

Visualizing Air Quality: How to Use NASA's Giovanni to Plot Satellite Tropospheric NO₂ Columns

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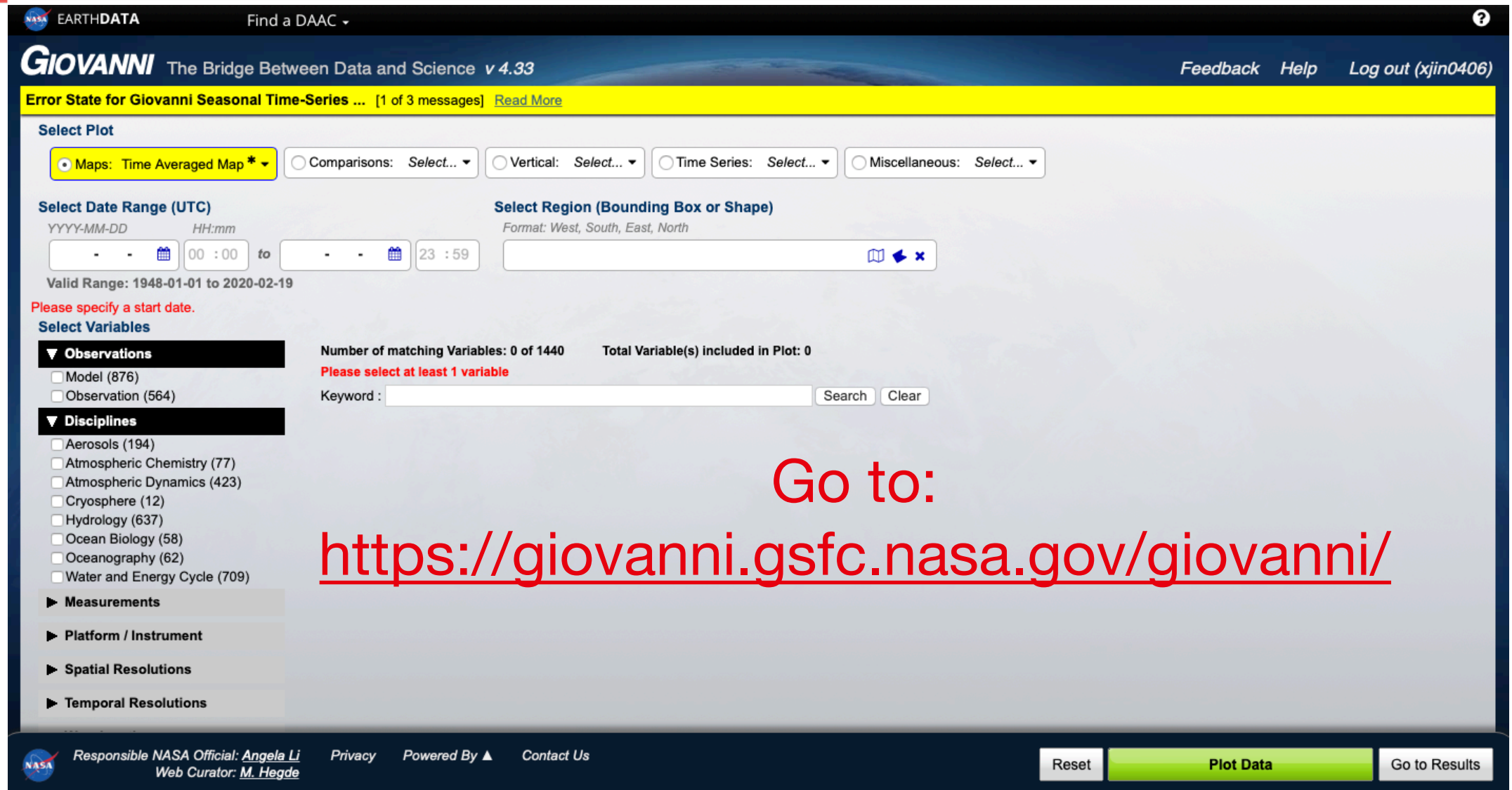
HAQAST2020

WEBINAR SERIES

Outline

- Introduction to NASA's Giovanni online visualization tool
- Overview of guidance documents from a HAQAST Tiger Team ('Supporting the use of Satellite Data in SIPs')
- Q&A

Giovanni: The bridge between data and science



HAQAST **EARTHDATA** Find a DAAC ?

GIOVANNI The Bridge Between Data and Science v 4.33 Feedback Help Log out (xjin0406)

Error State for Giovanni Seasonal Time-Series ... [1 of 3 messages] [Read More](#)

Select Plot

☒ Maps: Time Averaged Map * ☐ Comparisons: Select... ☐ Vertical: Select... ☐ Time Series: Select... ☐ Miscellaneous: Select...

Select Date Range (UTC) **Select Region (Bounding Box or Shape)**

YYYY-MM-DD HH:mm
 - - [calendar icon] 00 : 00 to - - [calendar icon] 23 : 59
 Valid Range: 1948-01-01 to 2020-02-19
 Format: West, South, East, North

Please specify a start date.

Select Variables

☒ **Observations**
☐ Model (876)
☐ Observation (564)

☒ **Disciplines**
☐ Aerosols (194)
☐ Atmospheric Chemistry (77)
☐ Atmospheric Dynamics (423)
☐ Cryosphere (12)
☐ Hydrology (637)
☐ Ocean Biology (58)
☐ Oceanography (62)
☐ Water and Energy Cycle (709)

☐ **Measurements**
☐ **Platform / Instrument**
☐ **Spatial Resolutions**
☐ **Temporal Resolutions**

Number of matching Variables: 0 of 1440 Total Variable(s) included in Plot: 0
 Please select at least 1 variable
 Keyword:

[Reset](#) [Plot Data](#) [Go to Results](#)

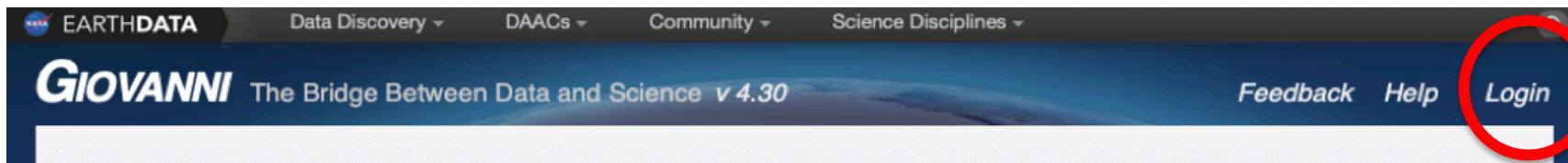
Responsible NASA Official: [Angela Li](#)
 Web Curator: [M. Hegde](#)

[Privacy](#) [Powered By ▲](#) [Contact Us](#)

Go to:
<https://giovanni.gsfc.nasa.gov/giovanni/>

First step: Register for an account on NASA EarthData

- You can use Giovanni as a guest, but limited to 4 time steps.
- Register your account at: <https://urs.earthdata.nasa.gov/users/new>
- Go to Giovanni website (<https://giovanni.gsfc.nasa.gov/giovanni/>), click on Login at the upper right corner.





What can you do with Giovanni?

- Make time-averaged maps (e.g. monthly, seasonal, annual average, or select your own time range).
- Make an animation.
- Make time series.
- Compare two variables: map of correlation, scatter plots.
- Make vertical profiles.
- Zonal mean maps.
- Histograms.
- Multiple measurements: NO₂, SO₂, HCHO, CO, aerosol optical depth (AOD).
- Multiple instruments: OMI, MISR, MOPITT, AIRS, MODIS.

Limitations of Giovanni

- Cannot define data selection criteria.
- Map/graph customization is limited.
- Not easy to automate the jobs.
- Sometimes it can be slow, especially for large calculation (e.g. multiple years).
- Cannot compare between two time periods.
- Only Level-3 data are supported.
- Some species (e.g. NH_3) are not supported.
- TROPOMI data are still not included.
- You can only download the results, not the original data. (To download original data, click on the product landing page or data lineage).

Make a plot in five steps!

1 Select Plot

☒ Maps: Time Averaged Map * ☐ Comparisons: Select... ☐ Vertical: Select... ☐ Time Series: Select... ☐ Miscellaneous: Select...

2 Select Date Range (UTC)

YYYY-MM-DD HH:mm
2011 -01 -01 00 :00 to 2011 -12 -31 23 :59
Valid Range: 1948-01-01 to 2020-02-19

3 Select Region (Bounding Box or Shape)

Format: West, South, East, North
Countries United States;

4a Select Variables

▼ Observations
☒ Observation (2)

▼ Disciplines
☒ Atmospheric Chemistry (2)

▼ Measurements

- ☐ Aerosol Index (2)
- ☐ Aerosol Optical Depth (7)
- ☐ Air Temperature (1)
- ☐ Angstrom Exponent (2)
- ☐ CF4 (8)
- ☐ CO (17)
- ☐ CO2 (2)
- ☐ HCHO (1)
- ☒ NO2 (2)
- ☐ Ozone (22)
- ☐ SO2 (1)
- ☐ Total Aerosol Optical Depth (2)

► Platform / Instrument

► Spatial Resolutions

► Temporal Resolutions

Number of matching Variables: 2 of 1440 Total Variable(s) included in Plot: 0
Please select at least 1 variable

Keyword : Search Clear

4b

	Variable	Units	Source	Temp.Res.	Spat.Res.	Begin Date	End Date
<input checked="" type="checkbox"/>	NO2 Total Column (30% Cloud Screened) (OMNO2d v003)	1/cm2	OMI	Daily	0.25 °	2004-10-01	2020-02-17
<input type="checkbox"/>	NO2 Tropospheric Column (30% Cloud Screened) (OMNO2d v003)	1/cm2	OMI	Daily	0.25 °	2004-10-01	2020-02-17

5

Reset Plot Data Go to Results

Select variables

▼ Observations

- ☐ Model (16)
- ☐ Observation (61)

▼ Disciplines

- ☐ Aerosols (194)
- ☒ Atmospheric Chemistry (77)
- ☐ Atmospheric Dynamics (423)
- ☐ Cryosphere (12)
- ☐ Hydrology (637)
- ☐ Ocean Biology (58)
- ☐ Oceanography (62)
- ☐ Water and Energy Cycle (709)

▼ Measurements

- ☐ Aerosol Index (2)
- ☐ Aerosol Optical Depth (7)
- ☐ Air Temperature (1)
- ☐ Angstrom Exponent (2)
- ☐ CH₄ (8)
- ☐ CO (22)
- ☐ CO₂ (2)
- ☐ Emissivity (1)
- ☐ HCHO (1)
- ☐ NO₂ (2)
- ☐ Ozone (30)
- ☐ SO₂ (4)
- ☐ Total Aerosol Optical Depth (2)

► Platform / Instrument

► Spatial Resolutions

► Temporal Resolutions

► Wavelengths

► Portal

▼ Platform / Instrument

- ☐ AIRS (35)
- ☐ MERRA Model (2)
- ☐ MERRA-2 Model (14)
- ☐ MODIS-Aqua (5)
- ☐ MODIS-Terra (2)
- ☐ MOPITT (9)
- ☐ OMI (7)
- ☐ TOMS EP (1)
- ☐ TOMS Meteor-3 (1)
- ☐ TOMS Nimbus-7 (1)

▼ Spatial Resolutions

- ☐ 0.1 ° (1)
- ☐ 0.25 ° (5)
- ☐ 0.5 x 0.625 ° (14)
- ☐ 1 ° (39)
- ☐ 1.0 ° (9)
- ☐ 1.0 x 1.25 ° (3)
- ☐ 1.25 ° (2)
- ☐ 2 x 2.5 ° (2)
- ☐ 4 km (2)

▼ Temporal Resolutions

- ☐ 3-hourly (2)
- ☐ 8-daily (2)
- ☐ daily (29)
- ☐ hourly (2)
- ☐ monthly (42)

▼ Wavelengths

- ☐ 550.0 (5)
- ☐ 869.0 (1)

Options for selecting regions

Option 1: Type in the Latitude/Longitude Range

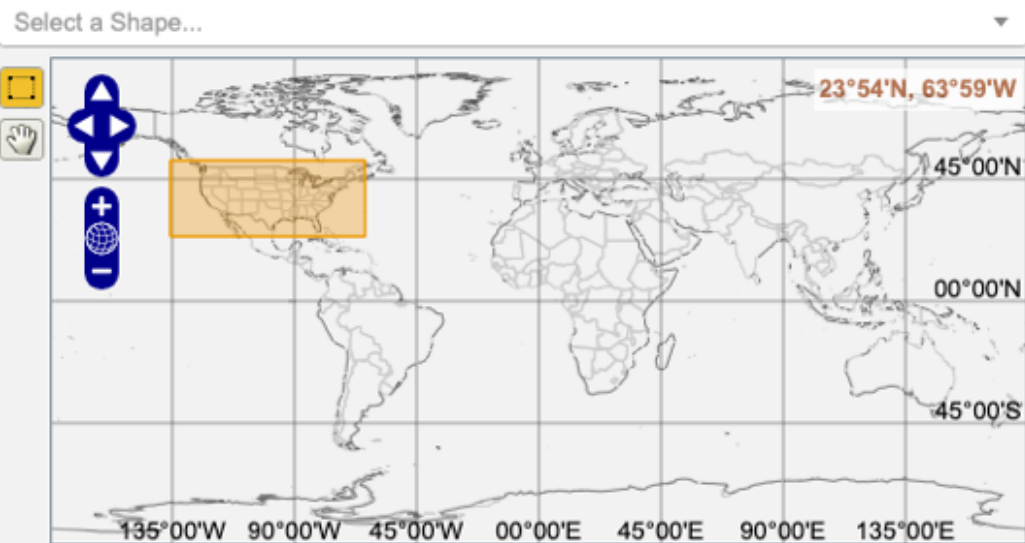
Select Region (Bounding Box or Shape)

Format: West, South, East, North

-180,-90,180,90



Option 2: Use the cursor to select a region on map



Option 3: Select by country, land/sea, US States, Watersheds.

Select a Shape...

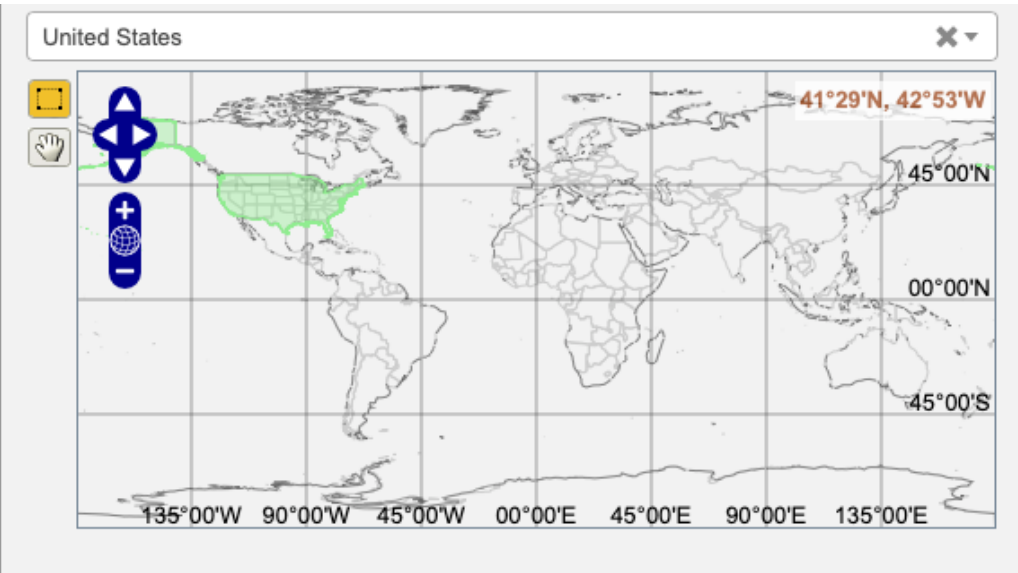
►Countries (source: [HIU](#), [US State Department](#))

►Land Only file (source: [GES DISC](#))

►Sea Only file (source: [GES DISC](#))

►US States (source: [TIGER/Line](#), [US Census Bureau](#))

►Watersheds (source: [Major Hydrological Basins](#), [FAO \(United Nations\)](#))



Working with time averaged maps

1 Select Plot
☒ Maps: Time Averaged Map*
☐ Comparisons: Select...
☐ Vertical: Select...
☐ Time Series: Select...
☐ Miscellaneous: Select...

2 Select Date Range (UTC)
 YYYY-MM-DD HH:mm
 2011 -01 -01 00 :00 to 2011 -12 -31 23 :59
 Valid Range: 1948-01-01 to 2020-02-19

3 Select Region (Bounding Box or Shape)
 Format: West, South, East, North
 Countries United States;

4a Select Variables
Observations
☒ Observation (2)
Disciplines
☒ Atmospheric Chemistry (2)
Measurements
☐ Aerosol Index (2)
☐ Aerosol Optical Depth (7)
☐ Air Temperature (1)
☐ Angstrom Exponent (2)
☐ CO (17)
☐ CO2 (2)
☐ HCHO (1)
☒ NO2 (2)
☐ Ozone (22)
☐ SO2 (1)
☐ Total Aerosol Optical Depth (2)
Platform / Instrument
Spatial Resolutions
Temporal Resolutions

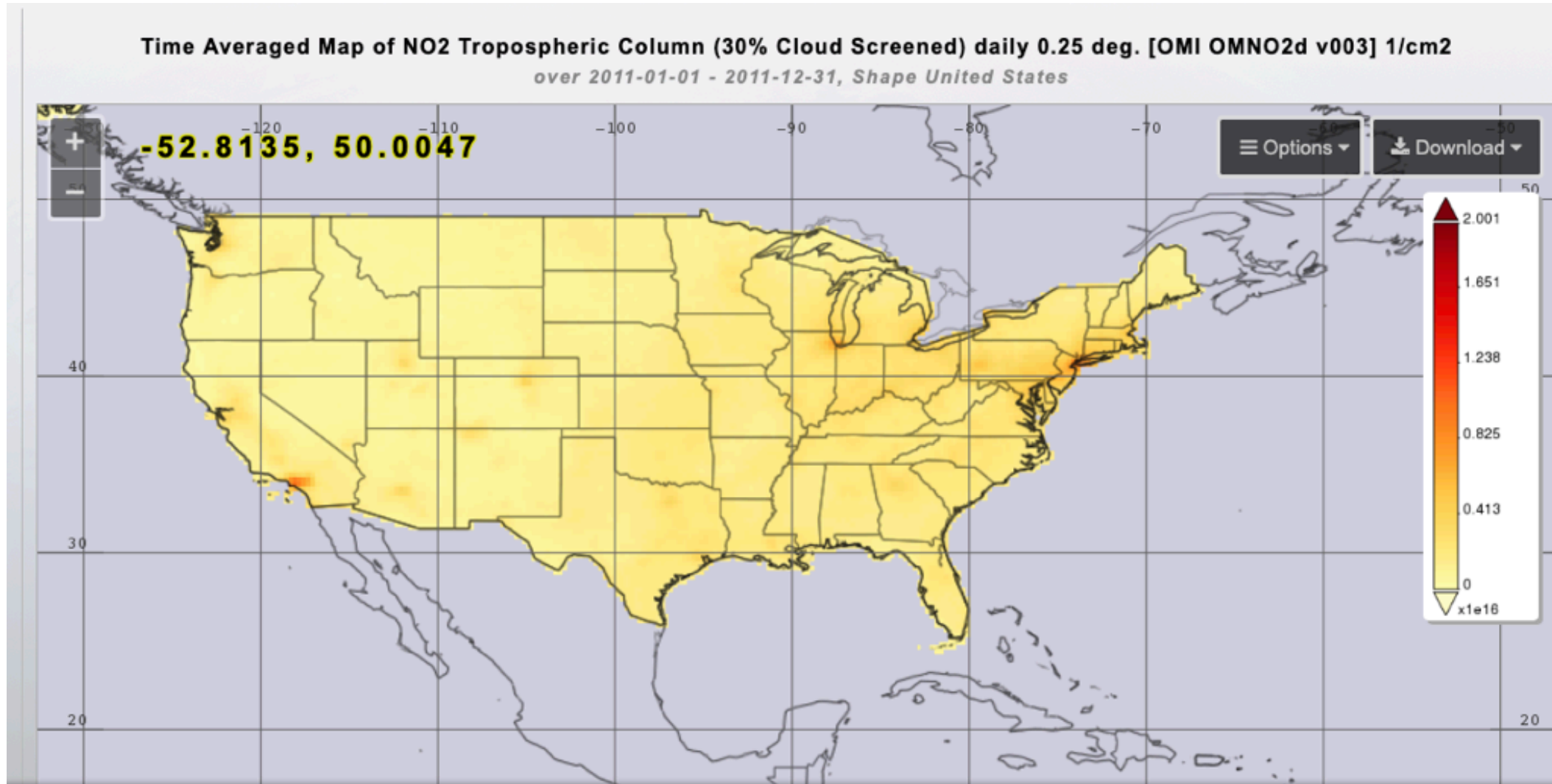
Number of matching Variables: 2 of 1440 Total Variable(s) included in Plot: 0
 Please select at least 1 variable
 Keyword: Search Clear

4b

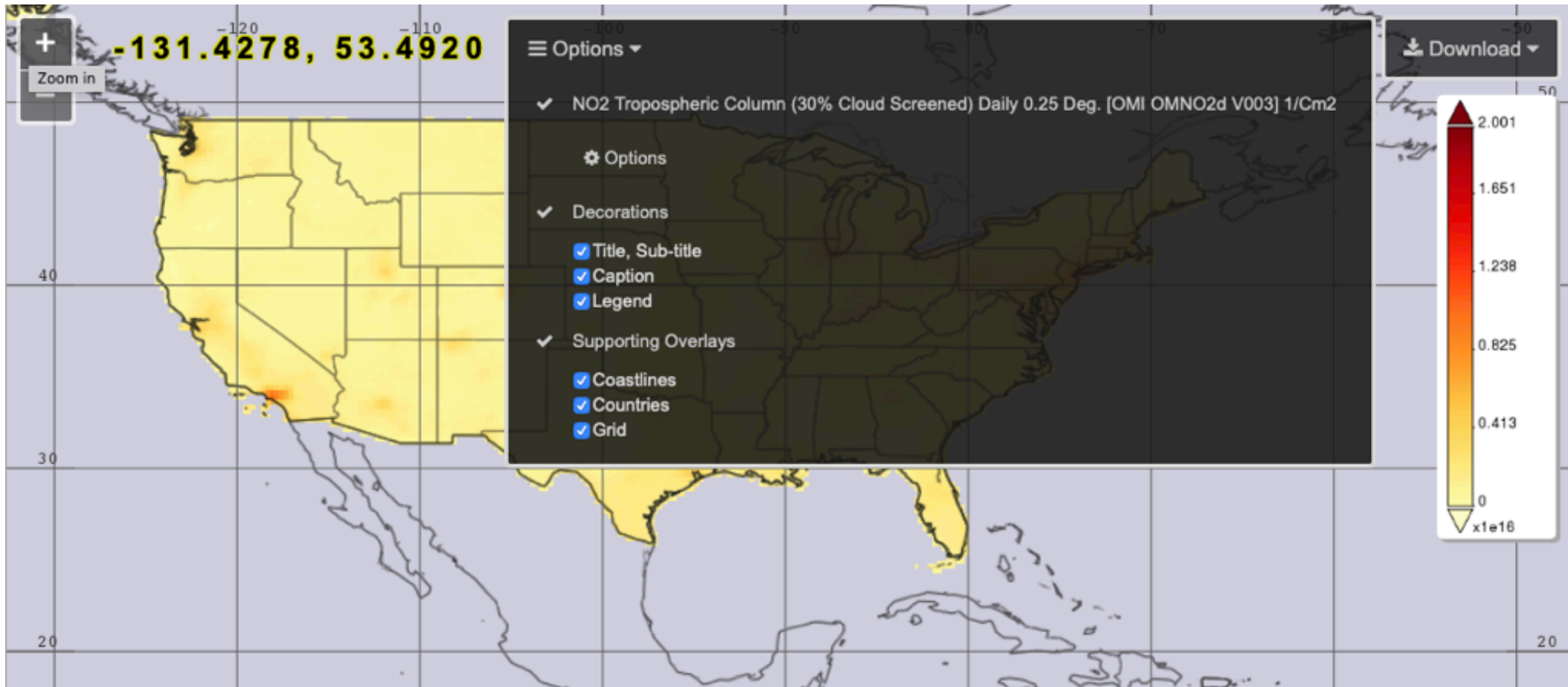
	Variable	Units	Source	Temp.Res.	Spat.Res.	Begin Date	End Date
<input type="checkbox"/>	NO2 Total Column (30% Cloud Screened) (OMNO2d v003)	1/cm2	OMI	Daily	0.25 °	2004-10-01	2020-02-17
<input type="checkbox"/>	NO2 Tropospheric Column (30% Cloud Screened) (OMNO2d v003)	1/cm2	OMI	Daily	0.25 °	2004-10-01	2020-02-17

5 Reset Plot Data Go to Results

Annual average OMI NO₂ tropospheric column



How to customize maps?



How to customize maps: More options

Map Options [X]

NO2 Tropospheric Column (30% Cloud Screened) daily 0.25 deg. [OMI OMNO2d v003] 1/cm2

Data Range

0 Minimum

2.00000005e+16 Maximum

Palette

☒ Yellow-Orange-Red (Seq), 65

Smoothing

☐ On ☒ Off






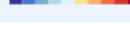


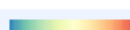

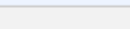
Projection

Equidistant Cylindrical

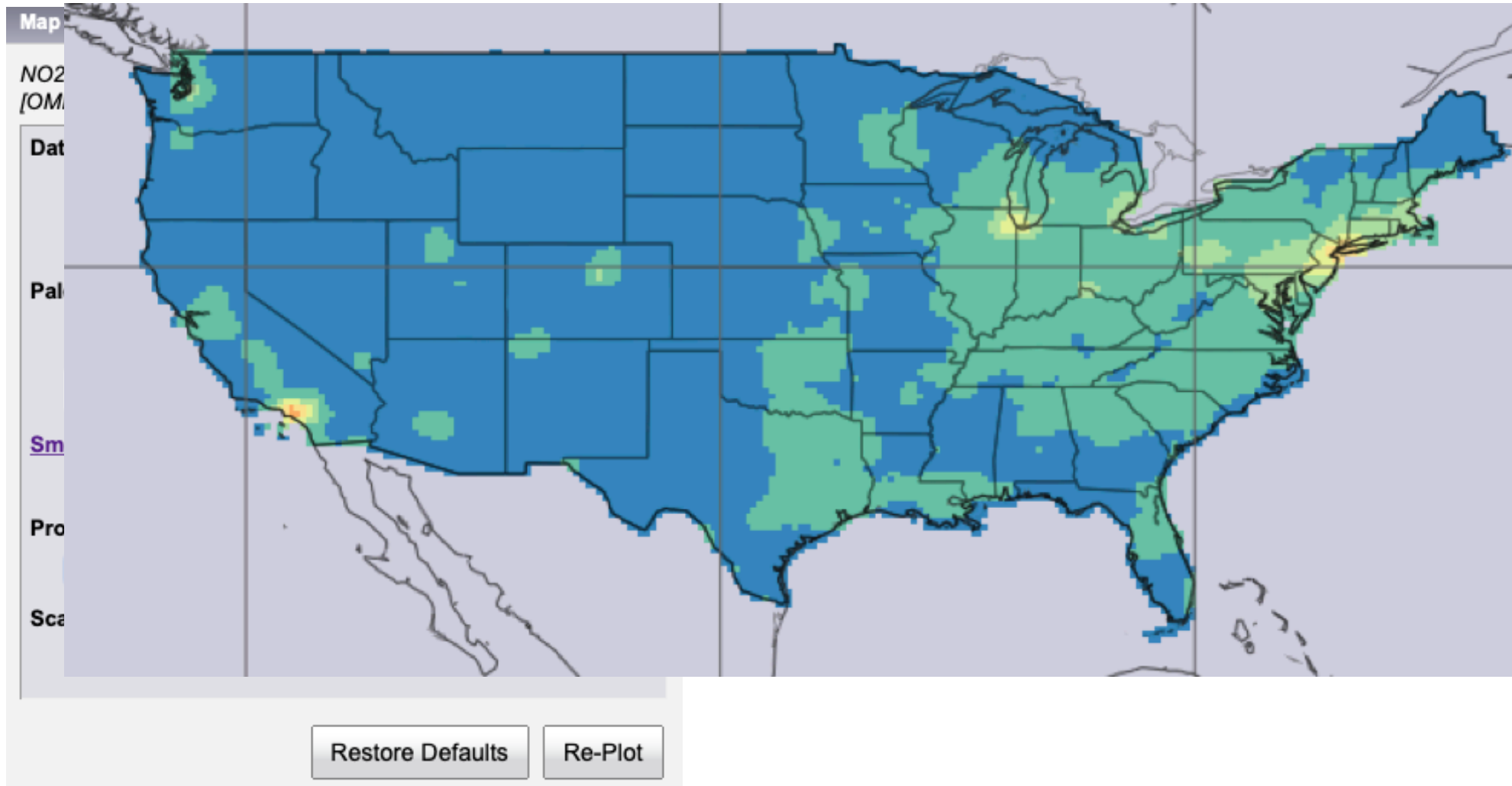
Scaling

☒ Linear ☐ Log

Palette Options [X]

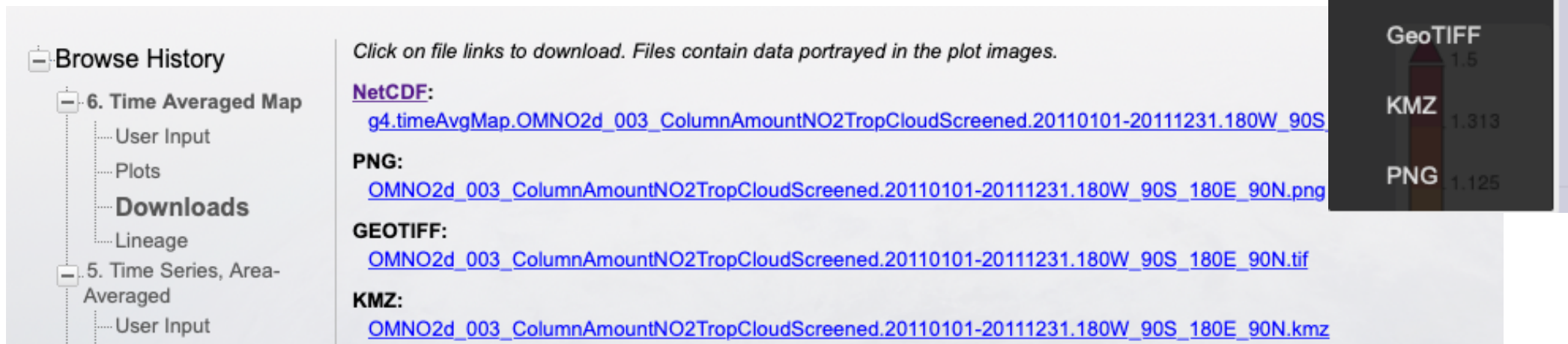
	Preview	Name
<input type="radio"/>		Air Quality Index (Cust), 8
<input type="radio"/>		Blue-Green-Yellow (Seq), 9
<input type="radio"/>		Blue-Pink (Seq), 65
<input type="radio"/>		Blue-Red (Div), 10
<input type="radio"/>		Blue-Red (Div), 11
<input type="radio"/>		Blue-Yellow-Red (Div), 10
<input type="radio"/>		Blue-Yellow-Red (Div), 11
<input type="radio"/>		Blue-Yellow-Red (Div), 12
<input type="radio"/>		Blue-Yellow-Red (Div), 12 (Source: Panoply)
<input type="radio"/>		Blue-Yellow-Red (Div), 65
<input type="radio"/>		Blues (Seq), 65

Customized map



Four options to save results

- NetCDF: for further analysis in other tools (e.g. Panoply, programming).
- PNG: Ready to present!
- GEOTIFF: tiff with geographic information (e.g. use in ArcGIS).
- KMZ: plot in Google Earth.



The screenshot displays the HAQAST web interface. On the left, a 'Browse History' sidebar shows a tree structure with '6. Time Averaged Map' selected, containing 'User Input', 'Plots', and 'Downloads'. The main content area has a heading 'Click on file links to download. Files contain data portrayed in the plot images.' Below this, four download options are listed: NetCDF, PNG, GEOTIFF, and KMZ, each with a corresponding file link. A 'Download' dropdown menu is open on the right, showing the file sizes for each format: GeoTIFF (1.5), KMZ (1.313), and PNG (1.125).

Browse History

- 6. Time Averaged Map
 - User Input
 - Plots
 - Downloads**
 - Lineage
- 5. Time Series, Area-Averaged
 - User Input

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

NetCDF:
[g4.timeAvgMap.OMNO2d_003_ColumnAmountNO2TropCloudScreened.20110101-20111231.180W_90S](#)

PNG:
[OMNO2d_003_ColumnAmountNO2TropCloudScreened.20110101-20111231.180W_90S_180E_90N.png](#)

GEOTIFF:
[OMNO2d_003_ColumnAmountNO2TropCloudScreened.20110101-20111231.180W_90S_180E_90N.tif](#)

KMZ:
[OMNO2d_003_ColumnAmountNO2TropCloudScreened.20110101-20111231.180W_90S_180E_90N.kmz](#)

Download

- GeoTIFF 1.5
- KMZ 1.313
- PNG 1.125

Working with time series

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GIOVANNI The Bridge Between Data and Science v 4.33

Find a DAAC - Feedback Help Log out (xjin0406)

Error State for Giovanni Seasonal Time-Series ... [1 of 3 messages] [Read More](#)

Select Plot

☐ Maps: Select...
 ☐ Comparisons: Select...
 ☐ Vertical: Select...
 1 ☒ Time Series: Area-Averaged *
 ☐ Miscellaneous: Select...

2 **Select Date Range (UTC)**

YYYY-MM-DD HH:mm
 2005 -01 -01 00 : 00 to 2017 -12 -31 23 : 59
 Valid Range: 2004-10-01 to 2020-02-17

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

Format: West, South, East, North
 121.1133,33.5742,-119.0039,35.8594

Select Variables

▼ **Observations**
☐ Observation (2)

▼ **Disciplines**
☒ Atmospheric Chemistry (2)

▼ **Measurements**
☐ Aerosol Index (2)
☐ Aerosol Optical Depth (7)
☐ Air Temperature (1)
☐ Angstrom Exponent (2)
☐ CH4 (8)
☐ CO (22)
☐ CO2 (2)
☐ Emissivity (1)
☐ HCHO (1)
☒ NO2 (2)
☐ Ozone (30)
☐ SO2 (4)
☐ Total Aerosol Optical Depth (2)

▶ **Platform / Instrument**
 ▶ **Spatial Resolutions**

Number of matching Variables: 2 of 1440 Total Variable(s) included in Plot: 1

Keyword: Search Clear

4b

Variable	Units	Source	Temp.Res.	Spat.Res.	Begin Date	End Date
<input checked="" type="checkbox"/> NO2 Tropospheric Column (30% Cloud Screened) (OMNO2d v003)	1/cm2	OMI	Daily	0.25 °	2004-10-01	2020-02-17
<input type="checkbox"/> NO2 Total Column (30% Cloud Screened) (OMNO2d v003)	1/cm2	OMI	Daily	0.25 °	2004-10-01	2020-02-17

4a

5

Reset Plot Data Go to Results

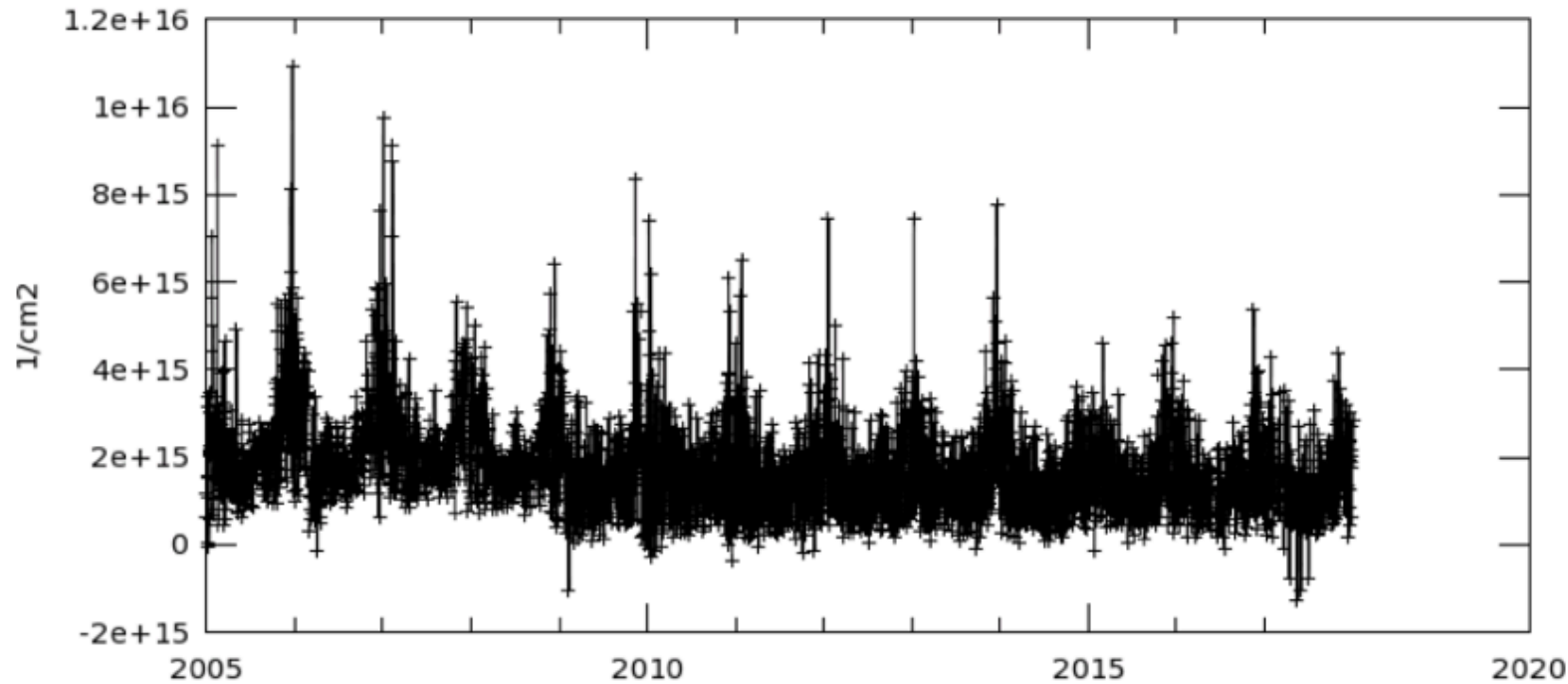
Responsible NASA Official: [Angela Li](#)
 Web Curator: [M. Hegde](#)

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NO₂ tropospheric column density over LA region

Time Series, Area-Averaged of NO₂ Tropospheric Column (30% Cloud Screened) daily 0.25 deg.
[OMI OMNO2d v003] 1/cm² over 2005-01-01 - 2017-12-31, Region 122.7832W, 32.7832N,
116.6309W, 36.2109N



- The user-selected region was defined by 122.7832W, 32.7832N, 116.6309W, 36.2109N. The data grid also limits the analyzable region to the following bounding points: 122.625W, 32.875N, 116.875W, 36.125N. This analyzable region indicates the spatial limits of the subsetting granules that went into making this visualization result.

Image

Options

Re-Plot Options

☒ Show title

☒ Show caption

Fit a trend line

Plot options

Time Series, Area-Averaged of NO2 Tropospheric Column (30% Cloud Screened) daily 0.25 deg. [OMI OMNO2d v003] 1/cm2 over 2005-01-01 - 2017-12-31, Region 122.7832W, 32.7832N, 116.6309W, 36.2109N

☒ Fit a line

Y Axis

Label

Area-Averaged of NO2 Tropospheric Column (30% Cl

Range

Min

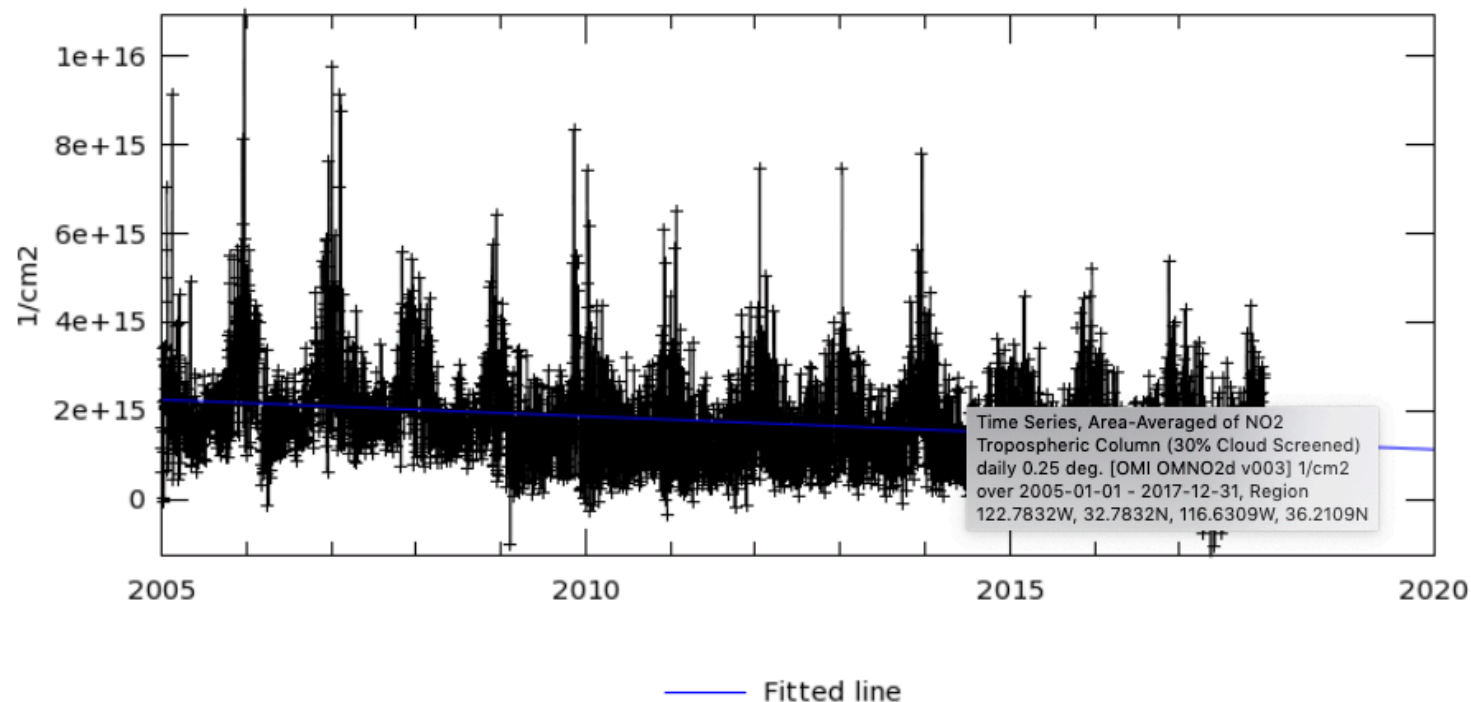
0

Max

1e+16

Re-Plot

Reset to defaults



Save figure and data

Browse History

7. Time Series, Area-Averaged

User Input

Plots

Downloads

Lineage

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

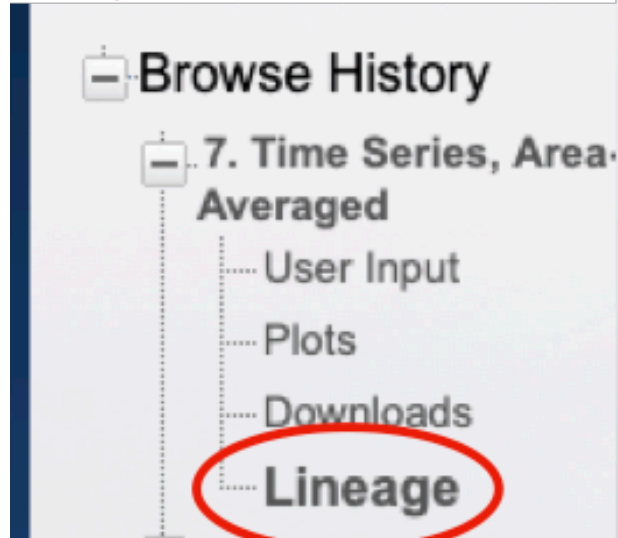
ASCII CSV:

[g4.areaAvgTimeSeries.OMNO2d_003_ColumnAmountNO2TropCloudScreened.20050101-20171231.122W_32N_116W_36N.csv](#)

PNG:

[g4.areaAvgTimeSeries.OMNO2d_003_ColumnAmountNO2TropCloudScreened.20050101-20171231.122W_32N_116W_36N.png](#)

How to download the original satellite data?

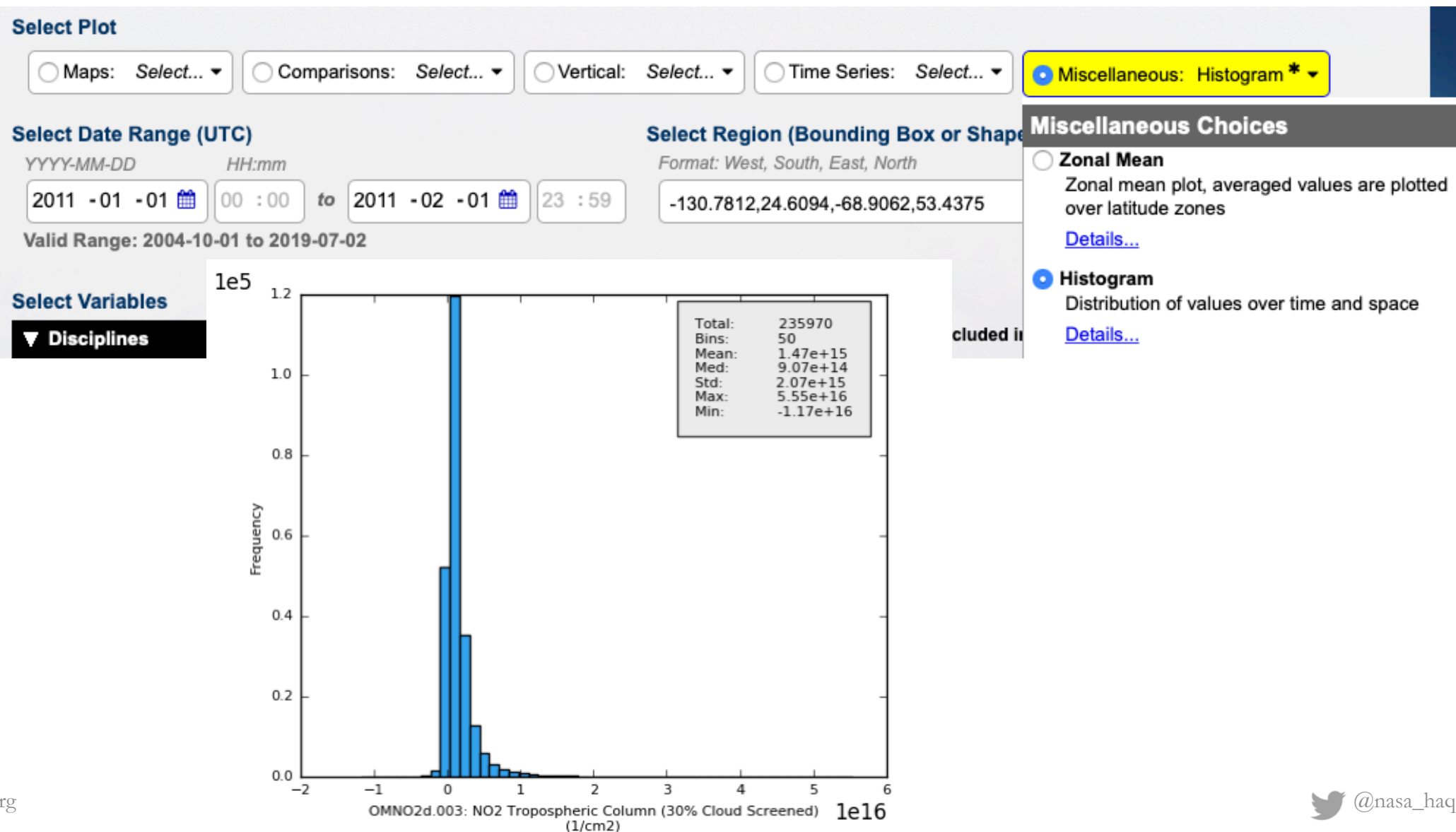


Data File Search (Time taken: 47.92 s)	
Output	
Data URL	http://acdisc.gesdisc.eosdis.nasa.gov/opendap/HDF-EOS5/ncml/Aura_OMI_Level3/OMNO2d.003/2005/OMI-Aura_L3-OMNO2d_2005m0101_v003-2018m0626t144023.he5.ncml.nc?ColumnAmountNO2TropCloudScreened[0:719][0:1439].lat[0:719].lon[0:1439]
Data URL	http://acdisc.gesdisc.eosdis.nasa.gov/opendap/HDF-EOS5/ncml/Aura_OMI_Level3/OMNO2d.003/2005/OMI-Aura_L3-OMNO2d_2005m0102_v003-2018m0626t143459.he5.ncml.nc?ColumnAmountNO2TropCloudScreened[0:719][0:1439].lat[0:719].lon[0:1439]
Data URL	http://acdisc.gesdisc.eosdis.nasa.gov/opendap/HDF-EOS5/ncml/Aura_OMI_Level3/OMNO2d.003/2005/OMI-Aura_L3-OMNO2d_2005m0103_v003-2018m0626t143501.he5.ncml.nc?ColumnAmountNO2TropCloudScreened[0:719][0:1439].lat[0:719].lon[0:1439]
Data URL	http://acdisc.gesdisc.eosdis.nasa.gov/opendap/HDF-EOS5/ncml/Aura_OMI_Level3/OMNO2d.003/2005/OMI-Aura_L3-OMNO2d_2005m0104_v003-2018m0626t143504.he5.ncml.nc?ColumnAmountNO2TropCloudScreened[0:719][0:1439].lat[0:719].lon[0:1439]
Data URL	http://acdisc.gesdisc.eosdis.nasa.gov/opendap/HDF-EOS5/ncml/Aura_OMI_Level3/OMNO2d.003/2005/OMI-Aura_L3-OMNO2d_2005m0105_v003-2018m0626t144014.he5.ncml.nc?ColumnAmountNO2TropCloudScreened[0:719][0:1439].lat[0:719].lon[0:1439]
Data URL	http://acdisc.gesdisc.eosdis.nasa.gov/opendap/HDF-EOS5/ncml/Aura_OMI_Level3/OMNO2d.003/2005/OMI-Aura_L3-OMNO2d_2005m0106_v003-2018m0626t143501.he5.ncml.nc?ColumnAmountNO2TropCloudScreened[0:719][0:1439].lat[0:719].lon[0:1439]
Data URL	http://acdisc.gesdisc.eosdis.nasa.gov/opendap/HDF-EOS5/ncml/Aura_OMI_Level3/OMNO2d.003/2005/OMI-Aura_L3-OMNO2d_2005m0107_v003-2018m0626t143458.he5.ncml.nc?ColumnAmountNO2TropCloudScreened[0:719][0:1439].lat[0:719].lon[0:1439]
Data URL	http://acdisc.gesdisc.eosdis.nasa.gov/opendap/HDF-EOS5/ncml/Aura_OMI_Level3/OMNO2d.003/2005/OMI-Aura_L3-OMNO2d_2005m0108_v003-2018m0626t143458.he5.ncml.nc?ColumnAmountNO2TropCloudScreened[0:719][0:1439].lat[0:719].lon[0:1439]
Data URL	http://acdisc.gesdisc.eosdis.nasa.gov/opendap/HDF-EOS5/ncml/Aura_OMI_Level3/OMNO2d.003/2005/OMI-Aura_L3-OMNO2d_2005m0109_v003-2018m0626t143458.he5.ncml.nc?ColumnAmountNO2TropCloudScreened[0:719][0:1439].lat[0:719].lon[0:1439]
Too many URLs to display. Download list of all URLs in step	
Data File Staging (Time taken: 4.45 s)	
Output	
Output file	scrubbed.OMNO2d_003_ColumnAmountNO2TropCloudScreened.20050101.nc
Output file	scrubbed.OMNO2d_003_ColumnAmountNO2TropCloudScreened.20050102.nc
Output file	scrubbed.OMNO2d_003_ColumnAmountNO2TropCloudScreened.20050103.nc
Output file	scrubbed.OMNO2d_003_ColumnAmountNO2TropCloudScreened.20050104.nc
Output file	scrubbed.OMNO2d_003_ColumnAmountNO2TropCloudScreened.20050105.nc
Output file	scrubbed.OMNO2d_003_ColumnAmountNO2TropCloudScreened.20050106.nc
Output file	scrubbed.OMNO2d_003_ColumnAmountNO2TropCloudScreened.20050107.nc
Output file	scrubbed.OMNO2d_003_ColumnAmountNO2TropCloudScreened.20050108.nc
Output file	scrubbed.OMNO2d_003_ColumnAmountNO2TropCloudScreened.20050109.nc
Output file	scrubbed.OMNO2d_003_ColumnAmountNO2TropCloudScreened.20050110.nc
Too many URLs to display. Download list of all URLs in step	

Bookmarking and data sharing

- You can bookmark the analysis by saving the URL of the Giovanni page. In the future you can always reload this analysis by copying and pasting the saved Giovanni URL into a browser.
- If you like the plot and want to share it with other people, you can also save the URL and they will be able to see your selections and figure.

Other figures: Histograms



Other figures: Zonal Mean

Select Plot

☐ Maps: *Select...*
☐ Comparisons: *Select...*
☐ Vertical: *Select...*
☐ Time Series: *Select...*
☒ Miscellaneous: Zonal Mean*

Select Date Range (UTC)

YYYY-MM-DD

HH:mm

2011 -01 -01

00 :00

to 2011 -02 -01

23 :59

Valid Range: 2004-10-01 to 2019-07-02

Select Region (Bounding Box or Shape)

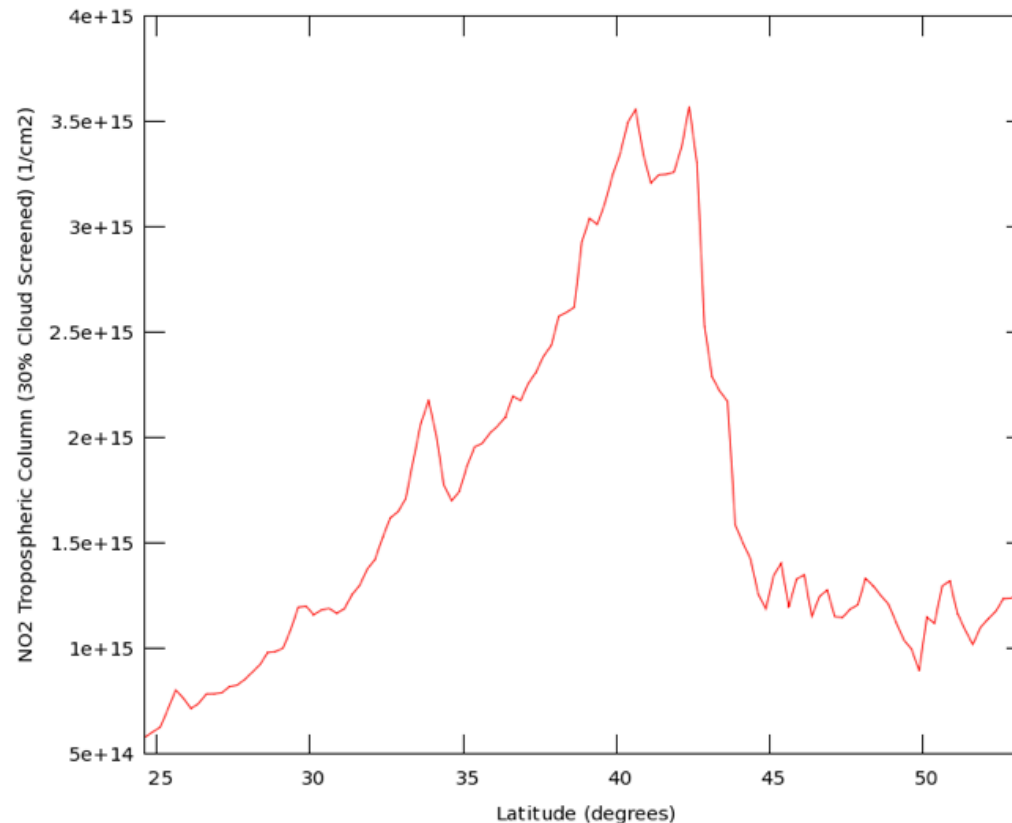
Format: West, South, East, North

-130.7812,24.6094,-68.9062,53.4375

Miscellaneous Choices

☒ Zonal Mean

Zonal mean plot, averaged values are plotted over latitude zones

[Details...](#)


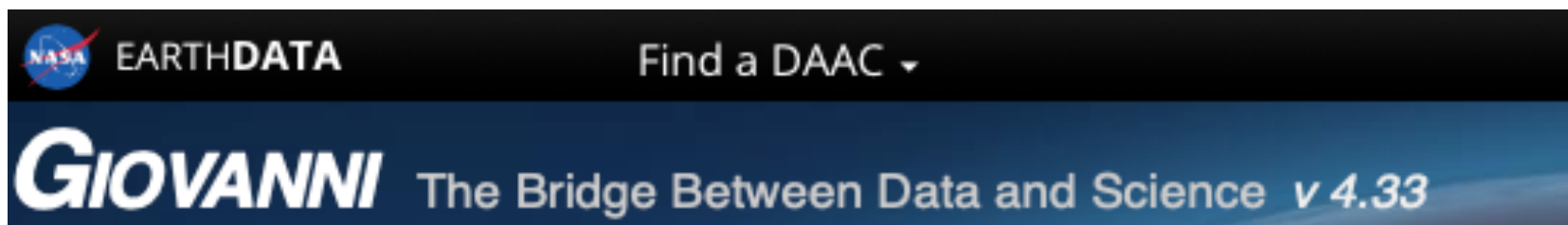


Practice:

Linking OMI tropospheric NO₂ column with ground-level NO₂

Link: https://atmoschem.ldeo.columbia.edu/wp-content/uploads/2020/02/mini_project_XJin_HAQAST2020_Webinar.pdf

- Part I: Visualize and analyze OMI tropospheric NO₂ data using Giovanni (<https://disc-beta.gsfc.nasa.gov/giovanni/>)



- Part II: Compare OMI NO₂ with EPA AQS ground-based measurements of NO₂ (<https://www.epa.gov/outdoor-air-quality-data>) using Excel.



Environmental Topics

Laws & Regulations

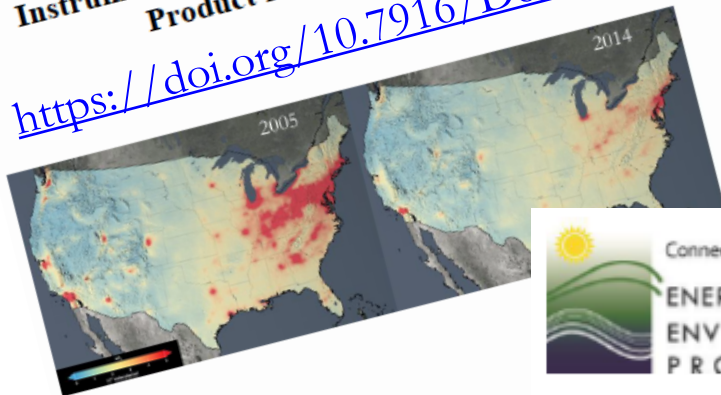
About EPA

Outdoor Air Quality Data

Technical Guidance Documents produced by a HAQAST Tiger Team

A Brief Tutorial on Using the Ozone Monitoring Instrument (OMI) Nitrogen Dioxide (NO_2) Data Product for SIPS Preparation

<https://doi.org/10.7916/D80K3S3W>



<https://doi.org/10.7916/D84B4HT6>

Guide to Using Satellite Images in Support of Exceptional Event Demonstrations

Lead Author: Bryan N. Duncan (NASA)
Contributing Authors: Michael Geigert (CT DEEP)



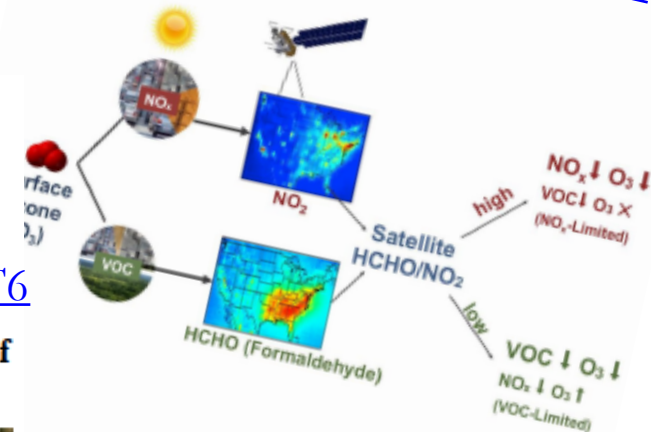
Michael Geigert

CTDEEP

March 2018

Using satellite observed formaldehyde (HCHO) and nitrogen dioxide (NO_2) as an indicator of ozone sensitivity in a SIP

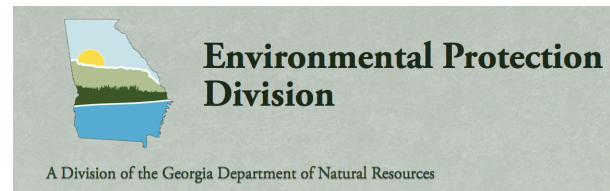
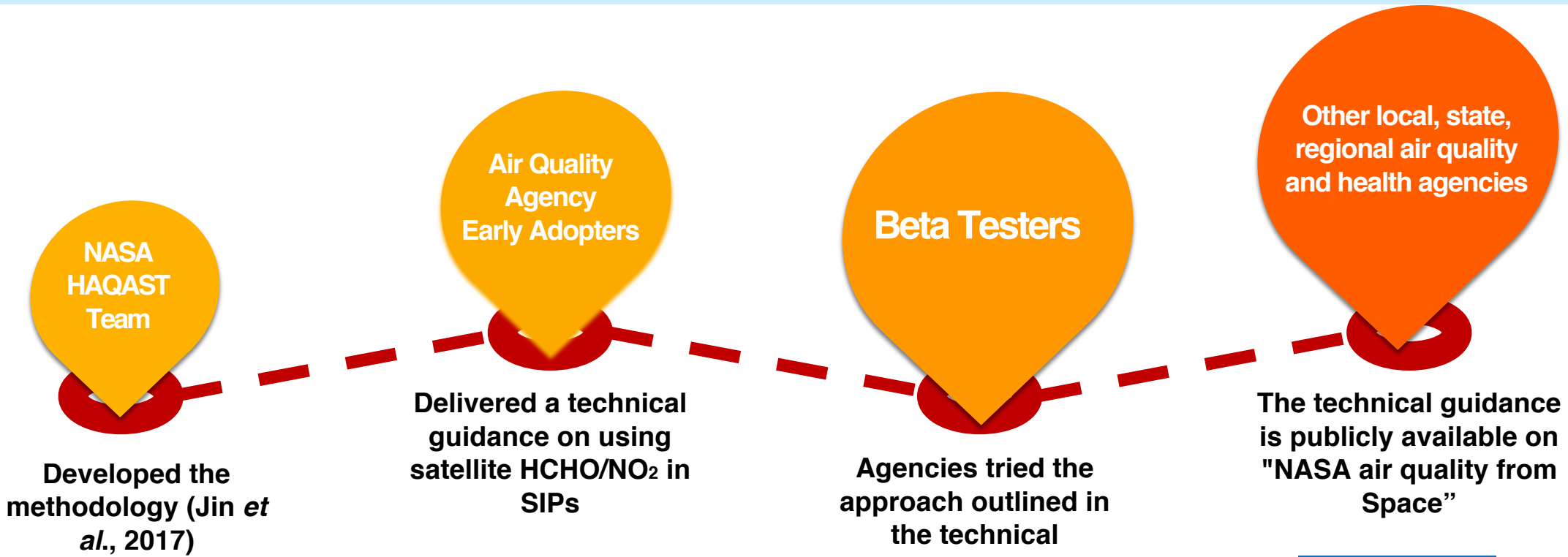
<https://doi.org/10.7916/D8M34C7V>



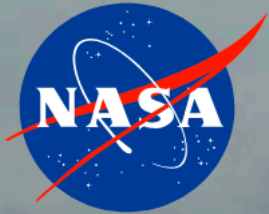
Xiaomeng Jin and Arlene Fiore (LDEO/Columbia)
Michael Geigert (CT DEEP)
Publication Date: June 12, 2018

Archived at Columbia U
Academic Commons
Repository

Technical Guidance Document: Using space-based HCHO/NO₂ as an indicator of O₃ sensitivity



Links to these documents are on NASA's air quality from space website <https://airquality.gsfc.nasa.gov/> -- visit "Managers" tab



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Observations from Space

Aura

EOS Project

OZONE HOLE WATCH

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Managers

State Implementation Plans

Publicly available NASA satellite data can help with State Implementation Plans (SIPs)

NASA's Earth science program maintains a large fleet of earth-observing satellites, all of which offer free data products. A number of these can be used to illustrate NO_x emissions trends and their relevance to ozone attainment, as well as for weight-of-evidence under the EPA's Exceptional Events Rule. A collaborative team of NASA-funded scientists and public stakeholders has recently developed a suite of easy-to-follow technical guidance documents to support state and local air quality agencies that want to bring the power of NASA's satellites to bear on the documentation of exceptional events. This work is a product of the NASA **Health and Air Quality Applied Sciences Team (HAQAST)** Year 1 (2017-2018) Tiger Team "Supporting the Use of Satellite Data in State Implementation Plans (SIPs)"

[Thanks to Bryan Duncan and his team for hosting these!](#)

@nasa_haqast

Additional documents coming online:



Technical Guidance Document

NASA Health and Air Quality Applied Sciences Team
2017–18 Tiger Team Project

Supporting the use of satellite data in State Implementation Plans

SHORT TUTORIAL*:

How do I create a timeseries of NO₂ tropospheric columns with Giovanni for my city?

Daniel Tong (GMU), Jennifer Wei (NASA) &
Suhung Shen (GMU)

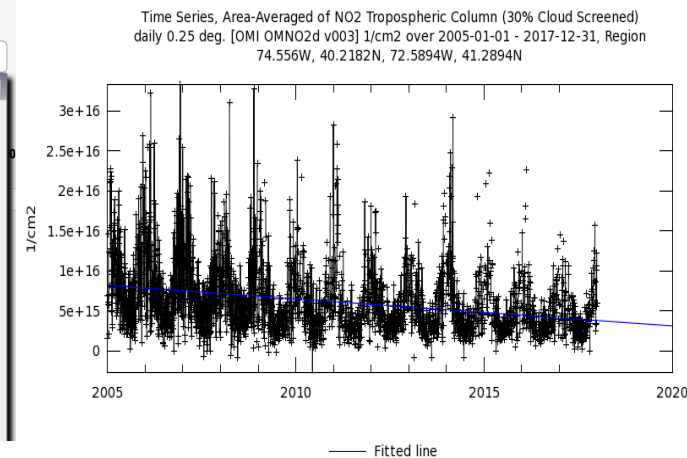
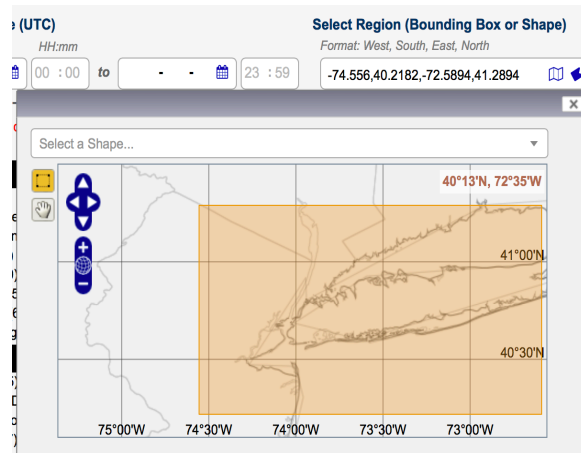
***includes other links to Giovanni resources**

Comparison of CMAQ Simulation to Satellite Observations: NO₂ Column versus OMI NO₂

<https://doi.org/10.7916/d8-cfw-5x30>

Prepared by:

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Georgia Institute of Technology
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Acknowledgments

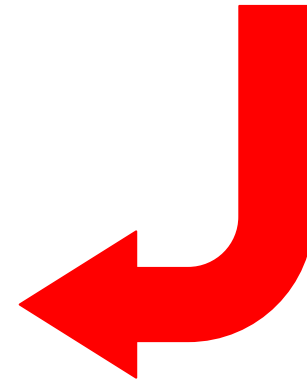
Analyses and visualizations used in this presentation were produced with the Giovanni online data system, developed and maintained by the NASA GES DISC



Questions?

Use the question function at the lower right of your screen

A screenshot of a web interface for asking questions. At the top, there is a tab labeled 'Q&A' with a dropdown arrow and a close button 'x'. Below the tab, the text 'All(0)' is displayed. The main area is a large empty box for questions. At the bottom, there is a text input field containing the text 'Hi--I have a question!'. Below the input field are two buttons: 'Send' and 'Send Privately'.



Be sure to check out our upcoming webinars. For all info, visit haqast.org/haqast2020

HAQAST2020

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