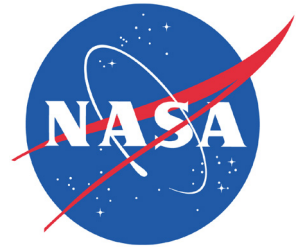




# NASA Giovanni Tutorial

by



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NASA Giovanni is a flexible, though somewhat complicated platform that allows a user to average remote-sensing data over time, create a range of plot types and formats, compare variables, and graphically display information. You can also download plot source files in [netCDF format](#).

For a far more detailed overview of Giovanni and everything that it can do, [here's the User Manual](#).

# Getting Started with NASA Giovanni

First, open [NASA Giovanni](https://giovanni.gsfc.nasa.gov/). (Tip: bookmark the page)

The screenshot shows the top navigation bar with links for EARTHDATA, Data Discovery, DAACs, Community, and Science Disciplines. Below this is the Giovanni logo and version information (v 4.21.6). A message banner indicates a transition to https. The main selection area includes a 'Select Plot' dropdown menu with 'Maps: Time Averaged Map' selected, and several other dropdowns for 'Comparisons', 'Vertical', 'Time Series', and 'Miscellaneous'. Below these are fields for 'Select Date Range (UTC)' and 'Select Region (Bounding Box or Shapefile)'.

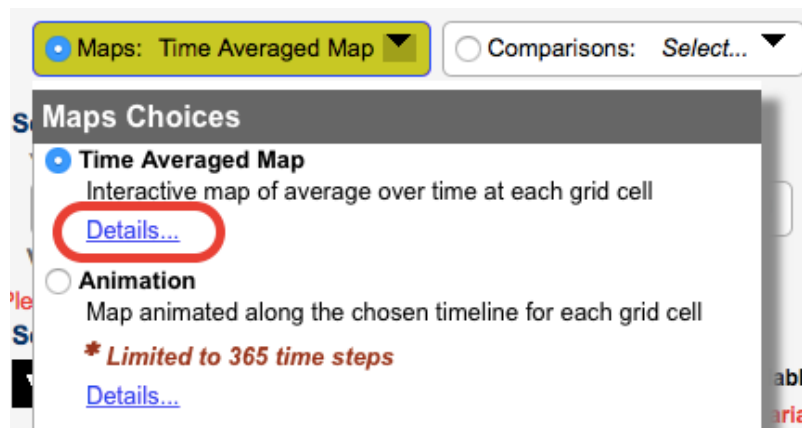
1. Select your **Plot**. Members of the Air Quality (AQ) community are likely to find that a **Time Averaged Map** is the most useful plot to choose. **Time Series** (described below), which displays as a set of line graphs, may also be useful for your purposes.

This screenshot shows the search results page with several annotations. A red box labeled '1' highlights the 'Select Plot' dropdown menu. A red box labeled '2' highlights the 'Select Date Range (UTC)' fields. A red box labeled '3' highlights the 'Select Region (Bounding Box or Shape)' field. A red box labeled '4' highlights the 'Select Variables' section, which includes a list of disciplines and a search bar. A red box labeled 'a' highlights the 'Total Variable(s) included in Plot: 0' and the search bar. A red box labeled 'b' highlights the 'Disciplines' list. A red box labeled '4bii' highlights the 'Variable' column in the search results table. A red box labeled '5' highlights the 'Plot Data' button at the bottom right.

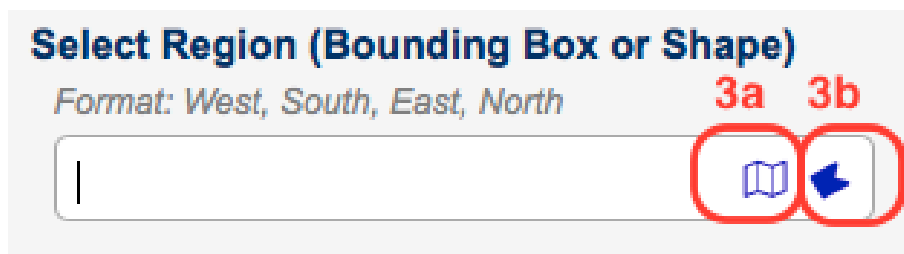
Variable	Source	Temp.Res.	Spat.Res.	Begin Date	End Date	Units
<input type="checkbox"/> Aerosol Absorption Optical Depth 388 nm (OMAERUVd v003)	OMI	Daily	1 °	2004-10-01	2016-12-17	-
<input type="checkbox"/> Aerosol Absorption Optical Depth 500 nm (OMAERUVd v003)	OMI	Daily	1 °	2004-10-01	2016-12-17	-
<input type="checkbox"/> Aerosol Optical Depth 388 nm (OMAERUVd v003)	OMI	Daily	1 °	2004-10-01	2016-12-17	-
<input type="checkbox"/> Aerosol Optical Depth 500 nm (OMAERUVd v003)	OMI	Daily	1 °	2004-10-01	2016-12-17	-
<input type="checkbox"/> UV Aerosol Index (OMTO3d v003)	OMI	Daily	1 °	2004-10-01	2016-12-17	-
<input type="checkbox"/> Aerosol Optical Depth 555 nm (MIL3DAE v4)	MISR	Daily	0.5 °	2000-02-25	2016-08-31	-
<input type="checkbox"/> Aerosol Optical Depth 550 nm (SWDB_L305 v004)	SeaWiFS	Daily	0.5 °	1997-09-03	2010-12-11	-
<input type="checkbox"/> Aerosol Optical Depth 550 nm (Land-only) (SWDB_L305 v004)	SeaWiFS	Daily	0.5 °	1997-09-03	2010-12-11	-
<input type="checkbox"/> Aerosol Optical Depth 550 nm (Ocean-only) (SWDB_L305 v004)	SeaWiFS	Daily	0.5 °	1997-09-03	2010-12-11	-
<input type="checkbox"/> Aerosol Optical Depth 550 nm (SWDB_L310 v004)	SeaWiFS	Daily	1 °	1997-09-03	2010-12-11	-
<input type="checkbox"/> Aerosol Optical Depth 550 nm (Land-only) (SWDB_L310 v004)	SeaWiFS	Daily	1 °	1997-09-03	2010-12-11	-
<input type="checkbox"/> Aerosol Optical Depth 550 nm (Ocean-only) (SWDB_L310 v004)	SeaWiFS	Daily	1 °	1997-09-03	2010-12-11	-
<input type="checkbox"/> Aerosol Optical Depth 550 nm (SWDB_L3M05 v004)	SeaWiFS	Monthly	0.5 °	1997-09-03	2010-12-31	-
<input type="checkbox"/> Aerosol Optical Depth 550 nm (Land-only) (SWDB_L3M05 v004)	SeaWiFS	Monthly	0.5 °	1997-09-03	2010-12-31	-
<input type="checkbox"/> Aerosol Optical Depth 550 nm (Ocean-only) (SWDB_L3M05 v004)	SeaWiFS	Monthly	0.5 °	1997-09-03	2010-12-31	-
<input type="checkbox"/> Aerosol Optical Depth 550 nm (SWDB_L3M10 v004)	SeaWiFS	Monthly	1 °	1997-09-03	2010-12-31	-
<input type="checkbox"/> Aerosol Optical Depth 550 nm (Land-only) (SWDB_L3M10 v004)	SeaWiFS	Monthly	1 °	1997-09-03	2010-12-31	-
<input type="checkbox"/> Aerosol Optical Depth 550 nm (Ocean-only) (SWDB_L3M10 v004)	SeaWiFS	Monthly	1 °	1997-09-03	2010-12-31	-
<input type="checkbox"/> Aerosol Absorption Optical Depth 342.5 nm (OMAEROe v003)	OMI	Daily	0.25 °	2004-10-01	2016-12-17	-
<input type="checkbox"/> Aerosol Absorption Optical Depth 388 nm (OMAEROe v003)	OMI	Daily	0.25 °	2004-10-01	2016-12-17	-
<input type="checkbox"/> Aerosol Absorption Optical Depth 442 nm (OMAEROe v003)	OMI	Daily	0.25 °	2004-10-01	2016-12-17	-
<input type="checkbox"/> Aerosol Absorption Optical Depth 469 nm (OMAEROe v003)	OMI	Daily	0.25 °	2004-10-01	2016-12-17	-
<input type="checkbox"/> Aerosol Absorption Optical Depth 483.5 nm (OMAEROe v003)	OMI	Daily	0.25 °	2004-10-01	2016-12-17	-

## Working with Time Averaged Maps

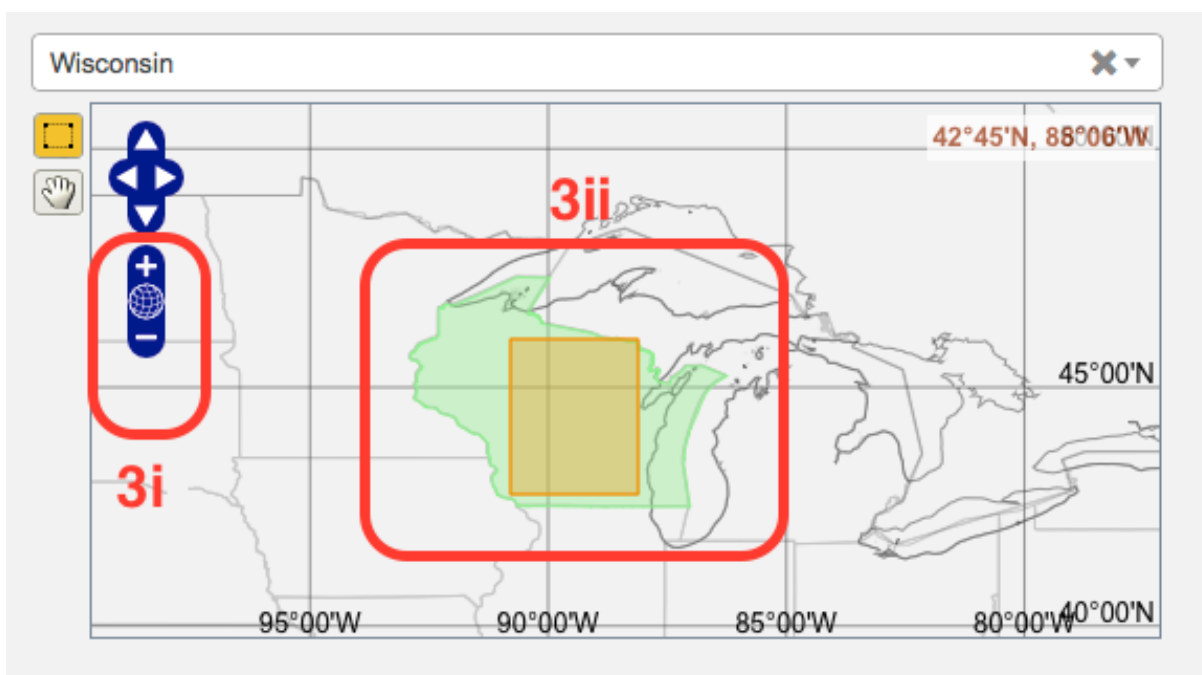
1. There are a few different Time Averaged Maps from which you can choose. Click the **Details** link beneath each to see which one is best suited for your purposes.



2. Next, select a **Date Range** for which you would like to see data. (You will not be able to specify start hours for either Time Averaged Maps or Time Series Plots.)
  - a. **Note:** Time Averaged Maps take a long time to run. The larger the date range, the more time it will take Giovanni to complete your map. Expect to be waiting *at least* a few minutes.
3. **Select Region** (the default region is the whole earth).
  - a. Click **Bounding Box** to select a square section of the earth.
    - i. Zoom in and to a specific part of the globe using the + and -.
    - ii. Use your mouse to select a square region of the map.
    - iii. To undo the selected region, click twice anywhere in the map.

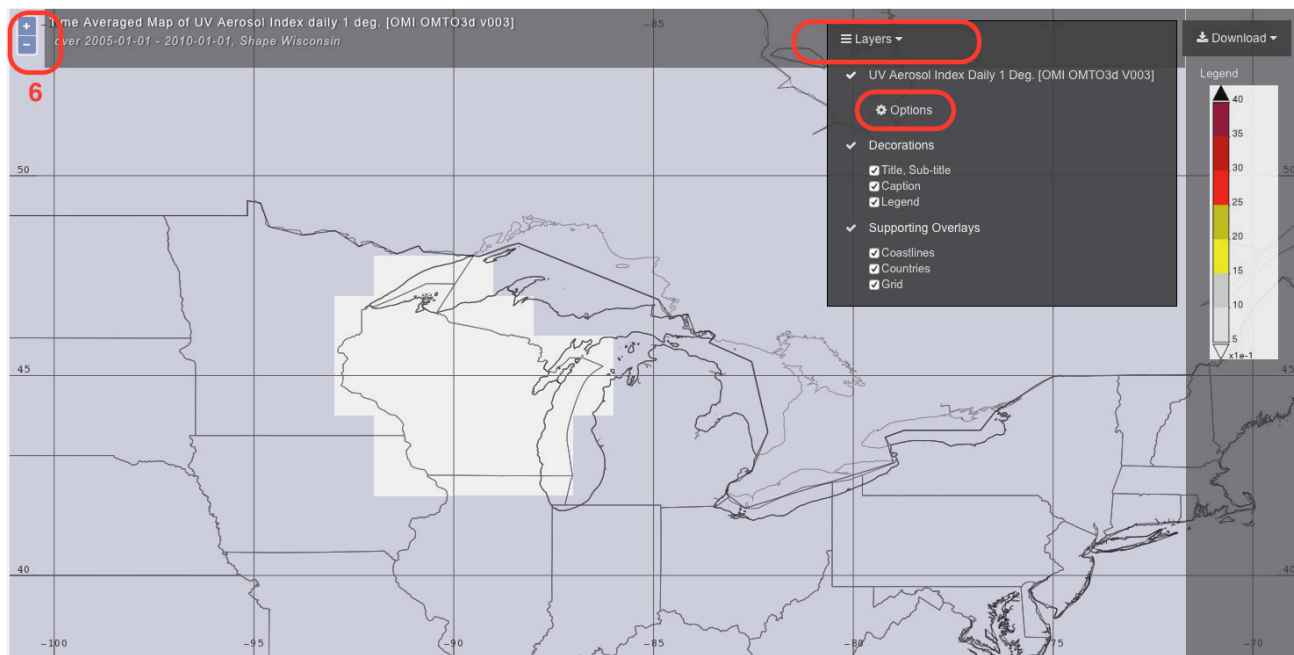


- b. Click **Select a Shape** to choose specific countries, U.S. States, watersheds, landmasses only, or oceans only.
  - i. Zoom in and out on a specific part of the globe using the + and -.
  - ii. You can also click and drag to highlight a rectangular region within a selected shape.



4. Finally, select the variables you would like to map.
  - a. There are nearly two thousand variables from which you can choose. You can search by keyword in the search field.
  - b. AQ users will also find it useful to filter variables by discipline. To do so, click **Disciplines**.
    - i. Check the box for either **Aerosols** or **Atmospheric Chemistry**, for example.
    - ii. A list of variables will appear. Check the box(es) of the ones you want to map.
5. Once you've chosen your variables, click **Plot Data**.
  - a. **Note:** Different variables are available for different temporal resolutions and durations. If you select a variable that is unavailable for the parameters you select, you'll be alerted with an error message and will need to change your parameters.
6. If you selected a relatively small geographical region (a state, for instance) you may find that your map is entirely gray and seemingly without data. Giovanni initially displays your results on a world map. Zoom in to your selected region.

7. You may find that the map would be easier to read if the colors were rescaled. To do so, click **Layers** and then select **Options**.

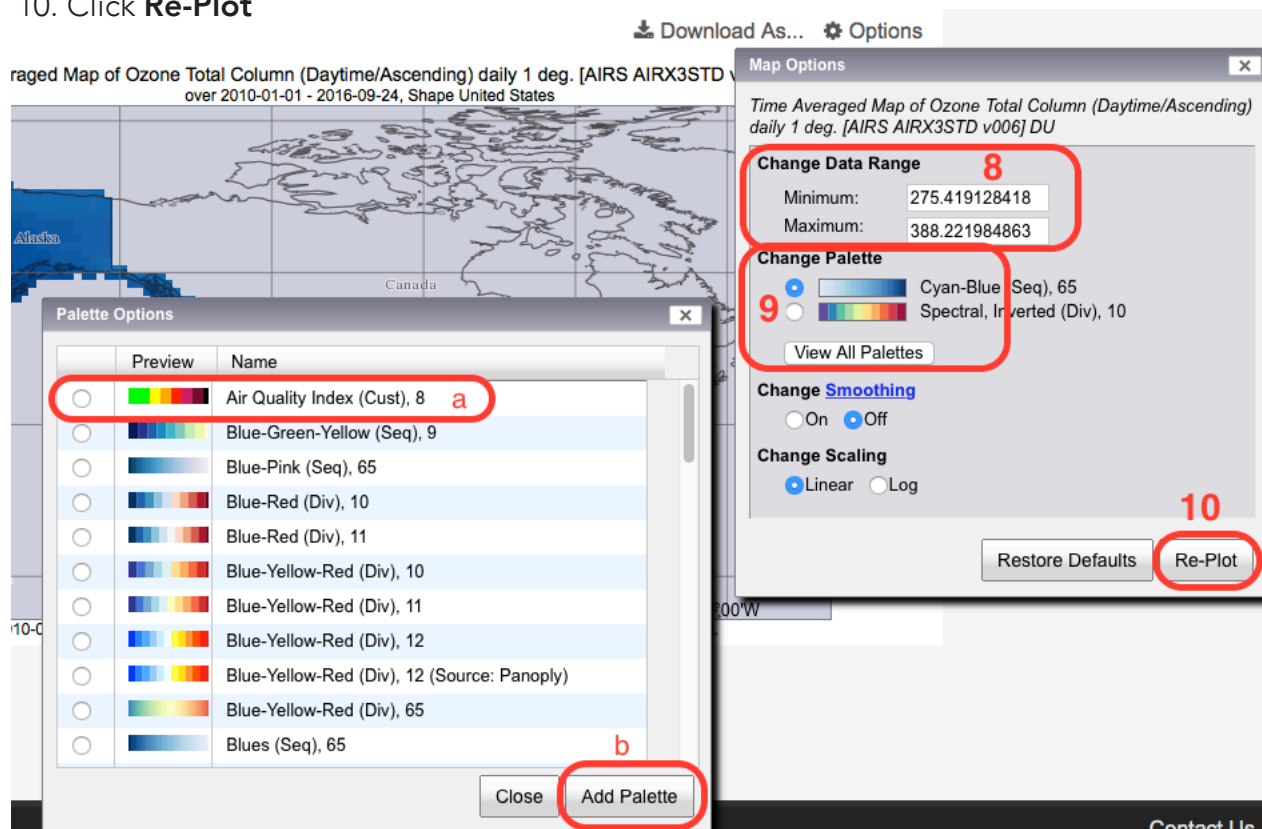


8. Change the **Minimum** and **Maximum** for a wider or narrower scale.

9. Select a higher-contrast color palette by clicking **View All Palettes**.

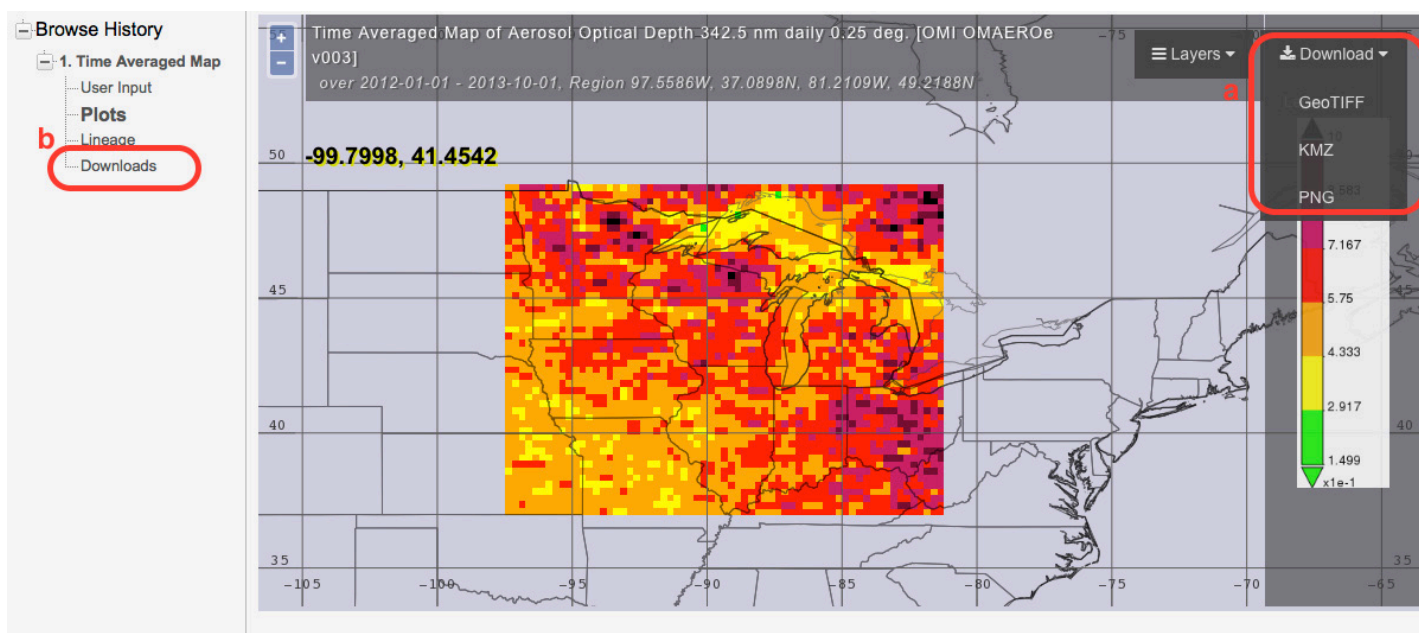
- Choose the palette that fits your needs.
- Click **Add Palette**.

10. Click **Re-Plot**



11. Download your data.

- Click **Download** (a) and when prompted, choose the file format that works best for your needs.
- If you'd like to download your data in NetCDF format (to plot in Panoply, for instance), click **Downloads** (b) and select NetCDF.



Click on file links to download. Files contain data portrayed in the plot images.

**NetCDF:**  
[g4.timeAvgMap.OMAEROe\\_003\\_AerosolOpticalThicknessMW\\_342\\_5.20120101-20131001.97W\\_37N\\_81W\\_49N.nc](#)

**PNG:**  
[OMAEROe\\_003\\_AerosolOpticalThicknessMW\\_342\\_5.20120101-20131001.97W\\_37N\\_81W\\_49N.png](#)

**GEOTIFF:**  
[OMAEROe\\_003\\_AerosolOpticalThicknessMW\\_342\\_5.20120101-20131001.97W\\_37N\\_81W\\_49N.geotif](#)

**KMZ:**  
[OMAEROe\\_003\\_AerosolOpticalThicknessMW\\_342\\_5.20120101-20131001.97W\\_37N\\_81W\\_49N.kmz](#)



## Working with Time Series

**1** Select Plot: Time Series: Area-Averaged Differences

**2** Select Date Range (UTC): YYYY-MM-DD HH:mm to YYYY-MM-DD HH:mm

**3** Select Region (Bounding Box or Shape): Format: West, South, East, North

**4** Select Variables: Disciplines (Aerosols, Atmospheric Chemistry, etc.) and Measurements (Aerosol Index, Aerosol Optical Depth, etc.)

**4a** Variable list table:

Variable	Source	Temp. Res.	Spat. Res.	Begin Date	End Date	Units
Aerosol Absorption Optical Depth 388 nm (OMAERUVd v003)	OMI	Daily	1°	2004-10-01	2016-12-17	-
Aerosol Absorption Optical Depth 500 nm (OMAERUVd v003)	OMI	Daily	1°	2004-10-01	2016-12-17	-
Aerosol Optical Depth 388 nm (OMAERUVd v003)	OMI	Daily	1°	2004-10-01	2016-12-17	-
Aerosol Optical Depth 500 nm (OMAERUVd v003)	OMI	Daily	1°	2004-10-01	2016-12-17	-
UV Aerosol Index (OMTO3d v003)	OMI	Daily	1°	2004-10-01	2016-12-17	-
Aerosol Optical Depth 555 nm (MIL3DAE v4)	MISR	Daily	0.5°	2000-02-25	2016-08-31	-
Aerosol Optical Depth 555 nm (SWDB_L305 v004)	SeaWiFS	Daily	0.5°	1997-09-03	2010-12-11	-
Aerosol Optical Depth 555 nm (Land-only) (SWDB_L305 v004)	SeaWiFS	Daily	0.5°	1997-09-03	2010-12-11	-
Aerosol Optical Depth 555 nm (Ocean-only) (SWDB_L305 v004)	SeaWiFS	Daily	0.5°	1997-09-03	2010-12-11	-
Aerosol Optical Depth 555 nm (SWDB_L310 v004)	SeaWiFS	Daily	1°	1997-09-03	2010-12-11	-
Aerosol Optical Depth 555 nm (Land-only) (SWDB_L310 v004)	SeaWiFS	Daily	1°	1997-09-03	2010-12-11	-
Aerosol Optical Depth 555 nm (Ocean-only) (SWDB_L310 v004)	SeaWiFS	Daily	1°	1997-09-03	2010-12-11	-
Aerosol Optical Depth 555 nm (SWDB_L3M05 v004)	SeaWiFS	Monthly	0.5°	1997-09-03	2010-12-31	-
Aerosol Optical Depth 555 nm (Land-only) (SWDB_L3M05 v004)	SeaWiFS	Monthly	0.5°	1997-09-03	2010-12-31	-
Aerosol Optical Depth 555 nm (Ocean-only) (SWDB_L3M05 v004)	SeaWiFS	Monthly	0.5°	1997-09-03	2010-12-31	-
Aerosol Optical Depth 555 nm (SWDB_L3M10 v004)	SeaWiFS	Monthly	1°	1997-09-03	2010-12-31	-
Aerosol Optical Depth 555 nm (Land-only) (SWDB_L3M10 v004)	SeaWiFS	Monthly	1°	1997-09-03	2010-12-31	-
Aerosol Optical Depth 555 nm (Ocean-only) (SWDB_L3M10 v004)	SeaWiFS	Monthly	1°	1997-09-03	2010-12-31	-
Aerosol Absorption Optical Depth 342.5 nm (OMAEROe v003)	OMI	Daily	0.25°	2004-10-01	2016-12-17	-
Aerosol Absorption Optical Depth 388 nm (OMAEROe v003)	OMI	Daily	0.25°	2004-10-01	2016-12-17	-
Aerosol Absorption Optical Depth 442 nm (OMAEROe v003)	OMI	Daily	0.25°	2004-10-01	2016-12-17	-

**5** Plot Data

1. If you'd like to see your data displayed in a line graph, choose **Time Series**. The process is fairly similar to working with Time Averaged Maps.

a. For the AQ community, you'll want to select an **Area-Averaged** graph.

**Maps: Time Averaged Map**

**Time Series: Select...**

2. Next, select a **Date Range** for which you would like to see data.

a. **Note:** Time Series graphs take a long time to run. The larger the date range, the more time it will take Giovanni to complete your graph. Expect to be waiting *at least* a few minutes.



3. **Select Region** (the default region is the whole earth).
  - a. Click **Bounding Box** to select a square section of the earth.
    - i. Zoom in and to out to a specific part of the globe using the + and -.
    - ii. Use your mouse to select a square region of the map.
    - iii. To undo the selected region, click twice anywhere on the map.

**Select Region (Bounding Box or Shape)**

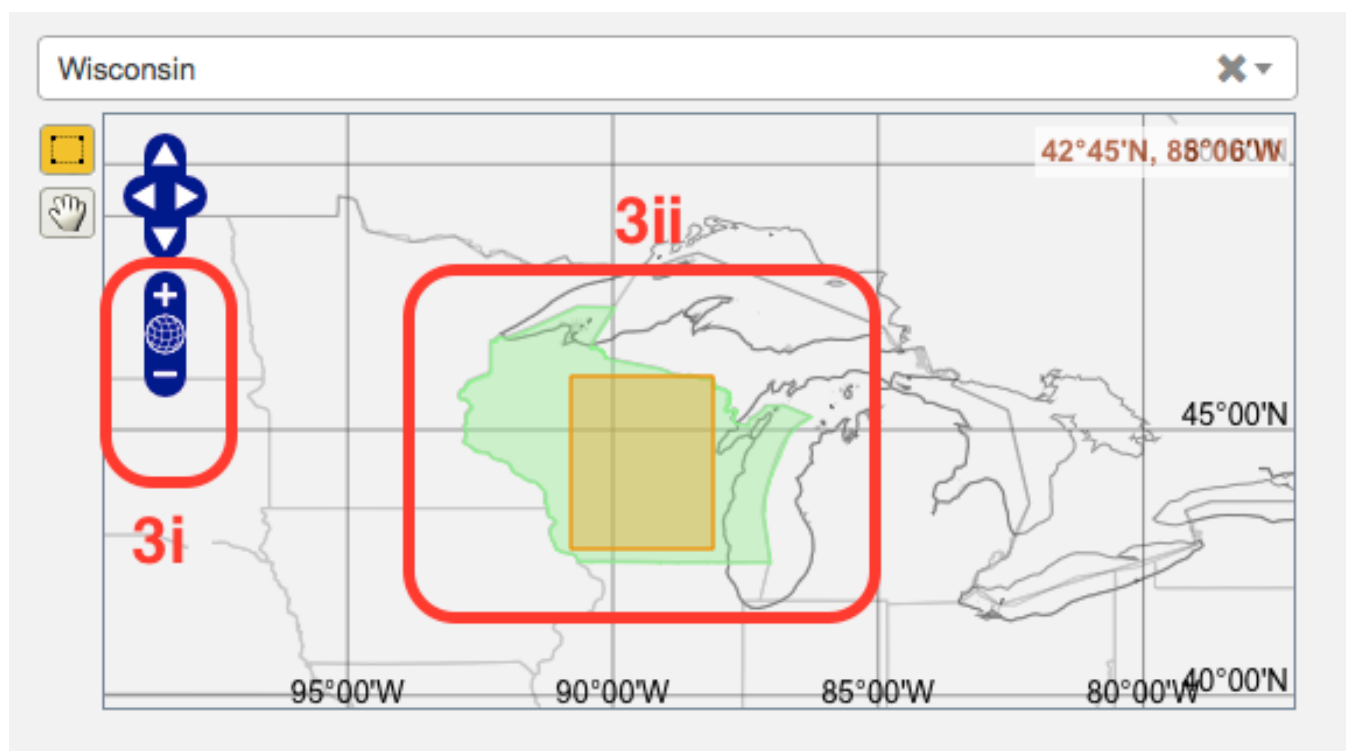
*Format: West, South, East, North*

3a 3b

|

- b. Click **Select a Shape** to choose specific countries, U.S. States, watersheds, landmasses only, or oceans only.
  - i. Zoom in and out on a specific part of the globe using the + and -.
  - ii. You can also click and drag to highlight a rectangular region within a selected shape.

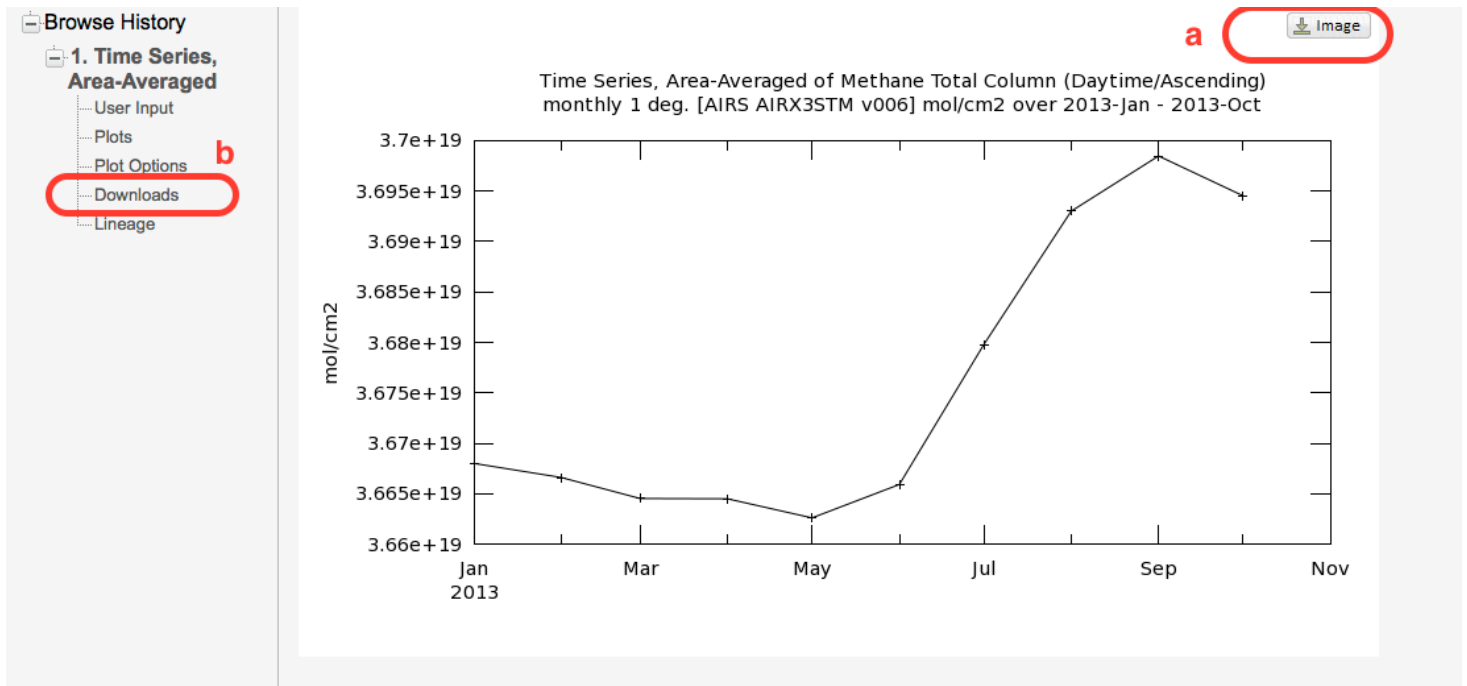


4. Finally, select the variables you would like to map.
  - a. There are nearly two thousand variables from which you can choose. You can search by keyword in the search field.
  - b. AQ users will also find it useful to filter variables by discipline. To do so, click **Disciplines**.
    - i. Check the box for either **Aerosols** or **Atmospheric Chemistry**, for example.
    - ii. A list of variables will appear. Check the box(es) of the ones you want to map.
5. Once you've chosen your variables, click **Plot Data**.



6. Download your data.

- Click **Download** (a) and when prompted, choose the file format that works best for your needs.
- If you'd like to download your data in csv format, click **Downloads** (b) and select csv.



**Browse History**

- 1. Time Series, Area-Averaged
  - User Input
  - Plots
  - Plot Options
  - Downloads**
  - Lineage

Click on file links to download. Files contain data portrayed in the plot images.

**ASCII CSV:**

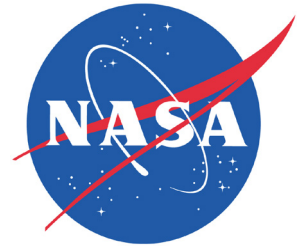
[g4.areaAvgTimeSeries.AIRX3STM\\_006\\_TotCH4\\_A.20130101-20131031.180W\\_90S\\_180E\\_90N.csv](#)

**PNG:**

[g4.areaAvgTimeSeries.AIRX3STM\\_006\\_TotCH4\\_A.20130101-20131031.180W\\_90S\\_180E\\_90N.png](#)



## FAQ



**Q:** Why can't I select a start hour for either Time Averaged Maps or Time Series Plots?

**A:** Temporal resolution varies between plot type and variable type. For Time Averaged Maps and Time Series Plots, hourly resolution is not available. Giovanni will use a daily or monthly data average to create maps and plots.

**Q:** What should I do if my Time Averaged Map does not appear correctly?

**A:** Check known issues link and browser compatibility. Also try switching web browsers.

**Q:** I'd like to graph/map formaldehyde. Can I do that with Giovanni?

**A:** Not as of yet.

**Q:** Can I plot two variables simultaneously when using Time-Averaged Map or Times Series Plot?

**A:** Two variables will not be expressed either on Time-Averaged Map or Times Series Plot. Time Series Plot will show you two different graphs, which express each variable in order.

**Q:** I'd like to make a difference of time-averaged maps for the same variable. In other words, I'm trying to compare levels of AOD from 2004 to levels of AOD from 2014. Will Giovanni let me do this?

**A:** No, Giovanni won't. That operation takes too much computing power. However, you can make difference maps using NASA's Panoply tool. For more information, go to the Panoply page.

**Q:** I'm having trouble with my browser/compatibility issues/etc.

**A:** Visit [this link](#) for a list of Giovanni's known issues.