

The

June 2012



Giovanni News

GODDARD EARTH SCIENCES DATA & INFORMATION SERVICES CENTER (GES DISC)

Greg Leptoukh's Life and Legacy

**SeaWiFS Deep
Blue Aerosol
Data**

The First G4: Aerostat

EDITORS' NOTE

In this Issue

Greg Leptoukh: Looking Back at His Life, Looking Forward with Giovanni

Jamaica's Donovan Campbell in the 2011 Sensing our Planet Annual

The First G4: Aerostat

Another New Record Number of Giovanni Publications in 2011

SeaWiFS Deep Blue Aerosol Data in Giovanni

High Spatial Resolution Land Surface Data in Giovanni

**Announcement:
The Gregory L. Leptoukh
Giovanni Online Workshop**

Wait a minute – is it June already?

The past few months have been some of the most eventful in the history of the NASA Giovanni system. You will read here a tribute to Greg Leptoukh, who left us suddenly in early January. Greg could easily be called the “father” of Giovanni (his family referred to Giovanni as “their other son”), but in actuality he was the mind that guided and the hand that pushed and pulled us to constantly make Giovanni better.

And we believe we have. The first “Giovanni-4” portal, Aerostat, has been released, a portal that includes a mode of social media interaction for research. Journal publications using Giovanni are abounding. Educators are increasingly utilizing the system, and we are developing portals and content specifically for both teachers and students. Researchers are coming up with novel ways to use the data, as well as new data products that they would like to see in Giovanni. Success begets more success, and more challenges, in the Giovanni world.

With all this happening, we are organizing an online Giovanni workshop for this September, to show what has already been done with the system, and what could be done with the system. See the announcement in this newsletter, and please respond if you are interested. It will be a look back and a look forward for Giovanni. We encourage your participation. Greg would have wanted that.

Your Editors, Jim Acker and Wainie Youn



October 13, 1953 – January 12, 2012

Greg Leptoukh:

Looking Back at His Life, Looking Forward with Giovanni

A couple of weeks after Greg passed away, after the immediate grief and shock had passed, a memorial service was held at Goddard Space Flight Center in his honor. Many remarks were made there by many different people, regarding both his scientific and technical achievements, and his activities with family and friends. What emerged from those remarks was a description in vignettes of the life of a brilliant man dedicated to his work, to his family (wife, daughter, and son), and to living life to the fullest.

A much fuller summary of Greg's life and achievements can be found at the Web site, gleptoukh.net; only a few highlights are provided here. Greg was born and raised in Georgia – the Eurasian country, not the southern state – and received his degrees in theoretical physics and cosmic ray physics from Tbilisi State University and Moscow State University, respectively. He did research in physics both there and at North Carolina State University, and then worked for the National Environmental Satellite, Data, and Information Service before coming to the NASA Goddard Distributed Active Archive Center (DAAC) in 1997 to prepare for, and then manage, the data archive and distribution effort for the Sea-viewing Wide Field-of-view Sensor (SeaWiFS) mission. After successfully delivering these data to oceanographers around the world, he moved on to the higher volume MODIS mission and higher visibility position of the lead for the MODIS data support team. Soon after, he was named the Science Data Manager for the Goddard Earth Sciences Data and Information Services Center (GES DISC). It was in this position that the idea for Giovanni surfaced, and its first implementation accomplished. Supposedly, Giovanni was born out of a request from noted Goddard atmospheric scientist, Yoram Kaufman, for a system that he could use to analyze data without having to program.

Making Giovanni more capable and useful, and “getting the word out” on Giovanni so that it would be used as a tool by the scientific community, became one of Greg's main goals (though certainly not the only one). He was able to bring Giovanni as an element into multi-national projects, such as NEESPI and MAIRS. Giovanni was able to incorporate more and more data sets, so that data were included from the atmospheric, oceanic, and terrestrial realms, allowing interactive analyses not possible with individual data products. Greg observed the increasing number of Giovanni images on posters at meetings and the increasing number of publications in journals with pride, knowing that these were the clearest measures of scientific acceptance – while occasionally chafing that Giovanni was not always acknowledged as the source! And, because just delivering data and imagery to scientists was only part of what they needed, Greg became more involved with issues of data quality, history, and reliability.

Greg clearly viewed Giovanni as a scientific mission, equivalent to the mission of a satellite in space, because all of the elements of such missions must function effectively for the data from a satellite to be of scientific quality. This vision for Giovanni guided his own efforts and those of the many colleagues with whom he interacted. As we now have inherited his vision, it remains for us to continue the work he initiated and sustained, and, in so doing, continue to implement Greg's vision for Giovanni toward fruition, i.e., serving the scientific needs of the world with such a system: to make data easier to find and easier to use, in order to address and answer vital questions for science and society in an era of unprecedented changes and unique challenges.

Tribute



Jamaica's Donovan Campbell in the 2011 *Sensing Our Planet Annual*



Essex Valley, St. Elizabeth Parish, Jamaica, with the Santa Cruz mountains visible in the distance. Picture courtesy J. Karanjac.

When we started putting together our list of 2011 publications that had utilized Giovanni, one publication that appeared early in the year grabbed our attention. The paper, in the journal *Applied Geography*, was entitled “Dealing with drought: Small farmers and environmental hazards in southern St. Elizabeth, Jamaica.” The authors were Donovan Campbell of the University of the West Indies at Mona (UWI-Mona), David Barker (UWI-Mona), and Duncan McGregor (Royal Holloway University of London). Campbell had also collaborated on a paper published in 2010, by a group led by Douglas Gamble of the University of North Carolina – Wilmington and Scott Gamble of East Carolina University. These researchers were focusing on how local farmers were dealing with changing climate patterns on the island, particularly changes in the onset and length of seasonal dry periods and longer periods of below-average rainfall. The farmers used knowledge gained over years of experience to time the planting and watering of

crops, but even a modest disruption of the pattern can lead to crop losses, if it is not anticipated.

The research team used rainfall data from the Tropical Rainfall Measuring Mission (TRMM) in Giovanni to determine how much change had occurred in the climate patterns on the mountainous Caribbean island. The data indicated that drought events had become more frequent and more intense over the last twenty years, which exacerbates the difficulty of farming in St. Elizabeth Parish, as it lies in an area with weather patterns affected by the central mountain range, which reduces the amount of rainfall it receives compared to the rest of the island. Direct interviews with the farmers revealed that they were well aware that their parish experienced two dry seasons, one generally in July and one occurring over the winter months from December through March. Crops are selected and planted for the short spring and longer autumn growing seasons.

The article was particularly intriguing, because Campbell had been a graduate student at the time of its publication. The focus of the article on local agriculture on the tropical island led to a recommendation that this research effort should be the subject of an article in the annual *Sensing our Planet* publication, written for the NASA Earth Observing System Data and Information System (EOSDIS) and produced at the National Snow and Ice Data Center (NSIDC). The *Sensing our Planet* team accepted the recommendation, and the article appeared in the 2011 issue, entitled “Growing Jamaica.”

It pleased us that Giovanni was used by a graduate student to investigate and understand the difficulties of agriculture for small-scale farmers, as we had discussed this research with Donovan by email several times. In the course of those conversations, we also learned that Donovan is an avid football (soccer to us in the United States) player and fan. Donovan is now on the faculty of UWI-Mona, likely still kicking the ball around in his free time.

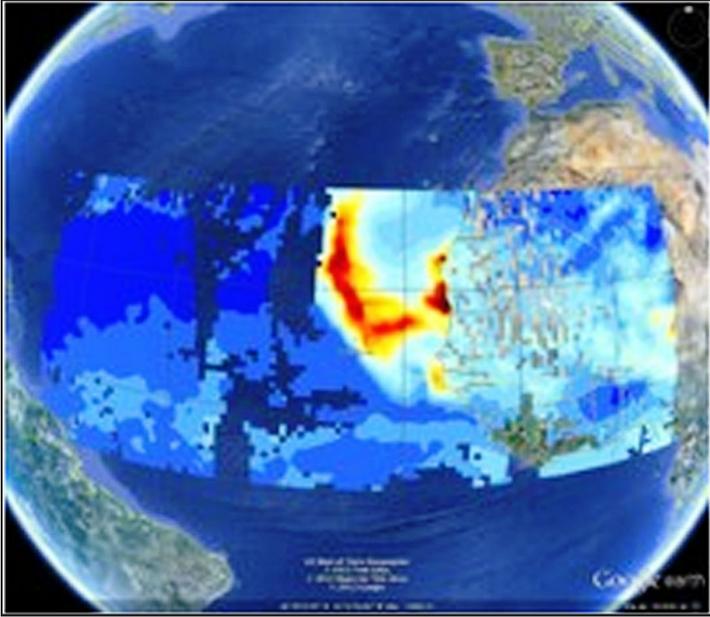
And from his Twitter account, he appears to be an Arsenal fan. (<https://twitter.com/#!/donovancampbel>)

<http://myspot.mona.uwi.edu/proffice/newsroom/entry/4312>



Donovan Campbell

Announcing AeroStat: Online Platform for Statistical Intercomparison of Aerosols



Merged AOD daily map of episodic dust event, March 3, 2003, viewed with Google Earth

AeroStat is also the first data portal for the next-generation Giovanni architecture

Despite the immense amount of atmospheric aerosol data available at various spatial and temporal scales, the largest uncertainty in predicting the course of Earth's future climate change is still primary and secondary aerosol climate feedbacks. **AeroStat** is an online environment for direct statistical intercomparison of global aerosol parameters in which data provenance and data quality can be readily accessed by scientists. **AeroStat** also provides a collaborative research environment for aerosol scientists where participants can share pertinent research workflow information (including cases of interest, algorithms, best practices, and known errors) within the community. This effort enables other users of the system to easily reproduce and independently verify the shared results, and allows for convenient tracking of scientific results back to their original input data, further ensuring the reliability of these results.

The Goddard Distributed Active Archive Center (GDAAC) recently released Version 1.2 of **AeroStat**, which enables (1) validation of multi-sensor aerosol products via "Time Series" and "Scatter Plot" analyses and (2) event monitoring by merging multi-sensor aerosol products to generate "Daily Maps." For validation, **AeroStat** uses data from MAPSS (the Multi-sensor Aerosol Products Sampling System) to provide spatio-temporal statistics for multiple spaceborne Level 2 aerosol products (from MODIS Terra, MODIS Aqua, MISR) sampled over AERONET ground stations. For event monitoring, **AeroStat** provides sequential satellite Level-3 gridded daily map data (individual or merged) derived from various Level 2 swath products. This Level 3 product is provided on a regular longitude-latitude grid with horizontal resolution of 0.5°, or about 54 km latitudinally.

With **AeroStat**, users can easily visualize and analyze statistical properties of atmospheric aerosol events, including data collected from multiple sensors and quality assurance (QA) properties of these data. **AeroStat** also provides a "Bias Adjustment" option to allow users to adjust the satellite data relative to an AERONET baseline.

Another New Record Number of Giovanni Publications in 2011



Well, Giovanni did it again. Or rather, scientists using Giovanni did it again. When the counting was finished, the number of peer-reviewed research journal publications in which Giovanni had been used appearing in the year 2011 had set a new annual record of 164. This grand total was augmented by the count for the final quarter, which occurred a bit later than usual due to the unexpected passing of Greg Leptoukh (see the lead article in this issue). Greg would have been very proud of the production by his technical prodigy. In fact, he had just noted that a publication written in 2007, to give authors an article to cite about Giovanni and which had appeared in the American Geophysical Union weekly newspaper *Eos* ("Online analysis enhances use of Earth science data"), had just achieved 100 citations itself.

The main reasons that Giovanni is being increasingly used around the world are that scientists can use Giovanni to explore and acquire data and images that are central to a research paper, or they can use the system to quickly create graphics and data analyses that augment a research study. The online tool has also been used to effectively and rapidly answer critical questions from peer reviewers, according to some of the authors that have described their use of the system.

Several publications caught our eyes, while doing the final 2011 tally, which are described below; the full list of references can be found in the GES DISC online news article "Final tally of Giovanni publications for 2011 yields unprecedented numbers."

Éric Valère Djagoua led a group of Ivory Coast researchers in a comparison study of upwelling off the coasts of the Ivory Coast and Ghana.

Yu-Te Hsieh, Gideon M. Henderson, Alexander L. Thomas of the University of Oxford examined thorium isotope concentrations in seawater to quantify the flux of dust to the ocean surface, which is an important process supplying vital trace metal nutrients.

Eric Nussbaumer and Rachel Pinker estimated global surface longwave radiative fluxes in research conducted at the University of Maryland – College Park.

Urbanski, Hao, and Nordgren from the Missoula Fire Sciences Laboratory of the United States Forest Service estimated emissions from wildland fires in the western United States.

SeaWiFS Deep Blue Aerosol Data in Giovanni

The NASA Goddard Earth Sciences Data and Information Services Center (GES DISC) announces a new Giovanni data portal (*SWDB daily*) for visualization of long-term daily Deep Blue aerosol products from the Sea-viewing Wide Field-Of View Sensor (SeaWiFS) mission. Global daily gridded products including aerosol optical thickness and Angstrom exponent over land and ocean are available at both 0.5 and 1-degree resolutions from 1997 through 2010. These data were produced by the “Consistent Long-Term Aerosol Data Records over Land and Ocean from SeaWiFS” project led by Dr. Christina Hsu, as part of the Making Earth Science data records for Use in Research for Earth Science (MEaSURES) program.

SeaWiFS was launched in late 1997 and provided exceptionally well-calibrated top-of-atmosphere radiance data until December 2010, more than 13 years. These data were partnered with an expanded Deep Blue algorithm and the new SeaWiFS Ocean Aerosol Retrieval (SOAR) algorithm. In accordance with Deep Blue’s original focus, the latest algorithm retrieves aerosol properties over not only bright desert surfaces, but also vegetated surfaces. The new SOAR algorithm completes the picture with retrievals over oceans and inland water bodies. With this combination of a long time series and global algorithms, researchers can finally identify the changing patterns of regional aerosol loading and provide insight into long-term variability and trends of aerosols on regional and global scales.

The SeaWiFS Deep Blue Giovanni portal for daily products can be found at:
http://gdata1.sci.gsfc.nasa.gov/daac-bin/G3/gui.cgi?instance_id=SWDB_daily

Following the release of Giovanni for *daily* SeaWiFS Deep Blue aerosol products, the NASA Goddard Earth Sciences Data and Information Services Center (GES DISC) announces the release of a new Giovanni portal for visualization and analysis of long-term *monthly* Deep Blue aerosol products from the Sea-viewing Wide Field-of-view Sensor (SeaWiFS) (*SWDB_monthly* ⇒ http://gdata1.sci.gsfc.nasa.gov/daac-bin/G3/gui.cgi?instance_id=SWDB_monthly).

Used around the world

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

to understand the world

High Spatial Resolution Land Surface Data in Giovanni

The Monsoon Asia Integrated Regional Study (MAIRS) project at the NASA Goddard Earth Sciences Data and Information Services Center (GES DISC) has integrated five global land products at 5.6km (0.05 Degree) resolution into the NASA Giovanni system, in support of the NASA Land Cover/Land Use Change program. The five data products, all Moderate Resolution Imaging Spectroradiometer (MODIS) standard products from the Land Processes Distributed Active Archive Center (LP DAAC), are the following:

MOD11C3.005: MODIS/Terra monthly land surface temperature, Collection 5

MOD13C2.005: MODIS/Terra monthly vegetation index, Collection 5

MOD11C2.005: MODIS/Terra 8-day land surface temperature, Collection 5

MOD13C1.005: MODIS/Terra 16-day vegetation index, Collection 5

MCD43C3.005: MODIS/Terra+Aqua 16-day Albedo, Collection 5

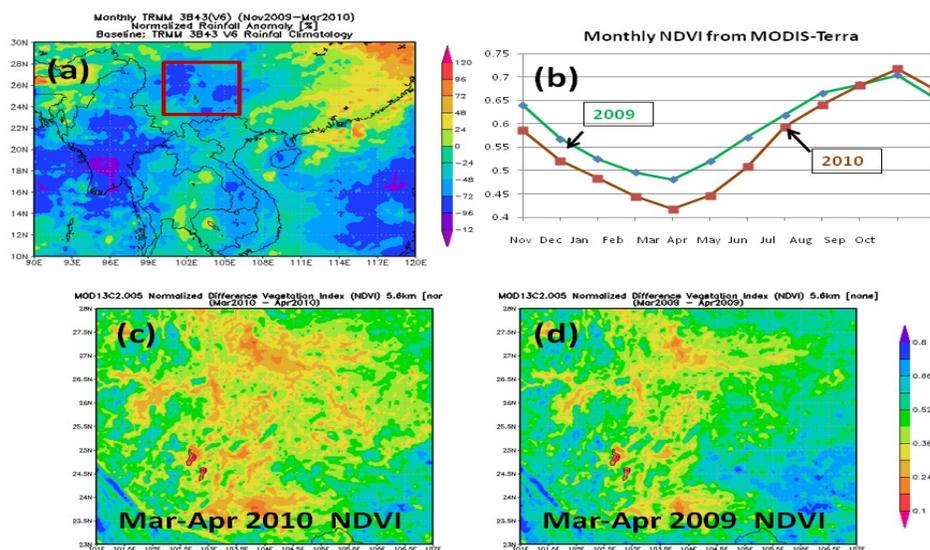
Giovanni portal for the monthly data:
Monsoon Asia Integrated Regional Study (MAIRS)
Monthly Products (5km or higher resolution)

Giovanni portal for 8-day and 16-day data:
Monsoon Asia Integrated Regional Study (MAIRS)
8-day and 16-day Products

These new products, combined with other land and atmospheric data sets in the Giovanni database, enable researchers to explore and quickly analyze regional surface conditions associated with climate variability. Such exploration can potentially lead to insights and strategies useful for agricultural applications, such as monitoring.

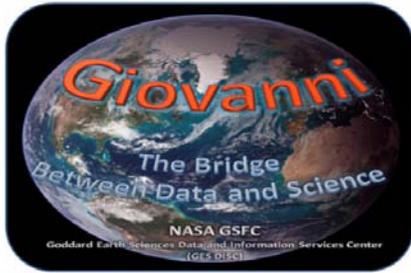
Drought over Southern Asia in Spring 2010

Precipitation was considerably below normal from winter 2009 through early spring 2010 over southern regions of Asia, as captured by the Tropical Rainfall Measuring Mission (panel (a) in the figure shown below). Accumulated precipitation was more than 70% below normal in some regions, which caused severe water shortage problems. MODIS observed that vegetation growth was weaker during the springtime of 2010 over the drought regions. Panel (b) in the figure shows a time series of area mean Normalized Difference Vegetation Index (NDVI) from MODIS-Terra over the boxed area in panel (a), indicating that vegetation greenness in spring 2010 was about 12% lower than that in spring 2009. Spatial patterns of vegetation health in the boxed region in panel (a) are shown in panels (c) and (d), using the 5.6km resolution NDVI data. Compared to the same months in 2009, this region was significantly less green in March and April of 2010.



(a) Normalized precipitation anomaly observed from TRMM over southern Asia for the period November 2009 - March 2010. (b) Monthly mean time-series of MODIS NDVI averaged for the boxed area in panel (a) for 2010 (red line) and 2009 (green line). (c) MODIS NDVI images at 5.6km resolution for the boxed region in panel (a) in springtime (March and April) 2010. (d) MODIS NDVI images at 5.6km resolution for the boxed region in panel (a) in springtime (March and April) 2009.

2012
Gregory G. Leptoukh



Online Giovanni Workshop

In September 2012, the NASA Goddard Earth Sciences Data and Information Services Center (GES DISC) will host an online workshop focused on the use of the pioneering data visualization and analysis tool, Giovanni.



The online workshop will be organized around four main themes:

- Earth system research utilizing Giovanni
- Giovanni applications (air quality, disaster management, environmental monitoring, etc.)
- Planned and desired augmentation of Giovanni
- Educational use of Giovanni

This workshop will primarily consist of online author-led presentations coupled with real-time discussions (chats) about these presentations. Presentations and chat logs will be available online for review and especially for participants who will not be able to participate in the live online sessions.

Several researchers have already indicated the topics that they would like to present, which include: air quality research in India, Greece, and eastern Russia; dust and tropical storm interaction; ocean chemistry and clouds; phytoplankton functional groups; comparison of precipitation products; and enhancements to Giovanni for science education.

The workshop will take place over three days in September 2012, with exact dates still to be determined. Sessions will take place during daylight hours in the Americas. We expect, however, to have an early-morning (7-10 AM in the Eastern USA time zone) session during which persons living in UTC 0 to +5 time zones (Europe, Africa, and western Asia) could participate, and an evening session (6-9 PM in the Eastern USA time zone) during which persons living in UTC +6 to +11 (eastern Asia and Australia) time zones could participate.

- ▶ Despite the demonstrated increasing use of Giovanni by the scientific community, we believe it is still not being utilized to its fullest potential. Many more researchers could benefit from the data available in Giovanni if they knew more about it. One goal of this workshop is thus to make a larger segment of the scientific community aware that Giovanni is ready and available to be used for their research needs.

The workshop is named in honor of Dr. Gregory Leptoukh, guiding hand and guiding mind of Giovanni, who passed away suddenly on January 12, 2012.

For the purpose of planning and scheduling, please indicate your interest with an email message sent to Dr. James G. Acker (james.g.acker@nasa.gov).