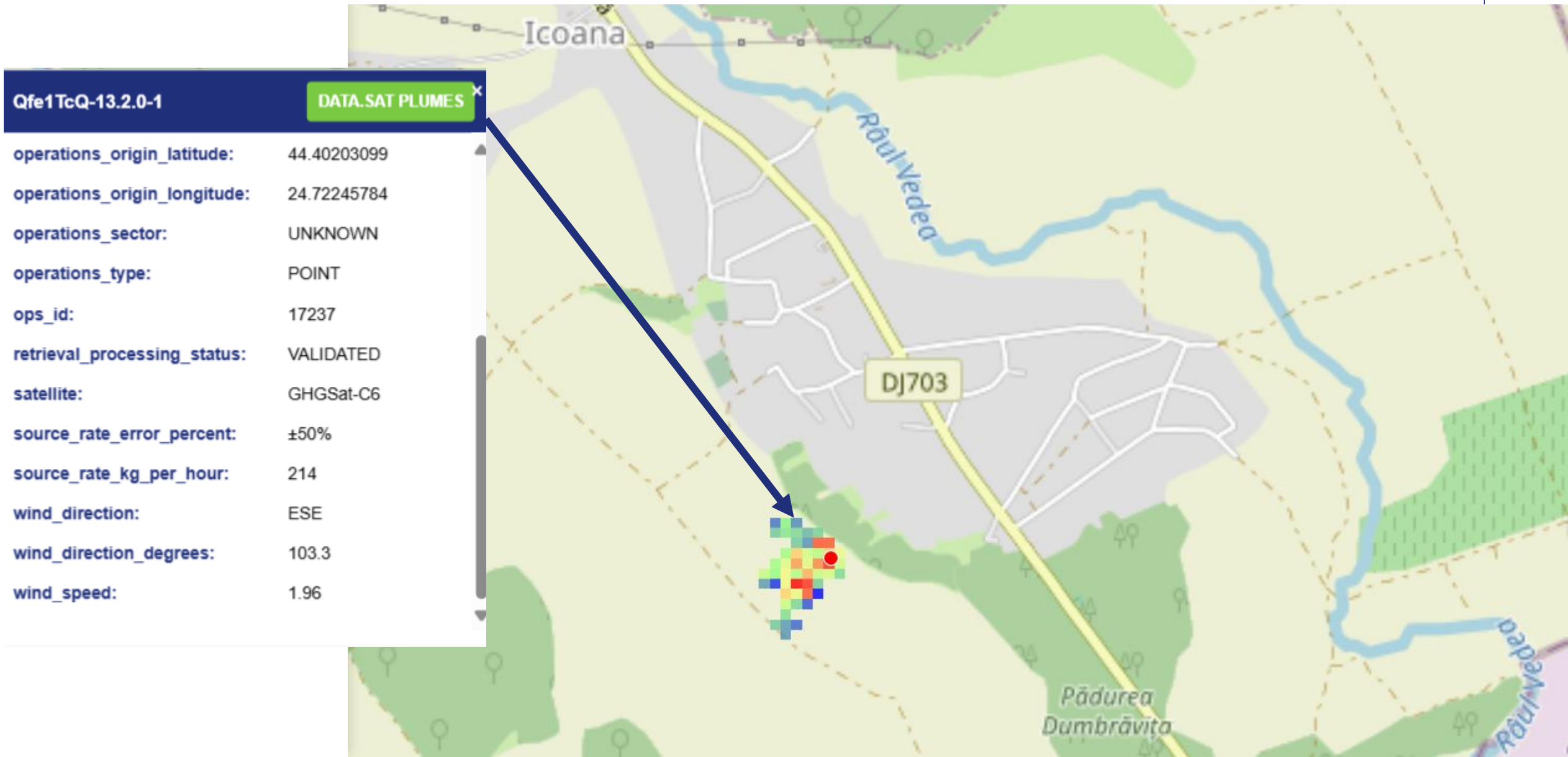
Oil & Gas site, north of Ploiesti – detected plume at 111 Kg/h

Ulm0plw-16.1.0-1	DATA.SAT PLUMES
operations_origin_latitude:	45.018799
operations_origin_longitude:	26.017259
operations_sector:	OIL_AND_GAS
operations_type:	POINT
ops_id:	50559
retrieval_processing_status:	VALIDATED
satellite:	GHGSat-C7
source_rate_error_percent:	±50%
source_rate_kg_per_hour:	111
wind_direction:	N
wind_direction_degrees:	359
wind_speed:	1.78



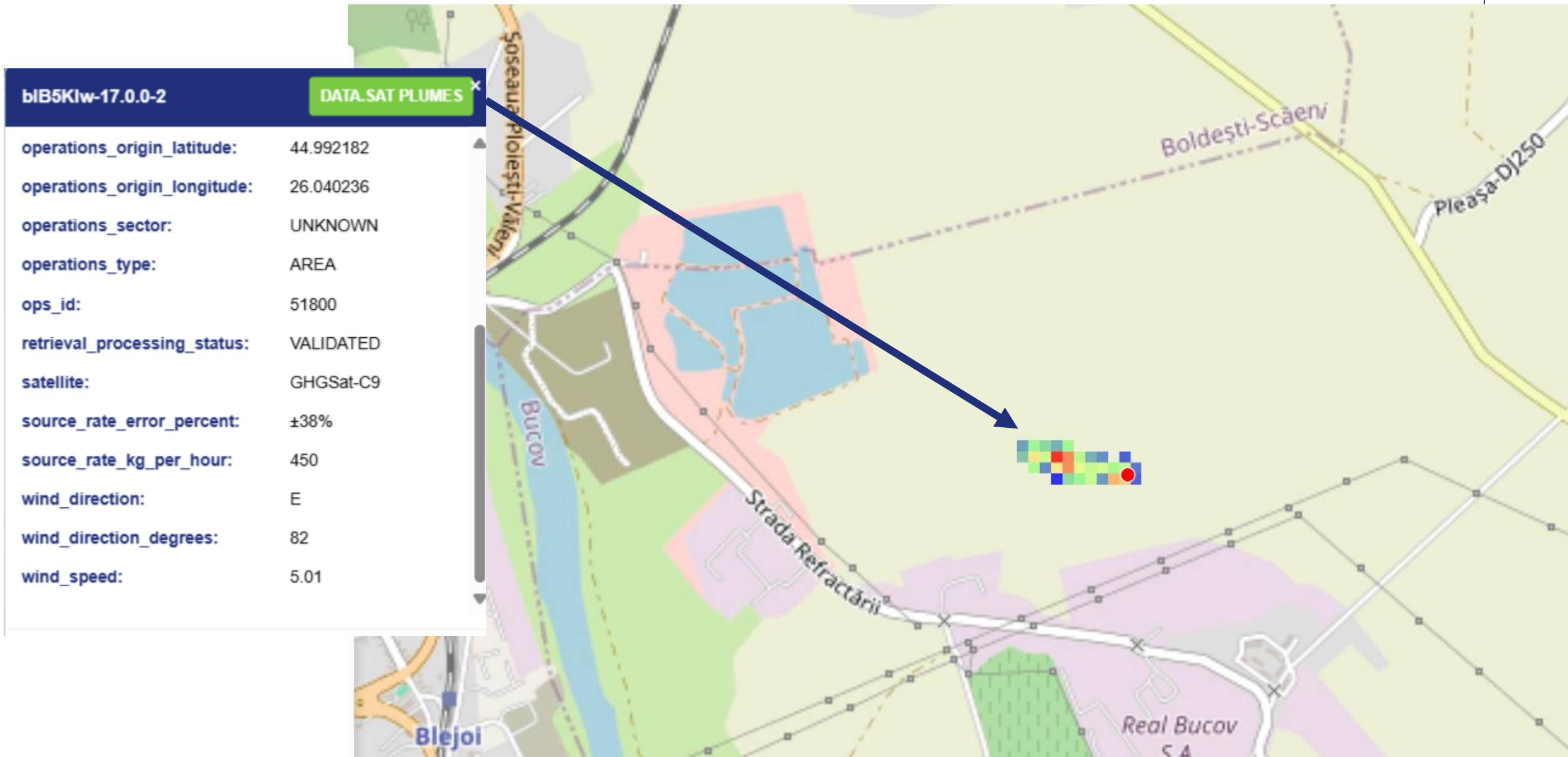
GHGSAT – ROMANIA DETAILS

"Unclassified" site, south of Icoana – potentially an abandoned well



GHGSAT – ROMANIA DETAILS

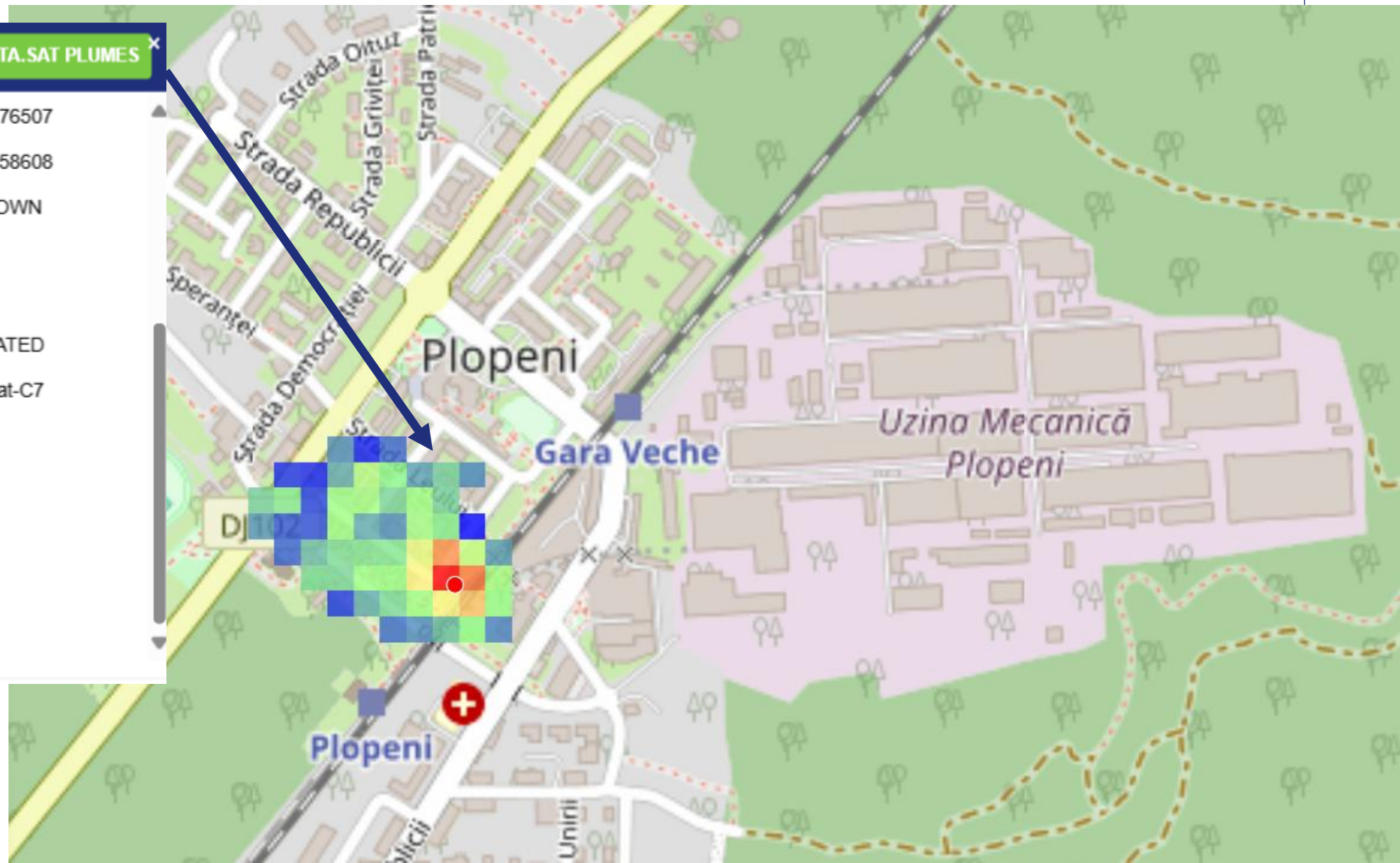
“Unclassified” site, northeast of Blejoi – potentially another abandoned well



GHGSAT – ROMANIA DETAILS

Unclassified site 3 at Plopeni

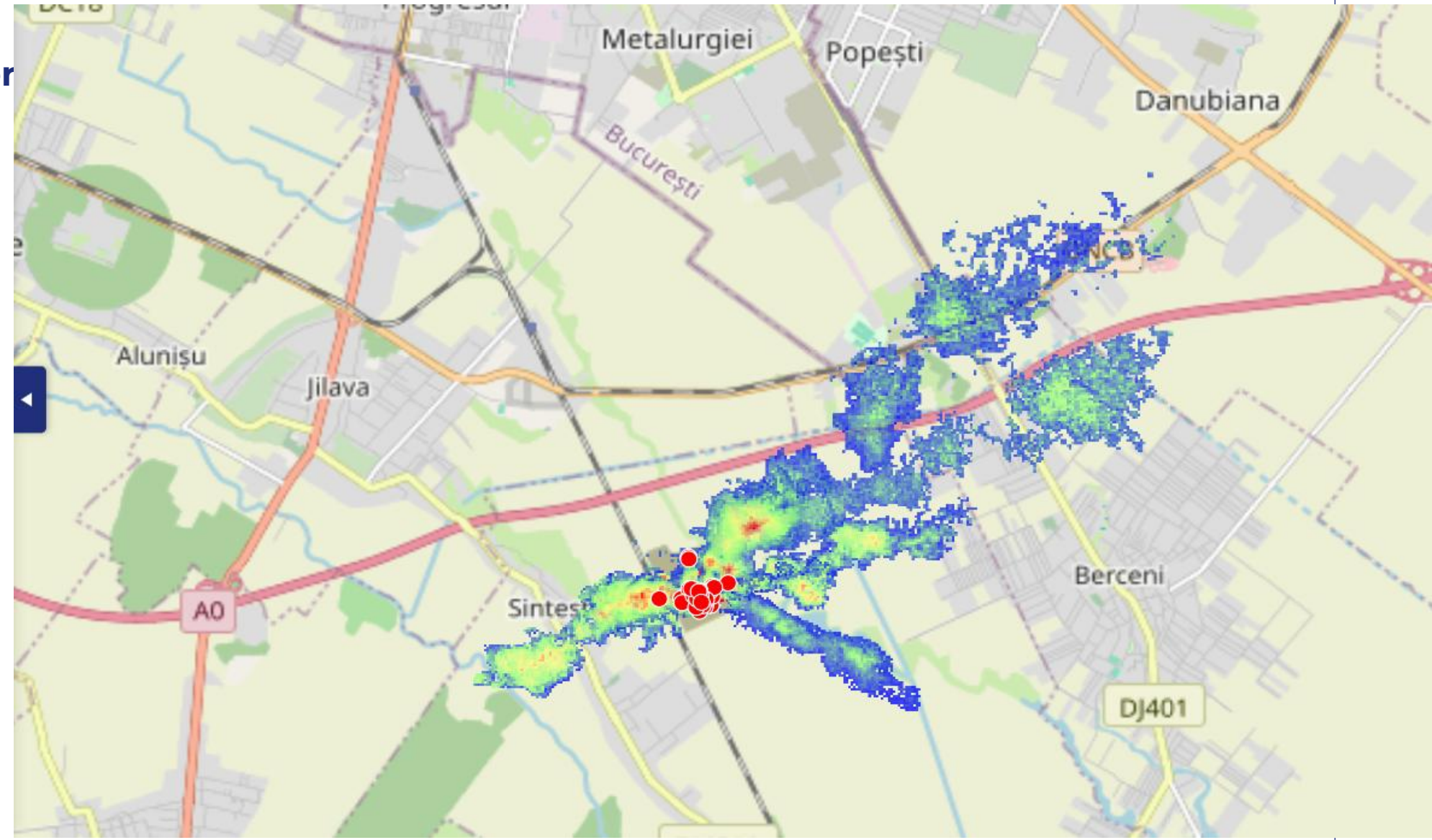
UgQlJcl-13.3.0-1	DATA.SAT PLUMES
operations_origin_latitude:	45.04676507
operations_origin_longitude:	25.95258608
operations_sector:	UNKNOWN
operations_type:	POINT
ops_id:	24277
retrieval_processing_status:	VALIDATED
satellite:	GHGSat-C7
source_rate_error_percent:	±48%
source_rate_kg_per_hour:	567
wind_direction:	S
wind_direction_degrees:	188.74
wind_speed:	2.12



GHGSAT – ROMANIA DETAILS

Landfill south of Bucharest – largest plumes of 5,650 kg/h

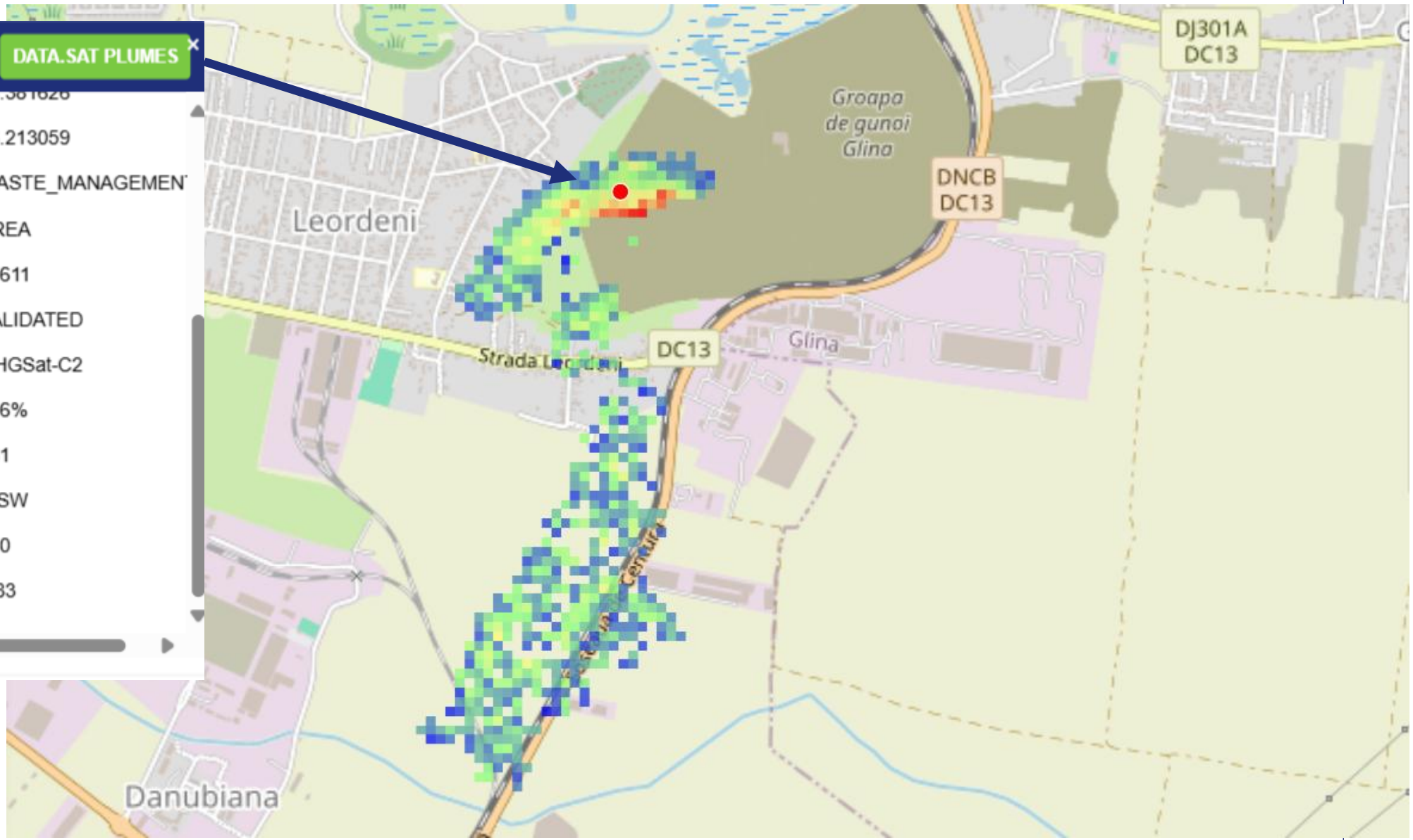
- **Largest CH4 emitter in the country**
- **51 detections**
- **Source rates**
  405 - 5,650kg/h



GHGSAT – ROMANIA DETAILS

Landfill south-east of Bucharest

9ndFgSo-15.4.0-1	DATA.SAT PLUMES
operations_origin_latitude:	44.381626
operations_origin_longitude:	26.213059
operations_sector:	WASTE_MANAGEMENT
operations_type:	AREA
ops_id:	45611
retrieval_processing_status:	VALIDATED
satellite:	GHGSat-C2
source_rate_error_percent:	±36%
source_rate_kg_per_hour:	861
wind_direction:	WSW
wind_direction_degrees:	240
wind_speed:	1.83



EU METHANE REGULATION – LDAR REQUIREMENTS

Leak Detection and Repair (LDAR)

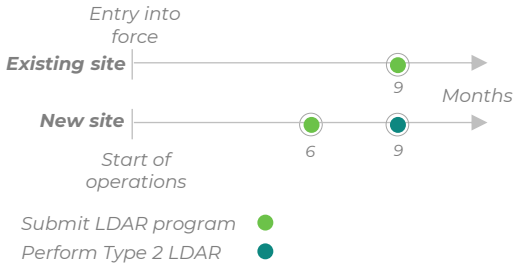
Adopt risk-based approach, categorize types of LDAR

Type 1: Big Leaks

First survey must be conducted within 12 months of regulation

Type 2: Small Leaks

Survey done 24 months before regulation may be considered first



- ***Minimum Detection Limit and detection technique for different devices to be established within 12 months for all equipment and tec***

Survey Frequency

Facility	1	2	3	4	5	6	7	8	9	10
Processing	●	●	●	●	●	●	●	●	●	●
Processing (min25%/year)	●				●				●	
Production	●			●			●			●
Production	●					●				

Type 1 LDAR ●
Type 2 LDAR ●

Repair/Replace Triggers

All components found to be emitting above these thresholds must be repaired or replaced:

Leak Type	Threshold
Type 1	**7000 ppm** in volume of CH_4 or **17 g/hr** CH_4
Type 2	**500 ppm** in volume of CH_4 or **1 g/hr** CH_4 for aboveground components and for offshore components above the sea level
	1000 ppm in volume of CH_4 or **5 g/hr** CH_4 for the second step of underground components (dig)
	7000 ppm in volume of CH_4 or **17 g/hr** for offshore components below the sea level and below the seabed

Initial repair attempt must be no later than 5 days and completion no later than 30 days from detection

Flaring

Except when re-injection, on-site utilization or dispatch to market is not feasible

Venting

Except in emergencies, malfunction or under certain approved conditions

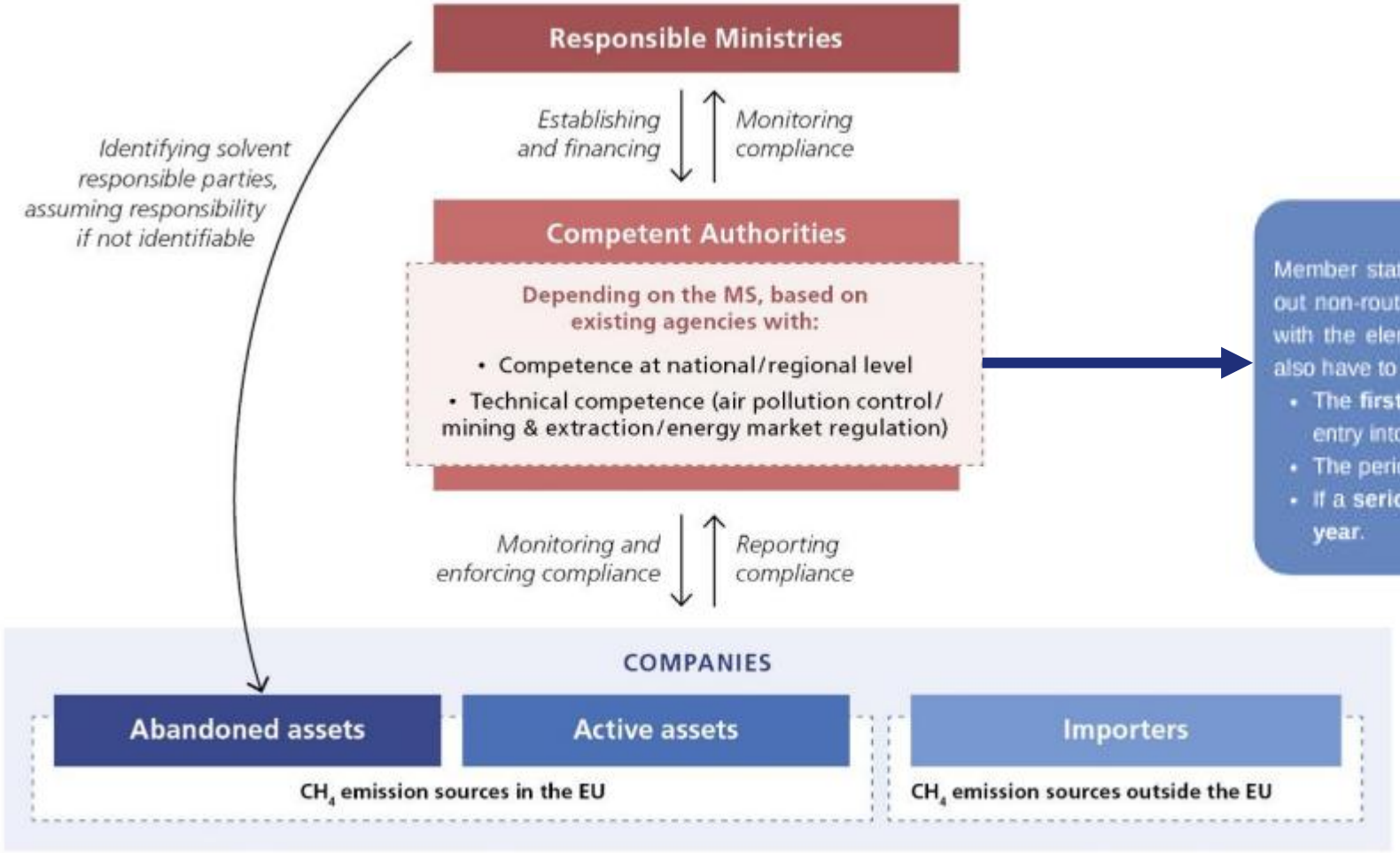
Permanently Plugged and Abandoned Wells

12 months from ruling – EU member States to take and make publicly available an inventory of inactive, temporarily/permanently plugged or abandoned wells in their jurisdiction.

If more than 40K wells exist, plan to take all inventory no later than 72 months

Proof of zero methane emissions should be produced for wells permanently plugged and abandoned **30 years before regulation** and, where available, for other wells

EU METHANE REGULATION – MRV REQUIREMENTS FOR MEMBER STATES



Inspections by the competent authorities

Member states will have to designate a competent authority; which will be able to carry out non-routine inspections for operators, mine operators and importers, in accordance with the elements set out in Article 6 of the Regulation. The competent authorities will also have to complete routine inspections for coal, oil and gas operators, as follows:

- The **first inspection must be completed no later than 21 months** after the date of entry into force of the regulation
- The period between inspections **cannot exceed 3 years**
- If a **serious breach** has been detected, the next inspection must take place **within 1 year**.