

# DAY 3: Second Forum on EO for Carbon Markets Breakout Groups

BOG 4 - Addressing Uncertainties and Benchmarking in EO-based MRV for Carbon Removals  
Chairs: Antonella Succurro (CINSOIL) and Michelle Hermes (EARSC)

Ann Mari Fjæraa and Jose-Miguel Rubio Iglesias,  
EEA Copernicus in-situ (COINS)





In situ

# THE ROLE OF EEA FOR THE IN-SITU COMPONENT

**Ann Mari Fjæraa (NILU, EEA)**

**José Miguel Rubio Iglesias (EEA)**



PROGRAMME  
OF THE EUROPEAN UNION



Implemented by



# EEA and the Copernicus in-situ Component Information System (COINS)

## Why in-situ?

The EEA COINS in-situ component is an essential part of the Copernicus program.

It provides integrated groundbased “in-situ” data that complements satellite data observations, and which is used for Cal/Val, and for data model production and verification.

Designed to manage, coordinate and provide access to data for various Copernicus services like atmosphere, marine, land, climate and security monitoring.





**Without in-situ data,  
we cannot deliver high quality and reliable products and services.**

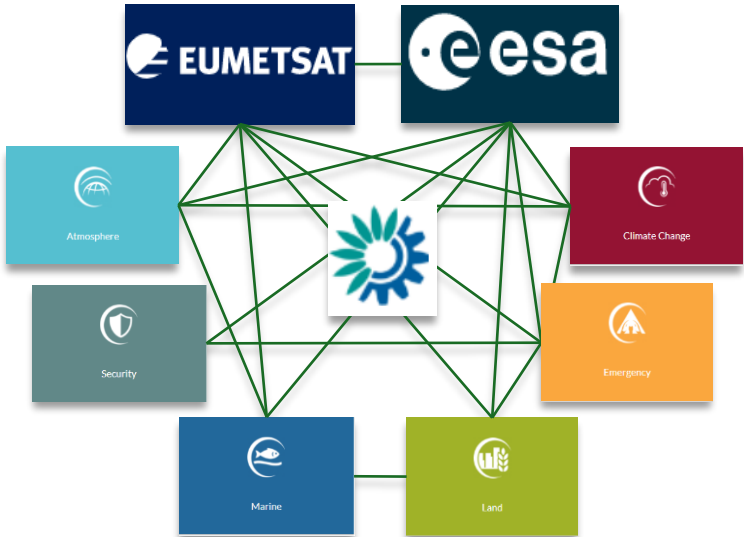


# EEA and the Copernicus in-situ Component Information System (COINS)

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.

<ul style="list-style-type: none"> <li>• State of Play report</li> <li>• CIS2</li> <li>• Factsheets</li> </ul> <p><b>STATE OF PLAY</b></p> 	<ul style="list-style-type: none"> <li>• CORDA</li> <li>• Access to specific in situ data</li> </ul> <p><b>DATA ACCESS</b></p> 	<ul style="list-style-type: none"> <li>• Licensing agreements</li> <li>• Use cases</li> <li>• Country reports</li> </ul> <p><b>ENGAGING WITH DATA PROVIDERS</b></p> 	<ul style="list-style-type: none"> <li>• In Situ Working groups</li> <li>• Reports, inventories</li> <li>• GEO, R&amp;D</li> </ul> <p><b>SUPPORT AND ADVICE</b></p> 
--	--	---	---



# EEA and the Copernicus in-situ Component Information System (COINS)



## Our climate data to monitor Europe's progress

A robust reporting system is required to **monitor progress toward EU climate change mitigation targets**. The EEA is a key player in setting up these **reporting systems**, providing guidance to Member States on how to report and quality check the input. The EEA collects and provides access to the following types of data:

- Greenhouse gas (GHG) inventories;
- Greenhouse gas projections;
- Policies and measures;
- National systems for GHG policies and measures and projections;
- Use of EU emissions trading system auctioning revenues;
- Information on support to developing countries;
- National climate change adaptation actions;
- Ozone-depleting substances;
- CO<sub>2</sub> emissions from new passenger cars, vans and heavy-duty vehicles.

Much of the data comes from datasets collected by the EEA. This data is then used to **fulfil the EU's own targets** and to allow the European Commission to assess whether the Union is on track to meet its **international pledges** made in the United Nations setting.

# EEA and the Copernicus in-situ Component Information System (COINS)

## The role of in-situ data:

In-situ data offers more localized, high-precision observations, which are essential for verifying EO data and improving models, especially in carbon removal monitoring (e.g., forest biomass, soil carbon);

Help to ensure that products are both accurate and reliable for monitoring carbon sinks and land use changes.

International arrangements;  
Support for enabling of international data via agreements.

\* Provided from the EEA, subject to the coordination of Copernicus access to in-situ data. Some of these results may also be reported by the individual Copernicus Services.

Partner	Signal	Status / Impact
United States – U.S. State Department	October 2018	Linking to report.
Australia – Copernicus Australia	November 2018	A Technical Operating Agreement was signed May 2017 by the EEA and Copernicus Australia. The purpose of the agreement is to facilitate data exchange and data sharing between Copernicus Australia and Copernicus.
Brazil – Ministry for Science, Technology, Innovation and Communications of Brazil	March 2018	Within the Scope of the Cooperation Agreement and based on a specific request, observations have been delivered to Copernicus by the Brazilian Meteorological Institute (INMET) via Copernicus.
Chile – Undersecretariat of Telecommunications of the Republic of Chile	March 2018	Within the Scope of the Cooperation Agreement 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	Chaperone has been installed and covers in-situ data requirements defined by the Copernicus Service. Data have been passed on to the Institute of Hydrology, Meteorology and Environmental Studies of Colombia (IDEAM). 100 in-situ results have been delivered.
India – Department of Space of India	March 2018	Chaperone has been installed and covers in-situ data requirements defined by the Copernicus Service. Data have been passed on to the Indian Space Organisation (ISRO). 100 in-situ results have been delivered.
Ukraine – Ukraine State Space Agency	May 2018	Linking to report.
Japan – Ministry of Education, Culture and Sports, Science and Technology	June 2018	Linking to report.
Austria – Austria Copernicus User Commission	June 2018	Linking to report.
Canada – Canadian Space Agency	May 2017	Within the Scope of the Cooperation Agreement and based on a specific request, a set of ground-based and atmospheric observations have been delivered to Copernicus by Environment Canada Change Canada.
France – National Authority for Geospatial Information	December 2017	Linking to report.
Spain – Ministry of Economy, Trade and Industry of Spain	January 2017	Chaperone has been installed (April 2017) and covers in-situ data requirements defined by the Copernicus Service. Data have been passed on to the Ministry of Economy, Trade and Industry. 100 in-situ results have been delivered.

**More than 10 International Arrangements with non-EU countries**



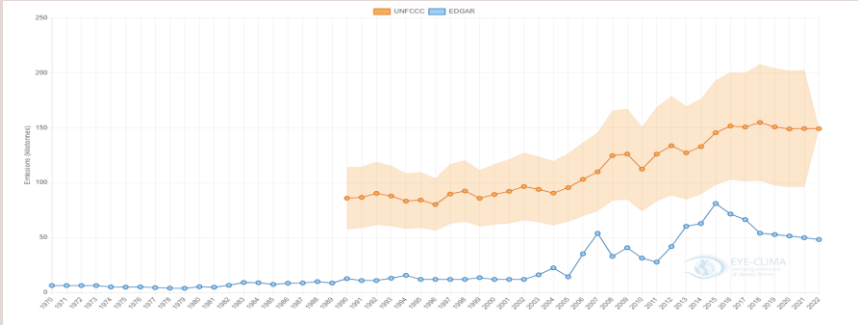
# EEA and the Copernicus in-situ Component Information System (COINS)

## How in-situ, Satellites and Models work together

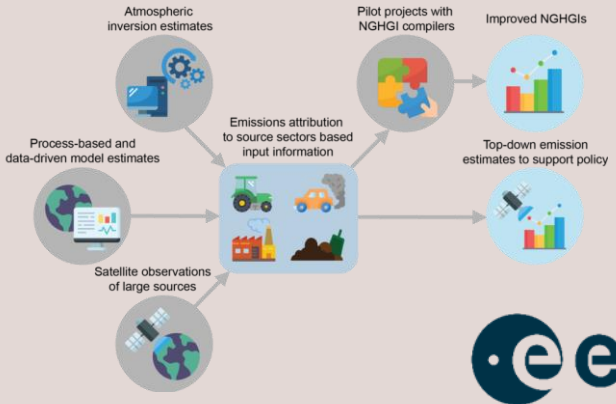
**Model Production and Validation:** Models (e.g., carbon stock assessments, land-use change predictions) are run and validated using both satellite and in-situ data to ensure they reflect real-world conditions.

**Benchmarking Models:** In-situ data helps **identify the strengths and weaknesses of various models** by testing them in different environmental conditions. This ensures that the best models are used in regions where they perform optimally, especially in carbon-heavy ecosystems like forests and wetlands.

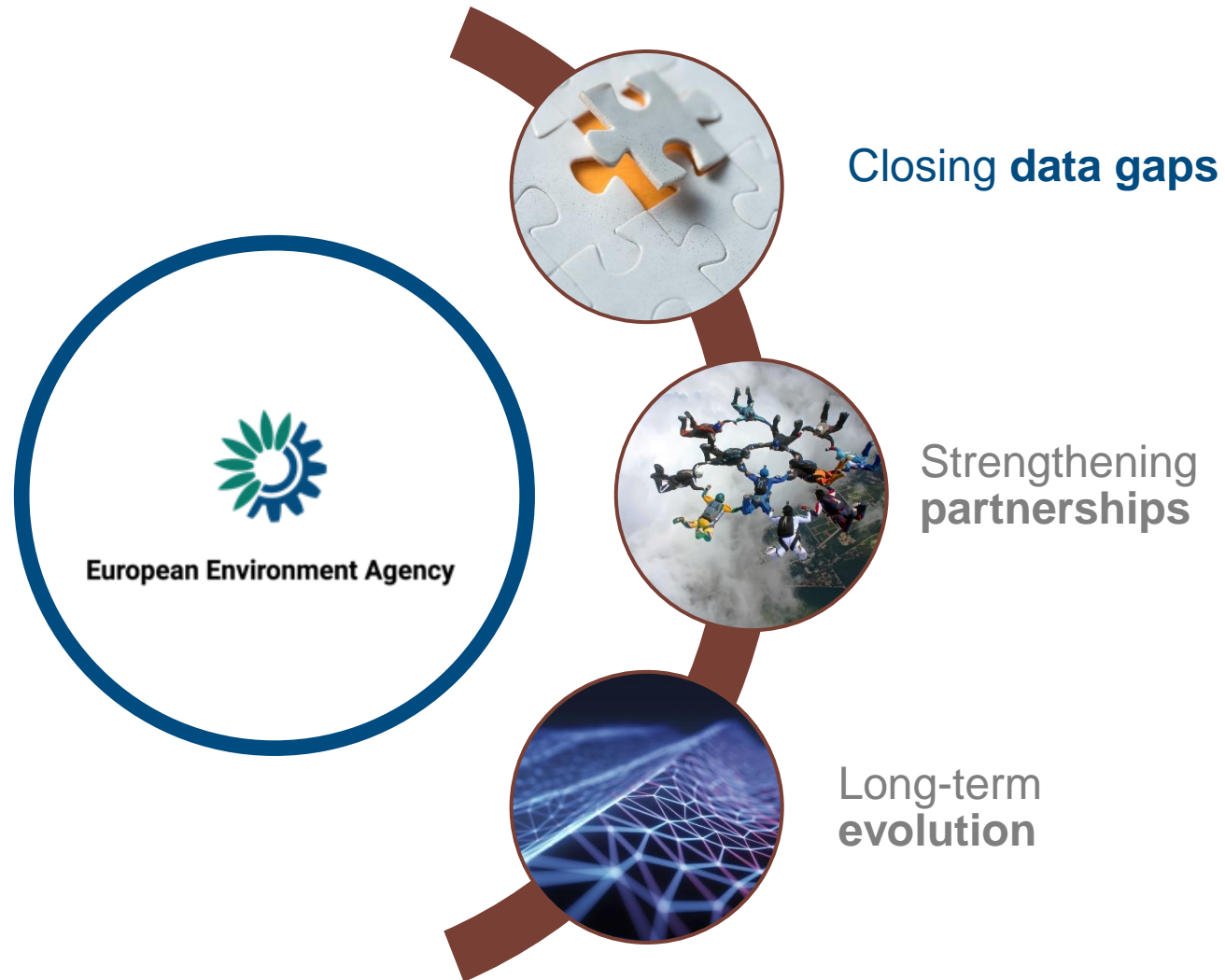
Reliable in-situ data helps policymakers and businesses make informed decisions on environmental and climate actions, enhancing the credibility of carbon removal projects in the EU. Much of the data comes from datasets collected by the EEA.



Technology	Afforestation and reforestation	Soil carbon sequestration	Bioenergy with carbon capture & storage	Direct air carbon capture & storage	Enhanced weathering	Peatland and coastal wetland restoration	Blue carbon management	Ocean albedo enhancement	Ocean fertilisation
Capture mechanism	Land based biological	Land based biological	Land based biological	Chemical	Chemical	Land based biological	Ocean based biological	Geochemical	Ocean based biological
Feasibility/Readiness	Green	Green	Green	Green	Green	Green	Yellow	Yellow	Yellow
Scalability	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Ease of MRV	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Potential consequences	Green	Green	Green	Green	Green	Green	Green	Green	Green
Public perception	Green	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Cost (US\$/tCO <sub>2</sub> e)	~ 100	~ 100	100-500	100-500	> 800	100-500	~ 100	~ 100	Too early to quantify
Storage medium	Buildings, vegetation, soils and sediments	Buildings, vegetation, soils and sediments	Geological reservoirs	Geological reservoirs	Minerals	Vegetation, soils and sediments	Minerals	Minerals	Marine sediments
Permanence	Decades to centuries	Decades to centuries	Ten thousand years or longer	Ten thousand years or longer	Ten thousand years or longer	Decades to centuries	Decades to centuries	Centuries to millennia	Centuries to millennia
Metric performance	Green	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow



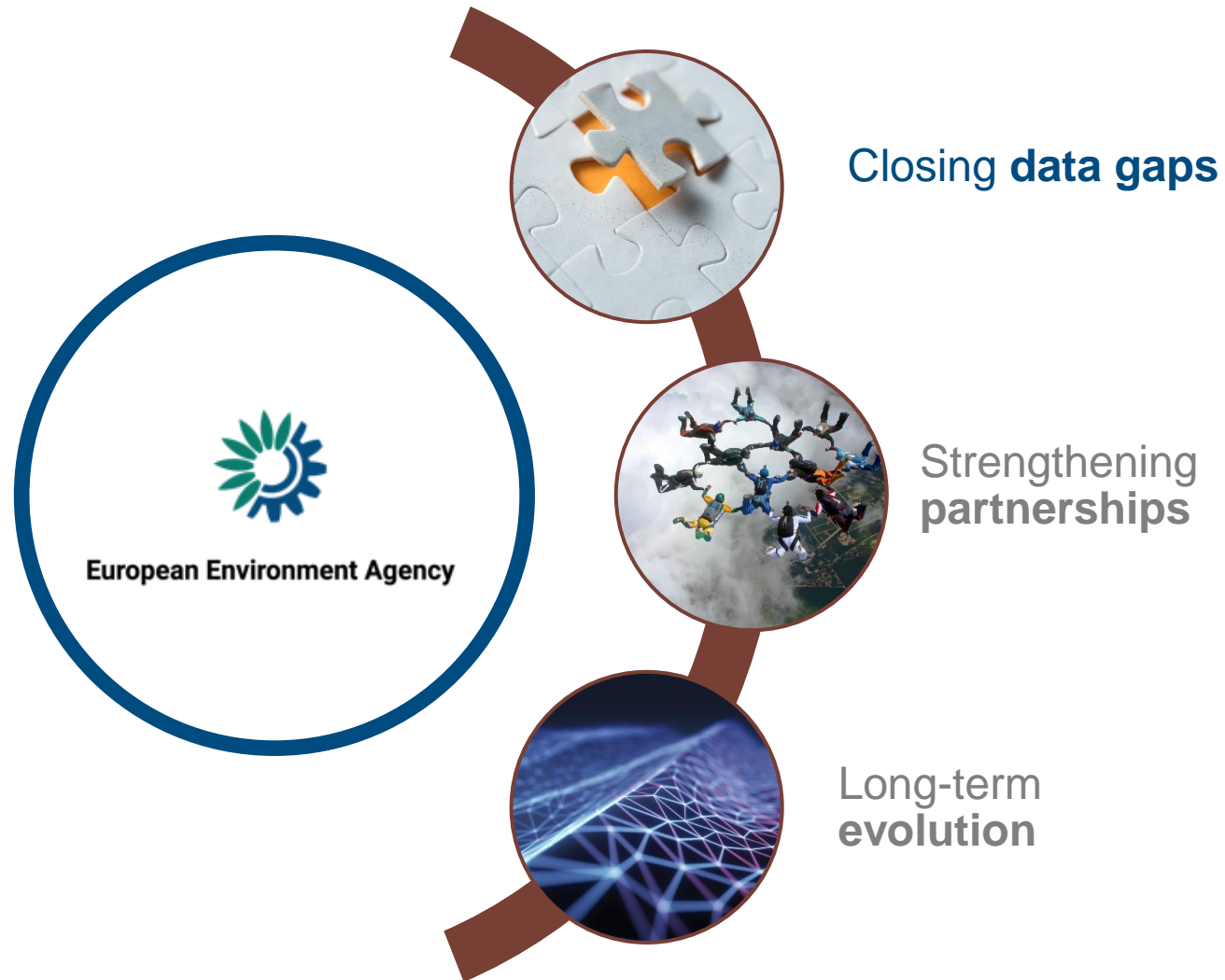
# EEA and the Copernicus in-situ Component Information System (COINS)



- ✓ Promoting open data policies
- ✓ Standard access solutions
- ✓ Implementation of Open Data Directive in EU
- ✓ Access to historical datasets

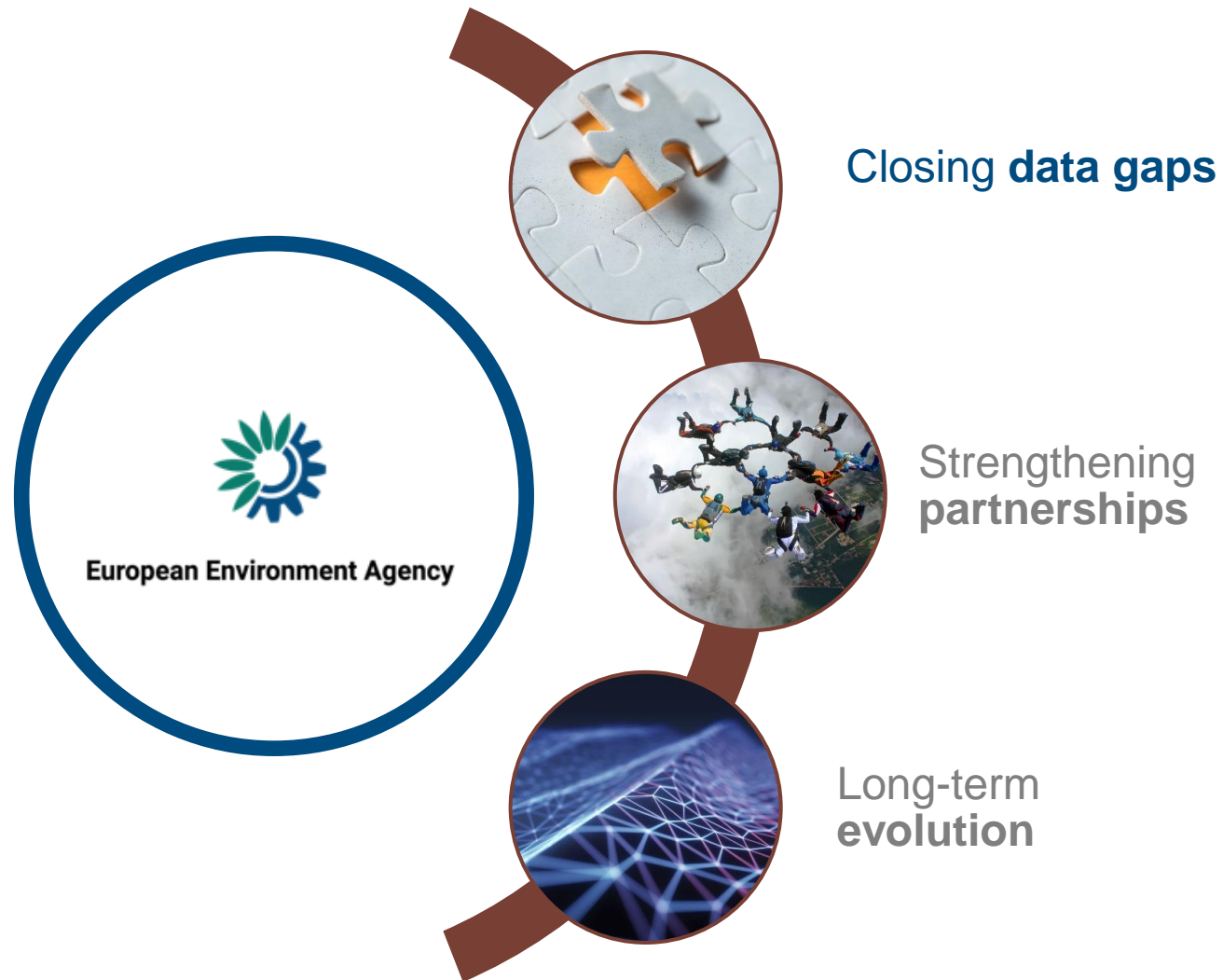


# EEA and the Copernicus in-situ Component Information System (COINS)



- ✓ Promoting open data policies
- ✓ Standard access solutions
- ✓ Implementation of Open Data Directive in EU
- ✓ Access to historical datasets
- ✓ International arrangements with non-EU countries
- ✓ Data sparse regions
- ✓ Collaboration with international organisations & networks

# EEA and the Copernicus in-situ Component Information System (COINS)



- ✓ Promoting open data policies
- ✓ Standard access solutions
- ✓ Implementation of Open Data Directive in EU
- ✓ Access to historical datasets
- ✓ International arrangements with non-EU countries
- ✓ Data sparse regions
- ✓ Collaboration with international organisations & networks
- ✓ **Close-to-real time reference products**
- ✓ **Alternative data sources**
- ✓ **Towards a different in-situ observation funding setting?**

# EEA and the Copernicus in-situ Component Information System (COINS)

## Where can the EEA contribute?

**Data Standardization:** The EEA can facilitate the harmonization of in-situ and satellite data across member states, improving the consistency of carbon monitoring.

**Benchmarking Models:** By coordinating with research institutions, the EEA can contribute to benchmarking efforts that determine which models are best suited for different environments, helping to reduce uncertainties in carbon accounting.

**Capacity Building:** EEA can support member states in developing their in-situ infrastructure, ensuring that even regions with less-developed monitoring systems can contribute to accurate carbon removal assessments.

**Supporting Carbon Removal Efforts:** The EEA, through COINS, can enhance the verification and validation of carbon removal projects, ensuring they are accurately accounted for in the EU's carbon neutrality efforts.

# EEA and the Copernicus in-situ Component Information System (COINS)

## Communication efforts



**COPERNICUS IN-SITU COMPONENT**  
Copernicus Services rely 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.

**Explore the Copernicus In-Situ component**  
Copernicus, the Earth Observation component of the EU Space Programme, relies on in-situ data for the generation, calibration and validation of its satellite data, products and services.

**Why are in-situ data important for Copernicus?**  
In-situ data are essential to the delivery of high-quality, reliable and sustainable information. Without them, Copernicus simply cannot deliver its

**Launch in Q4 2024**

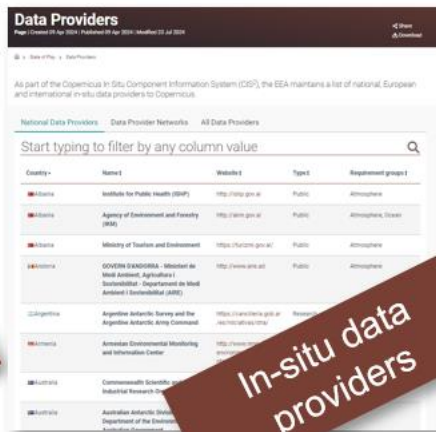


**Use of Polish national data LiDAR in the production of CLMS Urban Atlas Building Block Height (BBH) product (2012) | Copernicus In Situ**  
High quality LiDAR data has been used as first example for generating the Copernicus Land Monitoring Service (CLMS) Urban Atlas Building Block Height (BBH) dataset (product) processed when matching 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 last ground monitoring measurements in A, Y and Z coordinates are required to calibrate 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 historical database of ground motion includes coordinates of stations for each French department and for one of the EGMS calibration areas (French Pyrenees and Alps). The data include ground coordinates at different regular intervals.

**Use Cases**



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

Country	Name	Website	Type	Registration group
France	MetLife for Public Health (MPL)	http://mpl.gouv.fr	Public	Atmosphere
France	Agency of Environment and Forestry (ADE)	http://ade.gouv.fr	Public	Atmosphere, Ocean
France	Ministry of Tourism and Environment	http://tourisme.gouv.fr	Public	Atmosphere
France	COVDES (COORDONNÉE, Mesure de Vent, Arrière, Agulhas) / Sismoséisme / Département de Vent Arrière / Sismoséisme (DAS)	http://www.arsn.fr	Public	Atmosphere
Colombia	Agencia Nacional de Survey and the Argentine Antarctic Army Command	http://www.arsn.gov.co	Public	Atmosphere
Germany	Arbeitsgemeinschaft Umweltschutz und Umweltschutz Center	http://www.umweltschutz.de	Public	Atmosphere
Germany	Communitas Scientiarum et Technicarum (COST)	http://www.cost.eu	Public	Atmosphere
Germany	Austrian Antarctic Service	http://www.arsn.gov.at	Public	Atmosphere

**In-situ data providers**



**Copernicus Climate Change Service**  
Why are in-situ data important?  
The Copernicus Climate Change Service (C3S) mission is to support adaptation and mitigation policies of the European Union (EU) by providing consistent and authoritative information about climate change. C3S offers free and open access to climate data and tools based on the best available science and responds to user requirements defined by the Global Climate Observing System (GCOS).

**State of Play**



**In-Situ Component: Looking back and moving forward | Copernicus In Situ**  
The European Environment Agency (EEA) has a mandate from the Commission to oversee the state of the in-situ data and to support the overall operations. Several of the specific in-situ data providers are the European Space Agency and ESA.

**Reflecting on Copernicus, ground motion service and in situ data at EEA over the years | Copernicus In Situ**  
As part of the 3rd anniversary celebration, EEA has published a special report reflecting on the development of the Copernicus programme.

**An Illustrated History of the In-Situ Component of Copernicus | Copernicus In Situ**  
This report provides a historical overview of the in-situ data and its role in the development of the Copernicus programme.

**3rd Anniversary of COINS**

**Articles**



**Review of global in situ data for lakes and reservoirs**  
Lakes and reservoirs are important components of global water resources. The present report provides information on the state of in-situ data for lakes and reservoirs. The report covers the following areas: data availability, data quality, data access, data processing, data storage, data distribution, data use, and data management. The report also provides recommendations for improving the state of in-situ data for lakes and reservoirs.

**Technical Reports**



**Copernicus In-Situ Newsletter #3**  
The events of the past 12 months have seen challenges around the globe as countries grapple with the social, health and economic impacts of the coronavirus pandemic. In this context, this newsletter reflects on the status and progress of work undertaken within the Copernicus In-Situ component and its 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 Mick Carey, Secretary General and Executive Director, EuroGeographics.  
Some emerging approaches of potential value to the Copernicus In-Situ component.

**Newsletter**

# EEA and the Copernicus in-situ Component Information System (COINS)

## State of play:

The State of Play Report from EEA provides a comprehensive overview of the environmental situation across Europe.

**Assesses progress** towards environmental targets;  
evaluates the effectiveness of policies;  
and highlights key areas where further action is needed.

**Covers various environmental themes**, including air quality, climate change, biodiversity, water quality, and waste management, among others.

**Serves as an essential resource** for policy-makers, stakeholders, data providers, and the public to understand how well Europe is managing its environmental challenges.

Informs the development of **future environmental strategies** at both national and EU levels, supporting the European Green Deal and other sustainability initiatives.



# EEA and the Copernicus in-situ Component Information System (COINS)

## Points for the “speed dating”

Where can the EEA help you?

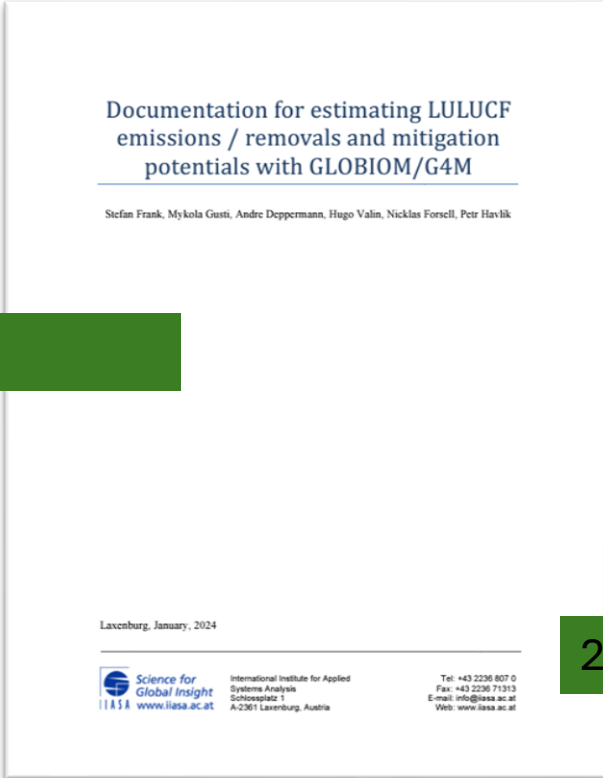
What is still missing?

Where are the major uncertainties?

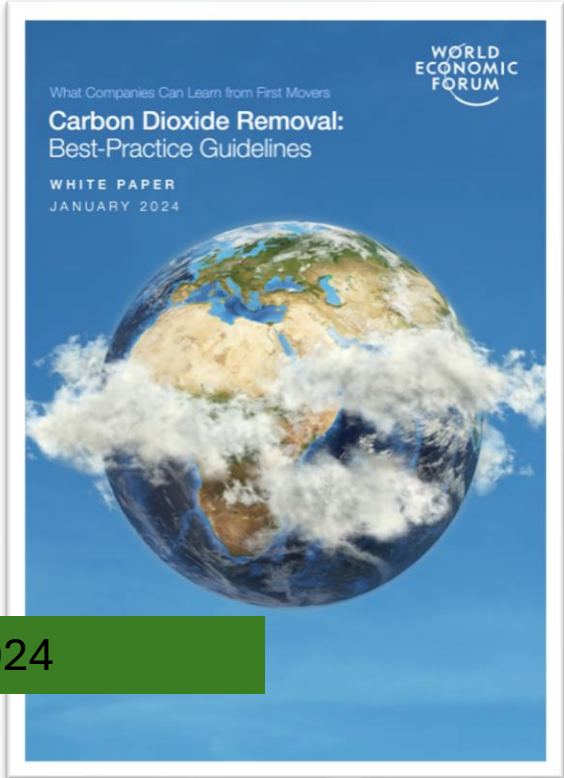
Where can in-situ data be a contribution?

Which data is needed?

2014



2024



**Copernicus EEA**  
1,258 seguidores  
2 semanas · 🌐

A big thank you to our colleagues from the Joint Research Centre (JRC), the Directorate-General for Defence Industry and Space (DEFIS), Copernicus ECMWF, Mercator Ocean International (Copernicus Marine Service), European Space Agency - ESA and EUMETSAT for participating in the Copernicus Working Group on #InSitu Observations.

Your inputs are essential for addressing the gaps, challenges and opportunities of the in situ data available within #Copernicus. Thanks to collaborative efforts like these, #EEA's In Situ coordination activities can optimally support all Copernicus Services and Entrusted Entities, and enable them to fulfil their user requirements.

Ver traducción

👍👏🗣️ 54 1 comentario · 6 veces compartid

👍 Recomendar    💬 Comentar    🔄 Compartir    ➦ Enviar