A new release: Giovanni 3.0.8.1
“Part 1: The Fetcher”

The new release of Giovanni in late July featured a significant change in the software which acquires the data from the GES DISC data archive system and prepares it for analysis in Giovanni. This software is called the data *fetcher* (G3Fetcher – see the feature “What’s a Fetcher?” at right). The notes on the 3.0.8.1 release describe the capabilities of the new fetcher software, as well as changes to the Giovanni instances.

The re-engineered data fetcher has several new capabilities, including the following:

✓ handles more data formats
✓ fetches data via more data accessing methods
✓ is better modularized for easier debugging
✓ includes better plug-in capability for handling new data formats and data accessing methods

G3Fetcher

→ Giovanni-3 database search
→ Get data: capable of fetching data through the following data access methods:

- FTP
- OPeNDAP
- HTTP
- On-The-Fly (OTF, which calls the DISC subsetter)
- Web Coverage Service (WCS)

→ Current built-in data handler can handle these data formats:

- HDF4
- HDF5
- NetCDF
- Simple binary
- GRIB (through OPeNDAP or GrADS Data Server, GDS)

G3Data (data processing)

✓ Latitude orientation
✓ Dimension order
✓ 0-360° data handling
✓ Scaling
✓ Setting fill value
✓ Special/fake dimension handling (such as for TRMM)
✓ Irregular dimension handling
✓ Improved file name convention

Improved cache directory structure (added date as subdirectory) has also been implemented.

SeaWiFS Recovers from Safe Haven Events

The Sea Viewing Wide Field-of-view Sensor (SeaWiFS) has experienced several extended safe-haven events in 2009. Though the satellite, launched in August 1997, is working again, the loss of data has affected the availability of 8-day SeaWiFS data in the Giovanni ocean color interface. Addition of MODIS-Aqua 8-day to the Ocean Color Radiometry instance is on our list of long-term projects.

What’s a Fetcher?

Giovanni’s face is what users see with a Web browser; behind-the-scenes vital work is performed by the Giovanni “Fetcher” software. Fetcher allows Giovanni to handle data in many different formats, obtained from many different data providers.

When a Giovanni user requests a visualization,Fetcher searches Giovanni’s inventory to find files with the selected parameters. These files may be at the GES DISC, or on a remote server elsewhere in the world. Giovanni uses data transfer protocols (FTP, HTTP, OpeNDAP, etc.) to get the data, which is then stored on a GES DISC computer. This step can take time; parameters may be in a very large file, which is copied, and the requested parameters are extracted. Fetcher then performs more steps: file decompression (if necessary) and conversion to a common format (Giovanni uses HDF4). For conversions, Fetcher selects appropriate converter plug-in software. This design allows flexibility for adaptation to new file formats. Once the data is converted, it is ready for further Giovanni analysis.
A new release: Giovanni 3.0.8.1
“Part 2: The Instances”

1. New data sets have been added in Giovanni-TOVAS:
   - TRMM_3B42RT
   - TRMM_3B41RT
   - TRMM_3B40RT
   - TRMM_3B42_Daily
   - Willmott_Monthly

2. The parameter “CH$_4$ volume mixing ratio _ascending (CH4_VMR_eff_D)” has been fixed and added to the AIRS Level 3 Monthly and the AIRS Level 3 Daily Giovanni instances.

3. GOCART V006 products were added to the Aerosol Monthly and Aerosol Daily instances. GOCART data is now available through 12/31/2007 with this new version.

4. The NEESPI Daily Instance and the A-Train Instance have also been refined.

5. Next on the list is a new instance for data from the Tropospheric Emission Spectrometer (TES), an instrument on the Aura satellite. Look for TES in August/September.

Giovanni Provides Data Views of Sarychev Peak Eruption in the Kuril Islands

Image of Sarychev Peak eruption taken by astronauts on the International Space Station on June 12, 2009.

During June 2009, Sarychev Peak on Matua Island in the Kuril Islands (the chain of islands which extends southward from the Kamchatka Peninsula toward the islands of Japan) erupted several times, spectacularly and explosively. Ash clouds from this eruption were dispersed widely in the atmosphere over the Pacific Ocean, causing cancellations of many trans-Pacific airline flights bound for destinations in Korea, Japan, and China. Airlines use NASA data and volcanic activity reports to avoid encounters with ash clouds at altitude, which can endanger aircraft due to interference of ash with the operation of jet engines.

Data products in Giovanni provide images of the ash and sulfur dioxide (SO$_2$) emissions from the volcano in the atmosphere.

Guide to Color Palettes


Image of S$_2$O$_3$ column amount from OMI for June 13-18, 2009. This map was generated with the OMI L2G instance.

Image of MODIS Aerosol Optical Depth, June 13-18, 2009. White areas of missing data east and north of the plume (red area) may be due to band saturation.
Universidad Nacional of Costa Rica Hosts First Satellite Remote Sensing Training Workshop Conducted in Spanish

On July 20-22, Ana Prados, Giovanni Science Team member, and Amy Huff, Battelle, conducted a workshop on Satellite Remote Sensing at the Laboratorio de Analisis Ambiental, Universidad Nacional, San Jose, Costa Rica. One of the featured presentations was a live demo on the use of Giovanni, conducted by Ana Prados, followed by two guided hands-on exercises examining poor air quality in Central America due to biomass burning and transported African dust. The workshop was conducted in Spanish; training materials in Spanish will soon be posted at: Atmospheric Science Remote Sensing – Professional Outreach and Education (click on “Workshops”).

The workshop ended with participant presentations on an air quality event or a topic of their choosing. Student presentations (in Spanish) can be viewed at: http://www.servir.net/index.php?option=com_content&task=blogsection&id=0&Itemid=163&lang=es

This Web site, which posts air quality summaries two to three times per week, frequently makes use of Giovanni-generated images and analyses.

One of the most significant areas of interest was in Ozone Mapping Instrument (OMI) SO₂ Giovanni imagery and analysis tools for monitoring emissions from the numerous active volcanoes in Costa Rica. A sample image (right) can be seen below for emissions from Turrialba Volcano (left, showing summit gas/steam plume, courtesy Rob Nunn).

SO₂ can be harmful to ecosystems due to acid deposition, and it can also diminish crop yields. Fluoride associated with volcanic emissions can also enter surface and subsurface water and be deposited on forage resources for livestock; in volcanic areas this can result in chronic skeletal fluorosis. Tracking volcanic emissions with Giovanni can thus aid assessment of societal and agricultural impact in affected regions.

Thanks to Lawrence Friedl and NASA HQ for funding this activity and to Julianna Kuhn, UMBC summer intern at the GES DISC for assistance in the preparation of training materials.

Summer Sunburn – in August, in southern Greenland?

The plot at right of Total Ozone Mapping Spectrometer (TOMS) Local Noon Erythemal UV Irradiance during August 2003 shows that values of this data product in summery southern Greenland appeared to be similar to those along the U.S. Northeast Coast – which may seem somewhat surprising! This visualization was plotted with the “Ocean” color palette.
The Rain in Spain Falls Mainly... Less, in the Future, In the Winter?

Spanish scientists studying precipitation patterns and climate change in the Mediterranean region have predicted that winter rainfall in Spain will decrease significantly in the future. An article at PHYSORG.com discusses this ("Rainfall to decrease over Iberian Peninsula," http://www.physorg.com/news167552453.html), and the paper on which it is based is entitled “Stability of the seasonal distribution of precipitation in the Mediterranean region: Observations since 1950 and projections for the 21st century,” Geophysical Research Letters, 36, L10703, doi:10.1029/2009GL037956, by Juan I. López-Moreno and Sergio M. Vicente-Serrano of the Pyrenean Institute of Ecology (CSIC), and Luis Gimeno and Raquel Nieto, University of Vigo.

The researchers examined gridded climate data starting in 1950 and extending through 2006, and then examined nine different climate model projections for the period 2040-2070. The historical data indicated that, for the western part of the Mediterranean basin (of specific interest to residents of the Iberian Peninsula), rainfall decreased by 8% in March, but increased by 3% over April-May. The climate model results indicated that, while seasonal patterns of rainfall are not expected to change, the amount of rainfall during all seasonal periods, especially the winter rainy season, is expected to decline.

Giovanni does not at present currently provide a capability to perform time-series analysis for specific months or seasons (i.e., precipitation trends for March only, or for spring). This capability is considered highly useful and is in development for future Giovanni releases. So, to examine what the researchers discuss in the paper, plots of precipitation for the month of March in the years 1980, 1990, 2000, and 2009 were generated. The Giovanni customized palette option was used to plot the accumulated rainfall totals with the same color palette to enable comparison. The data set is the recently released Global Precipitation Climatology Project (GPCP) Version 2.1., http://disc2.nascom.nasa.gov/Giovanni/tovas/rain.GPCP.shtml.

This comparison demonstrates that March 1980 had considerably more rainfall than did March in 1990, 2000, 2009. The variability of precipitation in the latter three months demonstrates the necessity of long-term data sets to assess climate-related trends.