

# Mapping and Monitoring MODIS Level-3 Chlorophyll Concentration in Lake Victoria, Africa

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# Objective

- Search, access, analyze, visualize, and download MODIS Chlorophyll Level-3 data using the Giovanni web tool

# Create Annual Average Chlorophyll Concentration Map in Lake Victoria

1. Go to Giovanni: <http://giovanni.gsfc.nasa.gov/giovanni>
2. On the Giovanni page you will see the following options:

**Select Plot:**  
selection of analysis options

**Select Date Range:**  
select time period

The screenshot shows the GIOVANNI web interface with the following sections:

- Navigation:** EARTHDATA, Data Discovery, DAACs, Community, Science Disciplines.
- Header:** GIOVANNI The Bridge Between Data and Science v 4.23 Release Notes Browser Compatibility Known Issues
- Message:** Time series area statistics temporarily unavailable ... [1 of 2 messages] Read More
- Select Plot:** Maps: Time Averaged Map (selected), Comparisons: Select..., Vertical: Select..., Time Series: Select..., Miscellaneous: Select...
- Select Date Range (UTC):** YYYY-MM-DD. HH:mm. Valid Range: 1948-01-01 to 2017-10-20.
- Select Region (Bounding Box or Shape):** Format: West, South, East, North.
- Select Variables:**
  - Disciplines:** Aerosols (185), Atmospheric Chemistry (80), Atmospheric Dynamics (399), Cryosphere (15), Hydrology (1004), Ocean Biology (49), Oceanography (50), Water and Energy Cycle (1073).
  - Measurements:** Aerosol Index (3), Aerosol Optical Depth (85), Air Pressure Anomaly (1), Air Pressure (52), Air Temperature Anomaly (2), Air Temperature (88).
- Search:** Number of matching Variables: 0 of 1767. Keyword: Search Clear.
- Buttons:** Help, Reset, Feedback, Plot Data.

**Select Region:**  
select geographic region by lat/lon, map, or shapefile

**Keyword:** search by data parameter or keyword

**Plot Data:** starts action to make your desired plot



# Subset Data and Make Monthly Chlorophyll Time Series

3. Enter the following options:

– **Keyword:** Enter **Chlorophyll** and click **Search**

- You will get the following list, select **Chlorophyll a Concentration:** (MODISA\_L3m\_CHL\_v2018)



Number of matching Variables: 16 of 1952      Total Variable(s) included in Plot: 1

Keyword: Chlorophyll      Search      Clear

	Variable	Units	Source	Temp.Res.	Spat.Res.	Begin Date	End Date
<input type="checkbox"/>	<a href="#">Total chlorophyll</a> (NOBM_DAY vR2017)	mg m-3	NOBM Model	Daily	0.67 x 1.25 °	1998-01-01	2015-12-31
<input type="checkbox"/>	<a href="#">Chlorophyll a Concentration</a> (OCTS_L3m_CHL v2014)	mg m-3	OCTS	Monthly	9 km	1996-11-01	1997-06-30
<input type="checkbox"/>	<a href="#">Total chlorophyll</a> (NOBM_MON vR2017)	mg m-3	NOBM Model	Monthly	0.67 x 1.25 °	1998-01-01	2015-12-31
<input type="checkbox"/>	<a href="#">Normalized fluorescence line height</a> (MODISA_L3m_FLH v2018)	mW cm <sup>-2</sup> um <sup>-1</sup> sr <sup>-1</sup>	MODIS-Aqua	Monthly	4 km	2002-07-04	2018-06-30
<input checked="" type="checkbox"/>	<a href="#">Chlorophyll a concentration</a> (MODISA_L3m_CHL v2018)	mg m-3	MODIS-Aqua	Monthly	4 km	2002-07-04	2018-06-30

– Under **Select Plot** Select **Time Series**, and then select **Area Averaged** from the drop-down menu



Time Series: Area-Averaged      Miscellaneous: Select...

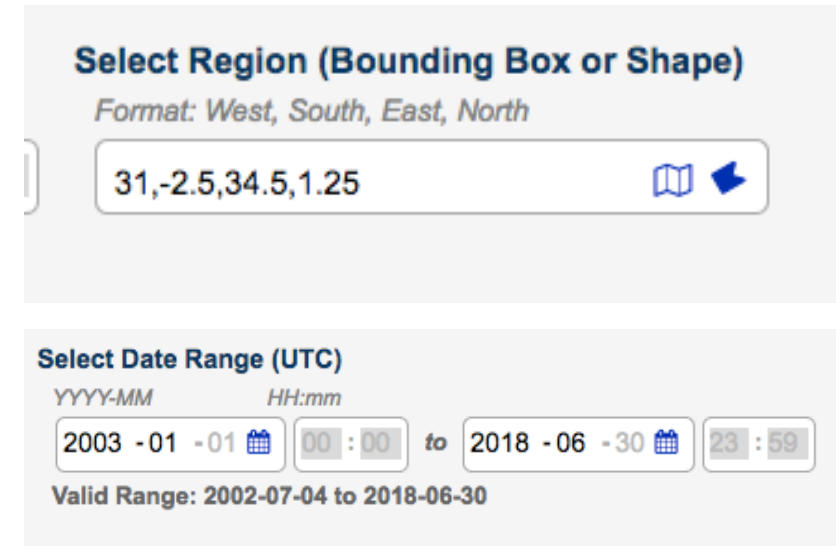
**Time Series Choices**

- Hovmoller, Longitude-Averaged**  
Longitude-averaged Hovmoller, plotted over the selected time and latitude ranges  
[Details...](#)
- Hovmoller, Latitude-Averaged**  
Latitude-averaged Hovmoller, plotted over the selected time and longitude ranges  
[Details...](#)
- Area-Averaged Differences**  
Time series of area averages of differences between two variables at each spatial grid point  
[Details...](#)
- Area-Averaged**  
Time series of area-averaged values  
[Details...](#)
- Seasonal**  
Seasonal (inter annual) time series  
[Details...](#)



# Subset Data and Make Monthly Chlorophyll Time Series

- Under **Select Region (Bounding Box or Shape)**, enter the longitude-latitude around Lake Victoria:
    - 31.0, -2.5, 34.5, 1.25
  - Under **Select Data Range**, set the range to **2003-01 to 2018-06** for January 2003 to June 2018)
4. Click on **Plot Data** (on the bottom right part of the screen)
    - You will get a time series plot
  5. Go to **Download** on the left and click to open and save a .csv file to see the data table



The screenshot shows two sections of a web interface. The top section is titled "Select Region (Bounding Box or Shape)" and includes a text input field containing "31,-2.5,34.5,1.25". Below the input field are two icons: a blue map icon and a blue arrow icon. The bottom section is titled "Select Date Range (UTC)" and includes two date pickers. The first date picker shows "2003 -01 -01" and the second shows "2018 -06 -30". Between the date pickers is a "to" label and a time picker showing "00 : 00" and "23 : 59". Below the date pickers is a "Valid Range: 2002-07-04 to 2018-06-30" label.



# Subset Data and Make Monthly Chlorophyll Time Series

- Examine the time series, then go to the Google Form on the website to answer the following questions:
  1. Which year and month had the maximum chlorophyll concentration? What was the amount?
  2. How many months had a chlorophyll concentration of more than 40 mg/m<sup>3</sup>?
  3. What was the average range of chlorophyll concentration?

# Create a Chlorophyll Concentration Map for Lake Victoria

6. Click **Back to Data Selection** at the bottom right
  7. Under **Select Date Range (UTC)**, choose the year and month that matches when the time series showed maximum chlorophyll concentration
  8. Under **Select Plot**, change the setting to **Maps: Time Averaged Map**
  9. Click on **Plot Data** to get the map
  10. (Optional) Go to **Download** and click on the kmz file that you can view with Google Earth
    - Note: you will have to download and install Google Earth from <https://www.google.com/earth/> on your computer if you do not already have it
- Examine the map and answer the following question on the Google Form on the training page:
    1. What is the maximum chlorophyll concentration range in the map?





Thank You