



CO<sub>2</sub>  
Human  
Emissions

# Research Data Portal

Daniel Thiemert

[che-project.eu](http://che-project.eu)



Co-ordinated by  
 ECMWF

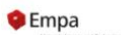


# CO<sub>2</sub> Human Emissions

## D7.8 Research Data Portal

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<b>Author(s):</b>	Daniel Thiemert (ECMWF)
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AIRBUS





# CO<sub>2</sub> Human Emissions

## CHE: CO<sub>2</sub> Human Emissions Project

Coordination and Support Action (CSA)  
H2020-EO-3-2017 Preparation for a European  
capacity to monitor CO<sub>2</sub> anthropogenic emissions

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**Contact:**

ECMWF, Shinfield Park, Reading, RG2 9AX,  
[gianpaolo.balsamo@ecmwf.int](mailto:gianpaolo.balsamo@ecmwf.int)



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## 1 Executive Summary

D7.8 provides the initial and early version of the CHE Research Data Portal. The deliverable has identified a number of data sets used as input for the CHE project in the following areas:

- CO<sub>2</sub> Hot Spots
- CO<sub>2</sub> Inventory
- Data Portal
- Biosphere Fluxes
- GHG Inventory.

The data portal references these data sets rather than replicate them. Data sets to be generated by the CHE project include

- CO<sub>2</sub> fluxes
- CO<sub>2</sub> atmospheric concentrations
- Synthetic CO<sub>2</sub> satellite observations
- Concentrations and fluxes of other tracers

These output data sets will similarly be referenced on the data portal, and will be placed in existing repositories, such as ICOS, the Global Carbon Project and Copernicus Climate Data Store (once available).

The CHE Data Portal is available at <https://www.che-project.eu/data-portal>.

## 2 Introduction

### 2.1 Background

CHE, as a Coordination and Support Action, is bringing together European expertise and a consolidated approach to building an operational CO<sub>2</sub> emission monitoring capacity. CHE partners are at the forefront of developments in the compilation of emission inventories, the observation of the carbon cycle from ground-based and satellite measurements, the process modelling of the carbon cycle, atmospheric transport modelling, and data assimilation and inversion systems. There will be four main areas of work covering: observations, emission inventories, modelling and inversion systems.

The central questions that CHE will address are:

- What does it take to have a combined bottom-up and top-down estimation system capable of distinguishing the anthropogenic part of the CO<sub>2</sub> budget from the natural fluxes?
- How can we make the first steps towards such a system that can use the high spatial and temporal resolution of satellite observations to monitor anthropogenic emissions at the required time scales?
- And what does it take to transform a research system into a fully operational monitoring capacity?

CHE will support a large community by providing a library of realistic CO<sub>2</sub> simulations from global to city scale to examine the capacity for monitoring future fossil fuel emissions and to adequately dimension space mission requirements.

## 2.2 Scope of this deliverable

### 2.2.1 Objectives of this deliverables

The deliverable D7.8 Research Data Portal is expected to provide the data portal for the CHE project by providing references to the input data sets used within the project as well as the output data sets created by the project. It is not the aim of this deliverable to create new technology for providing the data. Rather, existing technology will be re-used by way of linking to the available resources.

### 2.2.2 Work performed in this deliverable

The work has focused on collecting the information and references for data sets used within the project. The details have been made available on the CHE project website under <https://www.che-project.eu/data-portal>.

### 2.2.3 Deviations and counter measures

No deviations have been encountered

### 3 Input Data Sets

The following data sets have been identified as input for the CHE project. The list will be updated regularly updated as work progresses and additional data sets have been identified. The links are available via the CHE Data Portal at <https://www.che-project.eu/data-portal>.

**Table 1: Initial CHE Input Data Sets**

Area	Data Set	Brief Description	Link
<b>CO<sub>2</sub> Hot Spots</b>	Indianapolis Flux Experiment - INFLUX	CO <sub>2</sub> urban hotspots estimations using in situ measurements (flux towers, flasks, TCCON, etc.)	<a href="http://sites.psu.edu/influx/">http://sites.psu.edu/influx/</a>
	CARMA	Carbon emissions of more than 60,000 power plants and 20,000 power companies in every country on Earth	<a href="http://carma.org/">http://carma.org/</a>
	E-PRTR	Key environmental data from industrial facilities in European Union Member States and in Iceland, Liechtenstein, Norway, Serbia and Switzerland	<a href="http://prtr.ec.europa.eu/">http://prtr.ec.europa.eu/</a>
<b>CO<sub>2</sub> Inventory</b>	ICOS Carbon Portal	Products based on in situ measurements Including Global Carbon Budget	<a href="https://www.icos-cp.eu/">https://www.icos-cp.eu/</a> <a href="https://www.icos-cp.eu/GCP/2017">https://www.icos-cp.eu/GCP/2017</a> and <a href="http://www.globalcarbonproject.org/carbonbudget/index.htm">http://www.globalcarbonproject.org/carbonbudget/index.htm</a>
	CarbonTracker North America and CarbonTracker Europe	CO <sub>2</sub> measurement and modelling system developed by NOAA and Wageningen University to keep track of sources (emissions to the atmosphere) and sinks (removal from the atmosphere) of carbon dioxide around the world	<a href="https://www.esrl.noaa.gov/gmd/ccgg/carbontracker/">https://www.esrl.noaa.gov/gmd/ccgg/carbontracker/</a> <a href="http://www.carbontracker.eu/">http://www.carbontracker.eu/</a>
	Open-source Data Inventory for Anthropogenic CO <sub>2</sub> - ODIAC	Global fossil fuel CO <sub>2</sub> inventory	<a href="http://www.odiac.org/index.html">http://www.odiac.org/index.html</a>

	International Energy Agency (IEA)	Detailed energy balances and CO <sub>2</sub> emission estimations at national level	<a href="https://www.iea.org/statistics/relateddatabases/co2emissionsfromfuelcombustion/">https://www.iea.org/statistics/relateddatabases/co2emissionsfromfuelcombustion/</a>
	Global Carbon Atlas/Project	Online platform to explore, visualize and interpret global and regional carbon data arising from both human activities and natural processes	<a href="http://www.globalcarbonatlas.org/en/CO2-emissions">http://www.globalcarbonatlas.org/en/CO2-emissions</a>
<b>Data Portal</b>	UNFCCC	Links to different databases of CO <sub>2</sub> and other GHG emissions	<a href="http://unfccc.int/ghg_data/ghg_data_non_unfccc/items/3170.php">http://unfccc.int/ghg_data/ghg_data_non_unfccc/items/3170.php</a>
<b>Biosphere Fluxes</b>	NASA JPL's CMS-Flux project	Top-down CO <sub>2</sub> attribution, FLUXNET evaluation, and ECCO-Darwin ocean biogeochemistry	<a href="https://cmsflux.jpl.nasa.gov/">https://cmsflux.jpl.nasa.gov/</a>
	ACT-America	Aircraft campaign for GHG fluxes and transport estimates over the US	<a href="https://act-america.larc.nasa.gov/">https://act-america.larc.nasa.gov/</a>
	ECMWF Data sets	GHG flux inversions	<a href="http://apps.ecmwf.int/datasets/">http://apps.ecmwf.int/datasets/</a>
	FluxCom	An initiative to upscale biosphere-atmosphere fluxes from FLUXNET sites to continental and global scales	<a href="http://www.fluxcom.org/">http://www.fluxcom.org/</a> <a href="https://www.bgc-jena.mpg.de/geodb/projects/Data.php">https://www.bgc-jena.mpg.de/geodb/projects/Data.php</a>
	BACI	Upscaled diurnal cycles of land-atmosphere fluxes: a new global half-hourly data product	<a href="https://www.bgc-jena.mpg.de/geodb/projects/FileDetails.php">https://www.bgc-jena.mpg.de/geodb/projects/FileDetails.php</a>
<b>GHG Inventory</b>	EUROSTAT	Provides data from the annual greenhouse gas inventory compiled by the European Environment Agency (EEA) on behalf of the EU. Estimates of greenhouse gas emissions are produced for a number of sources which are delineated in sectors primarily according to the technological source of emissions, as devised by the IPCC.	<a href="http://ec.europa.eu/eurostat/data/database">http://ec.europa.eu/eurostat/data/database</a>



	EDGAR	Provides past and present global anthropogenic emissions of greenhouse gases and air pollutants by country on a spatial grid.	<a href="http://data.jrc.ec.europa.eu/collection/EDGAR">http://data.jrc.ec.europa.eu/collection/EDGAR</a>
	NOAA Global Monitoring Division	Products based on in situ data	<a href="https://www.esrl.noaa.gov/gmd/ccgg/">https://www.esrl.noaa.gov/gmd/ccgg/</a>
	UNFCCC	GHG data	<a href="http://unfccc.int/ghg_data/new_reporting_requirements/items/9560.php">http://unfccc.int/ghg_data/new_reporting_requirements/items/9560.php</a>
	CDIAC	Records of the concentrations of CO <sub>2</sub> , CH <sub>4</sub> , SF <sub>6</sub> , and HFC-23 in the atmosphere; emissions of CO <sub>2</sub> from fuel combustion; emissions of CH <sub>4</sub> ; and long-term climate trends	<a href="http://cdiac.ess-dive.lbl.gov/trends/trends.htm">http://cdiac.ess-dive.lbl.gov/trends/trends.htm</a>
	WDCGG	World Data Centre for Greenhouse Gases (WDCGG). Data archive of WMO's Global Atmosphere Watch (GAW) programme for measurements of greenhouse gases (CO <sub>2</sub> , CH <sub>4</sub> , CFCs, N <sub>2</sub> O, etc.) and related gases (e.g., CO) in the atmosphere and ocean.	<a href="https://ds.data.jma.go.jp/gmd/wdcgg/">https://ds.data.jma.go.jp/gmd/wdcgg/</a>

## 4 Output Data Sets

The following output data sets have been defined in the CHE Description of Action and follow-on discussions.

**Table 2: CHE Output Data Sets**

Context	Models	Applications	Output Fields
<b>Global</b>	IFS, LMDZ, TM5, TM5+OpenIFS, CCFDAS	Global scale at spatial resolutions of 10 km or coarser aiming at representing the whole globe with continuous transport models/process models of surface fluxes	CO <sub>2</sub> fluxes, CO <sub>2</sub> atmospheric concentrations, other tracers, optimal process parameter values

<b>Regional</b>	CHIMERE, COSMO-GHG, , LOTOS-EUROS, WRF-GHG, WRF-STILT	Regional to continental area at spatial resolution of 5 to 10 km aiming at representing the evolution in limited-area domain with boundary conditions	CO <sub>2</sub> fluxes, CO <sub>2</sub> atmospheric concentrations, other tracers
<b>City Scale</b>	CHIMERE, COSMO-GHG, WRF-CHEM, EULAG	Local targeted areas at spatial resolution of about 1 km or finer aiming at representing detailed emissions	CO <sub>2</sub> fluxes, CO <sub>2</sub> atmospheric concentrations, other tracers
<b>Synthetic Satellite Datasets</b>	WRF-STILT, LOTOS-EUROS, COSMO	Synthetic satellite observations with realistic random and systematic uncertainties for European and regional (city) scale using satellite orbit simulations and input from the CO <sub>2</sub> and aerosol simulations. Input for inverse modelling studies.	Column mean dry air mole fractions XCO <sub>2</sub> along satellite orbits at pixel resolution with random and systematic uncertainties

Further descriptions of output data sets can be found in D7.5 Data Management Plan.

It is planned that all data will be made available to the wider community through the use of existing data portals linked to ICOS, the Global Carbon Project and Copernicus Climate Data Store and these will be linked through the via the CHE Data Portal at <https://www.che-project.eu/data-portal> as soon as they become available.

## 5 CHE Data Portal

The CHE Data Portal is accessible via <https://www.che-project.eu/data-portal>. It provides the references to data sets as described above and will be maintained throughout the lifetime of the project.

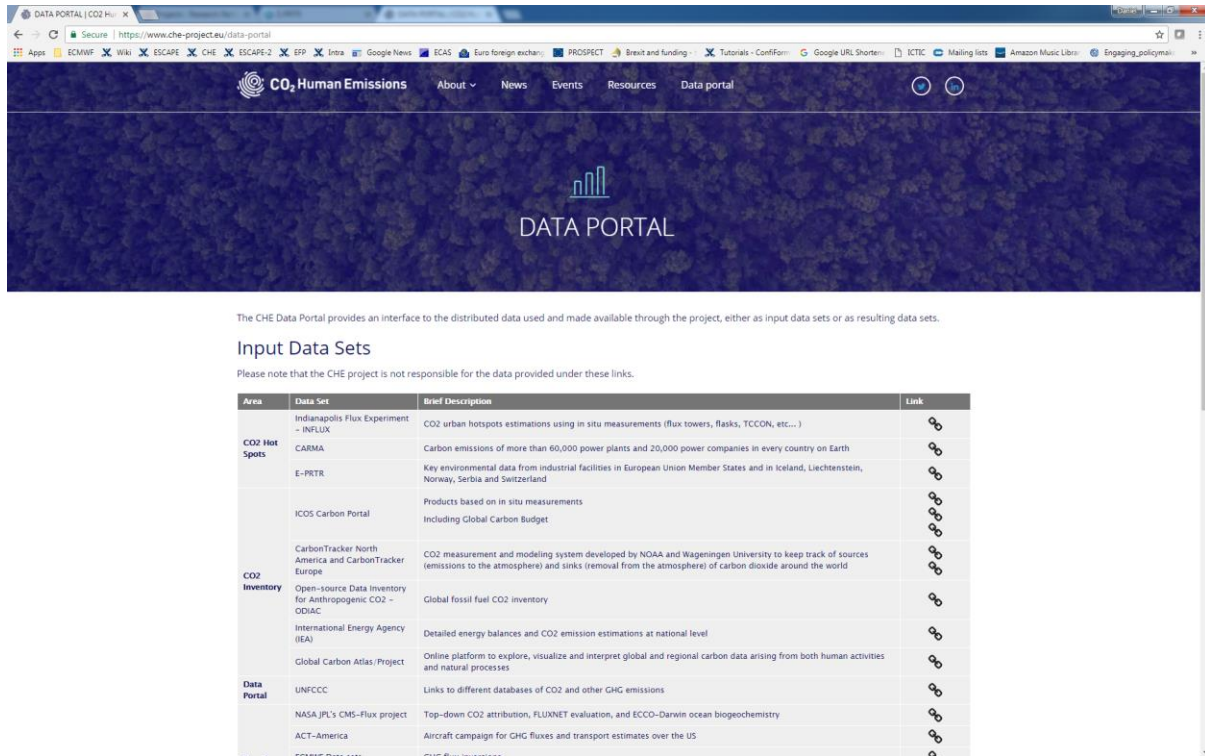


Figure 1: CHE Data Portal

## 6 Summary

D7.8 provided the first and early version of the CHE Research Data Portal by collecting references to relevant data sets used as inputs in the project, and providing an outlook on the data sets to be produced within the project. It is clear that the data portal is a living and evolving document/ platform that requires constant updating as the work in the CHE project progresses.

## Document History

Version	Author(s)	Date	Changes
0.1	Daniel Thiemert (ECMWF)	08/03/2018	Initial Version for Internal Review
1.0	Daniel Thiemert (ECMWF)	21/03/2018	Final version after review

## Internal Review History

Internal Reviewers	Date	Comments
Dominik Brunner (EMPA)	20/03/2018	Approved with comments
Rosemary Munro (EUMETSAT)	19/03/2018	The deliverable D7.8 v0.1 provides an accurate and complete status of the current first and early version of the CHE Research Data Portal.

## Estimated Effort Contribution per Partner

Partner	Effort
ECMWF	0.1
<b>Total</b>	<b>0.1</b>

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