EO4SD MARINE PORTAL – QUICK START GUIDE

https://eo4sd.eofrom.space

Date: 15-04-2020

Contract No.

4000123982/18/I-NB

Submitted by

PML | Plymouth Marine Laboratory

In Cooperation with:

National Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL

BROCKMANN CONSULT GMBH

UNIVERSITY OF TWENTE.

SEVEN

DOCUMENT RELEASE SHEET

	Name	Organisation	Signature
Authors	James Dingle Emma Sullivan	PML	
Reviewer	Steve Groom	PML	
Approver	Christine Sams	NOC	
Issuing Authority	Gordon Campbell	ESA	

CHANGE RECORD

Revision	Purpose of Update	Date
1.0	Final Draft, PML	21-04-2020

CONTENTS

CONTENTS 3

EXECUTIVE SUMMARY 4

1 What data are available? 4

1.1 Chlorophyll-a 4

1.2 Total Suspended Matter 5

2 How do I view/download the data? 6

2.1 Viewing Layers 6

2.2 Modifying colours/using a different colour palette 7

2.3 Selecting a region of interest 8

2.3.1 Simple bounding box 8

2.3.2 Irregular polygon 8

2.3.3 Import a WKT (Well-known text) polygon 9

2.4 Downloading a timeseries for an area 10

2.5 Creating a plot 11

3 Extra resources 13

3.1 Short series of video guides to using the portal 13

3.2 Online help 13

EXECUTIVE SUMMARY

- This document provides a simple user guide for use of the PML EO4SD Portal. The Portal (https://eo4sd.eofrom.space) contains Sentinel 3 OLCI water-quality data at 300m resolution for the entire coast of Africa, Myanmar and the Caribbean. The data are processed at PML and use the Polymer atmospheric correction.

1 WHAT DATA ARE AVAILABLE?

1.1 Chlorophyll-a

Phytoplankton are the microscopic photosynthetic organisms at the base of the marine food web. Chlorophyll-a is a photosynthetic pigment within the cells of phytoplankton, and its concentration in surface waters can be used as an indicator of phytoplankton biomass. Changes in phytoplankton populations may impact marine life and have implications for food availability and economic productivity. Satellite-derived chlorophyll concentration can be used to study seasonal and interannual phytoplankton dynamics, as well as monitoring coastal water quality, eutrophication and harmful algal blooms. High Chlorophyll-a concentrations can indicate high nutrient concentrations in the surface waters and can possibly be due to eutrophication of coastal waters.

The chlorophyll-a concentration provided in the EO4SD portal is derived from Sentinel-3 OLCI instrument and processed using the POLYMER algorithm (doi:10.1364/OE.19.009783). The data are provided daily at 300 m resolution and has the unit mg Chl-a m^{-3}.

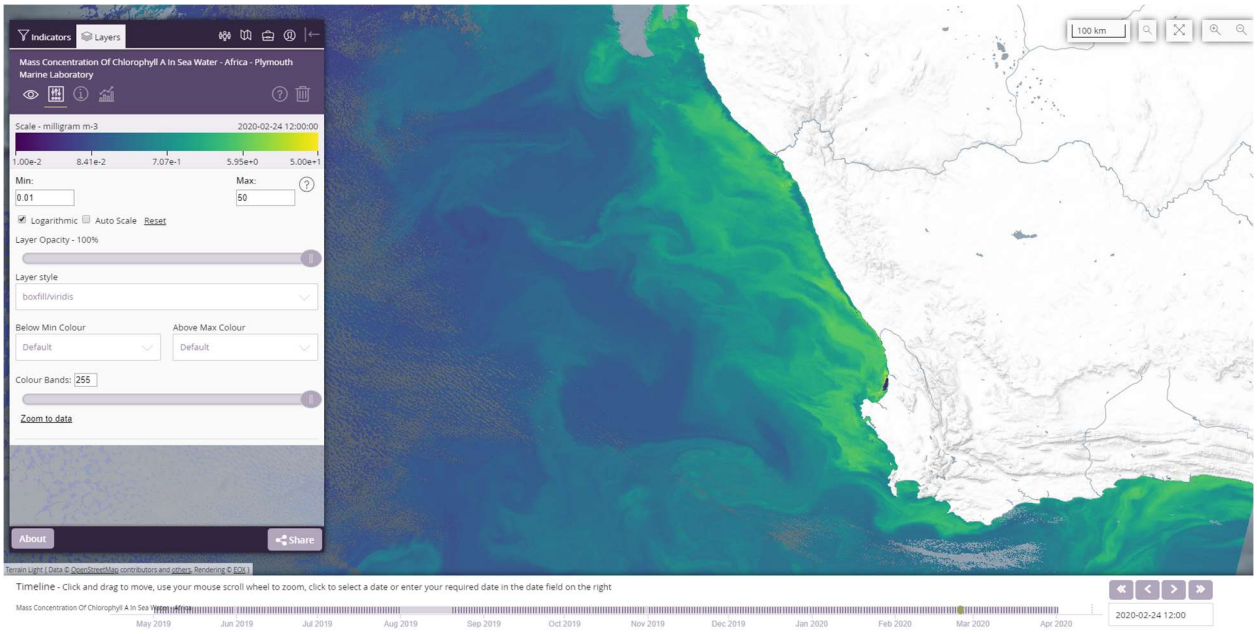


Figure 1: View of the EO4SD Marine Portal satellite-derived chlorophyll concentration off the west coast of South Africa on 24 February 2020. In this area upwelling of nutrient rich deep water occurs and leads to high productivity.

1.2 Total Suspended Matter

Satellite-derived total suspended matter concentration (TSM) is a measure of the concentration of particles, both organic and inorganic, suspended in water and is closely related to water turbidity. Satellite-derived TSM can be used to assess and monitor suspended sediment distribution and is a key component of water quality in coastal areas. TSM may change over time and space due to currents, mixing, winds, waves, storms and tides.

TSM concentration provided in the portal is derived from Sentinel 3 OLCI data using the algorithm and parameters from Nechad et al (2010) (doi:10.1016/j.rse.2009.11.022) and has units g m^{-3}.

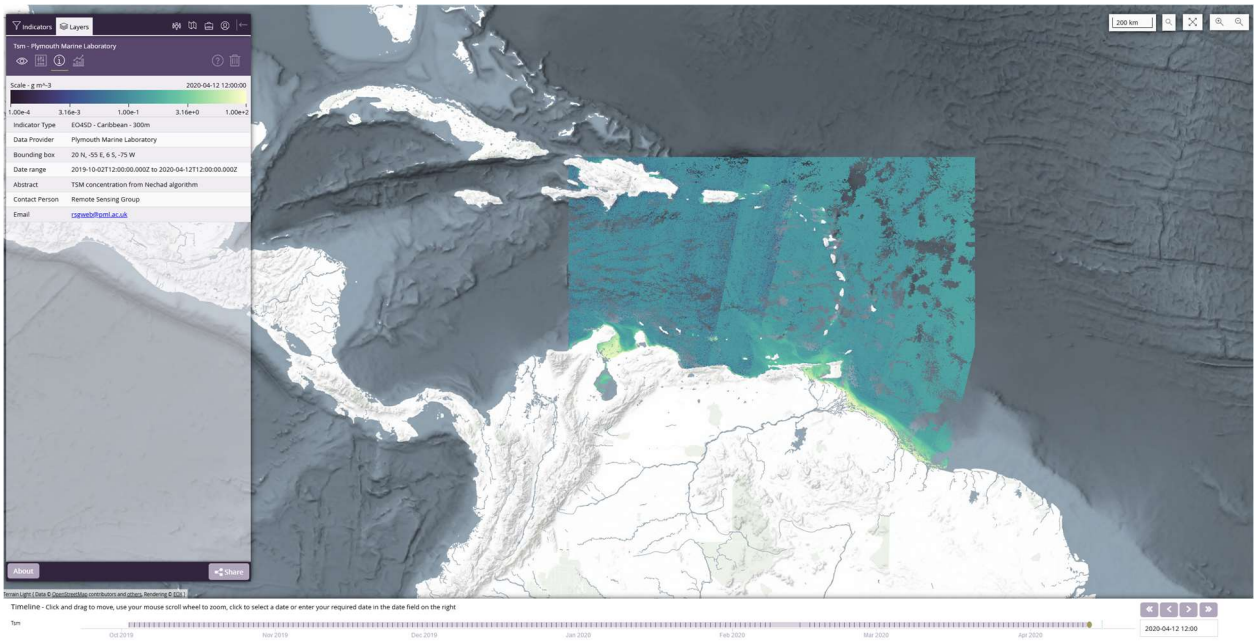
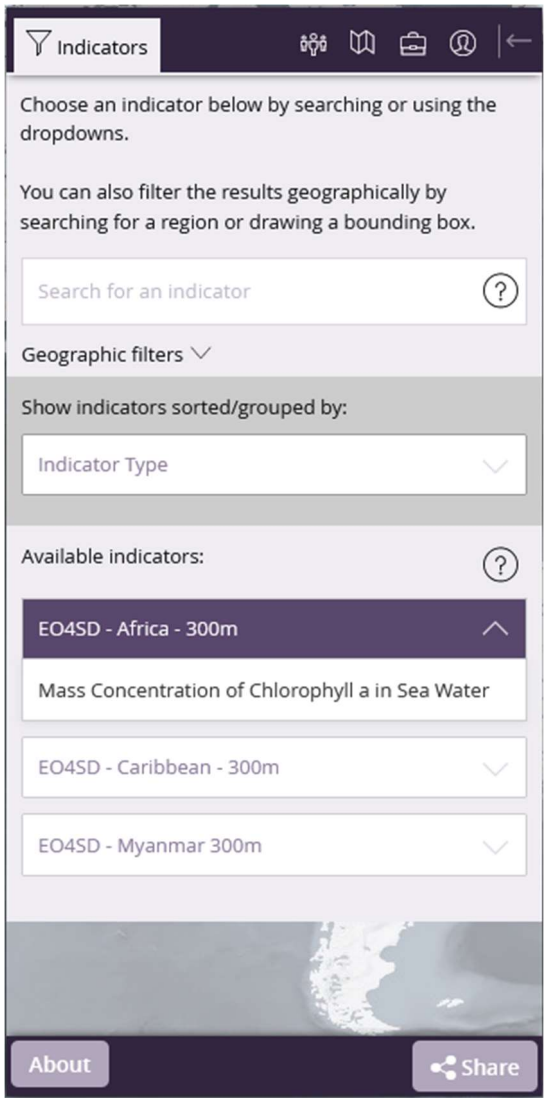


Figure 2: View of the EO4SD Marine Portal satellite-derived total suspended matter for the Caribbean Islands and surrounding region on 12 April 2020.

2 HOW DO I VIEW/DOWNLOAD THE DATA?

2.1 Viewing Layers

The menu that you are presented with as you visit the portal will include the indicator selection panel. You first select a region e.g. “EO4SD – Africa – 300m” and then available products are shown (in this case just chl-a). Clicking on the product will load the most recent data.



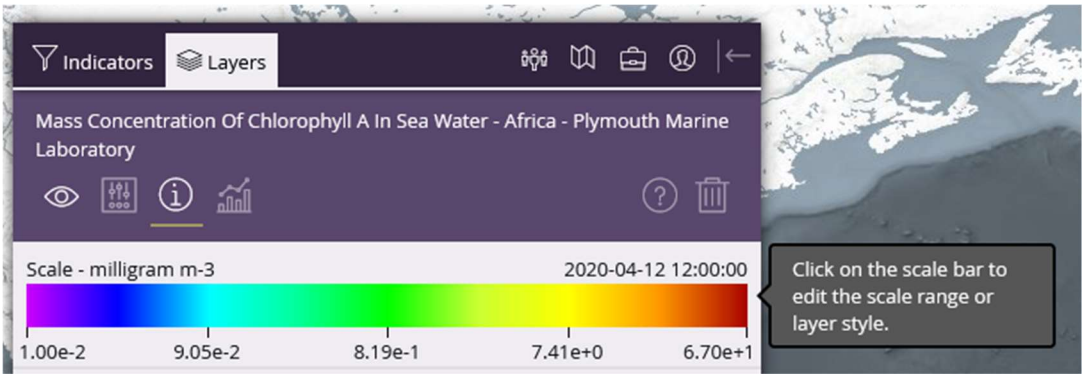
At the time of writing, the portal contains 300m data processed for three regions of interest: the entire coastline of Africa, the Caribbean and Myanmar. Note, a generic chl-a algorithm is used instead of a location specific or regional algorithm: it is known for Mediterranean waters that the standard algorithms overestimate chl-a.

Note: The portal only loads data for the region viewed on the screen; so if you are only interested in a specific section of the coastline, it is recommended that you zoom (using either the mouse scroll

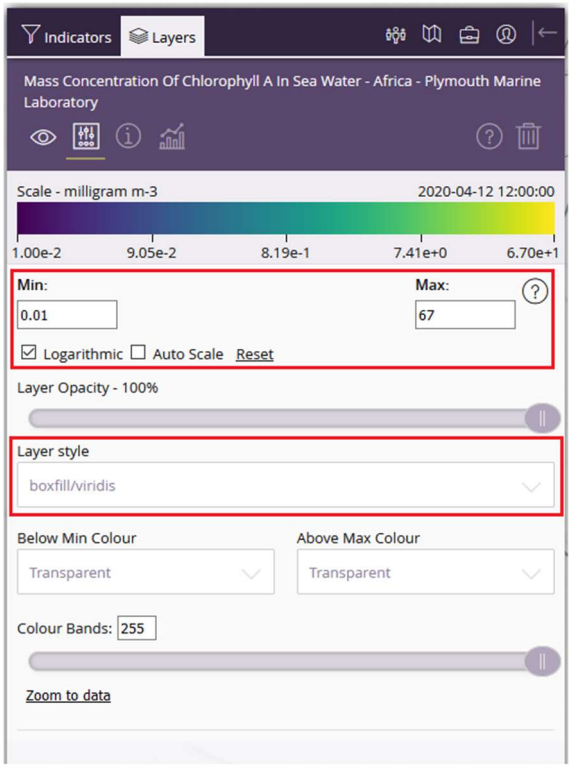
wheel or the +/- buttons in the top right of the portal interface) as this will significantly improve loading times.

2.2 Modifying colours/using a different colour palette

To highlight features in a specific range of values or use a different colour palette according to your preferences, you can click on the scale bar in the Layers panel to modify it.



Doing so will bring up the following interface:

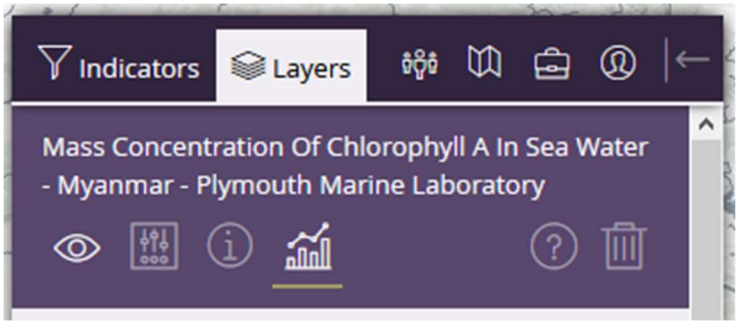


If you are interested in features in a specific range of values, you can specify lower and upper bounds. Note chl-a is usually displayed as a log-normal quantity so select “logarithmic”.

If you would like to view the data in a different colour palette, you can choose from a long list of available palettes here.

2.3 Selecting a region of interest

Once you have selected one of the variables in the provided areas, the portal interface should automatically take you to the 'Layers' tab – this shows a list of all of the currently displayed layers and you can show/hide or close these at your will. In this tab is also where there are options to select a region of interest for each available layer.

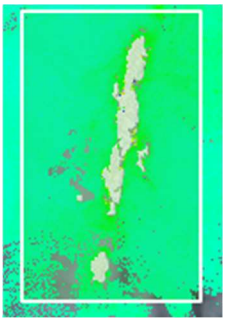


To select an area of interest, there are a few options ranging from simple to advanced:

2.3.1 **Simple bounding box**

This is the fastest and easiest way to extract data for a region of interest; just click the 'Draw Polygon' button and then click on the map once to start the rectangular selection and then again to complete the bounding box.

Below is an example bounding box around the Andaman Islands in the Myanmar 300m data layer.



2.3.2 **Irregular polygon**

If you would like to further restrict your selection or more closely follow coastline/land features etc. then you can do so via the 'Draw Irregular Polygon' button. To create an irregular polygon selection, click once on the map to start the selection and then click again every time you would like to form a corner. To complete the selection, you will need to either join the line back with the starting point or, alternatively, you can double click to automatically close the selection (it will draw a straight line back to the starting point)

To demonstrate, the image below shows a further restricted area within the previous selection around the Andaman Islands.

2.3.3 **Import a WKT (Well-known text) polygon**

Ref: https://en.wikipedia.org/wiki/Well-known_text_representation_of_geometry

If you already have a known polygon that you would like to extract, then you are able to paste it into the box that says 'Or enter coordinates'

This box will accept either a simple bounding box definition or a full WKT polygon definition. The format of this string is important and must comply with the well-known text standard for simple polygons.

The polygon must be:

- space separated **longitude / latitude** (x/y) pairs that are in turn separated by commas
  - these values are decimal degrees (not degrees, minutes, seconds) and may be round numbers or decimals (45 and 45.0 both work)
  - East and North are positive, West and South negative
- contained inside 'POLYGON((…))', note the double parentheses
- a closed polygon, the first and last point must be the same

For example, a very simple polygon for the entire northern hemisphere would be:

POLYGON((-180 90,180 90,180 0,-180 0,-180 90))

As a more complex example, the following WKT polygon definition will draw a similar polygon around the Andaman Islands (in the Myanmar layer) if you paste it into the above text box:

POLYGON((93.345 14.271,92.637 13.535,92.444 12.695,92.357 11.893,92.06 11.552,92.373 11.14,92.115 10.613,92.368 10.316,92.642 10.228,92.851 10.459,92.862 10.822,92.708 11.014,92.922 11.321,92.922 11.733,93.224 11.722,93.208 12.288,93.043 12.393,93.192 13.458,93.51 14.073,93.444 14.227,93.345 14.271))

Note: If you draw a polygon manually, the WKT definition will be shown in the coordinates text box. It is useful to copy this and save it somewhere locally so you can use the same polygon for future analyses.

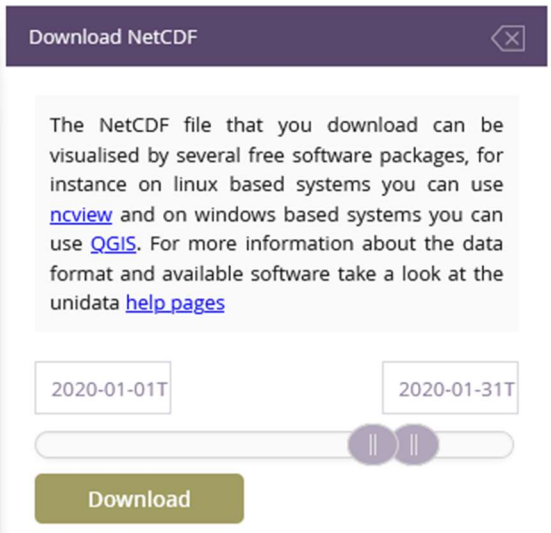
2.4 Downloading a timeseries for an area

Once you have your desired area selected, there are two buttons near the bottom of the current interface panel.

If you click the 'Download netCDF' button, you will be presented with a new interface that will allow you to select a time range of data you would like to download for your area.

Depending on the size of the area and the length of the time range you choose, this can take anywhere from a few seconds to upwards of a few minutes or even hours in extreme cases. If you find the request is timing out, then it means that the subset has exceeded the 4GB limit for manual subsets.

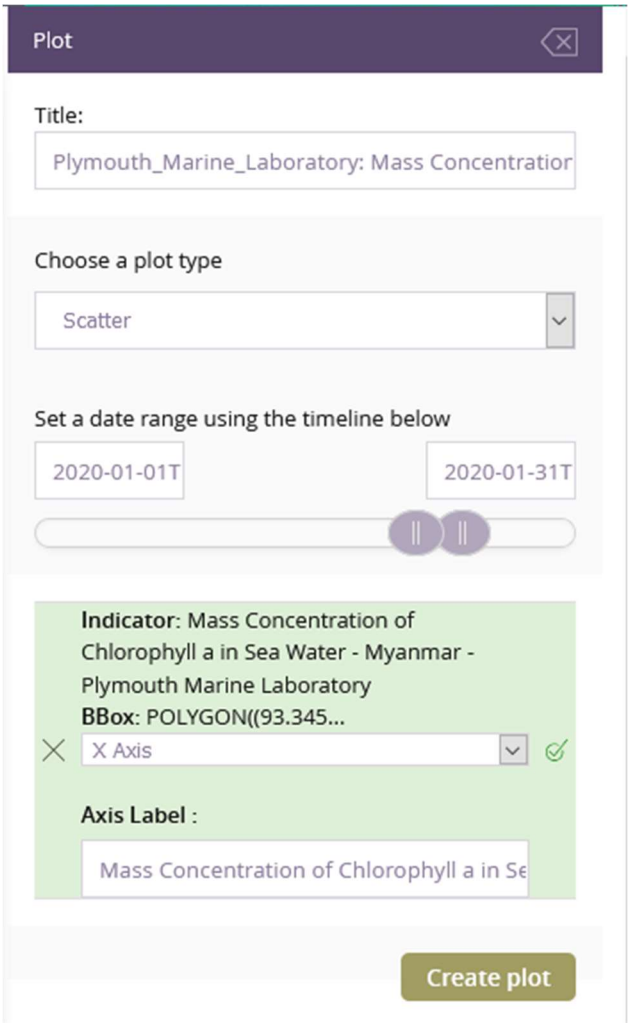
Note: By default, when you open this panel, the entire possible time-range is selected. In order to keep the request time down it is recommended that you start off with a smaller time range to get an idea how long it takes to request, for example, 1 month of data for your requested area.



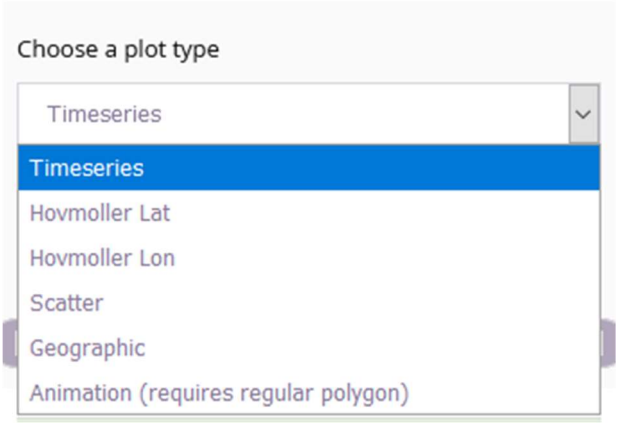
The file that is downloaded as a result of this is compatible with popular visualization tools (ncview, SNAP, QGIS etc).

2.5 Creating a plot

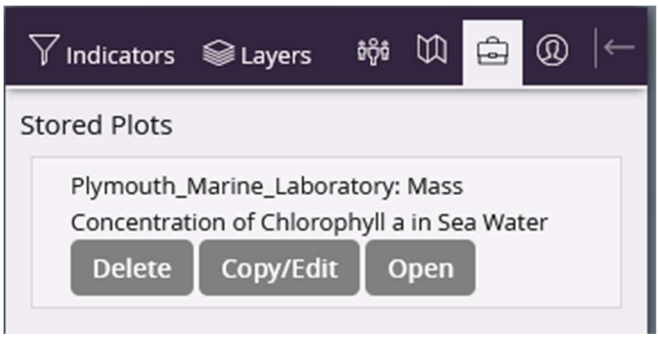
Creating a plot is very similar to downloading a timeseries, with just two extra steps: choosing the type of plot and labelling the axes.



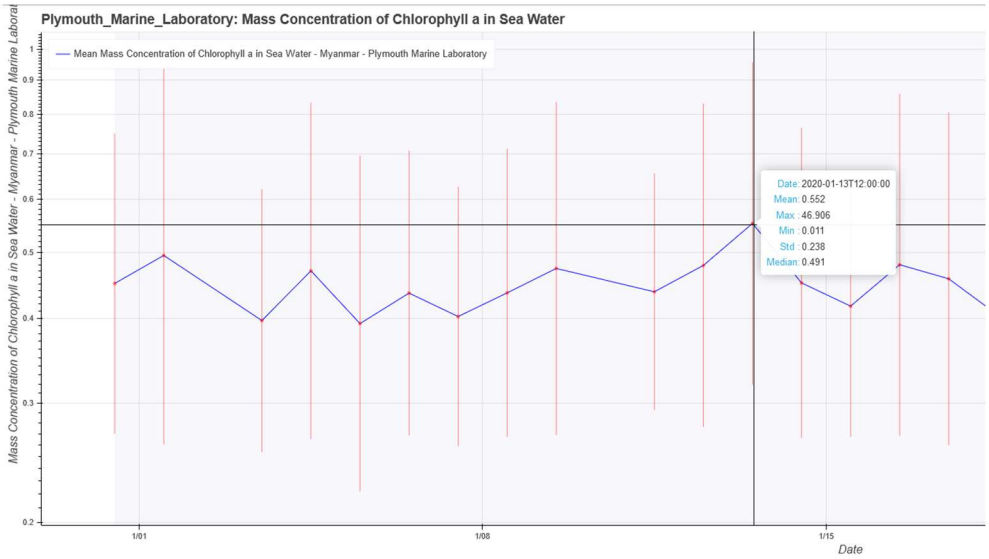
An example simple timeseries plot for the entire month of January 2020 in a region of interest (Andaman Islands) is shown below but there are a few other types of plot to choose from:



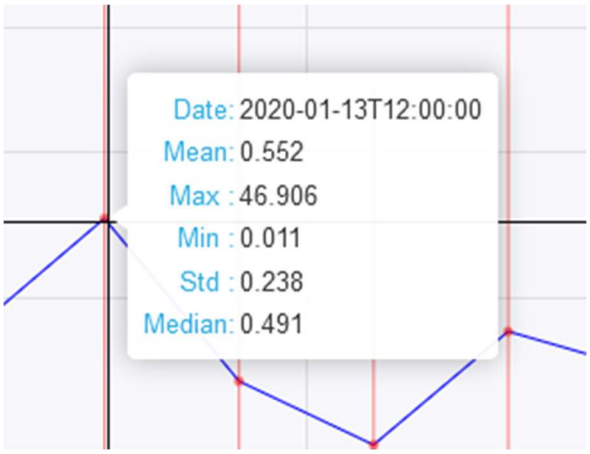
When your plot has finished processing, you will be taken to the 'Stored Plots' panel and have the option to open your plot, make another similar plot with slight edits, or delete your plot.



Clicking 'Open' will take you to an interactive plot window that will allow you to zoom/pan the plot and show various statistics as you mouseover the data points.



A closer look at the statistics panel for a timestep:



3 EXTRA RESOURCES

3.1 Short series of video guides to using the portal

https://www.youtube.com/watch?v=e3mTl-rnIr0&list=PLgSBIsLamaCoXjvuo4R_mFyFUlL7b5bVY

These were created as a narrated step-by-step guide to the portal a few years ago and can be very helpful if you run into trouble using this quick start guide, or, if you just prefer being shown the examples in real time.

3.2 Online help

The portal contains in-built help tutorials than can be accessed by clicking on the ? symbol in the various panes.