Editor’s Note

Greetings! This issue of The Giovanni News is our annual AGU Fall Meeting issue. And there’s something different about it – the meeting, not the issue! The meeting is in New Orleans this year, rather than San Francisco. In this issue, as we’ve done previously, we have all of the talks and presentations given by our GES DISC authors. The abstracts for the presentations related to Giovanni are provided for your perusal. The titles of talks are in green, so pay attention to the times! Note that two of our authors are doing eLightning presentations, a three-minute talk followed by an electronic poster session using a touchscreen monitor.

That’s not all – we have Release Notes for Versions 4.24 and 4.25 of Giovanni (look for our polar projection example, too), a Paper of Interest from recent months, and a slogan inspired by … well, you’ll probably figure it out.

Laissez les bons temps rouler!

Jim Acker
The Giovanni News Editor

Paper of Interest


The Moderate Resolution Imaging Spectroradiometer (MODIS) observed chlorophyll a concentrations (chl a) significantly higher than normal in the central Red Sea in June 2015. In this study, the authors sought to determine the cause of this anomalous phytoplankton bloom. Many different variables (chl a, sea surface temperature (SST) and height (SSH), mixed layer depth (MLD), ocean current velocity and aerosol optical depth (AOD)) were examined. The authors concluded that there was not a single factor that dominated as a cause of this bloom; rather, a combination of factors affecting nutrient availability, both in the water and in the atmosphere, were involved. One factor that likely did not contribute was a coastal dust event occurring in late June, because lag analysis showed about a two-month lag between dust outbreaks and increased chl a.
Release Notes, Giovanni Version 4.24 and 4.25

4.24 Release Notes
Release Date: 2017-10-31

New Features

- Polar projection: This release includes support for North Polar and South Polar projections in map plots. The polar projection options are accessed via the Layers box which is available when the initial plot is displayed. To obtain a full 360° polar plot, use -180 for the West longitude, and 180 for the East longitude. See the ‘Projections’ sub-section in the ‘Plotting Data and Replotting Options’ section of the User Manual for an illustrated description of the polar projection option.

- Earthdata Login: NASA recently changed their policy with regard to data access. Giovanni therefore now requires users to login before data can be downloaded. Plots can still be generated and downloaded without logging in, but you will notice you won’t be able to download data. The Earthdata Login button appears in the top right of the Giovanni web page. If you are logging into Earthdata for the first time, the Web pages linked below will help you obtain Earthdata login credentials:
  - https://wiki.earthdata.nasa.gov/display/EL/How+To+Register+With+Earthdata+Login
  - https://disc.gsfc.nasa.gov/earthdata-login

- The User-Defined Climatology / Quasi-Climatology map has been renamed to Monthly and Seasonal Averages

New Data Variables

MOPITT (Measurement of Pollution in the Troposphere)
MOP03TM v007 (6 variables)
MOP03JM v007 (3 variables)
Release Notes, Giovanni Version 4.24 and 4.25

4.25 Release Notes
Release Date: 2017-12-20

New Features

➢ For maps, clicking on GeoTIFF under the Download icon will provide a data file to download, rather than an image. This file can be displayed by various image viewers.

➢ Giovanni now reads in global attributes of granular start and end time through OpenSearch. This means that granules which do not have a time dimension or as a variable in the files can be added to Giovanni, as long as the time information is embedded in the global attributes.

Bug Fixes

➢ Fixed several bugs related to maps visualizations, causing failures and delays.

➢ The titles in the User-Defined Climatology (labeled ‘Monthly and Seasonal Averages’) maps and Seasonal Time-Series plots have been modified to more accurately describe the plot. For example, “Precipitation Rate monthly 0.25 deg. [TRMM TRMM_3B43 v7] mm/hr over 2009-Dec - 2014-Feb, Region 180W, 50S, 180E, 50N” is now labeled as “Average Precipitation Rate monthly 0.25 deg. [TRMM TRMM_3B43 v7] mm/hr for DJF months 2009-Dec - 2014-Feb, Region 180W, 50S, 180E, 50N”.

➢ Vector support has been re-enabled for Time Averaged and Overlay Maps. Variables that can be displayed as vectors (such as wind velocity) can be mapped. Variables expressed as vectors can be found by typing “vector” in the Keyword Search field.

➢ The units column is now shown immediately to the right of the variable name. This will make it more convenient for the users to compare units between variables.

New Data Variables
AMSR2/GCOM-W1 surface soil moisture (LPRM) L3 1 day 10 km x 10 km descending V001 (4 variables)
A11A-1867: AIRS-only Product on Giovanni for Exploring Up-to-date AIRS Observation and Comparing with AIRS+AMSU Product, 08:00 - 12:20, Poster Hall D-F

The NASA Goddard Earth Sciences Data and Information Services Center (GES DISC) has been the home of processing, archiving, and distribution services for the Atmospheric Infrared Sounder (AIRS) mission since its launch in 2002 for the global observations of the atmospheric state. Giovanni, a web-based application developed by the GES DISC, provides a simple and intuitive way to visualize, analyze, and access vast amounts of Earth science remote sensing data without having to download the data. Most important variables, including temperature and humidity profiles, outgoing longwave radiation, cloud properties, and trace gases, from version 6 AIRS product are available on Giovanni.

The AIRS is an instrument suite comprised of a hyperspectral infrared instrument AIRS and two multichannel microwave instruments, the Advanced Microwave Sounding Unit (AMSU) and the Humidity Sounder for Brazil (HSB). As the HSB ceased operation in very early stage of AIRS mission, the AIRS project operates two parallel retrieval algorithms: one using both IR and MW measurements (AIRS+AMSU) and the other using only IR measurements (AIRS-only) for the most time of the mission. The AIRS+AMSU product is better and the variables on Giovanni are from it. However, the generation of AIRS+AMSU product has been suspended since the AMSU instrument anomaly occurred in late 2016. To continue exploring up-to-date AIRS observations, the same set of variables from the AIRS-only product are added on Giovanni by the GES DISC. This will also support the comparison of AIRS-only with AIRS+AMSU retrievals. In the presentation, we will demonstrate the visualization of AIRS-only product and the plots/statistics of comparison with AIRS+AMSU product using Giovanni.

A13D-2101: Accessing Suomi NPP OMPS Products Through the GES DISC Online Data Services, 13:40 - 18:00, Poster Hall D-F
James E. Johnson, ADNET Systems Inc.; Jennifer C. Wei, ADNET Systems Inc.; Irina Gerasimov; ADNET Systems Inc.; Bruce Vollmer, NASA Goddard Space Flight Center
IN21B-0039: GES DISC Datalist Improves Earth Science Data Discoverability, 08:00 - 12:20, Poster Hall D-F

IN23B-0088: Data and Science: GES DISC Users' Data Usage and Science Exploration, 13:40 - 18:00, Poster Hall D-F

ED23D-0324: GES DISC Data Recipes in Jupyter Notebooks
13:40 - 18:00, Poster Hall D-F
Angela Li, NASA Goddard Space Flight Center; Ben Banavige, Harvard University; Karthik Garimella, Washington University in St Louis; Justin Rice, NASA Goddard Space Flight Center; Suhung Shen, George Mason University; Zhong Liu, NASA Goddard Space Flight Center

ED21A-0260: Access NASA Satellite Global Precipitation Data Visualization on YouTube, 08:00 - 12:20, Poster Hall D-F
IN23A-0080: Giovanni in the Cloud: Earth Science Data Exploration in Amazon Web Services, 13:40 - 18:00, Poster Hall D-F
Maksym Petrenko, ADNET Systems Inc.; Mahabal Hegde; ADNET Systems Inc.; Christine Smit, Telophase, Inc.; Hailiang Zhang, ADNET Systems, Inc., Paul Pilone, Element84; Andrey A. Zasorin, Telophase, Inc.; Long Pham, NASA Goddard Space Flight Center

Giovanni (https://giovanni.gsfc.nasa.gov/giovanni/) is a popular online data exploration tool at the NASA Goddard Earth Sciences Data Information Services Center (GES DISC), providing 22 analysis and visualization services for over 1600 Earth Science data variables. Owing to its popularity, Giovanni has experienced a consistent growth in overall demand, with periodic usage spikes attributed to trainings by education organizations, extensive data analysis in response to natural disasters, preparations for science meetings, etc. Furthermore, the new generation of spaceborne sensors and high resolution models have resulted in an exponential growth in data volume with data distributed across the traditional boundaries of datacenters. Seamless exploration of data (without users having to worry about data center boundaries) has been a key recommendation of the GES DISC User Working Group. These factors have required new strategies for delivering acceptable performance.

The cloud-based Giovanni, built on Amazon Web Services (AWS), evaluates (1) AWS native solutions to provide a scalable, serverless architecture; (2) open standards for data storage in the Cloud; (3) a cost model for operations; and (4) end-user performance. Our preliminary findings indicate that the use of serverless architecture has a potential to significantly reduce development and operational cost of Giovanni. The combination of using AWS managed services, storage of data in open standards, and schema-on-read data access strategy simplifies data access and analytics, in addition to making data more accessible to the end users of Giovanni through popular programming languages.

IN23D-0111: Recovering Nimbus era Observations at the NASA GES DISC, 13:40 - 18:00, Poster Hall D-F
H21F-1558: Enabling NLDAS-2 Anomaly Analysis Using Giovanni,  
08:00 - 12:20, Poster Hall D-F  

A newly implemented feature in Giovanni (NASA Geospatial Interactive Online Visualization and Analysis Interface) allows users to explore and visualize anomaly data from the NLDAS-2 Primary Forcing and Noah model data sets. For a given measurement and location, an anomaly describes how conditions for a particular time period compare to normal conditions, based on long-term averages. Analyzing anomalies is important for monitoring droughts, determining weather trends, and studying land surface processes relevant for meteorology, hydrology, and climate. Using Giovanni to analyze anomalies for NLDAS-2 data allows for these studies to be efficiently conducted for the central North American region. Phase 2 of NLDAS (NLDAS-2) currently runs at an 1/8th degree resolution, in near-real time, with data sets extending back to January 1979. NLDAS-2 provides data for soil moisture, precipitation, temperature, and other hydrology measurements. Hourly, monthly, and 30-year (1980-2009) monthly climatology data are available for several land surface models and forcing data sets. The Giovanni anomaly tool calculates monthly anomalies, for a given user-defined variable, as the difference between the NLDAS-2 monthly climatology data and the monthly data. The resulting anomaly describes how a chosen month compares to the 30-year monthly average. The presentation will demonstrate the capabilities and usefulness of Giovanni’s anomaly tool, detail the recently added NLDAS-2 variables for which anomalies are available, and show how users can access the data.

IN24B-06: Challenges in Visualizing Satellite Level 2 Atmospheric Data with GIS approach, 17:15 - 17:30, Convention Center - 228-230  
Jennifer C. Wei, ADNET Systems Inc.; Wenli Yang, George Mason University; Peisheng Zhao, George Mason University; Long Pham, NASA Goddard Space Flight Center; David J. Meyer, NASA Goddard Space Flight Center
IN31A-0068: Use of Schema on Read in Earth Science Data Archives, 08:00 - 12:20, Poster Hall D-F
Mahabal Hegde, ADNET Systems Inc.; Christine Smit, Telophase, Inc.; Paul Pilone, Element84; Maksym Petrenko; ADNET Systems Inc.; Long Pham, NASA Goddard Space Flight Center

ED31B-0288: The NASA Earthdata Forums – An Interactive Venue for Discussions of NASA Data and Earth Science, 08:00 - 12:20
Poster Hall D-F

ED32B-07: Satellite Level 3 & 4 Data Subsetting at NASA GES DISC, 11:50 - 12:05, Convention Center - 242

MERRA-2 Monthly Surface Wind Speed, May 2008, over Antarctica, using the new polar projection option in Giovanni!
H41K-03: Restructuring Big Data to Improve Data Access and Performance in Analytic Services Making Research More Efficient for the Study of Extreme Weather Events and Application User Communities, 08:30 - 08:45, Convention Center 291-292
Dana Ostrenga, NASA Goddard Space Flight Center; Suhung Shen, George Mason University; Bruce Vollmer, NASA Goddard Space Flight Center; David J. Meyer, NASA Goddard Space Flight Center

IN41B-0037: Investigating Access Performance of Long Time Series with Restructured Big Model Data, 08:00 - 12:20, Poster Hall D-F
Suhung Shen, George Mason University; Dana Ostrenga, ADNET Systems Inc.; Bruce Vollmer, NASA Goddard Space Flight Center; David J. Meyer, NASA Goddard Space Flight Center

IN41B-0038: Complexities in Subsetting Satellite Level 2 Data, 08:00 - 12:20, Poster Hall D-F

IN42A-06: Mining Twitter Data Stream to Augment NASA GPM Validation, 11:35 - 11:50, Convention Center - 231-232
William L. Teng, ADNET Systems Inc.; Arif Albayrak, ADNET Systems Inc.; George John Huffman, NASA Goddard Space Flight Center; Bruce Vollmer, NASA Goddard Space Flight Center
IN41B-0039: The Value of Data and Metadata Standardization for Interoperability in Giovanni, 08:00 - 12:20, Poster Hall D-F

Giovanni (https://giovanni.gsfc.nasa.gov/giovanni/) is a data exploration and visualization tool at the NASA Goddard Earth Sciences Data Information Services Center (GES DISC). It has been around in one form or another for more than 15 years. Giovanni calculates simple statistics and produces 22 different visualizations for more than 1600 geophysical parameters from more than 90 satellite and model products.

Giovanni relies on external data format standards to ensure interoperability, including the NetCDF CF Metadata Conventions. Unfortunately, these standards were insufficient to make Giovanni's internal data representation truly simple to use. Finding and working with dimensions can be convoluted with the CF Conventions. Furthermore, the CF Conventions are silent on machine-friendly descriptive metadata such as the parameter's source product and product version.

In order to simplify analyzing disparate earth science data parameters in a unified way, we developed Giovanni's internal standard. First, the format standardizes parameter dimensions and variables so they can be easily found. Second, the format adds all the machine-friendly metadata Giovanni needs to present our parameters to users in a consistent and clear manner. At a glance, users can grasp all the pertinent information about parameters both during parameter selection and after visualization.

This poster gives examples of how our metadata and data standards, both external and internal, have both simplified our code base and improved our users' experiences.
IN52A-03: Developing Information Services and Tools to Access and Evaluate Data Quality in Global Satellite-based Precipitation Products, 10:29 - 10:32, eLightning Area
Zhong Liu, George Mason University; Chung-Lin Shie, NASA Goddard Space Flight Center; David J. Meyer, NASA Goddard Space Flight Center

Global satellite-based precipitation products have been widely used in research and applications around the world. Compared to ground-based observations, satellite-based measurements provide precipitation data on a global scale, especially in remote continents and over oceans. Over the years, satellite-based precipitation products have evolved from single sensor and single algorithm to multi-sensors and multi-algorithms. As a result, many satellite-based precipitation products have been enhanced such as spatial and temporal coverages. With inclusion of ground-based measurements, biases of satellite-based precipitation products have been significantly reduced. However, data quality issues still exist and can be caused by many factors such as observations, satellite platform anomaly, algorithms, production, calibration, validation, data services, etc.

The NASA Goddard Earth Sciences (GES) Data and Information Services Center (DISC) is home to NASA global precipitation product archives including the Tropical Rainfall Measuring Mission (TRMM), the Global Precipitation Measurement (GPM), as well as other global and regional precipitation products. Precipitation is one of the top downloaded and accessed parameters in the GES DISC data archive. Meanwhile, users want to easily locate and obtain data quality information at regional and global scales to better understand how precipitation products perform and how reliable they are. As data service providers, it is necessary to provide an easy access to data quality information, however, such information normally is not available, and when it is available, it is not in one place and difficult to locate. In this presentation, we will present challenges and activities at the GES DISC to address precipitation data quality issues.
IN52A-07: Comparing AIRS/AMSU-A Satellite and MERRA/MERRA-2 Reanalysis products with In-situ Station Observations at Summit, Greenland, 10:41 - 10:44, eLightning Area

Using Giovanni makes the Earth a bigger place and a smaller place (at the same time)
Linette Boisvert, Earth System Science Interdisciplinary Center; Chung-Lin Shie, NASA Goddard Space Flight Center

IN21B-0046: Progress Report on the Airborne Composition Standard Variable Name and Time Series Working Groups of the 2017 ESDSWG, Tuesday, December 12, 08:00 - 12:20, Poster Hall D-F
Keith D. Evans, University of Maryland Baltimore County; Amanda Benson Early, NASA Langley Research Center; Emily Ann Northup, NASA Langley Research Center; Daniel P. Ames, Brigham Young University; William L. Teng, ADNET Systems Inc.; Stephen W. Olding, Columbus Technologies and Services; Nickolay Anatoly Krotkov; NASA Goddard Space Flight Center

AGU 2017 Fall Meeting
Leptoukh Lecture for Earth and Space Sciences Informatics Focus Group

IN34A-01: Earth sensing: from ice to the Internet of Things (Invited) Wednesday, December 13, 2017  16:12 - 16:57
Convention Center - La Nouvelle AB

Given by Kirk Martinez, University of Southampton
NLDAS 0.125 degree hourly surface pressure, 09Z on September 11, 2017, during the transit of Hurricane Irma over the Florida peninsula (first seen on Twitter, https://twitter.com/NASA_Giovanni).