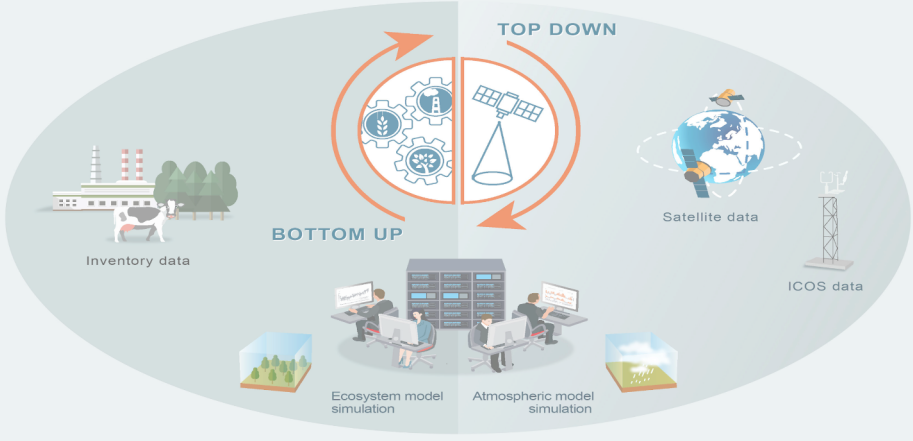
VERIFY General Assembly

The VERIFY legacy in CoCO2 and CAMS

May 9th -11th , 2022

Richard Engelen



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 776810

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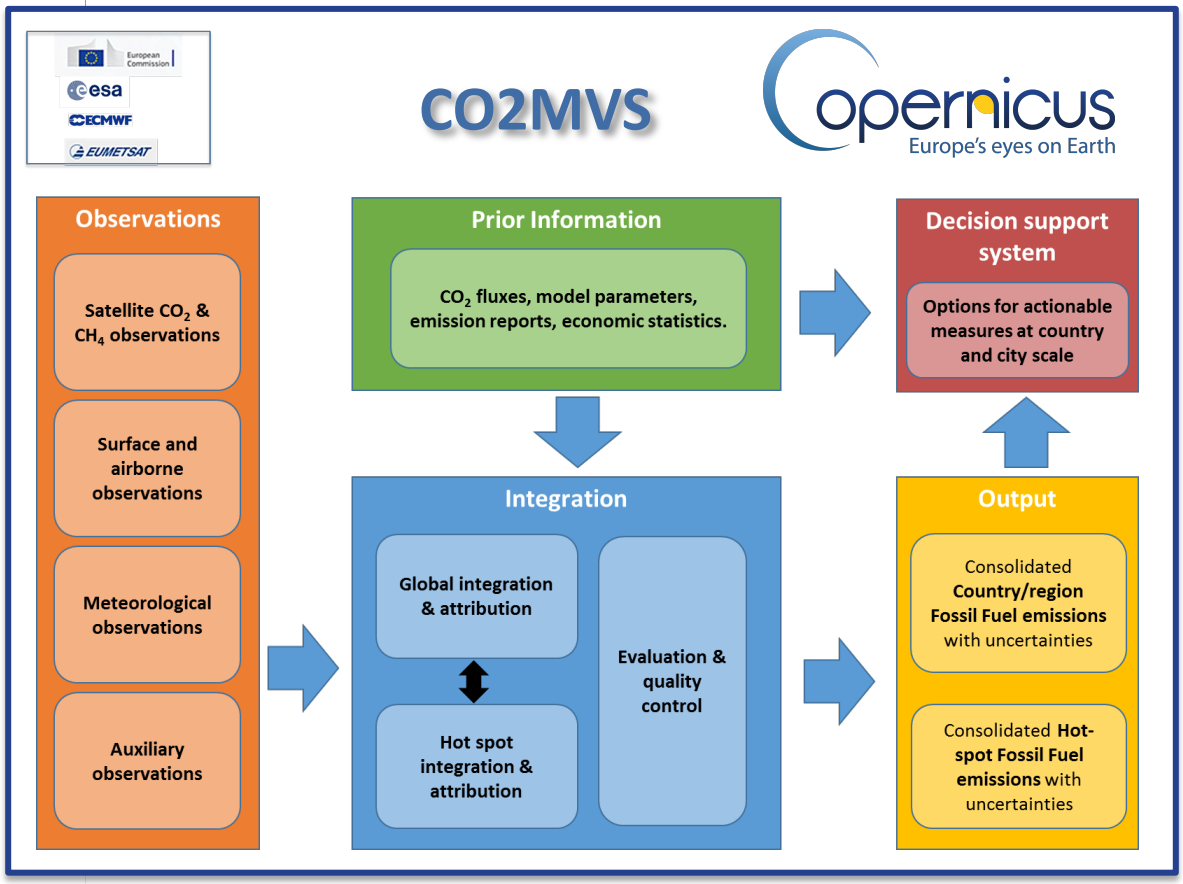
Copernicus CO_2 monitoring service



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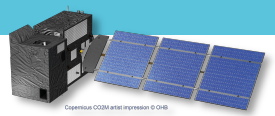
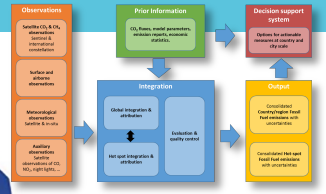
Towards the Copernicus CO2MVS

From expert groups through dedicated research funding to operational services





2026

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atmosphere.copernicus.eu

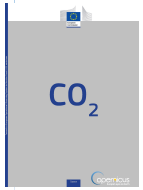
2021

UNITED NATIONS
PARIS CLIMATE AGREEMENT
SIGNING CEREMONY
22 APRIL 2016

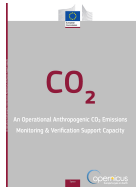
CoCO2
Prototype system for a Copernicus CO_2 service

2021

2018



2015



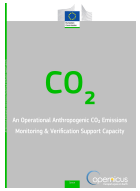
2017

CO_2 Human Emissions

2017

VERIFY

2018



2019

European Commission
esa
ECMWF
EUMETSAT

PROGRAMME OF THE EUROPEAN UNION

Copernicus
Europe's eyes on Earth

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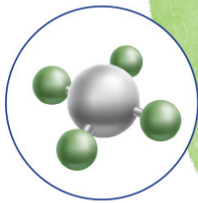
CAMS support to EU environmental ambitions

The European Green Deal

EU Methane Strategy



UNITED NATIONS PARIS CLIMATE AGREEMENT SIGNING CEREMONY — 22 APRIL 2016 —

Atmosphere Monitoring Service

Technical Annex for the budget implementation tasks linked to the provision of the Copernicus Atmosphere Monitoring Service (2021-2027)

PROGRAMME OF THE EUROPEAN UNION

Copernicus Europe's eyes on Earth

IMPLEMENTED BY ECMWF

Period: January 2021 – December 2023

CoCO2

Prototype system for a Copernicus CO_2 service

- **WP2 - Prior and ancillary information**
- **WP3 - Global modelling and data assimilation**
- **WP4 - Local and regional modelling and data assimilation**
- **WP5 - Connecting scales and uncertainties**
- **WP6 - Integration, testing, application, and initial validation of prototype systems**
- **WP7 - Observations**
- **WP8 - User engagement**

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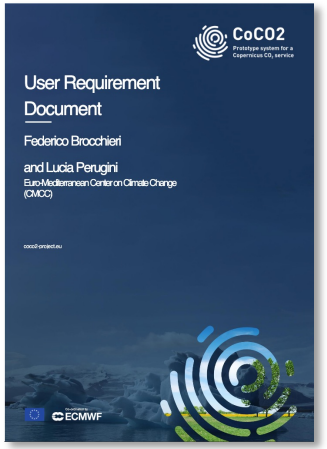
CoCO2 WP6

T6.1 Prolongation of the VERIFY synthesis for an additional year

Extend the VERIFY annual synthesis to 2021



T6.2 Identify relevant needs for the periodic Global Stocktake

Update of the VERIFY User Requirements Document

T6.3 Prepare prototype systems and data flow for the 1st GST

Prepare the codes of and the input data to the prototype systems for the 1st GST

T6.4 Provide emission estimates and corresponding evaluation for the 1st GST

Deliver prototype products for the 1st GST

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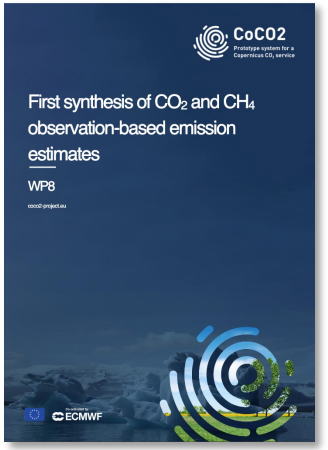
CoCO2 WP8

T8.1 Production of consistent estimates of emissions of CO_2 and CH_4

Bringing the information together to assess consistency and added value



T8.2 Blueprint for a decision support system

How do we convert the large amount of output data to meaningful information?

T8.3 Engagement with user communities

Interact with different user communities

T8.4 Priority needs for national inventory-based reporting

Extend the dialogue with national agencies, as started in VERIFY

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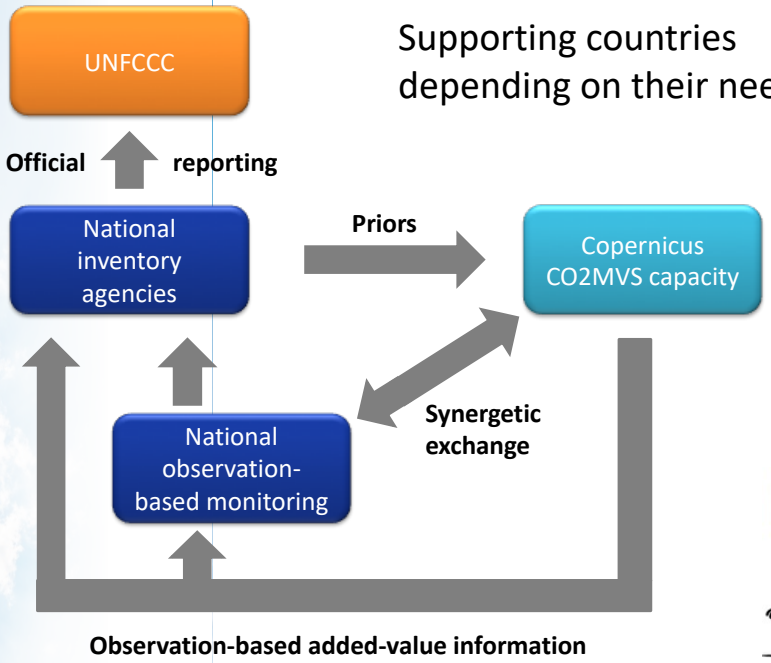
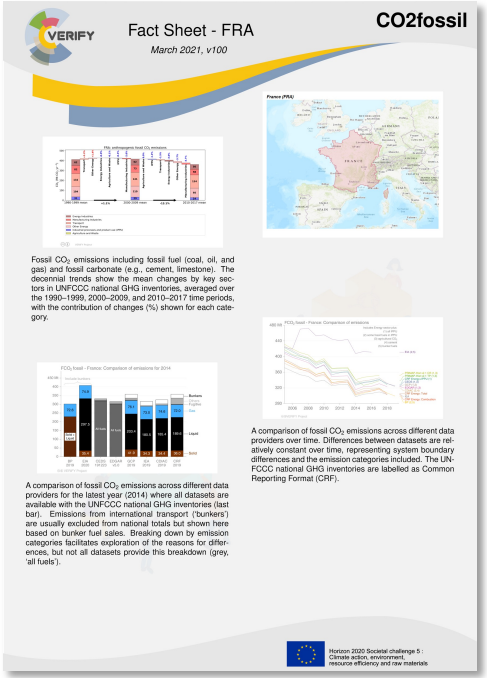
User engagement – co-design of service portfolio



Supporting countries depending on their needs.



Working with users to understand their requirements and together build the added value of the CO2MVS.

CAMS phase 2 (2021 – 2028)

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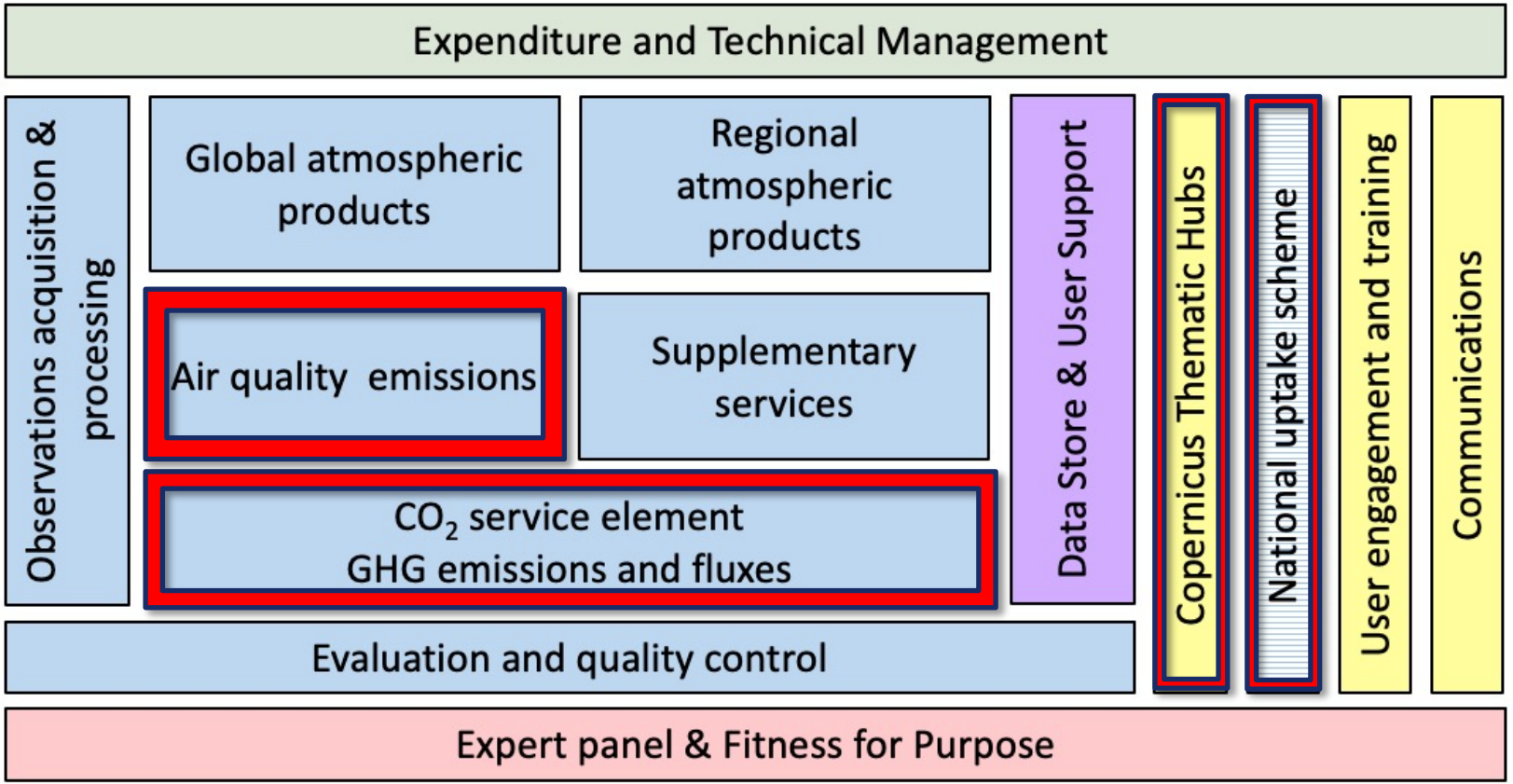


PROGRAMME OF THE EUROPEAN UNION

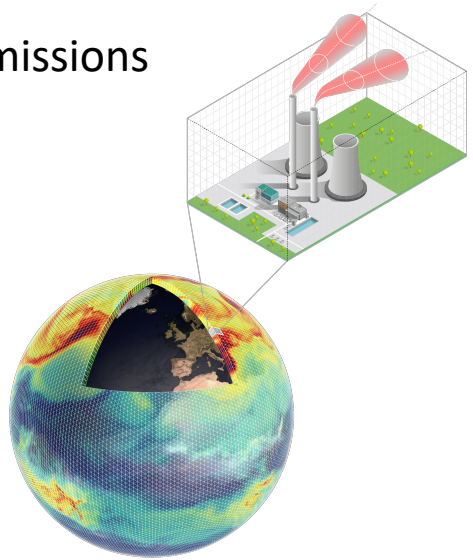
Copernicus Europe's eyes on Earth

IMPLEMENTED BY ECMWF

CAMS CO2 service element

Service element: CO_2 and other greenhouse gas emissions and fluxes

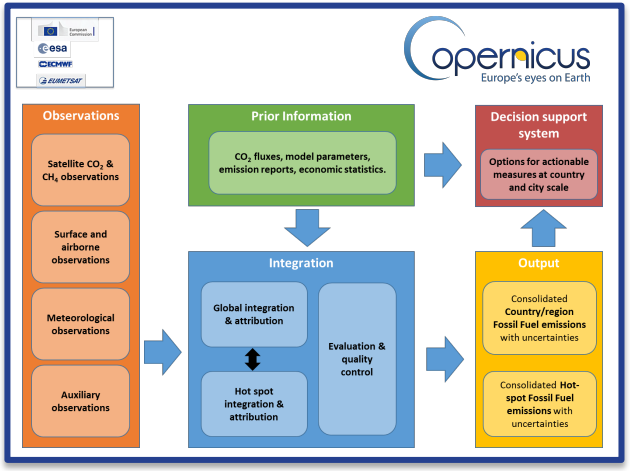
- **Prior emission** inventories of greenhouse gases (together with air quality)
- Development and provision of **global** observation-based emissions and fluxes
- Development and provision of **hot-spot** observation-based emissions
- Co-design of specific **user services**
- **EQC** of emissions and surface fluxes products



Integrated system approach

Key elements of the CO2MVS

- Operational with long-term horizon
- Intrinsic check of consistency between all input data streams and components of the carbon cycle
- Global & local scale
- Directly linked to emission estimates for air pollutants
- Support for national activities can be adapted based on requirements
- Services based on latest science
- In collaboration with KCEO, the service will be an access point for expertise



CAMS National Collaboration Programme (NCP)

The CAMS NCP is supporting EU Member States and Copernicus contributing countries with improving the uptake of CAMS products and promoting a partnership between CAMS and Member States

Recent meeting with Portugal, Czech Republic, Spain, Hungary, Norway, Iceland, The Netherlands, Poland, Bulgaria, Italy, France, and Germany.

Detailed discussions already with Germany, France, Italy, and Denmark

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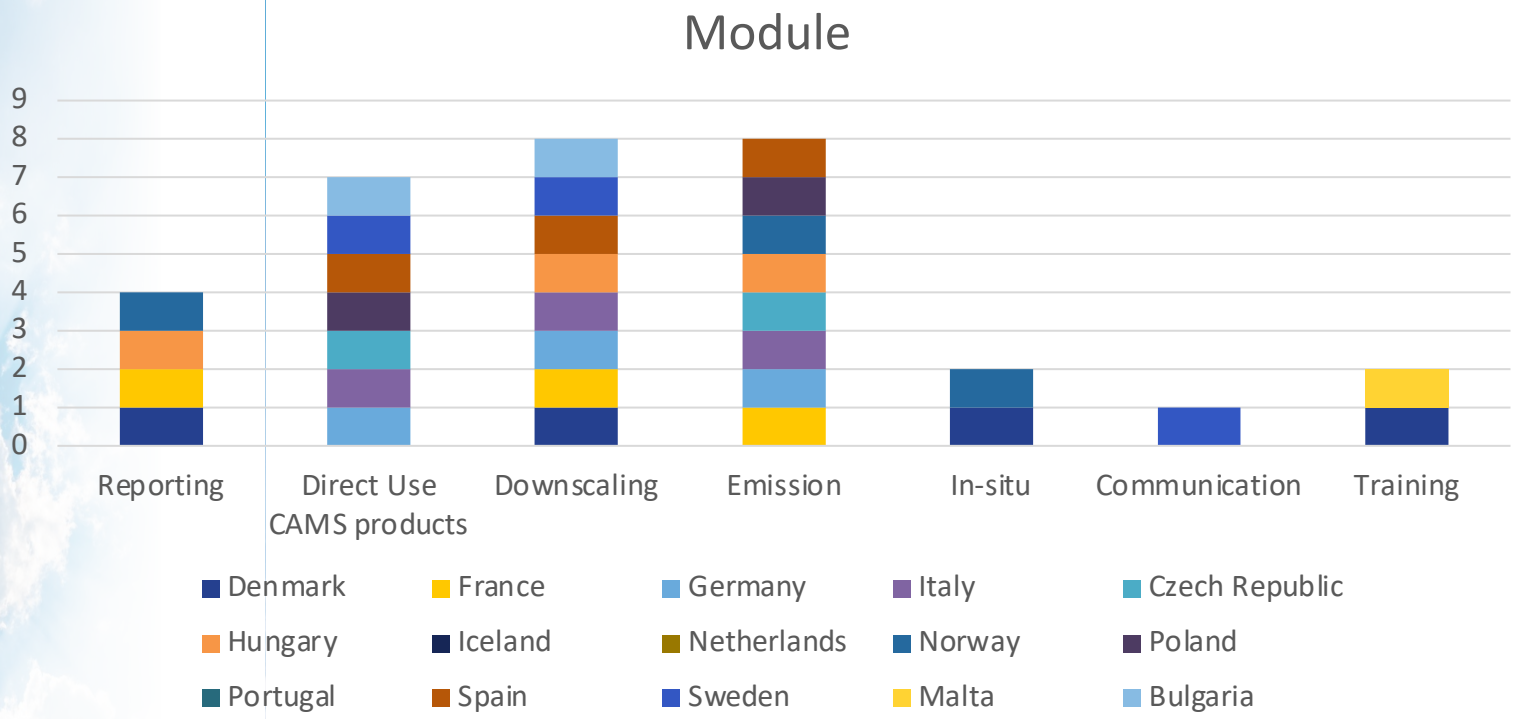
Initial interest in NCP modules



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What's next?

- CoCO2 will continue the discussion meetings with national inventory agencies, if we think that is a good thing to do.
- CAMS will ramp up its user interaction activities related to observation-based emission monitoring. This can be bilateral as well as in user-sector focused discussions.
- Ideally, all EU countries (and others) should be involved. Are there lessons to be learned from VERIFY about how to ensure focused constructive discussions?
- ECMWF is also collaborating with the EEA to see how best to support member states.

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Final remarks

Observations have their uncertainties and might be difficult to interpret in terms of emissions, but they represent the impact of all our (mitigation) actions on the atmospheric concentrations. They are an important way to show where we don't understand (yet) all that is happening.

Current science-based estimates might not be sufficiently mature yet to meet expectations, but now is the time to guide/support the development of these new services that will become part of our routine monitoring of emissions and the carbon cycle as a whole.

Translating the large wealth of data into policy-relevant understandable information products will be a critical part of the future service.