



# GIOVANNI NEWS

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

## Welcome to San Francisco!



## From the Editors

*Image: World Property Channel*

Hello. This is the special issue of The Giovanni News devoted to the 2013 Fall Meeting of the American Geophysical Union (AGU). In this issue you will find the titles of all of the presentations at the meeting on which NASA GES DISC staff members are either authors or co-authors. The breadth of the GES DISC impact and participation in this meeting is indicated by the twenty-two presentations that are shown here.

Brief summaries of the presentations which involve the Giovanni system are provided. These summaries were adapted from the abstracts of the presentations that can be found in full on the AGU 2013 Fall Meeting Web site. In the list of authors accompanying the title of the presentation, GES DISC staff members are in boldface.

This issue also includes the biography of Simon Cox, who will give the annual Leptoukh Lecture, which is named in honor of the late Gregory Leptoukh, former GES DISC Data Manager.

Following the meeting, many of the actual presentations will be made available from the 2013 Fall Meeting Web site or on the GES DISC Web site.

Coming up later this month will be the first Giovanni Image Hall of Fame selections.

Jim Acker and Wainie Youn



### H11E. Innovation in Hydrology Through the Design, Development, and Use of Community Technologies and Resources Posters

8:00 AM - 12:20 PM; Hall A-C (Moscone South)

H11E-1200. Enhancing Access to and Use of NASA Earth Sciences Data via CUAHSI-HIS (Hydrologic Information System) and Other Hydrologic Community Tools

**Hualan Rui; Richard Strub; William L. Teng; Bruce Vollmer; David M. Mocko; David R. Maidment; Timothy L. Whiteaker**

This presentation describes two approaches utilized by the GES DISC to improve the usability of NASA earth science data for the hydrological community. The first approach uses the concept of “data rods”, which are time-series data, for use in hydrological community tools. Several variables from the North American and Global Land Data Assimilation Systems (NLDAS and GLDAS) have been archived as data rods. The second approach uses the Simple Subset Wizard (SSW) created by the GES DISC as a data access method that converts data to time series before it is made available through a Web service. This approach makes much more data available than just the set of variables that are archived as data rods. The presentation provides case studies on the use of the available data for drought monitoring, estimates of maximum precipitation, hurricane effects on soil moisture and runoff, and data intercomparison. The use of the data in GIS applications will also be described.

H11E-1204. A New Open Data Open Modeling Framework for the Geosciences Community (Invited)

**Xu Liang; Daniel Salas; Miguel Navarro; Yao Liang; William L. Teng; Richard P. Hooper; Pedro J. Restrepo; Jerad D. Bales**

### A11I. Remote Sensing of CO2 and CH4: From Missions to Science—Remote Sensing of Carbon Cycle Science I [SWIRL\_CU] (cosponsored by AMS)

8:00 AM - 10:00 AM; 3006 (Moscone West)

A11I-05. Sensitivity of AIRS and ACOS retrievals to CO2 emissions from biomass burning

**Thomas J. Hearty; Andrey K. Savtchenko; Jennifer C. Wei; Arif Albayrak; Bruce Vollmer**

### IN13A. Data Curation, Credibility, Preservation Implementation, and Data Rescue to Enable Multi-source Science III Posters

1:40 PM - 6:00 PM; Hall A-C (Moscone South)

IN13A-1548. Implementing an Open Source Document Preservation System at the NASA GES-DISC

**Mo G. Khayat; Steven J. Kempler; Barbara DeShong; Ed Esfandiari; James E. Johnson; Irina V. Gerasimov; Michael R. Berganski**

### IN13B. Persistent Identifiers and Citation in Earth Science Information Infrastructure Posters

1:40 PM - 6:00 PM; Hall A-C (Moscone South)

IN13B-1571: Application of Digital Object Identifiers to data sets at the NASA Goddard Earth Sciences Data and Information Services Center (GES DISC)

**Bruce Vollmer; Dana Ostrenga; James E. Johnson; Andrey K. Savtchenko; Suhung Shen; William L. Teng; Jennifer C. Wei**





### **IN21D. Big Data Analytic Systems: Computing and Collaborating Effectively in Distributed Systems I [SWIRL\_CM]**

8:00 AM - 10:00 AM; 2020 (Moscone West)

**IN21D-05. Volume, Variety and Veracity of Big Data Analytics in NASA's Giovanni Tool**

**Christopher Lynnes; Mahabaleshwara Hegde; Christine Smit; Jianfu Pan; Keith Bryant; Chocka Chidambaram; Peisheng Zhao**

This presentation discusses the need for innovative Big Data Analytic capabilities to provide users with the ability to use increasingly large volumes of Earth remote sensing data. The Geospatial Interactive Online Visualization ANd aNalysis (Giovanni) tool is an example of a server-side analysis tool that provides a Web interface for gridded data sets. Giovanni's main objective is to allow the user to explore its data holdings using various forms of visualization and data summarization or aggregation algorithms, thus allowing the user to examine statistics and pictures for the overall data, while eventually acquiring only the most useful data. Giovanni uses open standards to address the various data formats and archive methods of different data centers, and employs provenance and workflow tracking in addition to expert scientific assistance so that users can assess the quality and validity of the data.

### **A23E. Aerosol, Tropical Cyclones, Volcanic Emissions, Measurements, Data and SASKTRAN Posters**

1:40 PM - 6:00 PM; Hall A-C (Moscone South)

A23E-0303. The NASA MEaSURES-2006 Science Datasets Distributed at GES DISC

*Chung-Lin Shie; Gary T. Alcott; Mei-Lin Chen; James E. Johnson; Steven J. Kempler; Guang-Dih Lei; Dana M. Ostrenga; Andrey K. Savtchenko; Suhung Shen; William L. Teng; Elaine Vadnais; Bruce Vollmer; Jennifer C. Wei*

A23E-0327. A Satellite Observation Information Service for Data Assimilation Applications

*Meemong Lee; Richard J. Weidner; Christopher Lynnes; Irina V. Gerasimov*

### **IN23A. Big Data Analytic Systems: Computing and Collaborating Effectively in Distributed Systems II Posters [SWIRL\_CM]**

1:40 PM - 6:00 PM; Hall A-C (Moscone South)

**IN23A-1407. The Path from Large Earth Science Datasets to Information**

***Gilberto A. Vicente***

This presentation demonstrates several tools and computational technologies that have been developed by the NASA GES DISC to manage the large volume of data and variety of data products currently in the archive from many different missions and programs. Archival, documentation, distribution, access and analysis functions are explored. The challenge of understanding and responding to the user community, and the development of useful tools for visualization and analysis of the data, will also be discussed.





### **IN23B. Collaborative Frameworks and Experiences in Earth and Space Science Posters**

1:40 PM - 6:00 PM; Hall A-C (Moscone South)

IN23B-1432. Collaborative workbench for cyberinfrastructure to accelerate science algorithm development

*Rahul Ramachandran; Manil Maskey; Kwo-Sen Kuo; **Christopher Lynnes***

### **NH23C. Planning and Mitigation for Natural Hazards Through Specialized Remote Sensing Techniques II Posters**

1:40 PM - 6:00 PM; Hall A-C (Moscone South)

NH23C-1540. Hydrologic Severity-based Forecast System for Road Infrastructure Monitoring

*Felipe Hernandez; Lianxia Li; Sricharan Lochan; Xu Liang; Yao Liang; **William L. Teng***





### **IN31C. Search, Discovery and Visual Representation of Scientific Data I Posters**

8:00 AM - 12:20 PM; Hall A-C (Moscone South)

IN31C-1516. Exploring NASA Satellite Data with High Resolution Visualization

*Jennifer C. Wei; Wenli Yang; James E. Johnson; Suhung Shen; Peisheng Zhao; Irina V. Gerasimov; Bruce Vollmer; Gilberto A. Vicente; Long Pham*

### **A31C. Measurements, Modeling, and Evaluation of Emissions I Posters**

8:00 AM - 12:20 PM; Hall A-C (Moscone South)

A31C-0060. Making NASA Remote Sensing Data Directly Usable in Multiscale Air Quality Models

*Steven J. Kempler; Daniel Tong*

### **IN32A. Emerging Technologies in Earth and Space Science Informatics (ESSI) I**

10:20 AM - 12:20 PM; 2020 (Moscone West)

#### **IN32A-03. Maintaining the momentum of Open Search in Earth Science Data discovery**

*Douglas J. Newman; Christopher Lynnes*

### **H32F. Remote Sensing Applications for Water Resources Management II: Groundwater Monitoring, Data Integration and Modeling**

10:20 AM - 12:20 PM; 3016 (Moscone West)

H32F-06. Global Water Maps

*David R. Maidment; Fernando Salas; William L. Teng*

### **H33E. Global Precipitation Measurement, Validation, and Applications III Posters**

1:40 PM - 6:00 PM; Hall A-C (Moscone South)

H33E-1418. Preparing Precipitation Data Access, Value-added Services and Scientific Exploration Tools for the Integrated Multi-satellite Retrievals for GPM (IMERG)

*Dana Ostrenga; Zhong Liu; Steven J. Kempler; Bruce Vollmer; William L. Teng*

The Precipitation Data and Information Services Center (PDISC), located at the NASA GES DISC, is home of the Tropical Rainfall Measuring Mission (TRMM) data archive. The TRMM Multi-Satellite Precipitation Analysis (TMPA) products are the most popular products in the TRMM product family in terms of data download and access through Mirador, the GES-DISC Interactive Online Visualization AND aNalysis Infrastructure (Giovanni), and other services. The next generation of TMPA, the Integrated Multi-satellite Retrievals for GPM (IMERG) to be released in 2014 after the launch of GPM, will be significantly improved in terms of spatial and temporal resolutions. To better serve the user community, we are preparing data services and samples are listed below.

The GES DISC has developed Giovanni in consultation with members of the user community, and it provides search, subset, analysis and display capabilities. Additional PDISC tool and service capabilities being adapted for GPM data include: an on-line PDISC Portal (includes user guide, etc.); data ingest, processing, distribution from on-line archive; the Google-like Mirador data search and access engine; electronic distribution and subscriptions; semantic technology; drill-down and search capabilities; access through various web services, i.e., OPeNDAP, GDS, WMS, WCS; format conversion; and visualization and analysis of L2 data profiles and maps. Several other new or adapted capabilities in addition to these are also being implemented.

This presentation will further describe the data services at the PDISC that are currently being utilized by precipitation science and application researchers, and the preparation plan for IMERG. Comments and feedback are welcome.





### **B41A. Earth Observations for Global Agricultural Monitoring II Posters**

8:00 AM - 12:20 PM; Hall A-C (Moscone South)

B41A-0375. Enhancing USDA's Retrospective Analog Year Analyses Using NASA Satellite Precipitation and Soil Moisture Data

***William L. Teng***; Harlan D. Shannon

### **H42F. Utilizing Precipitation Data Sets and Quantifying Associated Uncertainties in Hydrometeorological and Climate Impact Applications I**

10:20 AM - 12:20 PM; 3022 (Moscone West)

H42F-08. Implementing the International Precipitation Working Group (IPWG) Validation Statistics in Online Tools to Intercompare and Characterize Satellite-derived Global Precipitation Products

***Zhong Liu***; Dana Ostrenga; ***William L. Teng***; ***Steven J. Kempler***

In 2012, the NASA GES DISC developed several online prototypes in the TRMM Online Visualization and Analysis System (TOVAS) which is a part of the Giovanni data analysis system. This year, the GES DISC is adding IPWG (International Precipitation Working Group) validation algorithms/statistics to further reveal characteristics and differences in satellite-derived daily products. The IPWG statistics contain 14 methods commonly used in weather forecast verification. This presentation will show results from these newly added statistical methods.

### **A43D. Multi-sensor and Model Aerosol Data Synergy for Climate and Air Quality**

### **Applications I Posters [SWIRL\_DA]**

1:40 PM - 6:00 PM; Hall A-C (Moscone South)

A43D-0297. Evaluation of Uncertainty in Satellite Monthly Aerosol Products Associated with Spatial Sampling

***Suhung Shen***; ***Christopher Lynnes***; Andrew M. Sayer; Corey Bettenhausen; ***Jennifer C. Wei***; ***Bruce Vollmer***; Nai-Yung C. Hsu; ***Steven J. Kempler***

### **A43B. Cloud, Convection, Radiation, Water and Energy Cycles I Posters**

1:40 PM - 6:00 PM; Hall A-C (Moscone South)

A43B-0254. AIRS Version 6 Products and Data Services at NASA GES DISC

***Feng Ding***; ***Andrey K. Savtchenko***; ***Thomas J. Hearty***; ***Michael L. Theobald***; ***Bruce Vollmer***; ***Ed Esfandiari***

The NASA Goddard Earth Sciences Data and Information Services Center (GES DISC) is the home of processing, archiving, and distribution services for data from the Atmospheric Infrared Sounder (AIRS) mission. The GES DISC, in collaboration with the AIRS Project, released data from the Version 6 algorithm in early 2013. The new algorithm represents a significant improvement over previous versions in terms of greater stability, yield, and quality of products.

The GES DISC is working to bring distribution services up-to-date with these new developments, focusing on popular services, like variable subsetting and quality screening, which are impacted by the new elements in Version 6. Other developments in visualization services (such as Giovanni, Near-Real Time imagery, and a granule-map viewer) are progressing along with the introduction of the new data; each service presents its own challenge.

This presentation will demonstrate the most significant improvements in Version 6 AIRS products, such as newly added variables (higher resolution outgoing longwave radiation, new cloud property products, etc.), the new quality control schema, and improved retrieval yields. We will also demonstrate the various distribution and visualization services for AIRS data products.





# 2013 Leptoukh Lecture

**Date:**

Thursday 12 December

**Time:**

10:20 AM - 11:20 AM

**Location:**

Moscone South, 103

**Lecture Winner**

**(biographical information was acquired online)**

**Simon Cox** is a Senior Principal Research Scientist at the *Commonwealth Scientific and Industrial Research Organisation* (CSIRO). He trained as geophysicist, with a PhD in experimental rock mechanics from Columbia (Lamont-Doherty) following degrees in geological sciences at Cambridge and Imperial College London. He came to Australia for a post-doc with CSIRO, and then spent four years teaching at Monash University in Melbourne where he first began using GIS. Returning to CSIRO in Perth in 1994 to work on information management for the Australian Geodynamics CRC, he moved its focus for reporting onto the emerging World Wide Web, deploying a web-mapping system for Australian geology and geophysics in 1995. The challenge of maintaining the AGCRC website led to metadata-based systems, and Simon's engagement with the standards community when he joined the Dublin Core Advisory Council.

Work on XML-based standards for mineral exploration data led on to foundation of the GeoSciML project in collaboration with a number of geological surveys. An interest in tying these into broader interoperability systems led to engagement with the Open Geospatial Consortium, where he co-edited the Geography Markup Language (GML) v2 and v3. In OGC he developed Observations and Measurements as a common language for in situ, ex situ and remote sensing, going on to become an ISO standard, and forming the basis for operational systems in diverse fields including air-traffic, water data transfer and environmental monitoring applications. In 2009-10 he spent a year as a senior fellow at the EC Joint Research Centre in Italy working on integration of GEOSS and INSPIRE. He served on the council of the IUGS Commission for Geoscience Information and the International Association for Mathematical Geosciences. In 2006 he was awarded OGC's highest honor, the Gardels Medal. He has been a member of AGU since 1982. Simon is currently based in CSIRO Land and Water in Melbourne, working on a variety of projects across environmental informatics and spatial data systems.



### **IN51A. Approaches, Architectures and Standards for End to End Brokering I Posters**

8:00 AM - 12:20 PM; Hall A-C (Moscone South)

**IN51A-1539. Performance, Agility and Cost of Cloud Computing Services for NASA GES DISC Giovanni Application**  
*Long Pham; Aijun Chen; Stephen Wharton; Eric L. Winter; Christopher Lynnes*

The NASA Goddard Earth Science Data and Information Services Center (GES DISC) is investigating the performance, agility and cost of Cloud computing for GES DISC applications. Giovanni (Geospatial Interactive Online Visualization ANd aNalysis Infrastructure), one of the core applications at the GES DISC for online climate-related Earth science data access, subsetting, analysis, visualization, and downloading, was used to evaluate the feasibility and effort of porting an application to the Amazon Cloud Services platform. The performance and the cost of running Giovanni on the Amazon Cloud were compared to similar parameters for the GES DISC local operational system. The results of a Giovanni time-series analysis of aerosol absorption optical depth (388nm) from OMI (Ozone Monitoring Instrument)/Aura showed that the Cloud platform had a 38% better performance and cost 36% less than the local system. This investigation shows the potential of cloud computing to increase system performance and lower the overall cost of system management.

### **IN53D. Semantically Enabling Annotation, Discovery, Access, and Integration of Scientific Data II Posters**

1:40 PM - 6:00 PM; Hall A-C (Moscone South)

**IN53D-1592. Discovering accessibility, display, and manipulation of data in a data portal**  
*Nancy J. Hoebelheinrich; Patrick West; Peter A. Fox; Christopher Lynnes*

### **A52D. Mineral Dust Aerosols: From Small-Scale Insights to Large-Scale Understanding III [SWIRL\_DA] (cosponsored by AMS)**

10:20 AM - 12:20 PM; 3012 (Moscone West)

**A52D-06. Long-term dust climatology in the western United States**  
*Daniel Tong; Hang Lei; Julian X. Wang; Pius Lee*