CoCO2

Prototype system for a Copernicus CO_2 service

Dissemination and Exploitation Plan

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coco2-project.eu

Co-ordinated by ECMWF

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Prototype system for a Copernicus CO_2 service

D9.3 Dissemination and Exploitation Plan

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CoCO2: Prototype system for a Copernicus CO_2 service

Coordination and Support Action (CSA)
H2020-IBA-SPACE-CHE2-2019 Copernicus evolution – Research activities in support of a European operational monitoring support capacity for fossil CO2 emissions

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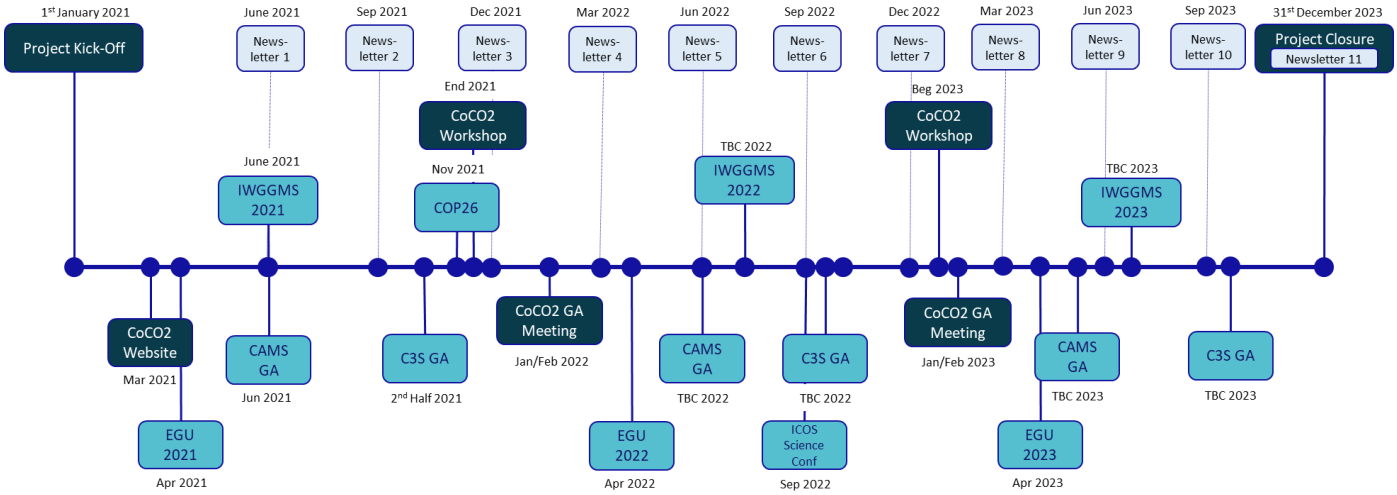
1 Executive Summary

Dissemination and exploitation activities present a crucial element in the success of the CoCO2 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.

D9.3 provides the starting point for both dissemination and exploitation in the project.

The dissemination plan identifies instruments and targets. These include activities organised by CoCO2 (including workshops, website, newsletters, etc.) as well as important events attended by CoCO2 (workshops, conferences, fairs, etc.), and an overview is given in the figure below:



Activities organised by CHE

Activities attended by CHE

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

An overview of the exploitation aspects is given in the table below:

Exploitable Products	• Operational production of assimilated ocean pCO2 products • Datasets and publications • Emission datasets • Incorporate the resulting CoCO2 emission datasets in the HERMESv3_GR emission inventory library (https://earth.bsc.es/gitlab/es/hermesv3_gr), so that they can be used by the community of modellers that use chemical transport models • GHG fact sheets per country per sector or city/emission plant level • Improved inversion system that will allow calculations for current and historical CO2 emissions, using top-down

	methods, on the local scale Krakow), national scale (Poland) and beyond, if possible applicable to other atmospheric constituents • University courses in top-down modelling of greenhouse gases • Material to demonstrate the CO2 MVS capabilities to support discussion with national authorities • CoCO2 nature runs • Foreground elements of the global, regional and local prototype systems and/or their documentation
Exploitation Activities during the Project	• Benchmark analysis, operationalization (2021, 2022) • Links with CAMS (if this can be considered as exploitation) • Integration of the resulting emission datasets into the HERMESv3_GR emission inventory library during the last year of the project • Workshops with stakeholders
Exploitation Activities after the end of the Project	• Operational production of assimilated air-sea pCO2 products • Services for agriculture (2024), Improved land surface conditions in atmospheric models, i.e. numerical weather prediction models, air quality models, and climate models (2025) • Exploitation activities post-CoCO2 will depend on the results of the research conducted in CoCO2 • Within Copernicus CO2MVS this process of consultation with stakeholders will continue and intensify • Further development of the inverse modelling system of CO2 on local and national scale, 2024-2027 • Preparing and performing new university course on data assimilation methods for students based on results obtained in the scope of CoCO2, 2024-2028 • Further development of emission estimation algorithms and inverse modeling techniques as well as uncertainty characterization. • Direct implementation of global CO2MVS component in CAMS
Consortium-wide/Joint Exploitation	• Vegetation description component of CAMS • Country-factsheets (D6.1 or further developments of these) • New methodology for GHG emission quantification using atmospheric data; Synthesis • Definition and demonstration of the CO2MVS prototype

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.

2 Introduction

2.1 Background

To support EU countries in assessing their progress for reaching their targets agreed in the Paris Agreement, the European Commission has clearly stated that a way to monitor anthropogenic CO2 emissions is needed. Such a capacity would deliver consistent and reliable information to support policy- and decision-making processes.

To maintain Europe's independence in this domain, it is imperative that the EU establishes an observation-based operational anthropogenic CO2 emissions Monitoring and Verification Support (MVS) capacity as part of its Copernicus programme.

The CoCO2 Coordination and Support Action is intended as a continuation of the CO2 Human Emissions (CHE) project, led by ECMWF. In the Work Programme, ECMWF is identified as the predefined beneficiary tasked to further develop the prototype system for the foreseen MVS capacity together with partners principally based on the CHE consortium. In addition, ECMWF will continue some of the work initiated in the VERIFY project as well.

The main objective of CoCO2 is to perform R&D activities identified as a need in the CHE project and strongly recommended by the European Commission's CO2 monitoring Task Force. The activities shall sustain the development of a European capacity for monitoring anthropogenic CO2 emissions. The activities will address all components of the system, such as atmospheric transport models, re-analysis, data assimilation techniques, bottom-up estimation, in-situ networks and ancillary measurements needed to address the attribution of CO2 emissions. The aim is to have prototype systems at the required spatial scales ready by the end of the project as input for the foreseen Copernicus CO2 service element.

2.2 Scope of this deliverable

2.2.1 Objectives of this deliverables

D9.3 provides the outline dissemination and exploitation plan.

The Dissemination Plan complements the Media and Communication Plan (D9.4) and identifies instruments and targets for dissemination, including important conferences, journals, and events.

The Exploitation Plan initiates the exploitation work within the CoCO2 project by identifying initial exploitation routes and innovation ideas. The deliverable collects, in a first version, the feedback from CoCO2 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, D9.3 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.

3 Dissemination Plan

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. Newsletters (digital and print)
   b. Public Deliverables
   c. Dissemination Materials (brochures, posters, flyers)
   d. Website and social media

The following table provides information on the CoCO2 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 - Policy briefs Communication: - Project news/ Newsletters - Tailored updates on the results - CoCO2 website	ECMWF with support from all partners
Scientific community	Dissemination: - Peer-reviewed scientific papers - CoCO2 data portal - Workshops - Conferences Communication - Newsletters	All partners
Satellite agencies, technology providers	Dissemination - CoCO2 data portal Communication - Targeted publication material - Link with relevant H2020 and other initiatives - Representation at relevant conferences and fairs - Newsletters	All partners
General public	Communication - General Information Material - CoCO2 website - Project news/ Newsletters - Dissemination Material	ECMWF with support from all partners and in close collaboration with the European Commission (REA and DG-DEFIS).

	- Press releases	

3.1 Dissemination Instruments

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

3.1.1 CoCO2 Website

The CoCO2 website (www.coco2-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.

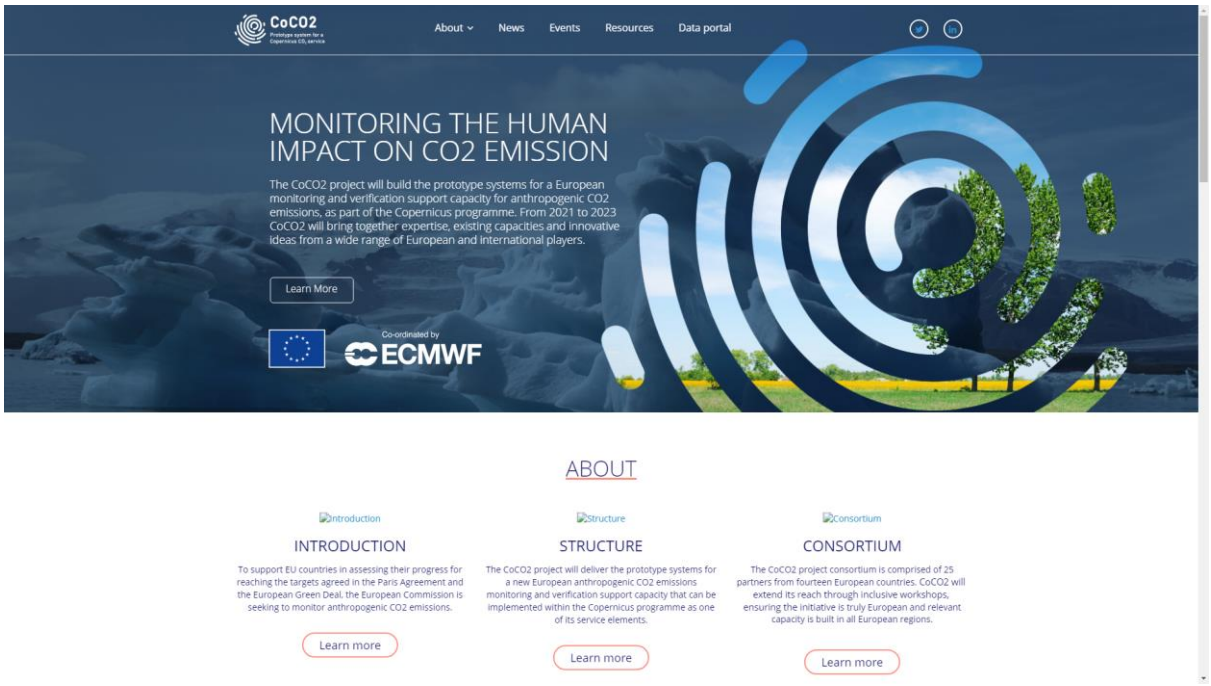


Figure 1: CoCO2 Project Website

Events as well as resources will be published on the website together with regular news updates and access to data sets. Further details will be provided in the CoCO2 deliverable D9.2 Project Website.

The website will also host the data portal which will provide an interface to the distributed data and products made available by the project and is therefore also a major dissemination instrument in itself.

3.1.2 CoCO2 Workshops

CoCO2 will organise a number of workshops to discuss the CoCO2 progress and to align the progress with user requirements. These workshops will connect with 13 representatives from the national inventory agencies, DG-CLIMA, IPCC, UNFCCC, GEIA, and city or local 14 stakeholders. In this process CoCO2 will also involve organisations such as UNEP, WMO (I3GIS) and GEO in order to better align our activities. A first workshop will be organised towards the end of 2021.

3.1.3 Journals, Conferences and Workshops

Strong engagement with the academic sector will promote the work performed in CoCO2 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 CoCO2 and related topics at the annual

meeting of the European Geophysical Union, and by the general process of CoCO2 scientists attending and presenting seminars and engaging in discussion at universities and research institutes.

Conferences and Workshops of interest for CoCO2 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
- Marine Ecosystem Analysis and Prediction Task Team 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 CoCO2 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 plus one year at least ten peer-reviewed, co-authored (journal) publications will be produced covering the topics of the scientific-technical work packages of the CoCO2 project (WPs 1 to 8). In addition, regular conference and workshop publications and attendance with talks on topics from CoCO2 will complement these publications.

3.1.4 Scientific Committees

The representation of ECMWF and project partners in international committees will be used as a channel for disseminating CoCO2 results and output in the weather and climate prediction communities. Scientific results from CoCO2 will also be conveyed to international programmes and bodies such as the Global Climate Observing System (GCOS), the World Climate Research Programme (WCRP), the Committee on Earth Observation Satellites (CEOS), the Integrated Carbon Observation system (ICOS), the Global Carbon Project (GCP), as well as the Swiss Commission for Remote Sensing, and the WMO Integrated Global Greenhouse Gas Information System (IG3IS). In this regard, there is also a key role envisaged for the CoCO2 External Experts Group as well as Inventory Agency Advisory Board, which consists of many European and international experts. Apart from providing feedback on the CoCO2 developments, these experts will also establish the link with many other international initiatives related to the future monitoring of CO_2 emissions. Finally, progress and results will be directly shared with the European Commission and its Task Force (which forms the CoCO2 External Advisory Board) that supports the Commission with planning the development of a future CO_2 emission monitoring system. This will directly and indirectly ensure that the advice resulting

from the CoCO2 project will inform all relevant stakeholders. The close interaction with the Task Force will also ensure that any guidance coming from them can be taken into account during the CoCO2 project.

3.1.5 Newsletters

Newsletters will be produced on a quarterly basis, with the first newsletter to be released in June 2021, covering the start-up phase of the project and introducing the project to the wider community. The newsletters will provide updates on the progress of the project and provide selected highlights in more detail.

3.1.6 Other Instruments

Other instruments used by the CoCO2 project to disseminate its results include:

- Tradeshows
- Exhibitions
- Web / wiki pages
- Press releases, Dissemination of information through print, TV and radio media,
- Overview of project results in partners' newsletter.
- Lunch lecture at policy DG (DG GROW, DG CLIMA)
- Open house day and other Company dissemination tools

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

3.2 Dissemination Milestones

The dissemination milestones are provided in Figure 2. Naturally, this figure should not be seen as comprehensive given the not all relevant events are know yet for the whole duration of the project.

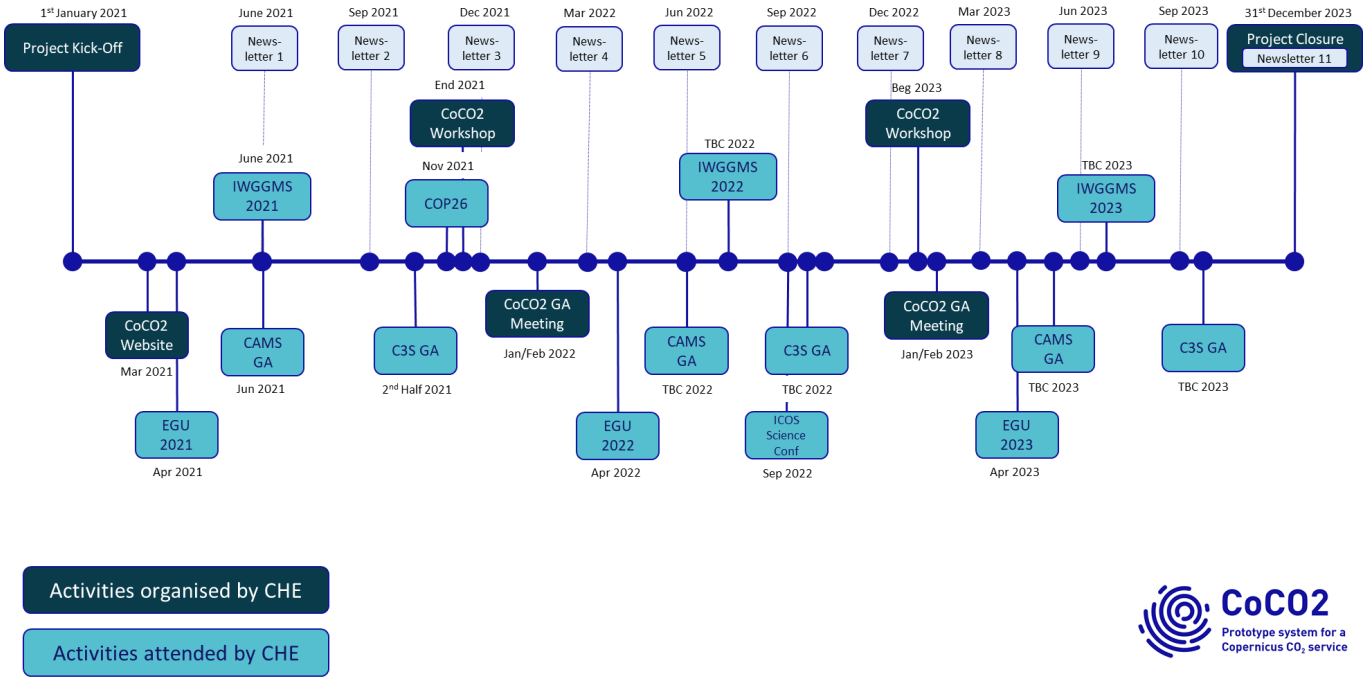


Figure 2: Dissemination Milestones

4 Exploitation Plan

Exploitation has various aims:

- It should maximise the impact of the funding granted in the market;
- It should ensure sustainable growth, more and better jobs, as well as industry competitiveness, especially in the case of SMEs;
- Partners and stakeholders should get value or use from a project, where "Use" is defined as

  "direct or indirect utilisation of foreground in further research activities other than those covered by the project, or for developing, creating and marketing a product or process, or for creating and providing a service"[1].

4.1 Exploitation Targets

The CoCO2 Description of Action states the following with respect to exploitation:

> "CoCO2 will use existing modelling and inversion infrastructure (after further improvement where needed) to develop a future emission monitoring system. The important outputs of CoCO2 are therefore the various detailed designs and prototype components. Although various developments within CoCO2 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 (e.g., the Functional Requirements Specification Documents (FRSDs) in WP6) 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. 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 as well as the policy makers will be exploitation targets. Science communities include those related to CO2 monitoring, atmospheric monitoring, as well as the wider weather and climate modelling communities. Policy makers include those on regional, national as well as European level. 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 CoCO2 products in the other activities undertaken by partners in the consortium operating CoCO2, in particular at the national level."

4.2 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 was circulated and responded to by each partner.

The following questions where included:

Exploitable Results

Which deliverables from CoCO2 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 further work will be required (post- CoCO2) to take the CoCO2 output from this TRL into a product?

[1] See also http://ec.europa.eu/research/participants/data/ref/fp7/89593/ipr_en.pdf

What assessments/ evaluations do you plan within CoCO2 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 CoCO2?
Who are the customers for this product?
What similar systems are already in the marketplace offered by other suppliers?
How do you think the market will change over the next 5 years?

Exploitation Activities during the CoCO2 project

What exploitation activities do you plan to perform in CoCO2 and when?

Exploitation Activities after the CoCO2 project

What exploitation activities do you plan to perform post- CoCO2 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 CoCO2 proposition?
Can you describe a commercial model?
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 by all partners. Therefore the questionnaire also serves the purpose of reminding partners of the importance of exploitation in a project such as CoCO2, and to start thinking of potential routes and related exploitation activities.

Based on the above responses to the questionnaire, the following table summarises the findings (Table 2).

Table 2: Summary of Exploitation Findings

Exploitable Products	• Operational production of assimilated ocean pCO2 products • Datasets and publications • Emission datasets • Incorporate the resulting CoCO2 emission datasets in the HERMESv3_GR emission inventory library (https://earth.bsc.es/gitlab/es/hermesv3_gr), so that they can be used by the community of modellers that use chemical transport models • GHG fact sheets per country per sector or city/emission plant level • Improved inversion system that will allow calculations for current and historical CO2 emissions, using top-down methods, on the local scale Krakow), national scale (Poland) and beyond, if possible applicable to other atmospheric constituents • University courses in top-down modelling of greenhouse gases • Material to demonstrate the CO2 MVS capabilities to support discussion with national authorities • CoCO2 nature runs

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Consortium-wide/Joint Exploitation	• Vegetation description component of CAMS • Country-factsheets (D6.1 or further developments of these) • New methodology for GHG emission quantification using atmospheric data; Synthesis • Definition and demonstration of the CO2MVS prototype

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 is to 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 somewhat less likely, due to the nature of the project. Nevertheless, a number of items (especially the operationalisation of a CO_2 Monitoring Support Capacity) 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.

5 Conclusion

In this deliverable, the CoCO2 dissemination and exploitation has been defined.

For dissemination a set of instruments have been identified, namely a website, workshops, newsletters 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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1.0	Daniel Thiemert (ECMWF)	29/03/2021	Final version

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