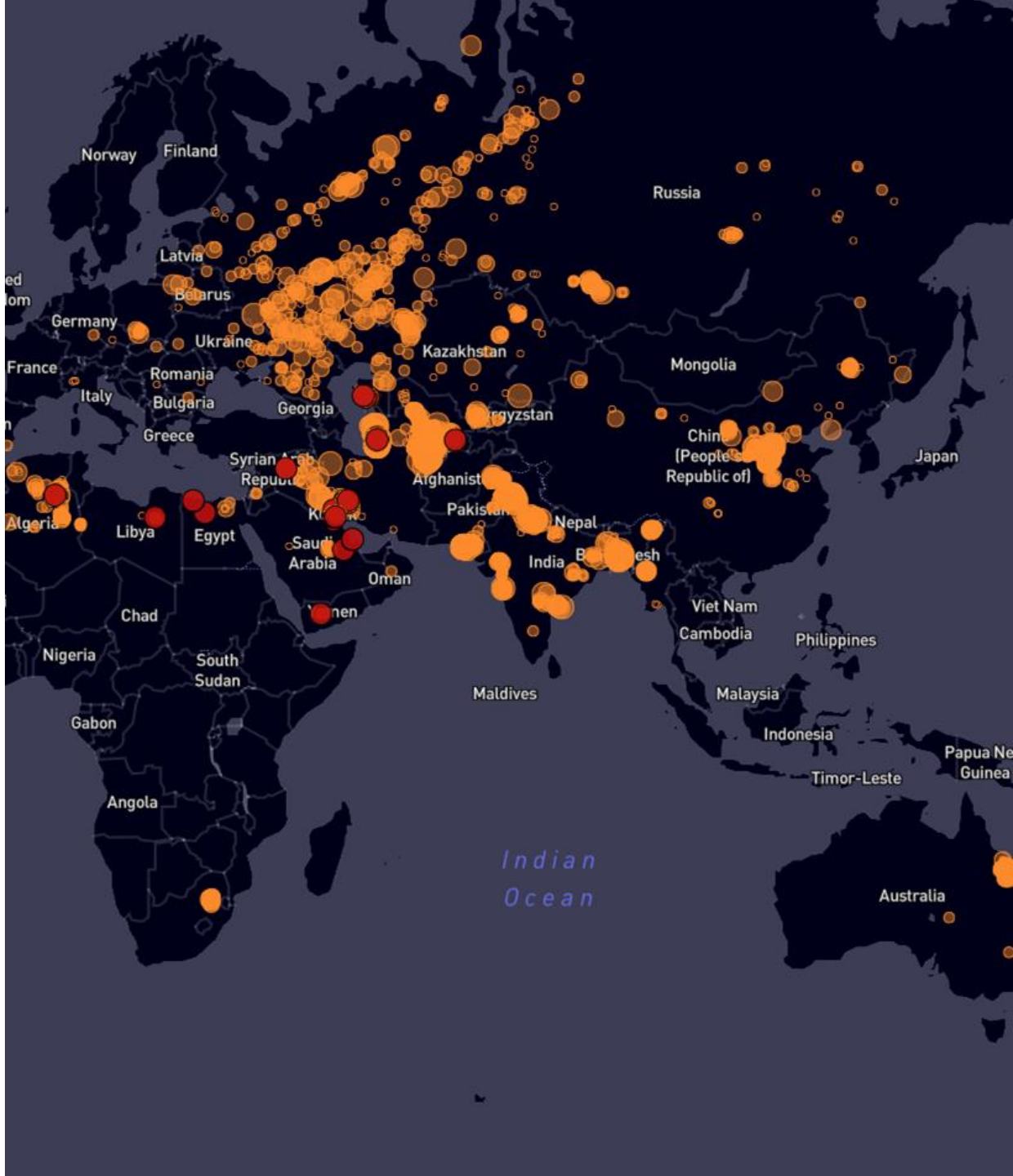
KAYRROS

European Commission

Leveraging EO for the Implementation of the EU Methane Strategy

///

KCEO - Workshop on Compliance Assurance
Thu. 20 June, 2024

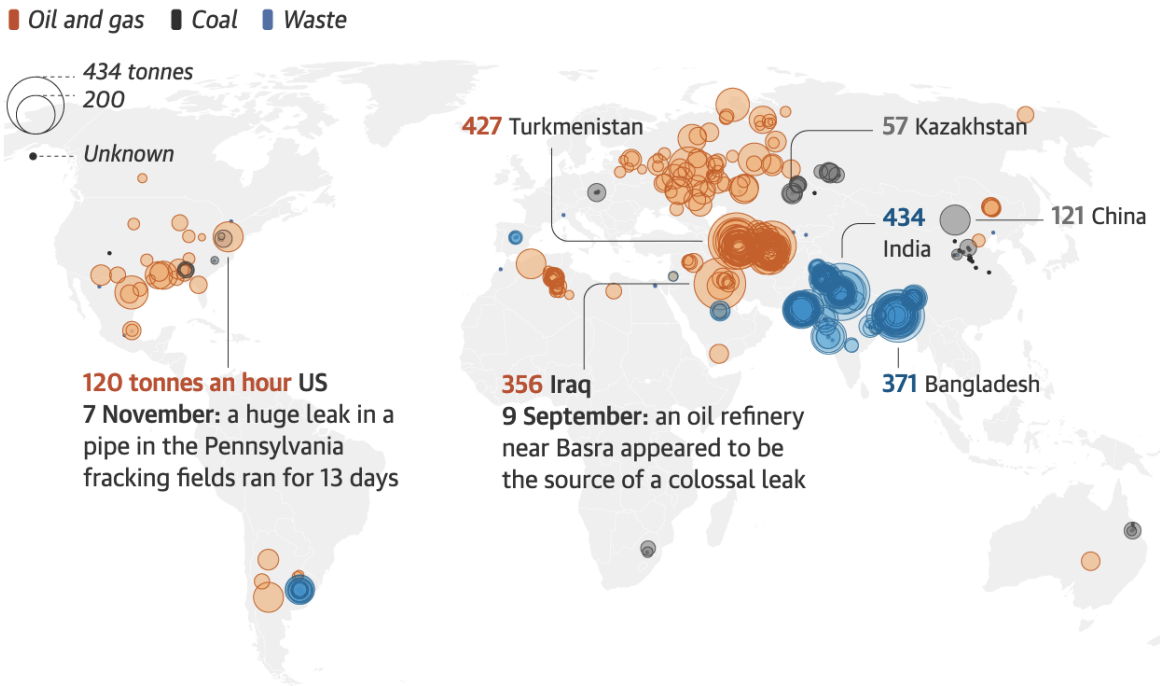


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Kayrros developed a tool to monitor methane emissions globally

More than 1,000 human-caused methane super-emitter events were detected in 2022

Emissions rate in tonnes of methane an hour, by source



Kayrros Methane Watch. Note: minimum leak rate is one tonne an hour. Leak rates for some events cannot be calculated and have been assigned a location only. Natural sources not shown

The Guardian

Revealed: 1,000 super-emitting methane leaks risk triggering climate tipping points

Using data and insights, reported that methane leaks from Turkmenistan caused more global warming in 2022 than the entire carbon emissions of the UK.

How it works?

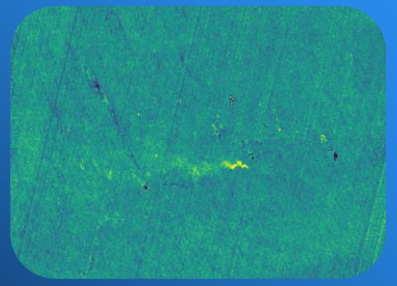
Image acquisition



Kayrros retrieves products from multiple satellite constellations:

- Sentinel-2 (ESA)
- Sentinel-3 (ESA)
- Sentinel-5P (ESA)
- LandSat 8/9 (NASA)
- PRISMA (ASI)
- EnMAP (DLR)
- EMIT sensor (NASA-JPL)
- WorldView-3 (Maxar)

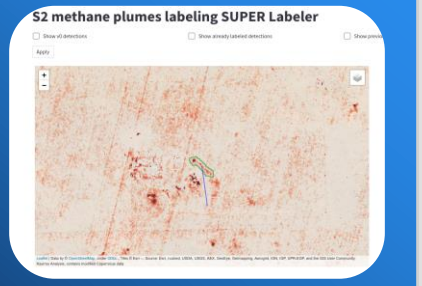
Detection and quantification



Kayrros automatically processes every satellite images captured over many AOIs to enhance methane abnormal concentrations.

Kayrros applies Deep-Learning algorithms to detect methane plumes and then quantifies their flow rate by Integrated Mass Enhancement (IME).

Manual labeling



Each methane plume detected by the AI model is manually analyzed by two distinct Data Labeler.

False Positives are filtered out.

Attribution



Kayrros identifies the source of the emission thanks to the high spatial resolution of the satellite imagery.

The asset's owner is often identified using Kayrros' internal asset database.

Delivery



Methane super-emitters detections can be delivered either through the Kayrros Platform, programmatically through an API or through a CSV file

Kayrros' workflow in numbers:

- 2500+ super-emitters detected in 2023
- 3 days delay between capturing and making the detection available

Tariffs and fees: Rapid Alert Mechanism

- UN International Methane Emissions Observatory (IMEO) uses satellites to detect, measure and attribute large emission events and assess the methane intensity of oil & gas suppliers
- IMEO Methane Alert & Response System (MARS) powered by Kayrros data
- IEA Global Methane Tracker leverages Kayrros satellite insights to shed light on global emission levels, trends and successes

Council of the EU | Press release | 27 May 2024 11:30

Fit for 55: Council gives final green light to cut methane emissions in the energy sector

European Council
Council of the European Union

EHS Daily Advisor

Final Rule Issued to Cut Methane Emissions, Strengthen GHG Reporting for Oil and Gas Industry

On May 6, 2024, the EPA announced it issued its final Subpart W rule to strengthen, expand, and update methane emissions reporting...

Tax Foundation

Methane Fee to Take Effect in 2024: A Mini Carbon Price

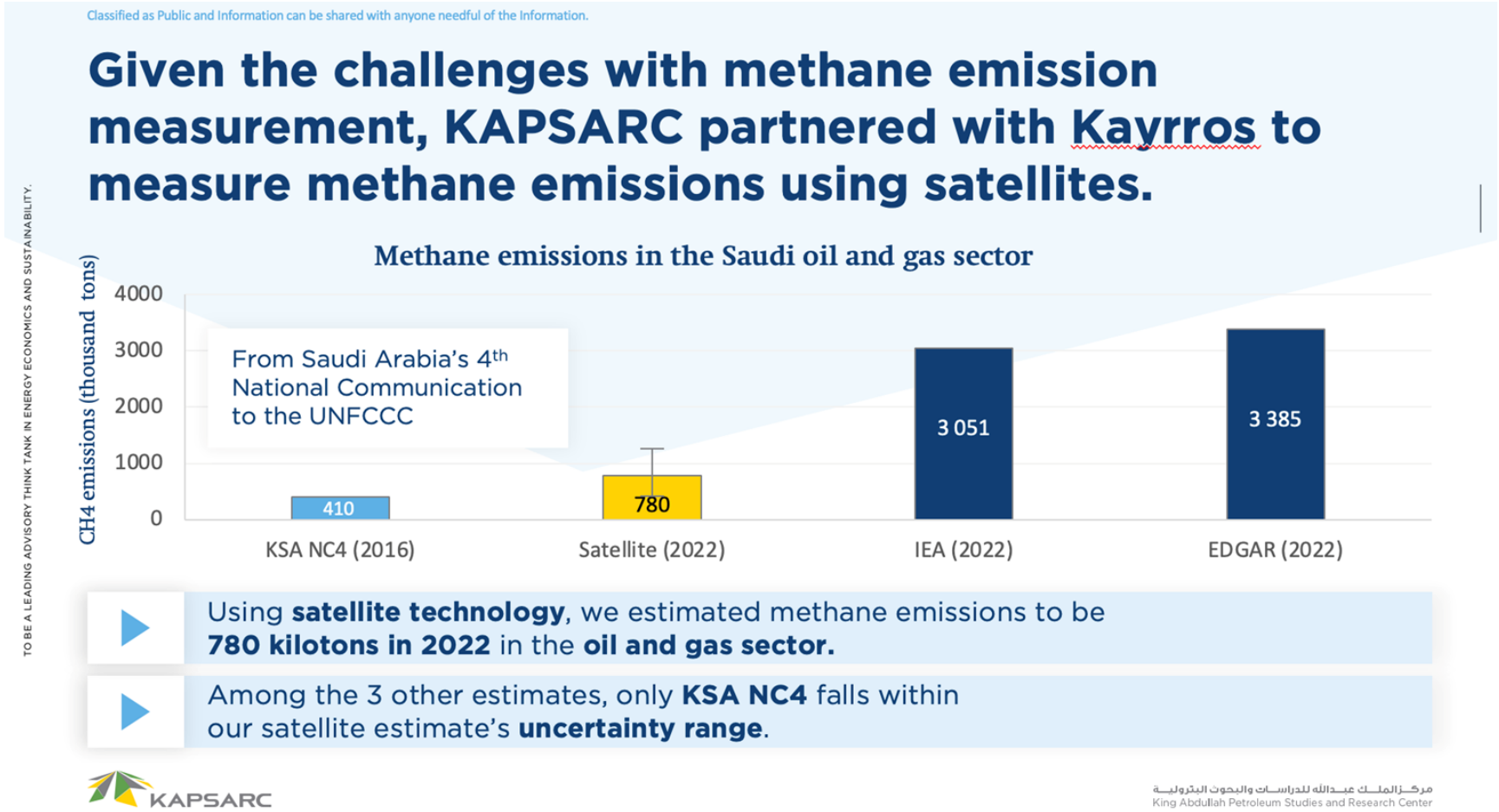
The Inflation Reduction Act's methane fee will take effect in 2024 and will act as a mini carbon price. Learn more on methane and natural...

Jan 2, 2024

Stock take and inventories: Determine maximum methane intensity

Satellite measurements are the most rigorous way to establish a science-based, accurate emission baseline at country level

Kayrros partnered with KAPSARC to measure Saudi Arabia's methane emissions from the oil & gas and waste sectors



KAYRROS

Paris
33 rue La Fayette
FR 75009

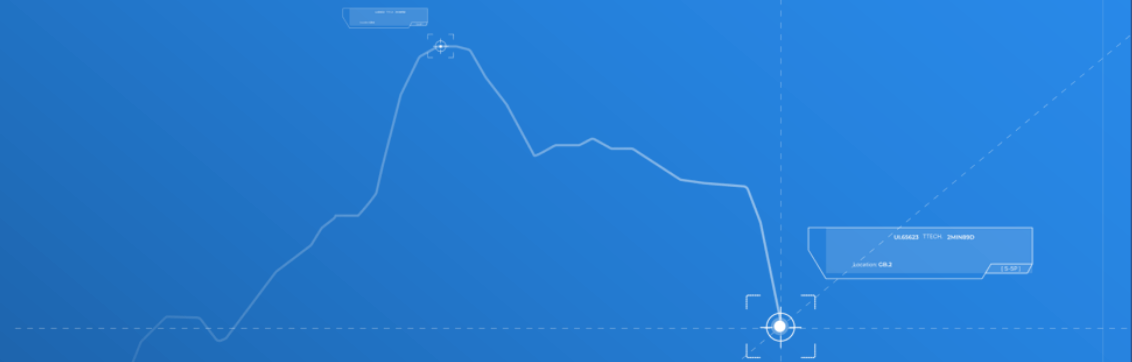
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138 Holborn, London EC1N 2SW

New York
12 East 49th Street
NY 10017

Houston
609 Main Street Houston
TX 77002

Singapore
Level 2, 15 Beach Road
Singapore 189677

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GAF AG
an e-GEOS (ASI / Telespazio) Company

GAF : Earth Observation Solutions

Copernicus Thematic Workshop on Compliance Assurance

20-06-2024 – Online

Inés Ruiz ines.ruiz@gaf.de



GAF

Experience-based Innovation for dedicated Geo-information Solutions, Satellite-based Mapping Services & Consulting

- 38+ Years of Experience
- 140+ Countries
- 220+ Employees
- Geodata: Reception – Distribution – Processing
- Professional & International Consulting
- Geoinformation Products & Software

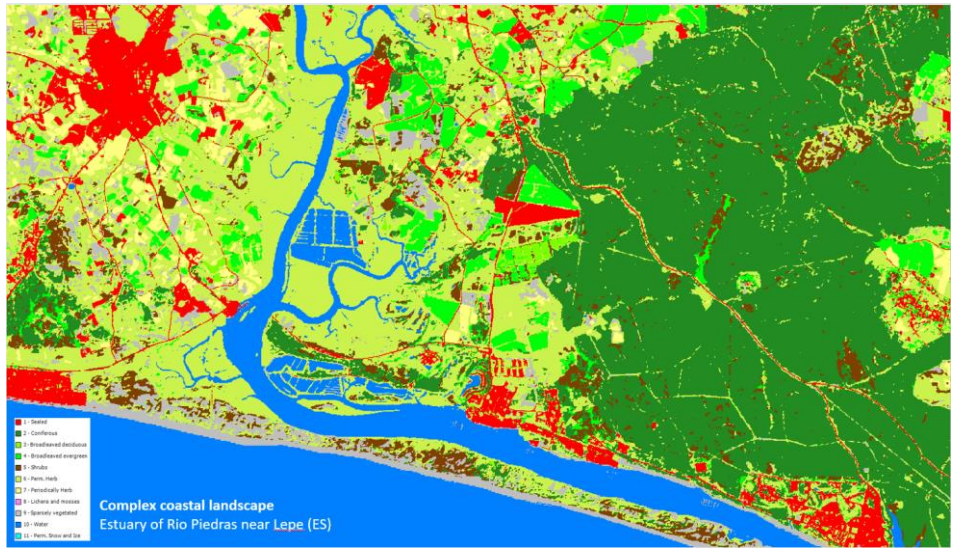


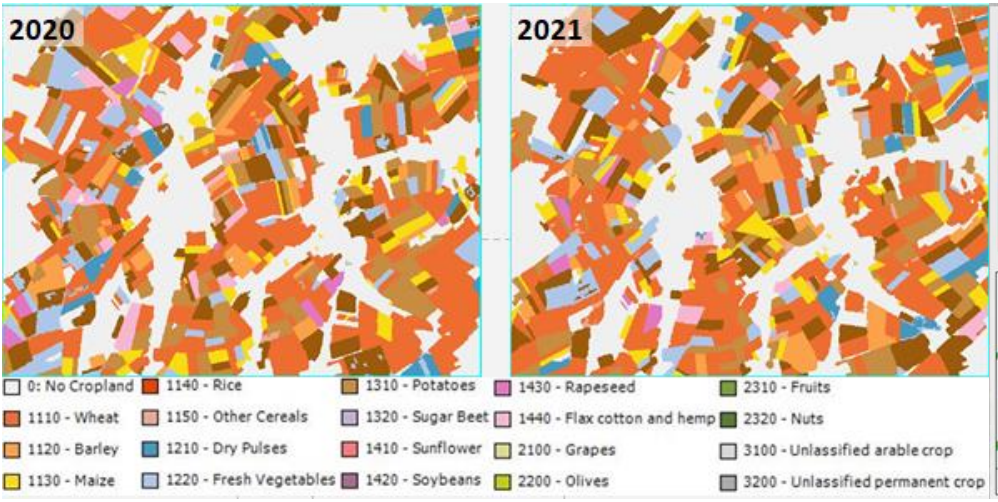
Images © GAF AG, contain material from Airbus, Antrix, Digital Globe/EUSI, 2018 Copernicus Emergency Management Service (© European Union, 2012-2018)

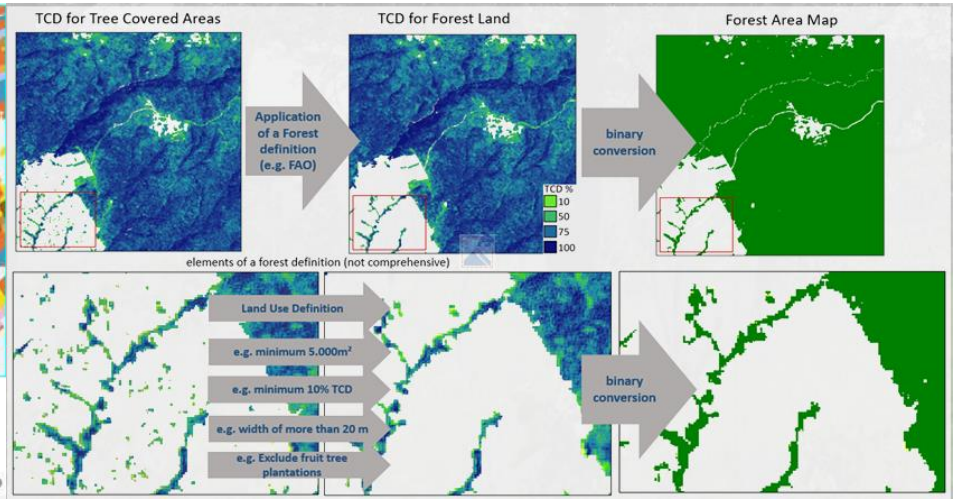
CLC+ Suite	LC
VLCC	Grassland
	Cropland
	Forestry
LCFM	Tropical Forestry

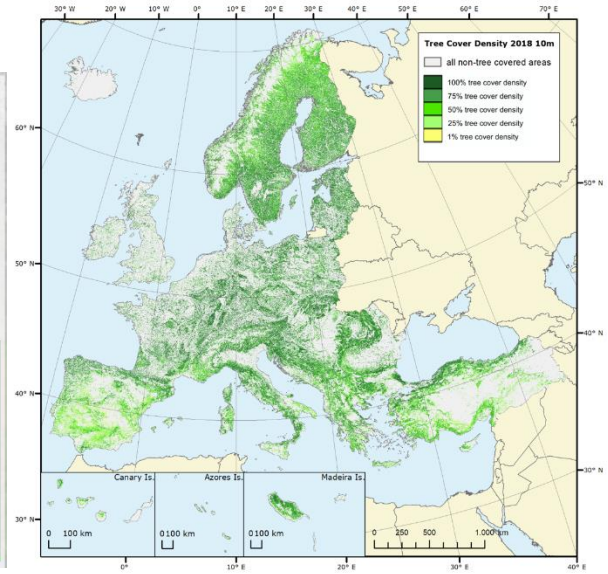
Support to policy fulfillment:

- CAP
- EUDR
- LULUCF
- Illegal Logging / Mining
- Foresty Deterioration
- ...









Thematic Activities

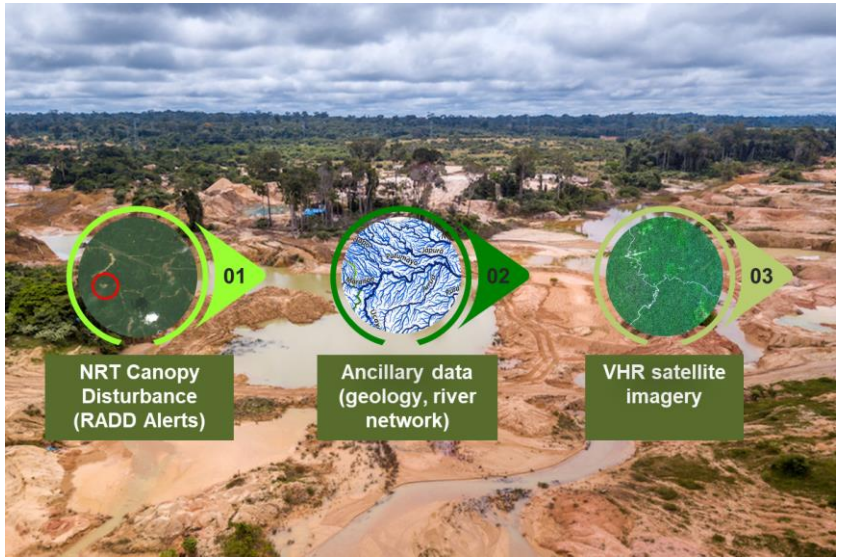
Agriculture to Support CAP and Insurances

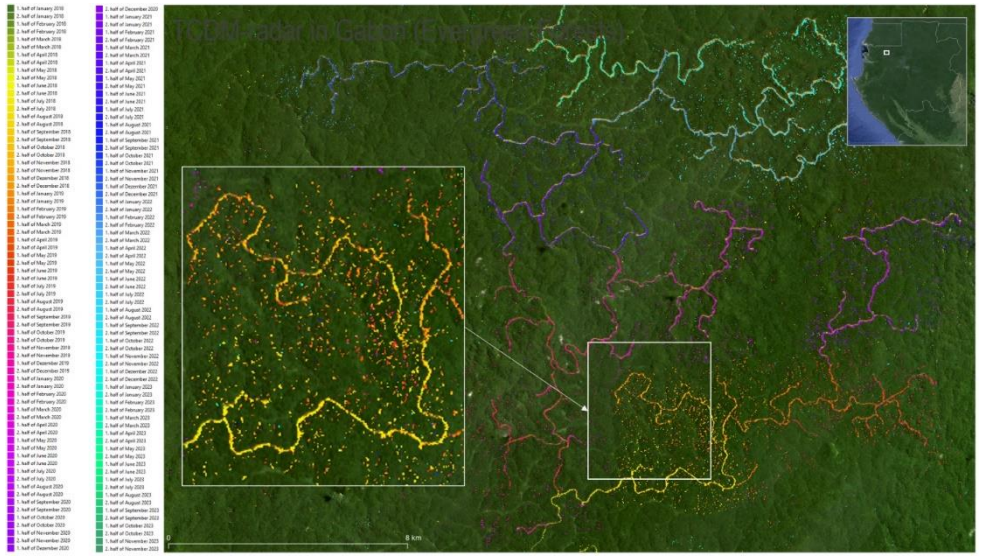
- Crop Type Mapping
- Crop Health Monitoring
- Drought Monitoring
- Sowing, Ploughing , Yield Estimation...



Artisanal and Small-Scale Mining &

Illegal Logging





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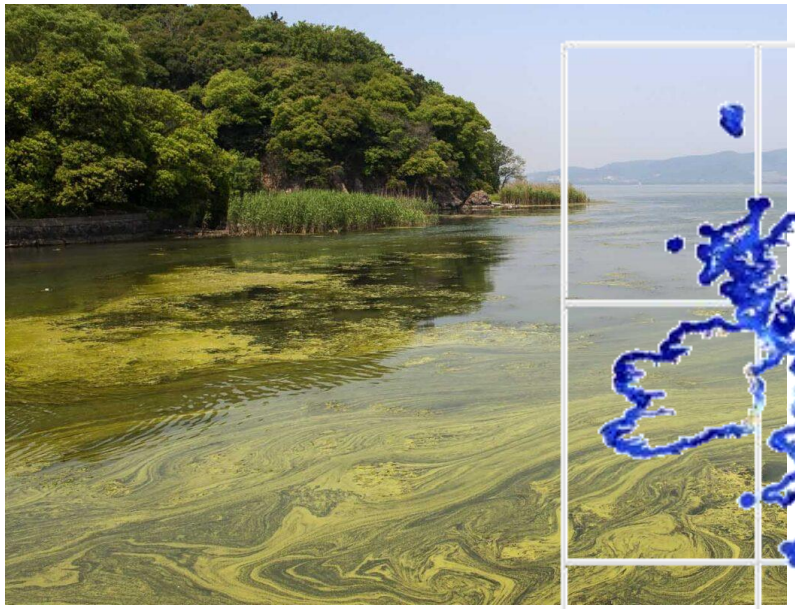
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@GAF_Munich


Brockmann Consult
Environmental Informatics • Geoinformation Services
Turning Data into Knowledge
Carsten Brockmann, Managing Director
Water Quality Compliance Assurance

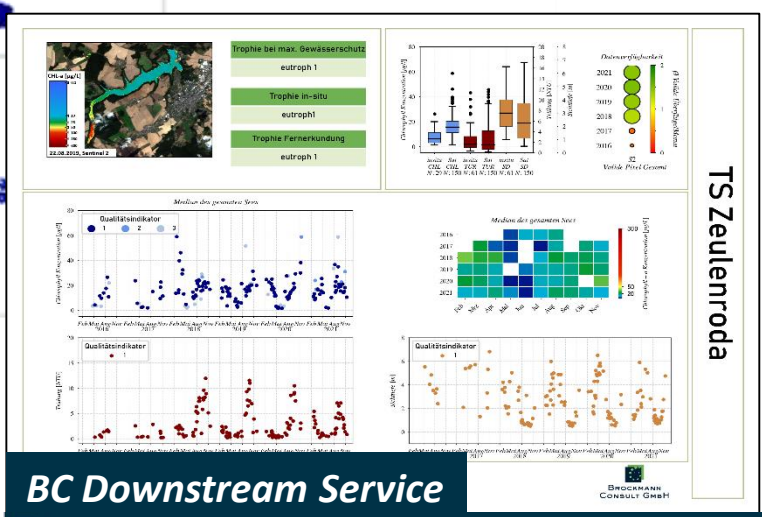
Water Framework Directive ♦ Marine Strategy Framework Directive ♦ Downstream Services



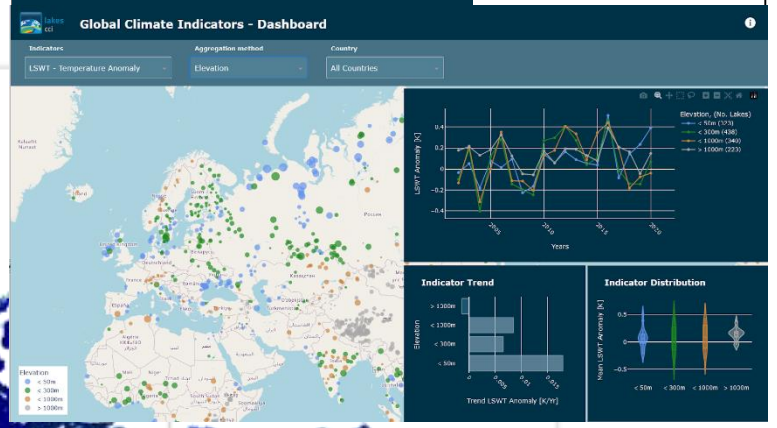
www.lgsonic.com/cyanobacterial-blooms

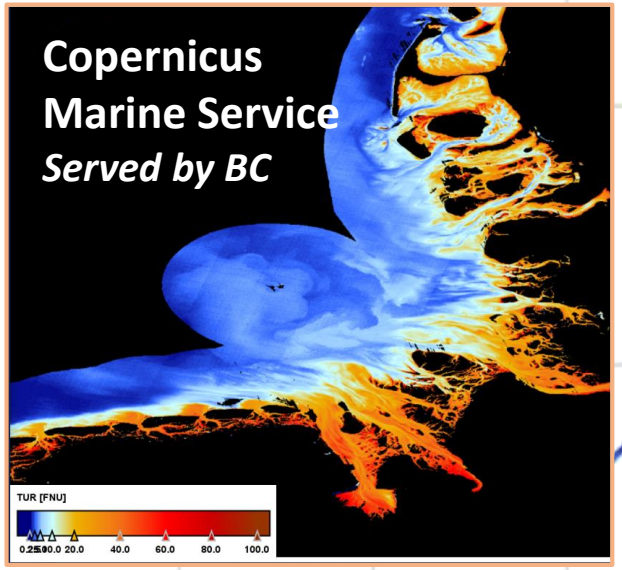


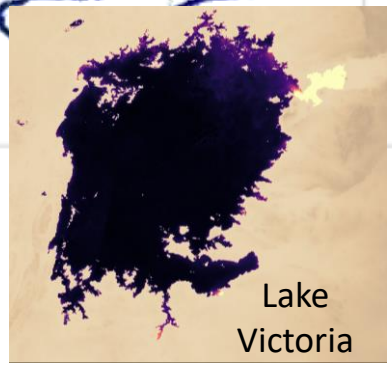
Copernicus Land Service
Served by BC



BC Downstream Service

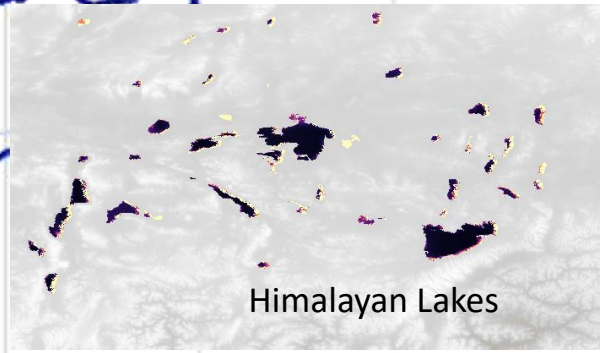












Water Framework Directive ♦ Marine Strategy Framework Directive ♦ Downstream Services

Water Quality

- **SDG 6.3** Improve water quality – Indicator 6.3.2 Proportion of bodies of water with good ambient water quality
- **Water Framework Directive** - Setting out rules to halt deterioration in the status of EU water bodies and achieve good status for Europe's rivers, lakes and groundwater.
- **Marine Strategy Framework Directive** - Protect the marine ecosystem and biodiversity upon which our health and marine-related economic and social activities depend.
- **Bathing Water Directive** - Protect the environment and the health of Europeans by attaining good bathing water quality throughout the EU

EO – Technical Readiness Level (stage of implementation)

- Operational capacity (algorithms, production chain) in place
- Validation limited due to still too few fiducial reference measurements, in particular for inland waters
- Consistent product quality for all European coastal and inland waters not yet achieved
- Unravelling the full potential of a unique and harmonised WQ assessment requires more R&D work on methods for AC, in-water algorithms and uncertainty characterisation
- Implementation of WFD and MSFD at national level still largely does not include EO
- Sentinel Expansion Missions LSTM and CHIME, Sentinel 2 and 3 Next Generation will significantly improve the data provision (more products, e.g. PFTs; more water bodies); preparation needed!

KCEO Deep Dive

- Gaps: (1) wetlands, rivers, coverage of Euopean inland waters at high resolution, (2) product harmonisation across inland water and coastal waters, product quality / uncertainty consistency, (3) EO in national implementation
- Evolution: (1) prepare uptake of Expansion missions & Next Gen, (2) exploit potential of VHR data (Contrib. Missions), (3) connect work done in Europe with policies and their implementation globally (Africa, US, Asia), UN / UNEP

New perspectives in emergency mapping: toward new satellite constellations and 3D data enabling digital twins



Piero Boccardo
Politecnico di Torino/ITHACA
ITALY



IRIDE Space programme

The team of Italian excellences

upstream

Argotech →10 satellites;

Ohb Italia →12 satellites

Thales Alenia Space →7 : specifically, these are 6 satellites with SAR (synthetic aperture radar) technology and one optical.

SITAEL →4 satellites with hyperspectral optical instrumentation

D-Orbit →1 satellitehigh resolution images, which uses microwave technology, for detection at night or in the presence of clouds.

downstream

e-GEOS →the infrastructure for access to IRIDE data and services by users: (Leonardo, Telespazio,



The launches of the IRIDE satellites will begin in 2025. For now, 2 Vega-C launches have been commissioned to ArianeSpace which will take place from the European spaceport in French Guiana.




Perspective 30°
Snap: Axis, 2D
faces: 10,387,696 vertices: 5,202,250
Y
Z
X

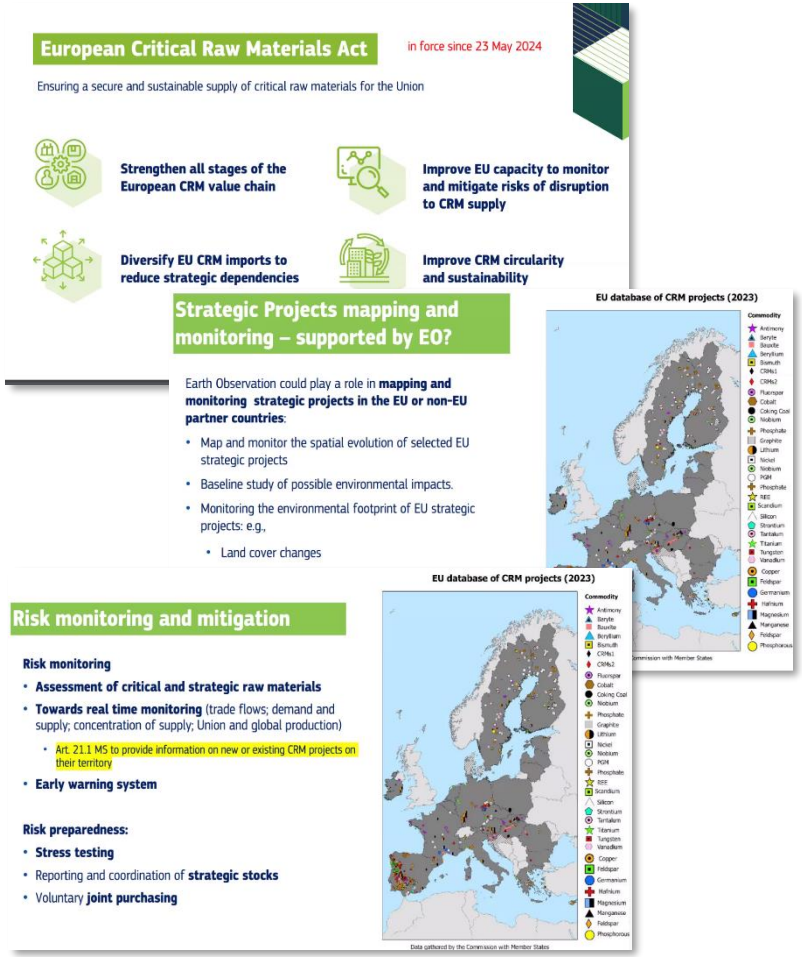


RISCOGNITION

ANALYSIS READY LOCATION INTELLIGENCE

Critical Raw Materials Act:

- Aims at ensuring the secure and sustainable supply of critical raw materials that are essential for the EU's economic resilience, green transition, and technological leadership.
- Reduce the EU's dependency on third countries for critical raw materials highly relevant for sectors such as renewable energy, digital technologies, aerospace, and defence.
- KCEO Use cases: 1) Mapping and monitoring the extent of the mining site & 2) Monitoring the evolution of specific sites for evaluating strategic projects including environmental impacts.



Source: Screenshots from Gerardo Herrera's PPT

Supported by
RIS INCOME
eit RawMaterials Connecting matters
Co-funded by the European Union
RISCOGNITION

Environment Social Governance Monitoring (RIS-INCOME):

- To develop and commercialize a software tool for the monitoring and management of Environmental, Social and Governance (ESG) criteria in the Mining sector.

- The tool addresses the requirements from the Corporate Sustainability Reporting Directive (CSRD) and related European Sustainability Reporting Standards (ESRS).

- Project duration: Jan 2024 – Dec. 2025 (➡ early development stage)

RIS INCOME

Supported by eit RawMaterials Connecting matters

Co-funded by the European Union

RISCOGNITION

Challenges:

- Lots of required information is in narrative format (ESRS). No quantitative /standardised measures necessary ➡ open to challenges.
- How to measure “biodiversity”? Not associated to accepted standards/measures
- Spatial & tenporal resolution (considering Sentinel-2 + CLMS as input data)
- Need for Service Level Agreements – a downstream commercial activity has guarantees to customer
- Build a defendable case for clients

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Opportunities:

- Multi-platform benefits of Sentinels-1,-2 and -3. Guaranteed long-term access. Improved capabilities through future Sentinel missions
- Scalable globally -> ability for European businesses to export services and training.
- Competitive – access to data makes it possible for SMEs to develop competitive services. Data is the new currency.

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Team:

- Lead: Fundacion Gómez Pardo
- AICRUMIT S.L.
- Riscognition GmbH
- Atalaya Mining
- MARMOLESMAM SL
- Sandfire MATSA
- Marble, Stone and Materials Technology Center
- Université de Technologie Tarbes Occitanie Pyrénées -UTTOP and
- Inštitut SeMe, okoljsko ozaveščanje in trajnostni razvoj, Poljčane

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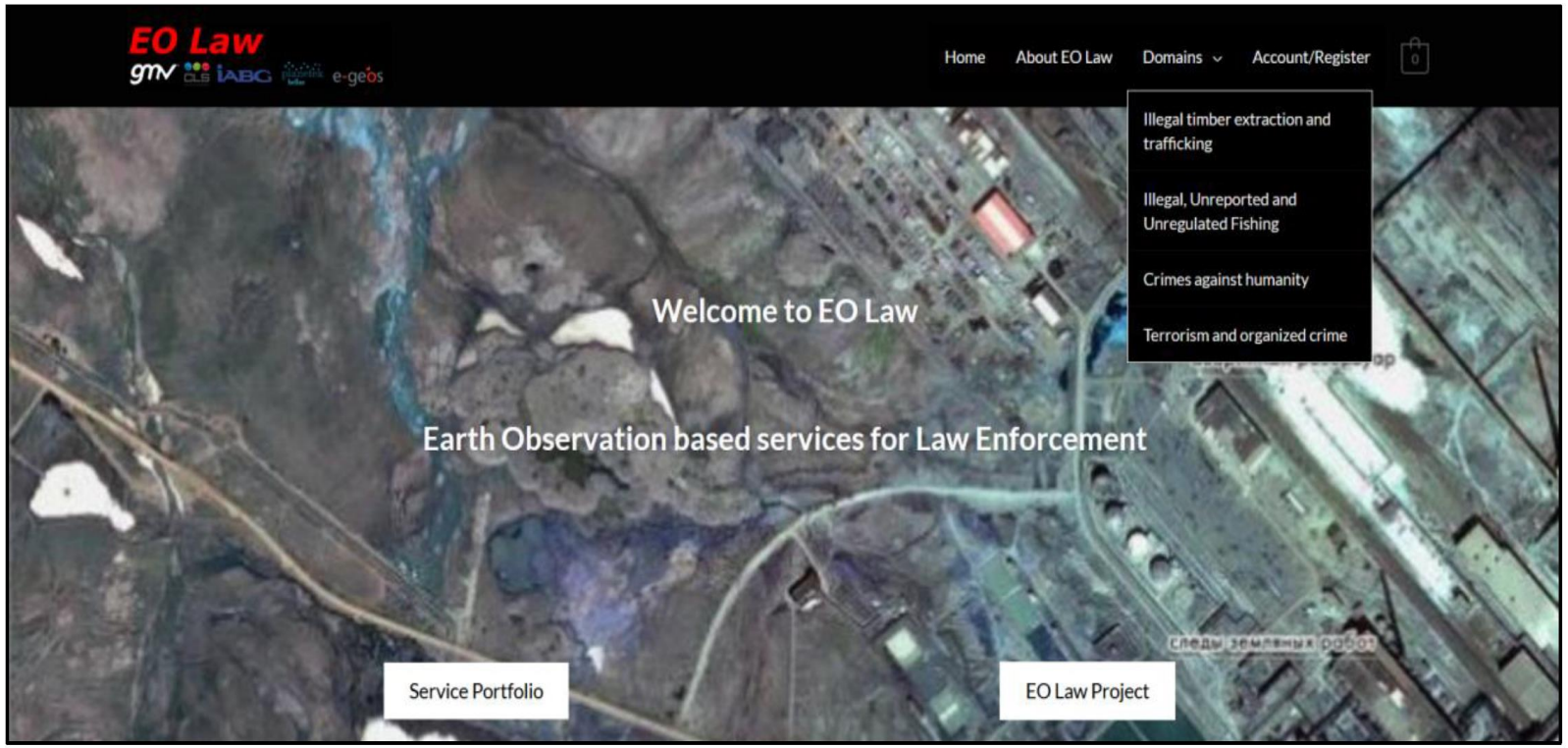
https://www.riscognition.com

info@riscognition.com

RISCOGNITION

EO based services for Law Enforcement

Developing services based on EO data combined with ICT data analytics and non-EO data for the Law Enforcement sector



Users :

Forest Stewardship Council certification (FSC), **ENCE**, Xunta de Galicia, Interpol, International Criminal Court, Indian Ocean Commission (Regional Maritime Information Fusion Centre), World Uyghurs Congress

Observers:

Federal Criminal Police Office (Germany)

Ministry of Interior (Austria)

Europol

EO based services for Law Enforcement

Four law enforcement domains were approached during the project:



Environmental crimes – Illegal timber extraction and trafficking



Environmental crimes – llegal, unreported and unregulated fishing fishing



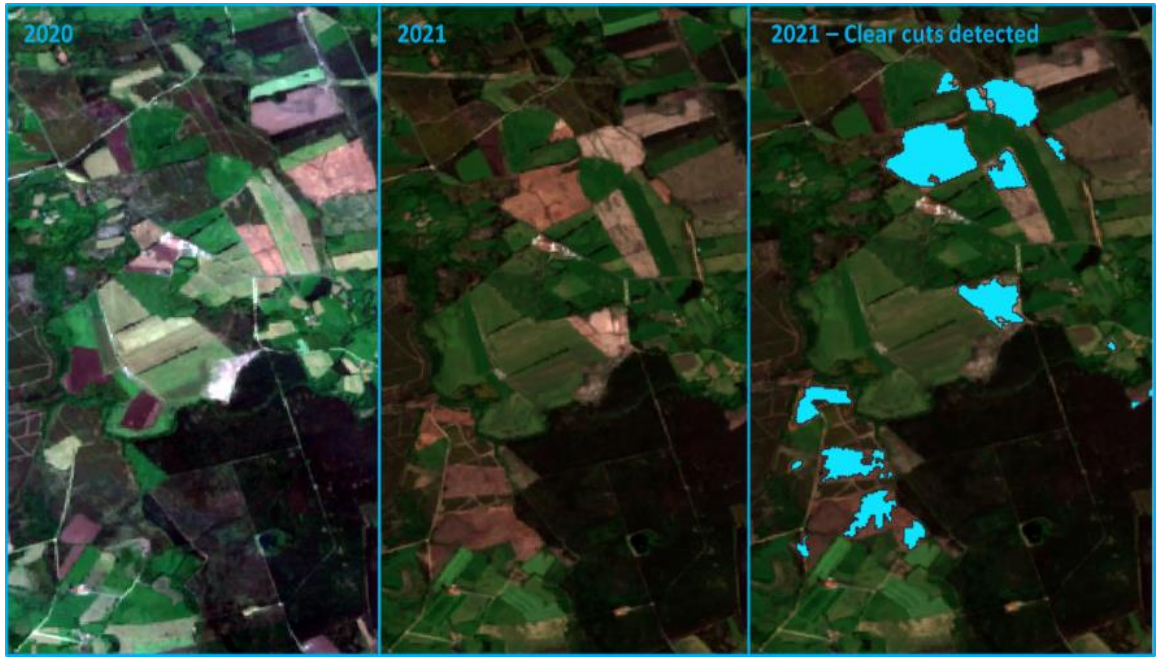
Crimes against humanity



Terrorism and organized crime

Benefits / Future road mapping

Illegal timber extraction and trafficking



EO Based services for continuous deforestation activities monitoring

Identification of suspicious activities for further investigation (e.g., route characterization, logging machinery, etc.)

Compliance assurance support by:

- **Assessing timber origins**
- **Verifying Sustainable Practices**
- **Assessing logging environmental impact**
- **Monitoring deforestation and forest degradation**
- **Public transparency and accountability**
- **Disaster response and recovery**

EO based services for Law Enforcement

Developing services based on EO data combined with ICT data analytics and non-EO data for the Law Enforcement sector

https://eo4society.esa.int/projects/eo-law-eo-derived-information-in-support-of-law-enforcementerived-information-in-support-of-law-enforcement/