



The best educational tool for interdisciplinary earth science

Giovanni

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Goddard Earth Science Data and Information Services Center

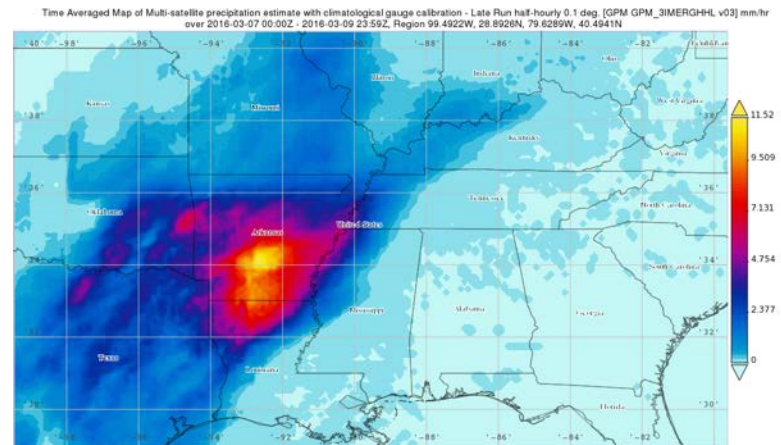
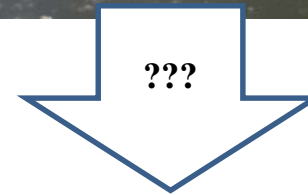
<https://giovanni.gsfc.nasa.gov/>



Why Earth Science data are so complicated?

There are many potential reasons:

- Scientific discovery
- Heterogeneous data formats
- Complex data structures
- Large volumes required for data storage
- Special programming requirements
- Diverse analytical software options



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



Reducing Barriers

- make it easy to find and access data
- user's preferences
 - ◆ select relevant data products
 - ◆ analyze these data with a variety of basic analysis
 - ◆ display options
- quickly and easily, with a “low-height” learning curve
- share and replicate basic operations before proceeding to independent inquiry ...

IMPOSSIBLE? NO!!!

Giovanni –

**Geospatial Interactive Online Visualization AND aNalysis
Infrastructure**

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What is Giovanni?

Giovanni is a scientific research tool.

Since the system first became available, over 1700 papers citing the use of Giovanni have been published in peer-reviewed science journals.

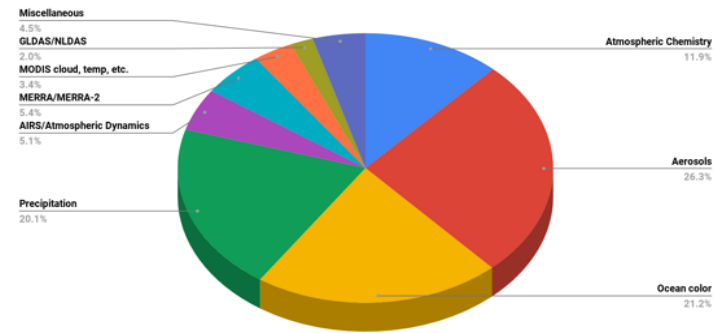
Giovanni is a scientific applications tool.

Professional scientists utilize Giovanni to investigate air quality, wind patterns for wind energy, weather–human health relationships, agricultural requirements, and hazardous algal blooms.

Giovanni is a science education tool.

Giovanni has been used by students in high school and college to investigate regional climate change, compare oceanic regions, and determine how much rain tropical storms contribute to annual precipitation in a selected region.

2016-2017 Publication using Giovanni





Only **FOUR** clicks are required to run Giovanni

Giovanni

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



Platform / Instrument

- AIRS (94)
- AMSR-E (14)
- Aquarius (2)
- FLDAS Model (375)
- GLDAS Model (191)
- GPM (20)
- GRACE (3)
- MERRA Model (79)
- MERRA-2 Model (142)
- MISR (2)
- MODIS-Aqua (77)
- MODIS-Terra (58)
- NCA-LDAS (42)
- NLDAS Model (267)
- NOBM Model (18)
- OCTS (6)
- OMI (37)
- SSMI (4)
- SeaWiFS (98)
- TOMS EP (4)
- TOMS Meteor-3 (2)
- TOMS Nimbus-7 (4)
- TRMM (14)

Spatial Resolutions

GIOVANNI The Bridge Between Data and Science v 4.19 [Release Notes](#) [Browser Compatibility](#) [Known Issues](#)

OMI is up and running normally... [1 of 4 messages] [Read More](#)

Select Plot

- Maps: Time Averaged Map
- Comparisons: Select...
- Time Series: Select...
- Vertical: Select...
- Miscellaneous: Select...

Select Date Range (UTC)

Start: [] [] [] [] [] [] to End: [] [] [] [] [] []

Select Region (Bounding Box or Shapefile)

[-180, -90, 180, 90] [Show Map](#) [Show Shapes](#)

Select Variables

Disciplines

- Aerosols (166)
- Atmospheric Chemistry (45)
- Atmospheric Dynamics (292)
- Cryosphere (13)
- Hydrology (854)
- Ocean Biology (12)
- Oceanography (15)
- Water and Energy Cycle (885)

Measurements

- Aerosol Index (3)
- Aerosol Optical Depth (26)
- Air Pressure (44)
- Air Temperature (60)
- Albedo (15)
- Altitude (4)
- Angstrom Exponent (16)

Number of matching Variables: 0 of 1404 Total Variable(s) included in Plot: 0

Keyword: [Search](#) [Clear](#)

Visualization Selection **Faceted Search**

Time Period Selection **Keyword Search**

Region-of-Interest Selection

[Help](#) [Reset](#) [Feedback](#) [Plot Data](#)

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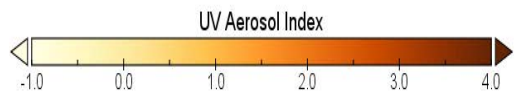
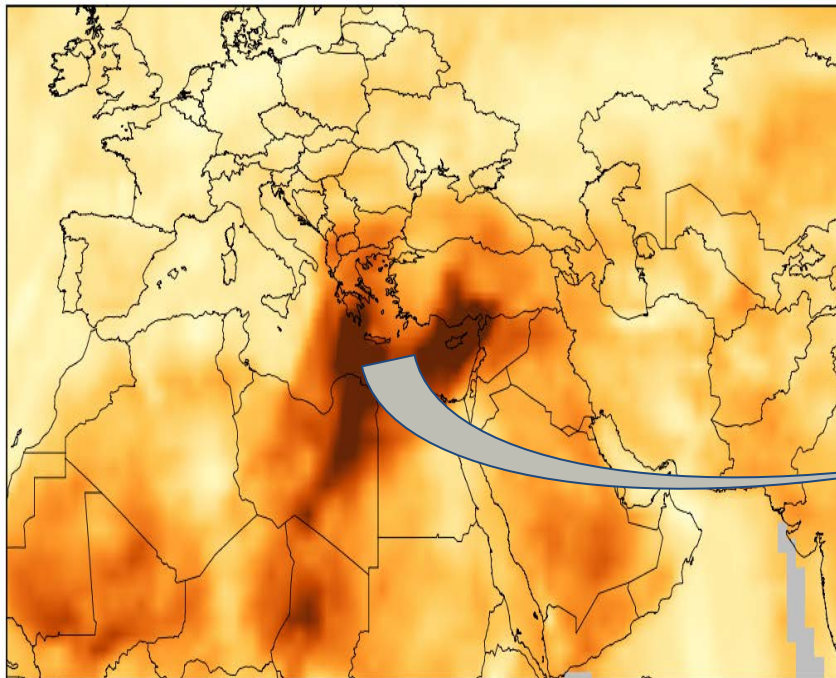
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Analyze a dust storm

- Select the UV Aerosol Index variable
- Select the time the storm took place, and where
- Select the Time-Averaged Map Option

OMPS-NPP_NMT03-L3-DAILY_v2.1 UV Aerosol Index
2018/03/22



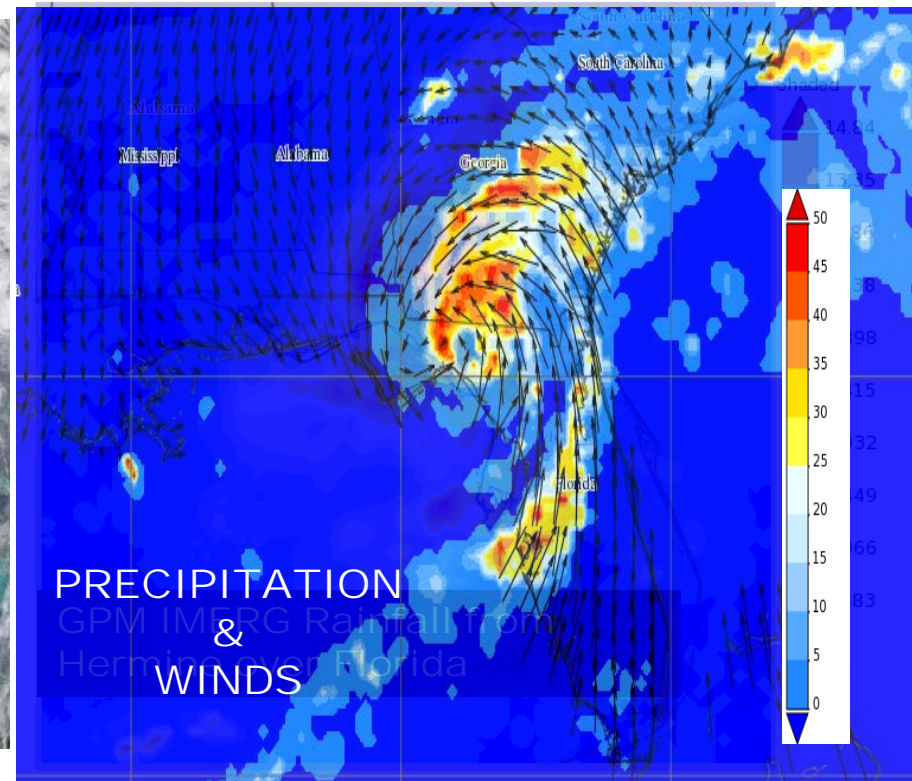
**Connect data
depicting an
interesting
event
to an event
in the news!**





Analyze a Hurricane

- Select rainfall and wind variables
- Select the time the hurricane came onshore, and where
- Select the overlay plot option

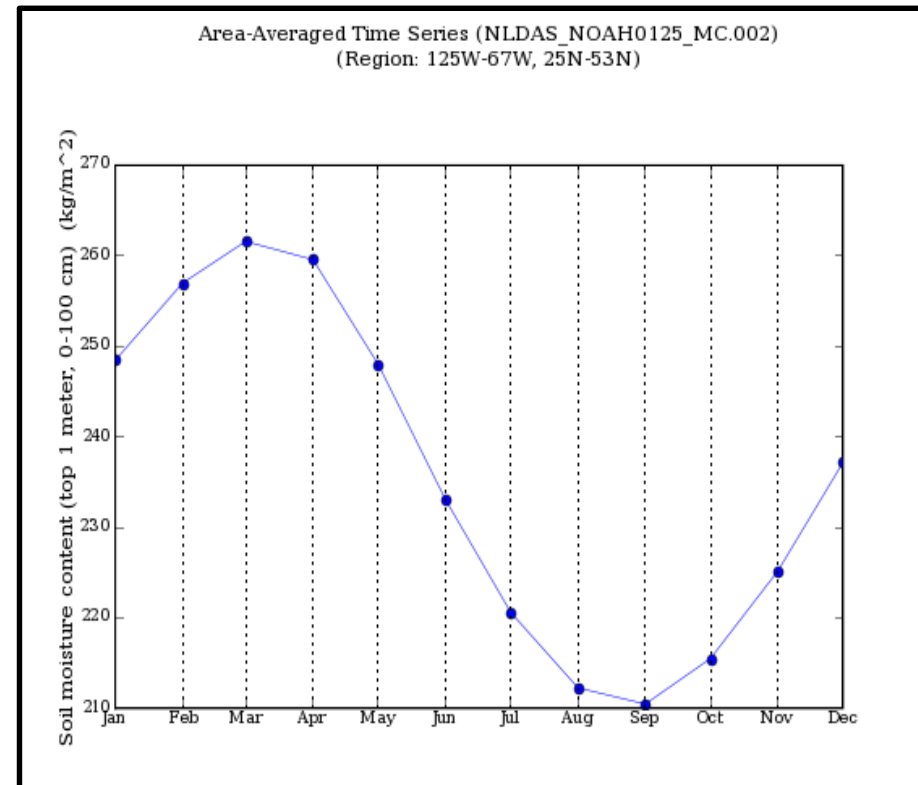
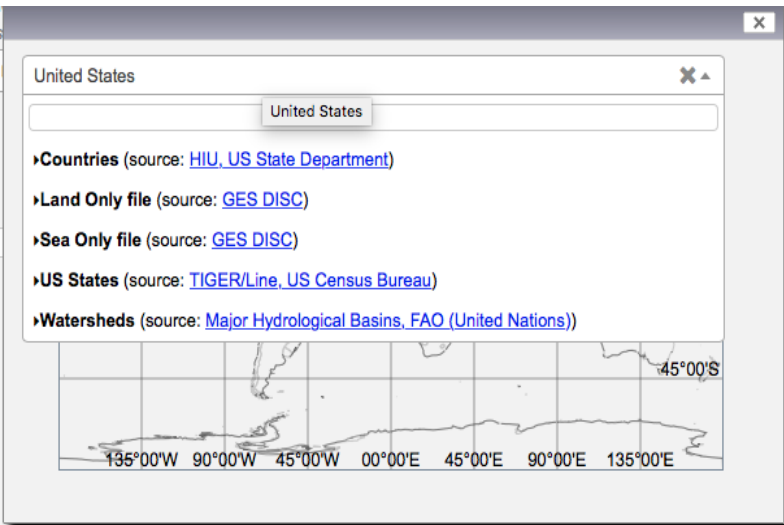


September 2nd, 2016



Analyze Seasonal Variability

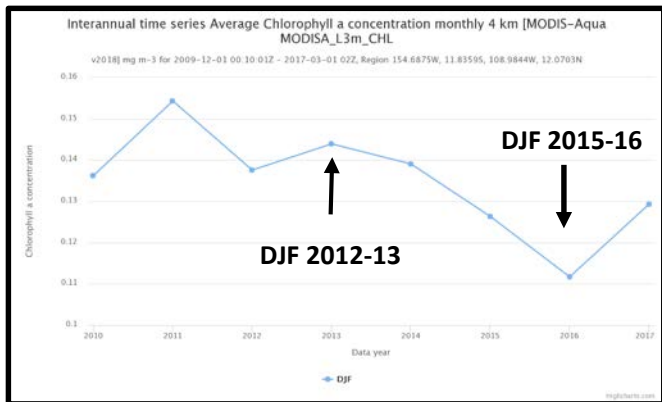
- Select a Soil Moisture variable
- Select a year, and the continental United States as the region
- Select the Time-Series, Area-Averaged Option



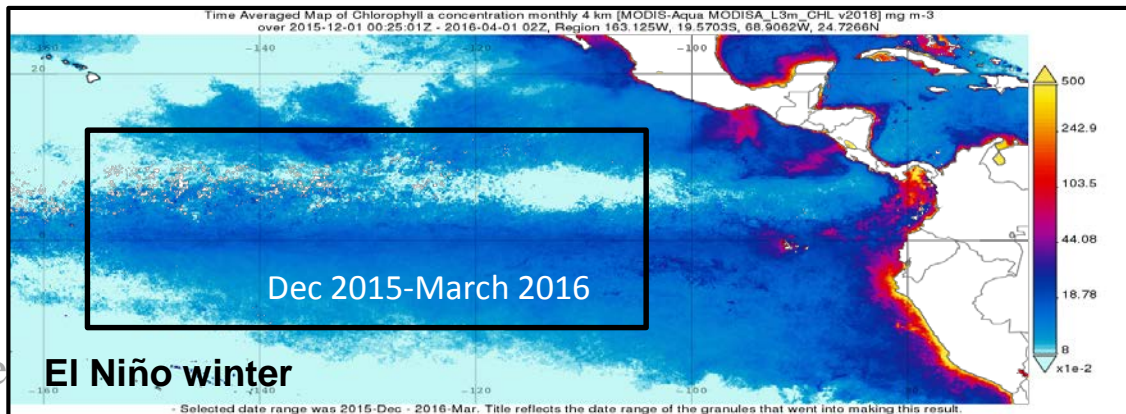
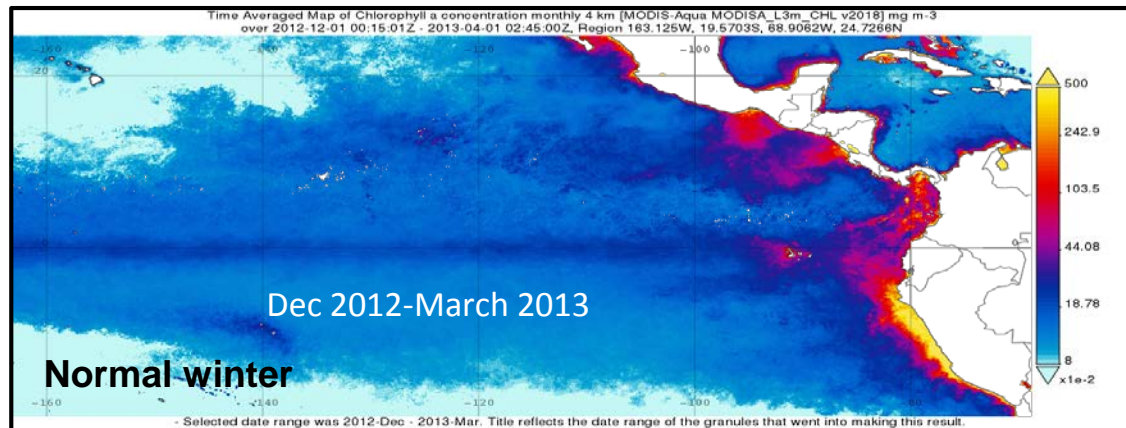


Analyze Inter-annual Variability

- Select the chlorophyll *a* variable
- Select the time periods Dec 2012-March 2013 (normal winter), and Dec 2015-March 2016 (“El Niño winter”)
- Select the central Pacific Ocean as the region
- Select the Time-Series, Area-Averaged Option
- Select the Seasonal Time Series Option, Dec-Jan-Feb, 2010-2017



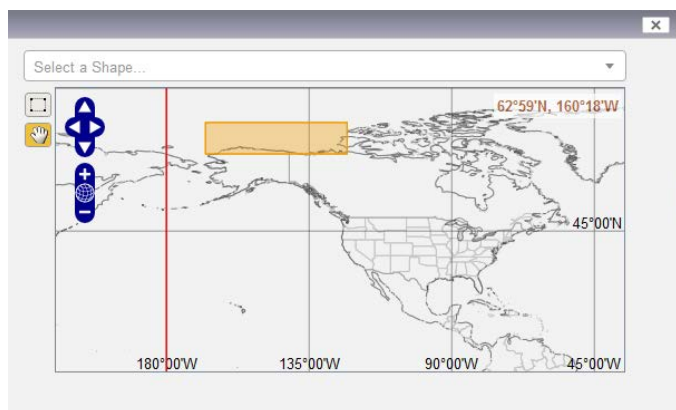
This Seasonal Time-Series displays the central Pacific chlorophyll *a* concentration for the months of December-January-February (DJF), beginning with DJF 2009-2010 and ending with DJF 2016-2017.



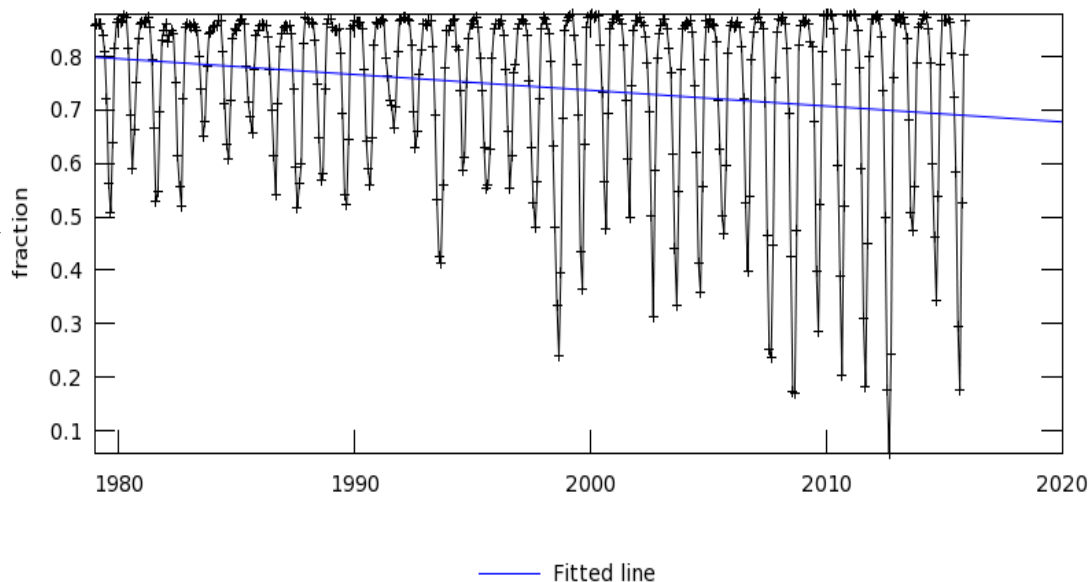


Analyze Climate-Change Related Trends

- Select the Fraction of Sea-Ice Monthly Variable
- Select the time period 1979-2015, and the Beaufort Sea region
- Select the Time-Series, Area-Averaged Option with optional trendline
- Share the URL: https://giovanni.gsfc.nasa.gov/giovanni/#service=ArAvTs&starttime=1979-01-01T00:00:00Z&endtime=2015-12-31T23:59:59Z&bbox=-167.7,69.3,-123,79.2&data=MATMNXFLX_5_2_0_FRSEAICE






Time Series, Area-Averaged of Fraction of sea-ice monthly 0.5 x 0.667 deg. [MERRA Model MATMNXFLX v5.2.0] fraction over 1979-Jan - 2015-Dec, Region 167.7W, 69.3N, 123W, 79.2N





GES DISC Resources Supporting

-  Video Tutorials
- How-To Guides
- News Articles
- Online Webinar Presentations
-  *The Giovanni News* Newsletters
-  Scientific and technical expertise available from Help Desk



Are there any questions?

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