



# Giovanni News

GODDARD EARTH SCIENCES DATA & INFORMATION SERVICES CENTER

## Editors' Note

This is the first December 2012 issue of *The Giovanni News*, highlighting the presentations by NASA Goddard Earth Sciences Data and Information Services Center (GES DISC) staff at the Fall Meeting of the American Geophysical Union in San Francisco, California. The meeting comes early in December this year, which means that we'll have another issue of *The Giovanni News* right after it (our second December 2012 issue), with a summary of the 2012 Gregory G. Leptoukh Online Giovanni Workshop, an update on the number of Giovanni publications in 2012, and other items of interest. Giovanni has had significant impacts in several spheres of the information and data world recently, and we want to tell you more about that.

Also, if you follow us on Twitter and use the meeting hashtag #AGU12, there will be daily announcements of our presentations.

In the presentation summaries presented on the following pages, NASA GES DISC staff member names are italicized.

*James Acker and Wainie Youn*

**Bringing you a world of data  
(with just a few clicks).  
<http://giovanni.gsfc.nasa.gov>**

## Monday, December 3

### Giovanni Data Portals and Resources Support Student Problem-Based Learning for Climate Change Education

James G. Acker, Daniel R. Zalles, Ruth A. Krumhansl

Poster Session ED13B

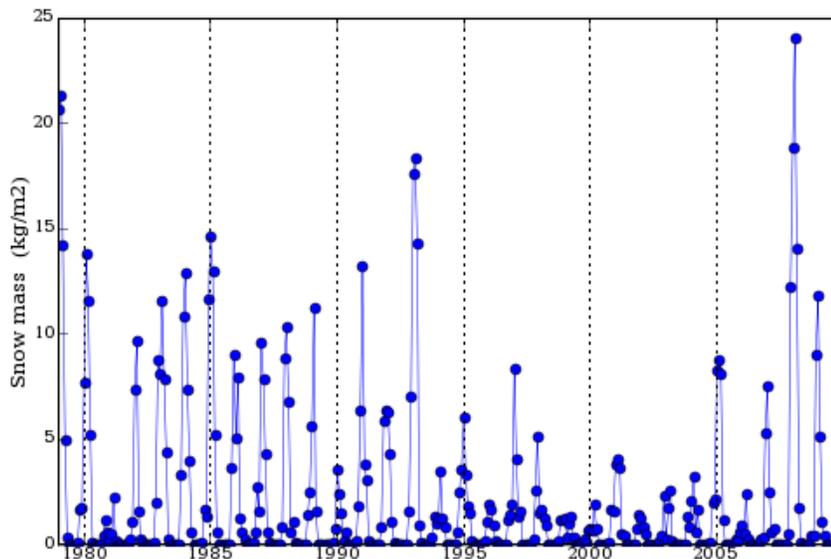
Climate Literacy: Barriers, Misconceptions, and Progress in Improving Climate Literacy III

Poster ED13B-0785

Moscone South, Monday December 3, 1:40-6:00 PM

The Data-Enhanced Investigations for Climate Change Education (DICCE) project, funded by NASA, is providing dedicated climate data portals in the NASA Giovanni data system for the use of teachers and students. The poster provides a guide to the NASA GES DISC components of the data system, including data product documentation and supporting instructional materials. An example of problem-based learning, assessing snowpack in the New Mexico mountains and a possible explanation for observed trends, is provided.

Area-Averaged Time Series (MATMNXLND.5.2.0)  
(Region: 106W-104W, 35N-37N)



*Reduced snow mass (a MERRA data product) in the New Mexico mountains is a water resources dilemma – and a potential climate change problem that students can examine.*

# AGU FALL MEETING

San Francisco | 3–7 December 2012

## *Monday, December 3*

### Other DICCE Presentations at the AGU Fall Meeting:

#### **Assessing Student Learning About Climate Change With Earth System Place-Based Geospatial Data** *(Invited)*

Daniel R. Zalles, Ruth A. Krumhansl, *James G. Acker*, James Manidakos, and Anne Elston

Poster Session ED13C

Climate Literacy: Evidence From Research and Evaluation on Effectiveness of Interdisciplinary Programs II

#### **Poster ED13C-0792**

Moscone South, Monday December 3, 1:40-6:00 PM

#### **Supporting teachers in the use of authentic, near-real time climate data from the NASA GIOVANNI data portal in the pre-college classroom.**

Ruth A. Krumhansl, Daniel R. Zalles, *James G. Acker*

Poster Session ED23A

Climate Literacy: Preparing K-12 Students to Address Next Generation Challenges III Posters

Poster ED23A-0746

Moscone South, Tuesday December 4, 1:40-6:00 PM

**GES DISC AGU POSTER PRESENTATION ABSTRACTS**



# AGU FALL MEETING

San Francisco | 3–7 December 2012

*Tuesday, December 4*

## **Global Long-Term SeaWiFS Deep Blue Aerosol Products available at NASA GES DISC**

*Suhung Shen, Andrew M. Sayer, Corey Bettenhausen, Jennifer C. Wei, Dana Ostrenga, Bruce Vollmer, Nai-Yung, Christina Hsu, Steven Kempler*

Poster Session A21A

Aerosols and Air Quality in South Asia: Observations, Modeling, Impacts IV Posters

Poster A21A-0029

Moscone South, Tuesday December 4, 8:00 AM – 12:00 PM

The recent release of global long-term (1997-2010) SeaWiFS Deep Blue (SWDB) aerosol products as a climate data record enables further research on regional air quality and the uncertainty of aerosol radiative forcing. The latest Deep Blue algorithm retrieves aerosol properties not only over bright desert surfaces, but also vegetated surfaces, oceans, and inland water bodies. Comparisons with AERONET observations have shown that the data are suitable for quantitative scientific use. This presentation, focused on the south Asia region, gives examples of higher resolution Level 2 images of dust events and the corresponding Level 3 monthly climatology. The data are compared with the widely-used MODIS (Deep Blue and Dark Target) aerosol dataset.

**GES DISC AGU POSTER PRESENTATION ABSTRACTS**



## *Tuesday, December 4*

### **Analysis of Water/Energy Budgets and Trends Using the NLDAS Monthly Data Sets**

*Bruce Vollmer, Hualan Rui, David Mocko, Bill Teng, Guang-Dih Lei*

Poster Session H21F

Integrated Observations, Modeling, and Predictions for Assessing Water and Energy Budgets at Global and Regional Scales and for a New Earth Observing Water Strategy III

Poster H21F-1239

Moscone South, December 4, 8:00 AM-12:00 PM

The North American Land Data Assimilation (NLDAS) is an excellent data source for supporting water and energy cycle studies. NLDAS hourly data, accessible from NASA Goddard Earth Sciences Data and Information Services Center have been broadly used by various user communities in modeling, research, and applications, such as drought and flood monitoring, watershed and water quality management, and case studies for extreme events. NLDAS data sets consist of a **Forcing** data set for land surface models, comprising a synthesis of best available near-surface observations and reanalyses, and separate land surface model output data sets of NLDAS models driven by the Forcing.

To further facilitate analysis of water and energy budgets and trends, NLDAS monthly data products have been recently released by NASA GES DISC. The NLDAS monthly data were generated from NLDAS hourly data, as monthly accumulation for precipitation and monthly average for other variables. This presentation describes the major characteristics of the NLDAS data sets, and preliminary analysis results of water and energy budgets and trends from the NLDAS monthly data are shown and discussed.

# AGU FALL MEETING

San Francisco | 3–7 December 2012

## *Tuesday, December 4*

### **Strive toward data harmony of multi sensor aerosol data – Tribute to Dr. Gregory Leptoukh** *(Invited)*

*Jennifer Wei\*, Steve Kempler, Chris Lynnes, Suhung Shen*

Session A24C

Multisensor and Model Aerosol Data Intercomparison and Synergy III

Presentation A24C-01

Moscone West, 3012 December 4, 4:00 PM

The Goddard Earth Sciences Data and Information Services Center (GES DISC) has been involved with aerosol data synergy activities and projects over recent years, led by Dr. Gregory Leptoukh. His particular interests centered on issues related to comparison and harmonization of several aspects of aerosol data, such as data quality, bias adjustment, and data provenance. A thorough understanding of these issues is needed to guide multi-sensor data usage and avoid apples-to-oranges inter-comparison and data fusion. In this talk, I will highlight these activities/projects. These would include the tools developed, but also the projects that address specific user needs and innovative services, such as Giovanni-MAPSS, AeroStat, NEESPI, MAIRS, ATDD, MDSA, LTA-SWDB, etc. I will also discuss preliminary results from new projects and future goals that build on the groundbreaking work left by Dr. Leptoukh.

**GES DISC AGU POSTER PRESENTATION ABSTRACTS**



## Tuesday, December 4

### The Leptoukh Lecture

Bridging Informatics and Earth Science: a Look at Gregory Leptoukh's Contributions *(Invited)*

*Christopher Lynnes*

Session IN24B  
Leptoukh Lecture

Presentation IN24B-01  
Moscone South, 104 December 4, 4:00 PM

With the tragic passing this year of Gregory Leptoukh, the Earth and Space Sciences community lost a tireless participant in – and advocate for – science informatics. Throughout his career at NASA, Dr. Leptoukh established a theme of bridging the gulf between the informatics and science communities. Nowhere is this more evident than his leadership in the development of **Giovanni (GES DISC Interactive Online Visualization AND aNalysis Infrastructure)**. Giovanni is an online tool that serves to hide the often-complex technical details of data format and structure, making science data easier to explore and use by Earth scientists. To date Giovanni has been acknowledged as a contributor in 500-odd scientific articles. In recent years, Leptoukh concentrated his efforts on multi-sensor data inter-comparison, merging and fusion. This work exposed several challenges at the intersection of data and science. One of these was the ease with which a naive user might generate spurious comparisons, a potential hazard that was the genesis of the **Multi-sensor Data Synergy Advisor (MDSA)**. The MDSA uses semantic ontologies and inference rules to organize knowledge about dataset quality and other salient characteristics in order to advise users on potential caveats for comparing or merging two datasets. Recently, Leptoukh also led the development of **AeroStat**, an online Giovanni instance to investigate aerosols via statistics from station and satellite comparisons and merged maps of data from more than one instrument. AeroStat offers a neural net based bias adjustment to "harmonize" the data by removing systematic offsets between datasets before merging. These examples exhibit Leptoukh's talent for adopting advanced computer technologies in the service of making science data more accessible to researchers. In this, he set an example that is at once both vital and challenging for the ESSI community to emulate.

# AGU FALL MEETING

San Francisco | 3–7 December 2012

## *Wednesday, December 5*

### **Newly Released Version 7 TRMM Multi-satellite Precipitation Analysis (TMPA) Products and Data Services at NASA GES DISC**

*Dana Ostrenga, Zhong Liu, William Teng, Steve Kempler*

Poster Session H33C

Global Precipitation Measurement, Validation, and Applications V

Poster H33C-1335

Moscone South, December 5, 1:40-6:00 PM

The NASA Goddard Earth Sciences Data and Information Services Center (GES DISC) is the home of several global precipitation product archives, in particular, Tropical Rainfall Measuring Mission (TRMM) data products.

The newly released Version 7 TRMM Multi-satellite Precipitation Analysis (TMPA) products consist of several important changes including 1) additional output fields including sensor-specific source and overpass times; 2) additional satellite input data; 3) uniformly reprocessed input data using current algorithms; 4) a new IR data set (Jan. 1998 – Feb 2000) was included; 5) use of a single, uniformly processed gauge analysis; and 6) use of a latitude-band calibration scheme for all satellites. More details will be presented. Several new parameters have been included, such as, gauge relative weighting in 3B43, HQ and IR precipitation in 3B42.

The presentation describes resources at the NASA GES DISC, which include Mirador, Giovanni, the Simple Subset Wizard, and data provided via OPeNDAP, an The Open Geospatial Consortium (OGC) Web Map Service (WMS), and a GrADS-DODS Data Server. In addition, the Precipitation Data and Information Services Center provides documentation, science focus articles and FAQ. User assistance is available from GES DISC staff members.

**GES DISC AGU POSTER PRESENTATION ABSTRACTS**



### Performance comparison of GES DISC data as a service between server-based system and cloud system

*Long Pham, Aijun Chen\*, Eric Winter, Christopher Lynnes*

Poster Session IN33B

Cloud Services for Earth System Science

Poster IN33B-1537

Moscone South, December 5, 1:40-6:00 PM

The NASA Goddard Earth Science Data and Information Service Center (GES DISC), in cooperation with the Goddard Information Technology & Communications Directorate, demonstrates and evaluates provision of “Data-as-a-Service” in a cloud environment using the OPeNDAP (Open-source Project for a Network Data Access Protocol) protocols. The demonstration requires porting the OPeNDAP software to the cloud platform along with a representative set of data and then exercising the server using several clients. The evaluation examines two aspects of using open source software in the cloud to serve large volumes of satellite data for public access and simple subsetting: **a)** ease of porting and operating OPeNDAP in the Goddard Cloud and Amazon Elastic Cloud Computing (EC2) and Simple Storage Service (S3) environments, including evaluation of the time needed to set up one instance; and **b)** access performance, e.g. data access stability and speed of the cloud environments as compared to existing GES DISC capabilities. Four kinds of satellite data products with different data formats (HDF4, HDF5) were selected as the test data. The Giovanni (GES-DISC Interactive Online Visualization ANd aNalysis Infrastructure) and GrADS (Grid and Analysis System) data services were also deployed to the cloud platforms to compare the data analysis performance between existing systems and cloud systems.

# AGU FALL MEETING

San Francisco | 3–7 December 2012

## *Thursday, December 6*

### **Giovanni: The Bridge Between Data and Science**

*Suhung Shen\*, Chris Lynnes, Steve Kempler*

Public Presentations, NASA Booth, Exhibit Hall

December 6, 9:30 AM

In this NASA public talk at the NASA exhibit booth, Dr. Shen will describe the inspiration for the current Giovanni data analysis system and the primary aspects of its operation, which is possible with a simple World Wide Web browser interface. The Giovanni system enables several different kinds of analyses with a wide variety of Earth remote sensing data from NASA missions and related data sets. Several recent examples of Giovanni analyses, including "Superstorm Sandy", will be shown.

Giovanni's main components are:

- Interactive map for region-of-interest selection
- Compendium of available data products for analysis
- Calendrical selection of time period of interest
- Menu of visualization options

The next generation of Giovanni, Giovanni-4, will also be described in this presentation.

**GES DISC AGU POSTER PRESENTATION ABSTRACTS**



## *Thursday, December 6*

### **Online Tools to Investigate Uncertainties in Satellite-derived Global Precipitation Products**

*Zhong Liu, Dana Ostrenga, William Teng, Steve Kempler*

Poster Session H41H

Uncertainties in Precipitation Measurement and Their Hydrological Impact I

Poster H41H-1260

Moscone South, December 6, 8:00 AM – 12:00 PM

Biases and uncertainties are common among precipitation data products, and obstacles exist which prevent rapid acquisition of information on product characteristics, such as data quality, biases and behaviors at a local or regional scale, and data specifically for user-defined areas or points of interest.

We have developed online prototypes in the GIOVANNI TRMM Online Visualization and Analysis System (TOVAS) to address these issues. There are four online tools allowing intercomparison of 3-hourly, daily, monthly and climatology of the existing and previous versions of TRMM Multi-satellite Precipitation Analysis (TMPA) products (3B42, 3B43) and their near-real-time products (3B42RT). Users can intercompare current and previous versions of TRMM monthly data products as well.

Future plans include: 1) integration of the IPWG (International Precipitation Working Group) Validation Algorithms/statistics in TOVAS; 2) addition of more Level-3 monthly TRMM products; and 3) addition of more climatology datasets derived from Level-3 TRMM monthly products.

# AGU FALL MEETING

San Francisco | 3–7 December 2012

## *Thursday, December 6*

### **Utilizing Satellite-derived Precipitation Products in Hydrometeorological Applications** *(Invited)*

*Zhong Liu\**, Dana Ostrenga, William Teng, Steve Kempler and George Huffman

Session H43K

Utilizing Precipitation Datasets in Hydrometeorological Applications II

Presentation H43K-02

Moscone West, 3018 December 6, 1:40 PM

The NASA GES DISC has developed precipitation data services to support hydrometeorological applications in order to maximize societal benefits of the Tropical Rainfall Measuring Mission (TRMM). In this presentation, we will present examples of utilizing precipitation data products in hydrometeorological applications, including: 1) monitoring global floods and droughts; 2) providing data services to support the USDA Crop Explorer; 3) support for hurricane monitoring activities and research; and 4) retrospective analog year analyses to improve USDA's world agricultural supply and demand estimates. We will also present precipitation data services that can be used to support hydrometeorological applications.

**GES DISC AGU POSTER PRESENTATION ABSTRACTS**

