CO2MVS RESEARCH ON SUPPLEMENTARY OBSERVATIONS

D5.3 Dissemination and Exploitation Plan

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1 Executive Summary

The project's dissemination and exploitation activities present a crucial element in the success of the CORSO project, as they ensure that results are taken up by the wider community and are sustainable beyond the initial funding period, thus providing value for money.

This D5.3 provides the starting point for both dissemination and exploitation in the project.

The dissemination plan identifies instruments and targets. These include activities organised by CORSO (including workshops, website, news items, etc.) as well as important events attended by CORSO members (i.e. workshops, conferences, seminars, etc.).

The present deliverable also provides the potential exploitation avenues in terms of outputs as well as respective exploitation activities during and after the end of the project, thus fulfilling the requirements of the Description of Action (DoA).

The dissemination and exploitation plans are to be considered living documents as new avenues might become important to the project over its lifetime. Thus, both will be updated regularly as the need arises.

A mid-term Dissemination and Exploitation Report will provide an update of the dissemination and exploitation activities, whilst a final Dissemination and Exploitation Report with detailed descriptions of dissemination activities, exploitable results and related activities will be produced towards the end of the project.

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2 Introduction

The following plan details the project's visual identity, describes the promotional exploitation options and communication channels. It aims at supporting partners' communication and dissemination activities and efforts in promoting the project. It will also ensure consistency in messaging, tone of voice and format.

2.1 Background

To enable the European Union (EU) to move towards a low-carbon economy and implement its commitments under the Paris Agreement, a binding target was set to cut emissions in the EU by at least 40% below 1990 levels by 2030. European Commission (EC) President von der Leyen committed to deepen this target to at least 55% reduction by 2030. This was further consolidated with the release of the Commission's European Green Deal on the 11th of December 2019, setting the targets for the European environment, economy, and society to reach zero net emissions of greenhouse gases in 2050, outlining all needed technological and societal transformations that are aiming at combining prosperity and sustainability. To support EU countries in achieving the targets, the EU and European Commission (EC) recognised the need for an objective way to monitor anthropogenic CO_2 emissions and their evolution over time.

Such a monitoring capacity will deliver consistent and reliable information to support informed policy- and decision-making processes, both at national and European level. To maintain independence in this domain, it is seen as critical that the EU establishes an observation-based operational anthropogenic CO_2 emissions Monitoring and Verification Support (MVS) (CO2MVS) capacity as part of its Copernicus Earth Observation programme.

The CORSO research and innovation project will build on and complement the work of previous projects such as CHE (the CO2 Human Emissions), and CoCO2 (Copernicus CO2 service) projects, both led by ECMWF. These projects have already started the ramping-up of the CO2MVS prototype systems, so it can be implemented within the Copernicus Atmosphere Monitoring Service (CAMS) with the aim to be operational by 2026. The CORSO project will further support establishing the new CO2MVS addressing specific research & development questions.

The main objectives of CORSO are to deliver further research activities and outcomes with a focus on the use of supplementary observations, i.e., of co-emitted species as well as the use of auxiliary observations to better separate fossil fuel emissions from the other sources and sinks of atmospheric CO_2. CORSO will deliver improved estimates of emission factors/ratios and their uncertainties as well as the capabilities at global and local scale to optimally use observations of co-emitted species to better estimate anthropogenic CO_2 emissions. CORSO will also provide clear recommendations to CAMS, ICOS, and WMO about the potential added-value of high-temporal resolution $^{14}CO_2$ and Atmospheric Potential Oxygen (APO) observations as tracers for anthropogenic emissions in both global and regional scale inversions and develop coupled land-atmosphere data assimilation in the global CO2MVS system constraining carbon cycle variables with satellite observations of soil moisture, LAI, SIF, and Biomass. Finally, CORSO will provide specific recommendations for the topics above for the operational implementation of the CO2MVS within the Copernicus programme.

2.2 Scope of this deliverable

2.2.1 Objectives of this deliverables

The Deliverable 5.3 provides the outline dissemination and exploitation plan.

The Dissemination Plan complements the Media and Communication Plan (D5.4) and identifies instruments and targets for dissemination, including important conferences, journals, and events.

The Exploitation Plan initiates the exploitation work within the CORSO project by identifying initial exploitation routes and innovation ideas. The deliverable collects, in a first version, the feedback from CORSO partners on their exploitation intentions as well as ideas for joint exploitation, where possible.

2.2.2 Work performed in this deliverable

As per the DoA, D5.3 should “outline the dissemination activities as well as identify the potential for exploitation and their routes”.

The work to create the plans included collection of feedback from the partners in form of questionnaires and the identification of the relevant aspects pertaining to both dissemination and exploitation.

2.2.3 Deviations and counter measures

No deviations have been encountered.

2.3 Project partners:

Partners	
EUROPEAN CENTRE FOR MEDIUM-RANGE WEATHER FORECASTS	ECMWF
AKADEMIA GORNICZO-HUTNICZA IM. STANISLAWA STASZICA W KRAKOWIE	AGH
BARCELONA SUPERCOMPUTING CENTER - CENTRO NACIONAL DE SUPERCOMPUTACION	BSC
COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES	CEA
KAMINSKI THOMAS HERBERT	iLab
METEO-FRANCE	MF
NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK TNO	TNO
RIJKSUNIVERSITEIT GRONINGEN	RUG
RUPRECHT-KARLS-UNIVERSITAET HEIDELBERG	UHEI
LUNDS UNIVERSITET	ULUND
UNIVERSITE PAUL SABATIER TOULOUSE III	UT3-CNRS
WAGENINGEN UNIVERSITY	WU
EIDGENOSSISCHE MATERIALPRUFUNGS- UND FORSCHUNGSANSTALT	EMPA
EIDGENOESSISCHE TECHNISCHE HOCHSCHULE ZUERICH	ETHZ
UNIVERSITY OF BRISTOL	UNIVBRIS
THE UNIVERSITY OF EDINBURGH	UEDIN

3 Project Communication & Dissemination

3.1 Internal & External Communication Channels

A partner protected web-based environment has been set up at ECMWF that includes a document repository and acts as the project's collaborative platform. The CORSO website acts as the main location to showcase all project information and outputs. The details of this are described in D5.2.

3.2 EU funding acknowledgement & Disclaimer

Dissemination of results (including public and confidential deliverables, conference/workshop presentations, and any type of visual information or promotional material) must display the EU emblem (see below "European Commission visual identity") plus the EU funding acknowledgement and disclaimer. Written materials eg journals need to include the text in acknowledgements.

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When displayed together with another logo, the EU emblem must remain distinct and separate and cannot be modified by adding other visual marks, brands or text. For the purposes of their obligations under Article 17 of the Grant Agreement, the beneficiaries may use the EU emblem without first obtaining approval from the Commission. This does not however give them the right of exclusive use. Moreover, they may not appropriate the EU emblem or any similar trademark or logo, either by registration or by any other means.

In addition, any publication, presentation, poster etc. needs to include the project logo, the EU Emblem and the above statement. These logos and statement are accessible to all partners on the internal pages of CORSO's Confluence wiki.

The project coordinator, ECMWF, has provided presentation and poster (PowerPoint) templates and Deliverable (Word) templates to the consortium partners that fulfil the above-mentioned requirements.

4 The Dissemination Plans

As per the DoA, CORSO dissemination activities are designed around providing/disseminating information to the scientific communities and relevant stakeholders in three areas:

1. Scientific and technical results through
    a. Scientific Publications
    b. Conference Talks
    c. Organised Workshops, providing updates on the project results
    d. Reports to and feedback from Committees and Boards
2. Products through dissemination of
    a. Datasets and accompanying material (e.g. descriptions, meta data)
    b. Algorithms / Specifications
    c. Graphics and animations
3. Progress information through provision of
    a. News items
    b. Public Deliverables
    c. Dissemination Materials (brochures, posters, flyers)
    d. Website and social media

The following table provides information on the CORSO Dissemination (and Communication) Targets.

Table 1: Dissemination Targets

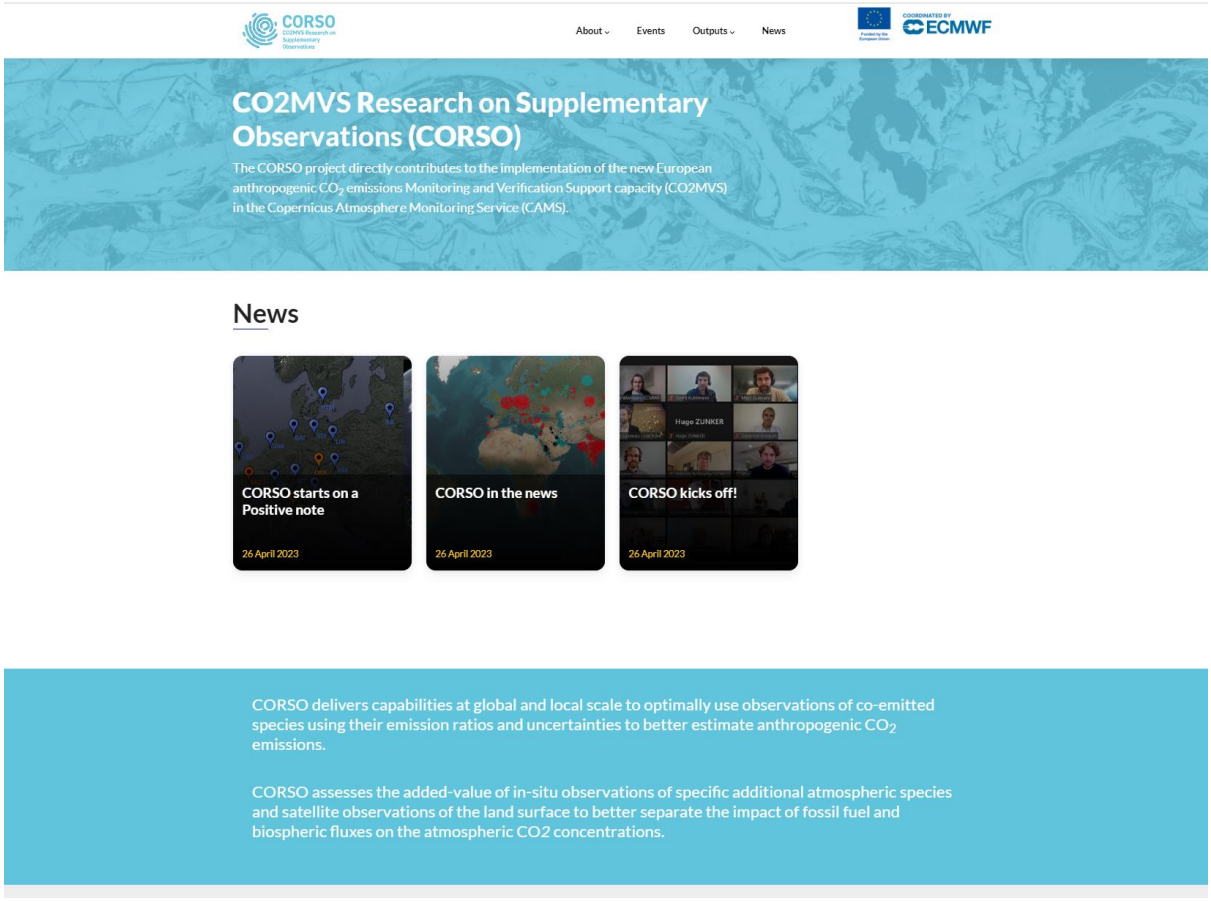
Target audience	Communication/ Dissemination Means	Responsibility
European Commission, CO_2 Task Force, EU Member States (incl. policy makers)	Dissemination: – Workshops and resulting reports Communication: – Project news/ Newsletters – Tailored updates on the results – CORSO website	ECMWF with support from all partners
Scientific community	Dissemination: – Peer-reviewed scientific papers – CORSO data portal – Workshops – Conferences Communication – News items	All partners
Satellite agencies, in-situ Research Infrastructures and international frameworks, technology providers	Dissemination – CoCO2 data portal Communication – Targeted publication material – Link with relevant H2020, Horizon Europe, and other initiatives – Representation at relevant conferences and fairs – Newsletters	All partners
General public	Communication – General Information Material – CORSO website – Project news/ Newsletters – Dissemination Material – Press releases	ECMWF with support from all partners and in close collaboration with the European Commission (HaDEA and DG-DEFIS).

4.1 Dissemination Instruments

This subsection provides an overview of the instruments used for dissemination.

4.1.1 CORSO Website

The CORSO website (www.corso-project.eu) serves as the main dissemination instrument for the project. It contains various sections both for the general public as well as specifically targeted towards stakeholders including the scientific community.



Screen shot of the home page of CORSO website

The CORSO website will provide access to information on the progress of the project. All deliverables that are published in the form of "PUBLIC" reports will be hosted on the website. Any data outputs will be subject to the Data Management Plan. For longer term archival of reports, this will be via the EU CORDIS system. A news slot on the website will draw attention to highlights such as new data deliveries and reports, eye-catching developments, and so forth. Important information of general interest will be published on the CORSO website, including the project status on milestones and deliverables. Further details are provided in the CORSO deliverable D5.2 Project Website.

Reports will be openly available from the public pages of the central CORSO website. To increase its visibility, the CORSO website will be linked on the websites of ECMWF, CAMS, C3S, and other partners.

4.1.2 Papers, Conferences and Workshops

Strong engagement with the academic sector will promote the work performed in CORSO and at the same time follow the scientific developments taking place outside the consortium. This exchange of information and knowledge will be realised through attendance of scientific conferences, organisation of sessions devoted to CORSO and related topics at relevant scientific conferences (e.g., EGU, Transcom, IG3IS, IWGGMS), and by the general process of CORSO scientists attending and presenting seminars and engaging in discussion at universities and research institutes. Conferences and Workshops of interest for CORSO include:

- European Geoscience Union General Assembly
- International Workshop on Greenhouse Gas Measurements from Space (IWGGMS)
- American Geophysical Union Fall Meetings
- ICOS Science Conference
- WMO/IG3IS workshops
- UN Climate Change Conference
- Biogeochemical Data Assimilation Working Group meeting
- GEIA (Global Emissions Initiative)
- ESA Conferences
- CNES Conferences

Publication in open-access scientific journals will play a major role as this allows a rigorous peer-review to take place, ensuring that CORSO results are relevant to the community. Relevant Journals include:

- Atmospheric Chemistry and Physics (ACP) https://www.atmospheric-chemistry-and-physics.net/
- Geoscientific Model Development (GMD) https://www.geoscientific-model-development.net/index.html
- Earth System Science Data (ESSD) https://www.earth-system-science-data.net/
- Biogeosciences (BG) https://www.biogeosciences.net/
- Earth System Dynamics (ESD) https://www.earth-system-dynamics.net/
- Journal of Advances in Modeling Earth Systems (JAMES) https://agupubs.onlinelibrary.wiley.com/journal/19422466

It is envisaged that over the course of the project, and for up to one year after project closure, a minimum of eight peer-reviewed, co-authored (journal) publications will be produced covering the topics of the scientific-technical work packages of the CORSO project (WPs 1 to 4). In addition, regular conference and workshop publications and attendance with talks on topics from CORSO will complement these publications.

4.1.3 Scientific Committees

The representation of ECMWF and project partners in international committees will be used as a channel for disseminating CORSO results and output in the weather and climate prediction communities, in particular to support of the CAMS CO2MVS capacity. Scientific results from CORSO will be conveyed to international programmes and bodies such as the Global Climate Observing System (GCOS), Committee on Earth Observation Satellites (CEOS), the World Climate Research Programme (WCRP) and the WMO (both the newly emerging Global Greenhouse gas Monitoring Infrastructure (GGMI), the IG3IS programme and the Global greenhouse Gas Watch (G3W)). Finally, progress and results will be directly shared with the European Commission and its CO2 Task Force that supports the Commission

with planning the development of a future CO2 emission monitoring system. The CO2 Task Force will act at the External Advisory Board for CORSO. This will directly and indirectly ensure that the advice resulting from the CORSO project will inform policy makers in Europe and beyond. The close interaction with the Task Force will also ensure that any guidance coming from it can be taken into account during the CORSO project.

4.1.4 Other Instruments

Other instruments used by the CORSO project to disseminate its results include:

- Web / wiki pages
- Dissemination of information through relevant social media,
- Linked communication with the CAMS communication sites
- Overview of project results in partners' newsletter.

Other instruments also include ad-hoc and planned interactions and liaison with relevant international research activities, such as the H2020-funded project CoCO2, as well as the Copernicus Services relevant, CAMS and C3S with their annual General Assemblies.

The products of CORSO will comprise reports, graphical displays, datasets and improved methods, algorithms and code. All these elements have their own important role. Reports are mostly targeted at informing the Commission and its Task Force on assessments, innovation progress and future directions. Graphical displays, where applicable, are targeted at all users as supportive information for the various model runs, method comparisons, and input datasets. The datasets will also target a wide user community to support them with parallel or alternative studies. Finally, improved methods, algorithms and code are meant to form the basis for follow-on development after the CORSO project has finished.

All mature data products of CORSO will be made publicly available to maximize the uptake by the scientific community. These include the new observations of 14CO2 and APO, prior emission data sets, and potentially the results from the various data assimilation studies (depending on maturity). It is envisaged to make use of several parallel data portals to ensure full visibility of the datasets. The main data portals will be based on the ICOS Carbon portal, the Centre for Environmental Data Analysis (CEDA) archive, and the Copernicus Atmosphere Data Store.

5 Exploitation Plan

Exploitation has various intentions, though in the context of Horizon Europe projects these activities are geared towards increasing the impact of their project results, notably:

- They must share publicly research results with the scientific community, commercial players, civil society and policymakers ('dissemination').
- They must use their best efforts to exploit their results directly or to have them exploited indirectly by another entity – notably the use of results in further research and innovation activities other than those covered by the action concerned, ('exploitation')

Dissemination and exploitation are a requirement of the CORSO GA (Article 17), and provide a route for the use of results that ultimately:

- Lead to new legislation or recommendations
- For the benefit of innovation, the economy and the society
- Help to tackle a problem and respond to an existing demand

Both dissemination and exploitation activities need to adhere to Fair and reasonable conditions.

5.1 Exploitation Targets

The CORSO Description of Action states the following with respect to exploitation:

> "CORSO will use existing modelling and inversion infrastructure (after further improvement where needed) to investigate and develop the specific aspects of the CO2MVS that need to be addressed as part of this Call. The important outputs of CORSO are therefore new data sets, reports and peer-reviewed articles describing new methodologies, and specific developments in the global and local models and data assimilation systems. Although various developments within CORSO will be based on pre-existing technology and will be realised through developing integrated technology, these developments will be shared publicly through proper documentation, either through public project documents or through articles in the peer-reviewed literature. Sharing this information publicly will support the implementation of the future Copernicus CO2 emission monitoring service element, which is normally done through competitive Invitations To Tender (ITT). In addition, some data sets will be created, and these will be provided on data servers without any restrictions, as described above. Therefore, the wider science community will be exploitation targets. Science communities include those related to CO2 monitoring, atmospheric monitoring, as well as the wider weather and climate modelling communities. This is especially relevant for any parallel or future studies related to the development of the future CO2 emission monitoring system as initiated by the European Commission and/or the European Space Agency. There may in addition be some exploitation of CORSO products in the other activities undertaken by partners in the consortium operating CORSO."

5.2 Exploitation Activities and Routes

In attempting to gather an overview of the exploitation intentions of the partners, and to identify potential exploitation actions, a questionnaire will be used to share with partners to collect their response for continual improvements to the table 2. The questions outlined below will be used for the upcoming deliverables D5.7 and D5.9 that is due at the mid-term and end of the project

The following questions will be included:

Exploitable Results

Which deliverables from CORSO do you intend to exploit?
Which specific output(s) from the deliverable(s) do you intend to exploit?
Is this output owned by you/another Partner/joint?
At what TRL (Technology Readiness Level) do you expect this output to be at the end of the project (if applicable)?
What assessments/ evaluations do you plan within CORSO to test whether outputs are exploitable?

Products resulting from Exploitation

What final product do you have in mind as the result of the exploitation?
What are the key functions of this product?
What is the Unique Selling Point (USP) for this product?
What proportion of this product will have been funded by CORSO?
Who are the customers for this product?
What similar systems are already in the marketplace offered by other suppliers?

Exploitation Activities during the CORSO project

What exploitation activities do you plan to perform in CORSO and when?

Exploitation Activities after the CORSO project

What exploitation activities do you plan to perform post- CORSO and when?

Consortium-wide Exploitation

What would be a consortium-wide results and product to be exploited?
How might the Consortium work at a collective level to exploit the CORSO proposition?
Would your organisation take a part in this, and in what role?
Which additional stakeholders be needed to operate the model?

Naturally, at this early stage in the project (month 3 of 36) not all questions can be answered. Therefore, the questionnaire serves the purpose of reminding partners of the importance of exploitation in a project such as CORSO, and to actively consider potential routes and related exploitation activities.

Based on the above questionnaire, the following table summarises the current status (Table 2).

Table 2: Summary of Exploitation Findings

Exploitable Products	• Global maps of CO2, CO and NOx emission factors and their uncertainties per sector • Improved global point source emissions dataset • List of CO2, NO2 and CO hot spot locations for the year 2021 identified in satellite observations • Time series of NOx and CO emissions of hot spots in Africa, Europe and SE Asia • Software library for data-driven emission quantification of hot spots • A prototype for a simplified chemistry scheme to describe observed variations in NO2 on spatial scales of ~25 km, suitable for global-scale models • Database of existing 14CO2 measurements • Database of existing APO measurements

	• APO and 14CO2 measurement datasets from the 1-year intensive observations in Western Europe • APO and 14CO2 flux databases • Estimates of the annual fossil fuel CO2 emissions at the continental to national scales over a decade, and specifically for 2024 in Europe • Improved land surface forward operators for SIF and low frequency MW data • Reports with recommendations for the implementation of the Copernicus CO2MVS
Exploitation Activities during the Project	• Any dataset that has been identified as public will be made available to external scientists. Several of these datasets are innovative and should create significant interest. • Project reports with recommendations will support uptake/implementation activities in CAMS, ICOS, and potentially other frameworks, already during the project.
Exploitation Activities after the end of the Project	• Any dataset that has been identified as public will be made available to external scientists. Several of these datasets are innovative and should create significant interest. • Project reports with recommendations will support uptake/implementation activities in CAMS, ICOS, and potentially other frameworks.
Consortium-wide/Joint Exploitation	• While outputs will be shared publicly as much as possible through documentation and peer-reviewed literature, the project will also support its consortium members to be better prepared for any upcoming CO2MVS implementation ITTs.

(Any datasets and databases produced will follow the Data Management Plan (D5.5)).

The activities during the project will now be taken up by the relevant work packages to ensure that exploitation is pursued and maximised. However, it should be noted that a complete consortium-wide exploitation of results (e.g., through structures such as a Joint Venture or Association) after the end of the project are unlikely, due to the nature of this research project CORSO. Nevertheless, a number of items (especially the use in the CO2MVS prototype) have been identified and will be further investigated as to the possibilities for direct joint exploitation, e.g. through joint responses to Invitations to Tender.

The Exploitation Plan will be revisited regularly and is thus to be understood as a living document, as developments during the course of the project may open up new avenues for exploitation.

6 Conclusion

In this deliverable, the CORSO dissemination and exploitation has been defined.

For dissemination a set of instruments have been identified, namely a website, news items and numerous scientific conference and workshop involvements.

Initial exploitation ideas from all partners have been collected in this document, complemented by the identification of exploitation activities. Project Office and Work Package leader can now use this information to steer the activities towards innovation realisation within the various work packages and the project as a whole.

A mid-term Dissemination and Exploitation Report will provide an update of the dissemination and exploitation activities, whilst a final Dissemination and Exploitation Report with detailed descriptions of dissemination activities, exploitable results and related activities will be produced towards the end of the project. These will ensure that the results are sustainable and realised into innovations.

Document History

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