Using GIOVANNI

What is GIOVANNI?

Giovanni is an acronym for **G**eospatial **I**nteractive **O**nline **V**isualization **AN**d A**N**alysis **I**nfrastructure. That's really just a fancy name for an easy-to-use, tool. Called the "Bridge Between Data and Science," it is designed to help you search for and retrieve specific Earth science data collected from satellite-based remote sensors. This Web-based tool is provided by NASA at Goddard Space Flight Center. Giovanni includes access to data in a number of fields:

- Aerosols
- Atmospheric chemistry and dynamics
- Water and Energy cycle; Hydrology; Cryosphere
- Oceanography
- Ocean biology
- and more…

GIOVANNI is Easy to Use

To get started, simply launch a reliable browser and point it to https://giovanni.gsfc.nasa.gov/giovanni/.
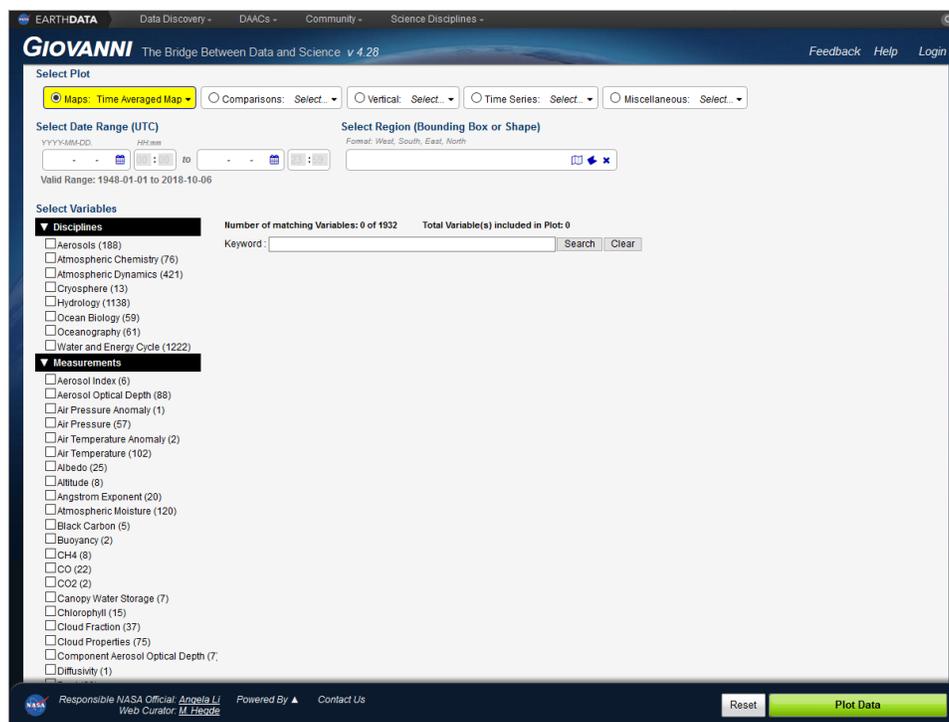
Available data are grouped into various categories on the left side of the screen including these:

▶ Disciplines	▶ Spatial Resolutions	▶ Depths
▶ Measurements	▶ Temporal Resolutions	▶ Special Functions
▶ Platform Instrument	▶ Wavelengths	▶ Portal

Cataloging the variables this way demonstrates there are many ways to sort and find the particular data set

you need. Let's explore the Disciplines list. Insure the **Disciplines** and **Measurements** lists are expanded. If necessary, click the expansion arrow of each to expand each list. Notice when the name of a data portal is checked in the Disciplines list, the Measurement list changes to reflect the data available for that discipline. Tick and untick the check box for various portals in Disciplines (one at a time) to see the data types available.

Accessing Data

Let's try a simple example. Suppose you are interested in the amount of phytoplankton (microscopic plants, mostly algae) in the upper layers of ocean water. Suppose you would like to know if the amount of plankton changes seasonally. Since phytoplankton is at the base of the food web and produces most of our oxygen, the amount of green algae in the ocean can be an indicator of the amount of larger species present in the area and of the health of the ocean in general. Satellite-based remote sensors can scan for the particular wavelengths of light reflected by chlorophyll-a in the green algae. You will be looking for chlorophyll-a data from the year 2012.

What Data Do I Want?
Check **Oceanography** or **Ocean Biology** in the **Disciplines** list. Then check **Chlorophyll** in the **Measurements** list. In the resulting list displayed in the middle of the screen, check **Chlorophyll a concentration – (MODIS)**. If given the choice, select **Monthly** for this example. Tick the checkbox. The visualization you selected will produce a Level 3 colored map with a color-keyed measurement legend. Level 3 data have been preprocessed to time-average and interpolate some missing data. The data are also georeferenced so they can be displayed easily as a map gridded with latitude and longitude.

What About Output Properties?
Now you must select a plot type, date range, and geographic region for your chlorophyll-a data.

In the **Select Plot** section, use the **Maps** drop-down arrow to select **Time Averaged Map**.①

In the **Select Date Range** section, use the calendar icons ② to select a start date of **2012 06-Jun**. Then select an end date of **2012 06-Jun**. Click the X to close the end date window.

In the **Select Region** section, you can open ③ the selection map ④ and drag ⑤ a boundary ⑥ around the region of interest. Or, if you know the longitudes and latitudes of the region's sides, type those coordinates into the Select Region field ⑦. The region of interest includes the ocean areas nearest sub-Saharan Africa. This region is bounded by 0˚ longitude on the west, -10˚ latitude on the north, 55˚ longitude on the east, and -40˚ latitude on the south. Type **0,-40,55,-10** into the field. Close the map.

Click the big green **Plot Data** button in the bottom right corner of the screen.

A screen will appear showing a progress bar. Below the bar, the processing steps GIOVANNI works through are listed in turn. The processing speed depends on how busy the server is and where your request falls in the queue. Shortly, the progress bar will disappear and the image displayed.
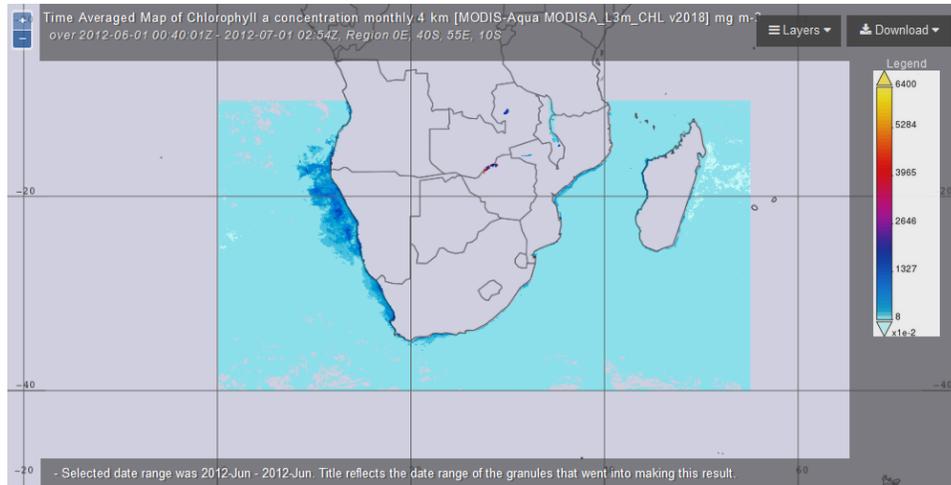
Downloading Data

In the upper-right corner of the image display, click the **Download** drop-down arrow. Notice the data are available in GEOTIFF, KMZ, and PNG formats. GEOTIFF and PNG can be opened with MultiSpec or ImageJ; KMZ can be viewed in Google Earth. PNG (portable network graphics format) is commonly used for Internet graphics because this type of compression results in smaller files that are easy to transfer. For now, select **PNG**.

From the pop-up, note the file name. Select **Save File**. The image file will download to the default download folder on your computer.

Close your browser.

Congratulations! You have successfully used Giovanni to find and download your data.

Your Turn

Now, it's time to play with GIOVANNI – experiment, learn, enjoy, share!

Try accessing an image of chlorophyll-a data for the same area in December 2012. Is there a seasonal difference in chlorophyll-a concentration? During which season is there more chlorophyll-a present around South Africa? How many more images should you access to properly answer those questions?

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