



# PRODUCT USER MANUAL

For the Global Ocean Physical Multi Year  
product

GLOBAL\_MULTIYEAR\_PHY\_001\_030  
Issue: 1.6

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**Approval Date** : November 2024



Copernicus  
Marine Service



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## RECORD TABLE

Issue	Date	§	Description of Change	Author	Validated By
1.1	2018/02/16	All	Initial version	E. Fernandez, J.M. Lellouche	C. Derval
1.2	2021/01/13	all	Addition of climatology dataset	M Drevillon	C. Derval
1.3	2021/11/15	All	Product and dataset Nomenclature update	C. Derval	C. Derval
1.4	2022/11/29	All	New template	A. Biardeau	Copernicus Marine Product Management
1.5	2023/06/16	All	Add interim dataset	O. Le Galloudec	Copernicus Marine Product Management
1.6	2024/05/31	All	Interim dataset M-1	R. Bourdallé- Badie	O. Le Galloudec

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## GLOSSARY AND ABBREVIATIONS

<b>CF</b>	Climate Forecast (convention for NetCDF)
<b>CMEMS</b>	Copernicus Marine Environment Monitoring Service
<b>ECMWF</b>	European Centre for Medium Range Weather forecast
<b>GLO</b>	Global
<b>NetCDF</b>	Network Common Data Form
<b>PUM</b>	Product User Manual
<b>QUID</b>	Quality Information Document

## DATA ACCESS

After registration, you will be able to download our data. To assist you, our [HelpCenter](#) is available, and more specifically its [section about download](#).

Information on operational issues on products and services can be found on our [User Notification Service](#). If you have any questions, please [contact us](#).

# 1) INTRODUCTION

This document is the user manual for the Copernicus Marine global reanalysis product GLOBAL\_MULTIYEAR\_PHY\_001\_030. The reanalysis is built to be as close as possible to the observations (i.e. realistic) and in agreement with the model physics. It covers the period from 1992 to 31/06/2021. The interim datasets cover 01/07/2021 to M-1 period.

The goal of this Copernicus Marine global ocean reanalysis is to provide an eddy resolving (1/12°) global ocean simulation, covering the recent period during which altimeter data are available (period starting with the launch of TOPEX POSEIDON and ERS-1 satellites early in the nineties), constrained by assimilation of observations and describing the space-time evolution of 3D thermodynamic variables (T, S), 3D dynamic variables (U, V), sea surface height and sea-ice features (concentration, thickness and horizontal velocity).

This product is defined on a standard regular grid at 1/12 degree (approx. 8km) and on 50 standard levels. It is interpolated from the 1/12 degree and 50 vertical levels Arakawa C native grid. All variables are on the same regular grid points.

GLOBAL\_MULTIYEAR\_PHY\_001\_030 product is organized in three datasets:

- **cmems\_mod\_glo\_phy\_my\_0.083deg\_P1D-m** which contains the 3D daily mean fields: 3D potential temperature, salinity and currents information from top to bottom and 2D sea surface level, bottom potential temperature, mixed layer thickness, sea ice thickness, sea ice fraction and sea ice velocities information.
- **cmems\_mod\_glo\_phy\_my\_0.083deg\_P1M-m** which contains the monthly mean fields: 3D potential temperature, salinity and currents information from top to bottom and 2D sea surface level, bottom potential temperature, mixed layer thickness, sea ice thickness, sea ice fraction and sea ice velocities information.
- **cmems\_mod\_glo\_phy\_myint\_0.083deg\_P1D-m** which contains the 3D daily mean fields: 3D potential temperature, salinity and currents information from top to bottom and 2D sea surface level, bottom potential temperature, mixed layer thickness, sea ice thickness, sea ice fraction and sea ice velocities information on the interim period.
- **cmems\_mod\_glo\_phy\_myint\_0.083deg\_P1M-m** which contains the monthly mean fields: 3D potential temperature, salinity and currents information from top to bottom and 2D sea surface level, bottom potential temperature, mixed layer thickness, sea ice thickness, sea ice fraction and sea ice velocities information on the interim period.
- **cmems\_mod\_glo\_phy\_my\_0.083deg-climatology\_P1M-m** which contains the monthly climatology mean fields: for each month of the year, the 1993-2016 average of 3D potential temperature, salinity and currents information from top to bottom and 2D sea surface level, bottom potential temperature, mixed layer thickness, sea ice thickness, sea ice fraction and sea ice velocities information.
- **cmems\_mod\_glo\_phy\_my\_0.083deg\_static** which contains the static fields for the system: coordinates, mean sea surface level, mask and bathymetry.

The product is published on the Copernicus Marine Service dissemination server after automatic and human quality controls. Files downloaded are in NetCDF format and follow CF-1.4 convention.

The analysis and forecasting system is described in the Quality Information Document (QUID – see [in REFERENCES](#)).

Information on operational issues on products and services can be found on our [User Notification Service](#). If you have any questions, please [contact us](#).

## 2) DESCRIPTION OF THE PRODUCT SPECIFICATION

### a) General Information

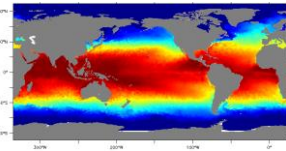
<b>Product Specification</b>	GLOBAL_MULTIYEAR_PHY_001_030
<b>Geographical coverage</b>	Global (180°E to 180°E ; 89°S to 90°N)
<b>Variables</b>	<ul style="list-style-type: none"> <li>• Potential temperature</li> <li>• Salinity</li> <li>• Sea surface height</li> <li>• Horizontal velocity (eastward and northward components)</li> <li>• Sea ice concentration</li> <li>• Sea ice velocity (eastward and northward components)</li> <li>• Sea ice thickness</li> <li>• Sea floor potential temperature</li> <li>• Density ocean mixed layer thickness</li> </ul>
	<b>Reanalysis</b>
<b>Update frequency</b>	Yearly
<b>Available time series</b>	04/12/1991 to 31/06/2021 for my period and 01/07/2021 to M-1 for interim period
<b>Target delivery time</b>	N/A
<b>Temporal resolution</b>	<ul style="list-style-type: none"> <li>- cmems_mod_glo_phy_my_0.083deg_P1D-m: daily mean</li> <li>- cmems_mod_glo_phy_my_0.083deg_P1M-m: monthly mean</li> <li>- cmems_mod_glo_phy_myint_0.083deg_P1D-m: daily mean</li> <li>- cmems_mod_glo_phy_myint_0.083deg_P1M-m: monthly mean</li> <li>- cmems_mod_glo_phy_my_0.083deg-climatology_P1M-m</li> </ul>
<b>Delivery mechanism</b>	Marine Data Store
<b>Horizontal resolution</b>	1/12 ° (equirectangular grid)

<b>Number of vertical levels</b>	50 levels
<b>Format</b>	NetCDF CF1.4



## b) Production System Description

The Operational Mercator global ocean reanalysis system at 1/12 degree is providing a 25-years time series starting on January, 1<sup>st</sup>, 1993. This product includes daily and monthly mean files of temperature, salinity, currents, sea level, mixed layer depth and ice parameters from the top to the bottom over the global ocean.

<b>Domain</b>	GLOBAL (180°W-180°E ; 80°S – 90°N)
<b>Resolution and grid</b>	1/12° ; regular grid ; 4320 x 2041
<b>Geographic coverage</b>	<p>This product is global with dedicated projection and spatial resolution. It is defined on a standard collocated grid at 1/12 degree (approx. 8 km). The parameters are interpolated from the native grid model, the 1/12 degree and 50 vertical levels Arakawa C native grid.</p> 
<b>Model Version</b>	LIM2 EVP NEMO 3.1
<b>Atmospheric forcing</b>	3-h and 24-h atmospheric forcing from ERA-Interim, including precipitation and radiative fluxes (SW+LW) corrections Hourly ERA5 forcing from January 1st 2019
<b>Assimilation scheme</b>	SAM2 (SEEK Kernel) + FGAT + IAU and 3D-VAR T/S bias correction
<b>Assimilated observations</b>	Reynolds 0.25° AVHRR-only SST, Delayed Time SLA from all altimetric satellites, in situ T/S profiles from Copernicus Marine CORAv4.1 database, CERSAT Sea Ice Concentration
<b>Initial conditions</b>	January 1993 T/S regressed from EN.4.2.0
<b>Bathymetry</b>	ETOPO1 for deep ocean and GEBCO8 on coast and continental shelf.

## c) Processing information

### 1. Time coverage

The time series covers the following period from 01/01/1993

### 2. Time averaging

For the monthly dataset, the fields are monthly means over the calendar month (first to last day of the month). For the daily dataset, the fields are daily means over a day (midnight to midnight, centered at noon).

## d) Details of datasets

GLOBAL_MULTIYEAR_PHY_001_030
<b>cmems_mod_glo_phy_my_0.083deg_P1D-m</b> contains the <u>daily mean fields</u> : 3D potential temperature, salinity and currents information from top to bottom and 2D sea surface level, bottom potential temperature, mixed layer thickness, sea ice thickness, sea ice fraction and sea ice velocities information
<b>cmems_mod_glo_phy_my_0.083deg_P1M-m</b> contains the <u>monthly mean fields</u> : 3D potential temperature, salinity and currents information from top to bottom and 2D sea surface level, bottom potential temperature, mixed layer thickness, sea ice thickness, sea ice fraction and sea ice velocities information.
<b>cmems_mod_glo_phy_myint_0.083deg_P1D-m</b> contains the <u>daily mean fields</u> : 3D potential temperature, salinity and currents information from top to bottom and 2D sea surface level, bottom potential temperature, mixed layer thickness, sea ice thickness, sea ice fraction and sea ice velocities information on the interim period.
<b>cmems_mod_glo_phy_myint_0.083deg_P1M-m</b> contains the <u>monthly mean fields</u> : 3D potential temperature, salinity and currents information from top to bottom and 2D sea surface level, bottom potential temperature, mixed layer thickness, sea ice thickness, sea ice fraction and sea ice velocities information on the interim period.
<b>cmems_mod_glo_phy_my_0.083deg-climatology_P1M-m</b> contains the <u>monthly climatology mean fields</u> : for each month of the year, the 1993-2016 average of 3D potential temperature, salinity and currents information from top to bottom and 2D sea surface level, bottom potential temperature, mixed layer thickness, sea ice thickness, sea ice fraction and sea ice velocities information.
<b>These 5 datasets contained all the variables described below:</b>
<b>thetao</b> [°C] Potential temperature sea_water_potential_temperature
<b>so</b> [psu] Salinity sea_water_salinity
<b>uo</b> [m/s] Eastward ocean current velocity eastward_sea_water_velocity
<b>vo</b> [m/s] Northward ocean current velocity northward_sea_water_velocity
<b>zos</b> [m] Sea surface height sea_surface_height_above_geoid
<b>mldtst</b> [m] Mixed layer thickness

<b>ocean_mixed_layer_thickness_defined_by_sigma_theta</b>
<b>bottomT</b> [°C] Sea floor potential temperature sea_water_potential_temperature_at_sea_floor
<b>siconc</b> [1] Sea ice concentration sea_ice_area_fraction
<b>sithick</b> [m] Sea ice thickness sea_ice_thickness
<b>usi</b> [m/s] Eastward sea ice velocity eastward_sea_ice_velocity
<b>vsi</b> [m/s] Northward sea ice velocity northward_sea_ice_velocity
<b>cmems_mod_glo_phy_my_0.083deg_static</b> contains the static fields for the system: coordinates, mean sea surface level, mask and bathymetry
<b>e1t</b> [m] Cell dimension along X axis
<b>e2t</b> [m] Cell dimension along Y axis
<b>e3t</b> [m/s] Cell dimension along Z axis cell_thickness
<b>mask</b> [1] Land-sea mask: 1 = sea ; 0 = land sea_binary_mask
<b>deptho</b> [m] Bathymetry sea_floor_depth_below_geoid
<b>deptho_lev</b> [1] Model level number at sea floor model_level_number_at_sea_floor
<b>mdt</b> [m] Mean dynamic topography sea_surface_height_above_geoid

Table 2: List of variables in datasets and their names and units in the NetCDF output files for the GLOBAL\_MULTIYEAR\_PHY\_001\_030 product

## e) Additional Information on parameters

<b>m1otst</b> [m]	ocean_mixed_layer_thickness_defined_by_sigma_theta. It is the depth where the density increase compared to density at 10 m depth corresponds to a temperature decrease of 0.2°C in local surface conditions ( $\theta_{10m}$ , $S_{10m}$ , $P_0 = 0$ db, surface pressure)
<b>zos</b> [m]	sea_surface_height_above_geoid. The geoid is a surface of constant geopotential with which mean sea level would coincide if the ocean were at rest. The parameter "zos" is the difference between the actual sea surface height at any given time and place, and that which it would have if the ocean were at rest.
<b>Ssh</b> [m]	See the Help Center <a href="#">article</a>

### 3) FILE FORMAT

The products are stored using the NetCDF format.

To know more about the NetCDF format, please follow this link:

[What is the format of Copernicus Marine products ? NetCDF](#)

To understand the differences between netCDF and Zarr, please consult this article:

[how-to-choose-between-netcdf-and-zarr-format-using-the-toolbox](#)

## 4) FILES NOMENCLATURE

*Information about nomenclature of files when downloaded can be found in this articles “[Files Nomenclature and Format](#)”*

### a) Nomenclature of files when downloaded through the Copernicus Marine Service Web Portal Subset Service

GLOBAL\_MULTIYEAR\_PHY\_001\_030 files nomenclature when downloaded through the CMEMS MDS Services is based on the following nomenclature:

The scheme is: **datasetname\_nnnnnnnnnnnnn.nc**

where:

- **datasetname**: as described previously
- **nnnnnnnnnnnnnn**: 13 digit integer corresponding to the current time (download time) in milliseconds since January 1, 1970 midnight UTC.
- **.nc**: standard NetCDF filename extension.

Example: cmems\_mod\_glo\_phy\_my\_0.083deg\_PID-m\_1669310276809.nc

### b) Nomenclature of original files

When downloading via MDS, the files are provided with the native nomenclature.

- Native nomenclature:

For the daily dataset, the scheme is:

**mercatorglorys12v1\_gl12\_mean\_yyyymmdd\_RYYYYMMDD.nc**

Where:

- yyyymmdd: field daily mean central date, on YYYYYMMDD format
- YYYYYMMDD: creation date of the file
- **.nc**: standard NetCDF filename extension.

For the monthly dataset, the scheme is:

**mercatorglorys12v1\_gl12\_mean\_yyyymm.nc**

Where:

- yyyymm: field monthly mean central date, on YYYYYMM format
- **.nc**: standard NetCDF filename extension.

For the daily dataset, the scheme is:

**mercatorglorys12v1\_gl12\_mean\_yyyymmdd\_RYYYYMMDD.nc**

Where:

- yyyymmdd: field daily mean central date, on YYYYYMMDD format
- YYYYYMMDD: creation date of the file

- **.nc**: standard NetCDF filename extension.

For the monthly dataset, the scheme is:

**mercatorglorys12v1\_gl12\_mean\_yyyymm.nc**

Where:

- yyyymm: field monthly mean central date, on YYYYMM format
- **.nc**: standard NetCDF filename extension.

### c) File size

DATASET NAME	NAME OF FILE	DIMENSION [GB]
cmems_mod_glo_phy_my_0.083deg_P1D-m	mercatorglorys12v1_gl12_mean_\${date1}_R\${date2}.nc	3.4
cmems_mod_glo_phy_my_0.083deg_P1M-m	mercatorglorys12v1_gl12_mean_\${yyyymm}.nc	3.4
cmems_mod_glo_phy_myint_0.083deg_P1D-m	mercatorglorys12v1_gl12_mean_\${date1}_R\${date2}.nc	3.4
cmems_mod_glo_phy_myint_0.083deg_P1M-m	mercatorglorys12v1_gl12_mean_\${yyyymm}.nc	3.4
cmems_mod_glo_phy_my_0.083deg-climatology_P1M-m	mercatorglorys12v1_gl12_mean_1993_2016_07.nc	1.2

#### d) **scale\_factor & add\_offset / missing\_value / land mask**

$\text{Real\_Value} = (\text{Display\_Value} \times \text{scale\_factor}) + \text{add\_offset}$

The missing value for this product is: -32767s

Land mask are equal to “\_FillValue” (see variable attribute on NetCDF file).

#### e) **Structure of files**

Example of the header of output NetCDF file is inserted in annex



## 5) REFERENCES

Quality Information Document (QUID) CMEMS\_GLO\_QUID\_001\_030 :

<https://catalogue.marine.copernicus.eu/documents/QUID/CMEMS-GLO-QUID-001-030.pdf>

## 6) ANNEX

### cmems\_mod\_glo\_phy\_my\_0.083deg\_P1D-m

netcdf mercatorglorys12v1\_gl12\_mean\_20201231\_R20210106 {

dimensions:

```
longitude = 4320 ;
latitude = 2041 ;
depth = 50 ;
time = UNLIMITED ; // (1 currently)
```

variables:

```
float longitude(longitude) ;
    longitude:valid_min = -180.f ;
    longitude:valid_max = 179.9167f ;
    longitude:step = 0.08332825f ;
    longitude:units = "degrees_east" ;
    longitude:unit_long = "Degrees East" ;
    longitude:long_name = "Longitude" ;
    longitude:standard_name = "longitude" ;
    longitude:axis = "X" ;
float latitude(latitude) ;
    latitude:valid_min = -80.f ;
    latitude:valid_max = 90.f ;
    latitude:step = 0.08333588f ;
    latitude:units = "degrees_north" ;
    latitude:unit_long = "Degrees North" ;
    latitude:long_name = "Latitude" ;
    latitude:standard_name = "latitude" ;
    latitude:axis = "Y" ;
float depth(depth) ;
    depth:valid_min = 0.494025f ;
    depth:valid_max = 5727.917f ;
    depth:units = "m" ;
    depth:positive = "down" ;
    depth:unit_long = "Meters" ;
    depth:long_name = "Depth" ;
    depth:standard_name = "depth" ;
    depth:axis = "Z" ;
float time(time) ;
    time:long_name = "Time (hours since 1950-01-01)" ;
```

```

time:standard_name = "time" ;
time:calendar = "gregorian" ;
time:valid_min = 622380.f ;
time:valid_max = 622380.f ;
time:units = "hours since 1950-01-01 00:00:00" ;
time:axis = "T" ;
short mlotst(time, latitude, longitude) ;
    mlotst:long_name = "Density ocean mixed layer thickness" ;
    mlotst:standard_name =
"ocean_mixed_layer_thickness_defined_by_sigma_theta" ;
    mlotst:units = "m" ;
    mlotst:unit_long = "Meters" ;
    mlotst:add_offset = -0.152592554688454 ;
    mlotst:scale_factor = 0.152592554688454 ;
    mlotst:_FillValue = -32767s ;
    mlotst:valid_min = 1s ;
    mlotst:valid_max = 6447s ;
    mlotst:cell_methods = "area: mean" ;
short zos(time, latitude, longitude) ;
    zos:long_name = "Sea surface height" ;
    zos:standard_name = "sea_surface_height_above_geoid" ;
    zos:units = "m" ;
    zos:unit_long = "Meters" ;
    zos:add_offset = 0. ;
    zos:scale_factor = 0.000305185094475746 ;
    zos:_FillValue = -32767s ;
    zos:valid_min = -6181s ;
    zos:valid_max = 5039s ;
    zos:cell_methods = "area: mean" ;
short bottomT(time, latitude, longitude) ;
    bottomT:long_name = "Sea floor potential temperature" ;
    bottomT:standard_name =
"sea_water_potential_temperature_at_sea_floor" ;
    bottomT:units = "degrees_C" ;
    bottomT:unit_long = "Degrees Celsius" ;
    bottomT:_FillValue = -32767s ;
    bottomT:add_offset = 21. ;
    bottomT:scale_factor = 0.000732444226741791 ;
    bottomT:valid_min = -32757s ;
    bottomT:valid_max = 21318s ;
    bottomT:cell_methods = "area: mean" ;
short sithick(time, latitude, longitude) ;
    sithick:long_name = "Sea ice thickness" ;
    sithick:standard_name = "sea_ice_thickness" ;
    sithick:units = "m" ;
    sithick:unit_long = "Meters" ;
    sithick:add_offset = -0.000762962736189365 ;
    sithick:scale_factor = 0.000762962736189365 ;
    sithick:_FillValue = -32767s ;

```

```

sithick:valid_min = 1s ;
sithick:valid_max = 4618s ;
sithick:cell_methods = "area: mean where sea_ice" ;
short siconc(time, latitude, longitude) ;
    siconc:long_name = "Ice concentration" ;
    siconc:standard_name = "sea_ice_area_fraction" ;
    siconc:units = "1" ;
    siconc:unit_long = "Fraction" ;
    siconc:add_offset = -3.81481368094683e-05 ;
    siconc:scale_factor = 3.81481368094683e-05 ;
    siconc:_FillValue = -32767s ;
    siconc:valid_min = 1s ;
    siconc:valid_max = 28060s ;
    siconc:cell_methods = "area: mean where sea_ice" ;
short usi(time, latitude, longitude) ;
    usi:long_name = "Sea ice eastward velocity" ;
    usi:standard_name = "eastward_sea_ice_velocity" ;
    usi:units = "m s-1" ;
    usi:unit_long = "Meters per second" ;
    usi:add_offset = 0. ;
    usi:scale_factor = 3.05185094475746e-05 ;
    usi:_FillValue = -32767s ;
    usi:valid_min = -32707s ;
    usi:valid_max = 32144s ;
    usi:cell_methods = "area: mean where sea_ice" ;
short vsi(time, latitude, longitude) ;
    vsi:long_name = "Sea ice northward velocity" ;
    vsi:standard_name = "northward_sea_ice_velocity" ;
    vsi:units = "m s-1" ;
    vsi:unit_long = "Meters per second" ;
    vsi:add_offset = 0. ;
    vsi:scale_factor = 3.05185094475746e-05 ;
    vsi:_FillValue = -32767s ;
    vsi:valid_min = -31907s ;
    vsi:valid_max = 31690s ;
    vsi:cell_methods = "area: mean where sea_ice" ;
short thetao(time, depth, latitude, longitude) ;
    thetao:long_name = "Temperature" ;
    thetao:standard_name = "sea_water_potential_temperature" ;
    thetao:units = "degrees_C" ;
    thetao:unit_long = "Degrees Celsius" ;
    thetao:_FillValue = -32767s ;
    thetao:add_offset = 21. ;
    thetao:scale_factor = 0.000732444226741791 ;
    thetao:valid_min = -32764s ;
    thetao:valid_max = 21298s ;
    thetao:cell_methods = "area: mean" ;
short so(time, depth, latitude, longitude) ;
    so:long_name = "Salinity" ;

```

```

so:standard_name = "sea_water_salinity" ;
so:units = "1e-3" ;
so:unit_long = "Practical Salinity Unit" ;
so:_FillValue = -32767s ;
so:add_offset = -0.00152592547237873 ;
so:scale_factor = 0.00152592547237873 ;
so:valid_min = 1s ;
so:valid_max = 28336s ;
so:cell_methods = "area: mean" ;
short uo(time, depth, latitude, longitude) ;
uo:long_name = "Eastward velocity" ;
uo:standard_name = "eastward_sea_water_velocity" ;
uo:units = "m s-1" ;
uo:unit_long = "Meters per second" ;
uo:_FillValue = -32767s ;
uo:add_offset = 0. ;
uo:scale_factor = 0.000610370188951492 ;
uo:valid_min = -3573s ;
uo:valid_max = 3559s ;
uo:cell_methods = "area: mean" ;
short vo(time, depth, latitude, longitude) ;
vo:long_name = "Northward velocity" ;
vo:standard_name = "northward_sea_water_velocity" ;
vo:units = "m s-1" ;
vo:unit_long = "Meters per second" ;
vo:_FillValue = -32767s ;
vo:add_offset = 0. ;
vo:scale_factor = 0.000610370188951492 ;
vo:valid_min = -3300s ;
vo:valid_max = 3399s ;
vo:cell_methods = "area: mean" ;

// global attributes:
:title = "daily mean fields from Global Ocean Physics Analysis and
Forecast updated Daily" ;
:easting = "longitude" ;
:northing = "latitude" ;
:history = "2022/05/25 21:54:07 MERCATOR OCEAN Netcdf creation" ;
:source = "MERCATOR GLORYS12V1" ;
:institution = "MERCATOR OCEAN" ;
:references = "http://www.mercator-ocean.fr" ;
:comment = "CMEMS product" ;
:Conventions = "CF-1.4" ;
:domain_name = "GL12" ;
:field_type = "mean" ;
:field_date = "2020-12-31 00:00:00" ;
:field_julian_date = 25932.f ;
:julian_day_unit = "days since 1950-01-01 00:00:00" ;
:forecast_range = "" ;

```

```

:forecast_type = "";
:bulletin_date = "2021-01-06 00:00:00" ;
:bulletin_type = "operational" ;
:longitude_min = -180.f ;
:longitude_max = 179.9167f ;
:latitude_min = -80.f ;
:latitude_max = 90.f ;
:z_min = 0.494025f ;
:z_max = 5727.917f ;
:_NCProperties = "version=2,netcdf=4.7.1,hdf5=1.10.5," ;
}

```

### **cmems\_mod\_glo\_phy\_my\_0.083deg\_P1M-m**

```

etcdcf mercatorglorys12v1_gl12_mean_202012 {
dimensions:

```

```

    longitude = 4320 ;
    latitude = 2041 ;
    depth = 50 ;
    time = 1 ;

```

```
variables:
```

```

    float longitude(longitude) ;
        longitude:valid_min = -180.f ;
        longitude:valid_max = 179.9167f ;
        longitude:step = 0.08332825f ;
        longitude:units = "degrees_east" ;
        longitude:unit_long = "Degrees East" ;
        longitude:long_name = "Longitude" ;
        longitude:standard_name = "longitude" ;
        longitude:axis = "X" ;

```

```

    float latitude(latitude) ;
        latitude:valid_min = -80.f ;
        latitude:valid_max = 90.f ;
        latitude:step = 0.08333588f ;
        latitude:units = "degrees_north" ;
        latitude:unit_long = "Degrees North" ;
        latitude:long_name = "Latitude" ;
        latitude:standard_name = "latitude" ;
        latitude:axis = "Y" ;

```

```

    float depth(depth) ;
        depth:valid_min = 0.494025f ;
        depth:valid_max = 5727.917f ;
        depth:units = "m" ;
        depth:positive = "down" ;
        depth:unit_long = "Meters" ;
        depth:long_name = "Depth" ;
        depth:standard_name = "depth" ;
        depth:axis = "Z" ;

```

```

    short mlotst(time, latitude, longitude) ;

```

```

        mlotst:_FillValue = -32767s ;
        mlotst:long_name = "Density ocean mixed layer thickness" ;
        mlotst:standard_name =
"ocean_mixed_layer_thickness_defined_by_sigma_theta" ;
        mlotst:units = "m" ;
        mlotst:unit_long = "Meters" ;
        mlotst:cell_methods = "area: mean" ;
        mlotst:add_offset = -0.152592554688454 ;
        mlotst:scale_factor = 0.152592554688454 ;
        mlotst:valid_min = 1s ;
        mlotst:valid_max = 23400s ;
    short zos(time, latitude, longitude) ;
        zos:_FillValue = -32767s ;
        zos:long_name = "Sea surface height" ;
        zos:standard_name = "sea_surface_height_above_geoid" ;
        zos:units = "m" ;
        zos:unit_long = "Meters" ;
        zos:cell_methods = "area: mean" ;
        zos:add_offset = 0. ;
        zos:scale_factor = 0.000305185094475746 ;
        zos:valid_min = -7000s ;
        zos:valid_max = 6100s ;
    short bottomT(time, latitude, longitude) ;
        bottomT:_FillValue = -32767s ;
        bottomT:long_name = "Sea floor potential temperature" ;
        bottomT:standard_name =
"sea_water_potential_temperature_at_sea_floor" ;
        bottomT:units = "degrees_C" ;
        bottomT:unit_long = "Degrees Celsius" ;
        bottomT:cell_methods = "area: mean" ;
        bottomT:add_offset = 21. ;
        bottomT:scale_factor = 0.000732444226741791 ;
        bottomT:valid_min = -32767s ;
        bottomT:valid_max = 22600s ;
    short sithick(time, latitude, longitude) ;
        sithick:_FillValue = -32767s ;
        sithick:long_name = "Sea ice thickness" ;
        sithick:standard_name = "sea_ice_thickness" ;
        sithick:units = "m" ;
        sithick:unit_long = "Meters" ;
        sithick:cell_methods = "area: mean where sea_ice" ;
        sithick:add_offset = -0.000762962736189365 ;
        sithick:scale_factor = 0.000762962736189365 ;
        sithick:valid_min = 1s ;
        sithick:valid_max = 10700s ;
    short siconc(time, latitude, longitude) ;
        siconc:_FillValue = -32767s ;
        siconc:long_name = "Ice concentration" ;
        siconc:standard_name = "sea_ice_area_fraction" ;

```

```

siconc:units = "1" ;
siconc:unit_long = "Fraction" ;
siconc:cell_methods = "area: mean where sea_ice" ;
siconc:add_offset = -3.81481368094683e-05 ;
siconc:scale_factor = 3.81481368094683e-05 ;
siconc:valid_min = 1s ;
siconc:valid_max = 28700s ;
short usi(time, latitude, longitude) ;
    usi:_FillValue = -32767s ;
    usi:long_name = "Sea ice eastward velocity" ;
    usi:standard_name = "eastward_sea_ice_velocity" ;
    usi:units = "m s-1" ;
    usi:unit_long = "Meters per second" ;
    usi:cell_methods = "area: mean where sea_ice" ;
    usi:add_offset = 0. ;
    usi:scale_factor = 3.05185094475746e-05 ;
    usi:valid_min = -32767s ;
    usi:valid_max = 32760s ;
short vsi(time, latitude, longitude) ;
    vsi:_FillValue = -32767s ;
    vsi:long_name = "Sea ice northward velocity" ;
    vsi:standard_name = "northward_sea_ice_velocity" ;
    vsi:units = "m s-1" ;
    vsi:unit_long = "Meters per second" ;
    vsi:cell_methods = "area: mean where sea_ice" ;
    vsi:add_offset = 0. ;
    vsi:scale_factor = 3.05185094475746e-05 ;
    vsi:valid_min = -32767s ;
    vsi:valid_max = 32760s ;
short thetao(time, depth, latitude, longitude) ;
    thetao:_FillValue = -32767s ;
    thetao:long_name = "Temperature" ;
    thetao:standard_name = "sea_water_potential_temperature" ;
    thetao:units = "degrees_C" ;
    thetao:unit_long = "Degrees Celsius" ;
    thetao:cell_methods = "area: mean" ;
    thetao:add_offset = 21. ;
    thetao:scale_factor = 0.000732444226741791 ;
    thetao:valid_min = -32767s ;
    thetao:valid_max = 22600s ;
short so(time, depth, latitude, longitude) ;
    so:_FillValue = -32767s ;
    so:long_name = "Salinity" ;
    so:standard_name = "sea_water_salinity" ;
    so:units = "1e-3" ;
    so:unit_long = "Practical Salinity Unit" ;
    so:cell_methods = "area: mean" ;
    so:add_offset = -0.00152592547237873 ;
    so:scale_factor = 0.00152592547237873 ;

```

```

        so:valid_min = 1s ;
        so:valid_max = 31700s ;
short uo(time, depth, latitude, longitude) ;
        uo:_FillValue = -32767s ;
        uo:long_name = "Eastward velocity" ;
        uo:standard_name = "eastward_sea_water_velocity" ;
        uo:units = "m s-1" ;
        uo:unit_long = "Meters per second" ;
        uo:cell_methods = "area: mean" ;
        uo:add_offset = 0. ;
        uo:scale_factor = 0.000610370188951492 ;
        uo:valid_min = -3800s ;
        uo:valid_max = 4700s ;
short vo(time, depth, latitude, longitude) ;
        vo:_FillValue = -32767s ;
        vo:long_name = "Northward velocity" ;
        vo:standard_name = "northward_sea_water_velocity" ;
        vo:units = "m s-1" ;
        vo:unit_long = "Meters per second" ;
        vo:cell_methods = "area: mean" ;
        vo:add_offset = 0. ;
        vo:scale_factor = 0.000610370188951492 ;
        vo:valid_min = -4900s ;
        vo:valid_max = 4300s ;
double time(time) ;
        time:units = "hours since 1950-01-01" ;
        time:axis = "T" ;
        time:long_name = "Time (hours since 1950-01-01)" ;
        time:standard_name = "time" ;
        time:calendar = "gregorian" ;

// global attributes:
        :title = "Monthly mean fields for product
GLOBAL_REANALYSIS_PHY_001_030" ;
        :references = "http://marine.copernicus.eu" ;
        :credit = "E.U. Copernicus Marine Service Information (CMEMS)" ;
        :licence = "http://marine.copernicus.eu/services-portfolio/service-
commitments-and-licence/" ;
        :contact = "servicedesk.cmems@mercator-ocean.eu" ;
        :producer = "CMEMS - Global Monitoring and Forecasting Centre" ;
        :institution = "Mercator Ocean" ;
        :Conventions = "CF-1.6" ;
        :area = "GLOBAL" ;
        :product = "GLOBAL_REANALYSIS_001_030" ;
        :dataset = "global-reanalysis-001-030-monthly" ;
        :source = "MERCATOR GLORYS12V1" ;
        :product_user_manual =
"http://marine.copernicus.eu/documents/PUM/CMEMS-GLO-PUM-001-030.pdf" ;

```



```

:quality_information_document =
"http://marine.copernicus.eu/documents/QUID/CMEMS-GLO-QUID-001-030.pdf" ;
:_NCProperties = "version=2,netcdf=4.8.1,hdf5=1.12.2" ;
}

```

### **cmems\_mod\_glo\_phy\_myint\_0.083deg\_P1D-m**

```

netcdf mercatorglorys12v1_gl12_mean_20210101_R20210113 {
dimensions:

```

```

    longitude = 4320 ;
    latitude = 2041 ;
    depth = 50 ;
    time = UNLIMITED ; // (1 currently)

```

```
variables:
```

```

    float longitude(longitude) ;
        longitude:valid_min = -180.f ;
        longitude:valid_max = 179.9167f ;
        longitude:step = 0.08332825f ;
        longitude:units = "degrees_east" ;
        longitude:unit_long = "Degrees East" ;
        longitude:long_name = "Longitude" ;
        longitude:standard_name = "longitude" ;
        longitude:axis = "X" ;
    float latitude(latitude) ;
        latitude:valid_min = -80.f ;
        latitude:valid_max = 90.f ;
        latitude:step = 0.08333588f ;
        latitude:units = "degrees_north" ;
        latitude:unit_long = "Degrees North" ;
        latitude:long_name = "Latitude" ;
        latitude:standard_name = "latitude" ;
        latitude:axis = "Y" ;
    float depth(depth) ;
        depth:valid_min = 0.494025f ;
        depth:valid_max = 5727.917f ;
        depth:units = "m" ;
        depth:positive = "down" ;
        depth:unit_long = "Meters" ;
        depth:long_name = "Depth" ;
        depth:standard_name = "depth" ;
        depth:axis = "Z" ;
    float time(time) ;
        time:long_name = "Time (hours since 1950-01-01)" ;
        time:standard_name = "time" ;
        time:calendar = "gregorian" ;
        time:valid_min = 622380.f ;
        time:valid_max = 622380.f ;
        time:units = "hours since 1950-01-01 00:00:00" ;
        time:axis = "T" ;

```

```

short mlotst(time, latitude, longitude) ;
    mlotst:long_name = "Density ocean mixed layer thickness" ;
    mlotst:standard_name =
"ocean_mixed_layer_thickness_defined_by_sigma_theta" ;
    mlotst:units = "m" ;
    mlotst:unit_long = "Meters" ;
    mlotst:add_offset = -0.152592554688454 ;
    mlotst:scale_factor = 0.152592554688454 ;
    mlotst:_FillValue = -32767s ;
    mlotst:valid_min = 1s ;
    mlotst:valid_max = 6447s ;
    mlotst:cell_methods = "area: mean" ;
short zos(time, latitude, longitude) ;
    zos:long_name = "Sea surface height" ;
    zos:standard_name = "sea_surface_height_above_geoid" ;
    zos:units = "m" ;
    zos:unit_long = "Meters" ;
    zos:add_offset = 0. ;
    zos:scale_factor = 0.000305185094475746 ;
    zos:_FillValue = -32767s ;
    zos:valid_min = -6181s ;
    zos:valid_max = 5039s ;
    zos:cell_methods = "area: mean" ;
short bottomT(time, latitude, longitude) ;
    bottomT:long_name = "Sea floor potential temperature" ;
    bottomT:standard_name =
"sea_water_potential_temperature_at_sea_floor" ;
    bottomT:units = "degrees_C" ;
    bottomT:unit_long = "Degrees Celsius" ;
    bottomT:_FillValue = -32767s ;
    bottomT:add_offset = 21. ;
    bottomT:scale_factor = 0.000732444226741791 ;
    bottomT:valid_min = -32757s ;
    bottomT:valid_max = 21318s ;
    bottomT:cell_methods = "area: mean" ;
short sithick(time, latitude, longitude) ;
    sithick:long_name = "Sea ice thickness" ;
    sithick:standard_name = "sea_ice_thickness" ;
    sithick:units = "m" ;
    sithick:unit_long = "Meters" ;
    sithick:add_offset = -0.000762962736189365 ;
    sithick:scale_factor = 0.000762962736189365 ;
    sithick:_FillValue = -32767s ;
    sithick:valid_min = 1s ;
    sithick:valid_max = 4618s ;
    sithick:cell_methods = "area: mean where sea_ice" ;
short siconc(time, latitude, longitude) ;
    siconc:long_name = "Ice concentration" ;
    siconc:standard_name = "sea_ice_area_fraction" ;

```

```

siconc:units = "1" ;
siconc:unit_long = "Fraction" ;
siconc:add_offset = -3.81481368094683e-05 ;
siconc:scale_factor = 3.81481368094683e-05 ;
siconc:_FillValue = -32767s ;
siconc:valid_min = 1s ;
siconc:valid_max = 28060s ;
siconc:cell_methods = "area: mean where sea_ice" ;
short usi(time, latitude, longitude) ;
    usi:long_name = "Sea ice eastward velocity" ;
    usi:standard_name = "eastward_sea_ice_velocity" ;
    usi:units = "m s-1" ;
    usi:unit_long = "Meters per second" ;
    usi:add_offset = 0. ;
    usi:scale_factor = 3.05185094475746e-05 ;
    usi:_FillValue = -32767s ;
    usi:valid_min = -32707s ;
    usi:valid_max = 32144s ;
    usi:cell_methods = "area: mean where sea_ice" ;
short vsi(time, latitude, longitude) ;
    vsi:long_name = "Sea ice northward velocity" ;
    vsi:standard_name = "northward_sea_ice_velocity" ;
    vsi:units = "m s-1" ;
    vsi:unit_long = "Meters per second" ;
    vsi:add_offset = 0. ;
    vsi:scale_factor = 3.05185094475746e-05 ;
    vsi:_FillValue = -32767s ;
    vsi:valid_min = -31907s ;
    vsi:valid_max = 31690s ;
    vsi:cell_methods = "area: mean where sea_ice" ;
short thetao(time, depth, latitude, longitude) ;
    thetao:long_name = "Temperature" ;
    thetao:standard_name = "sea_water_potential_temperature" ;
    thetao:units = "degrees_C" ;
    thetao:unit_long = "Degrees Celsius" ;
    thetao:_FillValue = -32767s ;
    thetao:add_offset = 21. ;
    thetao:scale_factor = 0.000732444226741791 ;
    thetao:valid_min = -32764s ;
    thetao:valid_max = 21298s ;
    thetao:cell_methods = "area: mean" ;
short so(time, depth, latitude, longitude) ;
    so:long_name = "Salinity" ;
    so:standard_name = "sea_water_salinity" ;
    so:units = "1e-3" ;
    so:unit_long = "Practical Salinity Unit" ;
    so:_FillValue = -32767s ;
    so:add_offset = -0.00152592547237873 ;
    so:scale_factor = 0.00152592547237873 ;

```

```

so:valid_min = 1s ;
so:valid_max = 28336s ;
so:cell_methods = "area: mean" ;
short uo(time, depth, latitude, longitude) ;
  uo:long_name = "Eastward velocity" ;
  uo:standard_name = "eastward_sea_water_velocity" ;
  uo:units = "m s-1" ;
  uo:unit_long = "Meters per second" ;
  uo:_FillValue = -32767s ;
  uo:add_offset = 0. ;
  uo:scale_factor = 0.000610370188951492 ;
  uo:valid_min = -3573s ;
  uo:valid_max = 3559s ;
  uo:cell_methods = "area: mean" ;
short vo(time, depth, latitude, longitude) ;
  vo:long_name = "Northward velocity" ;
  vo:standard_name = "northward_sea_water_velocity" ;
  vo:units = "m s-1" ;
  vo:unit_long = "Meters per second" ;
  vo:_FillValue = -32767s ;
  vo:add_offset = 0. ;
  vo:scale_factor = 0.000610370188951492 ;
  vo:valid_min = -3300s ;
  vo:valid_max = 3399s ;
  vo:cell_methods = "area: mean" ;

// global attributes:
:title = "daily mean fields from Global Ocean Physics Analysis and
Forecast updated Daily" ;
:easting = "longitude" ;
:northing = "latitude" ;
:history = "2022/05/25 21:54:07 MERCATOR OCEAN Netcdf creation" ;
:source = "MERCATOR GLORYS12V1" ;
:institution = "MERCATOR OCEAN" ;
:references = "http://www.mercator-ocean.fr" ;
:comment = "CMEMS product" ;
:Conventions = "CF-1.4" ;
:domain_name = "GL12" ;
:field_type = "mean" ;
:field_date = "2021-01-01 00:00:00" ;
:field_julian_date = 25933.f ;
:julian_day_unit = "days since 1950-01-01 00:00:00" ;
:forecast_range = "" ;
:forecast_type = "" ;
:bulletin_date = "2021-01-13 00:00:00" ;
:bulletin_type = "operational" ;
:longitude_min = -180.f ;
:longitude_max = 179.9167f ;
:latitude_min = -80.f ;

```

```

        :latitude_max = 90.f ;
        :z_min = 0.494025f ;
        :z_max = 5727.917f ;
        :_NCProperties = "version=2,netcdf=4.7.1,hdf5=1.10.5," ;
    }

```

### **cmems\_mod\_glo\_phy\_myint\_0.083deg\_P1M-m**

```

etcdf mercatorglorys12v1_gl12_mean_202101 {
dimensions:

```

```

    longitude = 4320 ;
    latitude = 2041 ;
    depth = 50 ;
    time = 1 ;

```

```

variables:

```

```

    float longitude(longitude) ;
        longitude:valid_min = -180.f ;
        longitude:valid_max = 179.9167f ;
        longitude:step = 0.08332825f ;
        longitude:units = "degrees_east" ;
        longitude:unit_long = "Degrees East" ;
        longitude:long_name = "Longitude" ;
        longitude:standard_name = "longitude" ;
        longitude:axis = "X" ;

```

```

    float latitude(latitude) ;
        latitude:valid_min = -80.f ;
        latitude:valid_max = 90.f ;
        latitude:step = 0.08333588f ;
        latitude:units = "degrees_north" ;
        latitude:unit_long = "Degrees North" ;
        latitude:long_name = "Latitude" ;
        latitude:standard_name = "latitude" ;
        latitude:axis = "Y" ;

```

```

    float depth(depth) ;
        depth:valid_min = 0.494025f ;
        depth:valid_max = 5727.917f ;
        depth:units = "m" ;
        depth:positive = "down" ;
        depth:unit_long = "Meters" ;
        depth:long_name = "Depth" ;
        depth:standard_name = "depth" ;
        depth:axis = "Z" ;

```

```

    short mlotst(time, latitude, longitude) ;
        mlotst:_FillValue = -32767s ;
        mlotst:long_name = "Density ocean mixed layer thickness" ;
        mlotst:standard_name =

```

```

    "ocean_mixed_layer_thickness_defined_by_sigma_theta" ;
        mlotst:units = "m" ;
        mlotst:unit_long = "Meters" ;

```

```

mlostst:cell_methods = "area: mean" ;
mlostst:add_offset = -0.152592554688454 ;
mlostst:scale_factor = 0.152592554688454 ;
mlostst:valid_min = 1s ;
mlostst:valid_max = 23400s ;
short zos(time, latitude, longitude) ;
zos:_FillValue = -32767s ;
zos:long_name = "Sea surface height" ;
zos:standard_name = "sea_surface_height_above_geoid" ;
zos:units = "m" ;
zos:unit_long = "Meters" ;
zos:cell_methods = "area: mean" ;
zos:add_offset = 0. ;
zos:scale_factor = 0.000305185094475746 ;
zos:valid_min = -7000s ;
zos:valid_max = 6100s ;
short bottomT(time, latitude, longitude) ;
bottomT:_FillValue = -32767s ;
bottomT:long_name = "Sea floor potential temperature" ;
bottomT:standard_name =
"sea_water_potential_temperature_at_sea_floor" ;
bottomT:units = "degrees_C" ;
bottomT:unit_long = "Degrees Celsius" ;
bottomT:cell_methods = "area: mean" ;
bottomT:add_offset = 21. ;
bottomT:scale_factor = 0.000732444226741791 ;
bottomT:valid_min = -32767s ;
bottomT:valid_max = 22600s ;
short sithick(time, latitude, longitude) ;
sithick:_FillValue = -32767s ;
sithick:long_name = "Sea ice thickness" ;
sithick:standard_name = "sea_ice_thickness" ;
sithick:units = "m" ;
sithick:unit_long = "Meters" ;
sithick:cell_methods = "area: mean where sea_ice" ;
sithick:add_offset = -0.000762962736189365 ;
sithick:scale_factor = 0.000762962736189365 ;
sithick:valid_min = 1s ;
sithick:valid_max = 10700s ;
short siconc(time, latitude, longitude) ;
siconc:_FillValue = -32767s ;
siconc:long_name = "Ice concentration" ;
siconc:standard_name = "sea_ice_area_fraction" ;
siconc:units = "1" ;
siconc:unit_long = "Fraction" ;
siconc:cell_methods = "area: mean where sea_ice" ;
siconc:add_offset = -3.81481368094683e-05 ;
siconc:scale_factor = 3.81481368094683e-05 ;
siconc:valid_min = 1s ;

```

```

        siconc:valid_max = 28700s ;
short usi(time, latitude, longitude) ;
    usi:_FillValue = -32767s ;
    usi:long_name = "Sea ice eastward velocity" ;
    usi:standard_name = "eastward_sea_ice_velocity" ;
    usi:units = "m s-1" ;
    usi:unit_long = "Meters per second" ;
    usi:cell_methods = "area: mean where sea_ice" ;
    usi:add_offset = 0. ;
    usi:scale_factor = 3.05185094475746e-05 ;
    usi:valid_min = -32767s ;
    usi:valid_max = 32760s ;
short vsi(time, latitude, longitude) ;
    vsi:_FillValue = -32767s ;
    vsi:long_name = "Sea ice northward velocity" ;
    vsi:standard_name = "northward_sea_ice_velocity" ;
    vsi:units = "m s-1" ;
    vsi:unit_long = "Meters per second" ;
    vsi:cell_methods = "area: mean where sea_ice" ;
    vsi:add_offset = 0. ;
    vsi:scale_factor = 3.05185094475746e-05 ;
    vsi:valid_min = -32767s ;
    vsi:valid_max = 32760s ;
short thetadepth(time, depth, latitude, longitude) ;
    thetadepth:_FillValue = -32767s ;
    thetadepth:long_name = "Temperature" ;
    thetadepth:standard_name = "sea_water_potential_temperature" ;
    thetadepth:units = "degrees_C" ;
    thetadepth:unit_long = "Degrees Celsius" ;
    thetadepth:cell_methods = "area: mean" ;
    thetadepth:add_offset = 21. ;
    thetadepth:scale_factor = 0.000732444226741791 ;
    thetadepth:valid_min = -32767s ;
    thetadepth:valid_max = 22600s ;
short so(time, depth, latitude, longitude) ;
    so:_FillValue = -32767s ;
    so:long_name = "Salinity" ;
    so:standard_name = "sea_water_salinity" ;
    so:units = "1e-3" ;
    so:unit_long = "Practical Salinity Unit" ;
    so:cell_methods = "area: mean" ;
    so:add_offset = -0.00152592547237873 ;
    so:scale_factor = 0.00152592547237873 ;
    so:valid_min = 1s ;
    so:valid_max = 31700s ;
short uo(time, depth, latitude, longitude) ;
    uo:_FillValue = -32767s ;
    uo:long_name = "Eastward velocity" ;
    uo:standard_name = "eastward_sea_water_velocity" ;

```



```

uo:units = "m s-1" ;
uo:unit_long = "Meters per second" ;
uo:cell_methods = "area: mean" ;
uo:add_offset = 0. ;
uo:scale_factor = 0.000610370188951492 ;
uo:valid_min = -3800s ;
uo:valid_max = 4700s ;
short vo(time, depth, latitude, longitude) ;
vo:_FillValue = -32767s ;
vo:long_name = "Northward velocity" ;
vo:standard_name = "northward_sea_water_velocity" ;
vo:units = "m s-1" ;
vo:unit_long = "Meters per second" ;
vo:cell_methods = "area: mean" ;
vo:add_offset = 0. ;
vo:scale_factor = 0.000610370188951492 ;
vo:valid_min = -4900s ;
vo:valid_max = 4300s ;
double time(time) ;
time:units = "hours since 1950-01-01" ;
time:axis = "T" ;
time:long_name = "Time (hours since 1950-01-01)" ;
time:standard_name = "time" ;
time:calendar = "gregorian" ;

// global attributes:
:title = "Monthly mean fields for product
GLOBAL_REANALYSIS_PHY_001_030" ;
:references = "http://marine.copernicus.eu" ;
:credit = "E.U. Copernicus Marine Service Information (CMEMS)" ;
:licence = "http://marine.copernicus.eu/services-portfolio/service-
commitments-and-licence/" ;
:contact = "servicedesk.cmems@mercator-ocean.eu" ;
:producer = "CMEMS - Global Monitoring and Forecasting Centre" ;
:institution = "Mercator Ocean" ;
:Conventions = "CF-1.6" ;
:area = "GLOBAL" ;
:product = "GLOBAL_REANALYSIS_001_030" ;
:dataset = "global-reanalysis-001-030-monthly" ;
:source = "MERCATOR GLORYS12V1" ;
:product_user_manual =
"http://marine.copernicus.eu/documents/PUM/CMEMS-GLO-PUM-001-030.pdf" ;
:quality_information_document =
"http://marine.copernicus.eu/documents/QUID/CMEMS-GLO-QUID-001-030.pdf" ;
:_NCProperties = "version=2,netcdf=4.8.1,hdf5=1.12.2" ;
}

```



**cmems\_mod\_glo\_phy\_my\_0.083deg-climatology\_P1M-m**

```

netcdf mercatorglorys12v1_gl12_mean_1993_2016_12 {
dimensions:
    time = UNLIMITED ; // (1 currently)
    longitude = 4320 ;
    latitude = 2041 ;
    depth = 50 ;
variables:
    double time(time) ;
        time:standard_name = "time" ;
        time:long_name = "Time (hours since 1950-01-01)" ;
        time:units = "hours since 1950-01-01" ;
        time:calendar = "gregorian" ;
        time:axis = "T" ;
    float longitude(longitude) ;
        longitude:standard_name = "longitude" ;
        longitude:long_name = "Longitude" ;
        longitude:units = "degrees_east" ;
        longitude:axis = "X" ;
    float latitude(latitude) ;
        latitude:standard_name = "latitude" ;
        latitude:long_name = "Latitude" ;
        latitude:units = "degrees_north" ;
        latitude:axis = "Y" ;
    float depth(depth) ;
        depth:standard_name = "depth" ;
        depth:long_name = "Depth" ;
        depth:units = "m" ;
        depth:positive = "down" ;
        depth:axis = "Z" ;
        depth:unit_long = "Meters" ;
    short mlotst(time, latitude, longitude) ;
        mlotst:standard_name =
"ocean_mixed_layer_thickness_defined_by_sigma_theta" ;
        mlotst:long_name = "Density ocean mixed layer thickness" ;
        mlotst:units = "m" ;
        mlotst:add_offset = -0.1525926f ;
        mlotst:scale_factor = 0.1525926f ;
        mlotst:_FillValue = -32767s ;
        mlotst:missing_value = -32767s ;
        mlotst:unit_long = "Meters" ;
        mlotst:cell_methods = "area: mean" ;
    short zos(time, latitude, longitude) ;
        zos:standard_name = "sea_surface_height_above_geoid" ;
        zos:long_name = "Sea surface height" ;
        zos:units = "m" ;
        zos:add_offset = 0.f ;
        zos:scale_factor = 0.0003051851f ;

```

```

        zos:_FillValue = -32767s ;
        zos:missing_value = -32767s ;
        zos:unit_long = "Meters" ;
        zos:cell_methods = "area: mean" ;
short bottomT(time, latitude, longitude) ;
    bottomT:standard_name =
"sea_water_potential_temperature_at_sea_floor" ;
    bottomT:long_name = "Sea floor potential temperature" ;
    bottomT:units = "degrees_C" ;
    bottomT:add_offset = 21.f ;
    bottomT:scale_factor = 0.0007324442f ;
    bottomT:_FillValue = -32767s ;
    bottomT:missing_value = -32767s ;
    bottomT:unit_long = "Degrees Celsius" ;
    bottomT:cell_methods = "area: mean" ;
short sithick(time, latitude, longitude) ;
    sithick:standard_name = "sea_ice_thickness" ;
    sithick:long_name = "Sea ice thickness" ;
    sithick:units = "m" ;
    sithick:add_offset = -0.0007629627f ;
    sithick:scale_factor = 0.0007629627f ;
    sithick:_FillValue = -32767s ;
    sithick:missing_value = -32767s ;
    sithick:unit_long = "Meters" ;
    sithick:cell_methods = "area: mean where sea_ice" ;
short siconc(time, latitude, longitude) ;
    siconc:standard_name = "sea_ice_area_fraction" ;
    siconc:long_name = "Ice concentration" ;
    siconc:units = "1" ;
    siconc:add_offset = -3.814814e-05f ;
    siconc:scale_factor = 3.814814e-05f ;
    siconc:_FillValue = -32767s ;
    siconc:missing_value = -32767s ;
    siconc:unit_long = "Fraction" ;
    siconc:cell_methods = "area: mean where sea_ice" ;
short usi(time, latitude, longitude) ;
    usi:standard_name = "eastward_sea_ice_velocity" ;
    usi:long_name = "Sea ice eastward velocity" ;
    usi:units = "m s-1" ;
    usi:add_offset = 0.f ;
    usi:scale_factor = 3.051851e-05f ;
    usi:_FillValue = -32767s ;
    usi:missing_value = -32767s ;
    usi:unit_long = "Meters per second" ;
    usi:cell_methods = "area: mean where sea_ice" ;
short vsi(time, latitude, longitude) ;
    vsi:standard_name = "northward_sea_ice_velocity" ;
    vsi:long_name = "Sea ice northward velocity" ;
    vsi:units = "m s-1" ;

```

```

vsi:add_offset = 0.f ;
vsi:scale_factor = 3.051851e-05f ;
vsi:_FillValue = -32767s ;
vsi:missing_value = -32767s ;
vsi:unit_long = "Meters per second" ;
vsi:cell_methods = "area: mean where sea_ice" ;
short thetao(time, depth, latitude, longitude) ;
thetao:standard_name = "sea_water_potential_temperature" ;
thetao:long_name = "Temperature" ;
thetao:units = "degrees_C" ;
thetao:add_offset = 21.f ;
thetao:scale_factor = 0.0007324442f ;
thetao:_FillValue = -32767s ;
thetao:missing_value = -32767s ;
thetao:unit_long = "Degrees Celsius" ;
thetao:cell_methods = "area: mean" ;
short so(time, depth, latitude, longitude) ;
so:standard_name = "sea_water_salinity" ;
so:long_name = "Salinity" ;
so:units = "1e-3" ;
so:add_offset = -0.001525925f ;
so:scale_factor = 0.001525925f ;
so:_FillValue = -32767s ;
so:missing_value = -32767s ;
so:unit_long = "Practical Salinity Unit" ;
so:cell_methods = "area: mean" ;
short uo(time, depth, latitude, longitude) ;
uo:standard_name = "eastward_sea_water_velocity" ;
uo:long_name = "Eastward velocity" ;
uo:units = "m s-1" ;
uo:add_offset = 0.f ;
uo:scale_factor = 0.0006103702f ;
uo:_FillValue = -32767s ;
uo:missing_value = -32767s ;
uo:unit_long = "Meters per second" ;
uo:cell_methods = "area: mean" ;
short vo(time, depth, latitude, longitude) ;
vo:standard_name = "northward_sea_water_velocity" ;
vo:long_name = "Northward velocity" ;
vo:units = "m s-1" ;
vo:add_offset = 0.f ;
vo:scale_factor = 0.0006103702f ;
vo:_FillValue = -32767s ;
vo:missing_value = -32767s ;
vo:unit_long = "Meters per second" ;
vo:cell_methods = "area: mean" ;

```

// global attributes:

```

:CDI = "Climate Data Interface version 1.9.3 (http://mpimet.mpg.de/cdi)"
;
:source = "MERCATOR GLORYS12V1" ;
:institution = "Mercator Ocean" ;
:Conventions = "CF-1.6" ;
:_NCProperties =
"version=1 | netcdfversion=4.4.1.1 | hdf5libversion=1.8.18" ;
:references = "http://marine.copernicus.eu" ;
:credit = "E.U. Copernicus Marine Service Information (CMEMS)" ;
:licence = "http://marine.copernicus.eu/services-portfolio/service-
commitments-and-licence/" ;
:contact = "servicedesk.cmems@mercator-ocean.eu" ;
:producer = "CMEMS - Global Monitoring and Forecasting Centre" ;
:area = "GLOBAL" ;
:product = "GLOBAL_REANALYSIS_001_030" ;
:product_user_manual =
"http://marine.copernicus.eu/documents/PUM/CMEMS-GLO-PUM-001-030.pdf" ;
:quality_information_document =
"http://marine.copernicus.eu/documents/QUID/CMEMS-GLO-QUID-001-030.pdf" ;
:CDO = "Climate Data Operators version 1.9.3
(http://mpimet.mpg.de/cdo)" ;
:title = "Monthly climatology fields for product
GLOBAL_REANALYSIS_PHY_001_030" ;
:dataset = "global-reanalysis-phy-001-030-monthly-climatology" ;
}

```