



In situ

# Copernicus In-Situ Component

**Cross-cutting in-situ activities  
supporting biodiversity applications**

José Miguel Rubio Iglesias (EEA)

BIOSPACE 25, 13 February 2025



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# In-situ data in Copernicus

Copernicus in-situ data: observations, **geospatial reference** and ancillary data licensed or provided for use in Copernicus

What for?

- **Production and validation** in Copernicus services
- As stand-alone **observation** products
- **Cal/Val** of satellite sensors

**Without in-situ data, Copernicus simply cannot deliver its data, products and services**



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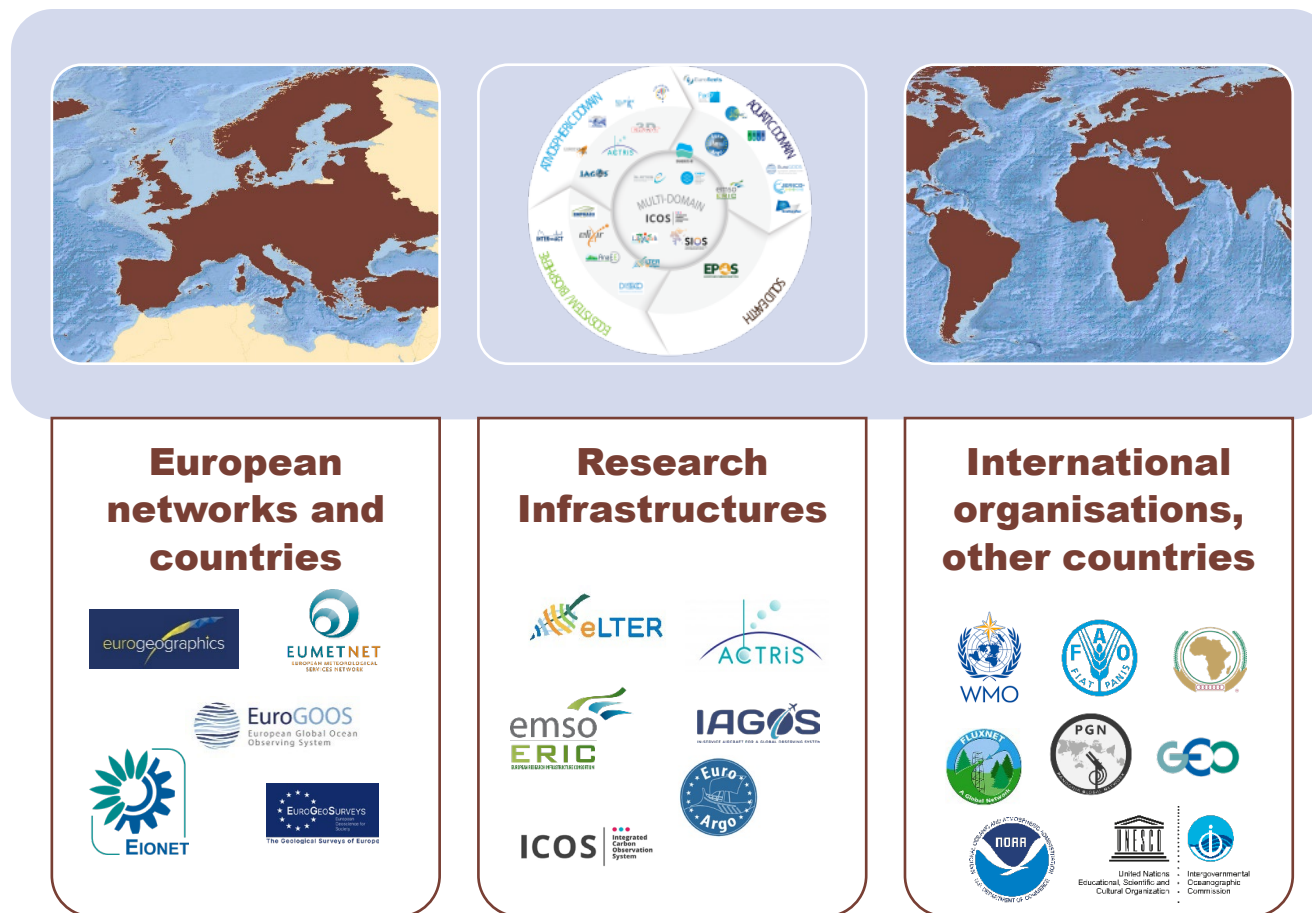
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# Where does in-situ data come from?

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In Situ data comes from a **myriad of data providers** and networks at national, regional and global level.



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# Governance of the Copernicus In-Situ

**Entrusted Entities** access and manage in situ data directly according to their operational needs on a day-to-day basis.

The **EEA** intervenes when a coordinated approach to accessing in situ data is required at a programmatic level: “cross-cutting activities”



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# Cross-cutting coordination activities (2021-2028)

- State of Play report
- Copernicus In-Situ Data Requirements (CIS<sup>2</sup>)
- Factsheets

STATE OF PLAY



- Copernicus Reference Data Access Portal (CORDA)
- Access to specific in situ data

DATA ACCESS



- Licensing agreements
- Use cases
- Inventory of data providers

ENGAGING WITH DATA PROVIDERS



- In Situ Working groups
- Thematic Reports, inventories
- GEO, R&D

SUPPORT AND ADVICE



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# State of Play : key issues encountered

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Access conditions and use restrictions



Insufficient spatial coverage



Uncertain sustainability of critical networks



Fragmentation and heterogeneity



Lack of alignment with data providers



Insufficient acknowledgement



Not long enough historical high time series



More data needed on specific areas



Increasing demands in frequency and resolution



Rapid accessibility



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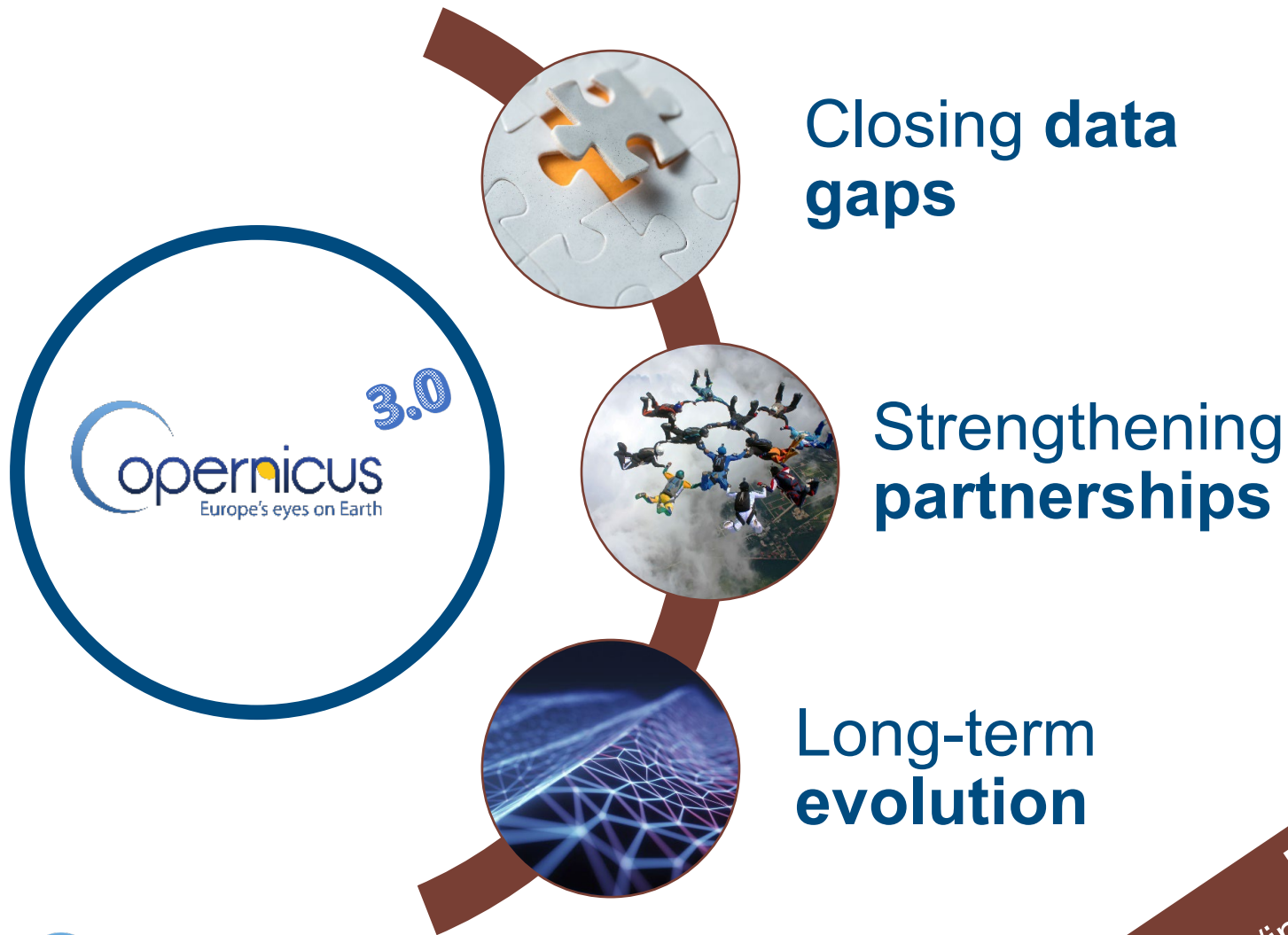


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# State of Play: Areas for evolution



More information on  
<https://insitu.copernicus.eu/state-of-play>



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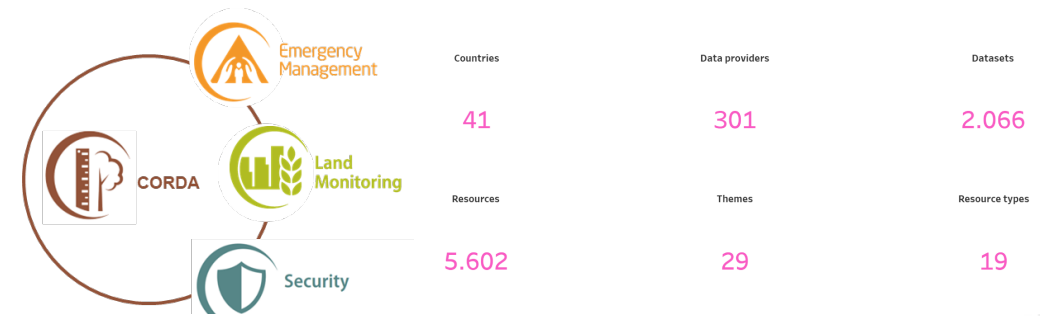




# Access to geospatial data: CORDA

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- Single entry point node to national and regional geospatial data
  - Data hosted in origin by default
  - Continuous monitoring and update
  - Semantically harmonized multi-country databases for key topics
  - Restricted for Copernicus service providers and data providers
- <https://corda.eea.europa.eu/>



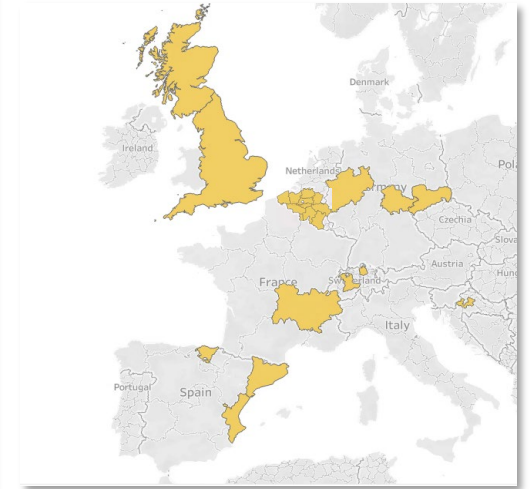
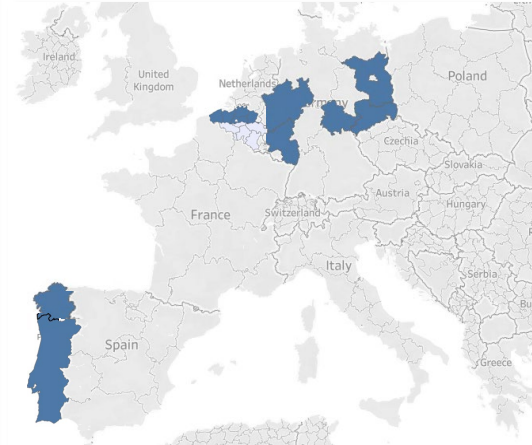
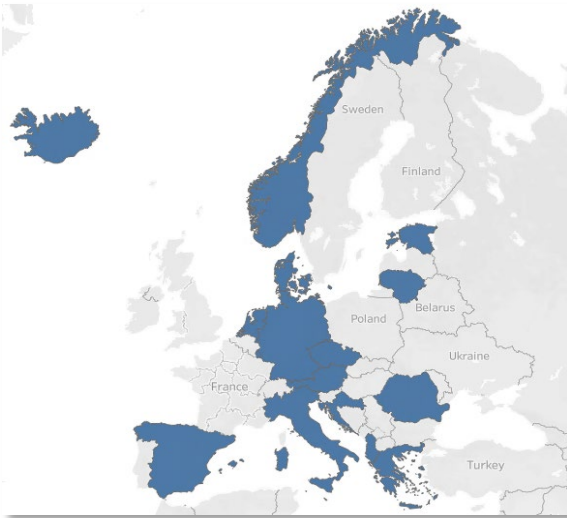
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# Examples of downloadable data in CORDA

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## Wetlands

- 15 national datasets
- 8 regional datasets

## LiDAR

- 15 national datasets
- 16 regional datasets



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# Engaging with data providers

National Data Providers | Data Provider Networks | All Data Providers

Greece

| Country | Name   | Website   | Type     | Requirement groups |
|---------|--|---|----------|--------------------|
| Greece  | Department of Geodesy and Surveying - Aristotle University of Thessaloniki (AOU)                             |   | Research | Other              |
| Greece  | Democritus University of Thrace, Department of Environmental Engineering, Special Account for Research Funds | http://www.recom.duth.gr/                                 | Research |                    |
| Greece  | Hellenic Centre for Marine Research, Institute of Oceanography (IOO)   | http://www.hcmr.gr/en/                                    | Research |                    |
| Greece  | National Observatory of Athens (NOA)   | http://www.gsi.hcmr.gr/services/GPS/NOA.php               | Research |                    |
| Greece  | Biomedical Research Foundation of the Academy of Athens  | https://www.bioacadem.gr/                                 | Research |                    |
| Greece  | University of Athens Institute of Accounting Systems and Applications  | http://forecast.uoa.gr                                    | Public   |                    |
| Greece  | National Cadastre and Mapping Agency S. A.   | http://www.estratogeia.gr/files/wn/Pages/Defa.../all.aspx | Public   |                    |
| Greece  | National Technical University of Athens, Physics Department  | https://www.physics.ntua.gr/~nrcak/en.html                | Public   |                    |
| Greece  | University of Crete  | http://www.uoi.gr/  | Public   |                    |

Product experience service

Type

Number of datasets

Comprehensive inventory of data providers and networks

Use of Italian national land cover / land use data to support identification of difficult mapping areas along coastal zones

Summary

Abstract data like the Copernicus data for Italy were used to support the thematic interpretation and Q-QA of the production of CLM4 crop type maps for the 'Copernicus' project. The use of national land cover data was necessary to improve the accuracy of the maps in other areas and the identification of the CLM4 data. With the digital interpretation data based on the CLM4 satellite imagery, the accuracy risks support the visual interpretation of difficult areas. The map of the Italian land cover system, among other things, information about habitats and their evaluation at scale of 1:50,000 and 1:25,000.

Datasets used

Data providers

Preview

Use of Austrian LPIS data in the production of HRL VLCC - crop type product

Summary

LPIS data is key for calibration and validation of HRL VLCC (Vegetation Level Cover Characteristics) Crop Type products (CTY). The HRL VLCC CTY for the reference year 2015 is a 10m scale product with a 10m resolution. While some other CLM4 products can also rely on visual interpretation, this is no longer feasible for large scale classification of crop type level. Production of CTY is currently ongoing and the product is neither published nor validated yet but that results from the internal validation show that the results are significantly better in all areas where detailed LPIS data is available as input for the production. LPIS data for Austria are provided by the Austrian Government.

Datasets used

Data providers

Preview

Use cases of national data in Copernicus

Copernicus Services Framework Agreement

Between: EuroGeographics AISBL, an international non-profit organisation under Belgian Law, with its registered office at address Rue du Nord, 16, 1000 Brussels, Belgium. Registration N°033.627.112

Hereafter "EuroGeographics" or "the Association"

And: [ Name ], a national organisation having the status of a [ ], registered under the laws of [ ] with its registered address [ ], Registration N° (if any) [ ], VAT N° (if any) [ ] Hereafter "the Member"

Hereby duly represented by [ ]

Licensing agreement for the use of data and/or products for the Copernicus Services

1. PARTIES

This License is agreed between:

**EUMETNET**, Avenue Des Orfèvres, 5, 1000 Brussels, Belgium. Licensor of the data and/or products to be licensed herein, acting on behalf of its Members, represented by Eric PETERMANS, Member or related to the Licensor

and

**The European Environment Agency**, (hereinafter referred to as the "EEA") acting under delegated tasks for the European Commission and Copernicus. The Commission makes the delegation agreement on the implementation of the Copernicus Land Monitoring Service and the Data Component entered into with the European Union on 1 December 2014, implemented for the purpose of this license agreement by Mr. Hans Brochez, Executive Director

and representing the following Copernicus Service Operator:

European Commission Joint Research Centre (Emergency Management Service and the Land Monitoring Service);  
The European Environment Agency (Land Monitoring Service);  
Meteo France (Meteo France Monitoring Service);  
France, European Maritime Safety Agency and European Centre for Crisis (Disaster) Service;  
European Centre for Medium-Range Weather Forecasting (Atmosphere Monitoring Service and Climate Change Service)

hereinafter collectively referred to as the Licensor for the purpose of this agreement where a provision applies without distinction to the EEA or a Copernicus Service Operator.

2. HEREMETERISE

The Licensor is authorized to use as a non-exclusive basis the data and/or products referred to in Article 1 and described in Annex 1 (and referred to as the Data). This Data is provided as specified hereafter:

• For use by these organisations with a delegated authority from the European Commission the Copernicus Services Operator in order to help fulfil the terms of their respective delegated agreement.

This Permitted Use shall be in accordance with the Limitations of Use as described under Article 4 below.

The terms and conditions of the present license agreement shall apply notwithstanding the provisions of Framework Contract No. 016/08/01/2004, Lot 1, signed between the EEA and

Overarching licensing agreements for Copernicus use

Engagement with thematic communities, programmes and initiatives



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# Use cases of in-situ data in Copernicus

## In situ

### Validation of the Copernicus Land Monitoring service's bio-physical products.

Use Case | Created 09 Aug 2024 | Published 27 Aug 2024 | Modified 13 Jan 2025

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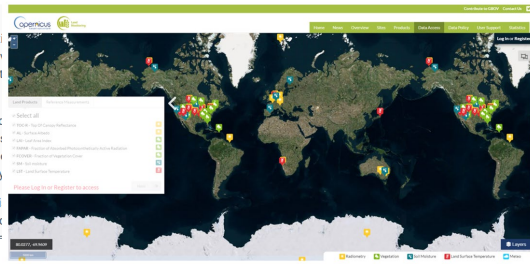
Resources > Folder of all use cases > Validation of the Copernicus Land Mon...

#### Summary

The Copernicus Land Monitoring Service (CLMS) performs systematic terrestrial cryosphere variables, i.e., the bio-geophysical status and energy portfolio focuses on land temperature and reflectance observations from satellite surfaces.

This results in a continuous timeseries of Vegetation indicators, Land Use and Land Cover Reflectance observations suited for environmental analysis and decision-making, providing a comprehensive view of the Earth's energy dynamics, enabling information on climate change mitigation, sustainable land use, water management, and biodiversity.

Importantly, validation against in-situ or ground-based observations shows that CLMS are consistent, fit for purpose, and meeting key user quality requirements with well specified and quality controlled in-situ data and networks.



Geographical distribution of stations and networks used by the Copernicus Land Monitoring Service for validation of biophysical products. Credit: Copernicus Land Monitoring Service (CLMS) / Joint Research Centre (JRC).

### Lake water quality

Use Case | Created 09 Aug 2024 | Published 27 Aug 2024 | Modified 13 Jan 2025

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Resources > Folder of all use cases > Lake water quality

#### Summary

Lake water quality information helps manage valuable ecosystems for nature and human activities and documents the impact of climate change and pollution. Lake water quality is vital to understanding not only the quality of the water in the lake, but also changes in land use as well as water chemistry, temperature and quality of contributing streams and rivers. It is of critical importance to aquatic ecology, and often to water supply. Changes to optical properties can indicate the influence of land use change, changes in water quality.

The Copernicus services produce several water quality related products:

- Turbidity (water clarity);
  - Trophic state index based on chlorophyll-a;
  - Lake surface reflectances measuring the apparent colour of the water.
- The next generation of products is expected to include additionally:
- Total suspended matter concentrations;
  - Chlorophyll-a concentration as a direct measure of phytoplankton biomass;
  - Harmful algal blooms of cyanobacteria.

Satellite data, such as those provided by Copernicus Sentinels, greatly reduce the potential for 'accessibility bias', whereby in-situ observations are taken from easily accessible areas rather than the best scientifically. Additionally, satellite observations can be taken from any location.



### Use of national habitat types in Iceland to support the production of CLC+ raster product

Use Case | Created 26 Jun 2024 | Published 12 Jan 2017 | Modified 14 Jan 2025

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Resources > Folder of all use cases > Use of national habitat types in Iceland...

#### Summary

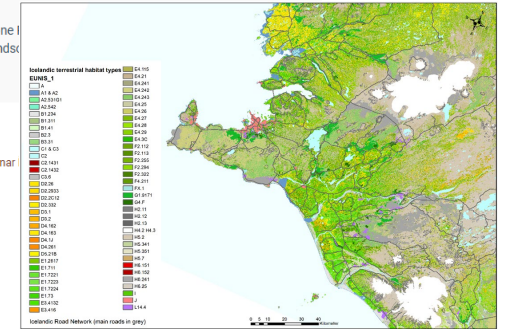
In the CLMS Land Cover and Land Use Mapping production of the CLC+ Backbone habitat map was used for sample point interpretation especially for complex lands and herbaceous areas which are difficult to differentiate on satellite images.

#### Datasets used

- Icelandic Terrestrial habitat types (EUNIS classification) map (Kortasjá Náttúrufræðistofnunar Náttúrufræðistofnun Íslands)

#### Data providers

- Icelandic Institute of Natural History (IINH)



### Use of Spanish national data in supporting post-wildfire damage assessment

Use Case | Created 26 Jun 2024 | Published 16 Aug 2023 | Modified 13 Jan 2025

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Resources > Folder of all use cases > Use of Spanish national data in support...

#### Summary

On 15th August 2023, a wildfire broke out on Tenerife, Canary Islands, Spain, particularly affecting Arafo and Candelaria municipalities, with potential risks of spreading to other areas. The affected region in Forestal Natural Park, and poses a threat to the Teide National Park, the Mapping service was activated with the EMSR685 code to monitor the over 12,000 hectares, and about 207 buildings were identified as potential. The Spanish national data (The Forest Map) was used as a (i.e. agriculture production and crop, forest stand information etc.) context.

#### AO1: TENERIFE

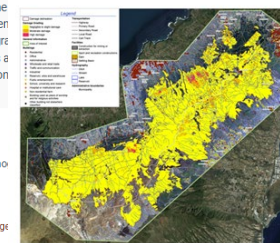
|            | Unit of measurement | Destroyed | High damage | Moderate damage | Height to light damage | Total affected |
|------------|---------------------|-----------|-------------|-----------------|------------------------|----------------|
| Burnt area | ha                  | 0.0       | 87.2        | 825.6           | 11027.7                | 11900.5        |

#### P14 – Impact assessment on assets and population Affected areas by fire severity

|                      | Unit of measurement                                | High damage | Moderate damage | Height to light damage | Total affected | Total    |
|----------------------|--|-------------|-----------------|------------------------|----------------|----------|
| Burnt area           | ha   | 87.2        | 825.6           | 11027.7                | 11900.5        | 26750.0  |
| P14 (Buildings)      | 211 (Affected buildings, Damage)                   | 71.89       | 747.99          | 4344.39                | 8760.03        | 14284.32 |
| P14 (Population)     | 212 (Affected buildings, Damage on population)     | 0.00        | 0.00            | 279.96                 | 30.33          | 460.32   |
| P14 (Infrastructure) | 213 (Affected buildings, Damage on infrastructure) | 0.00        | 0.00            | 0.00                   | 0.00           | 5.57     |
| P14 (Infrastructure) | 214 (Affected buildings, Damage on infrastructure) | 0.00        | 0.00            | 0.00                   | 0.00           | 197.95   |
| P14 (Infrastructure) | 215 (Affected buildings, Damage on infrastructure) | 0.00        | 0.00            | 185.52                 | 185.52         | 307.86   |

#### P15 – Impact assessment on selected aspects An extraction from the affected forest classification table (based on National Forestry Map classes)

P07 - Wildfire delineation and grading



#### Datasets used

- The Forest Map of Spain, Ministerio para la Transición Ecológica y el Reto Demográfico

#### Data providers

- Spanish Ministry for the Ecological Transition and the Demographic Challenge



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Copernicus Europe's eyes on Earth





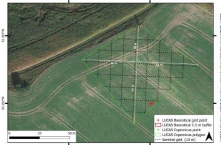
# Relevant reports and inventories

In situ



## Assessment of the current usage of LUCAS survey in Copernicus

With focus on production activities within Land Monitoring Service and Emergency Management Service – Mapping component



Version: 2.2  
Date: 20/09/2024

This report has been produced under the Framework Service Contract (EAS/DS/030002) for the provision of services supporting the European Environment Agency's activities cross-cutting coordination of the Copernicus programme in the data domain – Observational Data

## Assessment of the use of LUCAS in Copernicus Land production activities

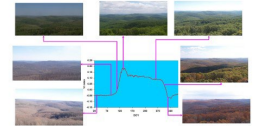
<https://insitu.copernicus.eu/resources/library/assessment-of-the-current-usage-of-lucas-survey-in-copernicus-january-2024>

## Metadata inventory of historical in-situ data for vegetation phenology products

<https://insitu.copernicus.eu/resources/library/global-phenology-inventory>



## Metadata inventory of historical in-situ data for vegetation phenology products



Version: V1.0  
Date: 30/03/2024  
This report has been produced under the Framework Service Contract (EAS/DS/030002) Lot 1 for Services supporting the European Environment Agency's (EEA) cross-cutting coordination of the Copernicus programme in the data domain – Observational Data



## Roadmap for a crowdsourcing campaign for in-situ data collection to support Copernicus Land Monitoring Service (CLMS) activities

Preparatory work for a crowdsourcing campaign supporting the HR Vegetated Land Cover Characteristics – Grassland Mowing Product (GSM)



Version: 1.1  
Date: 17/12/2024

This report has been produced under the Framework Service Contract (EAS/DS/030002) for the provision of services supporting the European Environment Agency's activities cross-cutting coordination of the Copernicus programme in the data domain – Observational Data

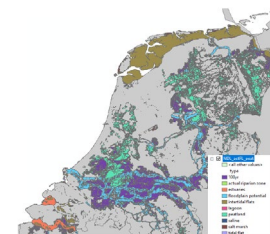
## Crowdsourcing approaches for the collection of grassland mowing events

<https://insitu.copernicus.eu/resources/library/crowdsourcing-campaign>

## Assessment of the availability of wetlands dataset for CLC+

Table 1: requirements for wetland data for CLMS

| Requirement                         |  |
|-------------------------------------|--|
| spatial coverage                    | EEA38 + UK (pan-European coverage)   |
| temporal coverage/ update frequency | annually, 3-yearly   |
| Reference years                     | 2018, 2021, 2022-  |
| Format                              | vector or raster   |
| resolution                          | MMU 0.5ha; 10m   |
| Licensing                           | free and open, or for Copernicus projects use                              |
|                                     | needed   |
|                                     | LAEA   |
|                                     | ~ 80%  |
|                                     | separation of unmanaged and managed wetlands                               |
|                                     | differentiation between water and wetlands                                 |
|                                     | <b>Inland wetlands:</b> inland marshes, peatbogs (exploited, unexploited), |
|                                     | <b>coastal wetlands:</b> salt marshes, saline, intertidal flats,           |
|                                     | water courses, lakes and reservoirs, transitional waters, sea & ocean      |
|                                     | differentiation inland water and sea water                                 |
|                                     | visual interpretation, semi-automatic processing                           |



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**[copernicus.insitu@eea.europa.eu](mailto:copernicus.insitu@eea.europa.eu)**



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# Ongoing in situ support activities

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## Design of a crowdsourcing campaign

Design a **pilot crowdsourcing-based campaign** in support of CLMS (grassland mowing events under HR VLCC).

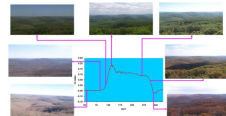


## Support on the future of LUCAS survey

## Inventory of phenology datasets

Creation of **inventory of in-situ historical metadata of data** relevant for vegetation phenology products: citizen science, phenocams and ecological observatories.

Historical In-situ Metadata  
Inventory for vegetation  
phenology products



Version: VXX  
Date: XX  
This report has been produced under the Framework Service Contract ESAC/DIR/2016/1 for the Service supporting the Copernicus Governance Agency (ESCA) cross-cutting coordination of the Copernicus programme's in situ data activities - Observational data.

## Inventory of phenology datasets



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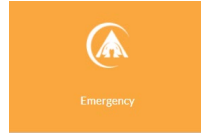


In situ

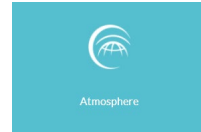
# Requirements for in-situ data at global level

Feedback from the IEA, linked with the coordination of Copernicus' access to in situ data. Some of these results may also be reported by the individual Copernicus Services.

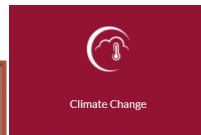
| Entity   | Signed        | Status / Impact   |
|--|---------------|---|
| United States – U.S. State Department  | October 2015  | Nothing to report.  |
| Australia – Geoscience Australia   | November 2015 | A Technical Operating Agreement was signed May 2017 by the IEA and Geoscience Australia. The purpose of the agreement is 'to facilitate dialogue and data sharing between Copernicus Australia and Copernicus'.   |
| Brazil – Ministry for Science, Technology, Innovation and Communication of Brazil    | March 2018    | Within the frame of the Cooperation Arrangement and based on a specific request, climate and meteorological observations have been delivered by the Brazilian Meteorological Institute (INMET) to Copernicus.   |
| Chile – Undersecretariat of Telecommunications of the Republic of Chile              | March 2018    | Within the frame of the Cooperation Arrangement and based on a specific request, historical and real time meteorological observations have been delivered to Copernicus via the National Weather Office of Chile and University of Chile.                   |
| Colombia – Institute of Hydrology, Meteorology and Environmental Studies of Colombia | March 2018    | Dialogue has been initiated and concrete in situ data requirements defined by the Copernicus Services have been passed on to the Institute of Hydrology, Meteorology and Environmental Studies of Colombia (IDEAM). No concrete results have been achieved. |
| India – Department of Space of India   | March 2018    | Dialogue has been initiated and concrete in situ data requirements defined by the Copernicus Services have been passed on to the Indian Space Organisation (ISRO). No concrete results have been achieved.  |
| Ukraine – Ukraine State Space Agency   | May 2018      | Nothing to report.  |
| Serbia – Ministry of Education, Science and Technological Development of Serbia      | June 2018     | Nothing to report.  |
| African Union – African Union Commission   | June 2018     | Nothing to report.  |
| Canada – Canadian Space Agency   | May 2022      | Within the frame of the Cooperation Arrangement and based on a specific request, a large amount of climate and meteorological observations have been delivered to Copernicus by Environment Climate Change Canada.  |
| Panama – National Authority for Government Innovation                                | December 2022 | Nothing to report.  |
| Japan – Ministry of Economy, Trade and Industry of Japan                             | January 2023  | Dialogue has been initiated (April 2022) and concrete in situ data requirements defined by the Copernicus Services have been passed on to the Ministry of Economy, Trade, and   |



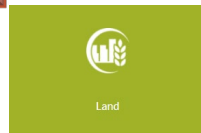
Emergency



Atmosphere



Climate Change



Land

More than 10 International Arrangements with non-EU countries

## Hydrology

- River discharge
- Reservoir volumes

## Atmosphere

- Concentrations of major air pollutants (NO<sub>x</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>, CO, SO<sub>2</sub>, HCHO, Pb, TSP, C<sub>6</sub>H<sub>6</sub>, among others).
- Improved observation of size resolved chemical composition of aerosol.
- Improved global observations of greenhouse gas concentrations and related species (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, 14C, ...).
- Vertically resolved concentration data of pollutant gases and aerosol.
- Solar radiation and UV.

## Climate

- Surface observations from all stations registered in WMO Oscar/Surface

## Land

- Land cover ground observations, and for some specific areas of interest, crop type observations
- Water quality observations
- Water level observations
- Soil moisture information
- GBOV complementing stations



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# New Copernicus In-Situ website – subscribe!

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**COPERNICUS IN-SITU COMPONENT**  
Copernicus relies on the availability of a wide variety of in-situ data. These data are used for production and validation of Copernicus products and are also provided to users as observations in their own right.

[Image story](#)

Image © Isra'at Atmospheric Observatory/Clarity BAYN Ltd/Cover

## Copernicus and its In-Situ Component

In-situ data, namely observations and geospatial reference data, are crucial for the generation, calibration and validation of satellite data, products and services of Copernicus, the Earth Observation component of the EU Space Programme.

- Copernicus is the European Union's revolutionary Earth Observation component of the EU Space Programme. It transforms information from multiple sources, including the Sentinel satellites and in-situ observations. Into operational services for keeping watch over the planet – from the land to the ocean, atmosphere and climate.
- For its operations, Copernicus relies on ground-based, air and sea borne monitoring systems, geospatial and ancillary data from a range of providers. These data constitute the "Copernicus In-Situ Component" and also complement and calibrate satellite information to increase product accuracy, reduce delivery time and support validation.
- The Cross-Cutting Coordination of the Copernicus In-Situ Component, led by the European Environment Agency (EEA), maps the availability of data and identifies gaps or bottlenecks in access. It also supports the provision of cross-cutting data and information, and manages partnerships with data providers to improve access and use.

## In-situ data in Copernicus and its governance

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Use of Polish national data LiDAR in the production of CLMS Urban Atlas Building Block Height (BBH) product (2012) Copernicus In Situ

High quality LiDAR data has been used as first scenario for generating the Copernicus Land Monitoring Service (CLMS) Urban Atlas Building Block Height (BBH) dataset (production process) when reaching the target year (2012). These are the main data.

Use of data from Austrian Automatic Tracking Total Station of ground movements for the validation of the European Ground Motion Service (EGMS) product | Copernicus In Situ

The daily ground monitoring measurements in X, Y and Z coordinates are acquired by continuous Automatic Tracking Total Station (ATTS) systems. The ATTS are autonomous geodesic devices for 3D monitoring of deformations. They consist of optical targets.

Use of French Ground Movements database for the validation of the European Ground Motion Service (EGMS) product | Copernicus In Situ

The French national database of ground motion includes positions of landfills for each French department and for one of the EGMS validation areas (French Pyrenees Alps). The core files include point coordinates of different registered phenomena.

Use Cases

**Data Providers**

As part of the Copernicus In-Situ Component Information System (CIS), the EEA maintains a list of national, European and international in-situ data providers to Copernicus.

| Country   | Name   | Website   | Type     | Requirement group |
|-----------|--|---|----------|-------------------|
| Albania   | Institute for Public Health (ISHP)   | <a href="http://shpa.gov.al">http://shpa.gov.al</a>   | Public   | Atmosphere        |
| Albania   | Agency of Environment and Forestry (AOF)   | <a href="http://aof.gov.al">http://aof.gov.al</a>   | Public   | Atmosphere, Ocean |
| Albania   | Ministry of Tourism and Environment  | <a href="https://www.mte.gov.al/">https://www.mte.gov.al/</a>   | Public   | Atmosphere        |
| Argentina | GOVERN DONDORA, Ministerio de Medio Ambiente, Agricultura y Sustentabilidad. Departamento de Med Ambiente (DesteMedAmb) (AR) | <a href="http://www.ama.gub.ar">http://www.ama.gub.ar</a>   | Public   | Atmosphere        |
| Argentina | Argentine Antarctic Survey and the Argentine Antarctic Army Command  | <a href="https://copernicus.gov.ar/registro/observa/">https://copernicus.gov.ar/registro/observa/</a>                 | Research |                   |
| Armenia   | Armenian Environmental Monitoring and Information Center   | <a href="http://www.ame.am/">http://www.ame.am/</a>   | Public   |                   |
| Australia | Copernicus National Scientific Data Infrastructure Research Unit   | <a href="https://www.csiro.au/">https://www.csiro.au/</a>   | Public   |                   |
| Australia | Australian Antarctic Division Department of the Environment and Heritage   | <a href="http://www.environment.gov.au/australia/antarctica/">http://www.environment.gov.au/australia/antarctica/</a> | Public   |                   |

In-situ data providers

**Articles**

In-Situ Component: Looking back and moving forward | Copernicus In Situ

The European Commission Agency (ESA) has a mandate from the Commission to oversee the state of in-situ data and to ensure the smooth operational delivery of this data to key entities like Copernicus Services, the European Space Agency, and ESA/ESTEC.

Reflecting on Copernicus, ground motion service and in-situ data at EEA over the years | Copernicus In Situ

Do not use a for operational purposes. All changes will be rapidly overwritten thanks to the automatic updates of the in-situ data provided to the European Environment Agency (EEA) using our services in the development of the Copernicus programme.

An Illustrated History of the In-Situ Component of Copernicus | Copernicus In Situ

Making Copernicus' 20th anniversary. Reflections on its 20-year history in Earth observation, overcoming early challenges, and future significance.

Articles

**Technical Reports**

Review of global in situ data for lakes and reservoirs

Global Lakes Reservoirs Report Catalogue v1.0.zip

Tags: #Lakes #Spatial data #Observations #Water

Copernicus components

Technical Reports

**State of Play**

Copernicus Climate Change Service

Why are in-situ data essential?

The Copernicus Climate Change Service (CCS) mission is to support adaptation and mitigation policies of the European Union (EU) by providing consistent and authoritative information about climate change. CCS offers free and open access to climate data and tools based on the latest available science and responds to user requirements defined by the Global Climate Observing System (GCOS).

The product portfolio of CCS is built around the concept of Essential Climate Variable (ECV) as defined by GCOS. These variables are used to monitor how the climate has been changing in the past and also how it will change in the future.

In-situ observations are fundamental to the quality of CCS products and services, and they must be preserved to enable future productions of Climate Data Records and Earth System Analysis. In general, CCS needs access to essential in-situ observations to perform three main tasks:

- Climate readiness.** In-situ observations provide essential information about the past climate, its variability and change. Observations are fundamental to user requirements defined by the Global Climate Observing System (GCOS).
- Calibration and validation of satellite observations.** In-situ observations enable production of multi-decadal CCS providing information about many different ECV datasets from calibrated and validated satellite data.
- Evaluation and improvement of climate models.** In-situ observations are used to compare model results against observations.

State of Play

**Newsletter**

Copernicus In Situ Newsletter #8

The events of the past 6 months have seen observations around the globe as countries grapple with the social, medical and economic impacts of the coronavirus pandemic. In this context, who monitors reflects on the status and progress of rock observations within the Copernicus In-Situ component and by associated partners.

Featured:

- The COVID-19 crisis affects information on the state of our environment, climate, and weather, derived from in-situ observations.
- Interview with Miká Curry, Secretary General and Executive Director, Eurogeographics.
- Some emerging approaches of potential value for the Copernicus In-Situ component.

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Newsletter

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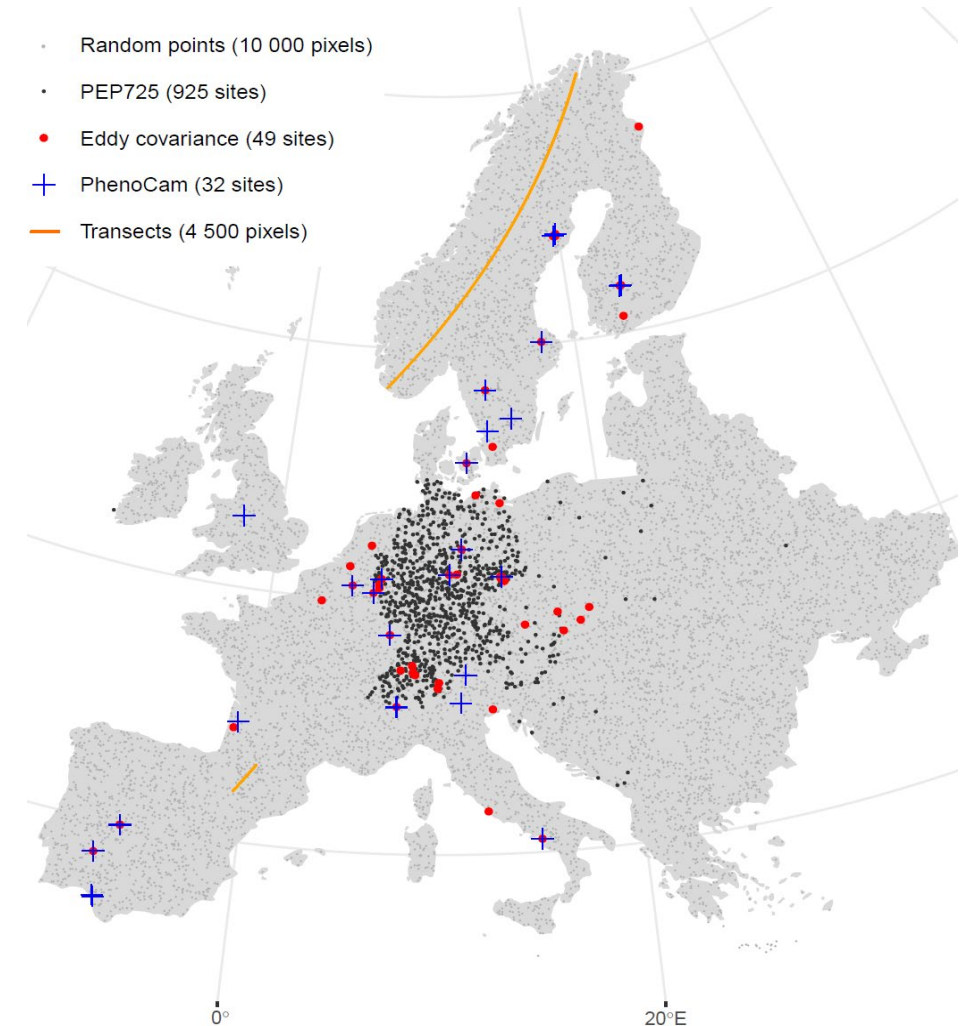
Implemented by European Environment Agency

# Calibration against reference data

## Reference datasets

- **GPP:** from eddy covariance (flux towers): 49 sites
- **PhenoCam:** greenness from phenological camera images: 32 sites
- **PEP725 ground phenological observations:** manual field observations: 925 sites
- **Agricultural crop data** (Belgium, Austria): 150 + 278 + 600 fields

*Tian, F., et al., 2021, Calibrating vegetation phenology from Sentinel-2 using eddy covariance, PhenoCam, and PEP725 networks across Europe. Remote Sensing of Environment, 260, 112456.*



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