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ESA ESRIN EOP-SDS

The realisation of a long-term partnership

The European Commission's Deputy Director General for Research and Innovation, Patrick Child and ESA's Director general of ESA, Josef Aschbacher at the signing ceremony, January 2020.

A common goal

*"…. **to jointly advance Earth System Science** and its contribution **to respond to the global challenges that society is facing** in the onset of this century"*

European Commission

Joint EC-ESA Earth System Science Initiative

ESA

FutureEO

ESA new Science and Innovation Earth Observation Programme

EC-RTD

Horizon Europe

New EU Research and Innovation Framework Programme

- Advance EO capabilities, Advance Earth System Science, and predictive capabilities
- Accelerate science and innovation
- Maximize scientific impact of Earth observation
- Transfer results into solutions for society
- Promote international cooperation

European Commission

Priority Themes

COCO2: Budget Estimates for CO_2 and CH_4

coordinated by: ECMWF, UK

The CoCO2 project builds the prototype systems for a European Monitoring and Verification Support capacity for anthropogenic CO_2 emissions (CO2MVS), building on VERIFY project
CoCO2 works towards the following key objectives:

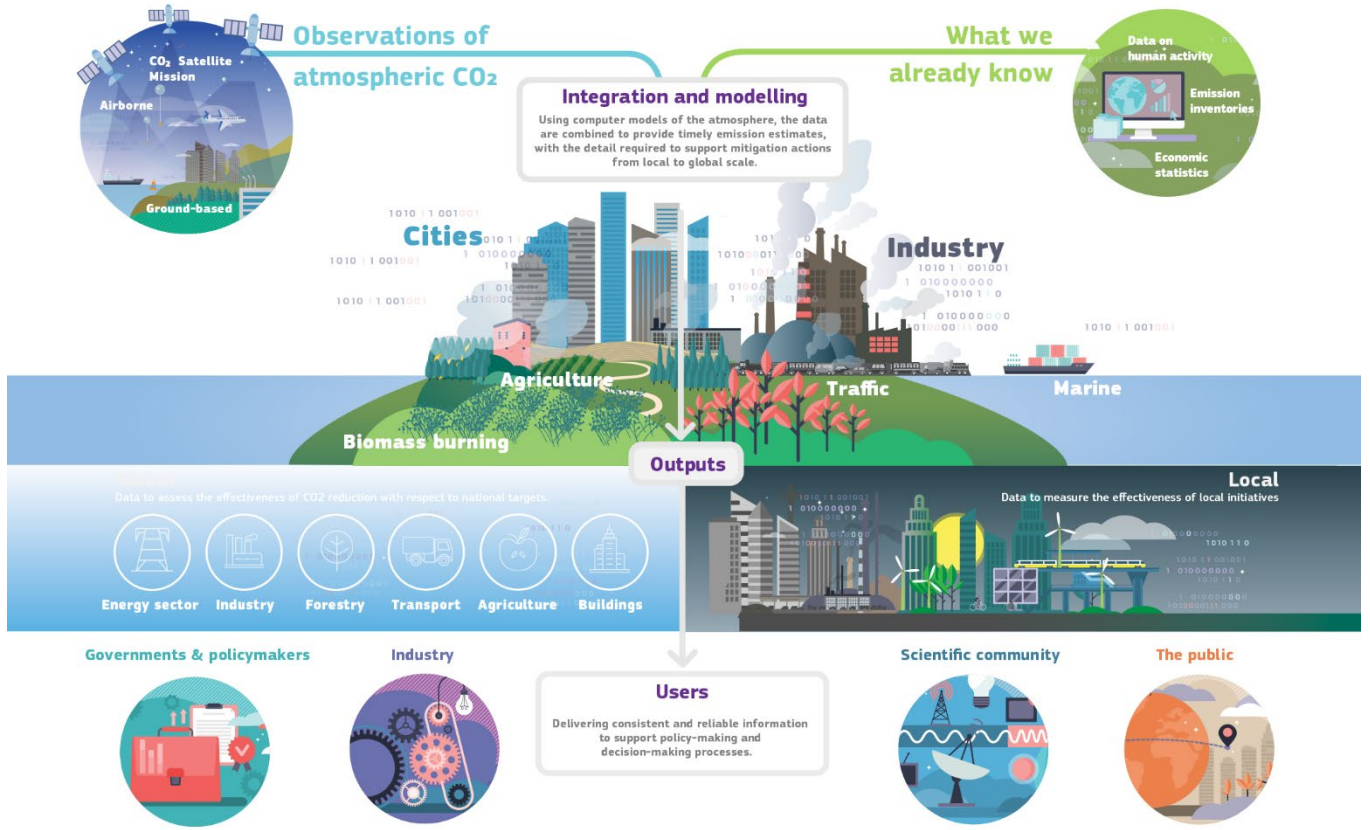
- Deliver prototype anthropogenic CO_2 emission estimation systems at global, regional and local scales;
- Develop methodologies to assess the propagation of uncertainties within the system as well as of the outputs resulting in an Evaluation and Quality Control framework;
- Provide first inputs to the global stocktake process in time for the first global stocktake in 2023;
- Provide recommendations for the operational implementation of the CO2MVS within the Copernicus Programme.

CoCO2
Prototype system for a Copernicus CO_2 service

European Commission

COCO2: Budget Estimates for CO_2 and CH_4

coordinated by: ECMWF, UK



CoCO2

Prototype system for a Copernicus CO_2 service

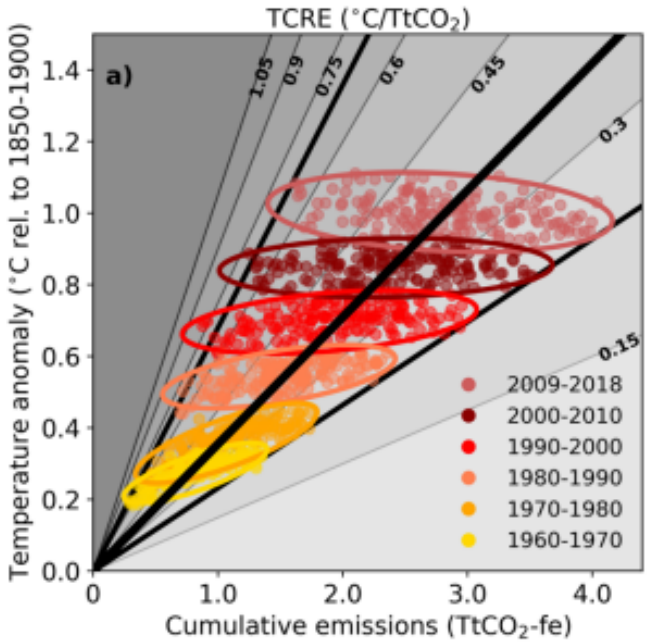
European Commission

Climate-Carbon Interaction in the Current Century

coordinated by: University of Exeter, UK

Climate-Carbon Interactions in the Coming Century (4C) addresses the crucial knowledge gap in the climate sensitivity to carbon dioxide emissions, by reducing the uncertainty in the quantitative understanding of carbon-climate interactions and feedbacks.

This is achieved through innovative integration of models and observations, providing new constraints on modelled carbon-climate interactions and climate projections



European Commission

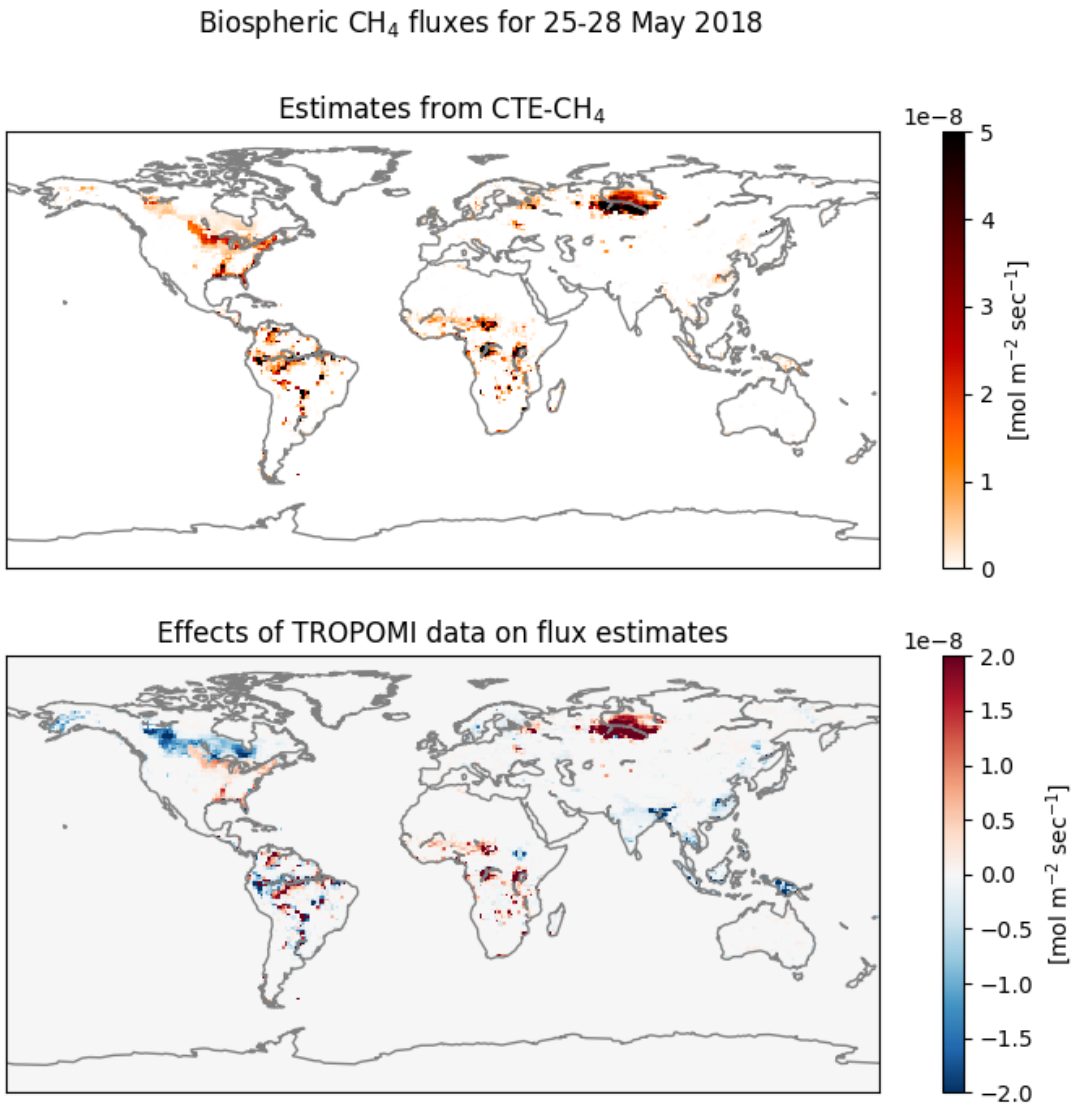
Atmosphere Science Cluster
Carbon Science Cluster

Scientific projects that develops new algorithms beyond primary objectives of the missions:

- **MethEO** - Carbon cycle in the Arctic and boreal regions links strongly to the evolving cryosphere – ice, snow and frost. Especially natural methane emissions from wetlands are controlled by seasonal frost and thaw of the soil;

- **Methane+** project aims at exploiting the SWIR and TIR CH_4 observations from different satellites in order to better differentiate between sources and sinks of CH_4 on the regional and global scale;
- Contribute to bottom-up and top-down estimates of changes in methane emissions in the Arctic, MethaneCAMP;
- HiresCH_4 aims for detection and repair of methane leaks from fossil fuel production activities.

MethE
Finish



FMI

Soil fr

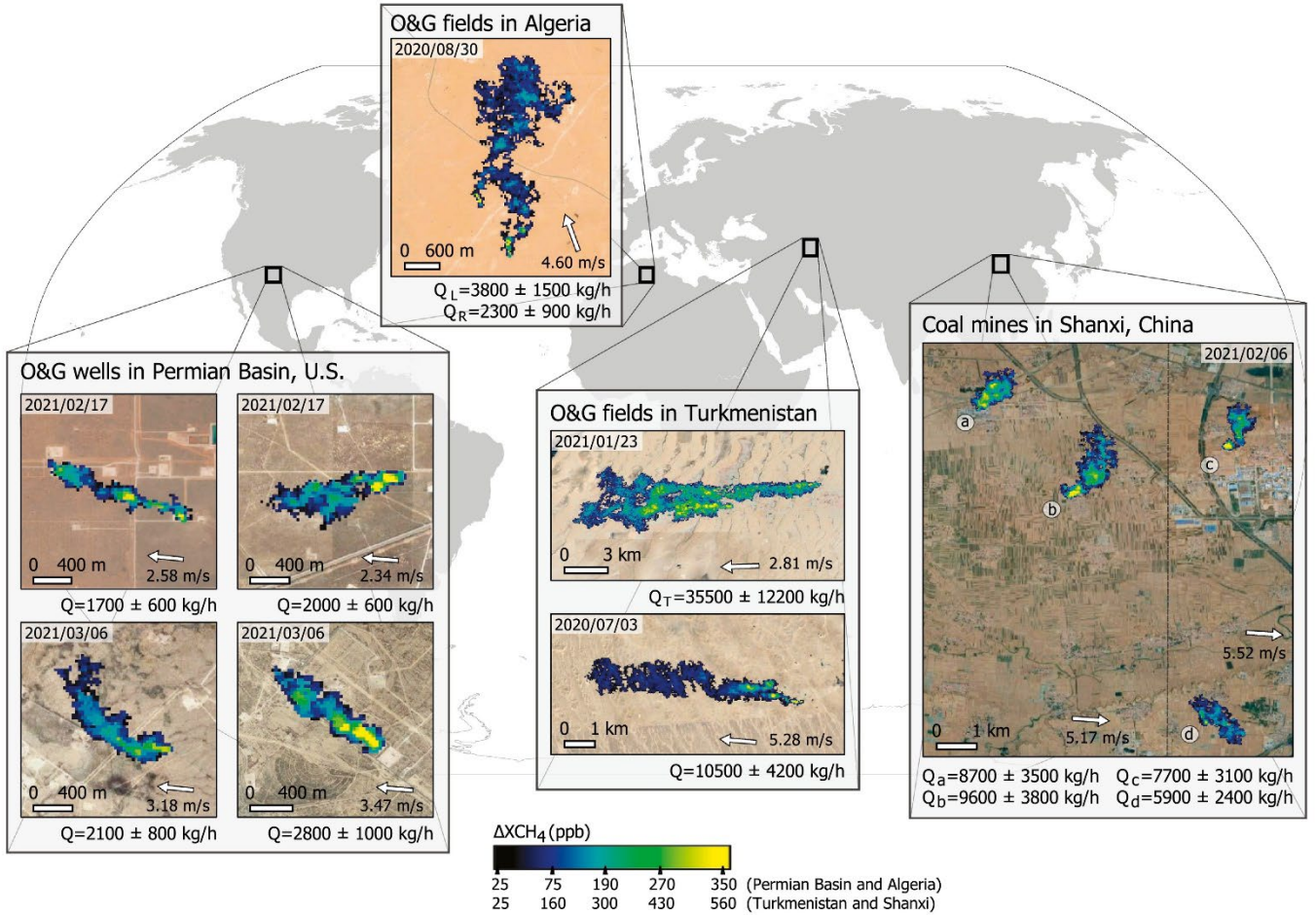
emi

European Commission

HiResCH$_4$

UNIVERSITA

WorldView3:
December 18, 20



CH$_4$ plume from an offshore platform as detected with the WV3 satellite on December 18, 2021

ΔXCH$_4$ (ppm)
1.8 4.1 6.4 8.7 11

ΔXCH$_4$ maps from plumes detected in real PRISMA images acquired in four different parts of the world (oil and gas extraction fields in Algeria, Turkmenistan, and the Permian Basin (USA), and coal mines in the Shanxi region in China)

Q= 92,000 ± 40,000 kg/h

Preparing 2023-2024

Major step forwards in the ESA RTD collaboration: development of a package of coordinated topics under the WP 23-24 of Horizon Europe.

Moving into a more structured approach: 10 topics of the WP 23-24 of Horizon Europe will be specifically coordinated with ESA counterpart actions.

The coordination with ESA will add value to projects that will be funded in bringing in EO based science and EO ESA actions.

11 topics across clusters 3,5,6. Broad areas of collaboration include:

- Climate (Clouds-Aerosol 2023, Methane 2024, ecosystem – carbon 2024)
- Biodiversity and Ecosystems (terrestrial and freshwater ecosystems 2023)
- Polar and Ocean (Blue carbon 2023, EOV 2023, Land-Sea interface 2023, Inland Ice 2024)
- A disaster resilient society for Europe (2x 2024)
- Deploying and adding value to Environmental Observations (MetSat 2024)

European Commission

Preparing 2023-2024

- Complementary calls in WP 2023- 2024
- Potential top-up of projects for collaboration with HE funded projects.

- Applicants are requested to get in touch with related ESA science clusters of FutureEO Programme.
- Activities for ensuring collaborations need to be described in proposals.

Launching an ambitious European scientific coordinate effort in 2023

Kick-off of the
Full Implementation Phase
May 2023 (TBD)

EC-ESA Earth System Science Initiative Forum: Science for Green and Sustainable Society

European Commission

Thank you

esa

European Commission