

PRODUCT USER MANUAL

OMI_HEALTH_carbon

Ocean carbon

GLOBAL_OMI_HEALTH_carbon_co2_flux_integrated

GLOBAL_OMI_HEALTH_carbon_ph_area_averaged

Issue: 3.0

Contributors: Trang Chau, Marion Gehlen, Frederic Chevallier

Approval Date:

CHANGE RECORD

Issue	Date	§	Description of Change	Author	Checked by	Validated by
1.0	January 2019	all	Creation of the document	Marion Gehlen, Trang Chau	Stéphanie Guinehut	
1.1	October 2019	§II.2	Uncertainty variables added in the description of the datasets content	Marion Gehlen, Trang Chau	Stéphanie Guinehut	
2.0	December 2019	§II.1 §II.2	Temporal extension	Thi Tuyet Trang Chau, Marion Gehlen, Frédéric Chevallier	Stéphanie Guinehut	C. Derval
3.0	September 2020	§II.1	Temporal extension	Thi Tuyet Trang Chau, Marion Gehlen, Frédéric Chevallier	Stéphanie Guinehut	
4.0	September 2021	§II.1	Temporal extension	Thi Tuyet Trang Chau, Marion Gehlen, Frédéric Chevallier		

<p>PUM for CMEMS Ocean Monitoring Indicator OMI_HEALTH_carbon</p>	<p>Ref: CMEMS-OMI-PUM-GLO-HEALTH-carbon Date : September 2021 Issue : 4.0</p>
---	---

TABLE OF CONTENTS

GLOSSARY AND ABBREVIATIONS 4

I INTRODUCTION..... 5

I.1 Summary 5

I.2 History of change..... 5

II DESCRIPTION OF THE PRODUCT SPECIFICATION..... 7

II.1 General Information about products 7

II.2 Details of the datasets 8

II.3 Product System Description..... 8

II.4 Download a product through the CMEMS Web Portal Ftp Service 9

III FILES NOMENCLATURE and FORMAT 10

III.1 Nomenclature of files when downloaded through the CMEMS FTP Services 10

III.2 File Format: format name 10

III.3 Reading Softwares..... 11

IV References..... 12

GLOSSARY AND ABBREVIATIONS

CMEMS	Copernicus Marine Environment Monitoring Service
MOI	Mercator Océan International
NetCDF	Network Common Data Form
OMI	Ocean Monitoring Indicator
PUM	Product User Manual
QUID	Quality Information Document

PUM for CMEMS Ocean Monitoring Indicator OMI_HEALTH_carbon	Ref: CMEMS-OMI-PUM-GLO-HEALTH-carbon Date : September 2021 Issue : 4.0
---	--

I INTRODUCTION

I.1 Summary

This document is the user manual for the CMEMS Ocean Monitoring Indicator (OMI) GLOBAL_OMI_HEALTH_carbon. It contains 2 OMIs:

- GLOBAL_OMI_HEALTH_carbon_co2_flux_integrated
- GLOBAL_OMI_HEALTH_carbon_ph_area_averaged

The OMIs provide estimates of global yearly ocean CO₂ uptake and area averaged yearly mean surface sea water pH reported on total scale. These estimates are derived from the global reconstruction of monthly surface ocean downward flux of carbon dioxide, respectively surface water pH reported on total scale distributed as part of MULTIOBS_GLO_BIO_CARBON_SURFACE_REP_015_008 (<http://marine.copernicus.eu/documents/PUM/CMEMS-MOB-PUM-015-008.pdf>). Units are in PgC/yr for CO₂ flux and pH units for pH.

The product is published on the CMEMS dissemination server after automatic and delayed-mode quality controls. The product is available online and disseminated through the CMEMS Information System. Files downloaded are in NetCDF format and follow CF-1.7 convention.

Disclaimer: The quality of the product may vary during the proposed time series depending on the possible update of the system.

The two OMIs are described in the Quality Information Document (QUID) CMEMS-OMI-QUID-GLO-HEALTH-carbon-co2-flux-integrated.pdf (<http://marine.copernicus.eu/documents/QUID/CMEMS-OMI-QUID-GLO-HEALTH-carbon-co2-flux-integrated.pdf>) and CMEMS-OMI-QUID-GLO-HEALTH-carbon-ph-area-averaged.pdf (<http://marine.copernicus.eu/documents/QUID/CMEMS-OMI-QUID-GLO-HEALTH-carbon-ph-area-averaged.pdf>). See also News flash. More detailed information can be obtained from <http://marine.copernicus.eu/services-portfolio/contact-us/>.

I.2 History of change

February 2019	1st publication of OMI_HEALTH_carbon products
---------------	---

PUM for CMEMS Ocean Monitoring Indicator OMI_HEALTH_carbon	Ref: CMEMS-OMI-PUM-GLO-HEALTH-carbon Date : September 2021 Issue : 4.0
---	--

	(GLOBAL_OMI_HEALTH_carbon_co2_flux_integrated; GLOBAL_OMI_HEALTH_carbon_ph_area_averaged)
October 2019	Uncertainty variables added in the description of the datasets content
December 2019	Temporal extension. The 1985-2018 period is now available
September 2020	Temporal extension (+1 year)
September 2021	Temporal extension (+1 year)

II DESCRIPTION OF THE PRODUCT SPECIFICATION

II.1 General Information about products

Product(s) name	GLOBAL_OMI_HEALTH_carbon_co2_flux_integrated GLOBAL_OMI_HEALTH_carbon_ph_area_averaged		
Geographical coverage	global		
Variables	global_integrated_co2_flux_expressed_as_carbon sea_water_ph_reported_on_total_scale		
Update frequency	yearly		
Available time series	From 1985-		
Delivery mechanism	FTP		
Temporal/Spatial resolution	yearly value, global mean value		
Integration depth (for example..)	surface		
Format	NetCDF CF1.7		

Detailed information on the systems and products are on CMEMS web site:

<http://marine.copernicus.eu/documents/QUID/CMEMS-OMI-QUID-GLO-HEALTH-carbon-co2-flux-integrated.pdf>

<http://marine.copernicus.eu/documents/QUID/CMEMS-OMI-QUID-GLO-HEALTH-carbon-ph-area-averaged.pdf>

II.2 Details of the datasets

OMI_HEALTH_carbon	
GLOBAL_OMI_HEALTH_carbon_co2_flux_integrated	contains the global yearly integrated CO2 flux
	<p>fgco2 [Pg yr-1] Global integrated surface downward flux of total CO2 global_integrated_co2_flux_expressed_as_carbon</p> <p>fgco2_uncertainty [Pg yr-1] Uncertainty (standard deviation) of global integrated surface downward flux of total CO2 global_integrated_co2_flux_expressed_as_carbon</p>
GLOBAL_OMI_HEALTH_carbon_ph_area_averaged	contains the area averaged yearly mean surface sea water pH reported on total scale
	<p>ph [1] Global mean seawater pH reported on total scale sea_water_ph_reported_on_total_scale</p> <p>ph_uncertainty [1] Uncertainty (standard deviation) of global mean seawater pH reported on total scale: sea_water_ph_reported_on_total_scale</p>

Note that the standard name and units of global integrated surface downward flux of total CO₂ (fgco2) in **GLOBAL_OMI_HEALTH_carbon_co2_flux_integrated** product are not yet included in CF conventions since they were created for this first contribution.

II.3 Product System Description

The estimates are derived from the global reconstruction of monthly surface ocean downward flux of carbon dioxide, respectively surface water pH reported on total scale distributed as part of MULTIOBS_GLO_BIO_CARBON_SURFACE_REP_015_008

(<http://marine.copernicus.eu/documents/PUM/CMEMS-MOB-PUM-015-008.pdf>),
(<http://marine.copernicus.eu/documents/QUID/CMEMS-MOB-QUID-015-008.pdf>).

PUM for CMEMS Ocean Monitoring Indicator OMI_HEALTH_carbon	Ref: CMEMS-OMI-PUM-GLO-HEALTH-carbon Date : September 2021 Issue : 4.0
---	--

II.4 Download a product through the CMEMS Web Portal Ftp Service

You first need to register. Please find below the registration steps:
<http://marine.copernicus.eu/web/34-products-and-services-faq.php#1>

Once registered, the CMEMS FAQ <http://marine.copernicus.eu/web/34-products-and-services-faq.php> will guide you on how to download a product through the CMEMS Web Portal FTP Service.

III FILES NOMENCLATURE AND FORMAT

III.1 Nomenclature of files when downloaded through the CMEMS FTP Services

OMI_HEALTH_carbon files nomenclature when downloaded through the CMEMS FTP Services is based on the following nomenclature:

<datasetname>_<timestep>_P<productiontime>.nc

Where :

- **<datasetname>** is the dataset reference (**global_omi_health_carbon_co2_flux_integrated** or **global_omi_health_carbon_ph_area_averaged**).
- **<timestep>** is the first time step contained in the file.
- **<productiontime>** is the production time when the file was generated.
- **.nc** is the standard NetCDF filename extension.

Example: global_omi_health_carbon_co2_flux_integrated_1985_P20191231.nc

III.2 File Format: format name

The products are stored using the NetCDF format.

NetCDF (network Common Data Form) is an interface for array-oriented data access and a library that provides an implementation of the interface. The NetCDF library also defines a machine-independent format for representing scientific data. Together, the interface, library, and format support the creation, access, and sharing of scientific data. The NetCDF software was developed at the Unidata Program Center in Boulder, Colorado. The NetCDF libraries define a machine-independent format for representing scientific data.

Please see Unidata NetCDF pages for more information, and to retrieve NetCDF software package. NetCDF data is:

- * Self-Describing. A netCDF file includes information about the data it contains.
- * Architecture-independent. A NetCDF file is represented in a form that can be accessed by computers with different ways of storing integers, characters, and floating-point numbers.
- * Direct-access. A small subset of a large dataset may be accessed efficiently, without first reading through all the preceding data.
- * Appendable. Data can be appended to a NetCDF dataset along one dimension without copying the dataset or redefining its structure. The structure of a NetCDF dataset can be changed, though this sometimes causes the dataset to be copied.
- * Sharable. One writer and multiple readers may simultaneously access the same NetCDF file.

PUM for CMEMS Ocean Monitoring Indicator OMI_HEALTH_carbon	Ref: CMEMS-OMI-PUM-GLO-HEALTH-carbon Date : September 2021 Issue : 4.0
---	--

III.3 Reading Softwares

The products are stored using the NetCDF-CF format. Note that these data can be browsed and used through several softwares, like:

- ✓ Basic Radar Altimetry Toolbox: <http://www.altimetry.info>
- ✓ ncBrowse: <http://www.epic.noaa.gov/java/ncBrowse/>
- ✓ NetCDF Operator (NCO): <http://nco.sourceforge.net/>
- ✓ <http://www.unidata.ucar.edu/software/netcdf/>

PUM for CMEMS Ocean Monitoring Indicator
OMI_HEALTH_carbon

Ref: CMEMS-OMI-PUM-GLO-HEALTH-carbon

Date : September 2021

Issue : 4.0

IV REFERENCES

See the Quality Information Document (QUID):

<http://marine.copernicus.eu/documents/QUID/CMEMS-OMI-QUID-GLO-HEALTH-carbon-co2-flux-integrated.pdf>

<http://marine.copernicus.eu/documents/QUID/CMEMS-OMI-QUID-GLO-HEALTH-carbon-ph-area-averaged.pdf>