

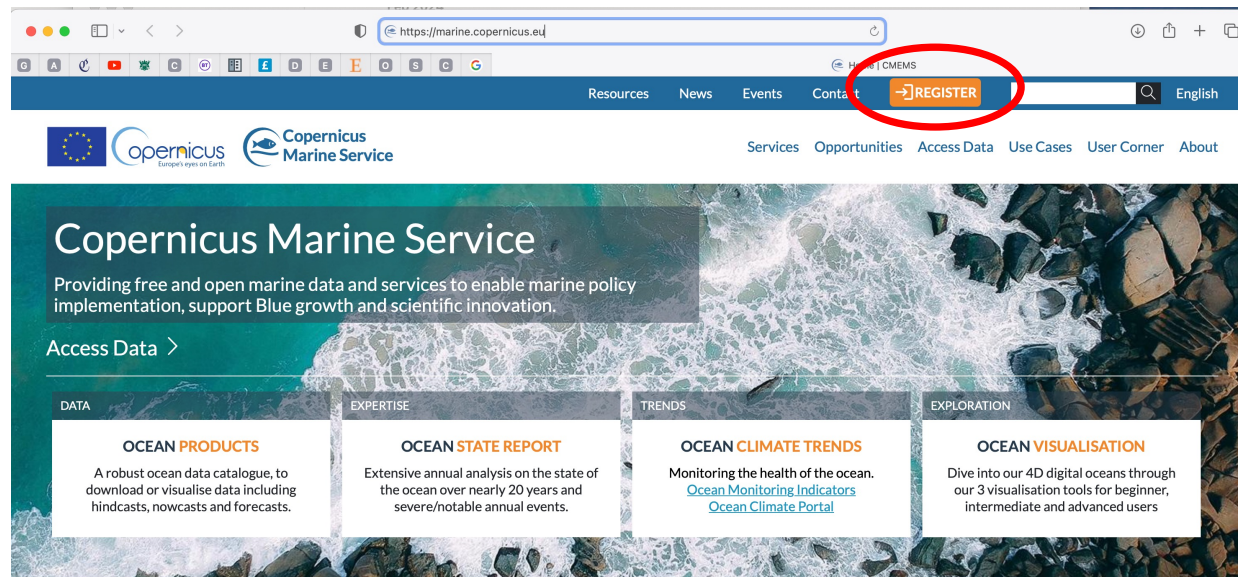
## Downloading and pre-processing CMEMS Satellite Altimeter Data

### Objectives:

- To be able to download Satellite Altimeter L3 data from CMEMS (Copernicus Marine Environment Monitoring Service).
- To pre-process these data into along track time series of Sea Level Anomalies for use with the validation and analysis code.

You will need to register for a CMEMS login id

Goto <https://marine.copernicus.eu>, and REGISTER



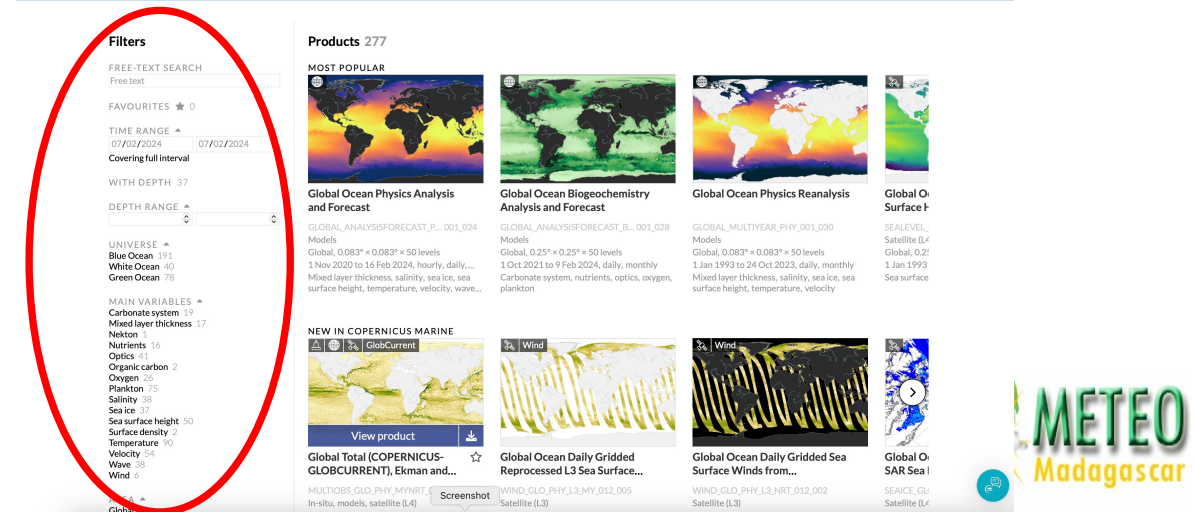
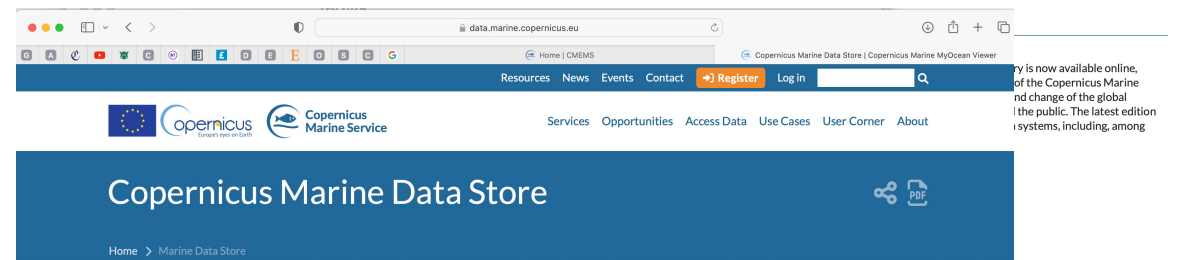
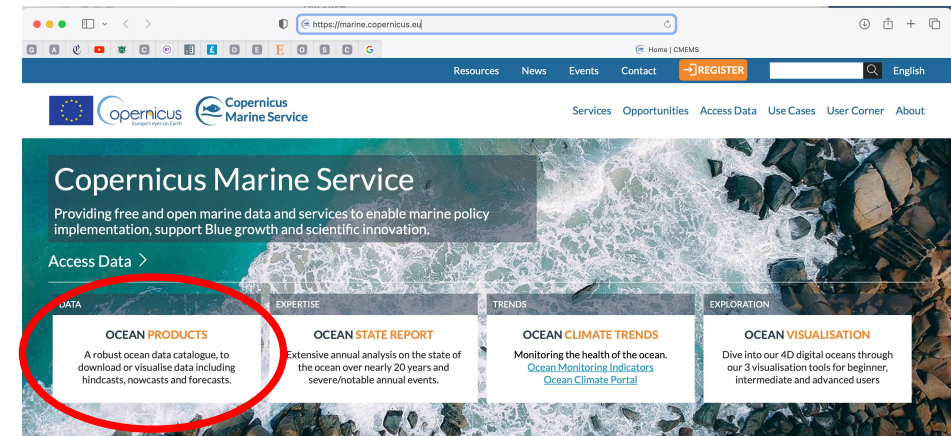
## Copernicus Ocean State Report 7 Release

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The seventh issue of the Copernicus Ocean State Report and its summary is now available online, coordinated by Mercator Ocean International, the implementing entity of the Copernicus Marine Service. It provides a comprehensive overview on the state, variability and change of the global ocean for scientists, members of the blue economy, decision makers and the public. The latest edition of the Ocean State Report details several unusual patterns across ocean systems, including, among

You can search for the L3 data on the web interface

- Click Access Data > Ocean Products
  - Under **Main Variables** select **Sea Surface Height**
  - Under **Area** select **Global Ocean**
  - Under **Source** select **Satellite observations**

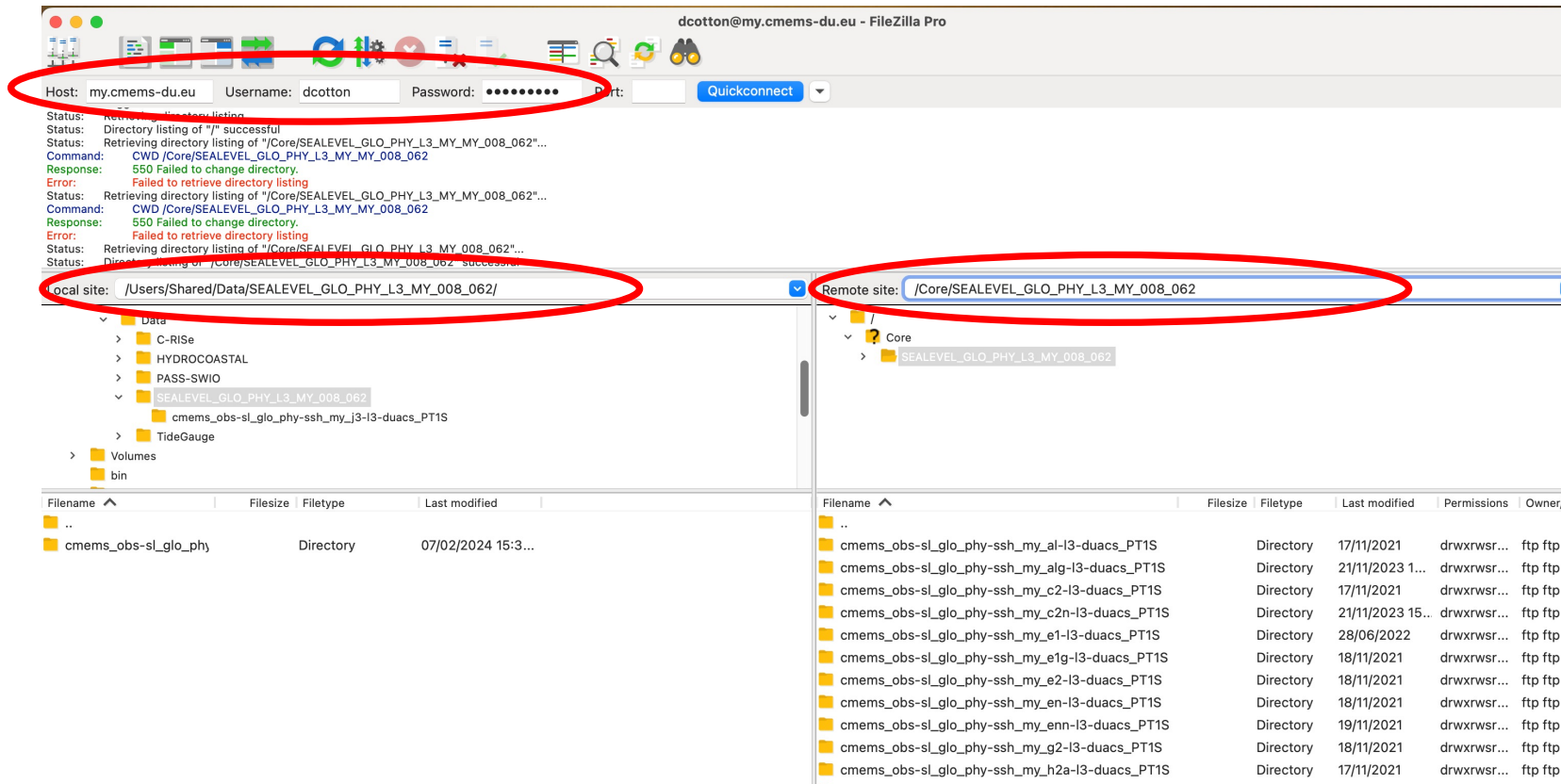


- We want Global Ocean Along Track L3 Sea Surface Heights Reprocessed...
- **Don't** click on view product (it doesn't display)
- Click on the download data icon for more information
- Scroll down on the Data Set ID list
- The data sets we want are
  - cmems\_obs-sl\_glo\_phy-ssh\_my\_j3-l3-duacs\_PT1S
  - cmems\_obs-sl\_glo\_phy-ssh\_my\_s3a-l3-duacs\_PT1S
  - cmems\_obs-sl\_glo\_phy-ssh\_my\_s3b-l3-duacs\_PT1S
  - cmems\_obs-sl\_glo\_phy-ssh\_my\_s6a-lr-l3-duacs\_PT1S
- It is possible to download from here, by clicking on browse, but you have to select individual files and it is slow.
- Better to use an ftp application (e.g. filezilla)

The screenshot shows the Copernicus Marine Data Store interface. The top section displays search filters and a grid of product thumbnails. One product, 'Global Ocean Along Track L3 Sea Surface Heights Reprocessed 1993...', is highlighted with a red circle. Below this, a detailed view of the product is shown, including a description and a table of Dataset IDs. The 'Dataset ID' column in the table is circled in red.

Dataset ID	Subset	Files	Maps
1048670/mol-0014...	-	Browse	-
cmems_obs-sl_glo_phy-ssh_my_al-l3-duacs_PT1S	-	Browse	-
cmems_obs-sl_glo_phy-ssh_my_alg-l3-duacs_PT1S	-	Browse	-
cmems_obs-sl_glo_phy-ssh_my_c2-l3-duacs_PT1S	-	Browse	-
cmems_obs-sl_ahv-ssh_mv_c2n-l3-duacs_PT1S	-	Browse	-





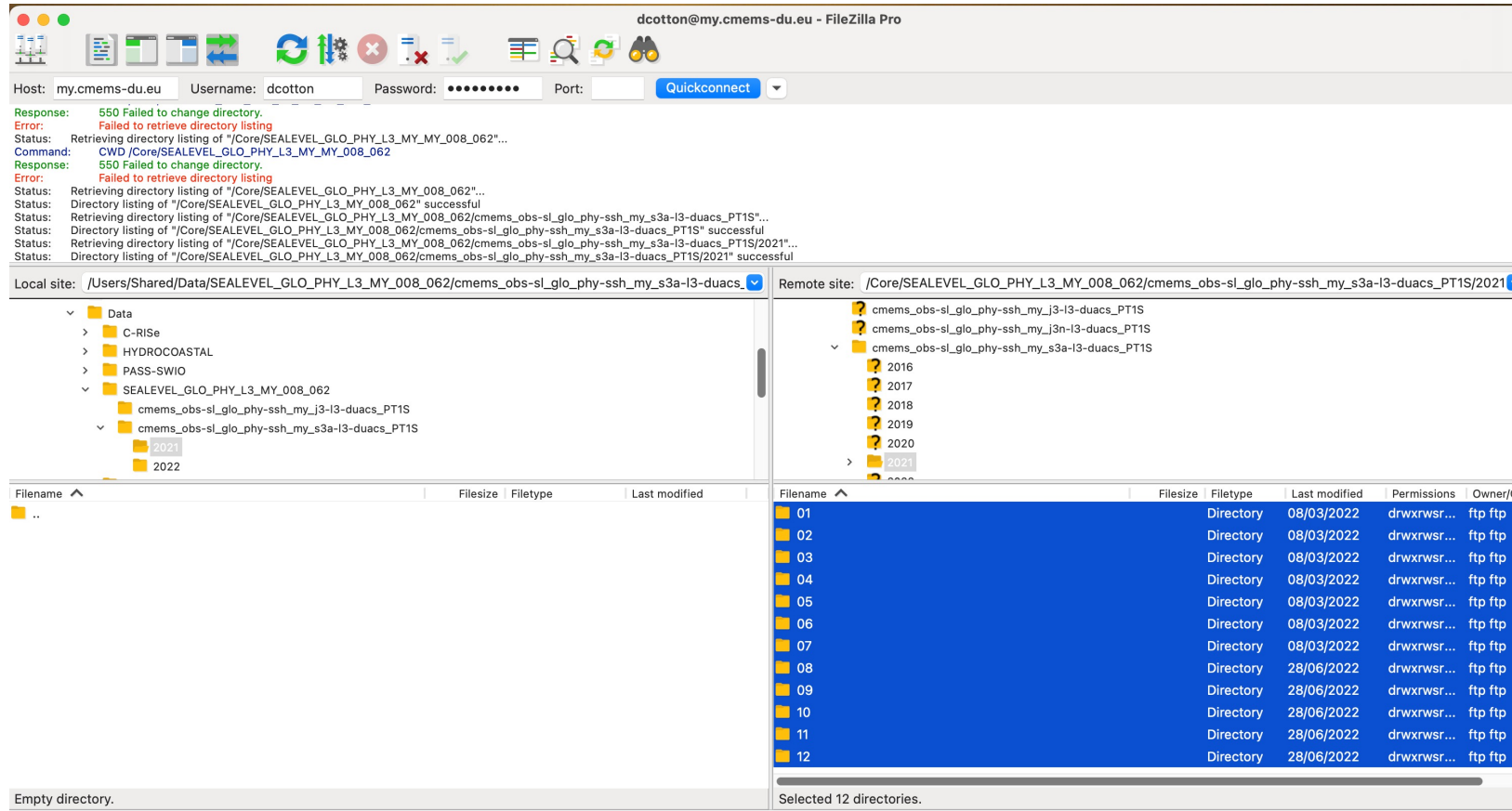
- Host is my.cmems-du.eu
- Input your username and password
- On the left select the location where you want to put the data
- On the right select /Core/SEALEVEL\_GLO\_L3\_MY\_008\_062

The screenshot shows the FileZilla Pro interface with the following details:

- Host:** my.cmems-du.eu | **Username:** dccotton | **Port:** [blank] | **Quickconnect** button
- Status Log:** Shows a sequence of directory listings and errors (550 Failed to change directory) for the path `/Core/SEALEVEL_GLO_PHY_L3_MY_MY_008_062`.
- Local site:** `/Users/Shared/Data/SEALEVEL_GLO_PHY_L3_MY_008_062/`
- Remote site:** `/Core/SEALEVEL_GLO_PHY_L3_MY_008_062`
- Remote Directory Listing:**

Filename	Filesize	Filetype	Last modified	Permissions	Owner/Group
cmems_obs-sl_glo_phy-ssh_my_j1g-l3-duacs_PT1S		Directory	17/11/2021	drwxrwsr...	ftp ftp
cmems_obs-sl_glo_phy-ssh_my_j1n-l3-duacs_PT1S		Directory	17/11/2021	drwxrwsr...	ftp ftp
cmems_obs-sl_glo_phy-ssh_my_j2-l3-duacs_PT1S		Directory	18/11/2021	drwxrwsr...	ftp ftp
cmems_obs-sl_glo_phy-ssh_my_j2g-l3-duacs_PT1S		Directory	15/11/2021	drwxrwsr...	ftp ftp
cmems_obs-sl_glo_phy-ssh_my_j2n-l3-duacs_PT1S		Directory	17/11/2021	drwxrwsr...	ftp ftp
cmems_obs-sl_glo_phy-ssh_my_j3-l3-duacs_PT1S		Directory	27/07/2022	drwxrwsr...	ftp ftp
cmems_obs-sl_glo_phy-ssh_my_j3n-l3-duacs_PT1S		Directory	22/11/2023 1...	drwxrwsr...	ftp ftp
<b>cmems_obs-sl_glo_phy-ssh_my_s3a-l3-duacs_PT1S</b>		<b>Directory</b>	<b>21/11/2023 15...</b>	<b>drwxrwsr...</b>	<b>ftp ftp</b>
cmems_obs-sl_glo_phy-ssh_my_s3b-l3-duacs_PT1S		Directory	21/11/2023 15...	drwxrwsr...	ftp ftp
cmems_obs-sl_glo_phy-ssh_my_s6a-lr-l3-duacs_P...		Directory	22/11/2023 1...	drwxrwsr...	ftp ftp
cmems_obs-sl_glo_phy-ssh_my_tp-l3-duacs_PT1S		Directory	28/06/2022	drwxrwsr...	ftp ftp
cmems_obs-sl_glo_phy-ssh_my_tpn-l3-duacs_PT1S		Directory	17/11/2021	drwxrwsr...	ftp ftp

- Select and open the directory of the source data you want (here my\_s3a-l3)



- Select the year folders on the local and remote sites
- Then drag over the monthly folders

- Copy the downloaded CMEMS L3 data into the correct directory on the laptop
  - code assumes C:/Shared/Data/SEALEVEL\_GLO\_PHY\_L3\_MY\_008\_062
- Create a directory for the output data
  - C:/Shared/Data/C-RISe/NewFiles



- Open Anaconda-Navigator application
- Select “Environments”
- Choose pass-swio and “Open Terminal”
- Install xarray and dask
- Choose “Open Terminal”
- Change directory to the location of the code
  - > `cd C:/ Shared/Software/Windows/SeaLevel/SeaLevelValidation/python_code`

- Python software to subset and pre-process the cmems L3 data into the format needed by the python analysis software

*extract\_CMEMS\_L3\_by\_satellite\_and\_year*

*combine\_trackfiles\_test.py*

- Python software to subset and pre-process the cmems L3 data into the format needed by the python analysis software

Run *extract\_CMEMS\_L3\_by\_satellite\_and\_year*

> python extract\_CMEMS\_L3\_by\_satellite\_and\_year.py

> answer questions to select satellite and year

- Generates along-track data files in C:/Shared/Data/C-RISe/NewFiles
- e.g. j1j2j3\_cmems\_P0005\_2022.nc

- Routine to combine the new data with the previous files:  
*combine\_trackfiles\_test*
  - > python combine\_trackfiles\_test.py
  - > answer questions to select satellite and year
    - Generates new along-track data files in C:/Shared/Data/C-RISe/NewFiles
      - e.g. j1j2j3\_cmems\_P0005\_upto\_2022.nc
- These files should then be renamed and replace the old files in C:/Shared/Data/C-RISe/AltimetryByPass
  - Keep the originals in case of any problems!

# Questions ?