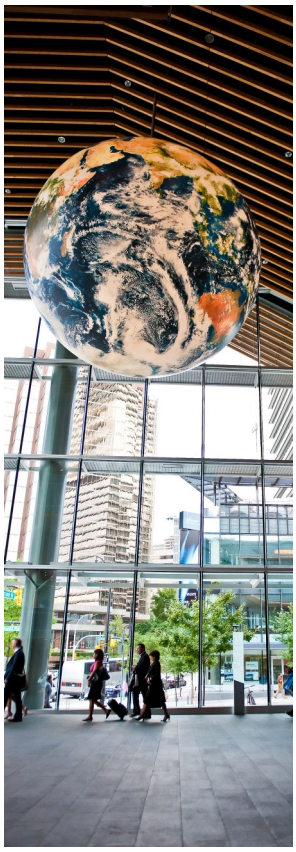
GEOSCIENCE INFORMATION SOCIETY

Four Years of Earth Science Information:

Exploring Data, Access, and More

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President
Geoscience Information Society
C/O American Geosciences Institute
4220 King Street
Alexandria VA 22302-1502 USA
president@geoinfo.org

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PREFACE

The Geoscience Information Society (GSIS) was established in 1965 as an independent, nonprofit professional society. Members include librarians, information specialists, publishers, and scientists concerned with all aspects of geosciences information. Members are based in the United States, India, Italy, Taiwan, Canada, and Australia.

GSIS is a member society of the American Geosciences Institute and is an associated society of the Geological Society of America (GSA). The GSIS Annual meeting is held in conjunction with the GSA Annual Meeting, and the papers, posters, and forums presented are a part of the GSA program.

The posters and oral presentations included in this proceedings volume were given at the 2013–2016 GSA Annual Meetings. The papers are arranged in the order they were presented and where the entire paper was not available, the abstract was provided. Reports of the GSIS program sessions, including minutes, schedules, and award winners, are also included.

Thanks to all presenters and authors who made this volume possible. Additional thanks go out to the session conveners, Hannah Winkler Hamalainen and Chris Badurek, and Hannah and Richard Huffine, who got the project started.

Matt Hudson

Part 1

Proceedings of the 48th Meeting of the Geoscience Information Society

GSA Poster Session 148

T144. Global Vision:
Geoscience Information for the Future

Poster Session Coordinator

Hannah Winkler Hamalainen
October 28, 2013
9:00 a.m. – 6:30 p.m.

GETTING DOWN AND DIRTY: CITIZEN INVOLVEMENT IN SCIENCE

Cynthia L. Prosser
University of Georgia Libraries, Science Library, University of Georgia
Athens, GA 30602, cprosser@uga.edu

Monica Pereira
John Spoor Broome Library, Collections, California State University Channel Islands
Camarillo, CA 93012, monica.pereira@csuci.edu

Abstract —What do water sampling, weather observation, and scanning for radio waves have in common? All these activities are parts of scientific projects in which researchers are joined by regular people, who have an interest in science. The success of these projects depends, in large part, on the participation of interested citizens aiding researchers in the pursuit of scientific knowledge. From earliest history, citizens have been observing and noting natural phenomena. These observations have led to the formation of the earliest data sets and further questions regarding the natural world. In turn, these questions have sparked investigation which has led to scientific progression. In today's world, the participation of citizen scientists adds to the fundamental accumulation of local data that would be impossible for government officials to gather. Citizen scientists are collecting essential data upon which is built a larger understanding of local, regional, and global scale phenomena.

INTRODUCTION

Many scientific projects aim to explain the causes and reasons of observed phenomena. These projects consist of data collection from literature searches, laboratory experiments, or field observations. Scientific literature seeks to records the progress of science. Experiments performed in the laboratory test theories in a controlled environment. Field observations can-include a variety of activities, e.g., recording the weather, sampling water and other natural materials, documenting earthquake activity, scanning for radio waves, and reporting marine debris. When the scope of a project expands, so too must the capacity for data collection. Where the geographic range of a project is large, scientists will need assistance from people outside the immediate core of the project. One method to acquire these data is to engage the help of people - those who are not necessarily scientists by vocation. This additional help can greatly expand the area covered and observations made. This is citizen science. The amount of data collected is increased, thus providing a clearer picture of the originally observed phenomena.

The citizen scientist extends the reach of professional scientists by reporting observations on a wider scale than the scientists themselves could address. Citizen science confers the added benefit of encouraging scientific literacy from a very young age, and across a wide range of sciences. While some scientists may be reluctant to trust data collected by "less highly-trained masses" (Willyard, 2009), there can be no denying that with commensurate training and practice, the ranks of observers comprise a potent collection force.

DEFINITION OF CITIZEN SCIENCE

Citizen science is defined as the systematic collection and analysis of data; development of technology; testing of natural phenomena; and the dissemination of these activities by researchers on a primarily avocational basis (Open Scientist, 2011). While it may seem excessive to define citizen science, it is a valuable exercise in apprehending the role played by lay persons in the pursuit of data, and acknowledges the input made by individuals who have a vested interest in contributing. For example, citizens testing and reporting on water in their neighborhood streams and rivers can more quickly identify problems, and may in some cases expose a lack of oversight

on the part of the appropriate authorities. There can be few, if any, disadvantages ascribed to the involvement of citizens in science, especially when they have been trained or guided by scientists. In the final analysis, all data must be vetted anyway, so there can be little argument against having more data sources.

PROTO-CITIZEN SCIENCE

From the beginning of time, people have been observing the world around them. They have been interested in the whys and wherefores of how the natural world functions. Interacting with natural environments and understanding natural phenomenon have been a matter of cultural and physical survival. Before science was codified, people had observed and recorded their observations in oral or tangible ways (Aldrete, 2004a). Citizen science can be said to have its earliest roots in the observations made by people as they went about their daily lives observing the recurring rhythms of nature, such as the annual flooding of rivers, the appearance and disappearance of constellations, the phases of the moon, the migration of animals, and the progression of the seasons (Aldrete, 2004b; Miller-Rushing et al., 2012).

Examples include: the ancient Egyptians observing the flood cycles of the Nile (Appiah and Gates, 2005; Ikram, 2005), the early Mesopotamians observing the movements of planets and stars and developing a numerical system (Aldrete, 2004b), the ancient Europeans developing metallurgy, e.g., bronze (Pearce, 2004), the early Polynesians noting the constellations and their movements and navigating by them (Sharp, 1964; West, 2009), the Aztecs using engineering for city building and agriculture (Grimbly, 2000), and the early Chinese developing medical systems (Harper, 1996; Cannon, 2002).

CONTRIBUTIONS OF INDIVIDUAL CITIZEN SCIENTISTS

Since the establishment and formalization of science, areas of scientific inquiry have benefited immensely from the contributions of citizen scientists. In early years, these scientists were typically from the upper classes, those who had the time and resources to engage in these pursuits (Miller-Rushing et al., 2012). Both men and women pursued these scientific endeavors. Gentlemen scientists such as Charles Darwin, naturalist, geologist, and originator of the theory of natural selection (Desmond et al., 2004); Antoine Lavoisier, chemist (Donovan, 2015); John Muir, naturalist, conservationist, and writer (Dillon, 2000); John Wesley Powell, explorer, geologist, and anthropologist (Fowler, 2000); David Rittenhouse, astronomer, mathematician, and maker of mathematical instruments (Bedini, 2000); and Henry David Thoreau, author and naturalist (Harding, 2000) have all laid the foundations of their particular fields.

Women scientists such as Mary Anning, fossil collector and fossil dealer (Torrens, 2008); Clara Barton, philanthropist and founder of American Red Cross (Pryor, 2000); Ada Lovelace, mathematician and computer pioneer (Toole, 2009); Maria Sibylla Merian, naturalist and nature artist (Rogers, 2015); Maria Mitchell, astronomer and teacher (Kohlstedt, 2000); and Ellen Richards, chemist and home economist (Stage, 2000) have likewise made significant contributions, in spite of social obstacles. This is just a sampling. Many other individuals, well-known and obscure, over the years have made important contributions to science, and while history does not honor this cadre of individuals in its entirety, nonetheless science has benefitted from its dedication. However, in all cases, a key skill has been, and continues to be, careful observation.

Benjamin Franklin (1706–1790)

Benjamin Franklin, of Philadelphia, was a printer turned inventor and statesman. While probably best known for his involvement with the American Revolution, his work as an inventor is also of note. His work with electricity led to the description of the positive and negative aspects of it and he coined many of the words associated with this science, such as charge and discharge, conductor, condense, and electrify (Lemay, 2000).

Charles Lyell (1797–1875)

Charles Lyell, of Scotland and England, was a lawyer turned geologist. He traveled extensively in England, eastern North America, and Europe. He wrote Principles of Geology, outlining his

observations of geologic phenomena, and put forth the theory of uniformitarianism (Rudwick, 2012).

Mary Anning (1799–1847)

Mary Anning, of Lyme Regis, UK, was a fossil collector turned self-taught geologist, paleontologist, and anatomist. Working on the Dorset Coast, in Jurassic deposits, she found large intact fossil skeletons, many the first of their kind. In her lifetime, she saw geology become firmly established as a science in its own right (Torrens, 2008).

Charles Darwin (1809–1882)

Charles Darwin, of Great Britain, was a gentleman naturalist and geologist. He circumnavigated the globe on the HMS Beagle and made many observations. From these observations he proposed the theory of evolution and later wrote On the Origin of Species (Desmond et al., 2004).

Alfred Russel Wallace (1823–1913)

Alfred Russel Wallace, of the UK, was a surveyor turned naturalist. He independently described the theory of evolution. On a voyage to the Malay Archipelago in the 1850s, his observations led him to describe what has become known as Wallace's Line, the division between Australian and Asian fauna (Smith, 2011).

THE CHANGING NATURE OF SCIENCE

The work of science in the twentieth and twenty-first centuries has been spurred by computer technologies. At first, such infrastructural capacities were expensive, so science was increasingly funded by academic, government, and private institutions (Understanding Science, 2015). That meant that the acquisition of new data and knowledge became the purview of such institutions and in large part dissemination was affordable by only those affiliated with such agencies.

As telecommunication protocols developed, large packets of data could be sent and received, and the Internet further accelerated the exchange of scientific information. Still, this technology was available only to those involved in scientific pursuits. Funded by the United States Department of Defense, and the National Science Foundation, this amalgam of networks eventually developed an interface that was approachable by ordinary citizens, that is the Worldwide Web (Ruthfield, 1995).

The Worldwide Web has vastly accelerated the dissemination of scientific information (Ruthfield, 1995). As computer technologies become more affordable and science has become more approachable, larger numbers of citizens are engaging with scientific concepts and data via the Web. As citizen interest in science converges with affordable and mobile technologies, scientists are recognizing the benefits of citizen participation in the cycle of data collection and dissemination.

Citizen scientists are not full- or part-time professional scientists; nevertheless they have a keen interest in scientific inquiry and are willing to volunteer to support scientific progress. Researchers have depended on volunteers for many years (Miller-Rushing et al., 2012). Historically these volunteers have been relatively local to the project. However with the advent of the Internet, and the Worldwide Web, volunteers are able to connect with more widespread projects via a global network through their home computers and smart phones. Furthermore, this has allowed the researchers to curb costs while expanding the scope of the project (Miller-Rushing et al., 2012).

COLLECTIONS OF CITIZEN SCIENCE ACTIVITES

The Worldwide Web is a rich source of citizen science projects. A diverse array of opportunities is available for all ages through agencies from all levels of government, academia, and private institutions. Various U.S. government agencies such as the U.S. Geological Survey, the National Park Service, and National Aeronautics and Space Administration, among others, provide opportunities for citizens to get their hands dirty and to help with observation and data collection.

CONCLUSION

There are many opportunities for regular citizens to participate in science—opportunities that are suitable for all age groups. Everyone from children to senior adults can participate at a level comfortable and interesting to them. This public participation in scientific data collection provides needed and necessary data to the researchers. These data are a

rich source of additional information for answering research questions and aiding in the explanation of observed phenomena.

EXAMPLES OF PROJECTS

Astronomy

SETI@home (http://setiathome.berkeley.edu/)
SETI@home uses the computing power of personal computers to analyze radio telescope data with the intent of detecting intelligent life beyond Earth's boundaries.

Planet Four (http://planetfour.org/)
Planet Four invites citizens to identify features on images of the Martian surface.

Weather and Climate

CoCoRaHS (http://www.cocorahs.org/)
The Community Collaborative Rain, Hail and Snow Network relies on volunteers to provide accurate precipitation data.

Old Weather (http://www.oldweather.org/)
Old Weather aims to transcribe ships' logs to determine historical weather conditions.

Ecology and Environment

Christmas Bird Count (http://birds.audubon.org/christmas-bird-count)
Possibly the oldest citizen science project (114 years), the Christmas Bird Count charts trends in bird populations.

Nature's Notebook (https://www.usanpn.org/natures_notebook)
Nature's Notebook focuses on animal and plant phenology. Hyperlocal data would be impossible to collect if scientists did not receive help.

ReefBase (http://www.reefbase.org/)
ReefBase collects data about coral reef health, including photographs and maps. The organization also serves as a repository of publications on reefs.

Geology and Earth Science

Did You Feel It? (http://earthquake.usgs.gov/earthquakes/dyfi/)
Did You Feel It? allows citizens to report the intensity of earthquakes felt. The data is georeferenced and used to created maps close to real time.

Skywarn (http://skywarn.org/)
Skywarn uses the observation skills of thousands of citizen scientists who report timely and accurate severe weather events.

Collections of Projects

SciStarter (http://scistarter.com)
SciStarter provides a variety ways to sift through all the ongoing citizen science projects listed on its Web site.

Zooniverse (https://www.zooniverse.org/)
Zooniverse is a suite of citizen science activities developed and maintained by the Citizen Science Alliance.

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SHARE AND SHARE ALIKE: USING WIKIMEDIA COMMONS TO DISSEMINATE GEOPHOTOGRAPHY

Michael C. Rygel
Department of Geology, State University of New York
College at Potsdam, 44 Pierrepont Ave, Potsdam, NY 13676, rygelmc@potsdam.edu

Abstract—Wikimedia Commons (http://commons.wikimedia.org) is an image repository that supports Wikipedia and provides users with a searchable database of thousands of geoscience-related images. Most of these images can be reused for any purpose provided that proper attribution is given and that derivative works can be similarly reused. Images housed on Wikimedia Commons appear in the results for major search engines, particularly if the image is properly titled, captioned, and categorized. Perhaps even more importantly, anyone can integrate these images into Wikipedia articles—one of the most widely used information sources for students and the general public.

Images can be showcased on a user page and/or a category gallery within Wikimedia Commons. My relatively modest collection of teaching images has been used in association with numerous Wikipedia articles, web pages, print publications, and educational materials. Noteworthy recent uses include textbooks (Tarbuck and Lutgens, Earth, 11th ed.; Prothero and Schwab, Sedimentary Geology, 3rd ed.), online educational materials (Norton's Smartwork questions for Marshak, Portrait of a Planet, 4th ed.), an educational iPad app (Back in Time), books by scientific publishers (Springer's Im Fokus: Bodenschätze), and educational web pages (The Smithsonian's Q?rius website; Lakes of Missouri Volunteer Program's Blue Green Algae in Missouri website; SEPM's STRATA web page). Additionally, I have received numerous email requests from individual asking about field trip destinations and literature relevant to the images.

The surprising uptake of my image collection demonstrates that the geoscience community needs increased access to quality geologic images that can be reused without complex copyright clearance and/or expensive fees. Geophotography contributions to Wikimedia Commons can help fill this need.

THE NATIONAL GEOLOGIC MAP DATABASE— A RESOURCE FOR GEOLOGIC MAPPING

David R. Soller
Nancy R. Stamm
U.S. Geological Survey
926-A National Center, Reston, VA 20192, drsoller@usgs.gov

Abstract—The USGS and the Association of American State Geologists are mandated by Congress to provide a National Geologic Map Database (NGMDB, http://ngmdb.usgs.gov/) of standardized, spatial geoscience information. In this partnership, collaboration occurs with the private sector, universities, and geological survey agencies in other countries. From the public website, we serve one of our principal user communities—the professional geologists and non-geologists who need to find geologic maps and geoscience reports, and get answers to their questions. Throughout the NGMDB project's 17 years of operation, service to government agencies, the private sector, and the general public has been a principal responsibility.

Online resources provided by, or linked from, the NGMDB include:

1) cartographic, database design, science terminology, and data-exchange standards (for example, a new standard, simple database design referred to as "NCGMP09," and the FGDC geologic map symbol standard and its implementation in ESRI software);

2) the U.S. Geologic Names Lexicon (GEOLEX), a standard reference for the nation's stratigraphic nomenclature;

3) the Geoscience Map Catalog (containing citations and links to ~94,600 publications, many containing GIS data and map images); and

4) Proceedings from the seventeen annual Digital Mapping Techniques workshops, which document map-preparation techniques and standards in use or in development by the nation's geological surveys.

SCIENTISTS AS MEDIA RESOURCES IN THE AFTERMATH OF DISASTERS: TRENDS IN NEWS COVERAGE FOLLOWING TWO DEVASTATING TSUNAMIS

Ellen K. Buelow
Department of Geology, San Diego State University
5500 Campanile Drive, San Diego, CA 92182

Xai Her
Department of Geology, University of Wisconsin-Eau Claire
154 Phillips Hall, Eau Claire, WI 54702

Scott K. Clark
Department of Geology, University of Wisconsin-Eau Claire
105 Garfield Ave, Eau Claire, WI 54701

Abstract—This study explores the role of scientists in the media's efforts to educate the public about natural disasters. Using the LexisNexis® database we obtained U.S. newspaper and newswire articles published during the week immediately following two major tsunamis: The 26 December 2004 Indian Ocean tsunami and the 11 March 2011 Japan tsunami. Retrieved articles were searched for information attributed to science experts (n = 74 articles for the 2004 Indian Ocean tsunami and n = 97 for the 2011 Japan tsunami). Articles were coded for the field of expertise and the type of information provided. The data show a clear difference in the topics that were discussed after the two tsunamis. Following the 2004 tsunami, 86% of coded articles provided basic information on tsunami-related topics: Explaining what a tsunami is; distinguishing between a tidal wave and a tsunami; describing how tsunamis are generated by earthquakes, and how earthquakes are related to plate tectonics; and, discussing the need for an Indian Ocean warning system. In the aftermath of the 2011 tsunami, a more diverse range of experts were called upon to discuss a more encompassing range of tsunami-related topics, including ocean-wide water level fluctuations and wave arrival times; the effectiveness of the Pacific Ocean warning system; and, the threat of a nuclear disaster. The extent of the media's change in focus is seen in the proportion of articles that included scientific explanations of how earthquakes cause tsunamis (64% in 2004 versus 19% in 2011), and those that discussed the difference between tidal waves and tsunamis (26% in 2004 versus 2% in 2011). We interpret the wider focus of the scientist-based information following the 2011 tsunami as evidence that the news coverage of the 2004 tsunami educated people about basic tsunami facts, which allowed the media to discuss a wider range of relevant scientific information in 2011. Prior research has shown that most U.S. adults learn about science through the media. Curiosity about disaster-related breaking news provides opportunities for 'just-in-time' teaching when people are motivated to learn about the science behind the disaster. These findings suggest that effective collaboration between scientists and the media during the news cycle of a disaster can improve the public's understanding of natural disasters.

THE PAST IS THE KEY TO THE FUTURE: URANIUM RESEARCH AT THE USGS DENVER LIBRARY

Emily C. Wild
Keith Van Cleave
U.S. Geological Survey
Library, Box 25046, MS 914, Denver Federal Center, Denver, CO 80225, ecwild@usgs.gov

Abstract—For the past five years, the U.S. Geological Survey (USGS) Denver Library has provided internal and external instructional sessions to library users on finding print, digital, and online library materials. As library materials become more available in online and digital databases, finding print, CD-ROM, and online subscription library materials have become more challenging for library users. Online content is indexed and available as full-text content; however, there are many databases to navigate and many journals, conference proceedings, government reports, and other series that are only partially available as full-text content. Additionally, database interfaces and access to subscription databases can change from year to year. Luckily, many researchers ask for help in the library resulting in impromptu and scheduled bibliographic instruction sessions for uranium research inquiries. The presentation will be an overview of the print, digital, and online uranium information sources used in the USGS Denver Library.

BACK TO THE FUTURE: URANIUM INFORMATION AT THE USGS DENVER LIBRARY

Emily C. Wild
Keith Van Cleave
U.S. Geological Survey
Library, Box 25046, MS 914, Denver Federal Center, Denver, CO 80225, ecwild@usgs.gov

Abstract—Library materials are more available as digital products in publication and geospatial databases; however, finding print, CD-ROM, online subscriptions, and open-access library materials are more challenging for library users. Published content is often indexed and available as full-text content to library users; howbeit, there are many databases to navigate and many journals, conference proceedings, government reports, and other materials that are only partially available as full-text content or not available in a digital format. Additionally, database interfaces and access to subscription databases can change from year to year.

In the past five years, uranium research inquiries have increased at the U.S. Geological Survey (USGS) Denver Library. The uranium publications that library users are looking to obtain include, but are not limited to, the program products from the USGS and the U.S. Atomic Energy Commission (AEC); for example, the National Uranium Resource Evaluation (NURE) program. Additionally, librarians assist users with the digital access to uranium ore, sediment, and water data and geospatial sources available from the USGS. This poster session will provide information for librarians to disseminate about the physical and digital access to uranium research materials in the USGS Denver Library for the United States and other countries.

GEOLOGICAL, ATMOSPHERIC, CLIMATIC DATA: COLLECTIONS IN THE U.S., POSSIBLY IN THE WORLD. A VISUAL PRESENTATION OF TYPES OF DATA, FORMATS, AND LOCATIONS OF STORAGE

Louise Deis
Library/GSIS, Princeton University
105 Peter B. Lewis Library, Princeton University, Princeton, NJ 08544, lfdeis@princeton.edu

Abstract—Big Data is "all the rage" lately. What constitutes big data in the geosciences? Where is it being stored? How much data?—some idea of the size of repositories. Who has access? What provisions exist for sharing? What formats? In this survey I want to cover U.S. governmental resources at the federal and state levels, and survey as many institutions as I can. I will quite possibly include (other) nation states, too, if I find significant resources. I intend to include atmospheric and climatic data resources, but probably not GIS.

DATA CITATION AND METRICS IN THE GEOSCIENCES

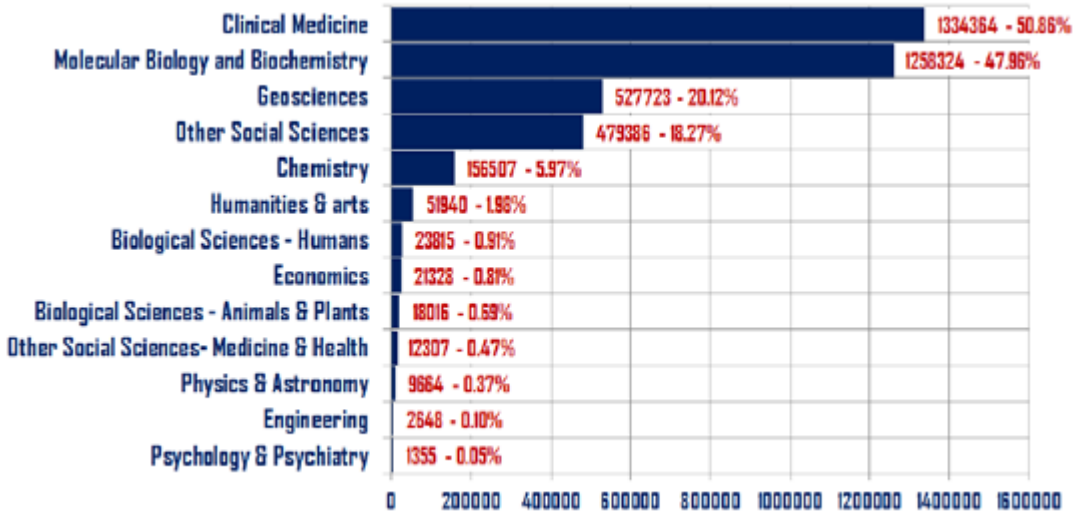
Amanda Bielskas
Columbia University Libraries
601 Schermerhorn, 1190 Amsterdam Ave., New York, NY 10027

Abstract—This poster will explore data citation and metrics in the geosciences. The history, current status, and hopefully some insight into the future can be gleaned from the examples that have been explored. The poster will illustrate a few data citation tools that are currently available for use such as the Data Citation Index as well as others including the DataCite project and Altmetrics.

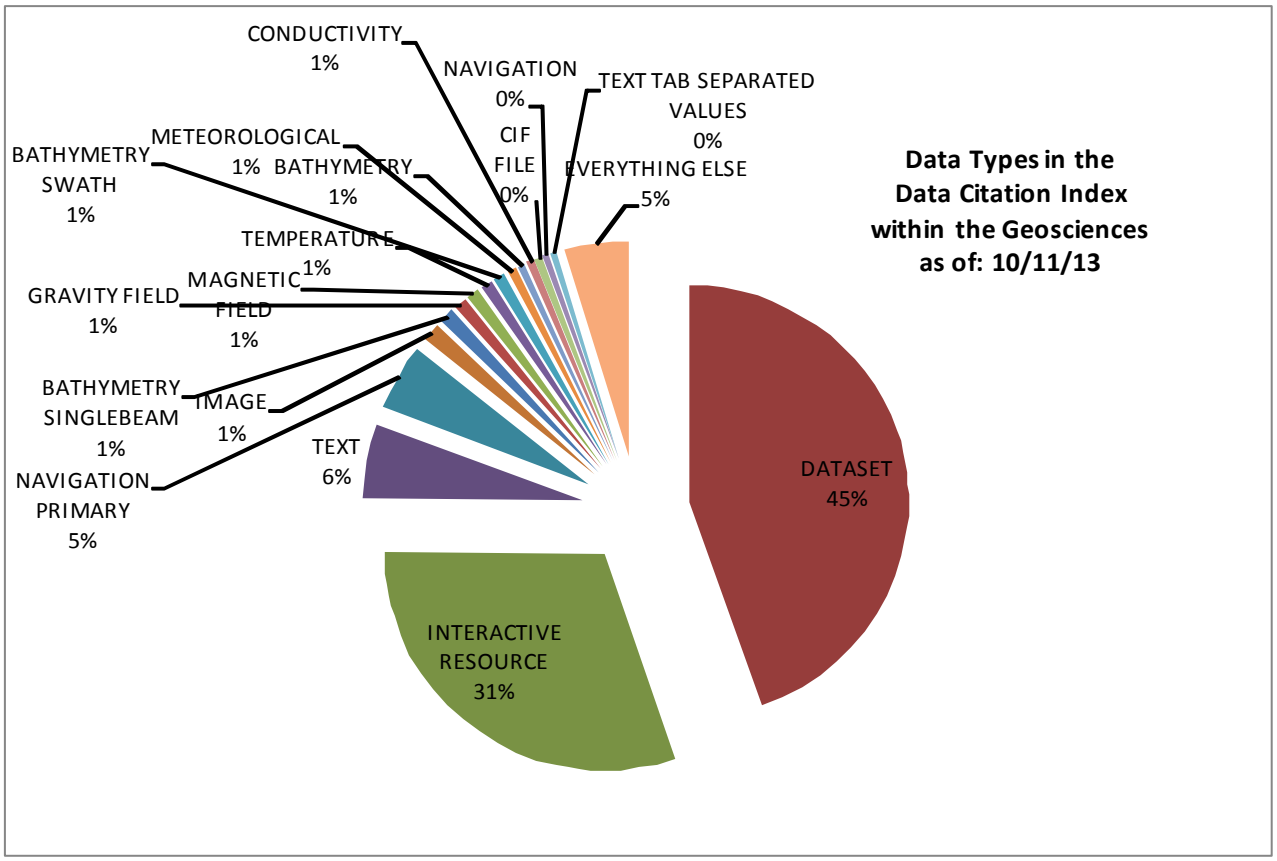
These tools will be used to help measure the contribution of digital research in the discipline and to get a different view of scholarly research output through the data lens.

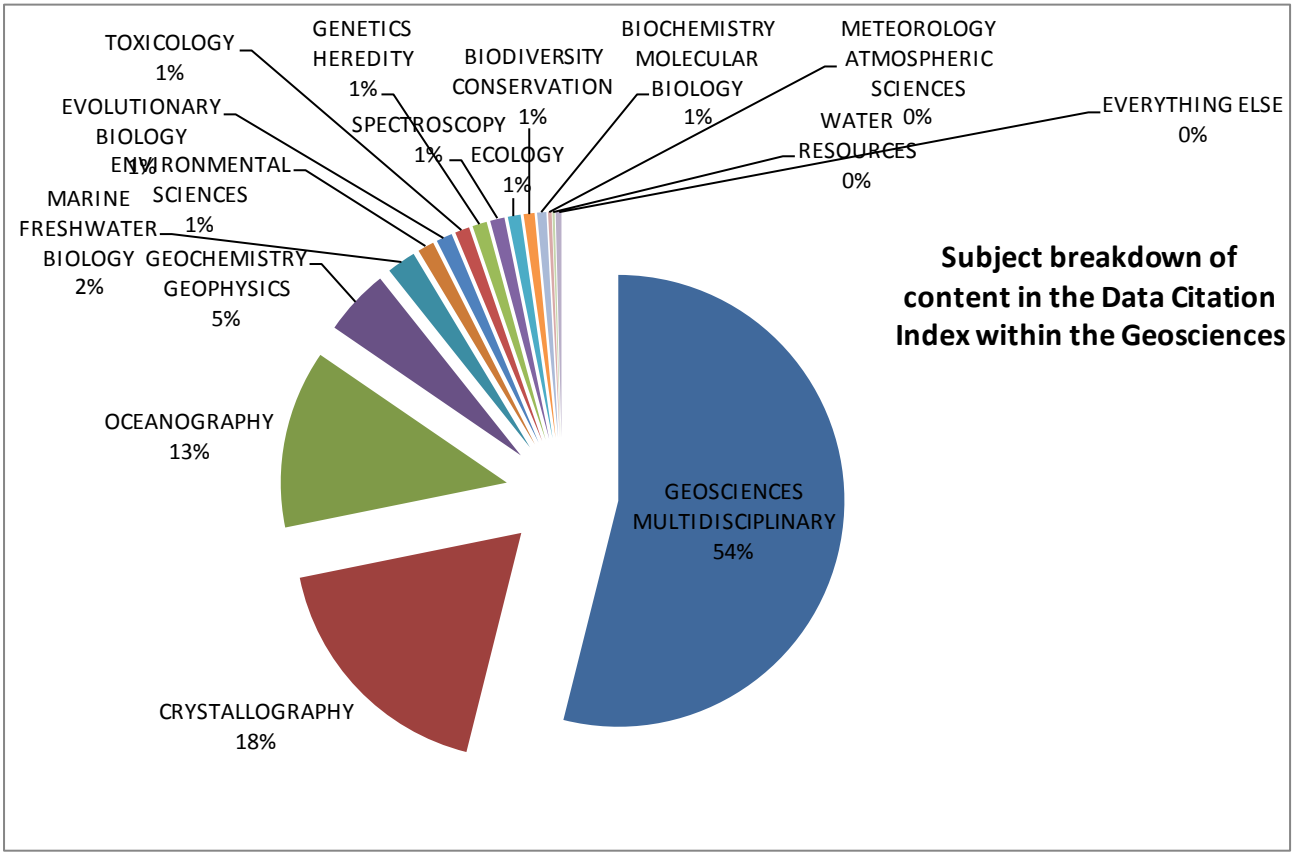
TYPES OF RECORDS WITHIN THE GEOSCIENCES IN THE DATA CITATION INDEX AS OF 10/11/13	
Total number of records (within the geosciences)	775,217
Data Sets	704,624
Data Studies	70,565
Repositories	28

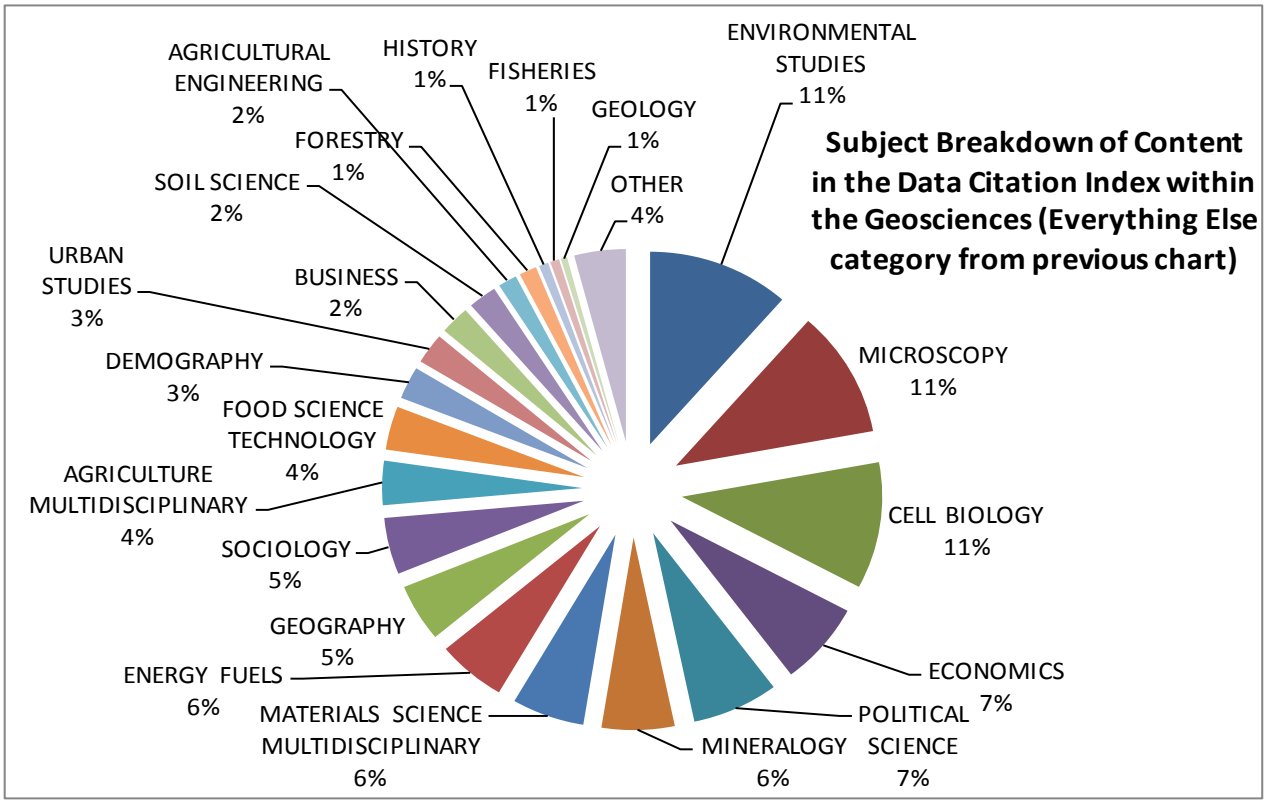
Record Distribution per Discipline in the Data Citation Index as of May 2013



From: Torres-Salinas, D., and Martín-Martín, A., 2013, An introduction to the coverage of the Data Citation Index (Thomson-Reuters): disciplines, document types and repositories. EC3 Working Papers. N 11. *arXiv preprint, arXiv:1306.6584.*


CONDUCTIVITY 1%
NAVIGATION 0%
TEXT TAB SEPARATED VALUES 0%
CIF FILE 0%
EVERYTHING ELSE 5%
METEOROLOGICAL 1%
BATHYMETRY 1%
BATHYMETRY SWATH 1%
TEMPERATURE 1%
MAGNETIC FIELD 1%
GRAVITY FIELD 1%
BATHYMETRY SINGLEBEAM 1%
IMAGE 1%
NAVIGATION PRIMARY 5%
TEXT 6%
DATASET 45%
INTERACTIVE RESOURCE 31%
Data Types in the Data Citation Index within the Geosciences as of: 10/11/13


TOXICOLOGY 1%
GENETICS HEREDITY 1%
BIODIVERSITY CONSERVATION 1%
BIOCHEMISTRY MOLECULAR BIOLOGY 1%
METEOROLOGY ATMOSPHERIC SCIENCES 0%
EVERYTHING ELSE 0%
EVOLUTIONARY BIOLOGY 1%
SPECTROSCOPY 1%
ECOLOGY 1%
WATER RESOURCES 0%
ENVIRONMENTAL SCIENCES 1%
MARINE FRESHWATER BIOLOGY 2%
GEOCHEMISTRY GEOPHYSICS 5%
OCEANOGRAPHY 13%
GEOSCIENCES MULTIDISCIPLINARY 54%
CRYSTALLOGRAPHY 18%
Subject breakdown of content in the Data Citation Index within the Geosciences



ALTMETRICS
(HTTP://ALTMETRICS.ORG)

Altmetrics: is the creation and study of new metrics based on the social Web for analyzing and informing scholarship.

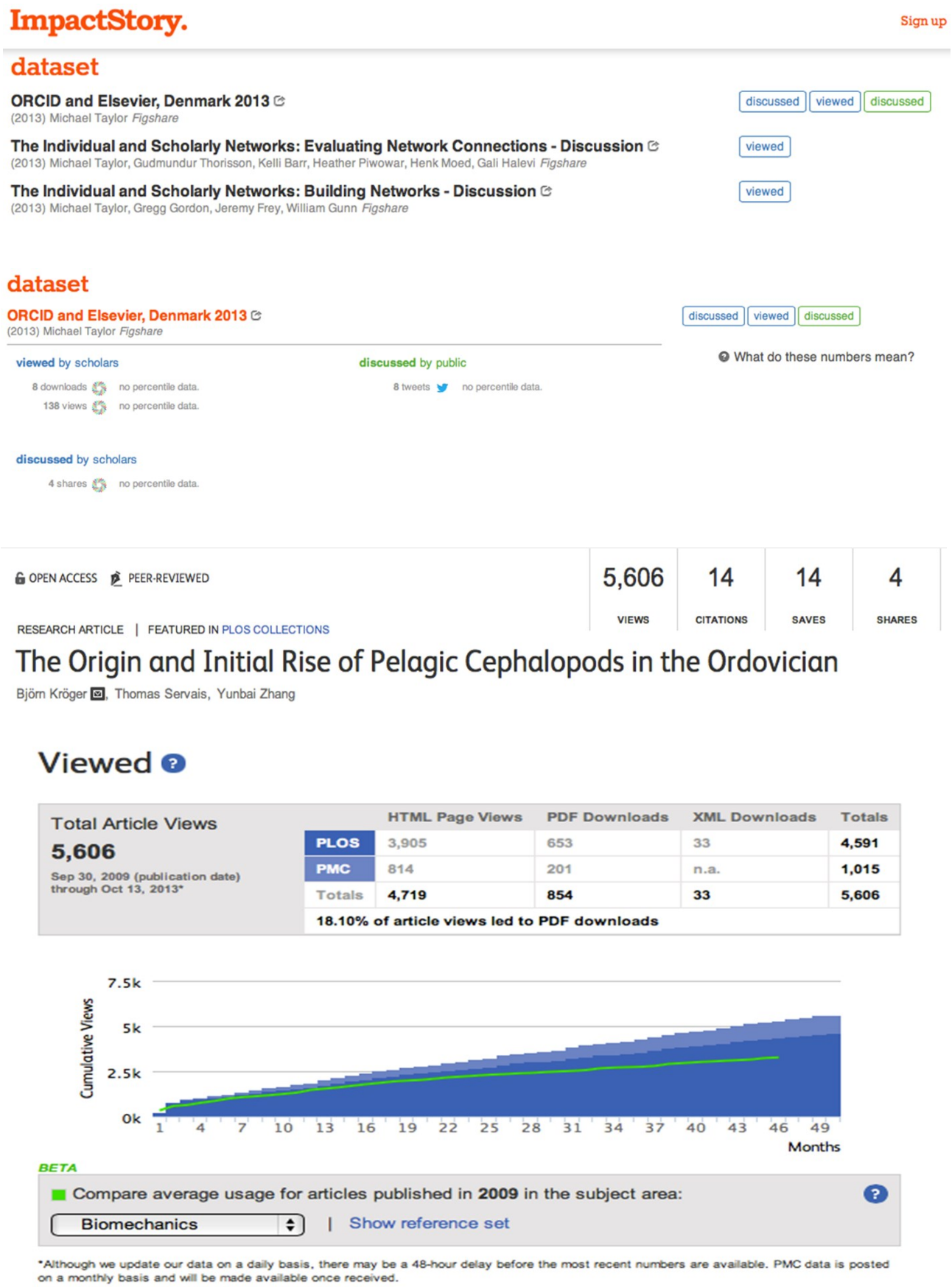
Almetrics Tools: http://altmetrics.org/tools/

ImpactStory (is a Web-based application that makes it easy to track the impact of a wide range of research artifacts (such as papers, datasets, slides, research code). The system aggregates impact data from many sources, from Mendeley to GitHub to Twitter and more, and displays it in a single, permalinked report.

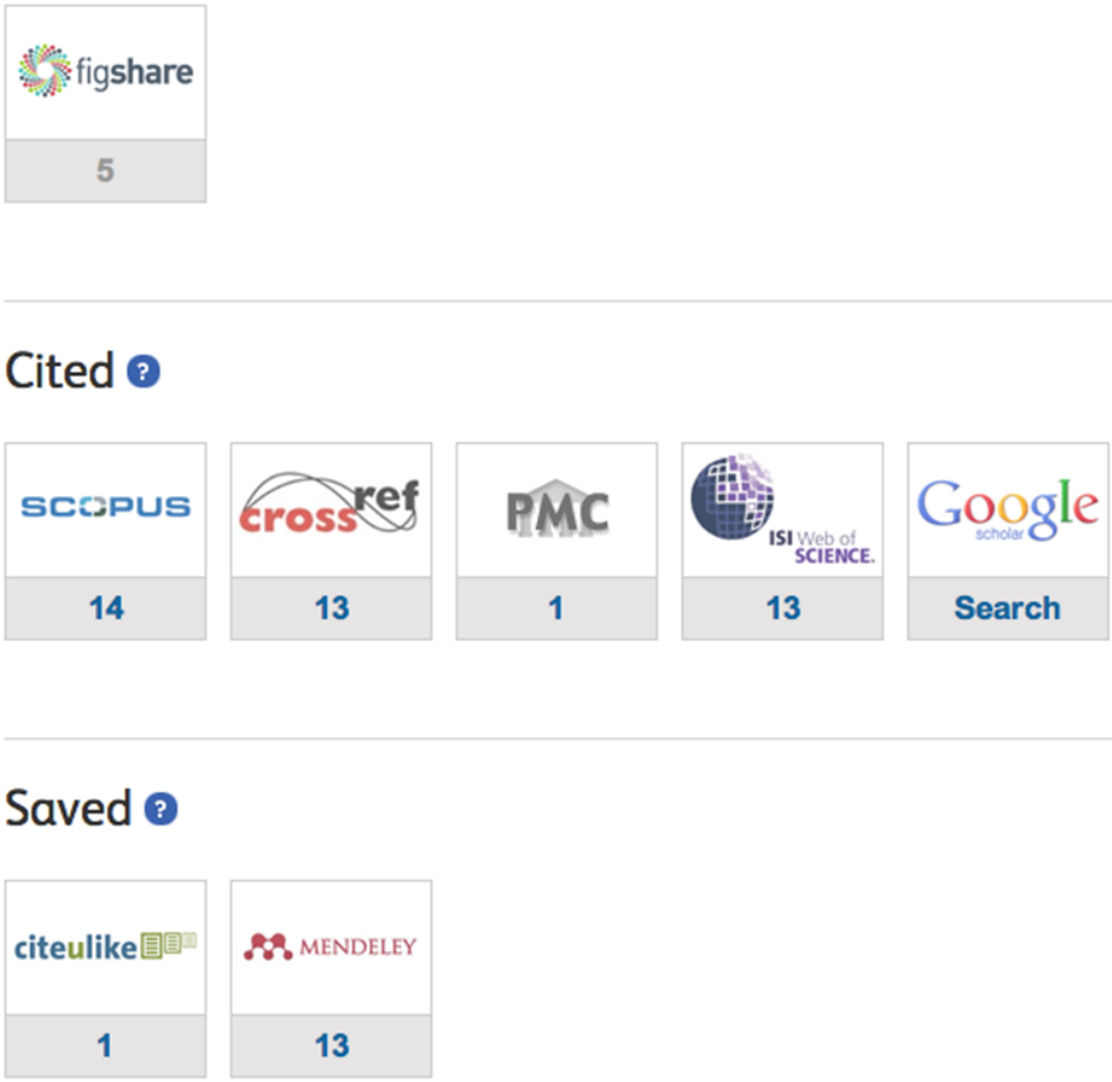
The **PLoS Impact Explorer** allows you to browse the conversations collected by altmetric.com for papers published by the Public Library of Science (PLoS).

CrowdoMeter is a web service that displays tweets linking to scientific articles and allows users to add semantic information.

Example Altmetrics from Michael Taylor's ImpactStory profile: (http://impactstory.org/MichaelTaylor15568)



EXAMPLE ALTMETRICS FROM PLOS ONE



WHY CITE DATA?

•Establishes easier access to research data

•Increases acceptance of research data as legitimate, citable contributions to the scholarly record

•Supports data archiving that will permit results to be verified and re-purposed for future study (allows others to verify your sources)

•By citing sources you uphold intellectual honesty and avoid plagiarism

•Helps organize and track your research process

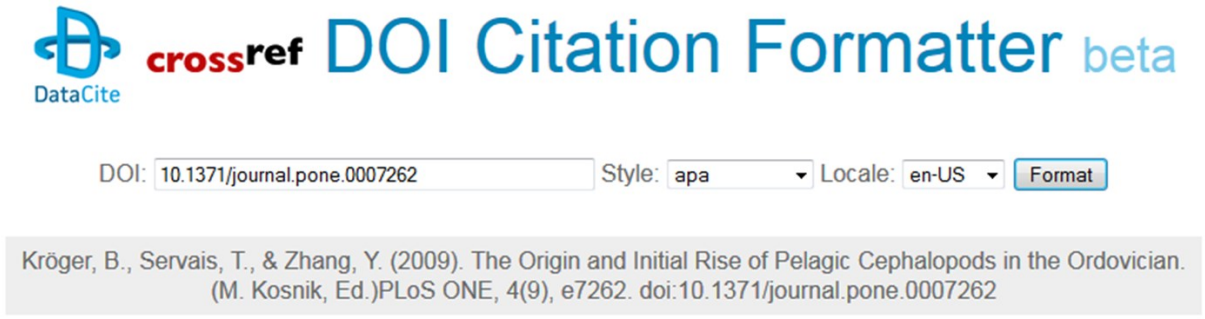
•Acknowledges the original source, gives credit where credit is due

•Enables citation analysis (aka citation metrics)

•Your data could be discoverable via Web of Science.

DOI CITATION FORMATTER

The DOI Citation Formatter creates different citation formats for DataCite and Crossref DOIs. Users can choose from more than 500 different citation formats in 45 different languages.



Data Citation (Nearly) Universal Core Elements:

•Creator(s)

•Date

•Title

•Publisher

•Identifier: A (DOI), or other unique label for the dataset.

Common Additional Elements:

•Location

•Version

•Access Date

•Feature Name

•Verifier

From: (Kratz, J., 2013)

The Task Force on Citation of Geoscience Data lists several Data Citation Examples for different Geoscience data formats including: Well Logs, Cores, Cuttings, Thin Sections; Specimens (rocks, fossils, etc.); Data Sets; and others. http://www.eaee.boun.edu.tr/BEE/Citation%20for%20Geoscience.htm

BRINGING HISTORIC MAPS TO LIFE: GEOREFERENCING FOR THE DIGITAL GLOBE TO SUPPORT INTERDISCIPLINARY SCHOLARSHIP

Katherine H. Weimer
Texas A&M University Libraries, Texas A&M University
5000 TAMU, College Station, TX 77843

Bruce E. Herbert
Geology & Geophysics, Texas A&M University
3115 TAMU, College Station, TX 77843, herbert@geo.tamu.edu

Abstract—Libraries have long been keepers of historic maps, including geologic maps. While these historic maps have traditionally been used for a range of scholarly pursuits, they are experiencing a renaissance when georeferenced and transformed for use with the digital globe, such as Google Earth. As library users shift to preferred digital format, the digital transformation of these historic maps becomes imperative. Beyond the provision of a digital image of the historic map, librarians should provide and promote the view of this information on modern terms. Laying historic maps or aerial photos over a digital globe provides insights and contexts into the location that a standard view of those materials cannot provide. Further, historic maps often provide details and information that is not included in modern maps, such as historic place names, schools, cemeteries, roads, and other cultural or natural features that no longer exist. Use of historic maps guide and support K–12 and post-secondary instructional needs across a number of disciplines. Once georeferenced, historic maps can provide the background for building digital exhibits, to include historic or modern photos, documents, or related texts. This paper will include examples of georeferenced maps, techniques for georeferencing for Google Earth and GIS systems, as well as case studies of their use by scholars.

PART 2:

GEOSCIENCE INFORMATION SOCIETY EVENTS

2013 Annual Meeting, Denver, Colorado
October 26th–30th

GEOSCIENCE INFORMATION SOCIETY
2013 SCHEDULE OF EVENTS

Note: GSIS Committees met separately as arranged by committee chairs

		Location
Saturday, October 26		
9:00 a.m. – 3:30 p.m.	Geoscience Librarianship 101	Auraria Library, 1100 Lawrence Street
3:00 p.m. – 5:00 p.m.	GSIS Executive Board Meeting	Lobby of the Comfort Inn. 401 17th Street.
5:00 p.m. – 7:00 p.m.	Early Bird No-Host Dinner & Meet-n-Greet	The Yard House 1555 Court Place
Sunday, October 27		
9:00 a.m. – 12:00 p.m.	GSIS Business Meeting	Hyatt CCC Mineral Hall A
5:00 p.m. – 7:30 p.m.	Exhibits Opening	Colorado Convention Center
8:00 p.m. – 10:00 p.m.	Ghost Tour of 6 Capitol Hill Mansions and more	Tour departs from 13th St. and Pennsylvania
Monday, October 28		
9:00 a.m. – 6:30 p.m.	GSIS Poster Session T144—Global Vision: Geoscience Information for the Future	Colorado Convention Center
1:00 p.m. – 2:30 p.m.	GSIS Luncheon	Hyatt CCC Centennial Ballroom G
3:00 p.m. – 5:00 p.m.	GSIS Vendor Update/Information Resources Session Presentation schedule: 3:00 – 3:20 GeoScienceWorld 3:20 – 3:40 American Geophysical Union 3:40 – 4:00 Geological Society of London 4:00 – 4:20 Elsevier 4:20 – 4:40 Proquest 4:40 – 5:00 AAPG	Hyatt CCC Mineral Hall E
Tuesday, October 29		
9:00 a.m – 11:30 p.m.	GSIS Professional Issues Roundtable	Hyatt CCC Centennial Ballroom H
2:00 p.m. –	Informal Field trip to the Tattered Cover Bookstore in LoDo	1628 16th St.
6:00 p.m. – 8:00 p.m.	GSIS/GSA Geoinformatics Division Joint Reception & Awards Ceremony	Hyatt CCC Mineral Hall B
Wednesday, October 30		
8:00 a.m. – 9:00 a.m.	Field Trip to the Denver Mint	Denver Mint 320 West Colfax Avenue

"GEOSCIENCE LIBRARIANSHIP 101"
A SEMINAR PRESENTED BY THE GEOSCIENCE INFORMATION SOCIETY

Saturday, October 26, 2013
Auraria Library,
1100 Lawrence Street
Denver, CO 80204

Workshop overview

9:00 a.m. – 9:15 a.m.	Check In Welcome/Introductions: Clara McLeod	Clara McLeod
9:15 a.m. – 10:15 a.m	Instruction/Geosciences Overview	Emily Wild, U.S. Geological Survey
10:15 a.m. – 10:30 a.m	Break	
10:30 a.m. – 12:00 p.m.	Maps and geographic information systems (GIS) • Introduction to maps • Overview of spatial geoscience information and GIS	Linda Zellmer, Western Illinois University
12:00 p.m. – 1:00 p.m.	Lunch and networking	
1:00 p.m. – 2:00 p.m.	Collection Development • Overview of collection development	Amanda Bielskas, Columbia University
2:00 p.m. – 2:15 p.m.	Break	
2:15 p.m. – 3:15 p.m.	Reference Services • Overview of reference in geosciences • Demo/exploration of some specific resources—GeoRef, but also low cost, readily available resources	Hannah Winkler, Stanford University
3:15 p.m. – 3:30 p.m.	Feedback and wrap up	Clara McLeod

Thanks to the following sponsors for their generous support of ***Geoscience Librarianship 101:***

GEOSCIENCE INFORMATION SOCIETY
2013 BUSINESS MEETING MINUTES

Sunday, October 27, 2013, 9:00 am –12:00 pm
Hyatt Convention Center, Mineral Hall A, Denver, Colorado

Respectfully submitted by Cynthia Prosser, Secretary

I. Call to order (Linda Zellmer) 9:35 AM

28 in attendance: Linda Zellmer, Cynthia Prosser, Shaun Hardy, Dorothy McGarry, Lura Joseph, Anne Huber, Carol La Russa, Jody Foote, Emily Wild, Amanda Bielskas, Kevin Lindstrom, Linda Musser, Thelma Thompson, Afifa Kechrid, Clara McLeod, Louise Deis, Dona Dirlam, Paula Rucinski, Hannah Winkler, Marie Dvorzak, Joann Lerud-Heck, Lisa Dunn, Michael Noga, John Hunter, Rusty Kimball, Julie, Triplehorn, Richard Huffine, Mary Scott.

II. Introduction of Executive Board

a. President (Linda Zellmer)
b. Vice President , President-Elect (2013), Amanda Bielskas
c. Vice-President, President-Elect (2014), Emily Wild
d. Secretary, Cynthia Prosser
e. Treasurer, Angelique Jenks-Brown (incoming Caroline Rauber)
f. Immediate Past-President, Lisa Johnston
g. Newsletter Editor, Bonnie Swoger
h. Publications Manager, Richard Huffine

III. Welcome and General Introductions (Linda Zellmer)

IV. Approval of the Agenda

John Hunter – moved, Lura Joseph – seconded, - Agenda approved

V. Approval of the Annual Business Meeting Minutes 2012 (November 4, 2012)

Linda Musser – moved, Amanda Bielskas – seconded. Minutes approved

VI. Reports

A. GSIS general (Linda Zellmer)

1. Committee memberships and chairs

2. Topical Session (requirements and future)

B. Financial (Angelique Jenks-Brown)

Pass

C. 2013 conference (Amada Bielskas)

D. Archives (Anne Huber sent a note to Bonnie Swoger - there was no report)

E. Awards Certificates (Linda Zellmer)

Awards were printed and brought to the meeting in folders to prevent breakage of the frames and to promote easy of packing for recipients.

F. Exhibits (April Love)

G. Membership (Cynthia Prosser)

Memberships and membership renewals for 109 members, including 10 new member applications were processed in 2013. Total membership numbers are down a little over last year. The memberships include 2 Sustaining, 95 Personal, 10 Retired and 2 Student members. In addition, there are 4 Institutional members (GSW, Geological Society, University of Illinois at Urbana-Champaign, and Illinois State Library).

2013 GSIS BUSINESS MEETING MINUTES
CONTINUED

H. Best Paper Award (Carol LaRussa)

The Geoscience Information Society Best Paper Award Committee has selected "The Ogallala Aquifer in Nebraska: Gray Literature (1891-2010)" by Adonna Fleming, Leslie M. Delserone and Elaine Nowick for this year's Best Paper Award. It was published in 2012 in volume 13 of the Journal of Agricultural and Food Information. The members of the committee found it to be very timely discussion of the issues involved in compiling an Ogallala Aquifer bibliography and especially of the importance of gray literature to the topic and its lack of representation in the library and digital information worlds. This is a common problem for researchers of many similar environmental topics and it deserves more attention.

Adonna Fleming is Associate Professor and GIS/Geosciences Librarian at the University of Nebraska-Lincoln. Leslie M. Delserone is Assistant Professor and Science Librarian at the University of Nebraska-Lincoln. Elaine Nowick is Professor Emeritus at the University of Nebraska-Lincoln.

I. Guidebooks (Jody Foote)

2 winners:

Rose, Bill, and Olson, Justin, 2013, Isle Royale; Keweenaw Rift geology: Houghton, MI, Michigan Technological University, 88 p. <http://www.d.umn.edu/prc/lakesuperiorgeology/Volumes/IRFieldTripBook_2013.pdf>

Eyles, Nick, 2013, Road rocks Ontario; over 250 geological wonders to discover: Markham, ON, Fitzhenry & Whiteside, 570 p. ISBN 9781550418590

J. Nominating (Lisa Johnston's Report)

Recruited and elected Emily Wild from USGS for Vice-President and Carolyn Rauber for Treasurer.

K. Best Reference Work Award (No chair, Michael Noga)

1. The committee called for nominations, received several, but did not come to a conclusion on a best work.
2. This Committee is still necessary.
3. One issue is that more and more of the resources are electronic and the committee members do not necessarily have access to them.
4. One solution is to get access for a limited time for the committee to consider the work.

L. Information Resources (has been organized by VP for the past several years)

It comes together as a part of the fundraising. If a vendor agrees to sponsor, they are offered a chance to speak at this session. This year everyone accepted.

Do we still need this committee? Should it be dissolved?

Dona Dirlam – it is open to everyone, it is great outreach.

After a lively discussion, a vote was taken and the Committee was dissolved.

M. Preservation (no chair)

Linda Musser – do we still have a committee?

Linda Zellmer – should we consider data as part of the charge?

A debate then erupted on the Committees and their effectiveness, functionality, and importance.

There is concern that the committees are not being filled and the work is not being accomplished. There have been several years that no one has volunteered to serve as Chair.

Some suggestions:

Give a committee until a certain date to have a chair and get started or the committee does not exist for the

year.

Executive Board needs to decide this at this meeting what committees go forward

Send a note to GeoNet if the committee is being sunseted.

Shaun Hardy – What is the strategic plan for the Society? Where is it going in the next 5 years? Does it move us forward and how would structural changes effect the society?

Have discussed in the past suggestions on how we should reorganized

What questions do we want to ask?

Dorothy McGarry - Set up a strategic committee? make suggestions, do surveys, etc.

Lisa Dunn – Exec. Board is responsible for the strategic vision. Do we really have enough people to form another committee?

Michael Noga – 20 years ago membership was around 200.

Emily Wild – what is the future?

Hannah Winkler – other societies shrinking as people retire or leave positions and those remaining assume more duties.

Michael Noga – people have more aspects to their jobs,

Emily Wild - people having more duties added to their jobs

Michael Noga –Would it help to have or publish more detail on what each committee is supposed to do? What specifically? What are the goals for the coming year? A purpose or plan to get the committee thinking.

Carol La Russa – A charge for the Committee.

Linda Zellmer – Should the committee be deciding what it needs to do?

Lura Joseph – awards stick with the committee, because they do other aspects

Linda Zellmer – 4 best awards. Would it be a benefit to merge Best Paper, Best Website, and the Ansari Distinguished Service into 1 committee?

Michael Noga – advocating

Julie Triplehorn – to combine all the awards would make a lot of work for someone

Amanda Bielskas – it is good to have more on the committee to have wide access to resources. Also if life happens to a committee member, there are still enough to do the work.

Michael Noga – We do have a nominating process, and it works pretty good (for the Bests committees).

Marie Do – awards committees – it is something that people can do without coming to the meeting, can contribute remotely.

Linda Musser – I see the value of an Awards committee, maybe take a middle ground and combine 2 of the awards to test the waters?

Thelma Thompson – For each committee, when you put out with the call to serve, state what time of year the members will be most busy. The committee work tends to be seasonal.

Hannah Winkler –I'm just realizing you can be on multiple committees and that much of the work is done remotely.

Lisa Dunn – I recommend there is a drop dead date. If the committee does not have a chair and has not started work, the committee be dropped for the year.

2013 GSIS BUSINESS MEETING MINUTES

CONTINUED

Lisa Dunn – Makes a motion for the Executive Board to pick a date that the committee has a chair else goes dead – subsequently, withdraws motion pending checking President's Manual – Joanne Lerud-Huck withdraws her second.

Ansari Distinguished Service Award had no chair, and thus no award this year.

Michael Noga – it is a very special award that does not have a recipient each year.

N. Distinguished Service Award (None; Sharon Tahirkheli)

Linda Musser – GSIS created this award, Mary Ansari then later funded it, we can go back to it simply being the GSIS Distinguished Service Award.

O. International Initiatives (Maxine Schmidt)

Dorothy McGarry – Maxine Schmidt had arranged with Jody Triplehorn to run the silent auction.

Perhaps use the moneys raised to sponsor memberships

Get some folks to write articles for the newsletter

Michael Noga – look at international theses &dissertations

P. Best Website (Bonnie Swoger)

Bob Tolliver – no award this year.

Q. Auditor (Miriam Kennard)

Books are in order, report in the newsletter.

R. Geonet Moderator (Louise Deis)

See chart.

GEONET SUBSCRIBERS FOR 2013	
Country	Subscribers
Australia	11
Austria	1
Belgium	2
Brazil	1
Canada	24
China	1
??? (EU)	1
France	4
Germany	3
Italy	1
Mexico	2
Netherlands	2
New Zealand	3
Norway	1
??? (RS)	1
Spain	1
Sweden	3
United Kingdom	7
United States	309
Total subscribers: 378 Total countries represented: 19 Total local host users: 0	

S. GSIS Newsletter Editor (Bonnie Swoger)

Newsletter coming out on schedule and people are volunteering content, perhaps ask for some International content, a few reviews of books and websites?

T. GSIS Newsletter Reviews Editor (Lori Tschirhart)

No report

U. Publications Manager (Richard Huffine, 2012–)

Working on the 2012 Proceedings.

Do we want to make this the 1st electronic only proceedings?

Membership's survey indicated that they would be like electronic access.

Do we want an embargo? Rolling wall?

Lisa Dunn – What platform would we use? Posting on our website?

Richard Huffine: An IR that has offered us space and we are working through that.

GSIS proceedings v. 40 & 41 published in January, a few available for purchase

2 large orders of back files were filled this year.

We are caught up

2012 Proceedings are in the works. Richard Huffine and Linda Zellmer are working on them.

Richard Huffine asked the Board about how to handle the 2013 Proceedings

Linda Zellmer – asking the poster presenters to write papers.

Richard Huffine – we will see some color and still remain under budget.

Retrospective to fill in older ones. Those produced electronically get up rapidly.

Marie Dvorzak – how many subscribers? Richard Huffine – about 15.

V. Publicity Officer (Adonna Fleming)

Publicity happened for Geo 101. Several announcements were sent out.

W. Webmaster (Courtney Hoffner)

Linda Zellmer – working to put up more content and has added Shaun's open access information.

Adding more to the resources page.

X. GSA Topical Session Convener (Hannah Winkler)

No technical session this year – we did not get the minimum 12 for it to go.

Did get the 7 needed for the poster session to go.

Will be collecting papers from posters for a proceedings.

How can we get more people involved for next year?

Unfortunately, don't really know exactly when session will be scheduled until closer the conference dates.

Linda Zellmer – can we do something via Skype to get participants? – Unfortunately not something that was offered at GSA

Lura Joseph – the conveners have to almost badger folks to get them to submit and present.

Jody Foote – have to send multiple emails asking for presentations

Michael Noga - constantly remind people what the theme is, keep promoting it

Lura Joseph – the convener does not know who has submitted and abstract until close to the deadline. It would be nice if the membership let the convener know they were going to submit or had submitted.

Marie Dvorzak – you need to beat the bushes to get presentation

Linda Zellmer – will Kevin Lindstrom volunteer to convene next year's sessions? We can talk later.

Hannah Winkler – Approached other groups but the timing was wrong for the other group – either too early or too late to have a joint session.

Richard Huffine – another possible group to approach is the History group

Hannah Winkler – One of our submissions went to the Education group.

Hannah Winkler – Do we want our own session or do we want to infiltrate other groups?

Emily Wild – Can we get other groups to infiltrate us?

Lura Joseph – Great ideas but make it only 1 other group.

2013 GSIS BUISINESS MEETING MINUTES
CONTINUED

Hannah Winkler – Make it duel topic and session to make sure it covers the interest of both groups

Richard Huffine – Mine the other talks and ask others to publish in our proceedings.

Y. Geoscience Librarianship 101 (Clara McLeod)

20 students & 5 instructors – Thanks Lisa Dunn for finding a place to hold it and to Gale for logistics and refreshments.

Hannah Winkler – Is there a travel award?

Shaun Hardy – Student sponsorship to come to the meeting?

Linda Zellmer – Make a motion to use any leftover funds from the fundraising to sponsor memberships for 3 students?

Lisa Dunn – Are we allowed to use the money to sponsor scholarships?

Linda Musser – Do we have professional development funds to cover this?

Clara McLeod – yes

Shaun Hardy – Use the professional development funds for the sponsorship.

Shaun Hardy – A number of years ago, there was a fellowship that brought over 2 International students for a 6 week practicum and they also attended GSA that year.

Lisa Dunn – If people donate money for a specific thing you have to use the money for that specific thing.

Clara McLeod – Thanks to everyone who made GeoScience Librarianship 101 such a success and thanks to Jan Heagy for certificates. We also welcomed new instructors, advertised the No-Host Dinner, and invited the students to attend too. Have looked at evals – most were pleased with the content. Comments included that they would like to see data management and a live GSIS session. They liked having a jump drive to take home. Always inquiries about doing online session.

Z. GSIS participation in AGI Member Society Council

Thanks to Linda Musser for attending the meeting in Piittsburgh

Amanda Bielskas will be attending tomorrow's meeting.

AA. AGI Harriet Wallace Scholarship Selection Committee, Mary Scott, 2012-2014

Another scholarship was given this year, applications for the next award are due in Jan. You receive the award for 1 year and may renew it for a second.

BB. CUAC (Clara McLeod or LindaZellmer)

Linda Zellmer – CUAC membership is declining.

WMAL – could not get a replacement for their membership slot

All this leading to CUAC being disbanded. Linda Zellmer – recommends the funds that remain should be divided amongst the CUAC membership.

Clara McLeod – CUAC is shutting down, read letter describing how the work of CUAC can be carried on. Highlights are: Have individual groups host Webinars on a regularly scheduled basis with government agency representatives to discuss initiatives, products, data, and services; Have a member from each group join the phone calls that take place monthly by the Federal Geographic Data Committee's working group. Note GSIS already has a member serving in this capacity; Encourage individual members to post about relevant government information on the list-servs for all our groups; Have one or more of the organizations appoint an individual or a committee to handle advocacy and government communication; Create a space in the Map Librarian's toolbox for relevant agency information; Encourage members to meet with Federal agency representatives at other meetings such as the ESRI User Conference, the American Association of Geographers, the Geo-

logical Society of America conference, NACIS, and the Federal Depository Library conference.

Richard Huffine – This is sad because of the part they have played in the past.

We should ask the LOC to play a part in keeping federal agency liaisons.

Clara McLeod – Federal Agencies valued them.

CC. Other Representation at Meetings?

Joanne Lerud-Heck – represents us to GSA publications, currently developing an ethics policy due to seeing more things like plagiarizing, permissions to use data, etc. What you do in these cases? What are the sanctions? Then you get into legal issues. Open access is being bantered about. When they choose a position we will hear of it.

Michael Noga – AGU publications committee, open access is a big discussion.

Kevin Lindstron – GeoRef advisory committee

Linda Musser – will be joining the GeoRef committee.

Richard Huffine – gave an webinar on open access. Commented that in the Federal government Open Access is a hot topic

Marie Dvorzak – AGI government affairs, meeting is in 2 weeks, open access and data management are big topics – what are other issues you would be interested in bringing to the group?

Thelma Thompson – NOAA is moving into FAA, no more paper nautical charts come spring.

Emily Wild – USGS, we have stopped printing maps, the big issue is that there are not print

Marie Dvorzak – Recent gov't shutdown shows why we need print.

Richard Huffine – or at least distribute the digits and not have them only on that 1 website. LOCKSS documents only for legislative not for the scientific agencies.

DD. Other News and Information

Anne Huber – working on getting the newsletters and proceedings scanned, University of Illinois

GSW for proceedings Content $6000, plus ongoing costs of about $6000 per year

For the 1st 25 years or so we did not collect copyright from the authors publishing in the Proceedings

Linda Dunn – we only have 2 options –put them up and do a take down if necessary or try and get copyright.

Deal with a protest as it would occur.

Marie Dvorzak – Hathi trust is persnickety abut copyright, they seem to think that there is copyright even where there isn't i.e. Federal documents do not have copyright

Linda Zellmer – AAPG datapages might be willing to work with us, but that database is not widely available.

Emily Wild – you can get in and use the database and if the item is open access you can access it.

IV. Old Business

GSIS Proceedings

We will have a proceedings from last year in some form

Linda Zellmer – request a quote from Ron Hart of AAPG Datapages

Publications and the GSIS Proceedings (Richard Huffine)

What to do about the Ansari Distinguished Service award?

2013 GSIS BUISINESS MEETING MINUTES
CONTINUED

Once we are assured the money has run out, we need to rename it

GSIS Wiki and digital archives (Bonnie Swoger/Lisa Johnston)

Collect papers for proceedings before conference

Michael Noga – always have this problem

Linda Musser – have we considered opening it up to other papers by members who could not attend the meeting

Linda Zellmer – should we look into collecting slides and presenting via Skype, etc.

Richard Huffine – perhaps develop open access articles based on webinars from all during the year.

Linda Zellmer – we could request papers for the newsletter from those who could not attend the meeting.

Joanne Lerud-Heck – while the papers are not peer-reviewed, the abstracts are, would have to rethink whether the papers would count toward tenure, so if we added these sorts of things it would lower the quality

Create/retire committees - see discussion about after Preservation committee report.

V. New Business

Publications and the GSIS Proceedings (Linda Zellmer, Richard Huffine)

Update on Anasari Award

Don't have an update at this time.

GSIS Wiki and digital archives (Bonnie Swoger/Lisa Johnston)

Sharing info via the Wiki, the board especially finds this convenient

2013 GSA Conference (Amanda Bielskas)

Thank you: AGU, Elsevier, AAPG Datapages, ProQuest, GSW, Geological Society. A total of $6750 was raised.

Attached the schedule.

VI. Other items

Thelma Thompson – working with open access and guidebooks, In particular, working on getting guidebooks online. Has received a $475,000 grant. The grant will help fund the building of PLACE, the Position-based Location Archive Coordinate Explorer. PLACE will be a geospatial search interface, available to the general public through the library website.

Judie Triplehorn – The silent auction will be at the reception on Tuesday evening and it starts at 6 PM and will go to 7:30 PM.

Linda Musser – I would like to formally thank Linda Zellmer for her service.

VII. Adjourn

Linda Musser – moved, Kevin Lindstrom – 2nd, we are adjourned at 12:10.

IMAGE QUALITY IN UNIVERSITY OF ILLINOIS DIGITAL GEOLOGY DISSERTATIONS FROM PROQUEST

Presented at the GSIS Professional Issues Roundtable
Tuesday, October 29, 2013, 9–11:30 a.m.
Hyatt CCC
Centennial Ballroom H
Denver, CO

Lura E. Joseph
Library, University of Illinois at Urbana-Champaign
450J Main Library, MC-522, 1408 W. Gregory Drive, Urbana, IL 61801, luraj@illinois.edu

Abstract—In 2009, University of Illinois at Urbana-Champaign (UIUC) purchased a block of approximately 5,000 UIUC dissertations, authored between 1989 and 1997, that were scanned from microfilm by Proquest. These were subsequently provided in PDF form both within the UIUC institutional digital repository (IDEALS) to the UIUC community and via the Proquest platform. Subsequently, approximately 18,000 additional dissertations were digitized from microfilm by Proquest for UIUC.

Most geology dissertations contain photographs, micrographs, maps, and cross-sections (often in color and often oversized), seismic sections and other figures, images, and plates. These do not copy adequately into microform format, and therefore are not adequate when digitized. This content is often some of the most useful information contained in geology dissertations.

Therefore, the dissertations digitized from microfilm are insufficient for the discipline of geology. Geology dissertations need to be scanned from originals into high-quality color and grey-scale. Administrators and other library staff unfamiliar with the discipline of geology may fail to understand the nature and extent of the problem. In order to document the need for this in-house work, a study was conducted to reveal the extent of problems in the Proquest versions digitized from microform. All known geology dissertations from UIUC (439) were included in the study. This talk discusses the results, which other geology librarians and geology departments may find useful for discussions with their own administrators regarding digitizing geology dissertations and theses.

Published paper: Joseph, L.E., 2014, Image quality in University of Illinois digital geology dissertations from ProQuest: Issues in Science and Technology Librarianship, n. 77 (Summer), https://doi.org/10.5062/F4Z31WM1.

2013 GEOSCIENCE INFORMATION SOCIETY AWARD WINNERS

Presented at the GSIS and GSA Informatics Division Joint Reception
Tuesday, October 29, 2013, 6–8 p.m.
Hyatt CCC
Mineral Hall B
Denver, CO

Mary B. Ansari Distinguished Service Award

No award given.

Mary B. Ansari Best Geoscience Research Resource Award

Henry R. Frankel
University of Missouri, Kansas City
frankelh@umkc.edu

Editor, for his book *The Continental Drift Controversy,* Cambridge University Press, 2012.

Best Website Award

No award given.

Best Paper Award

Adonna Fleming
University of Nebraska–Lincoln, dfleming2@unl.edu

Leslie M. Delserone
University of Nebraska–Lincoln, ldelserone2@unl.edu

Elaine Maytag Nowick
University of Nebraska–Lincoln, enowick@unl.edu

For their 2012 paper, "The Ogallala Aquifer in Nebraska: Gray Literature (1891–2010)," published in *Journal of Agricultural & Food Information,* v. 13, p. 213–239.

Best Guidebook Award

There were two winners this year:

Bill Rose
Michigan Technological University, raman@mtu.edu

Justin Olson
Michigan Technological University

For their 2013 guidebook, *Isle Royale: Keweenaw Rift Geology Field Trip,* published by the Institute of

Lake Superior Geology.

The second Guidebook award went to:

Nick Eyles
University of Toronto

For his 2013 guidebook, *Road Rocks Ontario: Over 250 Geological Wonders to Discover*, published by Fitzhenry & Whiteside.

Part 3

Proceedings of the 49th Meeting of the Geoscience Information Society

GSA Technical Session 192

T145. Where in the World?
Access and Availability to Geoscience Data I

Identifying, accessing, analyzing, and preserving geoscience data sets can be daunting. This session will examine how researchers, information professionals, and librarians are supporting data-intensive scientific discovery in the geosciences.

Session Convener

Hannah Winkler Hamalainen
October 21, 2014
8:00 a.m. – 12:00 p.m.

DATASETS IN GEOLOGY ARTICLES: A PRELIMINARY INVESTIGATION OF USE, CITATION, AND REPOSITORIES

Barry N Brown
Mansfield Library, University of Montana
Missoula, MT 59812, Barry.Brown@umontana.edu

Abstract—Scientific progress relies on sharing results and discoveries and building on the work of others. Geology researchers are presumably increasingly interested in sharing, and required by funders to share, their datasets and are also presumably increasingly reliant on the shared datasets of other researchers. Options for sharing datasets include local institutional or organizational repositories; journal article/publisher repositories; and national/international research network repositories. An analysis of articles in selected, impactful, professional journals for geology: *Geology; Journal of Metamorphic Geology; The Journal of Geology;* and *Sedimentology*, published between 2009–2013, was conducted to determine if the mention of, and specific citing of, datasets has increased over the last five years. Additionally, major repositories for geology datasets were identified and citations to them were noted.

DESCRIBING THE WORLD'S GEOSCIENCE DATA CENTERS

Louise Deis
Library/GSIS, Princeton University
105 Peter B. Lewis Library, Princeton University, Princeton, NJ 08544, lfdeis@princeton.edu

Abstract—The world is shrinking—as well as melting—and thanks to enormous strides in technology, we are able to share information much more readily. There is so much data, it is so right to organize and control it and make it available to all interested researchers. How else will we be able to peek over horizons? Presented will be overviews of major global geoscience data hubs focusing on atmospheric and oceanic sciences, climate change, geodynamics, geochemistry, and mineralogy. Descriptions will include repository sizes, data formats, and access.

STEPS TO UNDERSTANDING ENTIRE RANGE OF DATA RESOURCES IN THE GEOLOGICAL SCIENCES

Alison G. Johnston
University of Canterbury Library
Private Bag 4800, Christchurch, 8140, New Zealand, alison.johnston@canterbury.ac.nz

Abstract—Accessing geoscience data isn't a new issue; it has occupied me for most of my professional life as a geology liaison librarian at the University of Canterbury in New Zealand. As I am also a geological researcher with a recently awarded M.Sc. I have two different perspectives to share and they may not agree with each other! My years of experience as a liaison librarian has taught me the importance of recognizing where "old" data exists and the importance such data can have in generating new data. However, past publication trends in geology haven't made it easy to identify "old" data. Following the disastrous Canterbury earthquakes of 2010–2011 when the geological collection was severely affected, hard decisions had to be made about criteria for retaining material and the presence of data in items is now an important criteria for retention. However, there is room for improvement in providing access to geological data within present university library practices.

When I became a geological researcher generating my own data in the lab and in the field I discovered a new world of data resources outside the library walls. I discovered that "old" data was still vital to my project. I also approached individual researchers to reuse their data, used national data repositories and pondered on the question of how to make my data accessible—or not.

The general principles I wish to share from my experiences are centered on the need for geological librarians to understand the entire range of data sources in their sub-disciplines. Researchers may decide that if librarians don't understand the importance of "old" data they may have difficulties being involved with new geoscience data storage projects.

THE GEOSCIENCE THESIS AND INCORPORATION OF THE AUTHOR'S PRIOR PUBLICATIONS: IMPACTS ON USERS AND CHALLENGES FOR LIBRARIANS

Lisa G. Dunn
Arthur Lakes Library, Colorado School of Mines
1400 Illinois St., Golden CO 80401 USA, ldunn@mines.edu

Abstract—Graduate students in the geosciences are encouraged to publish their research before completing a thesis or dissertation. Increasingly, published articles are incorporated into the final thesis with only minor formatting changes and in some cases a significant part of the thesis consists of published articles—"thesis by publication." There are clear benefits for the graduate student in terms of author experience, and benefits for both the grad student and advisor in an established publication record and a wider audience for the research. At the same time, this practice changes the traditional nature of the thesis format and raises issues with intellectual property, access, usage, and data management. Librarians must address these issues to provide optimal support for both student authors and content users. A study of theses in geology and related fields at the Colorado School of Mines was done to determine the extent to which authors' prior publications were used, identify trends by discipline, and examine the manner in which prior publications are incorporated into the thesis. This study provides a framework to explore impacts on users, librarians, and the scholarly communication process.

INTRODUCTION

Tracking scholarly communication patterns in an academic environment includes examining the role of graduate students in the publication process and creation of the thesis. ("Thesis" is used here to refer to both MSc and PhD theses and dissertations to conform to local usage.) The traditional thesis in science and technology takes the form of a cohesive stand-alone monograph that includes a literature review, a body describing the research methodology and results, a conclusion, and a list of cited references, and has been viewed as a springboard for future publications by the graduate student. This format of the graduate thesis has evolved to reflect changing expectations for scholarly communication.

Prior to the advent of electronic dissertations and their increasing availability via open access, a thesis in the STEM fields was considered by some to be, for all practical purposes, unpublished. Publications, usually articles published in scholarly journals, still serve as the primary means of disseminating thesis research. In this model the student author benefits from the article publication experience, and both author and advisor benefit from the publication record and wider dissemination of their research. Experiences vary among graduate students, but for those students continuing in academia, publishing is a priority and success in publishing the results from the thesis is an important predictor of future scholarly productivity (Laurance et al., 2013; Kamler, 2008).

"Thesis by publication" (definitions vary, but defined here as a thesis consisting primarily of stand-alone published or publication-ready papers) is now a common alternative to the traditional thesis format (Boud and Lee, 2009; Dowling et al., 2012), although its use varies within the STEM disciplines including the geosciences. Additional developments to the thesis format also include extended abstracts, "thesis at a glance" reader's guides, front cover illustrations, intellectual property rights sections, and extensive digital data appendices (Gustavii, 2012).

The evolving thesis formats and publication practices raised questions about the extent of this process in geoscience programs at the Colorado School of Mines (CSM). CSM is a small doctoral degree-granting state university. Its focus on "Earth, Energy, Environment" includes established graduate programs in geology, geological engineering, and geophysical engineering. The graduate student author at CSM generally retains copyright to their thesis unless otherwise contractually arranged with an outside agency. As a degree program requirement, the author

assigns limited permissions for the university to copy and distribute his or her thesis, including via electronic access and duplication. CSM was a late adopter of electronic thesis submission in fall 2012. At that time, university procedures for thesis formatting and managing intellectual property were updated.

The *Colorado School of Mines Thesis Writers Guide* encourages the practice of incorporating the student author's prior publications into the thesis to promote "student participation in the wider research enterprise and a wider dissemination of student research results" (Colorado School of Mines, 2015). The Copyright and Permissions section of the *Thesis Writers Guide* includes guidelines on "Permission to include previously published material" and "Permission to include multi-authored papers" for graduate student authors. The *Guide* recommends that copyright permissions related to prior publications be included as part of the thesis as well.

This study examines the contents of MSc and PhD theses in STEM programs at CSM to determine the extent of prior works authored or co-authored by the graduate student and the extent of those prior works formally (with attribution) incorporated into the thesis. The initial study, described here, is set up to identify trends at our university and provide guidance for a possible longitudinal study. The practices of the graduate student author are of interest to librarians from both scholarly communications and information literacy standpoints—graduate students' behaviors have an impact on intellectual property decision-making, how information is used and cited, and the dissemination of research.

METHODOLOGY

Data for the study came from 414 e-thesis titles from fall 2012 to summer 2014. From this group, 37% are PhD titles and 63% are MSc titles. (This number does not include an additional 45 titles embargoed at the time of the study.) Data collected included: degree; department; advisor; treatment of incorporated papers; publication status of prior works (whether published/in press, submitted, or with intent to submit); and self-citing practices. "Prior work" refers here to the graduate student author's previously published or publication-ready content. Since the study focuses on the student author's general engagement in the scholarly communications process, prior works are not categorized according to their scholarly nature. For example, a technical poster, a peer-reviewed abstract, and a scholarly journal article are all counted as prior works. Self-citations were gathered from the thesis' primary list of references, footnotes, and references accompanying incorporated papers. Although a prior work may be cited multiple times within the thesis, it is counted only once as a self-citation.

Titles are grouped into categories made up of CSM university departments:

- Geosciences—geology and geological engineering, geophysics
- Extractive—metallurgical and materials engineering, petroleum engineering, mining engineering
- Engineering—electrical engineering and computer science, mechanical engineering, civil and environmental engineering, chemical and biological engineering
- MPC—applied mathematics and statistics, physics, chemistry and geochemistry
- HSS—liberal arts and international studies, economics and business

Categorization by department was chosen as a consistent method for an ongoing study and better suits the purpose of internal dissemination of this data. Using the graduate student's primary assigned department also reduces confusion for research where there is considerable cross-disciplinary overlap.

Potential Sources of Error

The study focuses on the graduate student's prior publications only as they relate to the graduate thesis at CSM. Data for students' research and publication on unrelated subjects are not considered here, making this a simplified model of the graduate student's engagement in scholarly communication. The study's relatively small data set and the limited time frame represented could potentially be skewed by the preferred publication practices of a few active research groups on campus.

Another potential source of error comes from how the student author interprets and applies the university's guidelines for thesis authors. Problems generally fall into two categories—variations in the manner in which a prior work is incorporated into the thesis, and variations in attribution of prior works:

- *Incorporation of a prior work*. Incorporation of a prior work is very clear in some cases, for example where a thesis chapter consists of a published journal article complete with attribution and distinct article-style formatting. At the other end of the spectrum, there are occurrences where the only clue to incorporation of a prior work is a statement to that effect located in a separate section of the thesis. Because of variations in thesis structure and wording, a visual review of both the list of references and the body of each thesis was done.
- *Attribution of an incorporated prior work.* The method of attribution (self-citing) varies considerably. Authors sometimes failed to cite themselves, in effect self-plagiarizing; failed to include their incorporated works in the thesis's list of references; excluded their own name from a citation where they were not the primary author; or used variations of their name that made identification problematic. Because of this, despite the visual review of the entire thesis the number of thesis titles that incorporate prior works is very possibly undercounted in this study.

RESULTS

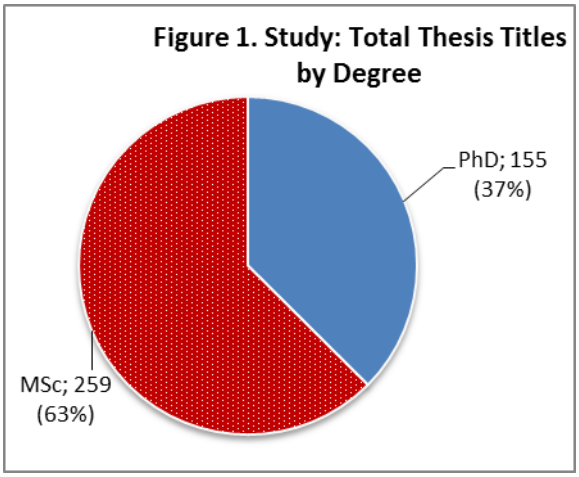
Data Set

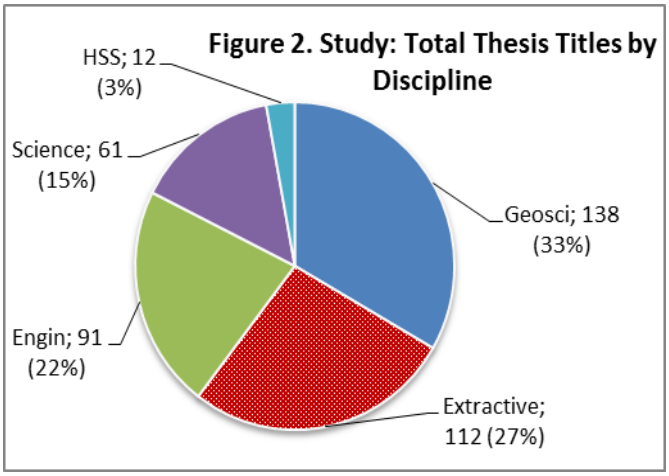
The data set represents a mix of PhD and MSc titles (Figure 1). The geosciences as defined in this study (geology, geological engineering, and geophysics) make up the largest number of thesis titles, followed by the extractive sciences (Figure 2). Because of the study's focus on STEM disciplines and the small number of humanities/social science (HSS) titles at our university, the HSS category is dropped from further analysis within this work.

The majority of titles examined for this study (60%) do not include either incorporated prior works or self-citations by the graduate student author (Figure 3). (Note that, in this and the following figures, a title can be counted multiple times if it has both incorporated works and self-citations.) Given institutional encouragement to publish where feasible, we can make an assumption that if these authors have any prior publications related to their thesis research they would have included those publications in the thesis in some manner.

Authors with either incorporated works or self-citations are further broken down by PhD and MSc degrees, providing general information on the extent of our graduate students' engagement in scholarly publishing before submission of their dissertation.

The difference between the level of involvement of PhDs and MScs in scholarly publishing is not surprising—PhDs typically have more results to

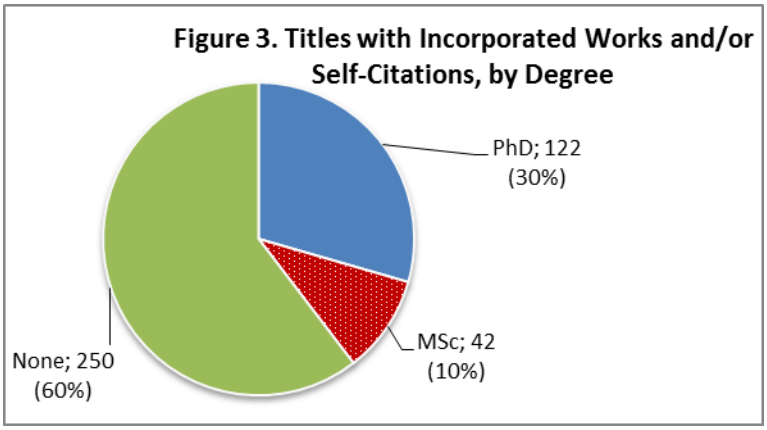




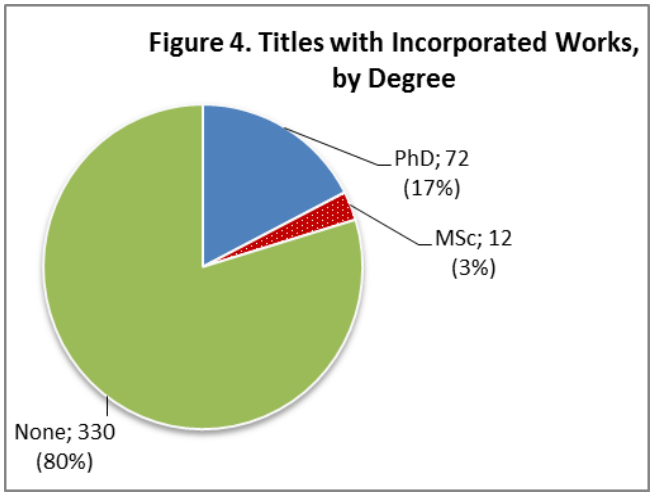
report, a longer time frame to publish, more opportunities to collaborate with other authors, and higher expectations for engagement in scholarly communication.

Incorporated Works

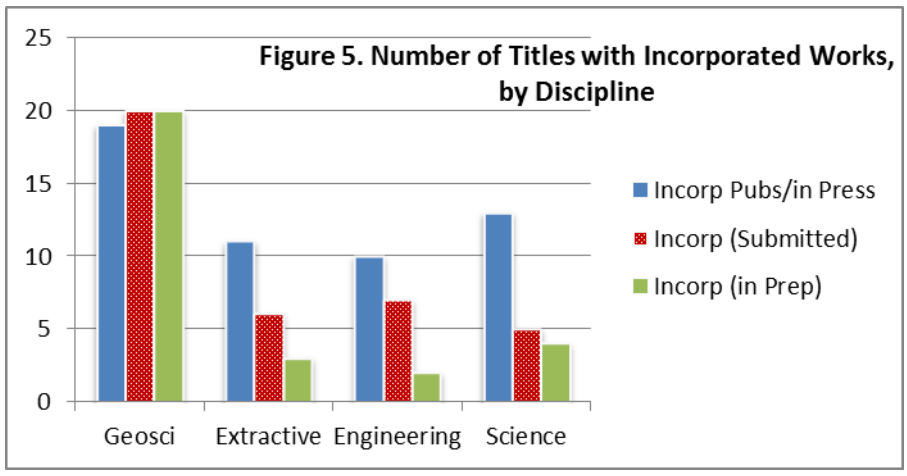
Twenty percent of all titles had prior works recognizably incorporated into the text of the thesis (Figure 4). The amount of this content ranged from 1–2 chapters (the norm) to representing the majority or entirety of the title's research content.



Review of the citation information for those titles with incorporated works shows that the graduate student is always the primary author of those works—a logical finding since the graduate student is the author of record of the thesis as well. Incorporated papers are also almost always co-authored with others, reflecting the research relationship of graduate student and advisor and others within a research group at this stage in the student's career, and the university's environment of collaborative research.



By discipline, the geosciences have the largest number of titles that include the graduate student author's prior works in various stages of publication (Figure 5). Figure 6 shows the same data as percentages for comparison. The geosciences titles are also more likely to incorporate works not yet published (works submitted or publication-ready) than the other STEM disciplines at CSM. The other disciplines were somewhat evenly matched in their lesser reliance on works not yet through an external publication process.



Review of the thesis titles with incorporated works indicates that 3 or more papers are generally enough to comprise the quantitative majority and/or the significant research content of the body of the thesis—these titles could reasonably be categorized as "thesis by publication."

Of the titles incorporating prior works, geosciences makes the most extensive use of this practice, with the largest overall number of occurrences and with approximately 80% of those thesis titles having 3 or more papers (Figures 7, 8). In contrast, engineering has only 35% of titles with 3 or more papers, and instead has the largest number of titles that incorporate a single prior work.

Self-Citations

Self-citations are another feature tracked in this study as a reflection of the graduate student author's engagement in the scholarly communications process. Figures 9 and 10 show the percentage of titles with self-citations *for works not incorporated into the thesis*.

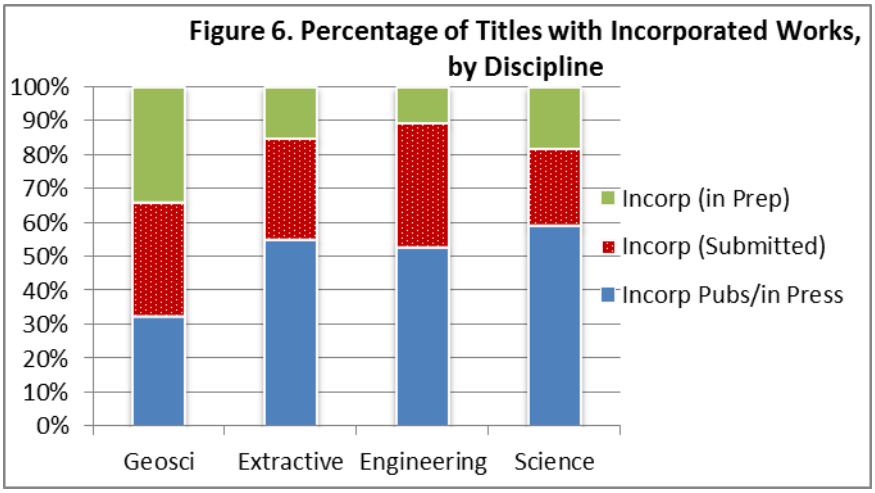
Using similar comparisons as the above for occurrences of self-citing, 40% of titles include self-citations (Figure 9). A review of the self-citations shows that the graduate student author is almost never the primary author of the cited work, in contrast to incorporated works where the student author is always the primary author.

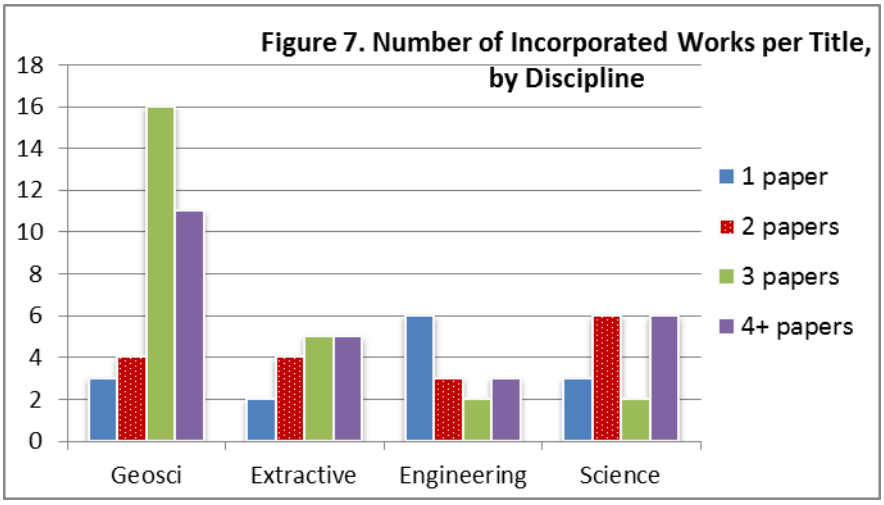
Again, this is a reasonable finding—the prior work may be relevant but not central to the graduate student's thesis topic; or as a secondary author the student's contribution may be insufficient to justify incorporating the prior work outright into the thesis.

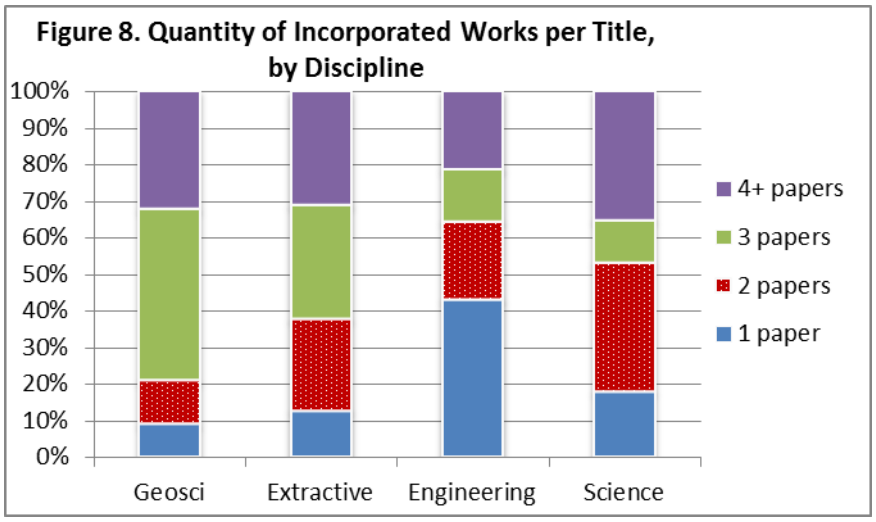
Of the titles incorporating authors' self-citations, science makes the most extensive use of this practice, with over 40% of its titles containing 3 or more self-citations, followed by engineering with over 30% (Figure 10). This indicates that a significant subset of graduate student authors in these disciplines do participate in the publication process, but as a secondary author.

CONCLUSIONS

The results of the study illustrate that graduate student theses at CSM represent a continuum between the "traditional" thesis as original work and the thesis consisting primarily of published or publication-ready works. For the time frame of this study, a significant minority of CSM graduate students have experience in prior publication and are engaged in the wider scholarly communications process. Students in the geosciences, represented by the largest number of thesis titles and having a greater occurrence of incorporated works per title, exhibit







the most activity in prior publication as well as the "highest" level of engagement as primary authors.

There does appear to be some distinction between the geosciences and other disciplines in how graduate students are engaged in the publication process at our university. Additional data is needed to determine whether the comparison differences in the study reflect short-term trends, local (departmental) practices for graduate student authors, or broader discipline-driven factors.

The author's attribution of other works is a critical component of scholarly communication. Undertaking this study provides us with a picture of the scope of variation in how thesis authors treat their own publications and a better understanding of what users face when they wish to incorporate and attribute content from a thesis or dissertation in their own scholarly communication activities. For the student author, this includes proper attribution of their own prior work within the thesis. Based on this study, failure to properly cite their own work in the body of the thesis or in the thesis's list of references is a concern. The same need for proper attribution applies to datasets from a prior work—data should be properly cited and that citation will ideally include information on availability (publisher's website, data repository, etc.) even if the dataset is also included with the thesis. Librarians can and should promote user-friendly attribution practices to student authors.

The observations from this study are being used to modify information literacy activities and the format of consultations with graduate students. For example, suggestions on a user-friendly format for documenting incorporation of a prior work include:

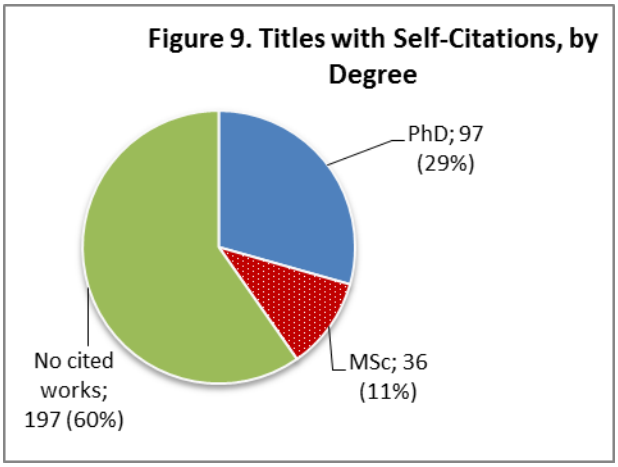
- A full citation that accompanies the prior work within the body of the thesis.
- Definition of the roles of the primary author and other authors as content creators where possible.
- A statement that indicates whether the content is reproduced in full, modified, etc.
- An intellectual property (IP) statement, for example: "reprinted with permission." The IP statement should also refer the user to any relevant thesis appendices documenting intellectual property rights.

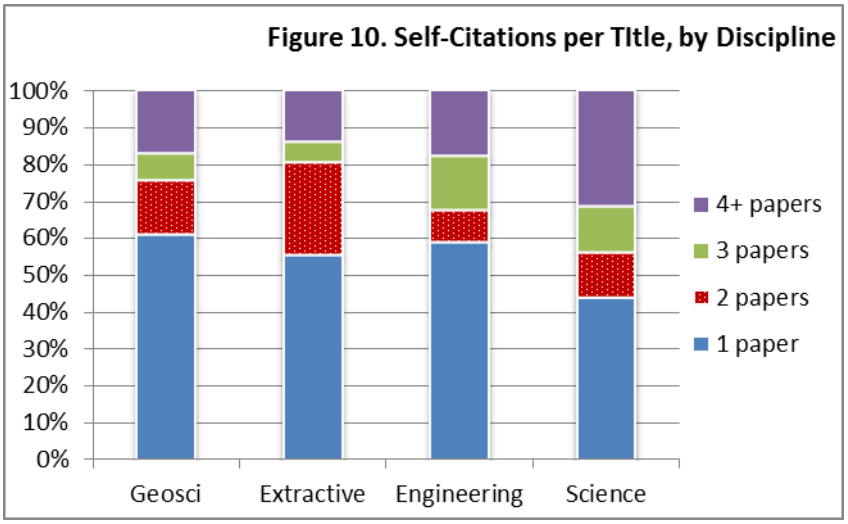
Example:

Ch. 3

A hierarchical approach for evaluating fluvial systems, architectural analysis and sequential evolution….

(Modified from S. Cooper[1], L. Hoffstadter[2]. AAPG Bulletin 2016, in press. Reprinted with permission of AAPG 2016[3].)
[Text]
...
[Footnotes]
[1] Primary author and researcher
[2] Secondary author, editorial assistance
[3] Appendix B includes IP permissions documents.





The study was successful in providing guidance for planning a larger longitudinal study to track our graduate students' scholarly communication activities. In the future, this study can be extended to more clearly identify trends between the geosciences and other categories at CSM, in a manner that would facilitate comparisons with other universities. Correlations with other citations studies, for example student authors' post-degree publications, will provide additional information on our graduate students' engagement in scholarly communication.

DISCUSSION

One of our challenges is to determine the role of the librarian in response to graduate publication practices and develop services to suit the changing needs of our graduate students. Responses can include: prioritizing services tailored to graduate students' publication needs; working with other entities on campus to develop and support best practices for student authors; recommending actions to improve the discoverability and accessibility of graduate students' publications; and strategies to enhance students' scholarly performance measures. The librarian can provide a unique perspective in support of both the student author and the user.

In particular:

IP status can be a difficult terrain for the graduate student to maneuver. CSM's policy on incorporating previously published materials in the graduate thesis places the burden of managing the process specifically on the student author. While this is appropriate, additional guidance would help the student author, who may at this stage in their career be unaware of either the IP rights issues or their ramifications. The student author is responsible for resolving the relevant permissions for themselves, their co-authors, and publishers. Our campus policy recommending that copyright permissions be directly incorporated into the thesis definitely clarifies the need for such permissions, but the variety of permission documents discovered in this study indicate that best practices or sample documents to communicate with other parties would be beneficial. The librarian can provide resources on IP management in the scholarly communication process for the student author and advisor.

Librarians will also be working with users to navigate a potential tangle of IP rights to determine how the content of a thesis can be used. For example, does the user contact the thesis author who holds the copyright to their own thesis or the original publisher of the incorporated article? Thesis appendices with IP permissions can provide much-needed supporting documentation. The library may also be the default contact for vendors and publishers who have questions about conflicting permissions, even years after the student leaves the university.

Attribution, as discussed above, is an area where the librarian can provide guidance for the graduate student author. The librarian will also be faced with questions from users on how to attribute this content, which is not straightforward for incorporated works. The graduate student is the author of record of the thesis, but "authorship" of the thesis content is no longer (and hasn't been for some time) automatically attributable solely to the student author—we now have a content-creation environment of secondary contributors, chapter co-authors, etc. Who or what exactly does the user cite? In the case of an incorporated article, for example, should the user cite the thesis, the article as originally published, or the article as a chapter of the thesis?

The librarian can assist users in making informed decisions about how they choose to cite thesis content. Other things being equal (accurate citation information, proper attribution of quotes, etc.), there is leeway for a decision based on the user's priorities. Citing the thesis provides potential connections with other relevant aspects of the research as well as context for the larger research project. Citing the article may have more credibility for the user's purpose, especially if the article was published in a leading journal, or if the publication date is important. One or the other format may be more accessible to the user's target audience—for example, the journal may have a wide subscription base, or the thesis may be openly accessible on the Web and discoverable via Google.

Continuing developments in the graduate thesis have the potential for more far-reaching changes in both scholarly communication, access, and library operations. Researchers and their institutions are exploring a range of metrics to reflect scientific productivity

and research performance, but metrics on "times cited" for scholarly articles is still a popular method. The user's choice in citing content from a thesis can affect the authors' bibliometrics and measured impact. Smart search engines, facilitated by open access and linked bibliographic data, have the capabilities to connect the fragmented pieces of a graduate student's research and facilitate use—if the works themselves are identifiable through their metadata.

For libraries that support thesis collections, the evolution of the graduate thesis and impacts on usage statistics can potentially change the way we allocate resources. For example, if the "worthwhile" information from the thesis has been published elsewhere, in what ways will we continue to support our thesis collections? Will we explore publisher partnerships, creative metadata practices and linked data models to ensure that the user can discover and retrieve all of the related thesis content, and that the student author can accurately measure their impact on their discipline?

The graduate thesis has always been a part of the scholarly communications process. If, as Thomson (2013) points out, the "gateway to the academy" is changing with the change in publication emphasis for graduate students, we should be engaged in the change and development of strategies in response.

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SUPPLEMENTARY MATERIALS AS A DATA SHARING OPTION IN THE GEOSCIENCES

Jeremy Kenyon
Nancy Sprague
University of Idaho Library
875 Perimeter Dr MS 2350, Moscow, ID 83844-2350, jkenyon@uidaho.edu

Abstract—Research data may be disseminated in a variety of ways. One data sharing option is through the supplementary materials that frequently accompany science journal articles. These materials, due to their variety and place on the periphery of scholarly communication, often escape best practices for data management. To discuss this issue, we will present results from a study to explore the content of supplementary materials in 30 high impact geoscience and plant science journals. The study is designed to analyze numerous characteristics of supplementary materials, including the number of supplementary files per article, the types and categories (e.g., videos, tables, code, etc.) of the files, the use of different types of visualizations (e.g., bar charts, scatterplots, maps, etc.), the file types (measured as file extensions), and the sizes of the files. We will also introduce some usage statistics obtained from publishers about how much use supplementary materials are getting. While our study compares two fields, our presentation will focus primarily on the supplementary materials of geoscience journals. Ultimately, this presentation will inform attendees of the manner of data sharing through supplementary materials, including access and usability issues, as well as implications for services in support of data management.

EARTH DATA! ACCESSING REAL-TIME, RECENT, AND HISTORICAL WATER DATA FROM PRINT AND ONLINE INFORMATION SOURCES

Emily Wild
Keith Van Cleave
U.S. Geological Survey, Library
Box 25046, MS 914, Denver Federal Center, Denver, CO 80225, ecwild@usgs.gov

Abstract—Information inquiries to the U.S. Geological Survey (USGS) Denver Library are often related to real-time, recent, and historical water. Data, maps, and publications through time for floods, droughts, water supplies, as well as land and land-use changes are available from several sources from the USGS. Additionally, how the water-cycle components relate to other Earth data are of interest to library users. Information sources are available in print and online to the public, and information specialists are eager to assist with finding and using Earth data through outreach and instruction sessions.

IF NOT NOW, WHEN?

Denise J. Hills
Energy Investigations, Geological Survey of Alabama
P.O. Box 869999, Tuscaloosa, AL 35486-6999

Sandy M. Ebersole
Geological Survey of Alabama, Tuscaloosa, AL 35405

W. Edward Osborne
Geological Survey of Alabama
P.O. Box 869999, Tuscaloosa, AL 35486-6999, dhills@gsa.state.al.us

Abstract—Data preservation, including updating legacy data records, is usually a secondary concern for researchers and policy makers. It is the belief that there will be time at some other point to take care of the little details such as verifying records. Some agencies maintain internal standards, while others have a more ad hoc approach, depending on individual researchers for data preservation.

The Geological Survey of Alabama and the State Oil and Gas Board of Alabama (GSA/OGB) have been part of data preservation projects, including the National Geological and Geophysical Data Preservation Program (NGGDPP) and the National Geothermal Data System (NGDS), for many years. These programs have allowed us to update inventories and database information, and replicate these essential records giving both in-house and off-site access. For example, we are updating our thin section records into a content model based on ones used for physical samples with NGDS. Motivation for this effort includes a desire to capture information before people involved in their initial description retire, as notation conventions by one researcher may not be comparable to another.

Yet many of the GSA/OGB physical object collections have been operating on a "maintain the status quo." This has served us, and those who utilize our resources, quite well until recently. However, we were forced to confront our shortcomings with the untimely death of the manager of our core and sample repositories, Mr. Lewis Dean. In the days following his passing, it became critically important to update and map locations of some items in our core repository, one of our most important collections. We had minimal records for these recently accessioned cores, as much of the information was still part of Mr. Dean's personal knowledge. It took several colleagues almost a week to update records to a point where we could continue minimal effective operations.

Timely acquisition of dataset information enables use, reuse, discovery, and preservation. Resignations, job re-assignments, death, computer crashes, natural disasters, and record loss are not always predictable. Thus, we must act with alacrity to preserve this information if we are to best utilize the data resources we have already collected.

Editor's note: Portions of this presentation were later published in *GeoResJ*, v. 6, June 2015, p. 1–8, "Let's make it easy: A workflow for physical sample metadata rescue," https://doi.org/10.1016/j.grj.2015.02.007.

CAN THE CITIZEN HELP THE SCIENTIST TO HELP THE CITIZEN? HOW INFORMATION OBTAINED FROM SOCIAL MEDIA AND SMARTPHONES CAN HELP SCIENTISTS UNDERSTAND MORE ABOUT NATURAL HAZARDS

Emma Bee[1]
Patrick Bell[1]
Diego Diaz-Doce[2]
Simon Flower[2]
Katy Mee[1]
Sarah Reay[2]
Steven Richardson[1]
Wayne Shelley[1]

[1]British Geological Survey, Environmental Science Centre
Keyworth, Nottingham, NG12 5GG, United Kingdom, ebee@bgs.ac.uk

[2]British Geological Survey, Murchison House, Edinburgh, EH9 3LA, United Kingdom

Abstract—Social media sites such as Twitter and Facebook can provide useful information to help locate and describe natural hazard events. For example, the USGS have recently built a "Twitter earthquake detection tool," which filters relevant tweets in a similar manner to how automated software picks earthquake waves from seismograms. Can social media help scientists capture information about other natural hazards (e.g., geomagnetic storms, landslides, and flooding) to help them improve scientific understanding and provide better advice?

In 2014, BGS developed GeoSocial, a tool for mapping geology related "tweets." GeoSocial is being trialed to map aurora sightings. The aurora is one symptom of geomagnetic activity (storms in the Earth's magnetic field). Such activity has the potential to impact man-made technologies on Earth and in space; for example, increasing drag on satellites, causing failure of electrical power grids, speeding up corrosion in pipelines, jeopardizing radio and telephone communications, and affecting the accuracy of geophysical exploration. When a geomagnetic storm forecast is issued, a common question posed to scientists is "How far south will the aurora borealis be seen?" Current projections do not always match sighting reports received after an aurora display, but by using social media, such as Twitter, a new source of data can be mined for scientific analysis.

Smartphone apps offer an alternative way of capturing geohazard information where the user is more knowingly and actively engaged. BGS, in collaboration with the Smithsonian Institution's Global Volcanism Program (GVP), has developed *myVolcano*—a mobile, crowdsourcing application for collecting data about volcanic hazards. *myVolcano* enables users anywhere in the world to submit their own geolocated observations of volcanic hazards (e.g., photographs, videos, descriptions, and physical samples). It was primarily developed as a tool for mapping volcanic ash distribution following volcanic eruptions in Iceland in 2010 and 2011 that caused widespread disruption to air travel across Europe. By capturing this information it is hoped that scientists will be able to produce better, more detailed and timely reports about the nature of volcanic ash and its distribution, helping to validate ash dispersion models, during a future event.

THE NATIONAL LAND COVER DATABASE PROJECT: THE STORY OF ITS IMPACT

Carol A. Deering
ERT, Inc., at USGS EROS
47914 252nd St., Mundt Federal Bldg, Sioux Falls, SD 57198, cdeering@usgs.gov

Abstract—The National Land Cover Database (NLCD) comprises Landsat-based, 30-meter resolution products that provide land surface spatial and descriptive data, including thematic class, percent impervious surface, and percent tree canopy cover. Since the publication of the first data products in 2000, NLCD has supported thousands of applications that seek to understand and assess ecosystems, biodiversity, and biological carbon sequestration; monitor water-quality and wildfire; predict and mitigate the effects of climate change; and develop land management policy. We have a bird's-eye view of the impact of the NLCD project, but we don't know the details around that impact. We don't understand the richness of that impact. In short, we don't yet know the story of NLCD project impact. A comprehensive assessment strategy is thus needed to gauge the reach and influence of the nation's land cover database project and tell the story of its importance. Traditional measures of impact such as citation counts should of course be part of that strategy. But how else might we assess the impact of the NLCD? We could ask questions about the breadth and depth of the research activities that comprise the project structure. Indicators of the reach and impact of these activities would include multidisciplinary collaborations, conference presentations, peer-reviewed publications, research and development assets, software and scripting developments, and Web support and promotion. We could ask questions about the role NLCD has played in advancing knowledge. Indicators of this kind of reach and impact would include paradigm shifts, continued and increasing data use, first and second generation citations, and user comments and surveys. An initial assessment of these non-traditional measures of research begins to flesh out the multi-chaptered story of the NLCD project and bring into focus its wide-ranging impact.

PRESERVING DIGITAL RESOURCES USING WEB ARCHIVING TOOLS— EXAMPLE FROM THE PENNSYLVANIA MARCELLUS SHALE PLAY

Linda R. Musser
Fletcher L. Byrom Earth & Mineral Sciences Library, Pennsylvania State University
105 Deike Building, University Park, PA 16802, Lrm4@psu.edu

Abstract—We live in a digital age, where most of our communications occur via electronic means such as email, web documents, digital photos, videos, and other electronic streams. Even the copy of record for most research journals is the electronic form. Preserving access to digital materials is a huge challenge, however. A 2013 study by Zittrain, Albert, and Lessig titled "Perma: Scoping and Addressing the Problem of Link and Reference Rot in Legal Citations" (http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2329161) found that more than 70% of the URLs in journals no longer worked, a syndrome commonly known as link rot. Many solutions have been proposed to combat link rot for the scholarly literature but what about the vast information universe contained in online newsletters, blogs, and social media channels such as Twitter, Facebook, and Pinterest? Some well-known attempts to capture such materials include the Internet Archive and tools such as Google's option to display cached versions of webpages. These efforts are not only limited in scope, their criteria for inclusion if often unclear. Mostly absent from the preservation process are librarians and other information professions with expertise in selecting materials to preserve and with organizing collections for later use. This paper will discuss the role of the information professional in facilitating the preservation of these ever evolving, ephemeral resources for future generations, with specifics drawn from an endeavor to capture and preserve resources related to the Marcellus shale play in Pennsylvania. Examples of other thematic archives of digital materials and the tools available to build them will also be provided.

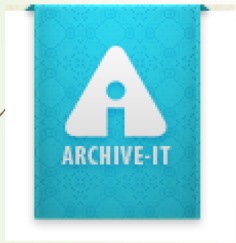
For a fuller description of these issues related to web archiving, see "Preserving the Digital Record of Science and Engineering: The Challenge of New Forms of Grey Literature," *Issues in Science and Technology Librarianship*, no.83, Winter 2016, http://www.istl.org/16-winter/short.html.

Slides on subsequent pages.


Preserving Digital Resources Using Web Archiving Tools
Linda Musser
October 2014


IIPC
netpreserve.org
INTERNATIONAL INTERNET PRESERVATION CONSORTIUM
TOOLS AND SOFTWARE
Acquisition
Heritrix, Archive Facebook, SiteStory…
Curator Tools
Web Curator Tool, CINCH…
Collection storage and maintenance
JHOVE2, Web Archive Transformation, SiteStory…
Access and finding aids
Memento, NutchWAX, Wayback Machine…

There are a limited number of service providers



The leading web archiving service
for collecting and accessing
cultural heritage on the web
Built at the Internet Archive

CDL Web Archiving Service

Web Archiving Service

The California Digital Library's Web Archiving Service
institutions, allowing them to build archives of websites

iterasi

Home Our Customers Features

Industry Leading Web & Social Media Archiving

Archive web content with ease for use in litigation, compliance audits, corporate records and more.

Many organizations utilize digital archiving services.

Type of Collecting Organization

Sort By: Count | (A-Z)

Colleges & Universities
K-12 Program Schools
Law Libraries
Museums & Art Libraries
National Institutions
NGOs
Other Institutions
Public Libraries & Local Governments
State Archives & Libraries

Archive It

Thematic collections have varying foci.

Subject Sort By: Count | (A-Z)

- Society & Culture (68)
- Arts & Humanities (30)
- Government (22)
- Universities & Libraries (21)
- Government - US Federal (20)
- Computers & Technology (16)
- Government - Counties (13)
- Blogs & Social Media (12)
- Government - US States (12)
- County services (8)
- County government-Utah (7)
- Spontaneous Events (7)
- space exploration (3)
- Affordable Care Act (2)
- Affordable Care Act (2)
- Children's Health Insurance Program (CHIP) (2)
- Medicaid (2)
- Medicare (2)
- Michigan State University (2)
- National Institutes of Health (U.S.) (2)
- Politics & Elections (2)
- Salt Lake County (Utah) (2)
- Space (2)
- Web archives (2)

Thematic collections are topical, geographic or event focused

Current Events in Africa Web Archive (CEAWA)

Collected by: Africana Librarians Council

Archived since: Mar, 2014

Description: A collaborative project led and funded by the Africana Librarians Council's Title VI Librarians, this is a project dedicated to archiving websites which document current events in African countries. The goal of this project is a plan to create permanent archive copies of content-rich websites that are valuable to scholars and students interested in studying and analyzing African events as they unfold.

Subject: Politics & Elections, Spontaneous Events, Society & Culture

Creator: Marion Frank-Wilson, Karen Fung, Timothy Johnson, Lauris Olson, Jason Schultz, Mohamed el Seoud

Waldo Canyon Fire Web Archive Collection

Collected by: Pikes Peak Library District

Archived since: Oct, 2012

Description: The Waldo Canyon Fire burned 18,247 acres in and around the city of Colorado Springs, Colorado, from June 23 to July 10, 2012. Much of the information generated about the fire was published on the World Wide Web, on a multitude of websites and social media sites. This collection captures some of the Internet publication activity that resulted from the fire.

Subject: Spontaneous Events, Science & Health, Waldo Canyon Fire, Wildfires, Colorado Springs, Colorado

Creator: Pikes Peak Library District Special Collections

Collector: Pikes Peak Library District

Corporate-focused collections are common but not always publically accessible

005 Official Website of The Church of Jesus Christ of Latter-day Saints (Historical View)

Collected by: The Church of Jesus Christ of Latter-day Saints
Archived since: Aug, 2014
Description: Official website of The Church of Jesus Christ of Latter-day Saints captured by Archive-it from 1996 through July 2014. Web content demonstrates changes made through the years.
Subject: Society & Culture, Blogs & Social Media
Creator: The Church of Jesus Christ of Latter-day Saints
Collector: LDS Church History Department

Collection level record

10 years on Mars

Collected by: University of Michigan, School of Information

Archived since: Mar, 2014
Description: Our mission is to capture the public perception of the Mars rovers on their 10th anniversary and to preserve and provide access to that information for future research.We will collect web pages that address the Mars rovers from three different perspectives on their 10th anniversary, and to preserve and provide access to that information for future research. Official government websites will provide the con information: what was officially released regarding the past ten years exploring Mars. As a counterpoint, will also capture the popular news and science media's relation of these events as well as the fringe (conspiracy theorizing, alien spotting and so on) perspectives and reactions.
Subject: Computers & Technology, Science & Health, Society & Culture, mars rovers, space exploration, mars exploration, Mars, space, NASA, mars images
Creator: Course SI639: Web Archiving
Format: image, text, video
Type: web pages, home pages, social media, microblog, news feed, news article, blog
Date: April 2014
Collector: Cecilia Caride, Stephanie Lafayette, Kathryn Horne
Language: English
Rights: This collection is made accessible to the public without restriction. The University of Michigan School of Information and Archive-It do not own copyright to these materials; contact the copyright holders for further information. , All materials in this collection are either government-created or have been archived under a claim of fair use for educational and research purposes. If you are the copyright holder to any of these materials and have comments or objections as to its use here, please contact any of the collectors and we'll be happy to discuss your concerns.

Individual record

Sites | Search Page Text

Page 1 of 1 (40 Total Results)

Sort By: Title (A-Z) | Title (Z-A) | URL (A-Z) | URL (Z-A)

Title: Curiosity Rover raw images

URL: http://curiosityrover.com/

Description: "NASA/JPL provides raw images from Curiosity at http://mars.jpl.nasa.gov/msl. This web site is not affiliated with JPL or NASA--it just provides a convenient method of accessing the images and viewing the latest Mars photos downloaded from the rover. In addition, there are several features available only on this web site, such as sorting capabilities, mapping the location of the images, camera pointing information, etc."

Captured 2 times between Mar 28, 2014 and Apr 13, 2014

Subject: Curiosity, Official, Photography.

Creator: Joe Knapp

Type: blog, digital images

Date: April 13, 2014

item types

subject headings

Capture data for a particular site

Note that attribution/ownership is embedded.

SCHOOL OF INFORMATION UNIVERSITY OF MICHIGAN

10 years on Mars Web Archive (University of Michigan, School of Information)

INTERNET ARCHIVE WaybackMachine

Enter Web Address: http:// All Take Me Back

Searched for http://curiosityrover.com/ 2 Results RSS Metadata

Look up URL in general Internet Archive web collection Proxy Mode Help

* denotes when page was updated

Found 2 Captures between Mar 28, 2014 - Apr 13, 2014

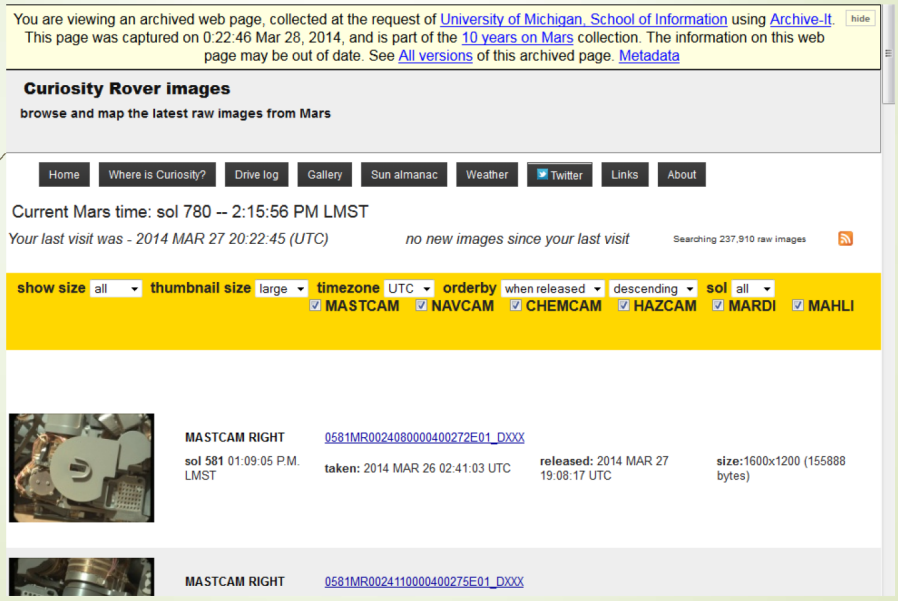
2014

2 pages

Mar 28, 2014 *

Apr 13, 2014 *

Sample capture of a webpage



The Library of Congress is a leader

- U.S. Election Web Archives
- U.S. Congressional/Legislative Web Archives
- Law Library Web Archives
- Single Sites Web Archive
- Other Events and Themed Web Archives
- International Web Archives
- Collaborations

The Library of Congress preserves and provides enduring access to the nation's cultural artifacts. This includes digital materials such as websites.

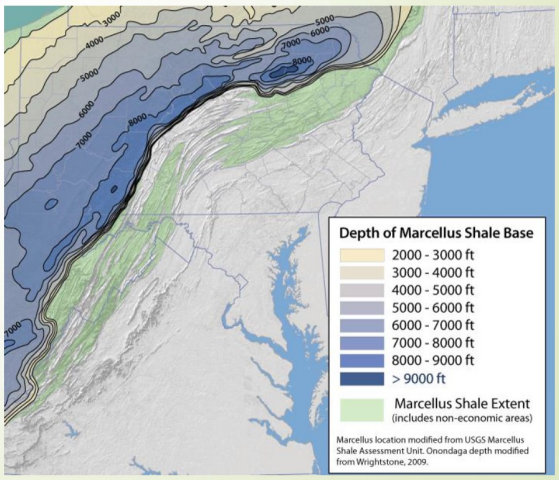
History of Web Archiving at the Library of Congress

In 2000, the Library of Congress established a pilot project to collect and preserve websites. A multidisciplinary team of Library staff studied methods to evaluate, select, collect, catalog, provide access to, and preserve these materials for future generations of researchers.

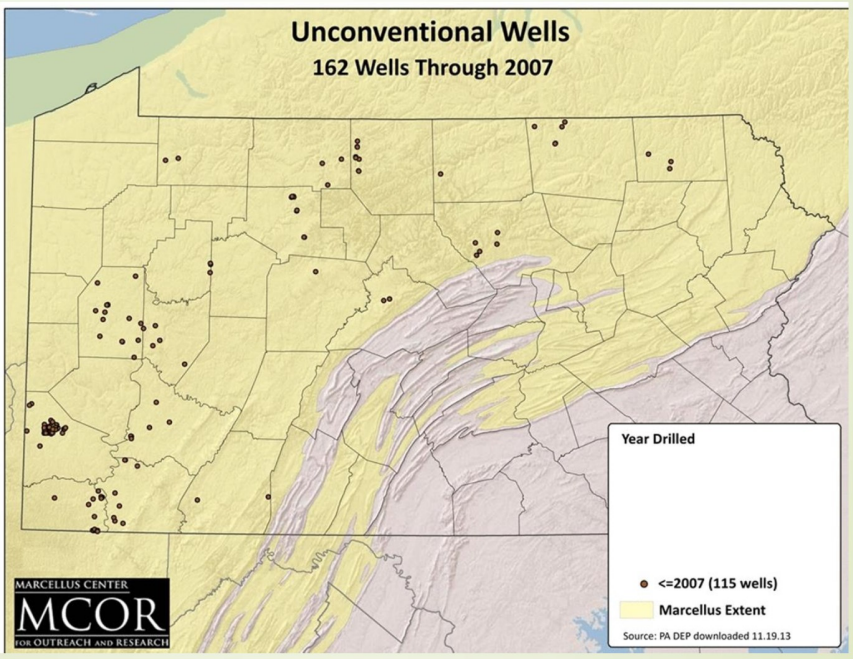
The Library has developed thematic web and event-based archives on such topics as the United States National Elections, the Iraq War, and the events of September 11.

Marcellus shale gas play

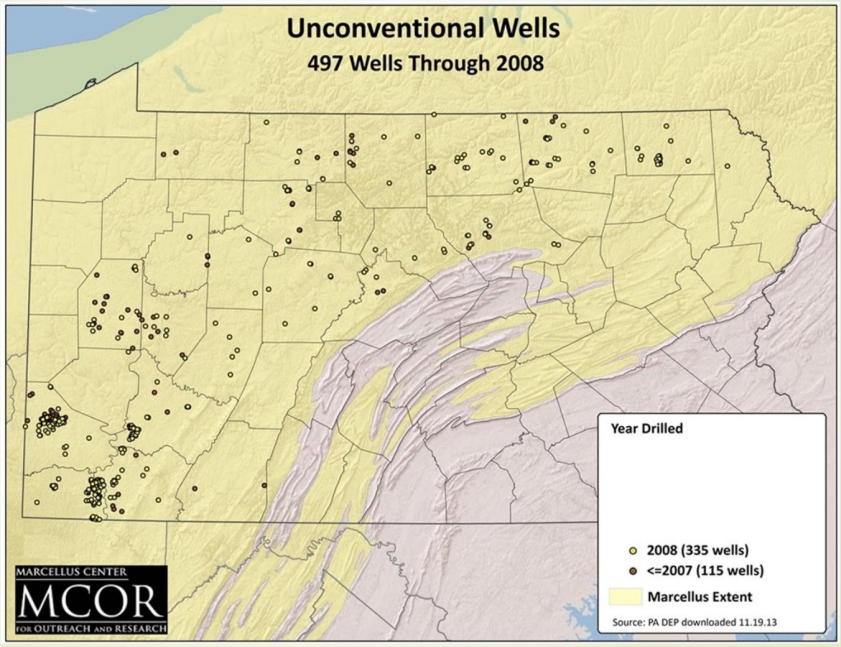
- In 2003, a well drilled in Washington County, PA utilized the hydraulic fracturing technique to tap gas in the Marcellus shale.



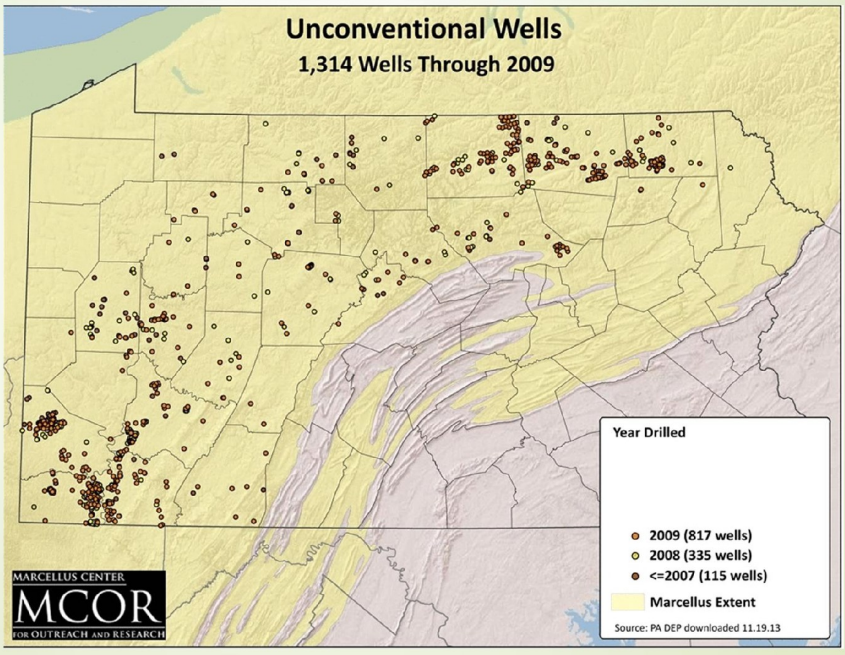
Extent of drilling in the Marcellus



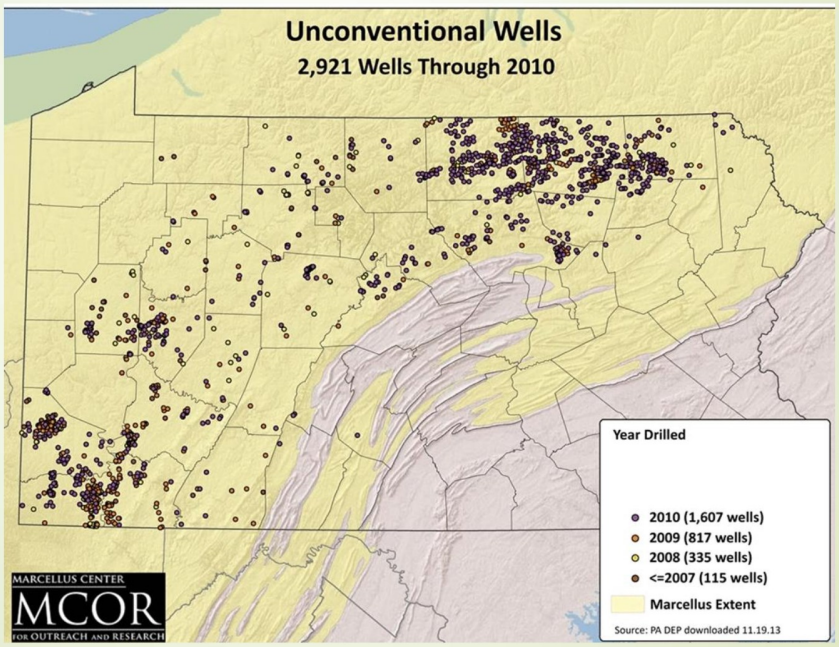
Extent of drilling in the Marcellus



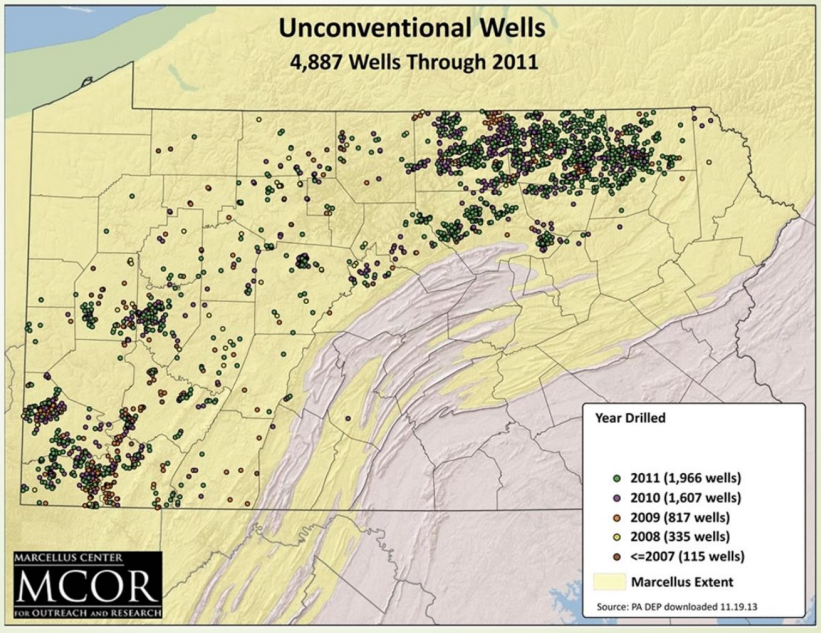
Extent of drilling in the Marcellus



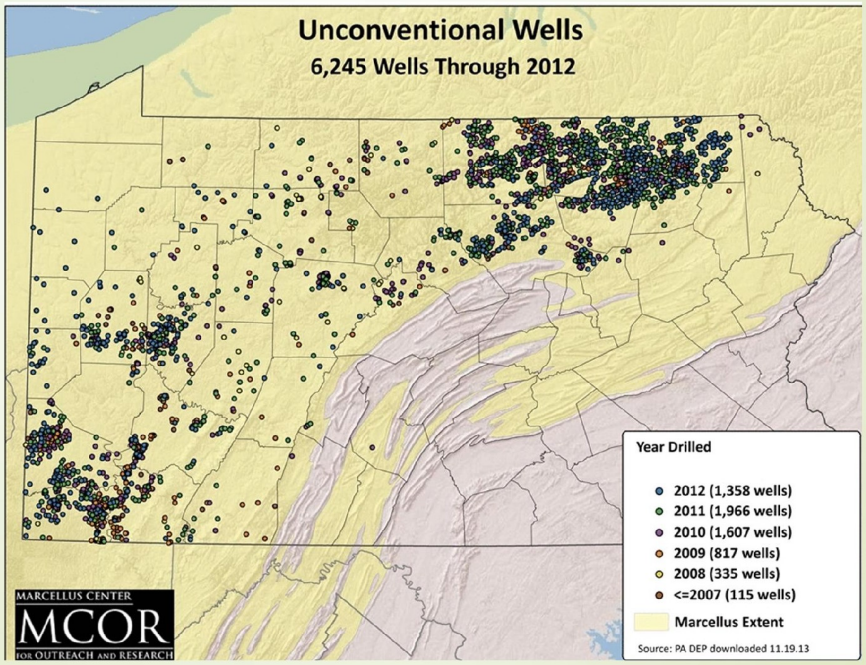
Extent of drilling in the Marcellus



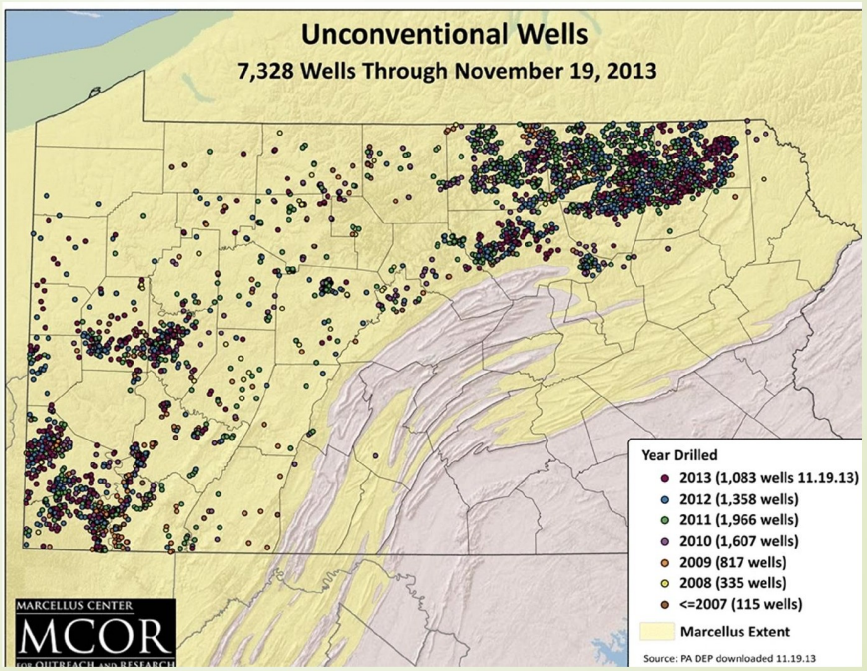
Extent of drilling in the Marcellus



Extent of drilling in the Marcellus



Extent of drilling in the Marcellus



Impacts have been widely felt throughout Pennsylvania

The new industry generated:

- Unexpected impacts on highways and local roads
- Need for skilled labor and training
- Need for housing and education for new workers and families
- Concerns about environmental and health impacts
- Information needs related to leasing and property rights
- etc.

We wanted to document some of these impacts

The Pennsylvania State University Libraries will develop a web archive documenting the morphology of the natural gas industry as it moves through successive stages toward maturation.

-- excerpt from PSUL Marcellus collection development policy

We browsed online for sites to potentially capture.

Owing to the early stages of development and the on-going public debate over the environmental, legal, economic, and social issues arising from the Marcellus initiative, a wealth of information exists in digital format to be captured from the Web sites of energy corporations and natural gas developers, state and local government agencies; energy policy research institutes; environmental groups; and health and safety commissions engaged in studying the environmental impact of the industry upon workers and Pennsylvania communities in close proximity to natural gas drilling activity.

Our categories

DRAFT!

- Drilling Industry
- Economic Impacts
- Education and Training
- Events
- Environmental
  - PA organizations
- Governmental
  - State
  - Local
- Health and Environmental Impacts
- Maps
- Media Coverage
- Opposition Groups
- Photographs
- Policy and Law
- Science and Technology
- Support Industries
- Videos

DRAFT!

Categorizing the materials found

- Background Information
- Health and Environmental Impact
- Economic Impact
- Visual Resources/Documentation
- Media Coverage
- Government/Policy
- Social Impact
- Research Guides
- Science and Technology

Collection development policy is an asset

This web archiving project seeks to provide a balanced assessment of natural gas development as represented by diverse interest groups and stakeholders.

While the project encompasses and documents natural gas exploration and development on a state-level, primary focus will be on the northern tier of Pennsylvania, the Susquehanna River Basin, and Delaware River Basin respectively.

Penn State's collection

Marcellus Shale Web Archive

Archived since: Jun, 2013
Description: This web archive seeks to provide a balanced assessment of natural gas development as represented by diverse interest groups and stakeholders. While the archive encompasses and documents natural gas exploration and development on a state-level, primary focus will be on the northern tier of Pennsylvania and the Susquehanna River Basin and Delaware River Basin respectively. Main topical areas include: background information; health and environmental impact; economic impact; visual resources/documentation; media coverage; government/policy; social impact; research guides; and, science/technology.
Identifier: HCLA 9529
Curator: Pennsylvania State University, Special Collections Library

We have over 300 sites identified to date.

- Exploration firms – Chesapeake, Range Resources, Exxon, etc.
- Government agencies: federal, state and local – EPA, DOE, PaGS, etc.
- Industry organizations – Marcellus Shale Coalition, API, etc.
- Professional organizations – AAPG, PA Bar Institute, etc.
- Education and training organizations – ShaleTec.org, etc.
- Environmental groups – No Fracking, etc.
- Citizen groups – League of Women Voters, etc.
- Media organizations – Marcellus Business Quarterly, etc.
- Conferences

Future and on-going activities

- We continue to refine and add to the list of websites captured.
- We are exploring software to facilitate the capture of social media materials.
- We are cautiously assessing inclusion of video materials.
- We are discussing partnerships to expand the collection. (Cornell example)
- Beginning to develop an interface and guides to the collection.
- Developing ways to publicize and promote use of the collection. (2015 Penn State Reads – The Boom)

Questions?

Thank you for your attention and interest!

ONEGEOLOGY: PROVIDING GLOBAL OPEN ACCESS TO GEOSCIENCE DATA

Marko Komac
OneGeology Consortium, Geological Survey of Slovenia
Dimičeva ulica 14, p.p. 2552, Ljubljana, SI-1001, Slovenia, Marko.Komac@geo-zs.si

T. Duffy
British Geological Survey
Murchison House, West Mains Road, Edinburgh, EH9 3LA, United Kingdom,

Francois Robida
BRGM
3-Avenue Guillemin, Orleans, 45060, France

M. Lee Allison
Arizona Geological Survey
416 W. Congress, #100, Tucson, AZ 85701-1381

Abstract—OneGeology (1G) is an initiative of geological survey organizations (GSOs) around the globe that dates back to 2007. Since then, OneGeology has been a leader in developing geological online map data using a new international standard—a geological exchange language known as the 'GeoSciML' (currently version 3.2 exists, which enables instant interoperability of the data). Increased use of this new language allows geological data to be shared and integrated across the planet among organizations. One of the primary goals of OneGeology is a transfer of know-how to the developing world, shortening the digital learning curve. In autumn 2013, OneGeology was transformed into a consortium with a clearly defined governance structure, making it more official, its operability more flexible, and its membership more open where in addition to GSOs, other types of organizations that manage geoscience data can join and contribute. The next stage of the OneGeology initiative is focused on increasing the openness and richness of that data from individual countries to create a multi-thematic global geological data resource on the rocks beneath our feet. Authoritative geosciences information will help to mitigate or prevent natural disasters, explore for resources (water, minerals, and energy) and identify risks to human health on a planetary scale. With this new stage, renewed OneGeology objectives were defined 1) to be the provider of geosciences data globally, 2) to ensure exchange of know-how and skills so all can participate, and 3) to use the global profile of 1G to increase awareness of the geosciences and their relevance among professionals and the general public. We live in a digital world that enables prompt access to vast amounts of open access data. Understanding our world, the geology beneath our feet, and environmental challenges related to geology calls for accessibility of geoscience data and the OneGeology Portal (portal.onegeology.org) is the place to find them.

CHALLENGES TO THE UTILITY AND LONG-TERM ACCESSIBILITY OF DIGITAL GEOLOGIC MAPS

David R. Soller
Nancy R. Stamm
U.S. Geological Survey
926-A National Center, Reston, VA 20192, drsoller@usgs.gov

Abstract—The essential nature of content and cartography on geologic maps and accompanying reports has been relatively consistent through time. As a result, geologic maps of today bear strong resemblance to those of the 1800s, thereby enabling new studies to draw upon maps and information of many vintages. Those who can read a modern geologic map are likely to understand a map published in the early days of the science because of the consistent portrayal of geologic features. Mappers have, essentially, been following a standard method since the inception of geologic mapping. The science has evolved, but fortunately the design of the geologic map has remained relatively stable.

The transition from paper to digital methods for map compilation and cartographic production has been underway for about five decades. This transition created new opportunities for innovative science and communication, but also carries the potential to degrade scientific productivity through decreases in standard information content and format. A perusal of maps published in GIS format during recent decades (e.g., searching the National Geologic Map Database, http://ngmdb.usgs.gov) illustrates this issue, and argues for increased standardization in order to ensure that the digital maps we produce today will be useable decades from now.

The development of standards for geologic map databases is a lengthy and difficult process, and some convergence of ideas and methods is occurring. Under mandate of the Geologic Mapping Act of 1992, the National Geologic Map Database (NGMDB) project serves to coordinate and highlight emerging methods, guidelines, and standards in order to assist in delivering digital geologic maps that can be easily used by scientists, decision makers, and the general public.

Regarding long-term management and usability of maps and reports, we face numerous challenges. In a typical agency, information management decisions must be based on triage; that is, what kinds of information (e.g., paper, digital) are most vulnerable to loss? Given our limited resources, what can we do to protect the paper and digital information assets upon which we all rely? This presentation will focus on these issues, as they affect science projects and development of a national archive of geoscience information.

PROVIDING FREE AND OPEN SOURCE ACCESS TO GEOSCIENCE DATA WORLDWIDE

M. Lee Allison
Stephen M. Richard
Kim Patten
Arizona Geological Survey
416 W. Congress, #100, Tucson, AZ 85701-1381

Abstract—Imagine a world where you have unlimited access to all the scientific data you need from any field, where you can easily analyze data of interest and display them any way you want, and where you can easily model your results and explore your ideas. The geosciences are leading the development in achieving these goals.

US Geoscience Information Network (USGIN) is a freely available data integration framework, jointly developed by the USGS and the Association of American State Geologists (AASG), in compliance with international standards and protocols to provide easy discovery, access, and interoperability for geoscience data. One of the USGIN standards includes a geologic exchange language known as 'GeoSciML' (v. 3.2, which enables instant interoperability of geologic formation data), which is also the base standard used by the 117-nation OneGeology consortium, established initially to serve digital geologic maps of the world. The USGIN deployment of NGDS serves as a continent-scale operational demonstration of the expanded One-Geology vision to provide access to all geoscience data worldwide.

USGIN is developed to accommodate a variety of applications; for example, the International Renewable Energy Agency streams data live to the Global Atlas of Renewable Energy. Alternatively, users without robust data sharing systems can download and implement a free software packet, "GIN Stack," to easily deploy web services.

The White House Open Data Access Initiative required all federally funded research projects and federal agencies to make their data publicly accessible in an open source, interoperable format, with metadata. USGIN currently incorporates all aspects of the initiative as it emphasizes interoperability. The system is successfully deployed as the National Geothermal Data System (NGDS), officially launched at the White House Energy Datapalooza in May 2014. The USGIN Foundation has been established to ensure this technology continues to be accessible and available.

Part 4

Proceedings of the 49th Meeting of the Geoscience Information Society

GSA Technical Session 253

T145. Where in the World?
Access and Availability to Geoscience Data II

Identifying, accessing, analyzing, and preserving geoscience data sets can be daunting. This session will examine how researchers, information professionals, and librarians are supporting data-intensive scientific discovery in the geosciences.

Session Convener

Hannah Winkler Hamalainen
October 21, 2014
1:00 p.m. – 4:45 p.m.

GEOLOGIC GUIDEBOOKS OF NORTH AMERICA DATABASE VS GEOREF: PROPOSED PROJECT TO COMBINE THE GUIDEBOOK DATABASE INTO GEOREF

Lura E. Joseph
Library, University of Illinois at Urbana-Champaign
450J Main Library, MC-522, 1408 W. Gregory Drive, Urbana, IL 61801, luraj@illinois.edu

Abstract—Two resources for identifying geologic field trip guidebooks are GeoRef and the Geologic Guidebooks of North America Database (Guidebook Database), a freely searchable database hosted by the American Geosciences Institute, and cooperatively maintained with Geoscience Information Society. The precursor to the Guidebook Database was the *Union List of Geologic Field Trip Guidebooks of North America*, a print resource produced by Geoscience Information Society, ending with the 6th edition in 1996. The current (July 13, 2014) number of field trips listed in the Guidebook Database is 12,394. The number of guidebook titles in GeoRef is currently unknown, and difficult to determine. Discussions about merging the Guidebook Database into GeoRef have recently been renewed. Due to the nature of both databases, this would not be a simple task. This paper discusses some of the problems, and possible steps, for merging the Guidebook Database into GeoRef, as well as advantages and disadvantages.

BACKGROUND

History:

The Geoscience Information Society (GSIS) archives reveal some of the earliest concerns among geology librarians, including the need for an international index of geological literature, and aids for identifying and accessing geologic field trip guidebooks. These conversations eventually led to the incorporation of the Geoscience Information Society in 1965. One of the earliest combined efforts of the society was publication of the first edition of the *Union List of Geologic Field Trip Guidebooks of North America* in 1968. The 6th (last) edition of Union List, published in 1996, was converted to digital format in 2002 and hosted online by the American Geosciences Institute (AGI) as the Geologic Guidebooks of North America Database (Guidebook Database). This freely searchable online database is updated as guidebook titles are added to GeoRef. The original Union List was limited to trips in North America. Shortly after the resource was converted to digital format, guidebooks to other geographic areas began to be added sporadically.

The Two Databases:

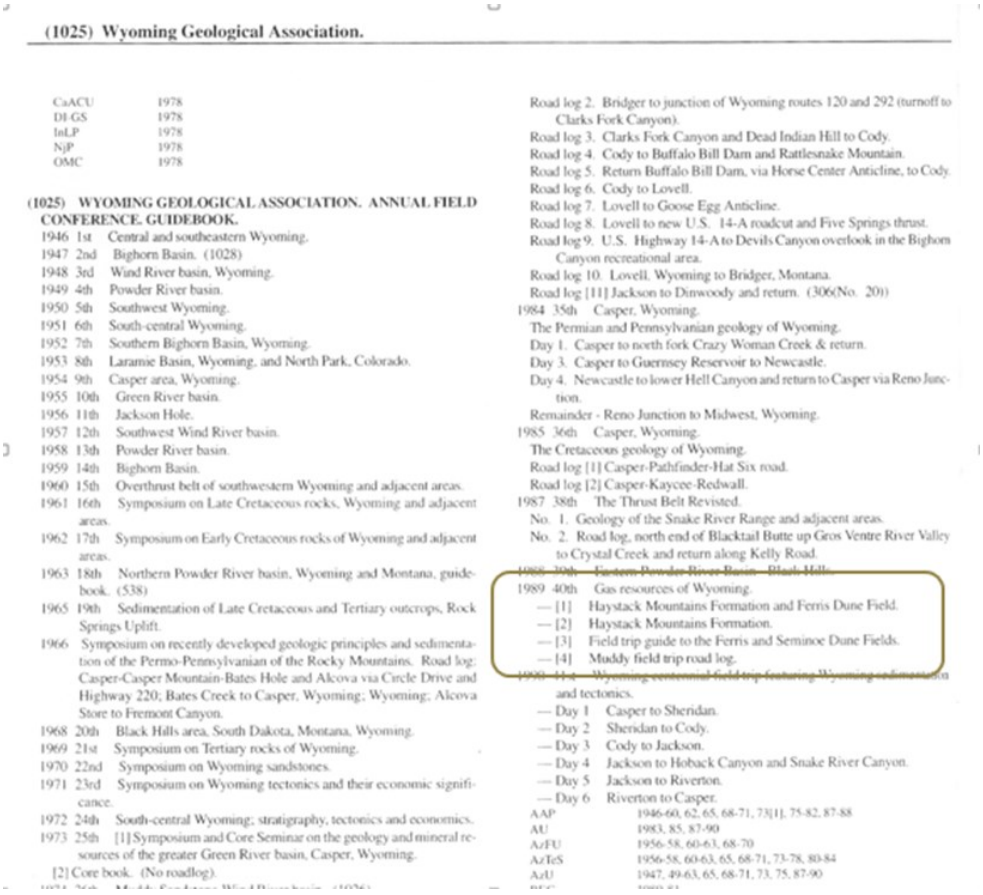
Neither the Guidebook Database nor GeoRef has complete coverage of geologic field trip guidebooks. The Guidebook Database lists guidebooks that are not indexed in GeoRef (especially early years), and GeoRef contains many titles that are missing from the Guidebook Database. There are many guidebooks that are not contained in either resource. (WorldCat is a third database that can be used to partially fill in the gaps.)

The two databases differ, making it difficult to combine the information (Table 1). The Guidebook Database is focused on trips; it is often necessary to mine into a record to determine the guidebook title and information. One guidebook may contain several or many trips, which are listed separately in the Guidebook Database. GeoRef indexing includes both the monograph title and also any separately authored content, which may include both trips and articles. If a trip is not separately authored, it will not have a separate record in GeoRef. It is likely that the Guidebook Database has become a mixture of types of records with the conversion to electronic format, since

TABLE 1. COMPARISON OF THE LEGACY DATABASE WITH GEOREF

Legacy Guidebook Database	GeoRef
- Focused on trips - Mostly Restricted to North America	- Focused on guidebook titles and individually authored articles - World

GeoRef does not separate out trips unless they are separately authored. The updates are accomplished by GeoRef indexers tagging records, so what is included in the Guidebook Database depends partly on what the indexers tag, and their understanding of what should go into the Guidebook Database. Tagged records are added to the Guidebook Database when a critical mass is reached—either a lot of corrections and additions for all files that reside on that server or about 25 to 30 guidebooks to add (email communication AGI-GeoRef).



(1025) Wyoming Geological Association.

CaACU 1978
DI-GS 1978
IaLP 1978
NjP 1978
OMC 1978

(1025) WYOMING GEOLOGICAL ASSOCIATION. ANNUAL FIELD CONFERENCE. GUIDEBOOK.
1946 1st Central and southeastern Wyoming.
1947 2nd Bighorn Basin. (1028)
1948 3rd Wind River basin, Wyoming.
1949 4th Powder River basin.
1950 5th Southwest Wyoming.
1951 6th South-central Wyoming.
1952 7th Southern Bighorn Basin, Wyoming.
1953 8th Laramie Basin, Wyoming, and North Park, Colorado.
1954 9th Casper area, Wyoming.
1955 10th Green River basin.
1956 11th Jackson Hole.
1957 12th Southwest Wind River basin.
1958 13th Powder River basin.
1959 14th Bighorn Basin.
1960 15th Overthrust belt of southwestern Wyoming and adjacent areas.
1961 16th Symposium on Late Cretaceous rocks, Wyoming and adjacent areas.
1962 17th Symposium on Early Cretaceous rocks of Wyoming and adjacent areas.
1963 18th Northern Powder River basin, Wyoming and Montana, guidebook. (538)
1965 19th Sedimentation of Late Cretaceous and Tertiary outcrops, Rock Springs Uplift.
1966 Symposium on recently developed geologic principles and sedimentation of the Permo-Pennsylvanian of the Rocky Mountains. Road log: Casper-Casper Mountain-Bates Hole and Alcova via Circle Drive and Highway 220; Bates Creek to Casper, Wyoming; Wyoming; Alcova Store to Fremont Canyon.
1968 20th Black Hills area, South Dakota, Montana, Wyoming.
1969 21st Symposium on Tertiary rocks of Wyoming.
1970 22nd Symposium on Wyoming sandstones.
1971 23rd Symposium on Wyoming tectonics and their economic significance.
1972 24th South-central Wyoming; stratigraphy, tectonics and economics.
1973 25th [1] Symposium and Core Seminar on the geology and mineral resources of the greater Green River basin, Casper, Wyoming.
[2] Core book. (No roadlog).
Road log 2. Bridger to junction of Wyoming routes 120 and 292 (turnoff to Clarks Fork Canyon).
Road log 3. Clarks Fork Canyon and Dead Indian Hill to Cody.
Road log 4. Cody to Buffalo Bill Dam and Rattlesnake Mountain.
Road log 5. Return Buffalo Bill Dam, via Horse Center Anticline, to Cody.
Road log 6. Cody to Lovell.
Road log 7. Lovell to Goose Egg Anticline.
Road log 8. Lovell to new U.S. 14-A roadcut and Five Springs thrust.
Road log 9. U.S. Highway 14-A to Devils Canyon overlook in the Bighorn Canyon recreational area.
Road log 10. Lovell, Wyoming to Bridger, Montana.
Road log [11] Jackson to Dinwoody and return. (306(No. 20))
1984 35th Casper, Wyoming.
The Permian and Pennsylvanian geology of Wyoming.
Day 1. Casper to north fork Crazy Woman Creek & return.
Day 3. Casper to Guernsey Reservoir to Newcastle.
Day 4. Newcastle to lower Hell Canyon and return to Casper via Reno Junction.
Remainder - Reno Junction to Midwest, Wyoming.
1985 36th Casper, Wyoming.
The Cretaceous geology of Wyoming.
Road log [1] Casper-Pathfinder-Hat Six road.
Road log [2] Casper-Kaycee-Redwall.
1987 38th The Thrust Belt Revisited.
No. 1. Geology of the Snake River Range and adjacent areas.
No. 2. Road log, north end of Blacktail Butte up Gros Ventre River Valley to Crystal Creek and return along Kelly Road.
1989 40th Gas resources of Wyoming.
— [1] Haystack Mountains Formation and Ferris Dune Field.
— [2] Haystack Mountains Formation.
— [3] Field trip guide to the Ferris and Seminoe Dune Fields.
— [4] Muddy field trip road log.
and tectonics.
— Day 1 Casper to Sheridan.
— Day 2 Sheridan to Cody.
— Day 3 Cody to Jackson.
— Day 4 Jackson to Hoback Canyon and Snake River Canyon.
— Day 5 Jackson to Riverton.
— Day 6 Riverton to Casper.
AAP 1946-60, 62, 65, 68-71, 73[1], 75-82, 87-88
AU 1983, 85, 87-90
AzFU 1956-58, 60-63, 68-70
AzTeS 1956-58, 60-63, 65, 68-71, 73-78, 80-84
AzU 1947, 49-63, 65, 68-71, 73, 75, 87-90

Figure 1. Records from the Union List.

The Guidebook Database contains information predominantly related to North America; GeoRef contains worldwide information. Other factors making comparisons difficult include the use of abbreviations for societies in earlier GeoRef records, and differences in interpreting the actual title of a guidebook by inputters of information into the separate databases. (Many guidebook series are notoriously lacking in standardization, and the title of an item may differ between the cover and the title page). Also, many guidebooks belong in more than one series due to trips being held jointly.

Titles in the Guidebook Database cannot simply be added to GeoRef; they must be indexed, which means the physical piece must be available to the indexer. Some of the guidebooks are very rare, and some may have gone missing over the years.

The current (July 13, 2014) number of records in the Guidebook Database is 12,394. It is not possible to know exactly how many field trips or guidebook titles are in GeoRef. A search of GeoRef using the string "guidebook* OR field trip* OR guide book* OR fieldtrip*" yielded 45,470 results on August 11, 2014 at 11:15 a.m. Central Standard Time. Adding the phrase "OR excursion*" yielded 52,420 results; some of those results are likely bogus since "excursion" may also be a graphical excursion rather than a field trip. As previously stated, the resulting records from GeoRef includes monograph titles and separately authored articles and trips within the monograph, whereas the records from the Guidebook Database are for trips, whether separate or multiple within a monograph.

Examples of Records:

Figure 1 is an example of records from the Union List. This example is from the Wyoming Geological Association Annual Field Conference Guidebook series. Note the box on the right. This particular guidebook is from 1989, the 40th conference. The record shows the monograph title (Gas resources of Wyoming) and 4 trips within the monograph.

Figure 2 is an example of the record from the Guidebook Database. This is the same record, after conver-

sion to electronic format as part of the Legacy Database within the Guidebook Database. Note that there are four trips, and the monograph title is the 5th line. Clicking on the "single view" of the first trip provides more detail, including holding institutions, and limited geographic and rock unit indexing.

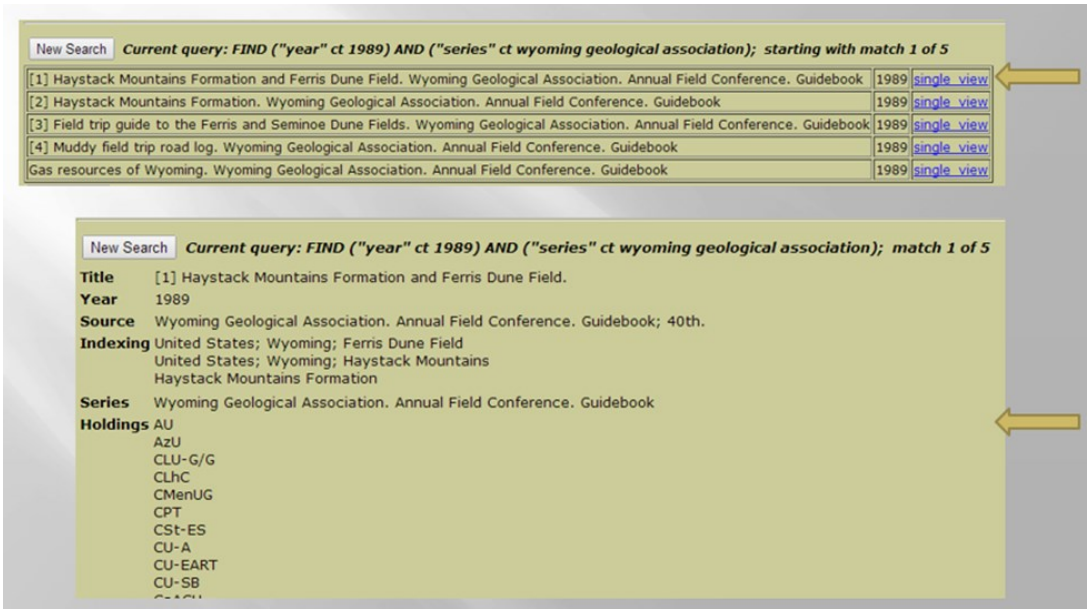


Figure 2. Examples of record from the Guidebook Database.

Figure 3. Examples of records from GeoRef.

Figure 3 is the example of the same guidebook in GeoRef. There are 25 results. One record (top left arrow) is for the monograph. The four trips are indicated with the arrows on the right. Note that these are only present because the trips were separately authored. The other 20 records are for separately authored articles (not trips) that are contained in the guidebook. (These are NOT in the Guidebook Database).

STEPS TO MERGE THE DATABASES

Over recent years, there have been conversations among geology librarians about the need to merge the Guidebook Database into GeoRef; however, due to the difficulties related to the differences between the two databases, any project to merge the two has been on the back burner. The need to migrate the independent databases maintained by AGI to a new platform has brought the possibility of a merger back into discussion.

At this point, it is not simple to even determine the number of guidebooks in GeoRef. Fortunately, the Legacy Database (the digitized Union List before any additions) is available; however, comparisons are complicated, as stated above. The following steps are proposed:

Proposed Steps to Merge Databases:

1. Output the entire Legacy Database into an Excel

spreadsheet.

Be able to sort on:

1. NOT in GeoRef, then
2. Series, then
3. Date

2. Create programming to automate a comparison between the two databases. It is doubtful that any programming could have perfect results, but it will be a start.

3. Run the program to compare the Guidebook Database vs GeoRef:

- Identify Guidebook Database titles that are NOT in GeoRef
- Identify Guidebook Database titles that ARE in GeoRef, but GeoRef does not include the index terms "guidebook" and "field trips."

4. Check those identified as IN GeoRef and NOT in GeoRef to make sure that is true. The final list of those NOT in GeoRef would determine the scope of the rest of the project.

5. Systematically index those NOT in GeoRef, and keep track of what is done on the spreadsheets. It would be best to work through series first. This would also be a good time to add guidebooks not in either the Guidebooks Database or GeoRef (some identified during a sabbatical project)

6. Simultaneously add the terms "guidebook" and "field trips" to records in GeoRef that don't have them.

7. Possibly add trips from the Legacy Database that are not individually authored to the notes field in the GeoRef record.

Current Status of the Project (October 2014)

AGI/GeoRef staff member Lawrence Berg has provided an Excel spreadsheet of the Legacy Database. The Legacy Database is the Guidebook Database immediately after the 6th edition of the Union List was converted to digital format, and before any updates were added. Any additions to the Guidebook Database after that point were also added to GeoRef, and therefore do not need to be checked. There are 9,326 total records in the Legacy Database (a combination of trips and some monograph titles). The spreadsheet from AGI/GeoRef has the following columns:

Series | Year | Issue | Keys | GeoRef ID | Author | Title

The Keys column is an ID created by Lawrence at AGI/GeoRef for each item in the Legacy Database, to aide in matching and eventual merger.

AGI/GeoRef ran a comparison of the two databases (Legacy and GeoRef). For reasons explained previously, this comparison is very imprecise. Nevertheless, the results are informative: The comparison resulted in 1181 tentative record matches between the two databases (12.66% of the Legacy Database). If there was a tentative match, the GeoRef ID for the item was added to the Legacy spreadsheet. The author is currently checking those matches to make sure they are genuine.

The ultimate goal in checking for matches is to find guidebook titles in the Legacy Database that are not in GeoRef so that they can be added to GeoRef. The trips that are in the Legacy Database, but not in GeoRef are irrelevant because they will be added to GeoRef when the guidebook is indexed, if they are individually authored (and won't be added if they are NOT individually authored, unless to the notes field).

After matching guidebook titles in the Legacy Database with GeoRef, we will know the extent of a project to add guidebook titles to GeoRef that are in the Legacy Database, but missing from GeoRef. It may not be possible to find a copy of all of the guidebooks listed in the Legacy Database, but if a copy is no longer available any place, it is mostly irrelevant to users. Perhaps there could be an appeal to get a copy of any of those back into some library. It would be interesting, at any rate, to know how many there are in that category.

Other Thoughts

- Keep the Guidebook Database and keep adding to it until we get everything into GeoRef.
- No telling how long it will take to get this project done.
- We should "archive" the final Guidebook Database, if possible. It might be historically relevant

someday.

- If trips are not individually authored, they will not be in GeoRef. They are also currently not being added to the Guidebook Database if they are not individually authored. In other words, trips that are not individually authored will only be in the Legacy portion of the Guidebook Database. If we take down the Guidebook Database, that information will be lost, except for the print Union List. Is that important? Could the trip information be added to GeoRef in a notes field?
- There is no charge to search the Guidebook Database. If it is taken down, people will no longer be able to search for guidebooks at no charge.

March 2016 Update

As of mid-March 2016, the Geoscience Information Society Guidebooks Committee has finished matching the Legacy Database records with GeoRef. As anticipated, there is a large number of records in the Legacy Database that will need to be indexed and added to GeoRef. Work by the task force identified 3256 trips that were not initially found in GeoRef. As work continues to identify hard copies for indexing, some of the 3256 are being identified in GeoRef. A paper describing this work and the encountered problems is expected in the near future. Indexing of the Legacy Database guidebooks missing from GeoRef is now ongoing.

GEOGRAPHIC INDEXING OF DIGITIZED NEIGC FIELD TRIP GUIDEBOOKS: THE PLACE PROJECT AT THE UNIVERSITY OF NEW HAMPSHIRE

Thelma B. Thompson
Eleta Exline
Dimond Library, University of New Hampshire
Durham, NH 03824, thelma.thompson@unh.edu

Abstract—In 2013 the University of New Hampshire Library and its partner, the UNH Earth Systems Research Center, received a National Leadership grant from the Institute of Museum and Library Services to build PLACE (the Position-based Location Archive Coordinate Explorer), a geospatial search interface that links the Library's Fedora-based digital collections with a UNH instance of the Open Geoportal. One unique component of the project is to use PLACE to locate geologic field trip guidebooks via a geospatial search based on bounding boxes that outline the maximum footprint of individual field trips.

Preparation for this project began in 2001 and 2003 with surveys of participants in the New England Intercollegiate Geologic Conference (NEIGC) and attendees at the Northeast GSA meeting. Those surveyed strongly supported the concept of searching guidebooks by geographic location.

In 2008, the UNH Library received a small grant from NE GSA that enabled us to begin digitization of NEIGC guidebooks. The digital guidebook collection presently comprises NEIGC trips from 1920-1989. Beginning in 2009, the Library began hiring interns; among their tasks was creation of bounding boxes for each trip. Specific methodologies evolved over the years and had to be adapted for the characteristics of each trip description, particularly for the very oldest trips. Currently for most trips we use a combination of road log, any maps within the guidebook, Google Earth, and recent and historic topographic maps in paper and digital format, augmented as needed by consultation of geologic maps and references found within the trip descriptions.

Because of the difficulty of accurately locating many individual stops we have chosen creation of bounding boxes as a more workable geographic search feature. If the author gives exact latitude/longitude or UTM coordinates, they may be included in the descriptive metadata. Since the guidebooks are scanned as entire books, they need to be structured as complex digital objects to deliver individual trips. The bounding boxes are nearly complete; current work on the metadata and interface is being supported by the IMLS grant. One of the grant requirements is creation of a toolkit that will enable other libraries to create geospatial search access to their collections.

DESIGNING METADATA FOR GEOLOGIC GEOSPATIAL DATA: A LIBRARIAN'S PERSPECTIVE OF USER NEEDS

Linda R. Zellmer
University Libraries, Western Illinois University
One University Circle, Macomb, IL 61455-1390, LR-Zellmer@wiu.edu

Abstract—Metadata. It's not every GIS user's favorite activity. In fact, all too often GIS users create minimal metadata. Alternatively, metadata may be so detailed that it is useless to people seeking data for work related to a specific area. While standards exist that describe the parts of a metadata record and whether they are mandatory or optional, there are no rules that describe how information in each field of the record, much less keywords, should be supplied.

Librarians have been describing resources in their collections for hundreds of years, and have developed standards on how to enter information about those resources into machine-readable cataloging records. Those standards could be useful if applied in developing metadata to describe geospatial data.

Keywords in metadata records are commonly used terms that describe the resource. They can be related to a discipline, place, stratum, time period, or theme. Assigning place names as keywords can be the most confusing, both from the perspective of the GIS data producer and the potential GIS data user. Users seeking information on a specific area, such as a county, parish, or national park do not need data that deal with an entire state or even larger area. However, data dealing with a physiographic region, such as a river basin, might be useful to people looking for information on a county. While some people may search both physiographic and political keyword terms, others may just search for information by searching for common political terms. People developing metadata need to put themselves in the place of the person looking for GIS data and add terms that will best describe the potential use of the data that they are describing.

HARNESSING DATA WITH THE CITIZEN SCIENTIST

Monica Pereira
John Spoor Broome Library, Collections, California State University Channel Islands
Camarillo, CA 93012, monica.pereira@csuci.edu

Cynthia Prosser
University of Georgia Libraries, Science Library
University of Georgia, Athens, GA 30602, cprosser@uga.edu

Abstract—Research questions in the geosciences demand large amounts of data. The challenge is to collect the requisite volume of data to address these queries adequately. Contributions in many fields of science are facilitated by the participation of ordinary people. This involvement provides opportunities for a wide variety of people to participate in science projects, increase the amounts of incoming data, and possibly increase the scope of the project. The internet provides easy discoverability and access to these projects.

There are numerous extant projects available to the volunteer, which require varying levels of expertise and commitment. Some are straightforward enough for school-age participants; others are more suited to adults. In-depth training and specialized equipment are necessary for some projects, while others can be started following a brief online tutorial. Most projects require access to the Internet via computer or smartphone in order to expedite research. Not only does the potential magnitude of data collection help scientists, it also increases the investment of citizen scientists in the outcomes of research, and promotes understanding of the scientific process and the variety of uses for the procured data.

INTRODUCTION

Scientific exploration and discovery in the twenty-first century is enabled by advanced technologies and advanced computing power. Long and elaborate processes involving high level calculations or complex pattern recognition can now be done much faster and more accurately as a result. Seismic measurements, climate modeling, soil and water sampling and testing, and myriad other investigations can be pursued with less effort than previously. In fact, the promise of computing technologies along with the Internet has opened new dimensions for scientific inquiry and distributing the results.

Along with enhanced computing capacity, new technologies have revitalized the public's interest in science and data collection, not just to the benefit of the public, but also to extend the reach of scientists (Branchini et al., 2015; Cohn, 2008; Cronin and Messemer, 2013; Nov et al., 2014). Indeed, scientific exploration and discovery are increasingly part of the public sphere through the work of citizen science. The value of citizen participation in scientific pursuits has become a self-evident mechanism for getting the work of science done as well as increasing scientific literacy for nonscientists.

Accompanying the specialization and mechanization of many aspects of human endeavor was the professionalization of science, making the citizen scientist a rarity (Miller-Rushing et al., 2012). By extension, such disregard separated the layperson from direct involvement in scientific endeavors. Happily, the Internet coupled with technologies for personal use have reopened the door for citizens and scientists to engage in mutually beneficial scientific investigation.

Data collection tasks using the distributive power of the Internet combines public interest in supporting scientific research, sustains project-based teaching and learning in academic institutions, and encourages more involvement in discovery than might otherwise occur. As a consequence citizen participation in science promotes discovery and offers the potential for expanding the scale of inquiry. What a small number of scientists might have found daunting and

expensive can now be accomplished through a broadened geographical and temporal base as people around the world add data through participation in projects. These large scale collaborative and contributory activities on the part of laypersons are called citizen science, or participatory science.

BENEFITS OF CITIZEN SCIENCE

Citizen science involves the participation of ordinary people, who may or may not be scientists, to collect data, report or record phenomena, and analyze artifacts. Citizen science is a form of project crowdsourcing with the intent to support scientific discovery and data-driven outcomes. With proper training, and checks and balances in the processes, there are numerous tasks that can engage the citizen scientist, and forward scientific research (Gonsamo and D'Odorico, 2014). The matter of training and other supports are crucial to maintaining the quality of data, and the interest and enthusiasm of thousands of citizen scientists (Clary and Snyder, 1999; Wright et al., 2015).

The essential element of citizen science is the voluntary participation of laypersons in scientific projects which run the gamut from observation to data collection to pattern identification (Marshall et al., 2015; Rossiter et al., 2015). With requisite instruction and guidance, citizen scientists can perform the necessary data collection and image identification tasks. Not surprisingly, there has been skepticism regarding the fitness of nonscientists, and other segments of the general population (young people, older adults, etc.) for such tasks. However, studies have shown that data collected by citizen scientists compares reliably to that of professionals (Fowler et al., 2013; Goodchild, 2007; Jordan et al., 2012; Newman et al., 2003). Some citizen science projects require very little training, and the data is averaged over the volume of contributions as a function of the crowd collection paradigm (e.g., *Old Weather*, https://www.oldweather.org/).

The range of projects in which citizens can participate has increased as scientists have recognized the potential impact for their work and as the Internet has invited and showcased the possibilities for lifelong learning. There can be little dissension that the benefit of participatory citizen science can help the public's appreciation of how research questions are formulated and the appreciation of research methods across several science disciplines (Bonney et al., 2009; Kullenberg and Kasperowski, 2016). The fact is that science cannot yield answers through the simple assemblage of large amounts of random data, but requires context through the formulation of hypotheses and focused research questions (Gandomi and Haider, 2015). By extension, understanding research methods and the scientific method in particular can increase citizen understanding of the ramifications of scientific inquiry, and, encourage involvement in understanding and querying government policy making at all levels (Mellouli et al., 2014).

Science is dependent on the collection of large amounts of data, or the teasing out of details from data through painstaking and routine work. The former would require a scientist to be in multiple locations than physically possible (e.g., *Did You Feel It?*, http://earthquake.usgs.gov/data/dyfi/), and the latter certainly requires more time than a scientist might have (e.g., *Disk Detective*, https://www.diskdetective.org/). Data may be hyperlocal (e.g., *River Instream Flow Stewards*, http://www.rifls.org/) or observations may be from unexpected occurrences (e.g., *Marine Debris Tracker*, http://www.marinedebris.engr.uga.edu/).

Decreased costs in computer storage and improvements in computing power have advanced scientific research in that more complex questions about phenomena and interactions can be posited. The scope of citizen science projects, also, is well-supported by the Internet and portable wireless technologies such that crowdsourcing has become an economical way to disseminate requests for help and organize citizen input. The U.S. Geological Survey (USGS) and the National Aeronautics and Space Administration (NASA) maintain lists of extant projects. Universities, museums, and other organizations, also, have projects available for a variety of interests. SETI@home (http://setiathome.ssl.berkeley.edu/) is one of the longest-running projects, using the passive or latent power of personal computers (left running) to probe radio signals for patterns that might indicate intelligent extraterrestrial life.

TYPES OF DATA

There are several methods for assembling and evaluating project data: collecting, reporting, recording, and analyzing. For example, collection of local precipitation data provides a more accurate picture of precipitation for Community Collaborative Rain, Hail and Snow Network (CoCoRaHS, http://www.cocorahs.org/) than would be available at the usual collection locations, e.g., an airport, which represents single point precipitation. The volume of precipitation cannot be measured as accurately from single points. Rather a wide and dense network of measurement points can provide better estimates. The data collected by citizen scientists is reflected online almost immediately. For this citizen science project, it is not enough to observe that precipitation has occurred. Accurate measurement of the amount of precipitation and the date and time it occurs provides a clearer picture of moisture. Online training is included to ensure that contributing citizens understand how to use the equipment provided, and how to measure accurately.

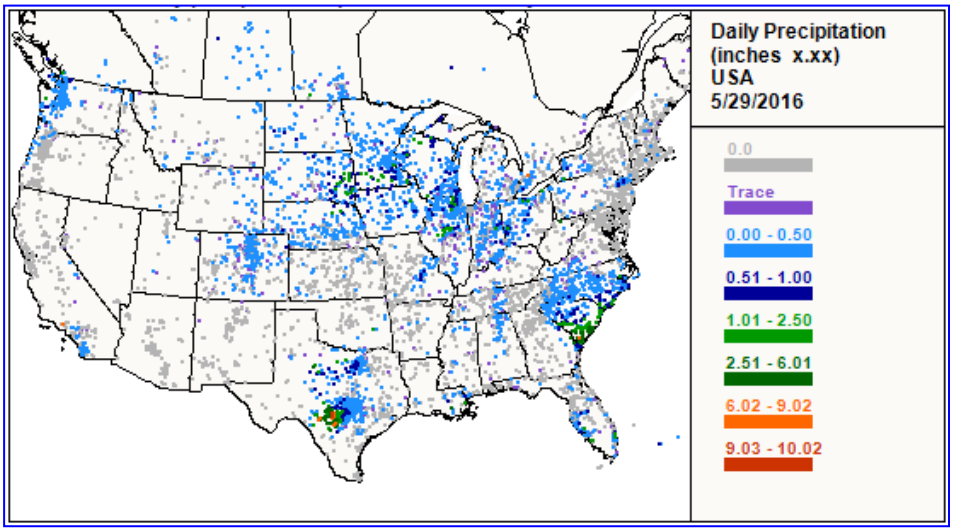


Figure 1: CoCoRaHS Map for May 29, 2016

Another project that involves active collection is the Marine Debris Tracker (http://www.marinedebris.engr.uga.edu/). This opportunity uses the Global Positioning System and requires a free app for the smartphone. The app stores data independently of a wireless signal until a wireless or cell signal is available, when the data is uploaded to the Marine Debris Tracker server. Debris of any size can be tracked, and data can be downloaded as a comma-separated value file, which allows participants to see their data at work. An interactive world map shows the locations for the reports.

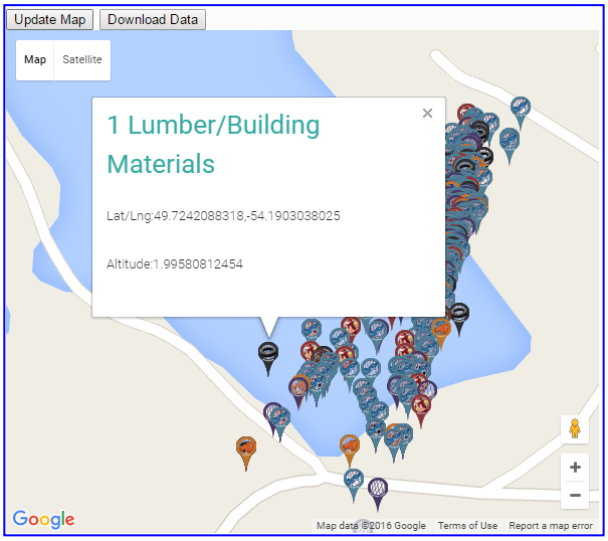


Figure 2: Marine Debris Map Detail

Reporting is another valuable function that can be fulfilled by the citizen scientist. The Quake-Catcher Network (http://qcn.stanford.edu/) needs the volunteer to connect a sensor to the lowest floor level of one's building, and attach it via a USB (universal serial bus) to an Internet-connected personal computer (with optional attachment for a smartphone or tablet). The requisite software is installed on the computer, and the computer is configured to send readings directly to the network. This is an example of passive or latent reporting, similar to the SETI@home project mentioned earlier, where a host computer collects and uploads sensor data for processing without any intervention of the citizen scientist.

SKYWARN® (http://skywarn.org/), on the other hand, requires more effort on the part of volunteers willing to report on severe weather events. Training coordinators in each state provide two-hour training on the fundamentals of storm and severe weather

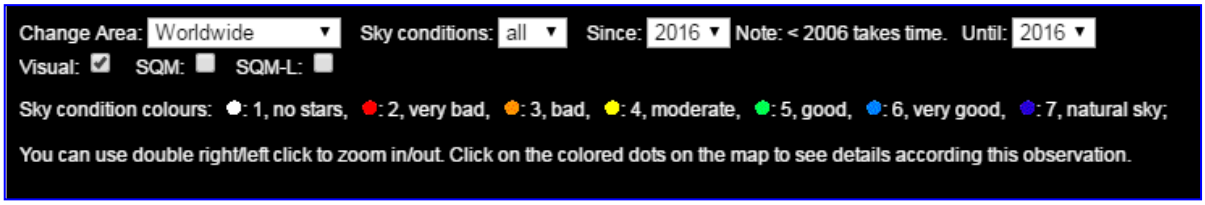


Figure 3: Map Legend for How Many Stars?

features and development for volunteer spotters. While the National Weather Service uses Doppler radar and satellite data, spotters are the reliable cadre of eyes on the ground who can provide up-to-the-minute details. It should be noted that spotters do not chase storms or severe weather. Their value lies in reporting what they observe in real time, providing extra seconds or minutes for local first responders to warn communities. Spotters are trained in what information to report, and how to report their information. In order to do this, spotters also are trained to identify potential severe weather features.

Recording data is yet another way to contribute to scientific inquiry. How Many Stars? (http://hms.sternhell.at/hms.php?lang = English&country = Worldwide&page = pages/main#null) is a night-sky visibility program based on the number of stars an observer records in the Orion constellation (for either hemisphere) or the Little Dipper (northern hemisphere only). The accompanying map provides a legend that indicates how clear the night sky is. Understanding how to find a constellation as it passes through the visible night sky hemisphere helps the new stargazer to orient herself. Recognizing how the constellations cycle throughout the year can inspire amateur stargazers to expand their repertoire.

The Target Asteroids! (http://www.asteroidmission.org/get-involved/target-asteroids/) project is a high-end recording opportunity. Access to an 8" telescope, a CCD (charge-coupled device) camera, and astronomy software is required. While the cost of such equipment, and the requisite knowledge to use it, will dampen the participatory urge in some, many volunteers are already equipped, or are members of local astronomy clubs, where they would have access to the necessary equipment. The aim of the project is to record observations of near-earth asteroids, and photograph them over a 30 min period. Lists of asteroids are provided and updated annually. In addition to the equipment, this project requires some sophistication on the part of the volunteer. Knowing when and where to look is a crucial skill to learn. The purpose of this project is to map asteroids and their orbits and observe any variations in orbits. This information will assist scientists in guiding future satellites launches.

The category of citizen science projects involving image analysis is a reminder of how much already existing data needs to be scanned for specific criteria. Tropical storm analysis through the Cyclone Center (https://www.cyclonecenter.org/) requests citizen science help in evaluating the storm centers and the kinds of clouds that best characterize them. The technique is subjective, but that is why hundreds or thousands of classifiers will average the identifications. Stronger storms appear in more vivid colors than weak ones. A guide is provided to help the volunteer classify each case. A cyclone field guide is provided so the eye of a storm can be more easily identified. In addition to using the colors to categorize storms, the volunteer also can learn about how storms develop. The work done for the Cyclone Center helps fine tune the understanding of storm inten-

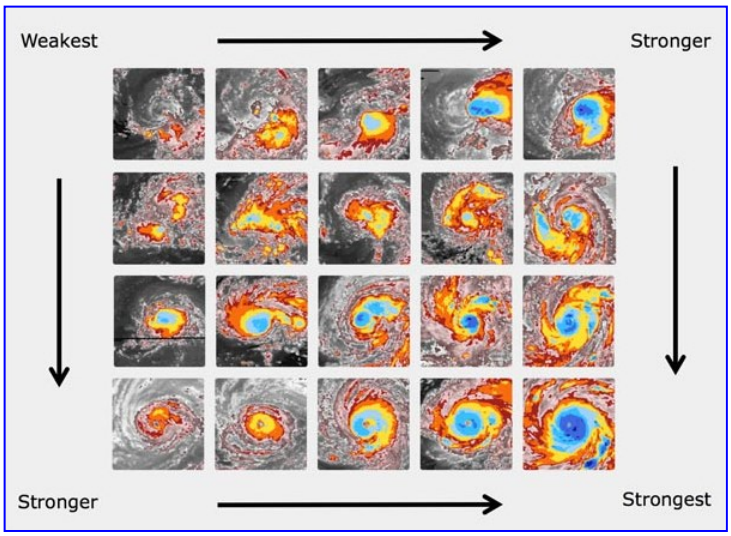


Figure 4: Storm Strength Guide

sity. The work maintains interest because of the variety of satellite and Doppler images expresses that range of storm strength.

Planet Four (https://www.planetfour.org/) asks volunteers to detect specific features (fans and blotches) in images taken of the Martian surface with the High Resolution Imaging Science Experiment (HRISE) camera on board the Mars Reconnaissance Orbiter. Image guidance and practice is provided. There are far more images than the scientists can manage, and the human eye is much better at detecting patterns in the complexities of light and dark that the images provide. Work on this project can ignite excitement in space exploration. Using a drawing tool, the volunteer outlines features having first identified the feature as either a blotch, a fan, or interesting feature.

An additional project on terrain mapping is available, Planet Four: Terrains (https://www.zooniverse.org/projects/mschwamb/planet-four-terrains). Planetary scientists are studying the formation and distributions of terrain types on the Martian surface. Training is provided on the variety of terrains. This project is one of the more challenging since there are several terrains, and each is unique.

LIVE PROJECTS AND PROJECT LIFESPANS

Citizen science projects are gaining in popularity. As the projects' inquiries are satisfied, those projects retire. Two of these, the Open Dinosaur Project (Taylor et al., 2010), and the Moon Zoo (Bugiolacchi et al., 2016) finished very quickly as a result of overwhelming volunteerism. As more scientists discover the power of thousands of contributions, it makes good sense to farm out portions of a project. As a consequence, the number of projects continues to expand rapidly. Two Web sites offer an entrée for prospective participants, SciStarter (https://scistarter.com/) and Zooniverse (https://www.zooniverse.org/). The sheer variety and volume of these enterprises is exciting. The Citizen Science Association held its first conference in 2015 (https://citizenscienceassociation.org/conference/citizen-science-2015/),and anticipates a 2017 conference (https://citizenscienceassociation.org/conference/citizen-science-2017/). All arenas of science have benefitted from citizen science involvement, from bird watching to the wide range shown above, and showcased in aggregator Web sites such as SciStarter and Zooniverse. Dozens of federal agencies, most notably, NASA and USGS have embarked on these collaborative ventures.

Figure 5: Fans and Blotches

CONCLUSION

The contributions of citizen participation in scientific inquiry represents a way to embed science in people's lives such that they see the utility and rigor of scientific research. That citizens are willing to assist according to each one's ability is a testament to the scientists who first thought to reengage the public in their experimental narratives. Citizens and governments can only be strengthened by such an interwoven process. Scientists need more help and citizens need more science. This synergy is a mutually beneficial trajectory (Haywood and Besley, 2014) that provides lifelong learning opportunities for all ages of citizen scientists. It is to be hoped that scientists and citizens continue this partnership, and that the pursuit of science becomes a meaningful way for all to understand the environment in which we live.

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EARTHCUBE: SEEKING COMMUNITY CONVERGENCE ON GEOSCIENCE CYBERINFRASTRUCTURE ARCHITECTURE

Stephen M. Richard
Arizona Geological Survey
416 W. Congress, #100, Tucson, AZ 85701, steve.richard@azgs.az.gov

Stephen Diggs
Scripps Institution of Oceanography
University of California, SIO/UCSD, San Diego, CA 92037

George Percivall
Open Geospatial Consortium, 1804 Stonegate Ave, Crofton, MD 21114

Abstract—Concrete decisions about the technical architecture of NSF EarthCube cannot be made until its governance organization is in place (fall 2014), but work is underway to promote consensus on the nature of the required architecture specification and how it will be used. The scope of the architecture must be determined through broad engagement of the earth science research and education community to meet their needs. EarthCube will be a system of systems, and must incorporate competing approaches, existing operational systems both within and outside of the NSF geoscience portfolio. A workshop held in June 2014 brought community members together to discuss EarthCube architecture and accelerate convergence. Several points of general agreement emerged. The EarthCube architecture should be a high level view of the system that can be used as a guide to assess the level of compatibility and interoperability of candidate technologies. The architecture framework can be used to identify gaps in capabilities and to establish development priorities. As an NSF system of systems operating in the context of a larger earth science research infrastructure, the architecture will need to focus on the gateways (interfaces and information exchange agreements) that connect components and enable interoperability. EarthCube components should be modular and loosely coupled, reducing the barriers to plugging in new components. The architecture should be viewed as an evolutionary artifact that will undergo continuous change to adapt to new research techniques and priorities and technology innovation. A "top down" design framework is useful to guide system development and management and assure that the "building blocks" work together, but the design must be responsive to "bottom up" input based on actual practice that emerges in the community. The business model for funding and maintaining production infrastructure should be treated as distinct from that supporting technology research and cutting edge development. These recommendations will inform the EarthCube Standing Committee for Technology and Architecture that will be in place in October 2014, tasked with developing the EarthCube architecture framework.

E-INFRASTRUCTURE AND DATA MANAGEMENT FOR GLOBAL CHANGE RESEARCH

Robert Gurney
Dept. of Meteorology, University of Reading
Whiteknights, PO Box 217, Reading, RG6 6AH, United Kingdom, r.j.gurney@reading.ac.uk

M. Lee Allison
Arizona Geological Survey
416 W. Congress, #100, Tucson, AZ 85701-1381

Abstract—The Belmont Forum, a coalition of science funding agencies from 15 countries, is supporting an 18-month effort to assess the state of international e-infrastructures and data management so that global change data and information can be exchanged more easily and efficiently internationally and across domains. Ultimately, this project aims to address the Belmont "Challenge" to deliver knowledge needed for action to avoid and adapt to detrimental environmental change, including extreme hazardous events.

This effort emerged from conclusions by the Belmont Forum that transformative approaches and innovative technologies are needed for heterogeneous data/information to be integrated and made interoperable for researchers in disparate fields, and for myriad uses across international, institutional, disciplinary, spatial, and temporal boundaries. The project will deliver a Community Strategy and Implementation Plan to prioritize international funding opportunities and long-term policy recommendations on how the Belmont Forum can implement a more coordinated, holistic, and sustainable approach to funding and supporting global change research. The Plan is expected to serve as the foundation of future Belmont Forum funding calls for proposals in support of research science goals as well as to establish long-term e-infrastructure.

More than 120 scientists, technologists, legal experts, social scientists, and others are participating in six work packages to develop the plan by spring 2015, under the broad headings of architecture/interoperability and governance: data integration for multidisciplinary research; improved interface between computation & data infrastructures; harmonization of global data infrastructure; data sharing; open data; and capacity building.

Recommendations are expected to lead to a more coordinated approach to policies, procedures, and funding mechanisms to support e-infrastructures globally in a more sustainable way.

DIGITAL DATA CAPTURE IN THE FIELD: ON-THE-OUTCROP MAP CREATION

Gerri L. McEwen
Martha A. Henderson
Ministry of Energy and Mines–Geological Survey Branch
University of Victoria, Victoria, BC V8P 5C2, Canada, gerri.mcewen@gov.bc.ca

Mitchell G. Mihalynuk
Victoria, BC V8X 2Z3, Canada

Stephen T. Johnston
School of Earth and Ocean Sciences, University of Victoria
Bob Wright Centre, PO Box 1700 STN CSC, Victoria, BC V8W 2Y2, Canada

Abstract—Today's technology allows mappers to streamline their efforts to instantaneously produce geological maps while on the outcrop. Conventional methods involved carrying an array of gear including, among other things, clipboards loaded with aerial photos and mylar, topographic maps, a stack of data sheets, plus a collection of pencil crayons and pencils, and a handheld GPS. This method is hampered by fixed scale, fixed map boundaries, cluttered data layers, and the time and effort required to compile and digitize map data and present in a publishable format. These problems are compounded with a large field party, where nightly compilation and updating of all mapsheets with daily results from all mappers is impractical.

In response to technological advancements such as tablet computers and GIS software packages, a multi-year partnership between the University of Victoria and the British Columbia Geological Survey has investigated on-the-outcrop digital mapping techniques. Our current deployment utilizes inexpensive tablet computers with GIS software: Microsoft Surface Pro 2&3 with USB GPS and Manifold™. High resolution imagery, topographic data, and any other pertinent digital dataset can be displayed at infinite scaling and modified as required during the mapping season. A streamlined MS Access database form linked to Manifold is used to capture field data entered by hand writing or voice recognition and instantly send that data to the map. Freeform notes and field drawings are captured in OneNote. Both manual and automated Cloud-based synchronization expedites data sharing and limits the risk of data loss due to tablet malfunction, loss, or destruction. A custom case protects the tablet and GPS while providing ventilation for cooling. The result… complete maps can now be created on the fly and fast-tracked to publication, saving the mapping crew time and effort in compiling notes and digitizing data at the end of a long day in the field.

This talk will outline the materials and methods used by the SNAP crew and share with you our experiences using the software as well as a view to the future for digital data capture in this and other projects.

LONG-TERM ORBITAL OBSERVATIONS OF THE WORLD'S ACTIVE VOLCANOES WITH THE ASTER VOLCANO ARCHIVE: THE CHALLENGES AND OPPORTUNITIES OF A 100TB DATA SET

David C. Pieri
Justin P. Linick
Jet Propulsion Laboratory/California Institute of Technology
4800 Oak Grove Drive, Mail Stop 183-501, Pasadena, CA 91109, dave.pieri@jpl.nasa.gov

Abstract—The physical and temporal systematics of the world's volcanic activity is a compelling productive arena for orbital remote sensing techniques, informing studies from basic volcanology to societal risk. The Advanced Spaceborne Thermal Emission and Reflection radiometer (ASTER—a joint project of Japan and the United States; 1999 launch), with high spatial resolution (15, 30, 90 m/pixel), multispectral character (0.52–0.86 μm; 1.6–2.4 μm; 8.1–11.6 μm), and stereo-photogrammetric capability is ideal for this task. The Smithsonian Holocene catalog of approximately 1550 volcanoes has yielded a burgeoning inventory of ASTER day and night images and their derivatives (e.g., SO_2 maps, thermal anomaly maps, alteration zone maps). To house and access this unprecedented continually growing data archive in a way that allows the survey, extraction, and distribution of important information in a timely way, at the Jet Propulsion Laboratory (JPL) we created the ASTER Volcano Archive (AVA—http://ava.jpl.nasa.gov). Now the world's largest web-accessible volcano image archive, it is one of several large data archives compiled by instruments (e.g., MODIS, MISR) on the NASA Terra orbital platform. The mechanics of organizing ~2 x 10^5 ASTER volcano 60 km x 60 km "postage stamps" and the implementation of data mining techniques to extract relevant characteristics (e.g., thermal emission, topography, and geomorphic style) emerge as significant challenges. Significant opportunities exist, however, to modernize, fundamentally advance, and unify global volcano geomorphology (à la the classic C.A. Cotton 1942 monograph *Volcanoes as Landscape Forms*). Additionally, we hope to use quantitative observations of topography and volcanogenic geomorphology (e.g., style and products of deposition and erosion) to document eruption history, to predict future eruptive behavior and to address hazards (especially when combined with geophysical data). We will discuss the challenges and scientific opportunities that this unique global volcanology data set represent, addressing opportunities for prompt data distribution to the scientific community, to disaster responders, the general public, and to educators. This work was performed at the Jet Propulsion Laboratory-California Institute of Technology, under contract to NASA.

LAND-USE AND LAND-COVER CHANGE IN DHAKA CITY BANGLADESH: A GIS AND REMOTE SENSING APPROACH

Niaz Morshed
Geography, Texas State University
601 University Drive, San Marcos, TX 78666, nmorshed29@gmail.com

Abstract—Dhaka, the capital city of Bangladesh, is considered the eighth largest city in the world because of its land area and high population density. The rapid change in land-use and land-cover (LULC) and unplanned urban expansion is receiving considerable attention from the local policy makers and international community. This study used geographic information system (GIS) and remote sensing techniques to examine the pattern and direction of LULC change in the Dhaka metropolitan city. This study utilized three different remotely sensed datasets in order to analyze LULC classes and their potential individually. Remotely sensed data including Landsat Thematic Mapper, Enhanced Thematic Mapper plus, and Operational Land Imager were used to estimate the pattern and direction of the LULC change. This study used a supervised classification procedure because of its better control over the classification and error detection, and making corrections. A post classification comparison change detection technique was used to estimate the major change between different land classes. The study revealed that built-up area increased significantly from 1989 to 2014 with an annual expansion of 81.54%. This analysis also quantified that this significant growth of built-up areas in the study area resulted from the substantial decrease of vegetation cover and potential agricultural land. It was apparent that 87.77% of the significant change occurred in agricultural land over the study period. Results drawn from this research should contribute to the update of LULC information, forecasting possible future LULC change and ensuring the sustainable development of the city.

ARIZONA GEOLOGICAL SURVEY MINING SITE—LEVERAGING 100 YEARS OF MINING REPORTS, MAPS, AND PHOTOGRAPHS FOR THE NEXT 100 YEARS

Casey C. Brown
Economic Geology, Arizona Geological Survey
3550 N. Central Ave, Phoenix, AZ 85012

M. Lee Allison
Arizona Geological Survey
416 W. Congress, #100, Tucson, AZ 85701-1381

Abstract—In 2011, the Arizona Department of Mines and Minerals (ADMMR) was closed and the fate of 70 years worth of mining records was unsure, until the Arizona Geological Survey (AZGS) proposed to curate the materials. The AZGS, recognizing the wealth of information contained in thousands of exploration reports, began an ambitious digitization project aimed at greatly increasing free access to the mineral and geological information contained therein.

The AZGS began the Mining Preservation Project by first creating a high level inventory of the mining files previously held by the ADMMR. File-level inventories of the collections were created and published online through the AZGS Repository. The AZGS identified 30 distinct collections of mining records. The ADMMR created four sets of its own records, nearly 5,000 maps, over 4,400 property files, 700 publications, and more than 6,000 photographs. It later received many donated collections: 5 photograph collections and 21 collections of exploration records from geologists. An initial survey of the holdings estimates the contents at 800,000 pages.

The AZGS had developed the infrastructure necessary to disseminate geoscience data in an interoperable framework called the U.S. Geoscience Information Network (USGIN). In order to conform to the USGIN standards of metadata interoperability, the materials had to be cataloged using the geographic metadata standard, ISO 19115. Required fields include a title, description, publication date, distributor contact, metadata contact, metadata date, and a link to the item. Additional recommended metadata for these files includes creator, thematic keywords, spatial keywords, etc.

Today, as metadata and digitization of each collection is completed, these documents are uploaded to an online search portal, mindata.azgs.az.gov, where researchers can find mine records by mine name, by spatial search on a map, or by browsing a gallery of photographs from exploration reports.

BED MORPHOLOGY OF BERING GLACIER, ALASKA

Bruce F. Molnia
National Civil Applicatons Program, U.S. Geological Survey
562 National Center, 12201 Sunrise Valley Drive, Reston, VA 20192, bmolnia@usgs.gov

Laura E. Snyder
U.S. Geological Survey
562 National Center, Reston, VA 20192

Abstract—Alaska's Bering Glacier is the largest and longest glacier in continental North America. Previously, we used GIS to analyze and integrate USGS reflection and refraction seismic data, ice-surface ice-penetrating radar (IPR) data, and NASA Warm Ice Sounding Explorer (WISE) airborne radar data to map the depths and morphology of the complex subglacial fiord system that underlies a 75-km-long segment of Bering's eastern piedmont lobe. The data synthesis revealed that a complex subglacial fiord system, in places as much as 380 m below sea level, reaches more than 65 km up-glacier from Bering's Little Ice Age end moraine complex. The WISE radar data that were used were collected in 2008. WISE, a 2.5 MHz radar that measures the nadir thickness of warm, fractured glacier ice, is based on the MARSIS planetary sounder. The WISE data both confirmed and expanded our initial interpretation of the fiord system's characteristics that was largely based on IPR data collected more than 15 years earlier.

This investigation used additional 2008 WISE data and a new 2012 WISE dataset to extend the mapping of Bering Glacier's bed to include the entire eastern part of the glacier. This additional ~100 km length of the glacier extends from the Bering Glacier/Malaspina Glacier divide in Canada to the western end of the Bagley Ice Valley. In all, ~718 km of radar profile lines were produced and analyzed. About 138 km of profiles were along the centerline of the glacier, while the remaining ~580 km were located in 60 cross profiles, perpendicular or oblique to the centerline. Data holidays account for ~14% of total profile line lengths.

Generally, centerline bed elevations in easternmost Bering Glacier are in the ~1,300–1,600 m above sea level (asl) range. At the western end of the Bagley Ice Valley, centerline bed elevations are in the ~100–300 m asl range. One area, ~95 km up glacier, has a bed elevation of <100 m asl. Ten kilometers to the east, the bed rises to ~600 m asl, and it remains close to that elevation for ~15 km. It continues to rise to Bering Glacier's origin with only a few 100 m of variability. Bed complexity in the Bagley Ice Valley area is low compared to the piedmont lobe area where several deeply eroded channels create 300–400 m of local relief. Centerline ice thicknesses observed range from <200 m near the terminus to >1.1 km in the western Bagley Ice Valley.

DEVELOPING SYNERGIES BETWEEN LARGE-SCALE RESEARCH AND GEODATABASES: NEOTOMA AND PALEON

Simon Goring
John W. Williams
Department of Geography, University of Wisconsin
550 N Park St, Madison, WI 53706, goring@wisc.edu

Eric Grimm
Illinois State Museum, Springfield, IL 62703

Russell W. Graham
Geosciences, The Pennsylvania State University
116 Deike, University Park, PA 16802

Chris J. Paciorek
Andria Dawson
Department of Statistics, University of California–Berkeley
367 Evans Hall, Berkeley, CA 94720

Jason McLachlan
Department of Biological Sciences, University of Notre Dame
100 Galvin Life Sciences, Notre Dame, IN 46556

Brian Bills
Center for Environmental Informatics, The Pennsylvania State University
Earth and Env. Systems Inst., 2217 Earth-Eng. Sciences Bldg., University Park, 16802-6813

Michael Anderson
Spatial Information Technologies
190 Tow Hill Road, Port Matilda, PA 16870

Abstract—Pliocene-Quaternary fossil records from mammals, plants, ostracodes, and insects, among others, have played a key role in our understanding of the interrelationship between climate and ecological communities on decadal, centennial, and millennial time scales. The Neotoma Paleoecological Database provides a centralized repository for over 11,000 datasets, comprising a variety of data types, ages, and locations across North America and around the world. Neotoma has already contributed to our understanding of late-Quaternary and Holocene change (among others: Blois et al., 2013; Goring et al., 2012; Hadley et al., 2009), and projects are currently underway that will continue to change the way we view past environments and ecosystems.

The utility of geoscience databases relies upon data contribution and can be measured by the use of the database for educational purposes, scientific research, and policy, conservation, or management outcomes. Collaborative efforts with external projects can operate synergistically to improve both data contribution and provide models for data use that can inform the development of tools for data access and manipulation. In particular, the development of web-based tools such as application programming interfaces and improved data structures that link key data characteristics for analysis are critical areas for improvement that can be extensively developed through use-case scenarios.

DEVELOPING SYNERGIES BETWEEN LARGE-SCALE RESEARCH AND GEODATABASES: NEOTOMA AND PALEON

continued

The interdisciplinary PalEON Project (http://paleonproject.net) links fossil pollen data with historic vegetation data from the northeastern United States in an effort to improve predictions of future ecological change. To achieve this objective in a dynamic and reproducible manner, PalEON has been working with Neotoma to procure and upload data, to work toward best practices for data storage and delivery through APIs and to develop a package for the statistical programming language R (the neotoma package). Here we provide a case study of the ways in which geoinformatics projects can interact with large-scale research projects to produce synergies that benefit both organizations, and to provide data-intensive test cases with which to improve standards of practice.

Part 5

Proceedings of the 49th Meeting of the Geoscience Information Society

GSA Poster Session 308

T146. Where's the Data?
Finding and Using Geoscience Data

Identifying, accessing, analyzing, and preserving geoscience data sets can be daunting. This session will examine how researchers, information professionals, and librarians are supporting data-intensive scientific discovery in the geosciences.

Poster Session Coordinator

Hannah Winkler Hamalainen
October 22, 2014
9:00 a.m. – 6:30 p.m.

FIELD PLAY AND THE 2014 NEW MEXICO GEOLOGICAL SOCIETY FALL FIELD CONFERENCE: INCORPORATING AUGMENTED REALITY AND LOCATION SENSITIVE CONTENT TO CREATE AN INTERACTIVE, DATA-RICH LANDSCAPE

Magdalena Donahue
Earth and Planetary Sciences, University of New Mexico
MSCO3-2040, 1 University of New Mexico, Albuquerque, NM 87131, mmsd@unm.edu

John Donahue
Computer Science & Engineering, New Mexico Institute of Mining and Technology
Department of Computer Science & Engineering, 801 Leroy Place, Socorro, NM 87801

Abstract—Field Play is an augmented reality (AR) educational and experiential tool that integrates geoscience educational content with the physical world. Built to run on Android mobile devices, the Field Play system is based around the creation of a data-rich landscape through which users engage in location-aware content to explore their environment through geologic field trips. Field Play has two goals: 1) improving access to abundant scientific information while in the field, and 2) promoting scientific education on a large scale, in a way that is personal, relevant, and interest-driven.

Field Play was incorporated in the New Mexico Geological Society annual Fall Field Conference (September 2014). This three-day trip in southern New Mexico included AR stops, annotated photographs, audio content of critical features, and links to guidebook and other pertinent scientific publications. For this trip, Field Play created predetermined routes based off of conference road logs, as well as free-standing supplementary content.

In practice, the embedded GPS within mobile devices triggers location-aware interactive content to become available when the user was within a set proximity of the feature (e.g., audio alert when approaching a fault zone). Additionally, users are given the option to interactively explore topical and location-based sub-modules that include AR binoculars, informational text, audio, topographic and geologic maps, and short YouTube lessons while in the field.

Field Play content is both trip-specific and stand-alone. Content exists within the Field Play ecosystem at two levels: curated, scientific content created by Field Play, and crowd sourced data originated by users. Both of these data types are fully "mashable," and can be combined by users to create personal topical or location-based trips using our trip creation tool.

Field Play content can be accessed online as well as via mobile device. We are working to expand our curated and crowd-sourced content to provide the geologic and public communities with an up-to-date, easily accessible resource of reliable geologic and scientific information for recreational, educational or professional use.

Update 2017: Field Play is currently undergoing a redevelopment phase and is currently offline.

See posters on subsequent pages.

What is Field Play?

Overarching Goals of Field Play:

1. Integrate educational contend into the physical world.
2. Improve access to abundant scientific information while in the field
3. Promote personal, relevant, interest-driven scientific education to large and diverse populations

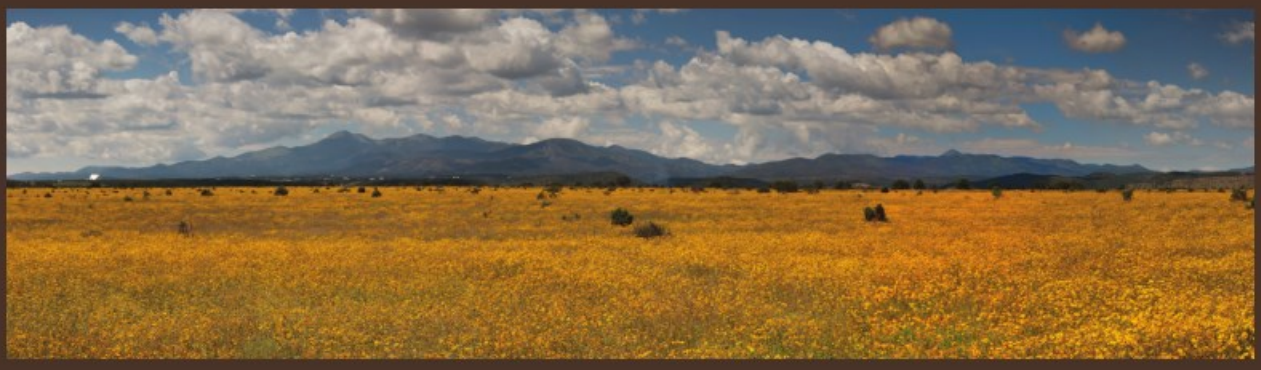
Specs

Augmented reality educational & experiental tool
Mobile device & web program
Android systems

How does Field Play work?

1. Content is trip-specific or stand-alone and can be sourced by Field Play or crowdsourced* and is completely 'mashable' by users
2. Content is accessible via mobile device or online

*** Coming soon. Want to stay abreast of latest developments and capabilities? See contact info at right**

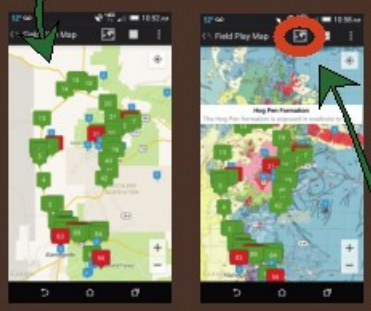


Field Play at the New Mexico Geological Society Fall Field Conference

Sacramento Mountains, New Mexico
3 days
Field Play conent includes: maps, audio content, annotated photographs, augmented reality,

Route map

Trip stops
Informational points
AR bionocular points

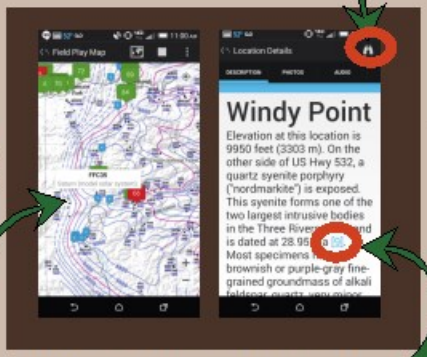


Base map layering

Google basemap
Any spatial data layer as base map(s)
(e.g., geologic & topographic maps, satellite imagery, hydrologic data, groundcover, etc.)

Augmented Reality (AR)

Interactive geospatially located information
Accessed through AR binoculars

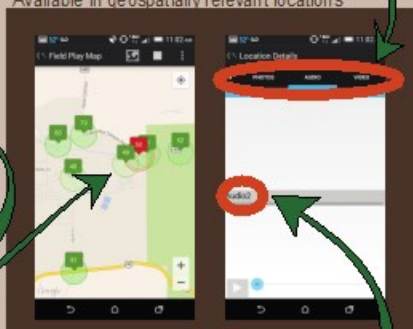


Interactive referencing

References can be collated
Live web links when available

Multi-type data access

Audio, photos, video, pdf's, data sheets, etc.
Available in geospatially relevant locations



Geotriggered audio content

Geofences automatically trigger audio
Users can approach interest point from any direction

Try Field Play at the 2014 GSA meeting

1. Download Field Play app
2. Scan barcode above
3. Select 2014 GSA Demo
4. Push 'start'
5. Explore!
6. Take feedback survey (optional)

Make your field trip* -- coming soon

1. Choose topic/theme & location
2. Populate map with your content or content from Field Play ecosystem
3. Public or private?
4. Enjoy your trip!

or

1. Choose topic/theme & location
2. We create your field trip
3. Enjoy your trip!

Have a project in mind? Let's work together!

Questions, comments & feedbackb are welcome:

Magdalena Donahue: mdonahue@think-ubiquitous.com
@RunMagdalena
John Donahue: jdonahue@think-ubiquitous.com

www.think-ubiquitous.com

@ThinkUbiquitous
www.facebook.com/fieldplay

PATTERNED GROUND II: CREATING GOOGLE EARTH KMZ FILES OF GEOREFERENCED HISTORIC NIKE MISSILE LAUNCH SITE AERIAL PHOTOGRAPHS USING GLOBAL MAPPER AND THE NEW ARC2EARTH EXTENSION FOR ARCMAP

David A. Tewksbury
Department of Geosciences, Hamilton College
198 College Hill Rd, Clinton, NY 13323-1218, dtewksbu@hamilton.edu

Abstract—The Nike missile was the first operational supersonic surface-to-air missile. The Nike Ajax and Hercules versions were all-weather weapons with a range of 30–90 miles to altitudes from 60,000 to greater than 100,000 feet. Nike sites consisted of an Integrated Fire Control facility (IFC) and a separate Launch Facility located relatively nearby. Between 1954 to as late as 1974, operational Nike anti-aircraft missile sites surrounded numerous cities and Defense Areas in the United States to protect them from attack by Soviet long-range bombers such as the Tupolev Tu-95 Bear.

Expanding the original Patterned Ground project that I began in 2013, Patterned Ground II adds georeferenced historical aerial imagery to a new base map of the NIKE missile launch sites located around major urban centers and Defense Areas in the United States. I downloaded from the USGS EarthExplorer site historic aerial photographs from the 1950s, 1960s, and 1970s showing operational sites. Metadata associated with these images provide lat/long coordinates for the image corners, but georeferencing is difficult when the corner marks are obscured in the scans and/or the imagery has been rotated such that the values do not reflect the correct corner positions.

Using the new Arc2Earth extension for ArcGIS, Google Earth imagery can be loaded directly into ArcMap and used as a base map for visually georeferencing these historic images. The Arc2Earth imagery provides seamless, high resolution coverage eliminating the need to download individual recent orthoimages, as previously needed, to visually georeference a historic image. The Google Earth imagery allows for easy comparison between land use/land cover when the site was operational and the current land use/land cover of the same area.

In order to create composite KMZ files for use by the NIKE Historical Society and others, I needed to do additional processing. Raster data exported as KMZ files directly from ArcMap do not display well in Google Earth. To improve the quality of the KMZ file, I exported the georeferenced image files from ArcMap as TIFFs, opened them in Global Mapper, and exported them using Global Mapper's KMZ export function, which creates a "super overlay" allowing Google Earth to display a quality raster image of the spatially located historic air photo.

UTILIZING GEOLOGIC SAMPLES POST PLATE BOUNDARY OBSERVATORY BOREHOLE STRAINMETER NETWORK CONSTRUCTION

Elizabeth Van Boskirk
Mike Gottlieb
Wade Johnson
Chad Pyatt
David Mencin
PBO, UNAVCO, 6350 Nautilus Dr, Boulder, CO 80301, boskirk@unavco.org

Kathleen Hodgkinson
Geodetic Data Services, UNAVCO, PASSCAL Building, 100 East Road, Socorro, NM 87801

Brent Henderson
PBO Data, IRIS PASSCAL Instrument Center
New Mexico Tech, 100 East Road, Socorro, NM 87801

Warren Gallaher
PBO, UNAVCO, 6350 Nautilus Dr, Boulder, CO 80301

Abstract—The Plate Boundary Observatory's borehole strainmeter network is made up of 80 stations at various locations across the Western United States. During the construction of the network, 6" boreholes were drilled to depths of 450 to 800 feet. Samples were collected, in most cases drill cuttings, but some boreholes were cored. Geophysical logs were run at all boreholes, using acoustic televiewer, caliper, full-waveform sonic, and e-tool. The cuttings and core samples have been photographed and are available to view online or by request. The logs are also available online.

The Plate Boundary Observatory borehole strainmeter network was primarily installed between 2005 and 2008. Site locations were focused around tectonic areas of interest, such as the San Andreas Fault, the San Jacinto Fault, the Cascade Subduction Zone, Mt. St Helens Volcano, and Yellowstone Caldera. In most cases, a UNAVCO representative with a geology background would observe the drilling, collect samples, and document fractures and water. Cuttings were collected every 10 feet, with the exception of Yellowstone, where they were collected every 5 feet. Core exists for 15 sites, but because of time and budget constraints the majority of boreholes were rotary drilled. The core we have is from the Cascadia subduction zone on the Olympic Peninsula and the Parkfield and San Juan Bautista segments of the San Andreas Fault.

While our primary mandate is operations and maintenance of the network, the data collected during drilling has value and we want to ensure researchers are aware it exists. This data could be helpful for igneous petrologists, structural geologists, stratigraphers, and sedimentary petrologists. For example, our nine boreholes in Yellowstone were the first drilling in the park since the 1970s, so these data are unique. We will outline the resources and how to access them.

EARTHCUBE: A COMMUNITY-DRIVEN ORGANIZATION FOR GEOSCIENCE CYBERINFRASTRUCTURE

M. Lee Allison
Arizona Geological Survey
416 W. Congress, #100, Tucson, AZ 85701-1381

Kim Patten
Arizona Geological Survey, 416 W. Congress, Tucson, AZ 85701

Rachael Black
Anna Katz
Kate Kretschmann
Genevieve Pearthree
Arizona Geological Survey
416 W. Congress, #100, Tucson, AZ 85701-1381

Abstract—The National Science Foundation's (NSF) EarthCube program is a community-driven approach to building cyberinfrastructure for managing, sharing, and exploring geoscience data and information to advance scientific discovery.

The EarthCube Test Enterprise Governance project is a two-year effort to engage diverse geo- and cyber-science communities in applying a responsive approach to the development of an appropriate governing system for EarthCube. Drawing in part on a series of two-dozen end-user workshops, an Assembly of seven stakeholder groups representing the broad EarthCube community developed a draft governance framework and accompanying charter finalized at the June 2014 EarthCube All Hands Meeting. This framework will be tested for one year, beginning October 2014. If successful, this framework could potentially act as a model for future NSF investments in geoscience cyberinfrastructure.

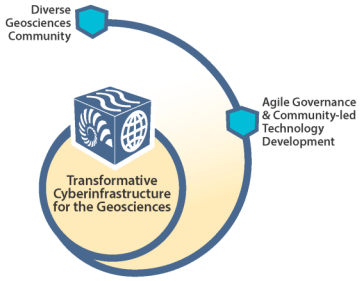
This framework is community-driven. Community-elected members of the leadership council will be responsible for managing EarthCube's strategic direction and refining its scope. Three standing committees will also be established: 1) to oversee the development of technology and architecture, 2) to coordinate among new and existing data facilities, and 3) to represent the academic geosciences community in driving development of EarthCube cyberinfrastructure. An engagement team and a liaison team will support communication initiatives and partnerships with external organizations and initiatives, and a central office will act as a logistical support function to the governance framework as a whole. Finally, ad hoc working groups and special interest groups will take on other issues related to EarthCube goals.

The 1-year phase will test the effectiveness of the proposed framework and allow for elements to be changed to better meet community needs. The committees and teams are being populated, in order to finalize leadership and decision-making processes to move community-selected priorities forward, including identifying science drivers, coordinating emerging technical elements, and coming to convergence on system architecture. A January mid-year review will assemble these groups to analyze the effectiveness of the framework to-date and make adjustments as necessary.

EARTHCUBE: A COMMUNITY-DRIVEN ORGANIZATION FOR GEOSCIENCE CYBERINFRASTRUCTURE

ALLISON, M. Lee, BLACK, Rachael, KATZ, Anna, KRETSCHMANN, Kate, and PEARTHREE, Genevieve; Arizona Geological Survey, 416 W. Congress, #100, Tucson, AZ 85701-1381, earthcube.org

EARTHCUBE VISION:



-**Transform the conduct** of data-enabled geoscience-related research

-Create effective **community-driven cyberinfrastructure**

-Allow **global data discovery** and **knowledge management**

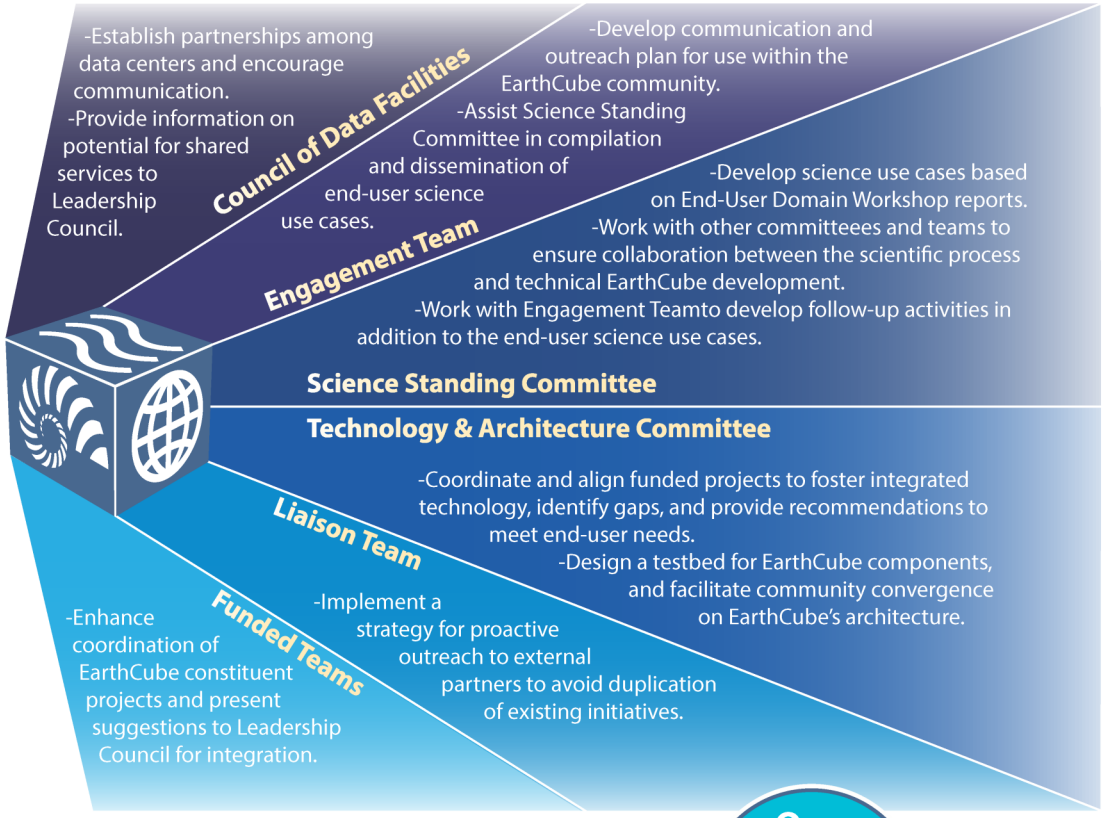
-Achieve **interoperability** and data integration **across disciplines**

EARTHCUBE IS...

-Building on and leveraging existing science & cyberinfrastructure
-Community-driven, with >2,500 members and growing
-Representing all the geosciences domains

EARTHCUBE JOURNEY:

2011 -Dear Colleague Letters & Charrettes
2012 -White Papers & Expressions of Interest
2013 -Roadmaps & Concept Designs
2014 -End-User Workshops & Stakeholder Alignment
2015 -Building Blocks, RCNs, & Conceptual Design Awards
-Demonstration Governance phase



EARTHCUBE
TRANSFORMING GEOSCIENCES RESEARCH

$25 MILLION in project awards | 27 Funded projects | 25 Domain workshops | OVER 2,500 COMMUNITY MEMBERS

This material is based upon work supported by the National Science Foundation under Grant No. 1340233.

Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.

EARTH—EDUCATION AND RESEARCH: TESTING HYPOTHESES—BRINGING SCIENTIFIC RESEARCH INTO THE CLASSROOM USING NEAR-REAL TIME DATA FROM OCEAN OBSERVATORIES

Megan H. Jones
Geology, North Hennepin Community College
7411 85th Ave. No, Brooklyn Park, MN 55445, megan.jones@nhcc.edu

George Matsumoto
Monterey Bay Aquarium Research Institute
7700 Sandholdt Road, Moss Landing, CA 95039

Abstract—EARTH is a professional development program for K–12 and community college teachers from a wide variety of educational backgrounds to develop curriculum using real and near-real time data from ocean observatories (e.g., Bermuda Atlantic Time Series, Tagging of Pacific Predators, Ocean Color WEB). These week long workshops have served to build a wide and useful network between numerous educators and researchers while accomplishing three goals: (1) to have scientists share their research data and results with the educators, (2) testing, review, and critique of previously developed EARTH exercises by participants as part of the application process, and (3) development of new exercises based on the science presented to the educators by the researchers. The first EARTH workshops (2002–2005) were held at the Monterey Bay Aquarium Research Institute in conjunction with Monterey Bay Aquarium and some later workshops have been held at a variety of locations on both coasts with several cosponsors (e.g., C-DEBI, C-MORE, Mid-Atlantic COSEE, COSEE-Alaska, NASA).

The program week has three or four scientist presentations with time directly after each presentation for educators to explore the data and have discussions with the scientist. In addition, each participant presents a recap of a previously developed EARTH exercise that they have tested in their classroom the previous year. This provides valuable feedback to the EARTH staff which helps them to get exercises "ready for prime time" on the EARTH website (http://www.mbari.org/earth/default.htm). The end of the weeklong program provides an entire day devoted to participants collaborating in creating lesson plans, gathering resources and data for the exercise(s) that they are developing. The EARTH workshops have developed numerous open access exercises/lesson plans in several ocean science disciplines (biology, geology, chemistry, marine technology) at a variety of grade levels, all of which can easily be modified for use in almost any class. These workshops provide an invaluable opportunity for educators and greatly enhance their students' learning.

THE VALUE OF OLD DATA: TRENDS IN GSA DATA REPOSITORY USAGE

Matt Hudson
Geological Society of America
3300 Penrose Place, Boulder, CO 80301, mhudson@geosociety.org

Abstract—The GSA Data Repository (DR) was established in 1974 as an open file in which authors of articles in GSA journals and books could place information that supplements and expands on their original papers. While not intended as a true data repository, meaning the data in the DR cannot be searched or manipulated on the online site, its usage provides a glimpse of the value of older data. The online version began in 1996, but only included data back to 1992. By 2004 the online version had expanded to include the complete archive, but analysis of DR usage did not become possible until April 2011, when GSA installed Google Analytics. Today, these analytics provide information about the location of DR users and how their usage has changed over time. For example, U.S.-based usage dropped 5% from 2011 to 2013, while China-based usage increased 37% in that same time frame. In addition, GSA can also determine what years of content people are viewing and how this usage may compare to the archive usage of the original papers. While GSA has no plans to stop providing access to older data, my research suggests that the scientific community remains divided on how long organizations should maintain data, with some suggesting indefinitely and others as little as three years. The GSA DR usage shows that 37% of views occur for data five years old or older, suggesting that data should be kept for more than five years. In comparison, usage for older papers remains higher. Sixty-nine and 55% of the usage for *GSA Bulletin* and *Geology* occurs with content more than 5 years old.

INTRODUCTION

As of October 2014, the GSA Data Repository (DR) contains data from more than 4,600 papers. The number of items deposited per year has grown considerably. Prior to the mid-1990s, the Repository received data from <50 papers per year, but that figure has increased to >350 papers per year.

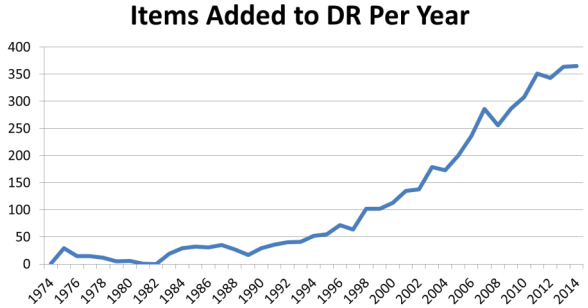
This increase in DR items parallels a larger trend. Many government funding agencies, such as the National Science Foundation, U.S. Geological Survey, and the Research Councils UK now have data handling policies. The Registry of Research Data Repositories, an inventory of all data repositories, has now identified more than 900 repositories, and in 2012 Thomson Reuters launched the Data Citation Index, which tracks this growing pool of data.

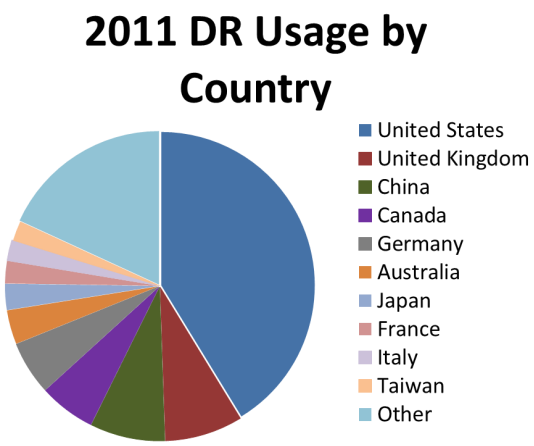
This growing emphasis on data accessibility has raised questions. Who is using data and how is the data being used? How long should data be stored and made available?

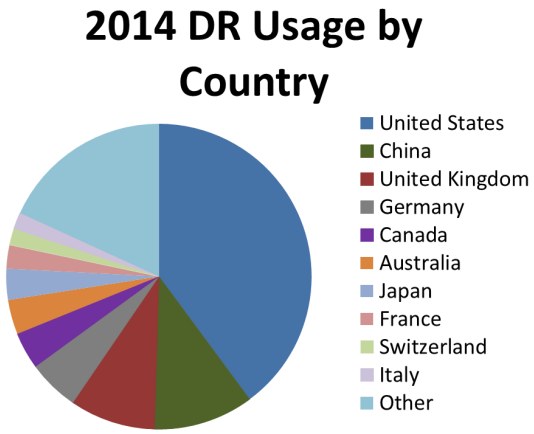
METHODS

GSA began using Google Analytics to track online visits to its DR in 2011. This software provides information about the numbers of visitors, page views, and the technology, location, and behavior of visitors. This usage can then be sorted according to the various pages of a Web site, and since the DR includes the year of the data in all url subdirectories, it is possible to sort this usage by age of the data.

The article-usage data was drawn from GeoScienceWorld usage statistics. GSA is one of the founders of GeoScienceWorld, and currently GSA's journals are







hosted at GeoScienceWorld and on the Society's own site at www.gsapubs.org. GeoScienceWorld is uniquely capable of providing usage statistics for GSA's journals that reveal the number of full-text article views for each issue of a journal. In this way, the usage per volume can be determined.

RESULTS

Who is Using GSA Data?

The DR receives visitors from more than 120 countries and territories per year. These visitors account for >20,000 sessions per year that produce >38,000 page views. Google Analytics can determine the location of 99% of these users.

From 2011 to 2014, the top eight visitor-producing countries remained consistent: United States, China, United Kingdom, Germany, Canada, Australia, Japan, and France. Approximately 40% of all visitors came from the United States. The percent of visitors from most countries remained stable; however, visitors from China increased from 8% in 2011 to 11% in 2014, making it the second highest contributor.

What Data is Being Viewed?

Google Analytics tracks usage only in the form of views. How much of this data is being used in new studies cannot be determined, but analytics can show what data users are interested in viewing.

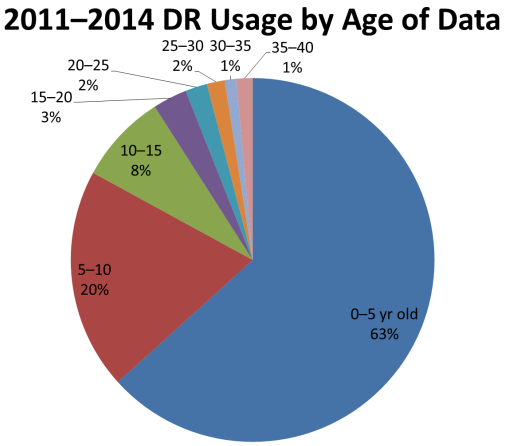
Not surprisingly, the most recent data receives the largest percentage of viewers. Between 2011 and 2014, 83% of the DR usage was for data produced in the past 10 years.

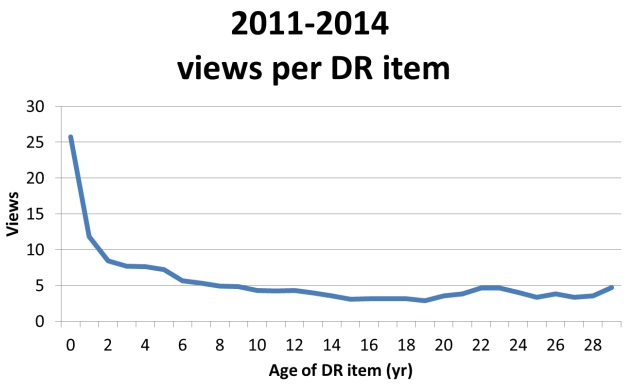
In order to take into account that more data has been added to the DR in recent years, and thus is likely to produce more views, the average number of views per item was also examined, which shows that the most recent data receives ~26 views per year whereas older data receives ~5 views per year. The oldest data was eliminated because the low number of items made the usage calculations unreliable.

How Data Usage Compares to Article Usage

One might expect that the usage of GSA's data would follow similar patterns to the usage of GSA's journal articles, particularly for a journal like Geology that is of a similar age to the DR. In some respects this is true. The most recent year's worth of content accounts for 24% of the annual DR usage and 25% of Geology's article views. Taken as a whole, however, this trend does not continue.

Only 65% of Geology's usage is for papers published in the past 10 years, compared to 83% of the DR usage. This is particularly surprising given that there are a number of vehicles in place to drive readers to the most recent articles, such as e-mail alerts and RSS feeds for each new issue. This indicates that

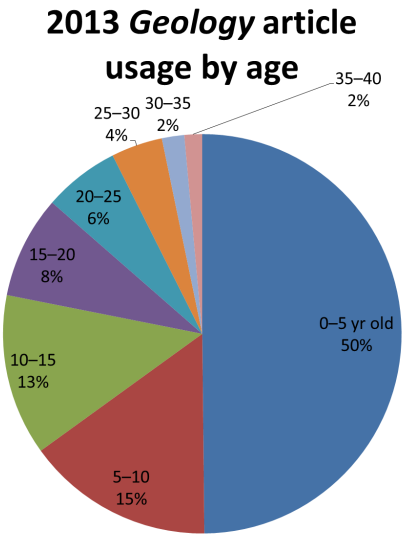


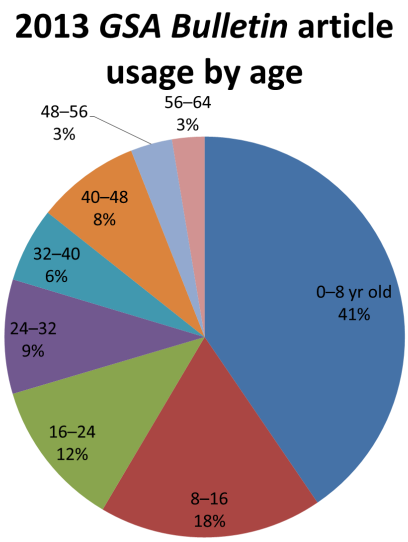


there is greater interest in archival articles than there is in archival data. Not surprisingly, the most recent content for GSA Bulletin, which has an archive dating back to 1890, accounts for an even smaller portion of views. When GSA Bulletin's archive is divided up into 8 equal segments similar to the structure of the Geology and DR analysis, the most recent two time slices account for only 59% of overall usage, well below Geology and the DR.

CONCLUSIONS

- The GSA Data Repository receives worldwide usage. Forty percent of visitors come from the United States, and a growing portion of visitors are coming from China, the second highest user.
- Although 83% of the Data Repository usage is for data produced in the previous 10 years, the archival data continues to receive views long after it has been published.
- Articles and data less than one year old both account for a quarter of all views, but archival articles receive more interest than archival data, suggesting that over time the original articles are more valuable to readers than the data behind them.





DECISION MATRIX FOR DATA SHARING AND STORAGE

Linda R. Musser
Fletcher L. Byrom Earth & Mineral Sciences Library
Pennsylvania State Univ, 105 Deike Building, University Park, PA 16802, lrm4@psu.edu

Abstract—There are many options available for those needing to store or share data, ranging from physical storage to local networks to cloud-based solutions. Choosing among these myriad options can be a challenge, however. This poster describes how to create a matrix of factors that can be used to evaluate data sharing and storage platforms and aid users in selecting an optimal solution based upon their needs. Some of the factors included in the matrix are: file size, preview capability, versioning, mobile access, collaboration capability, security, preservation and discoverability. To develop the decision matrix, factors relevant to the specific project are selected. Next, potential storage media are considered and rated on how well they fulfill the need described by each factor. The fullest range of storage options should be suggested and considered. These range from print files, physical media (USB drives, DVDs, and external hard drives), local area networks (LANs) and servers, cloud storage (Box, DropBox, etc.), publication, email, and repositories (disciplinary and institutional). A decision matrix can be a useful tool to help researchers make smart choices regarding data storage and data sharing options, and can be used to stimulate discussions with users, particularly when tailored to local resources.

Continued on next two pages.

FACTORS TO USE IN A DECISION MATRIX FOR DATA SHARING AND STORAGE

Size, Cost, Time:

1. Storage quota—What quantity of data can you store on the medium?
2. Upload size allowed—Are there limits on the files sizes that can be uploaded?
3. Expandability—If more space is needed, can you expand your allotment?
4. Cost—What are the costs of the storage medium?
5. Lifetime—How long will the data storage be required?
6. Timeline—How quickly do you need store the data?

Safety:

7. Backup capability and frequency—Will data be automatically backed up? How frequently?
8. Encryption—Is this a capability of the storage medium?
9. Security from theft (hacking)—How well protected is the storage medium?
10. Security from disaster—How vulnerable is the medium to fire/flood/physical damage?
11. Preservation—Does the medium perform checks for file degradation, such as bit rot?

Access:

12. Mobile / remote access—Are the files available remotely or from mobile devices?
13. Means of access—Is author access acceptable? E.g., single author, user managed group, etc.
14. Non-author access—Is it necessary for others to have access to the data? E.g., sponsor?
15. Portability—Is the storage medium accessible from needed locations?

Productivity Tools:

16. Versioning—Are multiple versions automatically stored?
17. Synching—Is synching supported?
18. Commenting—Does it have a comment function? Is it needed?
19. Integration with other tools (e.g., Microsoft Office…)—Is this available?
20. Collaboration—Does medium allow for sufficient collaboration? (e.g., accessible to all authors?)

Functionality:

21. Uploading—Is batch uploading allowed? File drag-and-drop capability?
22. Previewing—Is it important to be able to preview files before accessing or downloading?
23. Searching—Is this functionality required? Helpful?
24. Collection building—-Can collections be created?
25. Custom URL or DOI—Are these automatically generated?

Sharing:

26. Discoverability—Are data available to be indexed by search engines such as Google?
27. Citation—Do you want data to be citable?
28. Indexing—Is full text (or other) indexing supported?
29. Metadata—Can linked metadata be supported?
30. Analytics—Is usage data provided? E.g., times accessed, etc.

Other:

31. Sponsor requirements—What are requirements for data storage and sharing?
32. Level of completion—Are data in final form or under development?
33. Audience—Where will potential users look for the data?

PENNSTATE

Developing a Decision Matrix for Data Sharing and Storage

UBS drive, CD-ROM, DVD , external hard drive, LAN, print files, internal hard drive

Email, cloud storage (Box, Google Drive, etc.), repository (data, institutional, etc.)

Organizations are becoming more deliberate about records & data management and many funding agencies now require plans for data sharing. These trends, coupled with time-pressed schedules, heighten the importance of thoughtfully selecting one's data storage methods. Consideration of these factors at the beginning of a project can save time, protect data, and facilitate access and discoverability.
Choose from the factors below to develop a decision matrix that works for you!

	Box @ Penn State	Box Commercial Account	PASS	Scholarsphere	UCS Briefcase	Dropbox Free Account
Quota	50 GB	10 GB	10 GB	Unlimited	3 GB[1]	2 GB
Max. Upload Size	5 GB	250 MB		1 GB	75 MB	10 GB
Available to Faculty, Staff and Students	Yes	Yes	Yes	Yes	No[2]	Yes
Automatically Backed Up	Yes	Yes	Yes	Yes	Yes	Yes
Meets PSU security standards	Yes	No	Yes	Yes	Yes	No
umg based sharing	No	No	Yes	Yes	Yes	No
Commenting	Yes	Yes	No	No	No	No

Size, Cost & Time

- **Storage quota: What quantity is allowed?**
- **Upload size allowed: Are there limits on the file sizes?**
- **Expandability: Is it expandable?**
- **Cost: How expensive is it?**
- **Lifetime: How long will data storage be required?**
- **Timeline: How quickly do you need to store the data?**

Safety

- **Backup capability: Automatic? How frequently?**
- **Encryption: Available? Needed?**
- **Security from theft/ hacking: How well protected?**
- **Security from disaster: How vulnerable to fire/flood/etc.?**
- **Preservation: Are checks performed for file degradation?**

Access

- **Mobile / remote access: Are the files available remotely?**
- **Means of access: Is access by author, UMG, other?**
- **Non-author access: Is this necessary? (e.g., sponsor)**
- **Portability: Can storage be moved or transferred?**
- **Audience: Where will potential users look for the data?**

Productivity Tools

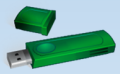
- **Versioning: Are multiple versions stored?**
- **Synching: Supported?**
- **Commenting: Is this available?**
- **Integration with other tools: Word, Excel, other?**
- **Collaboration: Supported? Tools available?**

Functionality

- **Uploading: Is batch uploading allowed?**
- **Previewing: Needed?**
- **Searching: Needed?**
- **Collection building: Can this be done?**
- **Custom URL or DOI: Automatically generated?**

Sharing

- **Discoverability: Can search engines find the data?**
- **Citation: Does data need to be citable?**
- **Indexing: Is full text or other indexing supported?**
- **Analytics: Is usage data provided?**
- **Sponsor requirements: Are there?**



Linda Musser, 105 Deike Bldg, University Park PA lindamusser@psu.edu 814-863-7073

A WEB-BASED TOOL FOR PREPARING FGDC-CSDGM METADATA

Ranjeet Devarakonda
Giri Palanisamy
Environmental Sciences Division, Oak Ridge National Laboratory
Oak Ridge, TN 37831, devarakondar@ornl.gov

Abstract—The newly developed Online Metadata Editor (OME) is a Web-based tool that allows users to create and maintain XML files containing key information, or metadata, about the research. Metadata include information about the specific projects, parameters, time periods, and locations associated with the data. Such information helps put the research findings in context. In addition, the metadata produced using OME will allow other researchers to find these data via metadata clearinghouses like Mercury. OME is part of Oak Ridge National Laboratory's Mercury software fleet. It was jointly developed to support projects funded by the USGS, NASA, DOE, and NOAA. OME's architecture provides a customizable interface to support project-specific requirements. Researchers simply use OME to enter relevant metadata into a Web-based form. From the information on the form, the Metadata Editor can create an XML file on the server that the editor has installed or to the user's personal computer. The produced XML file is in a structured "scientific metadata" format called Federal Geophysical Data Committee (FGDC). Researchers can also use OME to modify existing FGDC XML metadata files. As an example, an NGEE Arctic scientist used OME to register their datasets to the NGEE data archive and allowed the NGEE archive to publish these datasets via a data search portal (http://ngee.ornl.gov/data). These descriptive metadata created using OME allows the archives to enable advanced data search options using keyword, geo-spatial, temporal, and ontology filters. OME allows data centers like NGEE to produce high quality descriptive information about their data, in turn helping with the data discoverability.

SIMILARITIES IN DIFFERENT NATURES—A COMPARISON OF SOCIAL MEDIA USE BETWEEN HURRICANE SANDY AND OSO MUDSLIDE

Xiangyang Guan
Cynthia Chen
Civil and Environmental Engineering, University of Washington
201 More Hall, Box 352700, Seattle, WA 98195, guanxy@uw.edu

Abstract—It is well recognized that disasters are social phenomena. This suggests different kinds of disasters should have certain similarities, or certain universal patterns from the social perspective, because all the disasters are linked by a common crucial component: social disruption—the changes in life patterns from before disasters to during and after disasters. This paper presents an empirical examination of this implication. Using data from the social media Twitter, we compared the temporal evolutions of Hurricane Sandy in 2012 and Oso Mudslide in Washington State in 2014. It is discovered that despite the starkly different natures of the two disasters, similar patterns can be identified in the evolutions of both disasters. The patterns are strongest in the overall and local trends of the disruption changes, peaks of the disruption, and when the impacted area recovered to a stable state (not necessarily the pre-disaster state). These patterns are generally similar for the two disasters, while the one for Oso Mudslide appeared with a two-day lag compared to Hurricane Sandy. The result reveals that different disasters can have similar mechanisms in their social impacts. Our study empirically quantifies the theory that all disasters are social disruptions. The insight that a common pattern can be identified from all disasters can be invaluable in assisting disaster response and recovery effort.

UTILIZING DIGITAL MEDIA TO COMMUNICATE SCIENTIFIC FINDINGS WITH A DIVERSE AUDIENCE

Cristina M. Robins
Claudia Grant
Aaron R. Wood
Shari Ellis
Bruce J. MacFadden
Florida Museum of Natural History, University of Florida
1659 Museum Road, Dickinson Hall, Gainesville, FL 32611, crobins@flmnh.ufl.edu

Abstract—The Panama Canal Project–Partners in International Research and Education [PCP-PIRE] is a broad-reaching program funded by NSF to take advantage of a "once in a century" opportunity to explore the fossil and geological history of Panama during the expansion of the Panama Canal. PCP-PIRE consists of a confluence of multiple geologic specialties—vertebrate paleontology, invertebrate paleontology, paleobotany, taphonomy, geochronology, paleoecology, and earth science education. Communicating scientific finds within the project and with the general public requires a multifaceted approach.

Opening the lines of dialogue between individual scientists on the project and the general public is accomplished in numerous ways. An open source content management system for our digital website (Concrete 5; http://www.flmnh.ufl.edu/panama-pire/home/) allows people without any computer programming background (i.e., most scientists) to easily create and update web content. We have over 160 web pages and in the last year had 10,500 visits. Our monthly eNewsletter (circulation of ~325 people) keeps PCP-PIRE participants and stakeholders regularly updated on events and research. Online photo-sharing software (Flickr) is used for creating slideshows and photo essays of fossil finds and research activities; we have 255,000 individual photo views. A blog allows for short-form content and updates from both our scientists and students; after launching this June we have viewers from 10 countries with over 450 views. We use Facebook (~200 "likes") and Twitter (~50 followers) to regularly disseminate content to a wider audience, and monitor the response to different types of content using built-in platform statistics and Google Analytics. This allows us to tailor our content effectively and quickly shows successful and unsuccessful communication methods and popular topics.

PART 6:

GEOSCIENCE INFORMATION SOCIETY EVENTS

2014 Annual Meeting, Vancouver, British Columbia, Canada

October 18th–22nd

GEOSCIENCE INFORMATION SOCIETY
2014 SCHEDULE OF EVENTS

Note: GSIS Committees met separately as arranged by committee chairs

		Location
Saturday, October 18		
10:00 a.m. – 4:30 p.m.	Geoscience Librarianship 101	Woodward Library The University of British Columbia
5:15 p.m. –	Early Bird No-Host Dinner & Meet-n-Greet	Mahony & Sons Public House 5990 University Blvd.
Sunday, October 19		
9:00 a.m. – 12:00 p.m.	GSIS Business Meeting	Hyatt Regency Vancouver Oxford Room
12:00 p.m. – 1:30 p.m.	GSIS Executive Board Meeting	Hyatt Regency Vancouver Outside of Oxford Room
2:00 p.m. – 7:00 p.m.	Exhibits Opening	Colorado Convention Center
Monday, October 20		
9:00 a.m – 11:30 a.m.	GSIS Professional Issues Roundtable	Hyatt Regency Vancouver English Bay
2:00 p.m. – 4:30 p.m.	GSIS Vendor Updates Presentation schedule: Geological Society of America ProQuest American Geophysical Union Geological Society of London GeoScienceWorld	Hyatt Regency Vancouver English Bay
Tuesday, October 21		
8:00 a.m. – 5:00 p.m.	GSIS Technical Session T145—Where in the World? Access and Availability to Geoscience Data	Vancouver Convention Center Room 116/117
6:00 p.m. – 8:00 p.m.	GSIS/GSA Geoinformatics Division Joint Reception & Awards Ceremony	Hyatt Regency Vancouver Seymour Room
Wednesday, October 22		
9:00 a.m. – 6:30 p.m.	GSIS Poster Session T146—Where's the Data? Finding and Using Geoscience Data	Vancouver Convention Center West Exhibition Hall C

"GEOSCIENCE LIBRARIANSHIP 101"
A SEMINAR PRESENTED BY THE GEOSCIENCE INFORMATION SOCIETY

Saturday, October 18, 2014
Woodward Library, University of British Columbia
2198 Health Sciences Mall
Vancouver, BC V6T 1Z3, Canada

Workshop overview

10:15 a.m. – 10:30 a.m.	Check In Welcome/Introductions	Clara McLeod Washington University in St. Louis
10:30 a.m. – 11:30 a.m	Geoscience Overview/Instruction	Emily Wild, U.S. Geological Survey
11:30 a.m. – 12:30 p.m	Reference	Hannah Winkler, Stanford University
12:30 p.m. – 1:30 p.m.	Lunch and networking	
1:30 p.m. – 2:30 p.m.	Collection Development	Amanda Bielskas, Columbia University
2:30 p.m. – 3:15 p.m.	Maps: Collection Development and Reference	Linda Zellmer, Western Illinois University
3:15 p.m. – 3:30 p.m.	Break	
3:30 p.m. – 4:30 p.m.	GIS and the Digital Future	Linda Zellmer, Western Illinois University
4:30 p.m. – 4:45 p.m.	Feedback and Wrap Up	Clara McLeod Washington University in St. Louis

Thanks to the following sponsors for their generous support of ***Geoscience Librarianship 101:***

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GEOSCIENCE INFORMATION SOCIETY
2014 BUSINESS MEETING MINUTES

Sunday, October 19, 2014, 9:00 am –12:00 pm
Hyatt Regency Vancouver, Oxford Room, Vancouver, British Columbia, Canada

Respectfully submitted by Cynthia Prosser, Secretary

I. Call to order (Amanda Bielskas) 9:27 AM

23 in attendance: Cynthia Prosser, Emily Wild, Amanda Bielskas, Louise Deis, Matt Hudson, Connie Manson, Lura Joseph, Nancy Sprague, Jody Foote, Monica Pereira, Stephanie Earls, Hannah Winkler, Dorothy McGarry, Joanne Lerud-Heck, Jim Mehl, Shaun hardy, John Hunter, Rusty Kimball, Marie Dvorzak, Linda Musser, Linda Zellmer, Clara McLeod, Michael Noga

II. Welcome and General Introductions (Amanda Bielskas)

III. Introduction of Executive Board

a. President (Amanda Bielskas)
b. Vice President , President-Elect (2014), Emily Wild
c. Vice-President, President-Elect (2015), Matt Hudson
d. Secretary and Secretary-elect, Cynthia Prosser (incoming Louise Deis)
e. Treasurer, Caroline Rauber
f. Immediate Past-President, Linda Zellmer
g. Newsletter Editor, Bonnie Swoger
h. Publications Manager, Richard Huffine

IV. Approval of the Agenda

John Hunter – moved, Louise Deis – seconded, - Agenda approved
Marie Dvorzak notes GSIS will be 50 years old in 2016

V. Approval of the Annual Business Meeting Minutes 2013 (October 27, 2013)

Connie Manson – moved. If there are no corrections, the minutes will stand. So standing.

VI. Reports

A. GSIS general (Amanda Bielskas)

1. We had a hard time filling the committee chairs this year, please consider serving; it is hard to do the business of the society without the chairs and active committee members.

2. Incorporation: We have lost our incorporation as of 1974. Later in the meeting, we will discuss how to rectify this. Lura Joseph – The information regarding incorporation needs to go into the manual.

B. Committee memberships and chairs

1. Financial (Caroline Bishoff (Rauber) - not present)

   The 2014 GSIS Budget is attached. Current account balances and the Quarter 3 report are also attached.

   As of January 1, 2014, Carolyn Bishoff manages the accounts as Treasurer. As of January 1, 2015, Emily Wild as President and Louise Deis as Secretary will be co-signers on these accounts, to conform with our bylaws: “All checks, drafts, notes, and orders for the payment of money shall require the signatures of two elected Officers or agents that the Executive Board from time to time may designate” (IX, 3).

   Currently running under budget.

   Joanne Lerud Heck – when are we audited? Amanda Bielskas – When a new treasurer is elected. Not sure if it occurred this time. Joanne Lerud Heck – If we haven’t been audited, we need to be audited. At that time the auditor should check to see that we are up-to-date with the incorporation, the fees, etc. have been paid, etc.

2. 2014 conference (Emily Wild)

   We had an excellent turnout for Geo101 and a good turnout at the no-host dinner at Mahoney's & Sons, near UBC campus.
   We did a lot of PR for our technical sessions. We have 2 sessions this year. Good news for the GSIS. Because of the 2 technical sessions, we had to switch the Vendor Update and Professional Issues Roundtable. They are now the same day, in the same room which has saved us about $1000. Having the 2 events in the same room on the same day reduces the cost.
   Lura Joseph – That information needs to go into the manual.
   Emily Wild – The luncheon needs to be the first thing to be scheduled and I apologize that we don't have a luncheon this year.
   Michael Noga – English Bay – Professional Issues updates 9 – 11:30, Vendor Updates 2-4:30 (GSA, ProQuest, AGU, Geological Society of London, GSW. Emily Wild will give a brief overview). Have extended the time to provide for more discussion.
   Emily Wild – I advertised every place, I went - even at the airport and on the plane on the way here.
   Tues: Convention Centre: 2 technical sessions
   Joint reception with Geoinformatics at 6, the awards from both GSIS and Geoinformatics will be given.
   Wed: Poster Session will be in the morning.
   The GSIS booth is at #1128.
   Michael Noga – I am passing out the questions for the Professional Issues Roundtable. We will start with Government information, then we will move onto other topics.
   Amanda Bielskas – Thank you for coordinating this.

3. Archives (Rusty Kimball)

   GSIS Archives Committee Report
   In early April of this year, the Archives Committee agreed to accept a large amount of material from one of the founding members of GSIS, Skip McAfee. The material is in the form of 23 bound volumes of GIS material dating from its pre-formation in 1963, on up to 1974. The material includes correspondence pertaining to the formation of GIS on November 5, 1965 -especially letters to and from the first GIS president, Mark Pangborn and other founders, as well as other discussions, annual meeting reports, various committee reports, and other correspondence. These materials have been processed, and are in the archive at University of Illinois, as well as being on the finding list.

   In June, Thelma Thompson announced her retirement from University of New Hampshire and inquired about depositing her various committee files to the archives. We expect to hear from her when she has the materials prepared and sorted.

4. Secretary Report (Cynthia Prosser):

   Memberships and membership renewals for 109 members, including 6 new member applications (5 individual & 1 Institutional) were processed in 2014. Total membership numbers remained constant over last year although the composition changed slightly. We are seeing more retirements occurring. Individual memberships totaled 102 and there are 7 Institutional members (Earth Sciences Library, University of California, Berkley, GSW, Geological Society, University of Illinois at Urbana-Champaign, Illinois State Library, Springer, Texas A&M).

   The Executive Board discussed a change this year to changing Subscriptions to Institutional Members and thus all the benefits of membership. The change is currently being implemented and Institutional Membership is expected to rise as a result.

   The 2014 Membership Directory was produced this summer and sent to the membership in August. It has continued to be updated as a few corrections and a few more memberships have been received.

5. Membership (Chair vacant, Cynthia Prosser):

   Combined with the Secretary Report

6. Exhibits (April Love, Dona Dirlam):

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Linda Zellmer – Discussed producing a poster describing the CRAAP test as the theme of the exhibit this year. Dona Dirlam – Exhibits open at 2 PM, booth is #1128.

7. Best Paper Award (Nancy Sprague):

Geoscience Information Society Best Paper Award Committee Annual Report

On behalf of the GSIS Best Paper Award Committee I'm pleased to announce that the 2014 Best Paper Award will be presented to Shaun J. Hardy for his article "Open access publishing in the geosciences: Case study of the Deep Carbon Observatory". This article was published in the Geoscience Information Society Proceedings, Volume 43, pages 73-81. Shaun Hardy manages the joint research library of the Geophysical Laboratory and Department of Terrestrial Magnetism at the Carnegie Institution for Science in Washington, DC.

This concise, well-written article was selected for having broad significance in improving our understanding of open access publishing in the geosciences, current attitudes among researchers about open access, and the roles geoscience librarians can play in helping increase awareness of open access options.

The 2014 GSIS Best Paper Committee members are: Lisa Adamo, John Hunter, Michael Noga, Cynthia Prosser, and Nancy Sprague, chair. Carol La Russa, long-time chair of this committee, retired in June. The committee reviewed and rated journal articles published in 2013 that were found through extensive searches of over 12 databases, as well as the papers in Volume 43 of the GSIS Proceedings from 2012. The final selection was based on the top ranked paper using the following criteria: significance, originality, communication effectiveness, scholarship and contribution to the profession.

8. Guidebooks (Erin Palmer- not present, Guidebook Committee)

GSIS Guidebook Committee Report 2014:
Standards
This year saw tremendous progress toward updating the Guidebook Standards. Linda Musser, Dorothy McGarry and Thelma Thompson have presented a final draft of these updates to the Committee. The updated standards will be presented to the membership at the GSIS meeting in Vancouver, October 2014.

2014 Best Guidebook Award
There were a number of guidebooks considered for the 2014 Best Field Trip Guidebook Award. There was only one formal nomination. The recipient of this year's award is Geology of Newfoundland : touring through time at 48 scenic sites, 2012, by Martha Hickman Hild, Boulder Publications, ISBN: 978-1927099070. Lura Joseph, Jody Foote, Amanda Bielskas, Linda Musser, Thelma Thompson and April Love participated in the evaluation. The award will be presented at the joint GSIS – Geoinformatics reception in October.

Geology Guidebooks of North America Database
The committee continues to work on identifying newly published or newly discovered field trip Guidebooks and regularly submits listings of new titles to the GSIS newsletter. There has been discussion with GeoRef about moving items from the waiting list into the GGNAD.

Committee members worked on assigned geographic areas to discover upcoming field trips and contacted trip leaders about using the Guidelines for their guidebook publications. Louise covered Ohio through Nebraska and north to the border, as well as Saskatchewan, Manitoba, and Nunavut. From January to the end of October, she checked websites and Facebook pages for about 145 organizations and conferences in her area. Although a few field trips were missed she did contact 15 trip leaders. Positive responses were received from several leaders. Louise feels that the North American continent is covered by this process. She noted that fewer field trips are being held than there were 10-15 years ago, and fewer organizations announce those trips via their websites of Facebook. This is an interesting communication development that may have implications for recruitment of student geologists and for the long-term value of guidebooks to the profession.

Other
In 2009 Lura gave a talk at the International Grey Literature Conference. While working on the talk, she created an appendix that she recently shared with the Committee. This appendix may be included with a

future paper based on the talk.

2014 Guidebook Committee: Erin Palmer (Chair); Amanda Bielskas; Jody Foote, Lura Joseph; April Love; Linda Musser; Thelma Thompson; Louise Zipp

9. Nominating (Linda Zellmer)

   Put out a call for secretary and president on GeoNet: Louise and Matt. We had a slate of officers.

10. Best Reference Work Award (Rusty Kimball)

    GSIS Best Reference Work Award Committee Report
    The committee began work in earnest in March. The chair managed to secure access to most of the nominated titles by working with Elsevier & Springer to arrange brief trials so all committee members had access. In July the committee determined the winner to be Treatise on Geochemistry, 2nd edition from 2013. Although GSIS gave the award to the 1st edition of the Treatise ten years ago in 2004, the committee considered the large number of new chapters that were added on newer contemporary topics, as well as other chapters that were extensively revised in making its decision. An unusual twist to this year's award is that both of the executive editors of the Treatise, Dick Holland and Karl Turekian, recently passed away. So, under these remarkable circumstances, it was decided not to make a monetary award this year.

11. Information Resources (Has become the Vendor Update and has been organized by VP - effectively disbanded)

12. Preservation (no chair, Marie Dvorzak or Linda Musser?)

    The Preservation Committee was inactive in 2013/14.

    Linda Musser – I would like to make a motion to develop guidelines for preservation. There are problems with information disappearing. It is on the website for a year or so and then it disappears. I would like to propose that a special taskforce be proposed to handle these questions. There are copyright issues that need to be addressed. We need to create some guidelines we could distribute to publishers, etc. Perhaps partner with GeoRef, but we do need to partner with someone.

    Linda Zellmer – 1st, Linda Musser – 2nd. Put the call out on GeoNet.

    Ayes have it – the motion carries.

13. Distinguished Service Award (Jody Foote)

    Annual Report 2013-2014
    Following a discussion at the 2013 GSIS Annual Business Meeting about the future of the Mary B. Ansari Distinguished Service Award and the financial status of the award fund, Louise Deis, Jody Bales Foote, and Clara McLeod volunteered to serve on the Distinguished Service Award Committee to make recommendations for the future of the award.

    The 2013 GSIS Treasurer's Year-End Report stated that the Ansari Distinguished Service Award CD had a value of $3,537.84. After confirming that funding was available, the committee decided to begin the process of seeking nominations for the 2014 award.

    In April an announcement was sent to the Geonet listserv stating that nominations were being sought for the award. Other listservs were also contacted. The deadline to receive nominations was June 9.

    The committee selected Lura Joseph, Content Access and Research Services Librarian at the University of Illinois, Urbana-Champaign, as the recipient of the 2014 Mary B. Ansari Distinguished Service Award. Lura will receive a $500 check, a certificate, and an engraved rock at the 2014 GSIS Annual Meeting in Vancouver in October 2014.

    Mary B. Ansari was notified by mail of Lura's selection. Ms. Ansari contacted the committee to say she was delighted the award was being given this year and was pleased with the selection. She asked for a financial update in fall 2014 so she can consider a future monetary donation to the award fund. The an-

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nouncement of the award winner was sent to the Geonet listserv and the GSIS newsletter.

Recommendations:

- Funding is available to continue the award for several years.
- With the naming of an award winner this year, after a two-year lapse when no winner was named, Ms. Ansari said she has a renewed incentive to continue funding the award. Ms. Ansari should be notified each year whether or not the award is given and should receive an annual financial update on the award fund.
- Procedures for nominating a person for the award should be added to the GSIS website.
- The "History and Current Status" Report on the Mary B. Ansari Distinguished Service Award, written by Patricia Yocum in 2012, should be archived and accessible to GSIS. The report provides a history of the award, the process involved, a list of recipients, and topics to consider in the future.

Members: : Louise B. Deis 2014–2016; Jody Bales Foote, Chair 2014–2016; Clara P. McLeod 2014–2016

14. International Initiatives (Maxine Schmidt -not present):

Received no inquiries about registration assistance this year, and we had no other international initiatives on the table. While Maxine has been very involved with international library issues, she says geosciences hasn't come up as its own topic.

Monica Pereira – What is the trajectory of this committee?
Amanda Bielskas – In the past, we have helped an international geoscience librarian come to the meeting.
Lura Joseph – Even farther back, would partner with 1 or more institutions to have the geoscience librarian formally visit at the partnering institution.

15. Best Website (Bonnie Swoger- not present)

Best website committee report: We didn't receive any nominations for best website this year, as a result, we did not select a winner. There was a suggestion by one of the committee members that perhaps the Best Reference and Best Website should be rolled into one, selecting the best new resources (either in print or online). This is something that the groups should discuss.

Connie Manson – Isn't the best website a Mary B. Ansari award?
Amanda Bielskas – That is the best reference work.
Nancy Sprague – Maybe we should consider the best reference work for either print or website and then it be in honor of Mary B Ansari.

16. Auditor (Miriam Kennard) – no report

17. Geonet Moderator (Louise Deis)

We had only 1 or 2 instances of spam, which is really great, because this list is wide open. I don't screen or edit any messages coming to it. From my Geonet email records, 33 subscribers were added, and 16 left the list. The net gain is 17 subscribers.

The archives are searchable by string, substring (basic keyword, including names) or in the advanced search mode, by subject, author's address, "since – until", and there are multiple ways to sort the retrieval. There are simple, clickable examples for how to search the various fields.

https://lists.princeton.edu/cgi-bin/wa?A0=Geonet&X=46197D67A30F0E078C&Y=lfdeis%40princeton.edu

GEONET SUBSCRIBERS FOR 2014	
Country	Subscribers
Australia	9
Austria	1
Belgium	2
Brazil	1
Canada	25
China	1
??? (EU)	1
France	4
Germany	3
Italy	1
Mexico	2
Netherlands	2
New Zealand	3
Norway	1
??? (RS)	1
Singapore	1
Spain	1
Sweden	3
United Kingdom	7
United States	326
Total subscribers: 395	
Total countries represented: 20	
Total local host users: 0	

Thanks particularly to Emily Wild and Linda Zellmer for their useful, informative contributions to Geonet.

18. GSIS Newsletter Editor (Bonnie Swoger -not present)

    Discuss the current 6 month Newsletter embargo. Are there advantage/disadvantages to the embargo? Should we change it?

    Newsletter: Starting with the proceedings for the 2014 conference, the GSIS proceedings will be going open access. As a result, we needed to adjust our subscription options, including the GSIS Newsletter subscription. After discussions with the Executive Board, GSIS decided to cease offering a Newsletter subscription, but institutions can now join as Institutional members. This will cut down on the number of print copies of the Newsletter that are sent. Currently around 7.

19. GSIS Newsletter Reviews Editor (Lori Tschirhart -not present) none

20. Publications Manager (Richard Huffine, 2012–?, not present)

    GSIS Publications Update

    Current Volume
    The 2012 Proceedings (v.43) were printed and distributed to members and institutional subscribers in June 2014.

    Upcoming Volume
    There was no Technical Session held in October 2013 although the Society did have a Poster Session. Hannah Winkler is the editor for the Proceedings in 2014, which may be produced as a combined product (vols. 44 and 45). That volume will cover both the posters produced in 2013 and the sessions and posters delivered in 2014.

    Online Access
    The Society is planning to publish its Proceedings in an online Open Access format from this point forward. Rusty Kimball from the Texas A&M Libraries is currently working with his colleagues that operate the Texas Digital Library to see if they can host the Proceedings online. The site will eventually also include earlier volumes of the Proceedings.

    Pricing and Standing Orders
    Since GSIS will longer be publishing it's Proceedings in print, an adjustment is required to what is priced and sold to brokers of Standing Orders. The GSIS Newsletter is being distributed in print to institutional customers while an electronic format is mailed to individual members and posted to the GSIS Web site after 3 months. Therefore, the only option offered as a Standing Order will be an Institutional Membership for $100. GSIS will no longer offer a Newsletter Only subscription offer. Members are welcome and encouraged to join and renew through Standing Order for their institution and take advantage of the benefits of Institutional membership as well as the convenience that Standing Orders provides. Print copies of future Proceedings may be made available via Print-on-Demand services and the cost of those services will determine the price. Remaining print copies of older Proceedings, if available, will remain $45.

    Website Information
    There is some information on the Web site that does not appear to be linked to the current site but is discoverable by search. The following pages need to be updated or deleted to reflect the current state of Publications:
    http://www.geoinfo.org/orderf.html
    http://www.geoinfo.org/pubslist.html

CURRENT AVAILABILITY OF PRINT GSIS TITLES

Year	Volume	Copies
2012	43	34
2011	42	10
2010	41	6
2009	40	4
2008	39	3
2007	38	0
2006	37	3
2005	36	4
2004	35	8
2003	34	8
2002	33	8
2001	32	3
2000	31	3
1999	30	4
1999	29	4
1998	28	3
1996	27	4
1995	26	4
1994	25	1
1993	24	1
1992	23	1
1991	22	1
1990	21	1
1989	20	1
1997	Directory	5
1996	Intl. Conf.	5
1995	Sci. Editing	4

No earlier volumes are currently available for ordering from the Publications Manager.

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http://www.geoinfo.org/Proceedings/Proceedings.html
http://www.geoinfo.org/proceedings.html
http://www.geoinfo.org/ordering.html
I am happy to work with the GSIS Webmaster to update these pages so that they reflect current information.

Print Availability
The Publications Manager routinely fulfills requests for print copies of older Proceedings Documents if available.

Respectfully submitted by Richard Huffine, GSIS Publications Manager, October 15, 2014

Michael Noga – The Proceedings have the committee members, agendas, minutes, etc.
Rusty Kimball – Texas A&M will host back to volume 1 electronically.
Emily Wild – USGS has 3–5 copies each, we can sacrifice 1 copy for the digitization project.
Shaun Hardy – Will the print on demand be a part of membership?
Amanda Bielskas – No, that would be an extra fee.
Shaun Hardy – For institutional member maybe include the print on demand copy as part of the membership.
Cynthia Prosser – Remember, in going from a subscription to an institutional membership there is a big jump in price.

21. Publicity Officer (Vacant- Amanda Bielskas) Addonna Fleming stepped down, have not been able to get a replacement. Posted several times on GeoNet, published an ad in the Newsletter- no inquiries. Linda Zellmer helped with publicity for Geo 101. And I got some word out about the award winners, though GeoSpectrum didn't publish the news as hoped.

    Monica Pereira – is info about the award winners at the GSA booth?
    Does GSA show pictures of all the awards winners – no – just the sections (Shaun Hardy)

22. Webmaster (Courtney Hoffner - not present)

    2014 GSIS Webmaster Report
    Everything with our website is currently performing smoothly. I try to respond to member's request for changes and updates within a few days at most. Instructions on how to access our website server and what to do in case of problems have been added to the Wiki. Our website is hosted on AGI's servers so in case of technical problems, contact their tech people. Contact information in on the wiki as well. We might consider moving our website to something easier to update, like Wordpress or other content management system.

    Connie Manson – I inadvertently deleted my schedule. So I looked for the schedule on the website and could not find it?!?!?!? Should it be posted there?
    Linda Musser – It would be useful to see what the web traffic is, stats, etc.
    Hannah Winkler – It is hard to find with a Google search.
    Lura Joseph – Many societies have something on Wikipedia – if we did that, it might improve our results. Include link off to official site.
    Marie Dvorzak – We did something for the 25th.anniversary, should we do something for the 50th?

23. GSA Topical Session Convener (Hannah Winkler)

    Last year we only had a poster session. This year made a valiant effort to get submissions. We picked a topic that is timely and relevant. This year, we have 2 sessions. We had over 30 submissions (12 needed for a session) I did have to turn some away – some weren't appropriate for our session. I asked for submissions up until 2 or 3 days before deadline. As with any discipline, I suspect folks waited until the last minute to submit abstracts.

24. Geoscience Librarianship 101 (Clara McLeod)

    18 registrants, only 1 did not show. Very grateful to have Kevin Lindstrom help us.

Hannah Winkler – Does seem to be a trend that every year that there are inquiries for the information to be made available electronically.
Linda Zellmer – yes , every year we get several inquiries
Hannah Winkler – We need to keep track of this trend. Thank you Clara for doing such a phenomenal job at organizing this.

25. GSIS participation in AGI Member Society Council

    Linda Zellmer is attending at this meeting. Jan Heagy attended the meeting in Texas.

26. AGI Harriet Wallace Scholarship Selection Committee, Mary Scott 2012-2014

27. CUAC (Linda Zellmer)

    After many years, last year CUAC could not continue. Could not get members. Decided that it should be disbanded. Map & Geography round table did not send members for the past several years. GSIS, WAML, Magirt, SLA social sciences – Geography and Map, Godort, North East Map Organization (NEMO)
    At disbandment – CUAC had about $5000 in the treasury, $1191.39 given back to the 5/6 member organizations.
    CUAC material is being archived – The history of the organization is being preserved.

28. GSA Publications (Joni Lerud-Heck)

    Executive Council – passed an open access policy that is very different than other organizations. GSA – all journals will go to gold open access, phasing it in. Current plan – Geology will be first (2017), 2018 – Geosphere, 2019 – all the serials.

    Amanda Bielskas – can we get a motion for the board to write a letter in support
    Monica Pereira – 1st, Connie Manson – 2nd - So moved.
    Hannah Winkler – Is it a matter of public record yet?
    Matt Hudson – Yes, you can share the news.
    Emily Wild – So it is tweetable!
    Matt Hudson – Yes, It includes the archives (when the journal becomes open access, the backfiles will too). The journals are going to remain exactly the same with regard to review, etc.
    Linda Musser – Matt you had put out a call for older publications – did you get them?
    Matt Hudson – Yes
    Linda Zellmer – How did you do the maps?
    Matt – They are full scale. Microfiche scanned also.
    GIVE GSA a round of applause!!!!!! – yes, yes, yes!

29. Other Representation at Meetings?

    None.

VII. Old Business

1. Publications and the GSIS Proceedings (Amanda Bielskas and Richard Huffine)

2. Create/retire committees

    Linda Zellmer – I move to dissolve the information resources committee.
    Linda Musser – Have the interests of the membership changed and are they trying to fit under an inadequate framework?
    Linda Musser – I move that we dissolve all the committees and start over.
    Michael Noga – Better check the bylaws, to see what can be done.
    Linda Musser – We have been talking about these committee issues for several years now.
    Joni Lerud Heck – There is a complicating issue – some of the money in the treasury is earmarked for international initiatives. Need to identify that and may need talk to a lawyer too.
    Jody Foote – Can we assume that the 2 award committees with money that those committees are remaining?
    Linda Musser – The exec board can start over.

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Amanda Bielskas calls a vote for restarting the committees – the membership so voted.
Michael Noga – Do this with care.
Connie Manson – Would it be beneficial to survey the membership to see what committees the membership actually cares about?
Amanda Bielskas – We have lots of committees, too many for the size of the membership. I think a lot of the committees will be reinstated.
Monica Pereira – I am in favor of cleaning up the committee structure – but what about the committee like international initiatives – will it go away because it appears to have no interest in it?
Shaun Hardy – On the survey, many people did not even answer the question. That tells me there is no energy for that at this time in the organization. Is it creating a sense of guilt in the society?
Emily Wild – More than half the people I help are non US – visiting scientists from all over the world. USGS library is a destination library – people come especially to use the library. We are international and have a huge international component. Getting the word out – it is a slow process.
Monica Pereira – it is a slow process.
Emily Wild – USGS has large education base.
Linda Zellmer – Should we craft and send a blanket email to international to state that we have some funds to help.
Louise Deis – Can the Exec. Board & Strategic Committee meet to discuss these issues?
Shaun Hardy – Is there some time at Professional Issues to continue this discussion and the survey.

VIII. New Business

1. Open Access GSIS Publications (Amanda Bielskas and Richard Huffine)

2. GSIS incorporation issues (Amanda Bielskas with notes from Caroline Rauber)

   GSIS's certificate of incorporation was revoked on September 10, 1974, less than ten years after the original certificate was issued on March 3, 1966. This was confirmed with the Corporation Office in the Bureau of Regulatory and Consumer Affairs in Washington, D.C. It is not known why our corporation was revoked, but we suspect that the organization failed to stay in good standing by filing annual reports.

   The representative from the Consumer Office offered two options: either we could bring our corporation up-to-date, which would require filing annual reports for the years 1974-1996, at a cost of $0.55 per report, and then annual reports every two years from 1997-2013, at a cost of $130 per report. Finally, we would need to pay $80 to re-incorporate in the District of Columbia. The total cost to our organization would be $1259.90. Or, we could register as a new non-profit corporation, for $80. Either way, every two years, GSIS would be required to file an annual report and pay a fee of $80 by April 1 to remain in good standing.

   We would also need to register for a new tax ID number with the IRS. Currently, we believe our EIN is invalid, because it's registered to a corporation that doesn't exist. As a result, we are not able to fill out W-9 forms for organizations who subscribe to our proceedings and newsletters. Carolyn filed a 990 this year without knowledge of this problem, but won't be able to in the future unless we re-incorporate.

   The Treasurer recommends that we register as a new corporation. We originally registered in D.C. because a member of the executive board of GSIS was based in D.C., so we can choose to incorporate there again. Otherwise, we can register a non-profit elsewhere. If AGI is willing to be a c/o address, we can incorporate in Virginia.

3. Strategic Planning Survey Results (Amanda Bielskas)

4. Guidebooks - New Guidelines (Guidebook Committee)

5. Newsletter question and discussion: Curious about what members think the purpose of the Newsletter is. Is its goal to share information about members with each other? Or is the goal to share information about members, and geoscience information with a broader audience? If the goal is the latter, the limited circulation and 6 month embargo decreases its effectiveness and we should consider alternative methods of dissemination.

   Future of the newsletter as we consider declining membership and other issues. Are there other ways of sharing information that might give us a larger profile?

IX. Other Items

1. GEOREF tutorials – Jim Mehl – create tutorials to effectively use GeoRef – online tutorials – is the organization willing to form a committee and accept funding to create these tutorials?

   We have funds that have been allocated for this initiative.
   Hannah Winkler – motion to accept, Louise – 2nd, Motion carries – 2 abstentions.

2. Connie Manson– everyone who is a member of the Pacific section of GSIS is invited to the section meeting luncheon. Remember membership is strictly restricted to anyone who has been to the Pacific Northwest or has every wanted to.

   Lura Joseph – a round of applause for all the work that has gone into the meeting this year.
   Amanda Bielskas – Thank you everyone for their hard work.

X. Adjourn

Michael Noga – 1st, Jim Mehl -2nd – adjourned at noon.

SUMMARY OF 2014 PROFESSIONAL ISSUES ROUNDTABLE

Monday, October 20, 2014, 9–11:30 a.m.
Hyatt Regency Vancouver, English Bay
Vancouver, British Columbia, Canada

Summary submitted by Michael Noga, who also organized the event.
Originally published in *GSIS Newsletter*, Number 264, December 2014

The Professional Issues Roundtable was held in a penthouse meeting room in the Hyatt in Vancouver. The participants had a beautiful view of Vancouver towards the south. The catering included interesting chocolate concoctions.

USGS

The first part of the session focused on government information. Emily Wild gave a report on the US Geological Survey. She is the primary reference librarian for the USGS Library. There are 30–50 questions per day. Her outreach to the public is reflected in the messages on new USGS information and data that she sends to the Geonet regularly. There are still ten in the Ask USGS team, one for each major program (water, quakes, etc.). Most are former scientists.

The Denver library does print on demand. It also maintains an exchange program with other state, provincial, and international geological surveys (e.g. Japan, Turkey, South Africa, Iraq, and Russia). GeoRef indexes these publications. The Reston Library collects the rare books and political materials. The Menlo Park Library is sending materials to the Denver Library. The whole library keeps only 5 paper copies of each report. The *Geologic Atlas of the United States* is now rare and expensive.

New publications are printed only if there is money. Scans from the National Geologic Map Database must be indexed in the Publications Warehouse to be linked.

Emily talked about USGS plans for providing access to data. She recommended checking www.sciencebase.gov for data sets. Satellite imagery is accessible via Earth Explorer. NAS provides the hardware, and USGS provides the software and archiving.

Canada

The Geological Survey of Canada (GEOSCAN) has a lot online, though it may be hard to find some of the publications directly. GeoRef is a major finding aid for Canadian and provincial survey literature. CISTI and Environment Canada have had much downsizing.

Other Countries

OneGeology covers the European surveys. Australia has put a lot publications and mapping online. USGS works in Afghanistan plus a few other countries via the UN, but a lot of this research is not available online.

Other Topics

Before the meeting, some questions were submitted on Geonet. The discussion concerned metrics, off-site storage, delivery services, reference works and their formats, and where users turn to find information on geoscience.

Some comments on space: 48-hour turnaround of delivery from storage is too long. If the publications are

not online, try to keep the print close by. The earth sciences literature has a long half-life. The first instance of the geology of an area is important. Even though individual geoscience publications are low use, in aggregate they are used.

Some comments on courses: It can be hard to get invited to classes. Being embedded in a course is very important. There is a direct correlation of time spent in classes, on field trips, other informal interactions, etc. and students coming to the library.

Some comments on PDA: Faculty and students have to use the online catalog as a discovery tool to find the titles available on PDA. Pilots often don't have enough geoscience books to judge their effectiveness. The PDA version may be different than the online version offered by the publisher (CRC was given as an example.). Popular books may be purchased with the PDA funds. Finally, a price cap will be needed or else expensive books may be purchased.

GSW

At the GSIS Business Meeting, there was an announcement that the GSA Board had decided to gradually turn its journals into open-access publications. There was some discussion of this change and possible effect on GeoScienceWorld. GSW has an advantage for finding geoscience information in its common tool set with geographic finding aids. GSW is upgrading its searching and browsing capabilities. The GeoRef interface on GSW is also being upgraded.

Strategic Planning Survey

The last part of the Roundtable was a presentation by Amanda Bielskas on preliminary results from the Strategic Planning Survey. Most of the respondents are GSIS members, have a lot of experience in the profession, and reside in the U.S. A third of the respondents expect to retire within 5 years, but there was an expression of continued interest in the Society after retirement. More than 40% of the respondents have attended one to three GSIS meetings in the last 10 years. The biggest impediment is lack of travel support, followed by the choice of a different conference instead. The main reasons for attending a meeting are networking, the talks, the professional issues roundtable, vendor update, and business meeting. Geonet was popular for those who didn't attend meetings. More professional development from GSIS is desired.

GSIS MEMBER & NON-MEMBER (PRELIMINARY) STRATEGIC PLANNING SURVEY RESULTS

Submitted by Amanda Bielskas, presented at Business Meeting and Professional Issues Roundtable.

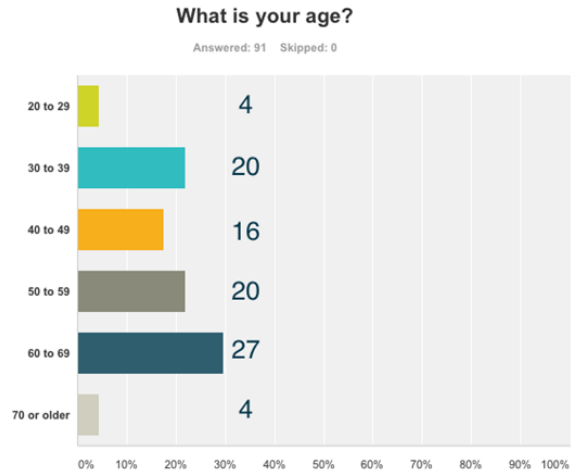
The GSIS Member & Nonmember Strategic Planning Survey was posted on GeoNet several times as well as emailed to all GSIS members (whose email was on file.) The Survey was live from September 13th to October 3rd, 2014. Ninety-one responses were collected. Not all users answered all survey questions. Five $10 Amazon.com gift certificates were offered as an incentive, winners were chosen at random and notified in early October.

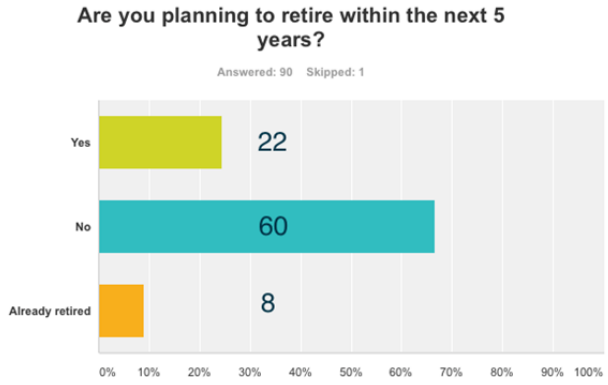
Strategic Planning Working Group: Amanda Bielskas, Shaun Hardy, Dorothy McGarry, Linda Musser, Jessica Pierce.

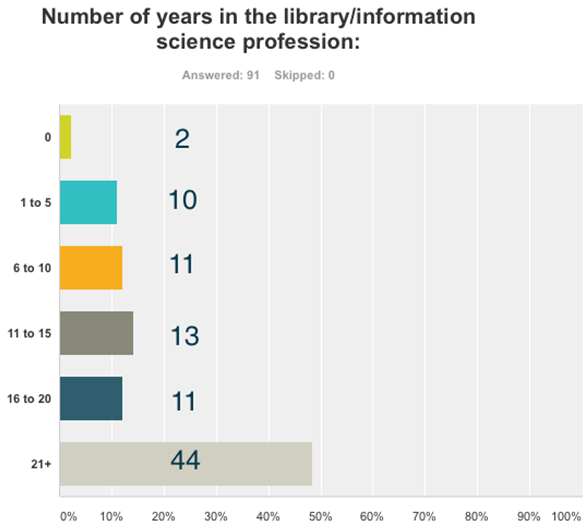
Initial Observations

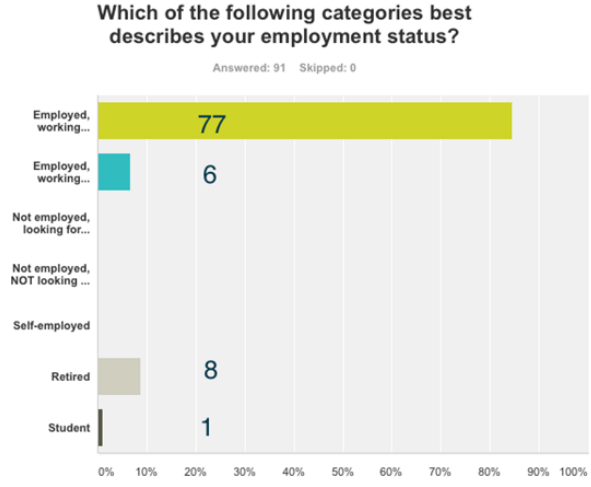
- Average age = 51
- Members have a lot of experience! 44 people have 21+ years of experience!
- 27% of responders likely to retire in the next 5 years (+ 8 already retired)
- A bunch of members plan to still be involved with GSIS when they retire
- Survey takers heavily based in US + Canada – only 5 outside N. America
- Average % time devoted to Geosciences = ~40%
- Majority of responders based at academic institutions
- Responders responsible for a variety of other subjects heavy in the STM, engineering & physical sciences, as well as bio, life, environmental, geography, math and science in general
- Most have heard of Geoscience Librarianship 101, less than ½ of members have taken it
- Majority of survey takers were GSIS members (73/91)
- Strong call for more online educational content and webinars; offer GS101 online, advanced courses online, additional content and materials to support professional development and growth
- More than ½ respondents consider GSIS their primary organization.
- Respondents belong to a lot of other Orgs top 4 = ALA, ACRL, SLA, WAML
- Belong to GSIS because: GeoNet, community/networking, publications
- Not all members have been on committees/ officers or more involved with GSIS
- Majority of members think GSIS is a good value $$ (especially compared to other orgs)
- Happy with the way GSIS is, GSIS could do better with education, communication, getting more involved, advocacy, webinars and online educational components
- Get more out of the Conference if: more relevant, more social, more follow up after meeting
- People generally happy with the way the conference is now with a few suggestions
- For many members, this is the only conference they attend
- We face a lot of challenges: Keeping up, new technology, budgets…
- GSIS can help with: professional development, advocacy, networking, information sharing

Survey Responses









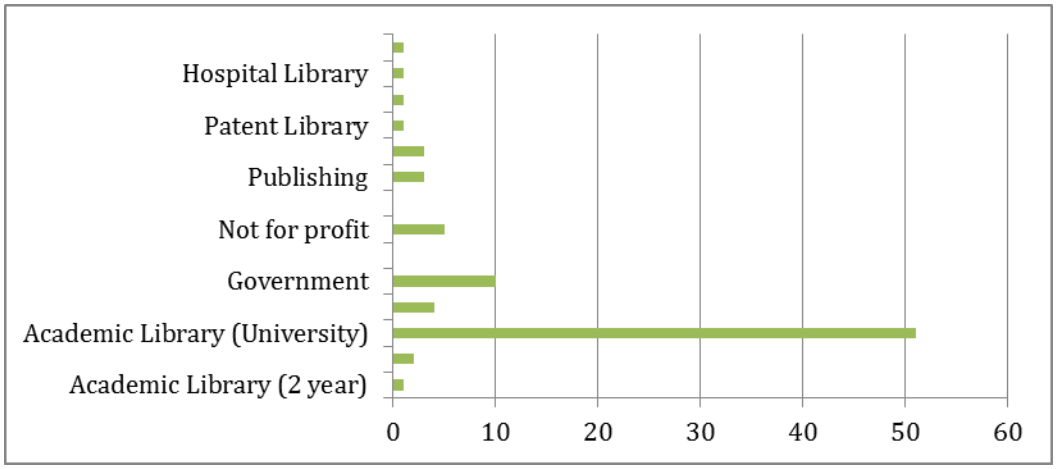
STRATEGIC PLANNING SURVEY RESULTS
CONTINUED

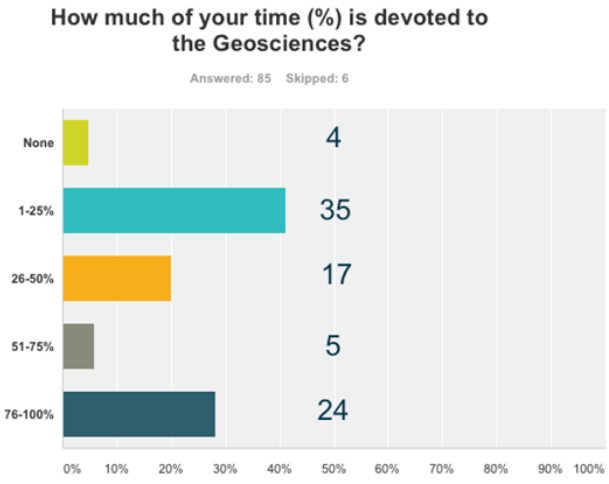
Job Title: (Skip question if currently not employed)

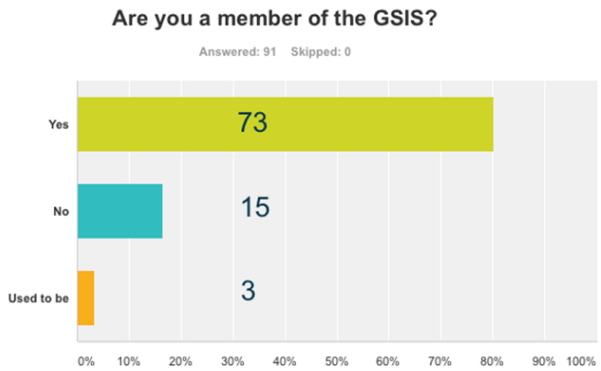
Answered: 77, Skipped: 14

Type of institution: (Skip question if currently not employed)

Answered: 76, Skipped: 15

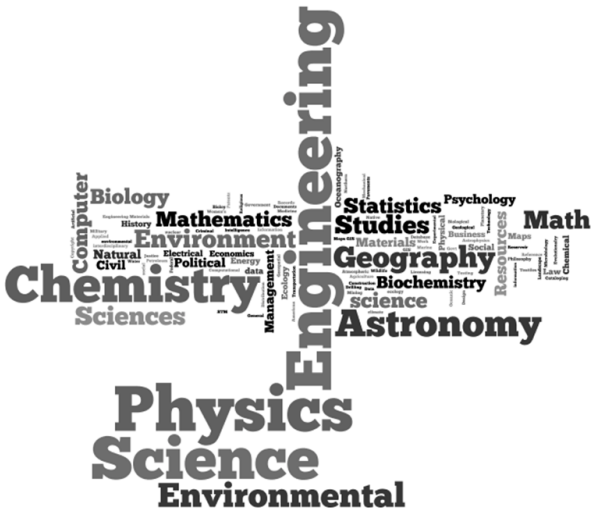


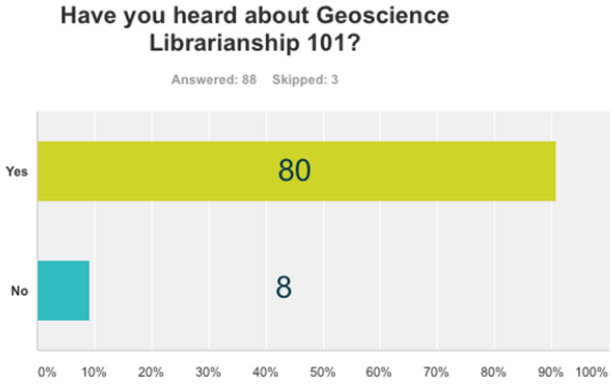


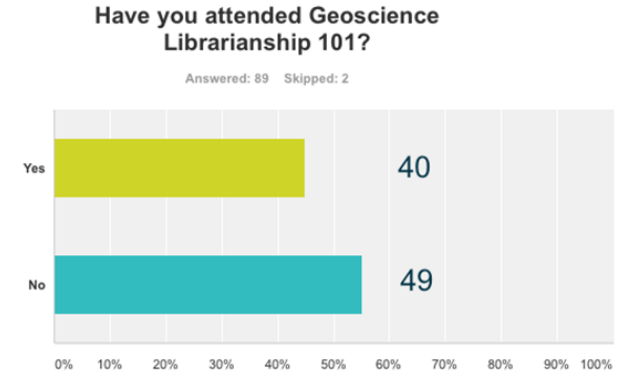


What other subject areas (besides geosciences) are you responsible for?

Answered: 64, Skipped: 27



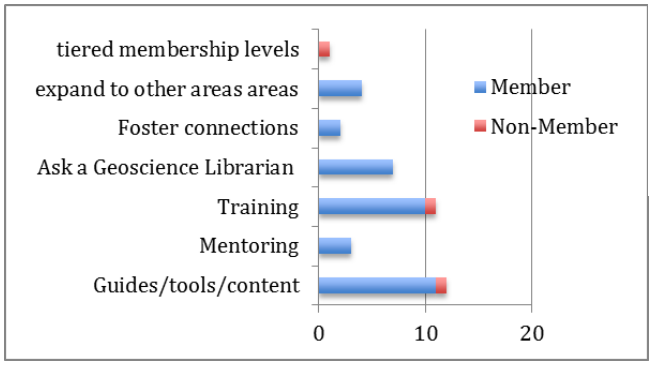


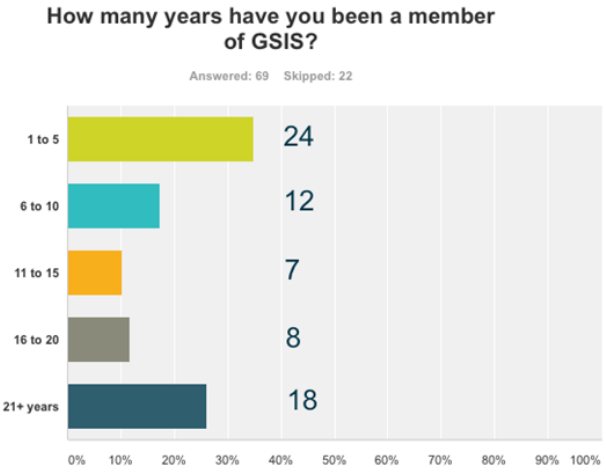


MEMBER RESPONSES

How can GSIS better help support librarians where this is only a minor area for which they are responsible?

Answered: 5 Skipped: 86





STRATEGIC PLANNING SURVEY RESULTS
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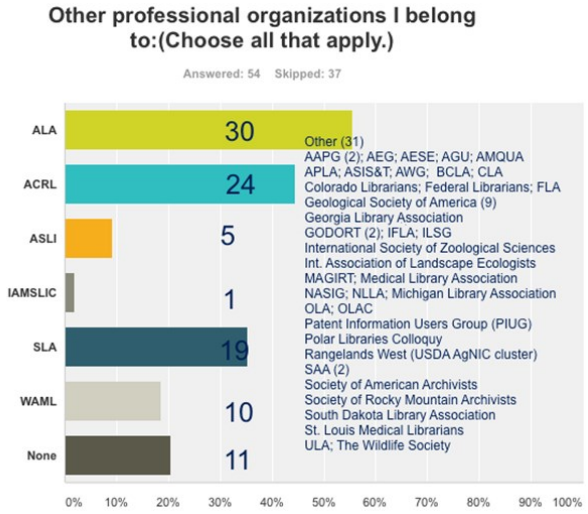
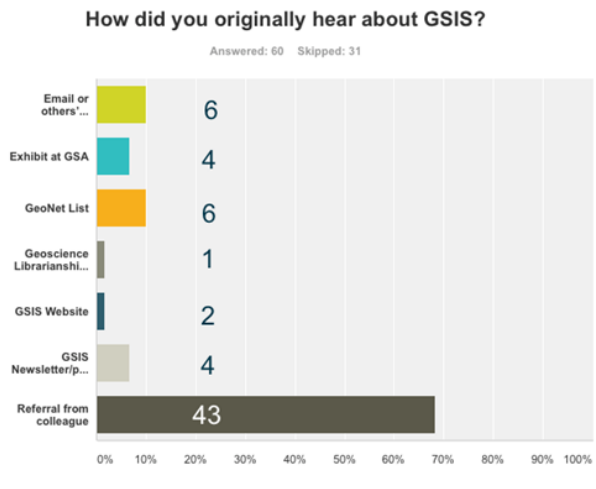
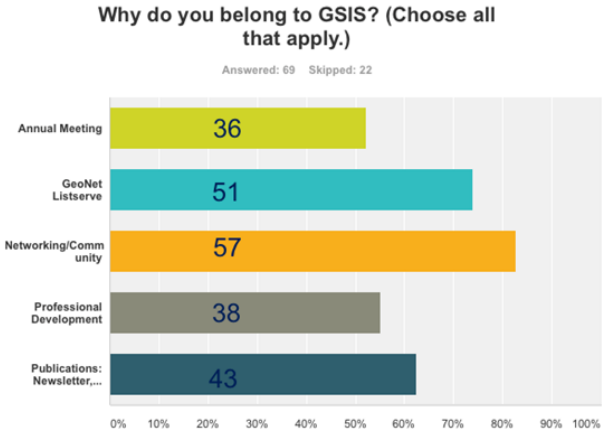
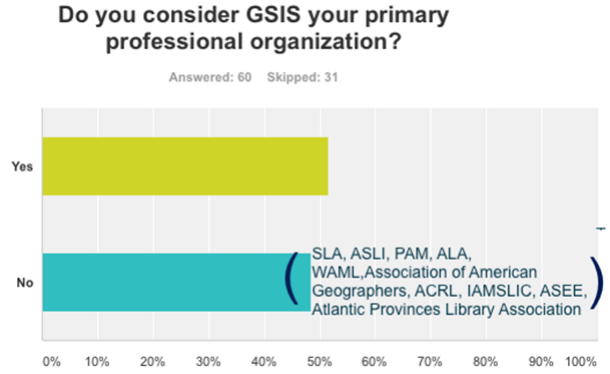






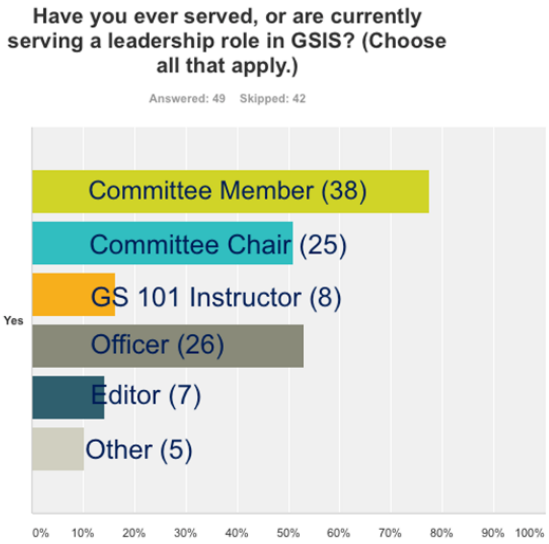


Other reasons:

- Colleagues help me a lot when I need it.
- GSIS is affiliated with GSA so I can have concrete connections to a scientific organization not just those limited to librarians.
- GSIS has met my subject interests.
- Sentimental reasons.

Why not? (16 responses)

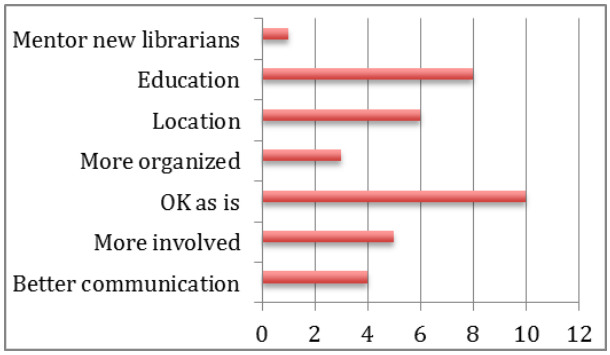
- New to GSIS (4)
- Time commitment required/ not enough time (6)
- Have had other responsibilities (2)
- Changes in work responsibilities
- Can not attend every annual meeting (2)
- Not a geoscience librarian



Do you think GSIS membership is a good value for the money?		
Answer	Response Percent	Response Count
Yes	98.3%	58
No, (why= have not seen any benefits yet)	1.7%	1

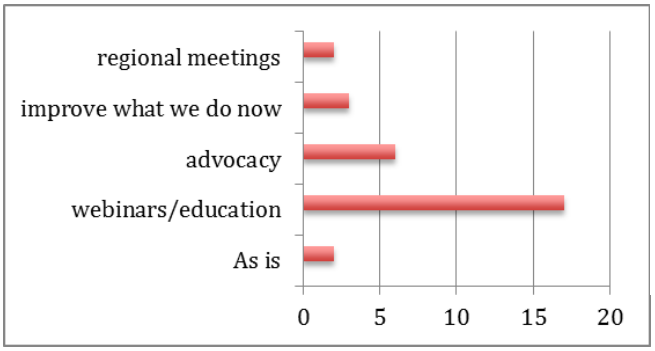
What could GSIS do to improve your experience as a member?

Answered: 37 Skipped: 54



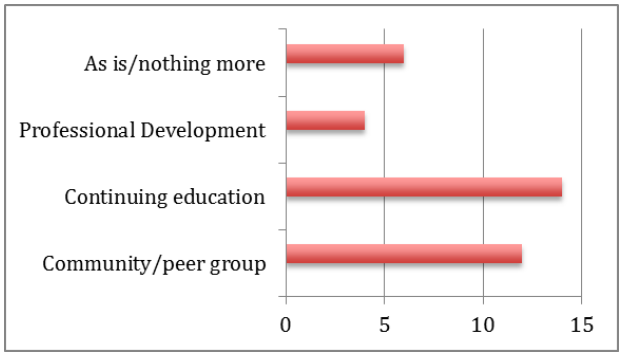
What activities beyond the annual meeting should the society engage in?

Answered: 34 Skipped: 57



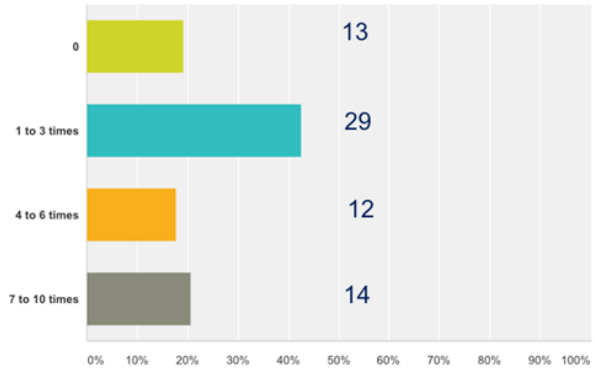
What do you want out of your GSIS membership?

Answered: 36 Skipped: 55



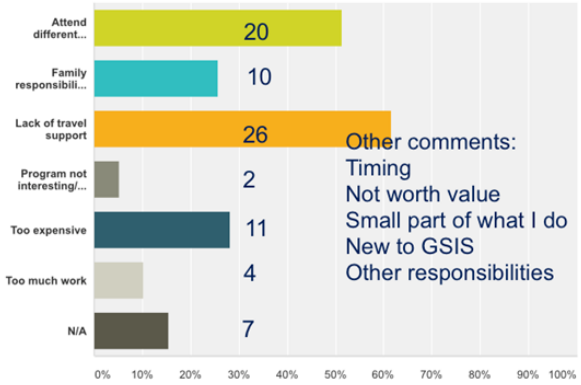
How often have you attended the GSIS conference at GSA in the past 10 years?

Answered: 68 Skipped: 23



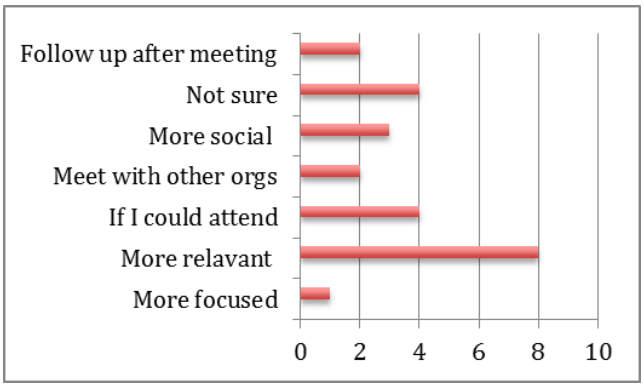
If you rarely or never attend the GSIS conference, why not? (Choose all that apply.)

Answered: 39 Skipped: 52



I would get more out of the GSIS/GSA conference if:

Answered: 24 Skipped: 67



STRATEGIC PLANNING SURVEY RESULTS
CONTINUED

Please rank the level of importance, the most important aspects of attending the GSIS/GSA conference to you (GSIS activities): Answered: 60, Skipped: 31

	Very Important	Important	Moderately Important	Of Little Importance	Unimportant	Total
Attending the GSIS talks	65.00% 39	18.33% 11	13.33% 8	3.33% 2	0.00% 0	60
Attending the GSIS poster sessions	28.81% 17	38.98% 23	23.73% 14	6.78% 4	1.69% 1	59
GSIS booth	10.53% 6	31.58% 18	36.84% 21	17.54% 10	3.51% 2	57
GSIS business meeting	33.33% 20	26.67% 16	26.67% 16	10.00% 6	3.33% 2	60
GSIS committee meeting	23.64% 13	27.27% 15	36.36% 20	9.09% 5	3.64% 2	55
GSIS executive board meeting	20.00% 11	14.55% 8	34.55% 19	20.00% 11	10.91% 6	55
GSIS field trip	7.14% 4	21.43% 12	39.29% 22	25.00% 14	7.14% 4	56
GSIS luncheon	26.67% 16	26.67% 16	28.33% 17	11.67% 7	6.67% 4	60
GSIS professional issues roundtable	55.93% 33	28.81% 17	11.86% 7	3.39% 2	0.00% 0	59
GSIS vendor update session	43.10% 25	41.38% 24	10.34% 6	3.45% 2	1.72% 1	58
GSIS/Geoinformatics reception	18.97% 11	32.76% 19	34.48% 20	13.79% 8	0.00% 0	58
Networking/Community	74.58% 44	18.64% 11	5.08% 3	1.69% 1	0.00% 0	59

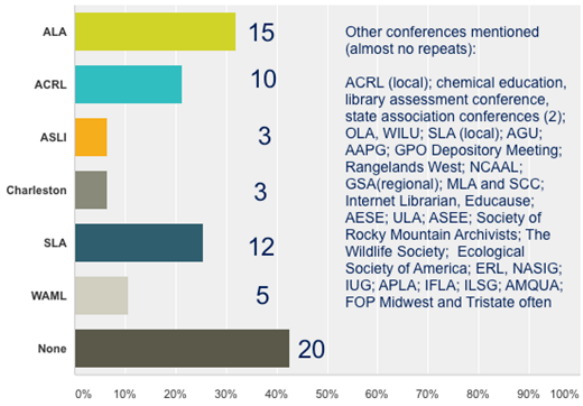
Please rank the level of importance, the most important aspects of attending the GSIS/GSA conference to you (GSA activities): Answered: 59, Skipped: 32

	Very Important	Important	Moderately Important	Of Little Importance	Unimportant	Total
Attending the talks of my faculty/students	26.32% 15	22.81% 13	29.82% 17	12.28% 7	8.77% 5	57
Alumni/school parties	7.14% 4	8.93% 5	30.36% 17	25.00% 14	28.57% 16	56
Exhibits/Vendors	36.21% 21	37.93% 22	20.69% 12	5.17% 3	0.00% 0	58
GSA beer reception	1.75% 1	10.53% 6	26.32% 15	29.82% 17	31.58% 18	57
GSA field trips	6.90% 4	12.07% 7	20.69% 12	43.10% 25	17.24% 10	58
GSA talks/public lectures	15.79% 9	38.60% 22	29.82% 17	8.77% 5	7.02% 4	57
Meeting with publishers/vendors	31.03% 18	43.10% 25	20.69% 12	3.45% 2	1.72% 1	58
Networking/Community	51.72% 30	29.31% 17	18.97% 11	0.00% 0	0.00% 0	58

STRATEGIC PLANNING SURVEY RESULTS
CONTINUED

Besides GSIS/GSA I regularly attend the following conferences (choose all that apply):

Answered: 47 Skipped: 44

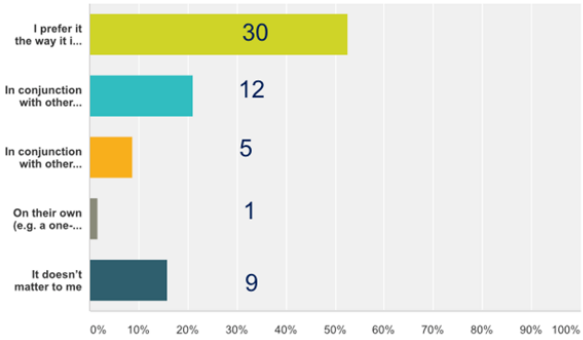


Other conferences mentioned (almost no repeats):

ACRL (local); chemical education, library assessment conference, state association conferences (2); OLA, WILU; SLA (local); AGU; AAPG; GPO Depository Meeting; Rangelands West; NCAAL; GSA(regional); MLA and SCC; Internet Librarian, Educause; AESE; ULA; ASEE; Society of Rocky Mountain Archivists; The Wildlife Society; Ecological Society of America; ERL, NASIG; IUG; APLA; IFLA; ILSG; AMQUA; FOP Midwest and Tristate often

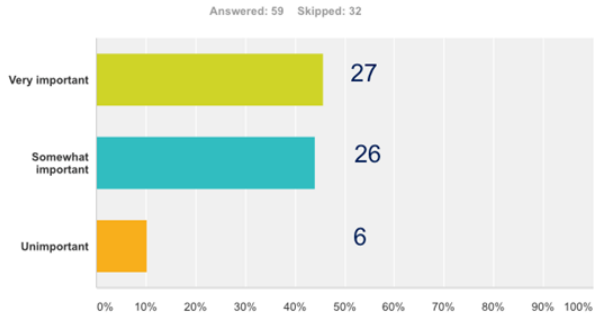
I would prefer if GSIS meetings were held:

Answered: 57 Skipped: 34



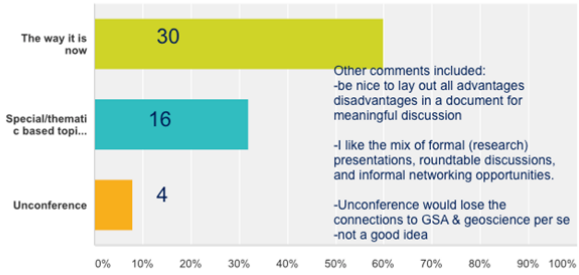
How important to you is it that GSIS meet with GSA?

Answered: 59 Skipped: 32



I would be interested in the following meeting/conference types:

Answered: 50 Skipped: 41



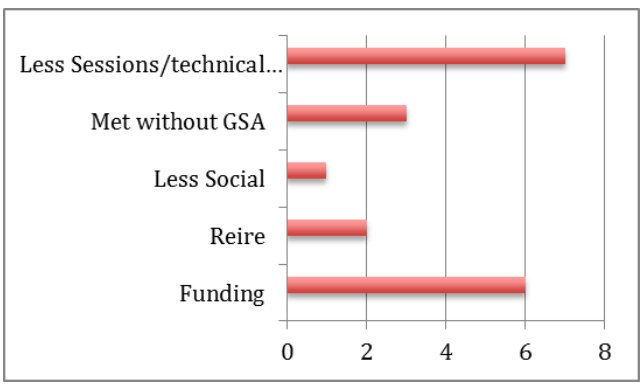
Other comments included:
-be nice to lay out all advantages disadvantages in a document for meaningful discussion

-I like the mix of formal (research) presentations, roundtable discussions, and informal networking opportunities.

-Unconference would lose the connections to GSA & geoscience per se
-not a good idea

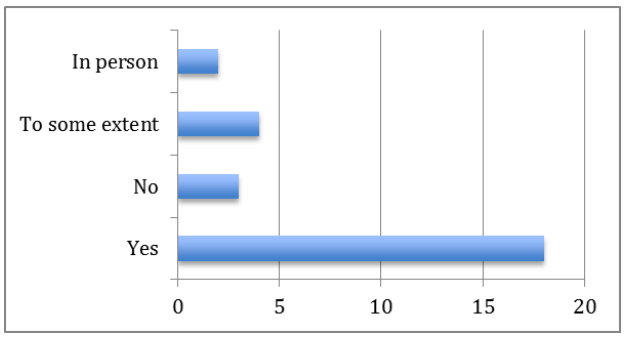
I would no longer attend the GSIS/GSA conference if:

Answered: 22 Skipped: 69



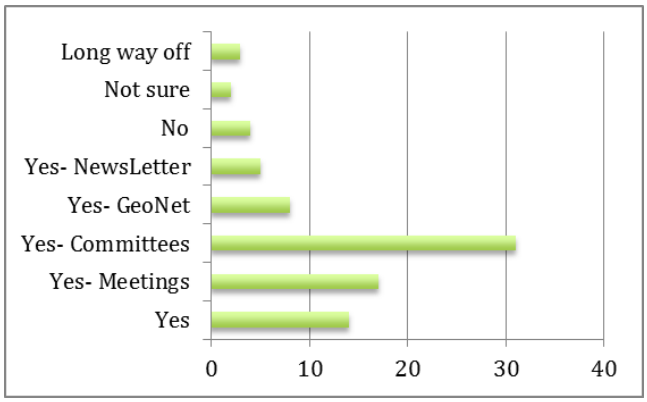
If you don't attend the meetings does GeoNet provide adequate "community" and contacts for you?

Answered: 31 Skipped: 60

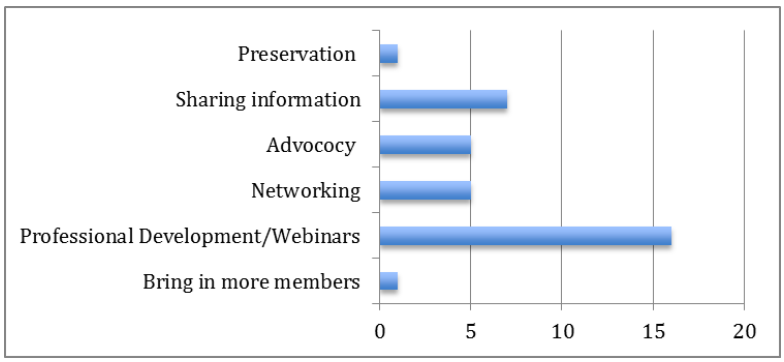


STRATEGIC PLANNING SURVEY RESULTS
CONTINUED

Do you plan to still be engaged with GSIS when you retire?
Answered: 59 Skipped: 32



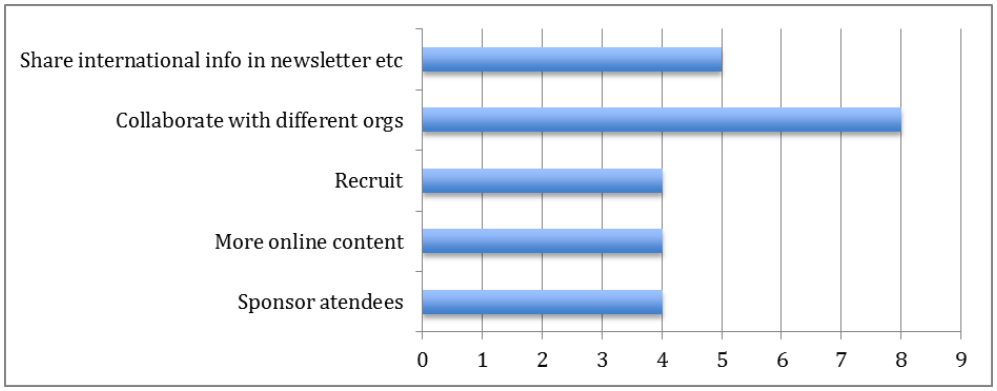
As a library/informational professional, what are the biggest challenges facing you today?
Answered: 46 Skipped: 45

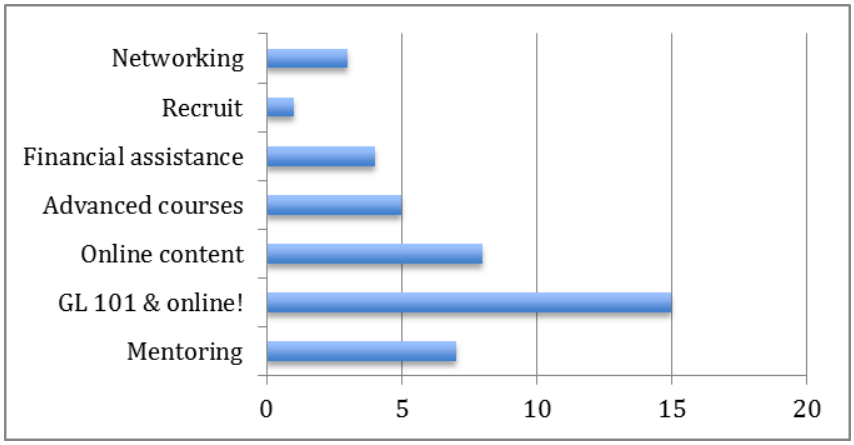


How can GSIS better support you in meeting these challenges?
Answered: 28 Skipped: 63

How can GSIS improve its international activities?

Answered: 28.
Skipped: 63

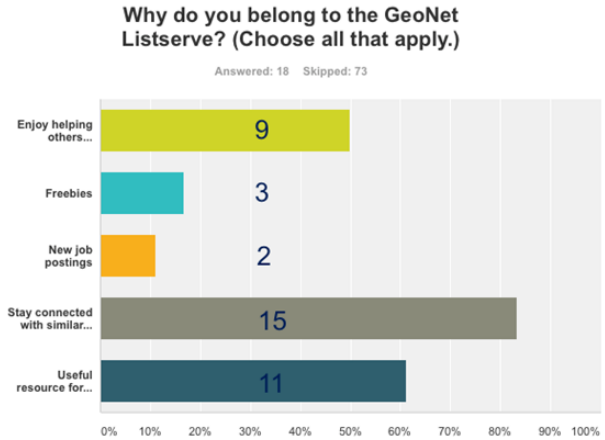




How can GSIS better help support librarians that are new to the profession?

Answered: 33, Skipped: 58

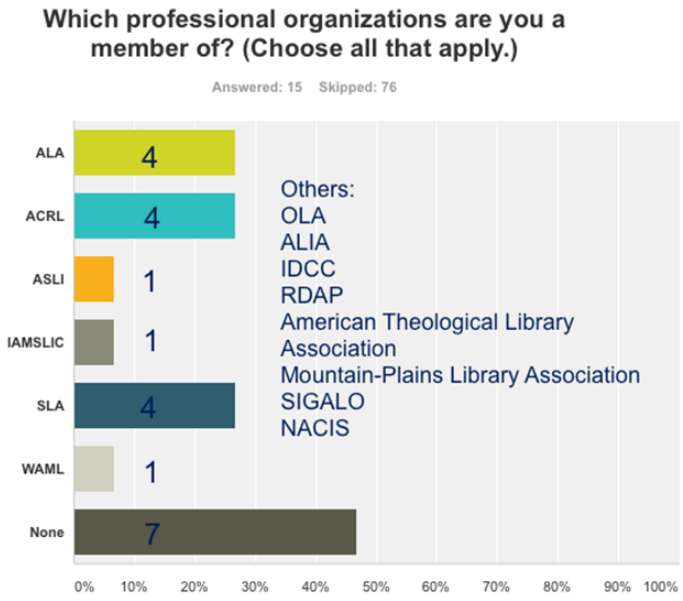
NONMEMBER RESPONSES

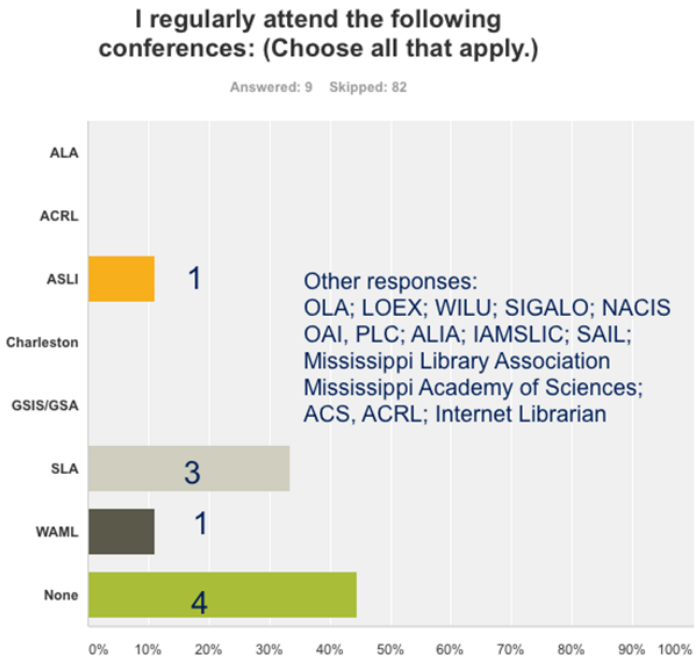


STRATEGIC PLANNING SURVEY RESULTS
CONTINUED

I would become a member of GSIS if:

- The dues were less (2)
- It were affordable & had clear benefits
- If there were an 'affiliate' or second-level tier membership level
- Annual meetings were held in Asia





2014 GEOSCIENCE INFORMATION SOCIETY AWARD WINNERS

Presented at the GSIS and GSA Informatics Division Join Reception
Tuesday, October 21, 2014, 6–8 p.m.
Hyatt Regency Vancouver
Seymour Room
Vancouver, British Columbia, Canada

Mary B. Ansari Distinguished Service Award

Lura Joseph
University of Illinois at Urbana-Champaign, Champaign, IL

Lura Joseph, Content Access and Research Services Librarian at the University of Illinois at Urbana-Champaign (UIUC), is the 2014 recipient of the Mary B. Ansari Distinguished Service Award given by the Geoscience Information Society (GSIS). From 2001 to 2012 she served as the Geology and Digital Projects Librarian at UIUC. The award was established in 2005 through the generous support of Ms. Ansari, Director Emerita for Branch Libraries and Administrative Services at the University of Nevada-Reno and President of the Geoscience Information Society in 1990. Over the past twenty years, Lura has consistently made the significant contributions 14 GSIS Newsletter Number 261, June 2014 to geoscience information that the award recognizes. Lura's long record of professional activity and research reflects a deep understanding of, and thoughtful concern for, the future of library collections, bibliography, and geoscience information. Mary B. Ansari Distinguished Service Award winner Lura Joseph.

Lura led the Geoscience Information Society as president from 2003–2004. She has served GSIS in many other ways since joining in 1993. In 2004 she edited the GSIS Proceedings, *Geoscience Information Horizons: Challenges, Choices, and Decisions*. For several years she was an instructor in the Geoscience 101 course offered to new geoscience librarians. She also served as chair of the Archival Committee and GSIS representative to the GeoRef Advisory Committee of the American Geological Institute.

Field trip guidebooks are Lura's true passion. She has been the driving force on the GSIS Guidebooks Committee for many years. She helped revise the "Guidelines for Authors, Editors, and Publishers of Geologic Field Trip Guidebooks" as a member of the Guidebooks Standards Subcommittee. Her dedication to maintaining, improving, and contributing to the Union List of Field Trip Guidebooks and the Geologic Guidebooks of North America database is well known among her peers. She devoted a sabbatical leave to researching and documenting guidebooks from many organizations. Lura continues to be a vocal advocate for the recognition of the value of guidebooks to the geoscience literature, and has been contributing a column for this Newsletter about recently published guidebooks (see p. 10).

If guidebooks are Lura's true passion, conducting research on topics of immediate and practical application to the library community is a close second. She is the author of nine peerreviewed journal articles. Two of those articles received the Best Paper Award from GSIS. Her first award-winning article, "Image and figure quality: A study of Elsevier's Earth and Planetary Sciences electronic journal back file package," was published in 2006 in Library Collections, Acquisitions, and Technical Services. One of her colleagues said of her research, "Faithful to her scientific training, she diligently assembles the relevant data, rationally analyzes them, and clearly and logically presents the results which emerge. The results of Lura's seminal study objectively demonstrated cause for concern and reiterated to the publishing, research, and library communities the critical importance of quality in preserving the scientific record in the digital age." Lura has authored several book chapters, written numerous book reviews, and made presentations at conferences, institutes, and workshops around the country.

Lura received both a Master of Science degree in Geology and a Master of Library and Information Studies

2014 GEOSCIENCE INFORMATION SOCIETY AWARD WINNERS
CONTINUED

degree from the University of Oklahoma. Her Bachelor of Arts degree in Anthropology was also earned from OU.

Mary B. Ansari Best Geoscience Research Resource Award

Heinrich D. Holland
Harvard University, Cambridge, MA

Karl K. Turekian,
Yale University, New Haven, CT

Editors, for their book, *Treatise on Geochemistry*, 2nd edition., Elsevier, 2013.

The 16-volume compendium was published by Elsevier in 2013. The first edition of the Treatise, also published by Elsevier, was honored with the Ansari Award in 2004. In choosing the second edition for the 2014 Award, the selection committee noted the significant amount of new material in the form of several new chapters and the extensive revision of other chapters to reflect current research.

Best Paper Award

Shaun J. Hardy
Carnegie Institution for Science, Washington, D.C.

For his 2012 paper “Open Access Publishing in the Geosciences: Case Study of the Deep Carbon Observatory,” published in the *GSIS Proceedings,* v. 43, 2012, p. 73-81.

Award committee chair Nancy Sprague (University of Idaho) stated that "this concise, well-written article was selected for having broad significance in improving our understanding of open access publishing in the geosciences, current attitudes among researchers about open access, and the roles geoscience librarians can play in helping increase awareness of open access options."

Best Guidebook Award

There were two winners this year:

Martha Hickman Hild
Memorial University, St. John's, NL, Canada

For her 2013 guidebook *Geology of Newfoundland Field Guide: Touring Through Time,* published by Boulder Publications

Noting its accessibility for geologists and non-geologists alike, the GSIS Guidebooks Committee praised the work for its enjoyable writing style, high quality illustrations, inclusion of geographic and GPS coordinates, walking directions, and clear organization. Hickman Hild is a geologist and science writer based in Flatrock, Newfoundland. Her book was published in 2012 by Boulder Publications, Portugal Cove, Newfoundland.

Part 7

Proceedings of the 50th Meeting of the Geoscience Information Society

GSA Technical Session 244

T95. Evolution of the Data Life Cycle

With increased expectations in the sharing of geoscience research data and complexities in the evolution of the data life cycle, geoscientists are evaluating best practices in scientific data collection, preservation, recovery, and subsequent reuse. In some cases geoscientists have started turning to their libraries or institutional repositories as a place to store and preserve that data. In other cases, geoscientists have found creative solutions to promote and enable data access and discoverability of their materials. This session will look at the challenges and strategies scientists, researchers, information professionals and librarians have in managing the data life cycle including: examples of repurposed and discovered data, how to manage and store data, data publishing and citation, and data curation and metadata management. Topics may include data ontologies, geoscience information, data discovery, archiving, depositories, and best practices for using geoscience data in its many formats.

Session Convener

Hannah Winkler Hamalainen
November 3, 2015
1:30 p.m. – 4:45 p.m.

OVERVIEW OF EMERGING REQUIREMENTS FOR DATA MANAGEMENT OF FEDERALLY FUNDED RESEARCH IN THE GEOSCIENCES

Richard Huffine
9422 Regency Crest Drive, Vienna, VA 22181, richardhuffine@gmail.com

Abstract—With its introduction by presidential memoranda in February 2013, the United States federal government has begun to lay out a set of guidelines and best practices for the management of data that is collected in the process of performing research that is at least in part funded by the federal government. This presentation will explore the status of requirements as well as the emerging best practices for data management in the geosciences based on the Public Access to Federally Funded Research mandate and the subsequent Public Access Plans that the mandate requires.

EVOLUTION OF THE DATA LIBRARIAN: DOCUMENTING THE EVOLVING ROLE OF DATA LIBRARIANS AT THE UNIVERSITY OF MICHIGAN LIBRARY

Lori Tschirhart
University of Michigan Library
919 South University Ave., Ann Arbor, MI 48109-1185, ltz@umich.edu

Abstract—Data services provided by libraries have grown and changed over time. This paper will explore the evolving services, priorities, and capacities of data librarians at one ARL library in relation to evolving demands by university stakeholders. The paper will also consider the many skill sets required in recent data librarian position descriptions, and will seek to clarify the most crucial skills necessary to fulfilling the research data needs of the earth sciences community.

Introduction

University of Michigan Librarians have provided services related to Geographic Information System (GIS) in some fashion or other for over twenty years. Early on, a group of librarians developed relationships with the geographer community and social science researchers due to their work within the library's robust maps collection and ties to the local Inter-University Consortium for Political and Social Research (ICPSR). More recently, demand for GIS support has become more prevalent among diverse disciplinary communities. To address increasing demand, new roles have been formally developed over time for Spatial and Numeric Data (SAND) librarians. These SAND librarians are often referred to as "functional experts" for the deep and specific expertise they offer related to spatial and numeric data. Because they have been a distinct service point for select data services through many years, I refer to them as "old school" data librarians.

Very recently, traditional subject librarians at the same institution have modified their research consultation services on a system-wide level to offer new modes of support for scholars using or creating research data. These new services are intended to support research at every phase of the research data lifecycle, from data management planning to curation and preservation.

In an effort to develop new research data services complementary to established spatial and numeric data services, and to better understand the specialized expertise held by SAND librarians, I conducted hour-long interviews with multiple librarians connected to spatial and numeric data service offerings. I asked questions designed to help me elicit details regarding their distinct areas of expertise and how they were first articulated and championed. I also invited these colleagues to discuss potential areas for growth and barriers to maximizing the value of their expertise related to spatial and numeric data. Through this paper, I will describe their responses, from their understanding of the early impetus for traditional data librarian services to their speculation on the future of our library's old school data librarian services.

Historical Data Librarian Services

In the early 1990s, the geographer community served by the library was increasingly interested in using GIS tools thanks to development and dissemination of digital spatial data. GIS and spatial data initiatives were developing, and the library, as a recognized data provider, collaborated. Librarians started supporting ESRI/Census classes, provided access to GIS software and associated training, and facilitated access to data for users. As time went on, more demand for data services grew. GIS assistance was articulated by scholars interested in population studies, health sciences, climatology/meteorology, and remote sensing of natural sciences data. The library responded to growing demand by developing new data librarian positions. The specialized expertise necessary to meet emerging demands began with a half-time librarian position. Over time, as the utility for spatial data became more apparent to the scholarly community, more SAND capacity was added through the development of new librarian positions.

Now, in 2015, the service has grown to employ two full time SAND librarians along with one visualization librarian. Librarians also developed two SAND labs in close proximity to map and architecture collections to provide specialized support to communities engaged with early use of GIS tools.

The development of specific SAND services focused on user needs not met by existing campus services. For instance, statistical analysis services were already available through the University of Michigan's Consulting for Statistics, Computing, and Analytics Research (CSCAR) and so were not replicated within the library. Early on, SAND librarians provided critical assistance with statistical code. Activities included assistance with finding variables, finding and re-purposing code, and reading manuals when users were stuck. Demand for spatial and census data was high, and services skewing toward social sciences researchers were emphasized.

The type of assistance offered by U-M SAND librarians has always involved some negotiation. Even today activities are fluid, varied, and often iterative. The intention and capacity of SAND services do not allow a production shop environment. SAND librarians regularly help people: articulate their data need, acquire data, construct datasets, clean or reduce noise so that data can be used for a distinct purpose, apply methodology, and interpret data. They also offer help with statistics syntax, statistical metrics, data formats, and map making when needed. They provide expertise with common tools including STATA, SPSS, SASS, and R, and provide assistance with tool selection and training. Finally, SAND librarians have long taken responsibility for maintaining knowledge of the location of publicly available data.

In addition to the services described previously, SAND librarians are contributing to the development of an Open Access portal which provides metadata and points to publicly available geospatial resources. At a later phase the portal may also provide metadata and access to licensed archive data at the library.

Emerging Opportunities for Education and Service Development

Over the last ten years, the landscape for spatial and numeric data services has changed dramatically. Geospatial computing possibilities have changed thanks to technological advances (especially mobile computing). More data is available and more users know how to find it. Campus data users know how to use software more and more often. Research is beginning to scale larger with high performance computing and more complex uses of data are emerging. And new platforms for instructional delivery offer ways to think about better education for future generations of SAND service users.

New developments in geospatial computing consumer services, while welcome, can unintentionally lead inexperienced researchers to believe that they can use the tools and data sets easily and without training. The library can have a role in deliberately defining services and providing education to counter this assumption. Services and instruction can be designed to provide people with chances to realize that the data they have selected doesn't always tell them what they think it is telling them. Our functional specialists have the expertise to highlight differences between using geospatial data and using it well.

The library also has an opportunity to provide new educational content to help scholars develop laboratory skills such as use of version control systems essential for research computing. Many of these skills can be delivered through software carpentry and data carpentry workshops. Software carpentry workshops introduce attendees to software used in laboratory research. Data carpentry workshops provide researchers with domain-specific data skills relevant to analysis and management of research data. This type of expertise is in high demand throughout campus, with many graduate students on research teams specifically sought by departmental research teams for their ability to teach about tools and methods used in their labs. With increased staffing, the library could develop dedicated staff positions to participate with campus partners in the delivery of training for software and data carpentry workshops.

Data visualization can help all kinds of scholars communicate their findings and advance understanding, and can be especially useful in making sense of big data. Data visualization services are already offered at the U-M Library and a new visualization

librarian position has been formalized. Growing demand is anticipated.

SAND librarians have identified a need for education and consultation around the ethics of data re-use. These experts are well poised to raise awareness of spurious correlations and the inadequacies of many statistical models for emerging research. There may be opportunity to mitigate the reproducibility problems of research through discussion, education, and advocacy for new models of publication and scientific experimentation. There is also ripe opportunity to enhance information literacy for future generations by highlighting examples of research and providing ethical guidance.

There has long been a desire among campus librarians for a campus data repository and library-supported data curation. At long last, the library is close to rolling out such a service. Depending on the eventual functionality of this emergent repository, new datasets produced by campus scholars will be described and made available for re-use. Data librarians and their disciplinary expert colleagues will have new opportunities to assist one another in order to support more collaborative research trending on campus.

Perennial Needs

In order to provide services that remain relevant to users, continuous investment in staff training and resources is essential. Librarians need to purchase, negotiate access to, point to, and host data. Time and skill is also required to manage servers and generally figure out the best ways to provide data and data services. Ongoing investment in infrastructure, too, is necessary to start providing appropriate access to sensitive data and to enable appropriate stewardship of research data. Our library has historically avoided dealing with sensitive data due to lack of infrastructure. All expertise benefits from regular upkeep. Since no expert can be equally good at all things, data librarians need capacity for building expertise. Thoughtful job posting design and avoidance of "kitchen sink" position descriptions will enable functional experts to cultivate deep skill and value for the research community served.

Finally, a down-to-earth mindset about the limitations of data can also bolster the relevance of data librarian services. There can exist a disconnect between the talents of data librarians drawn to complex inquiry and the wishes of some data consumers for quick, clean answers. For this reason, the library must identify and challenge unrealistic demands on the utility of research data and research data services.

Acknowledgments

Many thanks are offered to the following librarians who shared their time, ideas, and institutional knowledge with me and allowed me to synthesize it all into this report: Catherine Morse, Justin Joque, Mara Blake, Nicole Scholtz, Karl Longstreth, Jennifer Green, and Jake Carlson.

THE EVOLUTION, APPROVAL, AND IMPLEMENTATION OF THE U.S. GEOLOGICAL SURVEY SCIENCE DATA LIFECYCLE MODEL

John Faundeen
Department of the Interior
USGS-EROS, 47914 252nd Street, Sioux Falls, SD 57198, faundeen@usgs.gov

Tom Burley
U.S. Geological Survey, Austin, TX 78754

David Govoni
Department of Interior, US Geological Survey
12201 Sunrise Valley Drive, Reston, VA 20192

Heather S. Henkel
U.S. Geological Survey–FISC St. Petersburg
600 Fourth St. South, St. Petersburg, FL 33701

Elizabeth Martin
U.S. Geological Survey, Gainesville, FL 32653

Ellyn Montgomery
U.S. Geological Survey, Woods Hole, MA 02543

Lisa Zolly
Viv Hutchison
U.S. Geological Survey, Lakewood, CO 80225

Steve Tessler
U.S. Geological Survey, Lawrenceville, NJ 08648

Cassandra Ladino
U.S. Geological Survey, Reston, VA 20192

Abstract—This presentation will detail how the United States Geological Survey (USGS) Community for Data Integration (CDI) Data Management Working Group developed a Science Data Lifecycle Model, and the role the model plays in shaping bureau-wide policies. Starting with an extensive literature review of existing data lifecycle models, the effort expanded to include participation in a National Science Foundation data lifecycle workshop and organizing a two-day, face-to-face meeting where the basic elements for the Science Data Lifecycle Model were determined. Refinements and reviews spanned two years, leading to finalization of the model and documentation in a formal bureau publication. The bureau website devoted to data management (www.usgs.gov/datamanagement) was designed around the model's structure and concepts. The model helps the USGS address both the Office of Science and Technology Policy (OSTP) for increased public access to federally funded research, and the Office of Management and Budget (OMB) 2013 Open Data directives, by becoming the foundation for a series of bureau policies and instructional memo's related to data management planning, metadata development, data release procedures, and the long-term preservation of data. We also share use cases that illustrate the USGS model being used in research and data management processes.

WHO IS USING OUR DATASETS AND DATA PRODUCTS?

Carol A. Deering
Innovate!, Inc., at USGS EROS
47914 252nd St, Mundt Federal Bldg., Sioux Falls, SD 57198, cdeering@usgs.gov

Abstract—Who is using our datasets and data products? Researchers at the U.S. Geological Survey Earth Resources Observation and Science (USGS EROS) Center ask this question often, not out of curiosity, but because they need to know. At the EROS Center, datasets and data products that reveal the Earth's land cover, land use, and land change are compiled, created, and made available free-of-charge via the Web. Understanding how those data and products are used by stakeholders can shed light on the data strengths. Conversely, understanding how the data and products are used can also throw a spotlight on where they fall short, where there are data gaps and data weaknesses. Knowing who is using the data and products, how they are being used, and their strong and weak points can help determine what processes and products should be sustained as well as what can be improved in the data project. But, discovering who is using datasets and products, and how they are being used, is not always straightforward and easy. Citations to data and data products used in research and applications are inconsistent, sometimes nonexistent. Recent efforts to apply standards to data citation notwithstanding, citations to data and data products remain variable and unpredictable, making it difficult to track their usage. However, by leveraging a number of search tools and strategies, it is possible to discover usage of datasets and data products across the spectrum of user communities.

NATIONAL TECHNICAL REPORTS LIBRARY (NTRL): NOT JUST ANOTHER DATABASE

Angela R. Davis
University Libraries, The Pennsylvania State University
Engineering Library, 325 Hammond, University Park, PA 16802, ard21@psu.edu

Abstract—The National Technical Reports Library (NTRL) database was released for public use in October 2014 to improve the patchwork of access to National Technical Information Services (NTIS) documents. This database provides citation access to all three million NTIS documents and full-text to 800,000 reports, mostly post-1995. NTRL can be accessed through free individual registration or fee based subscriptions for individuals or institutions. NTIS is the permanent repository for federally funded scientific, technical, and engineering research reports. It collects materials from government agencies including the U.S. Geological Survey, Bureau of Mines, and National Oceanic and Atmospheric Administration, among others. In 2011, approximately 20% of NTIS materials were from geosciences or related disciplines.

You may already have access to NTIS information through a commercial database vendor or be satisfied with the free public search capabilities of www.ntis.gov. Why should you or your institution consider registering or subscribing to NTRL? Registration or subscription provides access to advanced search features and services that improve electronic access to NTIS materials. This presentation will discuss how NTRL differs from other platforms providing NTIS access, explore its search features, and discuss the pros and cons of registering or subscribing.

NASA LP DAAC PRODUCT LIFECYLE PLAN IN ACTION

Stacie L. Doman Bennett
Department of Interior, U.S. Geological Survey, Earth Resources Observation and Science
1605 S Brookview Place, Sioux Falls, SD 57110, sdomanbennett@usgs.gov

Abstract—The Land Processes Distributed Active Archive Center (LP DAAC) is a NASA Earth Observing System (EOS) Data and Information System (EOSDIS) DAAC that supports selected EOS Community non-standard data products such as the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) Global Emissivity Database (GED), and also supports NASA Earth Science programs such as Making Earth System Data Records for Use in Research Environments (MEaSUREs) to contribute in providing long-term, consistent, and mature data products.

To support and deliver excellence for NASA data stewardship, and to accommodate long-tail data preservation with Community and MEaSUREs products, the LP DAAC introduces a Product Lifecycle Plan that features a phased project framework to facilitate long-term product preservation. The first phase, Inception, captures all artifacts applied by the Product Developer(s) and develops Earth Science Data Records based on product artifacts. The second phase, Active Archive, distributes, promotes and provides services for the matured products to the science community. The third and final phase, Long-term Archive, establishes a permanent preservation location for all project artifacts. This poster depicts the LP DAAC Product Lifecycle Plan in action using the LP DAAC recently released NASA WELD Version 1.5 artifacts and phased objectives.

THE CHALLENGES OF IMPLEMENTING AND SUSTAINING BEST PRACTICES IN THE DATA LIFECYCLE FOR RESEARCHERS AND REPOSITORIES

Shelley Stall
American Geophysical Union
2000 Florida Avenue, NW, Washington, DC 20009, sstall@agu.org

Abstract—Emerging data management mandates from funders and the growing recognition of the value of research data are posing new challenges for researchers and repositories. Domain repositories will serve a critical growing role for quality and discoverability, and must be supported. Leading research institutions and companies will also be important as they develop and expand data curation efforts. This landscape poses a number of challenges for developing and ensuring the use of best practices in curating research data, enabling discovery, elevating quality across diverse repositories, and helping researchers collect and organize it through the full data life cycle, including publication, reporting back to funding agencies, and more. This multidimensional challenge will continue to grow in complexity.

The American Geophysical Union (AGU) is developing two programs to help researchers and data repositories develop and elevate best practices and address these challenges. The goal is to provide tools for the researchers and repositories, whether domain, institutional, or other, that improve performance throughout the data lifecycle across the Earth and space science community.

For scientists and researchers, AGU is developing courses around handling data that can lead toward a certification in geoscience data management. Course materials will cover metadata management and collection, data analysis, integration of data, and data presentation. The full set of course topics are being finalized by the advisory board with the first one planned to be available later this year.

AGU is also developing a program aimed at helping data repositories, large and small, domain-specific to general, assess and improve data management practices. AGU has partnered with the CMMI® Institute to develop their Data Management Maturity (DMM)SM framework within the Earth and space sciences.

A data management assessment using the DMMSM involves identifying accomplishments and weaknesses compared to leading practices for data management. Recommendations can help improve quality and consistency across the community that will facilitate reuse in the data lifecycle. Through governance, quality, and architecture process areas the assessment can measure the ability for data to be accessible, discoverable, and interoperable.

ASSESSMENT OF GREENHOUSE GAS DATA SETS ACROSS THE DATA LIFE CYCLE

Christopher A. Badurek
State University of New York at Cortland,
Department of Geography, Cortland, NY 13045, christopher.badurek@cortland.edu

Abstract—Researchers and educators are increasingly interested in accessing greenhouse gas data sets and related atmospheric concentrations both for research and active learning activities focused on climate science. This presentation discusses challenges in acquiring greenhouse gas GIS and remotely sensed data for the US and internationally, including discussion of related metadata and data quality issues. Acquisition and use of NASA data sources for mapping atmospheric concentrations of greenhouse gases and the extent of their data curation, discovery systems, and formal publication using persistent identifiers will be discussed. These issues represent a significant challenge in an escience workflow, particularly in reuse and data provenance lineages.

PREVENTING THE EXTINCTION OF THE ANTARCTIC JOURNAL OF THE UNITED STATES AND ITS PREDECESSORS: MAKING IT ACCESSIBLE INTO THE FUTURE

Sharon Tahirkheli
American Geosciences Institute
4220 King Street, Alexandria, VA 22302, snt@agiweb.org

Abstract—The *Antarctic Journal of the United States* was published by the U.S. National Science Foundation Office of Polar Programs (NSF-OPP) from 1966 through 2002. It was preceded by four other publications: the *Antarctic Status Report, USNC-IGY*; *the Bulletin of the U.S. Antarctic Projects Officer*; *the Antarctic Status Report*; and the *Antarctic Report*. The journal documented U.S. activities in Antarctica and related activities in other locations. It also tracked trends in the U.S. Antarctic Program and reported on Antarctic Treaty meetings. Regular entries included monthly climate data, announcements of awards made by the NSF, and information on scientific conferences related to Antarctica. Preliminary results of the U.S. national program in Antarctica were reported project-by-project. The journal ceased publication in 2002 as more and more Antarctic research began to appear in the mainstream scientific literature and the data could be transitioned to web sites. In 2011, the American Geosciences Institute (AGI) digitized the older issues of the *Antarctic Journal of the United States* and its predecessors under a grant from NSF. The digitized issues were made available on the web site of the Cold Regions Bibliography Project and were interconnected with the Antarctic Bibliography. As the Bibliography platform became outdated, AGI has begun to transition the digitized publication to an open repository structure using Islandora and the Bibliography to a new interface employing VuFind to preserve long-term accessibility of the data and articles.

GUIDEBOOKS ASSOCIATED WITH INTERNATIONAL GEOLOGICAL CONFERENCE FIELD TRIPS; ENDANGERED?

Lura E. Joseph
University of Illinois Library
1408 W. Gregory Dr., Urbana, IL 61801, luraj@illinois.edu

Abstract—Since 1968, the Geoscience Information Society has attempted to facilitate identification of and access to guidebooks produced for geologic field trips held in North America through the publication of the various editions of the *Union List of Geologic Field Trip Guidebooks of North America*, and the subsequent online version, *Geologic Guidebooks of North America Database*. Even with the concerted effort of dedicated geology librarians, there are gaps in these lists of guidebooks to geologic field trips in North America.

This raises the question, how have guidebooks to geologic field trips outside of North America fared? Are they being preserved, and how easily can they be identified and located? To begin to answer these questions, a pilot study was conducted to identify reoccurring international geological conferences, to determine which conferences hold associated geologic field trips, and to find out whether guidebooks to the trips can be identified with resources commonly used to find geologic literature. The pilot study was restricted to the years 2010 through 1014. This paper is a report of the study results, and includes suggestions to organizers of international geological conferences.

Introduction

Geologic field trip guidebooks are very important, yet ephemeral literature. Most geological conferences include one or more supplemental field trips. For field conferences, the emphasis is on the trip itself. Most trip leaders provide a guidebook for trip participants, but may make no effort to ensure that a copy ends up in a library where it will be available for future use. The ephemeral nature of guidebooks also makes it less likely that they will be included in indexes, thereby making identification of titles problematic.

Guidebooks contain general information about the regional geology, as well as information related to each stop on the trip. Most include maps, photographs, illustrations, and a road log so that the trip can be replicated. Field guides are valuable as records of features such as moraines, dunes, beaches, and channel fill; these features may be mined out of existence, covered with concrete, asphalt or buildings, or made inaccessible by land owners. The guides are also a part of the history of professional societies. A particular guidebook may be the only place that certain information is ever published. The information is useful for researchers and scholars both at the professional and student levels, and many can be understood by the general public. For more information, a bibliography of information about geologic field trip guidebooks has been published as an Appendix to a paper on guidebooks as grey literature (Joseph, 2016).

North American geologic field trip guidebooks can be identified by consulting three resources: *Geologic Guidebooks of North America Database* (Guidebooks Database) is maintained cooperatively by American Geoscience Institute (AGI) and the Geoscience Information Society (GSIS). This is the online extension of *The Union List of Geologic field Trip Guidebooks of North America*, last published in print by GSIS in 1996 (6th edition), and is available to search at no cost to the user. Guidebook titles are also included in the GeoRef online database (subscription based), and in WorldCat (both free and subscription based). However, none of these resources comes close to providing a complete list of geologic field trip guidebooks.

During a September 2008–February 2009 sabbatical project (Joseph, 2009), the author identified guide-

book titles in a number of the more important North American series that were missing from either GeoRef, the Guidebooks Database, WorldCat, or all three. From the 105 series that were studied, 5982 trips/guidebooks were identified, of which 24% were only in the Guidebooks Database, 14% were only in GeoRef, 42% were in both databases, and 20% were in neither database. Further, there were 1616 "years" among the 105 series for which no trips or guidebooks were identified. As a result of the project, AGI GeoRef increased efforts to index guidebooks. This is perhaps the most valuable outcome of the project; identification and access to valuable geological literature is being improved for researchers and scholars worldwide.

2015 Sabbatical Project

This six-month, 2015 sabbatical project extended the previous project to examine geologic guidebooks worldwide. To the author's knowledge no one has attempted to systematically study guidebook series for geologic trips outside of North America on a worldwide basis. GeoRef indexes guidebooks related to trips in all parts of the world, but they are only added as they are identified. WorldCat also contains information for trips to all parts of the world, but the title will only appear if a guidebook is added to a library, and if the series is analyzed (cataloged at the level of individual titles within a series).

Method

Methods refined during the past sabbatical were employed in this project. To begin, a list of international geoscience conference series was compiled using a variety of resources. These resources included lists maintained by umbrella organizations such as AGI. In addition, there are several geological magazines that report geologic conferences and field trips worldwide. The most useful one is *Episodes Journal of International Geoscience*. Quarterly issues for the past five years (2010–2014) of *Episodes* were examined to identify conferences series, meetings, and guidebook titles. A spreadsheet was created for each series, and data were recorded on a summary spreadsheet. After individual meetings were identified, various society and meeting websites were examined to discover whether there were associated field trips, and whether there was any mention of an associated guidebook.

Many of the websites no longer existed or else had little or no information about the associated field trips. In some cases limited information could be found on other society web pages that included calendars of events of interest to their members. GeoRef and Worldcat indexes were examined with a variety of search strategies to determine indexing gaps.

The project was conducted using University of Illinois library resources. These include geological literature, GeoRef, and WorldCat. Conducting the research locally kept costs to a minimum.

Results

A total of 230 international geoscience conference series were identified. There were 193 (83.9%) conference series that had at least one meeting in the five years studied (2010–2014). The total number of international meetings identified during the studied five years was 414. The average number of meetings in the 193 conference series was 2.15, with a range from 1 to 28 (the largest number being AGU Chapman conferences). Within the 193 conference series that had meetings, 113 (58.5%) had at least one known field trip.

Of the 414 known meetings, 204 (49.3%) had at least one identified field trip. In the author's experience, having attended numerous professional geology conferences over a greater than 40 year span of time, most geology/geoscience meetings have at least one associated field trip. If it is assumed that all 414 identified meetings did have at least one field trip, then around 210 guidebooks may exist that could not be identified (50.7% of 414). However, there are often multiple trips per meeting, so the actual total number of unidentified field trips could be much higher.

For the 414 identified meetings, the total number of known field trips discovered was 701. The average number of identified field trips per conference series was 6.2, and the average number of identified field trips per meeting was 3.4.

Only 146 guidebooks were located for the 701 identified field trips (20.8%). That is a remarkably low

percentage. In my experience, most field trips have at least some sort of guidebook, so as many as 555 guidebooks from this sample of field trips might be unidentified. Added to the 210 that might be unidentified due to unidentified field trips, the total could be at least 765 unidentified guidebooks. Therefore, nearly 84% of guidebooks may be unidentified from this 5-year sample of international geoscience conferences.

Of the total 146 guidebooks identified, the number of guidebooks that can be identified in Worldcat is 101 (69.18%), and the number that can be identified in GeoRef is 56 (38.36%). Multiple search strategies were employed and included the society name, the destination of the field trip, and possible wording of guidebook titles. It is possible that more titles are contained in the indexes, but without more information regarding the titles, it is unlikely that more guidebooks could be identified.

Conclusions

This research indicates that geoscience field trip guidebooks from international conferences, though valuable, is extremely endangered literature. Based on assumptions, as many as 765 guidebooks from international conferences over this five-year time span may be unidentified.

Therefore, 84% of the possible total number of guidebooks would be unidentified. Even if these assumptions are invalid, only 146 guidebooks (20.8%) were identified for 701 known field trips, therefore over 79% of the guidebooks for these known trips are unidentified.

While the guidebooks from North America have had the attention of the geology librarians, it appears there have been no stewards of the international segment of this literature. Information from earlier meetings is undoubtedly even more difficult to find,

TABLE 1: RESULTS SUMMARY

International conference series identified	230
International conference series with at least one identified meeting during 5 years studied	193 (83.9%)
International meetings (identified) during 5 years	414
Average number of known meetings for the 193 series	2.15 (range 1 to 28 meetings per series)
International conference series with at least one identified field trip	113 (58.5%)
Meetings (identified) with at least one identified field trip	204 (49.3%)
Possible unidentified trips (and guidebooks) from the 414 identified meetings, based on assumptions[1]	210 (calculated) (50.7%)
Field trips (identified)	701
Field trips per conference series with identified trip	6.2
Field trips per meeting[2]	3.4
Guidebooks (identified)	146 (20.8% of 701 identified Field Trips)
Possible unidentified guidebooks from the 701 identified field trips, based on assumptions[3]	555 (calculated)
Total possible unidentified guidebooks, based on assumptions[4]	765 (84% of likely total guidebooks, based on assumptions)
Guidebooks identified in WorldCat	101 (69.18% of identified guidebooks)
Guidebooks identified in GeoRef	56 (38.36% of identified guidebooks)

[1]Assumed all 414 identified meetings had at least one field trip. (100% – 49.3% = 50.7%; 414 x 50.7 = 210). Many meetings have more than one field trip[2].
[3]Assumed all 701 identified field trips had some sort of guidebook (701 – 146 = 555)
[4]210 + 555 = 765; 765 (calculated unidentified) + 146 (identified) = 911 (total likely guidebooks); 765/911 = 84%

since the perseverance of web pages likely decreases with time.

Many societies are not maintaining or archiving past meeting websites. This makes it very difficult to identify past meetings and meeting details. Often, the only clues to past meetings are from announcements in publications and on other society websites that are being maintained.

Even when old meeting websites are archived, the original information may be sparse regarding field trips. There may be mention of the possibility of trips, but no way to determine if a trip was actually held, or what the title of the trip was, and whether there was a guidebook and what the title of the guidebook might have been. Without that information, it is less likely that a guidebook will be identified in the indexes and library catalogs.

Suggestions

Several suggestions result from this research:

1. Societies need to include full information about field trips in their meeting announcements and web pages. The title of the trip should match the title of the associated guidebook.
2. If possible, PDFs of guidebooks should be made available online, or the guidebook should be made available for purchase in either digital or print form. A copy of the guidebook should be put in several libraries or library digital repositories.
3. Societies need to archive their past meeting websites at persistent URLs.
4. Since some small societies do not have persistent web space, and some conference series are loosely knit without geographic location or formal organization, perhaps an umbrella organization such as the International Union of Geological Sciences or regional organizations such as Geological Society of Africa could host meeting archives and field trip guidebooks online.

References Cited

Joseph, L.E., 2009, Geologic field trip guidebooks; Progress on a project to identify indexing gaps: Geoscience Information Society Proceedings, v. 40, p. 11–17.

Joseph, L.E., 2016, Geologic field trip guidebooks; Shades of grey: The Grey Journal; International Journal on Grey Literature, v. 12, n. 1, p. 35–50, preprint: http://greyguiderep.isti.cnr.it/linkdoc.php?authority=GreyGuide&collection=Published&idcode=2016-G42-001&langver=en.

WHY IN THE WORLD? COMPARING "EXPERT" SEARCH RESULTS IN GEOREF ON MULTIPLE DATABASE PLATFORMS

Linda R. Zellmer
University Libraries, Western Illinois University
One University Circle, Malpass Library, 415, Macomb, IL 61455-1390, LR-Zellmer@wiu.edu

Abstract—Libraries, and consequently their users, have several options for access to GeoRef. Kimball (2010) analyzed the features of GeoRef on three platforms (EBSCO, Engineering Village, and Ovid) and compared results of several simple searches, but did not test expert search techniques.

Several expert searches, designed to identify strengths and weaknesses of the various platforms' search systems, were performed in GeoRef on four platforms: EBSCO, Engineering Village, Ovid, and ProQuest. Controlled vocabulary searches were also performed. The results of the searches were compared to determine whether the items retrieved actually matched the search topic. The number of results that matched and did not match the topic were noted.

In addition to testing expert search techniques, searches using wildcards to replace characters that may or may not be present were also performed. The results were compared to determine how well the platforms performed on searching terms with variant spellings.

The number of results retrieved varied between platforms, with EBSCO retrieving the fewest results, and Engineering Village retrieving the most. One of the primary reasons for the discrepancy is that some platforms found geographic terms in the author and publisher address fields, even for proximity searches. Ovid and Engineering Village retrieved slightly more results when searching for variant forms of a term. These results need to be considered when choosing a database platform for GeoRef and other databases as well.

Kimball, R., 2010. The GeoRef Database: A Detailed Comparison and Analysis of Three Platforms: Science & Technology Libraries, v. 29, no. 1/2, p. 111–129.

MANAGING YOUR SCHOLARLY/RESEARCH PROFILE

Linda R. Musser
Fletcher L. Byrom Earth & Mineral Sciences Library, Pennsylvania State University
105 Deike Building, University Park, PA 16802, Lrm4@psu.edu

Abstract—Do you have a scholarly profile? More than one? ResearcherID, ORCID, Google Scholar profile, other? Why have one at all? Ultimately, researchers want others to find, recognize, and utilize their work. One challenge they face is disambiguation—which of the many authors named John Smith is the one doing research on impact craters? Another challenge they face is determining the impact of their work. Disambiguation can facilitate the process of answering that question as can the use of a scholarly profile. Tools are now available that individual researchers can utilize to make their work more visible and to better assess the impacts of their work. ORCID and ResearcherID can aid in disambiguation; Google Scholar can help determine your h-index. Some of these tools include traditional metrics, such as citation counts, as well as altmetrics, such as downloads, tweets, and so forth. This presentation will describe and contrast several scholarly profile services, focusing on the benefits of each.

dis·am·big·u·ate
/ˌdisamˈbigyəˌwāt/

verb

remove uncertainty of meaning from (an ambiguous sentence, phrase, or other linguistic unit).

STEP ONE – DISAMBIGUATE YOURSELF

PennState University Libraries

There is an **author ambiguity problem** within the scholarly research community. Researchers in the same or different fields may have the same first and last names. To address this problem, the idea is to assign each researcher a unique author identifier.

PennState University Libraries

ORCID
Connecting Research and Researchers

0000-0003-4320-2342 Susan Brantley

(Open **R**esearcher and **C**ontributor **ID)**

"ORCID aims to solve the name ambiguity problem in research and scholarly communications by creating a **central registry** of unique identifiers for individual researchers and an open and transparent **linking mechanism between ORCID and other current researcher ID schemes.** These identifiers, and the relationships among them, can be linked to the researcher's output to enhance the scientific discovery process and to improve the efficiency of research funding and collaboration within the research community."

ORCID is a non-profit organization supported by a global community of organizational members, including research organizations, publishers, funders, professional associations, and other stakeholders in the research ecosystem."

PennState University Libraries

RESEARCHERID

Name	Institution(s)	Country/Territory	Researcher ID	Keywords	Other Names
Dinwiddie Cynthia	Southwest Research Institute	United States	C-1385-2008	hydrogeology, hydrogeophysics, hydrology, geophysics	CL Dinwiddie, C Dinwiddie

"ResearcherID provides a solution to the author ambiguity problem within the scholarly research community.

… a unique identifier enables researchers to manage their publication lists, track their times cited counts and h-index, identify potential collaborators and avoid author misidentification.

… integrates with the Web of Science and is ORCID compliant, allowing you to claim and showcase your publications from a single account."

ResearcherID is specific to Thompson-Reuters products/platform.

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Scopus Author Identifier

Virtual International Authority File

- VIAF is an international authority file. It is a joint project of several national libraries and operated by OCLC (the Online Computer Library Center).

ISO 27729:2012
Information and documentation -- International standard name identifier (ISNI)

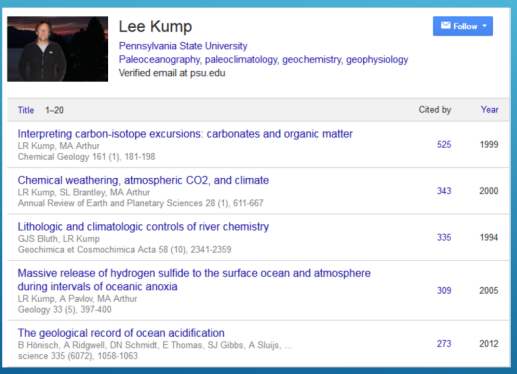
OTHER AUTHOR IDENTIFIER SCHEMA

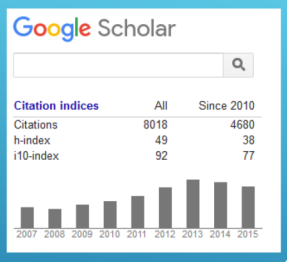
PennState University Libraries

STEP TWO: CREATE A PROFILE

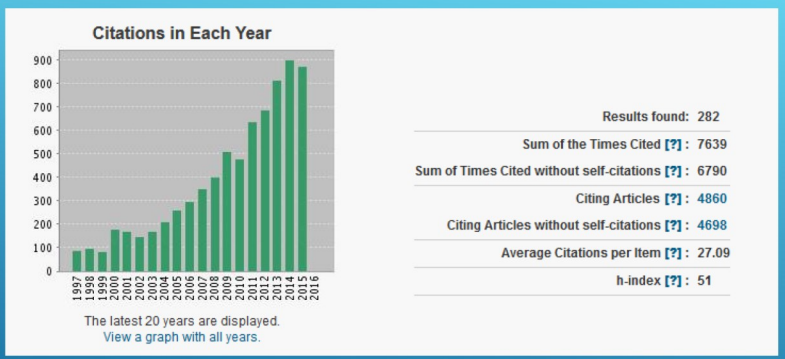
PennState University Libraries

Google Scholar **Citations**





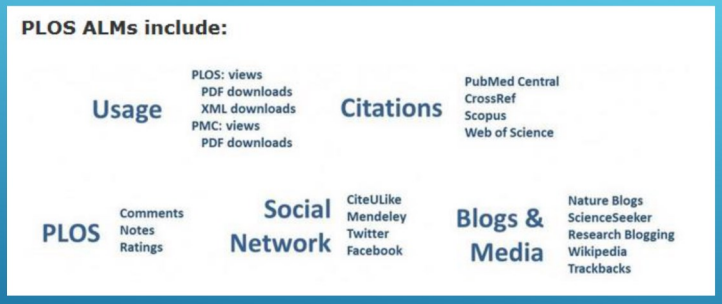
PennState University Libraries



WEB OF SCIENCE CITATION ANALYSIS

PennState University Libraries

PLOS | ARTICLE-LEVEL METRICS



PLOS ARTICLE LEVEL METRICS

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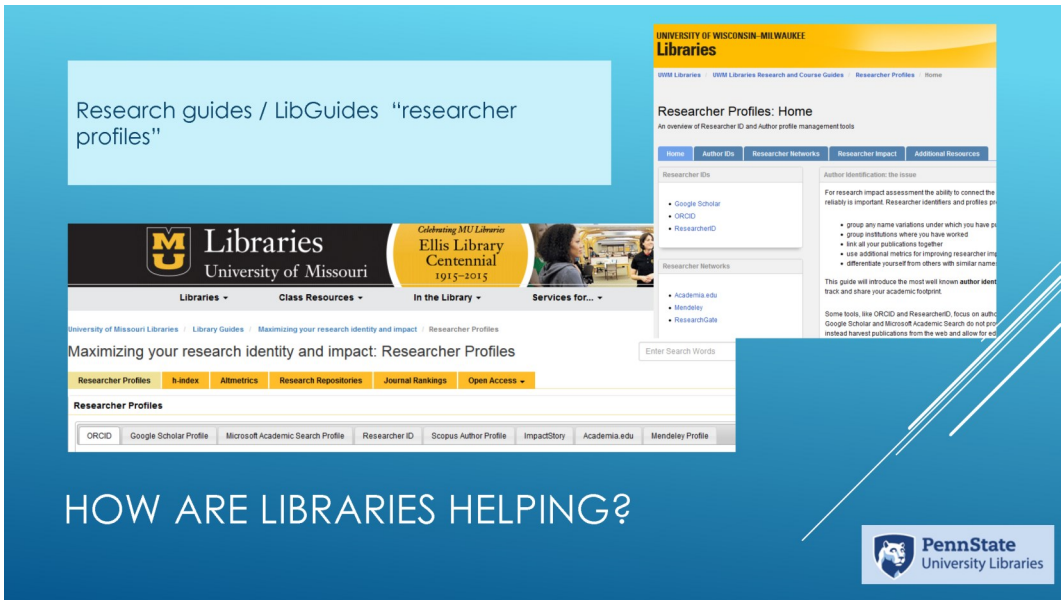
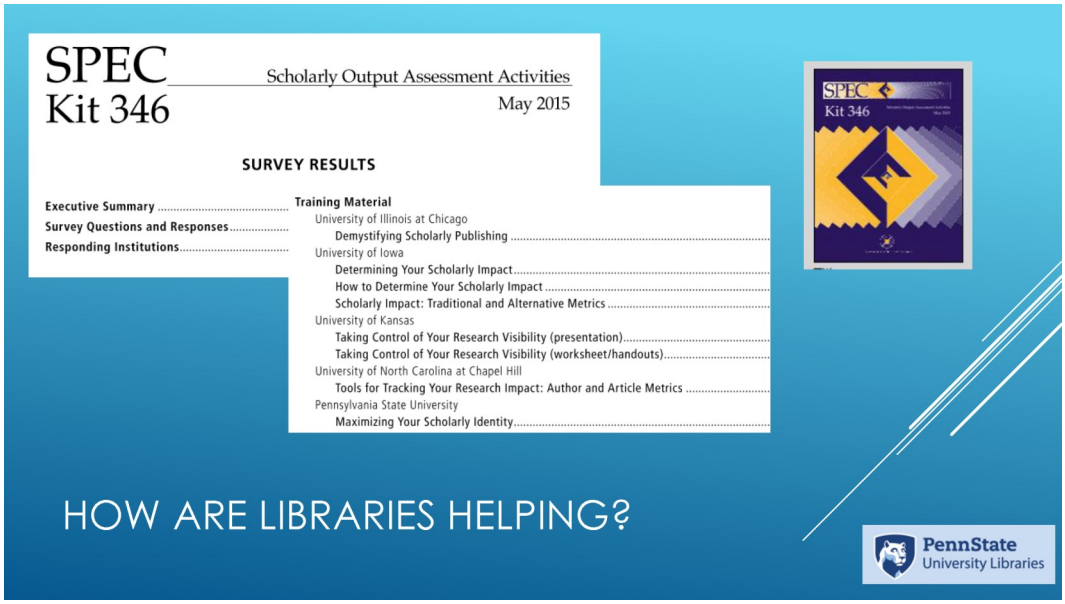
ImpactStory.
ReaderMeter
peer evaluation.org
Research Scorecard
altmetrics
PLUM ANALYTICS
Wordle
InCites
ALTMETRICS AND MORE
PennState University Libraries


Research guides / LibGuides "researcher profiles"
UNIVERSITY OF WISCONSIN-MILWAUKEE Libraries
Researcher Profiles: Home
Libraries University of Missouri
Ellis Library Centennial 1915–2015
Maximizing your research identity and impact: Researcher Profiles
Researcher Profiles
ORCID
Google Scholar Profile
Microsoft Academic Search Profile
Researcher ID
Scopus Author Profile
ImpactStory
Academia.edu
Mendeley Profile
HOW ARE LIBRARIES HELPING?
PennState University Libraries


SPEC Kit 346
Scholarly Output Assessment Activities
May 2015
SURVEY RESULTS
Executive Summary
Survey Questions and Responses
Responding Institutions
Training Material
University of Illinois at Chicago
Demystifying Scholarly Publishing
University of Iowa
Determining Your Scholarly Impact
How to Determine Your Scholarly Impact
Scholarly Impact: Traditional and Alternative Metrics
University of Kansas
Taking Control of Your Research Visibility (presentation)
Taking Control of Your Research Visibility (worksheet/handouts)
University of North Carolina at Chapel Hill
Tools for Tracking Your Research Impact: Author and Article Metrics
Pennsylvania State University
Maximizing Your Scholarly Identity
HOW ARE LIBRARIES HELPING?
PennState University Libraries

SUMMARY

Individual researchers have a variety of tools to make their work more visible and to better assess the impacts of their work.

ORCID and ResearcherID can aid in disambiguation;

Google Scholar and Web of Science can help determine citation and impact measures, e.g., h-index and citation counts.

Altmetrics and other tools can provide additional impact measures based upon downloads, tweets, reach and so forth.

Libraries are building upon their history of aiding in citation analysis by offering new services that explore and explain these new tools related to scholarly/research reputation and impact.

PennState University Libraries

RECOGNIZING OTHER WAYS OF KNOWING—THE INTERINSTITUTIONAL CONSORTIUM FOR INDIGENOUS KNOWLEDGE

Linda R. Musser
Fletcher L. Byrom Earth & Mineral Sciences Library, Pennsylvania State University
105 Deike Building, University Park, PA 16802, Lrm4@psu.edu

Abstract—ICIK, the Interinstitutional Consortium for Indigenous Knowledge, is based at Penn State within the University Libraries. The mission of ICIK is to build collaborative relationships that lead to interdisciplinary research related to indigenous ways of knowing. Such knowledge, generally passed down through oral traditions, reflects thousands of years of experimentation and learning related to climate, natural resources, and many other topics. As the world seeks answers to problems related to disease, famine, resource and ethnic conflict, indigenous knowledge has value for not only its cultural underpinnings but for the solutions and insights it can offer to scientists and others.

The consortium seeks to expand its network of scientists and scholars through communication and community building. Communication outlets include the ICIK listserv, newsletter, and the recently launched open access journal *IK: Other Ways of Knowing*. This peer reviewed journal publishes original research and review articles and is particularly interested in works reflecting indigenous perspectives and understanding in the earth and environmental sciences. ICIK builds community via workshops, webinars, support for collecting IK-related resources, development of bibliographies, scholarships, and educational resources. An example of this is AcademIK Connections, a video series designed to aid in introducing indigenous knowledge concepts into classroom settings. The series, comprised of 12 video clips, each 5–8 minutes in length, focuses on a particular thematic area—education, sustainability, and so on.

ICIK is part of a global network comprised of more than 20 indigenous knowledge resource centers in the Americas, Europe, Asia, Africa, and Oceania. ICIK is the only currently-active global indigenous knowledge resource center located in the United States. Collaboration and partnerships are welcome as we seek to preserve and celebrate the contributions from indigenous ways of knowing.

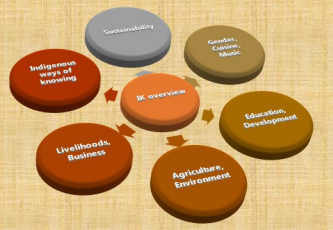
Poster on following page.

Recognizing Other Ways of Knowing

Inter-institutional Consortium for Indigenous Knowledge

ICIK is part of a global network of indigenous knowledge resource centers. Part of its mission is to celebrate diverse local knowledge systems and to facilitate transformation of the academy to embrace reciprocal outreach to, and in-reach from, local communities.
https://icik.libraries.psu.edu/

AcademIK Connections
(12 instructional modules)
Lesson plans with video



Pennsylvania State University Libraries

Valuing other ways of knowing

Do geoscientists respect oral traditions?

The style guides used by many geoscience journals require citations to 'personal communications' to be placed in the body of the text. They do not allow such citations in the list of references.

Why is this so?

Just because it is not written does not mean it should not receive equal treatment as a source of information.

It is time to provide equal treatment for references, whether they be articles, data or so-called *personal communications*.

"No personal communications in reference lists!"

CSE, USGS, AMA, & APA

"We provide equal treatment for all sources of information"

Join us!

MLA, Chicago, ACS, IEEE, ISO 690 and others

Oral traditions ≅ indigenous knowledge

PENNSTATE
Linda Musser (lindamusser@psu.edu)

PART 8:

GEOSCIENCE INFORMATION SOCIETY EVENTS

2015 Annual Meeting, Baltimore, Maryland, USA

October 31st–November 3rd

GEOSCIENCE INFORMATION SOCIETY
2015 SCHEDULE OF EVENTS

Note: GSIS Committees met separately as arranged by committee chairs

		Location
Saturday, October 31		
9:00 a.m. – 4:00 p.m.	Geoscience Librarianship 101	Milton S. Eisenhower Library Johns Hopkins University
6:00 p.m. –	Early Bird No-Host Dinner & Meet-n-Greet	Pratt Street Ale House 206 W Pratt St.
Sunday, November 1		
8:00 a.m. – 9:00 a.m.	GSIS Executive Board Meeting	Hilton Baltimore Peale B Room
9:00 a.m. – 12:00 p.m.	GSIS Business Meeting	Hilton Baltimore Peale B Room
1:00 p.m. –	Field trip to National Aquarium	501 E Pratt St.
2:00 p.m. – 7:00 p.m.	Exhibits Opening	Baltimore Convention Center
Monday, November 2		
9:00 a.m – 11:30 a.m.	GSIS Professional Issues Roundtable Sponsored by Society of Economic Geologists	Hilton Baltimore Peale B Room
12:00 p.m – 1:30 p.m.	GSIS Luncheon and Awards Ceremony	Hilton Baltimore Holiday Ballroom 2
3:00 p.m. – 5:00 p.m.	GSIS Vendor Updates Presentation schedule: Geological Society of London Gemological Institute of America Geofacets AAPG Datapages American Geophysical Union Wiley GeoScienceWorld SEPM, Society for Sedimentary Geology	Hilton Baltimore Peale B Room
Tuesday, November 3		
8:00 a.m. – 9:00 a.m.	GSIS Executive Board Meeting	Hilton Baltimore Peale B Room
9:00 a.m. –	Field Trip: George Peabody Library	17 East Mount Vernon Place
1:30 p.m. – 5:30 p.m.	GSIS Technical Session T95— Evolution of the Data Life Cycle	Baltimore Convention Center Room 338

"GEOSCIENCE LIBRARIANSHIP 101"
A SEMINAR PRESENTED BY THE GEOSCIENCE INFORMATION SOCIETY

Saturday, October 31, 2015
Milton S. Eisenhower Library, Johns Hopkins University
3400 North Charles Street
Baltimore, MD 21218

Workshop overview

9:15 a.m. – 9:45 a.m.	Continental Breakfast/Check In/ Welcome/Introductions	Clara McLeod Washington University in St. Louis
9:45 a.m. – 10:45 a.m	Geoscience Overview/Instruction	Emily Wild, U.S. Geological Survey
10:45 a.m. – 11:00 a.m.	Break	
11:00 a.m. – 12:00 p.m	Reference	Hannah Winkler, Stanford University
12:00 p.m. – 1:00 p.m.	Lunch and networking	
1:00 p.m. – 2:00 p.m.	Collection Development	Amanda Bielskas, Columbia University
2:00 p.m. – 2:45 p.m.	Maps: Collection Development and Reference	Linda Zellmer, Western Illinois University
2:45 p.m. – 3:00 p.m.	Break	
3:00 p.m. – 3:45 p.m.	GIS and the Digital Future	Linda Zellmer, Western Illinois University
3:45 p.m. – 4:00 p.m.	Feedback and Wrap Up	Clara McLeod Washington University in St. Louis

Thanks to the following sponsors for their generous support of ***Geoscience Librarianship 101:***

GEOSCIENCE INFORMATION SOCIETY
2015 BUSINESS MEETING MINUTES

Sunday, November 1, 2015, 9:00 am –12:00 pm
Hilton Baltimore, Peale B Room, Baltimore, Maryland

Respectfully submitted by Louise Deis, Secretary

I. Call to order (Emily Wild) 9:24 AM

26 in attendance: Matt Hudson, Hannah Winkler Hamalainen, Richard Huffine, Louise Deis, Emily Wild, Dorothy McGarry, Cynthia Prosser, Therese Triumph, Rusty Kimball, Jody Bales Foote, Lura Joseph, Robert Tolliver, Shaun Hardy, Michael Noga, Lisa Dunn, Joanne Lerud-Heck, Clara McLeod, Linda Zellmer, Mea Warren, Judie Triplehorn, Marie Dvorack, Linda Musser, Dena Hanson, Afifa Kechrid, Monica Pereira, Amanda Bielskas

II. Welcome and General Introductions (Emily Wild)

III. Introduction of Executive Board

a. President (Emily Wild)
b. Vice President , President-Elect (2015), Matt Hudson
c. Vice-President, President-Elect (2016), Hannah Hamalainen
d. Secretary and Secretary-elect, Louise Deis
e. Treasurer, Caroline Rauber, incoming Lori Tschirhart
f. Immediate Past-President, Amanda Bielskas
g. Newsletter Editor, Bonnie Swoger (December & March), Bob Tolliver (June & September)
h. Publications Manager, Richard Huffine
i. Publicity, Shaun Hardy

Emily also thanked Richard for his efforts on behalf of taking the initiative of digitizing the Proceedings. Richard then thanked Rusty Kimball for housing them at Texas A&M.

IV. Approval of the Agenda

Linda Zellmer moved, Monica Pereira seconded. Agenda approved.

V. Approval of the Annual Business Meeting Minutes 2014 (October 19, 2014)

All "ayes" except for one abstention.

VI. Reports

A. GSIS general (Emily Wild)

The future—long term and short term—of GSIS may depend upon the possibility of adding more members, and possibly joining with another related society, or division of a society.

Incorporation: We are incorporated at the Federal Level, but evidently not at the State level.

Shaun asked if we could possibly be reincorporated…to sort of begin again, but we'd have to change our name. (Lura proposed: the International Geosciences Information Society.)

From Matt, we learned that we were incorporated at the "state" level in Washington, D.C., from 1966 to 1974. This issue came to light when Carolyn Bishoff tried to change banks in August, 2014. Emily speculated that we might have some protection by being associated with GSA. Matt has secured the services of a pro bono lawyer, but we might have $5000 in (back) license fees to pay. The board members who have looked for documentation have not found any in digitized form, but it was decided that the physical archives must be searched. Lura said that our paper records are at UIUC's remote storage. They will have to be called out one box at a time. Anne Huber is in charge of the UIUC archives. At one time our archives were at USGS in Reston, VA, Richard said.

Emily met with some GSA representatives, and learned that we aren't alone in being concerned about our dwindling membership numbers. There is respect in the GSA for the GSIS. "Information is power;" our asso-

ciates realize that and are interested in helping GSIS. Pat Leahy spoke up for us. However, we have been discouraged from possibly merging with the Association of Earth Science Editors or the GSA Geoinformatics Division. Possible groups to combine with are the Geoscience Education or History and Philosophy of Geology Divisions, even Economic Geologists, Jody added. If we were to require a membership in GSA, the "early bird" annual membership would be $65, and Divisions could be joined at the cost of $7 or $10 annually. Dena wondered about the openness of Geonet. Monica suggested that a committee should look into these possibilities…and tactfully suggested that there remained lots to cover in the agenda.

Matt reviewed the planning for the Baltimore meeting: the roundtable session, the vendor update and speakers, the luncheon on Monday. He mentioned that there would not be a reception with Geoinformatics. Linda Musser was concerned that we were not scheduled to hear about GeoRef developments. Richard reminded us that GeoRef is available through many vendors, and not a direct supplier.

Matt said that conference expenses for the society have gone up. The vendors who spoke to us for the "Update" were willing to pay a minimum of $750 each for the privilege.

We don't know much about soliciting corporate sponsors, like Schlumberger, which is a sponsor for GSA. Will GSA become more virtual?

Linda Z. was concerned that sessions have to be 4 hours long. Hannah agreed that it would be nice to mix in 5-minute lightning talks with the technical talks. (Richard: Pecha Kucha) They could be virtual or physical (actual). Lura suggested that we choose very broad topics, but defenders of the Data Life Cycle assured us that this encompassed a broad expanse of topics.

B. Financial (Matt Hudson, on behalf of Carolyn Rauber):

Matt read Carolyn's report, since the treasurer could not be present. At the end of the third quarter, GSIS had a total of $68,646, with $29,000 in checking, $9700 in savings, $20,000 in Wells Fargo CDs, $5,800 in the Ansari Best Reference Award fund, and $3500 in the Ansari Distinguished Service Award fund.

Mary wants to be apprised of the balance.

There was a fair amount of discussion about the bylaws, and procedure manuals, too. Lura suggested that there are quite a few contradictions between the President's and Vice President's handbooks. Dena offered to be on a bylaws committee…having had recent experience.

C. Archives

Richard and Rusty spoke about the Proceedings, which are now in the Texas A&M Archives.

Rusty was pretty sure that volumes 1-7 are there and then 2004 to present. Richard said that he had contracted with the University of Michigan for scanning more of the Proceedings…at a good price. There is hope that UIUC will be willing to also house back-up digital files. Richard said that because there are so many single sheet articles, they opted for single PDF files for each year. Granularity was sacrificed for economics. To look for an article, one will have to scan the issue/volume.

D. Secretary Report

The secretary's report was really written by Cynthia Prosser, and had been read some time ago, having been disseminated to the Board.

E. Membership

Cynthia Prosser, chair of the membership committee, presented the new flyer, which had already been given out to attendees of Geoscience Librarianship 101. Two new members were present at this meeting, Therese Triump and Mea Warren, Therese having paid then and there. Linda M. inquired about the money available to fund new members. In Cynthia's experience, she found that these new members did not renew after their free year.

F. Exhibits

Linda Z. said that lots of people were stopping at the exhibit booth…partly she joked, because of the acronym boldly printed in the title: CRAAP. A sign-up sheet was going around for turns at "personing" the booth. There were handouts and candy.

G. The Best Paper Award

The Best Paper Award was won by a committee member, Nancy Sprague, but all transactions were very well documented and there was no conflict of interest.

H. Guidebooks

Linda M, as the Chair of the Guidebooks Committee, mentioned that they use the platform VuFind.org. She presented the new guidebook guidelines. She said that there were so many deserving guidebooks this year. They ultimately decided to present the award for the Roadside Geology series published by Mountain Press.

Joni reported on the GSA publishers meeting, including updates on forthcoming digital and print field guides that had been reported by GSA Field Guide Editor, Skip Davis.

I. Nominating Committee

Amanda reported for the Nominating Committee. All are happy that Hannah was willing to run for president. She ran unopposed. There were two willing to be treasurer, but one dropped out. arolyn's term is up and luckily for us, Lori agreed to run for the office.

J. Best Reference Work Award

Rusty reported on the Best Reference Work Award. The committee decided that it was a 3D map of a face of El Capitan in Yosemite Park. He would show it at the luncheon on Monday.

The next deadline for submission of outstanding reference works is May 15th.

Emily said that all procedures and awards guidelines should be on the Wiki. All GSIS members could/should request access. Alerts come to all participants when something new is posted.

K. The Mary Ansari Distinguished Service Award

The Mary Ansari Distinguished Service Award is being given to Michael Noga, Jody reported.

She noted that each of them (Mary & Michael) wrote notes in praise of working with each other.

L. Geonet Update

Louise reported that there are 389 Geonet listserv members. She thanked Emily for all her scholarly contributions, emanating from her voluminous reference work for the USGS. She's been providing topical information resources to the service. She has contributed 437 since 2010, and 125 from October 24, 2014. 24 subscribers joined the list and 17 left this year.

M. Publications

Richard, Publications Manager, expressed some concern over the delivery of the Proceedings to Institutional Members. We have very few, and they had been handled by SWETS, which no longer exists. He said that the USGS will bind copies and shelve them. Lulu.com will print on demand copies in black & white, probably at the rate of ~200 pages for $25.

N. Newsletter and more

Bob Tolliver, the new editor for our newsletter, mentioned that the next deadline for the GSIS Newsletter is December 15th.

The GSIS Newsletter Reviews needs a new editor, since Lori Tschirhart is becoming the treasurer.

Hannah reported that there were lots of volunteers, rather at the last minute, to present at the technical session. There were a few other than librarians. We need someone to take over organizing the technical sessions, since Hannah has become the VP, President-Elect

O. Geoscience Librarianship 101

Clara reported on a very successful Geoscience Librarianship 101. She thanked Jim Gillespie and Steve Stitch of Johns Hopkins for assisting in the use of the JHU facilities, leading tours of the Eisenhower Library, and the GIS Department, and otherwise being very gracious and useful. ESRI donated materials for Linda Zellmer's presentation on the GIS portion of her talk. There were 22 registrants, among them, 4 students. There were

four instructors: Emily, Hannah, Amanda and Linda Z. They are expecting to put the presentations on the web. Clara thanked them for their excellent presentations, and then Hannah thanked Clara for doing such an excellent job organizing GL 101…once again!

P. Other

Wikipedia now has an entry for the Geosciences Information Society, thanks to Cynthia and Richard! They encouraged others to contribute, too.

Shaun was thanked for his excellent publicity work and Linda M. announced the completion and availability of Standards for Guidebooks.

Matt said that 4 committees were disbanded, the International Initiatives, the Collection Development, and the Website Advisory – which was actually folded into the Best Reference Work committee. There are now 8 committees and the By Laws Ad Hoc Committee.

Amanda called for a webmaster's report.

Matt has spoken with Sharon Tahirkheli, Chief Editor of GeoRef, who has said that AGI is interested in sponsoring GeoRef tips and tricks, that is, best practices searching GeoRef.

VII. New Business

Michael said that he has been approached for writing a white paper on the value of print maps, by Prof. Sam Bowring of MIT. Many librarians, producers, and users are much concerned about the preservation of Geologic Maps.

Richard advised Matt to get some indemnity insurance in case there is a problem with the unintentional lack of State tax-free incorporation.

VIII.Other Business

Matt was asked to verify that GSA is on course to make all journals OA by the end of 5 years.

The GSA attendance statistics have gone up, last year's 125th Anniversary marking the highest attendance, Matt added.

Richard said that federal government employees have had to decide upon attendance to GSA or AGU. More USGS staff have decided to attend AGU.

Marie announced that November 5th, 2016, will be our official 50th Anniversary! She mentioned that we will be in Denver in late September for this celebration. An ad hoc committee should be formed, starting right after the business meeting today. Several members offered, and an ad hoc committee was created. The committee was tasked with coming up with a plan to celebrate the anniversary. This included going through the archives to see how our 25th Anniversary was celebrated. Skip McCaffrey and Claren Kidd were instrumental in planning for that. Joni reminisced about the special steak dinner they had at the 25th Anniversary, held in Texas—with GSA—that year. Members received 25-year ribbons.

Two new members were announced: Mea Warren from the University of Texas, and Therese Triumph from UNC Chapel Hill.

The gavel was then passed to Matt from Emily.

IX. Adjournment

Michael motioned for adjournment at noon and Afifa seconded it.

SUMMARY OF 2015 PROFESSIONAL ISSUES ROUNDTABLE

Monday, November 2, 2015, 9–11:30 a.m.
Hilton Baltimore, Peale B Room
Baltimore, Maryland

Summary submitted by Richard Huffine, who also organized the event.
Sponsored by the Society of Economic Geologists

TOPICS FOR DISCUSSION

Collection Development

Who is still collecting in the geosciences?

Many libraries are becoming homogenous due to bulk purchases and "big deals."

Who is collecting what special literature from what geographic areas, globally? Geologic maps, guidebooks, conference proceedings, etc.

Print

Is there a good defense for preserving and maintaining access to paper maps today?

Who is collecting state documents in print?

E-Books

Are e-book platform influences your purchasing decisions?

The GeoScience World ebook platform. (Who has signed on? Is this the way to go – rather than subscribing directly to the societies?)

Open Access

Extent of OA in geosciences?

Given GSA's pending transition to open access, is there still a strong desire for OA content? Are APCs affecting your budgets?

Wikipedia

Could GSIS plan and provide training for Wikipedia editing at future meetings?

Could we host a "Geo Edit-a-Thon" at future meetings that engages our members in improving Wikipedia based on the resources we have access to and our knowledge of the disciplines?

Institutional Repositories

Is the time right for a "Geoscience Heritage Library" similar to the Biodiversity Heritage Library? How would we make something like that a reality?

What percentage of geosciences literature is/can be retrieved by using Google/Scholar?

Who among the GSIS members is taking an active role in data curation for their researchers?

2015 PROFESSIONAL ISSUES ROUNDTABLE
CONTINUED

Supporting Research

Is anyone experimenting with maker spaces for geoscience researchers?

How is GeoRef working via the GSW platform?

Who is using and/or promoting ORCID IDs for your researchers?

Electronic Theses and Dissertations (ETDs)

How are you navigating the messy state of copyright, embargoes, and metadata for these materials?

2015 GEOSCIENCE INFORMATION SOCIETY AWARD WINNERS

Presented at the GSIS Luncheon and Awards Ceremony
Monday, November 2, 2015, 12–1:30 p.m.
Hilton Baltimore
Holiday Ballroom
Baltimore, Maryland

Mary B. Ansari Distinguished Service Award

Michael Noga
Massachusetts Institute of Technology, Cambridge, Massachusetts

Michael Noga, Collections Strategist at the Massachusetts Institute of Technology Libraries, is the 2015 recipient of the Mary B. Ansari Distinguished Service Award from the Geoscience Information Society (GSIS).

Michael's contributions to geoscience information span more than three decades. He served as secretary, vice-president, president, and past-president of GSIS, as well as chair of several committees. Michael also represented GSIS externally on various advisory groups. He served on the Publications Committee of both the Geological Society of America and the American Geophysical Union and currently is Vice-Chair of the GeoScienceWorld Board of Directors. One of his colleagues said, "Not only is his breadth of service impressive, the continuity of his contributions continue from his first joining the GSIS in the 1980s until today."

Michael has a sophisticated understanding of collection development issues that is both admired and appreciated by his colleagues. Over the years he committed himself to highlighting collections issues in the geosciences. For many years Michael compiled extensive data on geoscience periodical prices and shared them with his colleagues at the collection development forums held at the annual GSIS meetings. His colleagues, and geoscience information as a whole, have benefitted enormously from his sharing of his knowledge and concerns related to serial costs, journal retention, and preservation of the literature.

The serial literature of the geosciences has long been a focus of Michael's professional research. He received the GSIS Best Paper Award in 1993 for his analysis of usage patterns of geoscience journals. His study on conference papers in geoscience proceedings won the award in 2005. He is the author of numerous other articles on the topic of geoscience serials.

Michael is, as one letter of nomination stated, "first and foremost, a rigorous thinker who asks important questions about libraries and our profession and understands the use and misuse of data in making decisions. Michael is not afraid to challenge prevailing trends and to debunk fads in library administration when they do not demonstrably result in better service to users and better scholarship." He is highly regarded for the effort he makes to get to know the MIT faculty and graduate students he works with in order to understand how they seek, use, and share information.

Michael received a B.A. in biology and an M.S. in library and information science from Case Western Reserve University. He earned an M.A. in geography from the University of Cincinnati. He previously was Head of Collection Development and Acquisitions for Physical Sciences and Technology Libraries at University of California, Los Angeles and Acting Assistant Head at Stanford's Branner Earth Sciences Library.

2015 GEOSCIENCE INFORMATION SOCIETY AWARD WINNERS
CONTINUED

Mary B. Ansari Best Geoscience Research Resource Award

Roger L. Putnam
University of North Carolina, Chapel Hill, NC, and National Park Service, Yosemite National Park, CA

Allen F. Glazner,
University of North Carolina, Chapel Hill, NC

Bryan S. Law
Reno, Nevada

Greg M. Stock
National Park Service, Yosemite National Park, CA

Compilers, for their map, "Geologic Map of the Southeast Face of El Capitan, Yosemite Valley, California," Geological Society of America, 2014.

It is the first-ever high resolution geologic map of the 3,000-foot tall vertical cliff face and provides unique insights into the evolution of this iconic granite monolith. The map was published by the Geological Society of America in 2014. Putnam, a geologist, educator, and rock climber in Sonora, California, accepted the award on behalf of the team of scientists and climbers who created the one-of-a-kind map.

Best Paper Award

Jeremy Kenyon
University of Idaho Library

Nancy Sprague
University of Idaho Library

For his 2014 paper "Trends in the use of supplementary materials in environmental science journals," published in *Issues in Science and Technology Librarianship*, no. 75, Winter 2014, https://doi.org/10.5062/F40Z717Z.

In announcing their selection, the award committee cited Kenyon and Sprague's "clear comparison of specific policies in the context of different disciplines and publications," adding that the study "offers a new methodology for examining supplementary materials and their trends and pitfalls." The paper includes helpful links to the policies and guidelines of 61 journals in six environmental science disciplines. The Best Paper Award is given annually for an outstanding contribution to the field of geoscience information published during the previous year.

Best Guidebook Award

Kate Zeigler
Zeigler Geologic Consulting

J. Michael Timmons
New Mexico Bureau of Geology, Socorro, NM

Stacy Timmons
New Mexico Bureau of Geology, Socorro, NM

Steve Semken

Arizona State University, Tempe, AZ

Editors, for their 2013 guidebook *Geology of Route 66 Region: Flagstaff to Grants,* published by the New Mexico Geological Society.

Best Guidebook Series Award

Mountain Press
Missoula, MT

For their longstanding *Roadside Geology of* …series

Mountain Press is the first recipient of this new award, created to recognize those organizations who make continued contributions to this genre over time.

Part 9

Proceedings of the 51st Meeting of the Geoscience Information Society

GSA Poster Session 156

T93. Use of Geoscience Data Resources in Education and Research

Poster Session Coordinator

Christopher Badurek
September 26, 2016
9:00 a.m. – 6:30 p.m.

THE AMERICAN GEOPHYSICAL UNION DATA MANAGEMENT MATURITY PROGRAM

Shelley Stall
Brooks Hanson
American Geophysical Union
2000 Florida Avenue, NW, Washington, DC 20009

Lesley A.I. Wyborn
American Geophysical Union
2000 Florida Avenue, NW, Washington, DC 20009
National Computational Infrastructure, Australian National University
56 Mills Road, Acton, 2600, Australia, lesley.wyborn@anu.edu.au

Abstract—There is a growing appreciation that the collective output of publicly funded research programs is truly a 'Big Data' asset that is of enduring value, and if carefully managed, curated and archived, can be reused and/or repurposed to answer the key research questions of today and those of the future. As a result, funders are increasingly mandating that data collected by publicly funded research be properly captured, documented, curated, and made accessible. Data management plans are now required as part of grant applications. Such mandates are posing challenges for researchers and repositories managers, many of whom have little experience in managing data throughout its full life cycle, including publication and reporting back to funding agencies. In response to these mandates and a broad recognition of the importance of geoscience data, the American Geophysical Union (AGU) has developed an assessment program that will help data repositories, large and small, domain-specific to general, use best practices to improve data management.

AGU has partnered with the CMMI® Institute to adapt their Data Management Maturity (DMM)℠ framework to the needs of the Earth and space sciences. The new DMM model was developed by a large number of experts in data management. The DMM is comprised of 25 process areas organized into 5 categories: strategy, governance, data quality, operations, and platform and architecture. These process areas serve as the principal means to communicate the goals, practices, and example work products of the model. Accomplishment of process area practices allows an organization, and those within it, to build capabilities in data management.

An AGU data management assessment using the DMMSM involves identifying achievements and weaknesses in an organization, compared with leading practices for data management. Recommendations help improve quality and consistency for the assessed organization and support improvement in the community across the data lifecycle. During 2015 two repositories took part in pilot studies to test the process. Both groups reported that they found strong value in how the assessment improved data management and supported their organizational plans and goals.

A COMMUNITY METADATA AUGMENTATION AND CURATION MODEL FOR IMPROVED CROSS-DOMAIN GEOSCIENCE DATA DISCOVERY

Ilya Zaslavsky
San Diego Supercomputer Center, University of California
San Diego, 9500 Gilman Drive, La Jolla, CA 92093-0505, valentin@sdsc.edu

Stephen M. Richard
Arizona Geological Survey, 416 W. Congress, #100, Tucson, AZ 85701

Amarnath Gupta
David Valentine
Thomas Whitenack
Adam Schachne
San Diego Supercomputer Center, University of California
San Diego, 9500 Gilman Drive, La Jolla, CA 92093-0505

Ibrahim Ozyurt
University of California San Diego, 9500 Gilman Dr., La Jolla, CA 92093

Abstract—Cross-disciplinary data discovery in the earth sciences is a complex challenge due to different data models, semantic conventions, access protocols, and other practices of data description and access across geoscience disciplines. Quality, completeness, and standards-compliance of available metadata catalogs vary dramatically, while metadata curation remains mostly manual and labor-intensive. In view of rapidly growing data volumes and cross-domain data interoperability needs, traditional metadata management models become increasingly inadequate.

CINERGI (Community Inventory of EarthCube Resources for Geoscience Interoperability, http://earthcube.org/group/cinergi) is an NSF EarthCube Building Block project assembling a large cross-disciplinary inventory of geoscience information resources, consistently described and made available via standard service interfaces. Metadata descriptions are obtained from multiple geoscience repository catalogs as well as through community contributions. The metadata documents are converted to a standard representation, analyzed and automatically enhanced, which includes automatic generation of relevant keywords based on text analysis, derivation of spatial extent, and validation of organization names mentioned in the metadata. Keyword generation, in turn, is based on a cross-domain bridge ontology, which integrates several existing geoscience ontologies and controlled vocabularies, and on GeoSciGraph, a system for text parsing, vocabulary management, and semantic annotation. Once processed, the metadata records are republished as ISO-19115/19139 documents with embedded semantic references to the ontologies integrated into CINERGI, along with provenance information for each record. The CINERGI curation model expects that repository curators examine results of automatic metadata augmentation, approving or rejecting computer-generated metadata elements, and thus triggering further ontology updates and re-processing. We report on project results and the main system components: the metadata augmentation pipeline; the underlying CINERGI ontology and semantic services; services and user interfaces for resource discovery and access; and accompanying provenance and validation services.

ANALYSIS READY SATELLITE DATA ACCESS

Jonathan Morton
Duncan McGreggor
Element 84, USGS Earth Resources Observation and Science (EROS) Center
47914 252nd Street, Sioux Falls, SD 57198-0001

Steve Foga
Stinger Ghaffarian Technologies, Inc., USGS Earth Resources Observation and Science (EROS) Center, 47914 252nd Street, Sioux Falls, SD 57198-0001, steven.foga.ctr@usgs.gov

Brian Sauer
John L. Dwyer
U.S. Geological Survey, USGS Earth Resources Observation and Science (EROS) Center
47914 252nd Street, Sioux Falls, SD 57198-0001

Abstract—The Landsat satellite missions have systematically provided multispectral imagery over Earth's surface for over 40 years, amassing a temporally dense archive of data that could be used in any number of scientific studies involving the monitoring, assessment, and projection of land change. U.S. Geological Survey (USGS) Earth Resources Observation and Science (EROS) Center, while continuing to operate Landsat data collection, archive, and distribution, has initiated development of an advanced capacity that will efficiently deliver user-specified information derivatives that transform the availability of lower-level data into analysis ready products for use in mapping and modeling applications. Using advanced processing frameworks and applications programming interfaces (API), Landsat scenes are deconstructed and stored as pixels in a datacube from which seamless, calibrated, georeferenced, spatially projected, and quality-masked areas of interest, co-registered temporal layer stacks, temporal or band composites, and vectors of pixel values for specific point locations drilled down through data layers can be easily extracted. The need to perform time, network, and disk consuming pre-analysis data manipulations is ameliorated by the abstraction of traditional World Reference System-2 (WRS-2) scenes into parcels of information that can be filtered for quality conditions and readily packaged to user specifications for format, map projection, band selection, geographic extent, and time period. This exciting new information access methodology is currently evolving through a prototypical phase and is expected to achieve an initial operating capability over the continental U.S. by November 2017.

ADVANCING NETCDF-CF FOR THE GEOSCIENCE COMMUNITY

Ethan Davis
UCAR Unidata
PO Box 3000, Boulder, CO 80307, edavis@ucar.edu

Abstract—The Climate and Forecast (CF) metadata conventions for netCDF (netCDF-CF) are used widely by weather forecasters, climate scientists, and remote-sensing researchers to include auxiliary information along with scientific data. This auxiliary information, or metadata, describes where and how the data were collected, the units of measurement used, and other similar details. Numerous open source and commercial software tools are able to explore and analyze data sets that include netCDF-CF metadata.

This presentation will introduce work to extend the existing netCDF-CF metadata conventions in ways that will broaden the range of earth science domains whose data can be represented. It will include discussion of the enhancements to netCDF-CF that are envisioned and information on how to participate in the community-based standards development process.

A WEB-BASED PLATFORM FOR VISUALIZATION AND ANALYSIS OF COASTAL GEOMORPHOLOGY DATA

Nathan Vinhateiro
Paul Hall
RPS ASA
South Kingstown, RI 02879, nathan.vinhateiro@rpsgroup.com

Abstract—Monitoring programs that collect long-term information on beach morphology are fundamental to understanding how processes such as storms and sea level rise shape the coast. One such program, maintained by the U.S. Army Corps of Engineers (USACE) Coastal and Hydraulics Laboratory, includes a 36-year record of beach profiles, nearshore bathymetry, and meteorologic and oceanographic measurements collected at the Field Research Facility (FRF) in Duck, NC. The records have been used to study seasonal and interannual trends in beach profile changes, quantify erosion during storms, and to characterize subsequent beach recovery. Although the dataset is in the public domain, a limiting factor in its use has been rapid, reliable access to the profiles and associated oceanographic data.

Here we present a web-based platform developed to allow interactive exploration and analysis of coastal geomorphology data and to facilitate comparison with simultaneous oceanographic data (e.g., water level, currents, wave climate). The platform was developed by the USACE Mobile District Spatial Data Branch and RPS ASA for the U.S. Army Engineer Research and Development Center (USACE ERDC) and includes both a data management system and a suite of visualization and analysis tools. The system allows easy display of both beach profiles and LiDAR data and includes on-the-fly plotting functions to visualize changes in these data over time. It also provides tools for performing a variety of basic analyses, such as calculation of beach cross-sections or extraction of shoreline positions from profile data. Most importantly, the relationship between coastal morphology and environmental forcing can be examined at a variety of timescales, providing greater understanding of the evolution of sandy beaches due to both short-term (storm) events and longer-term (climatic) trends.

The platform utilizes a modern web technology stack with a Javascript front end and a Python back end to manage the web services. The design is flexible enough to support a myriad of coastal geology datasets and although developed for the USACE, the system can be readily implemented at other locations to provide scientists, engineers, planners, and science educators with a user-friendly tool for monitoring coastal change and placing it in context of environmental forcing.

LINKING THE INDIANA GEOLOGIC NAMES INFORMATION SYSTEM TO COMPLEMENTARY GEOLOGICAL DATABASES

Nancy R. Hasenmueller
Walter A. Hasenmueller
Indiana Geological Survey, Indiana University, 611 North Walnut Grove Avenue, Bloomington, IN 47405, hasenmue@indiana.edu

Gary J. Motz
Department of Geological Sciences, Indiana University
1001 E. Tenth St., Bloomington, IN 47405-1405

Michael S. Daniels
Indiana Geological Survey, Indiana University
611 North Walnut Grove Avenue, Bloomington, IN 47405

Abstract—In 2009, the Indiana Geological Survey (IGS) launched a geologic names website incorporating information for the bedrock units within the state (https://igs.indiana.edu/IGNIS/). The website and supporting Indiana Geologic Names Information System (IGNIS) were initially developed by the IGS Geologic Names Committee with assistance from IGS information services and photography and imaging staff. The primary purpose of the website and IGNIS is to make current information about geologic names that are recognized by the IGS available to a broad spectrum of users from academia, industry, government, and the general public.

In addition to the descriptions and images of the bedrock units, a stratigraphic column interface was developed that allows IGNIS website users to explore and understand the stratigraphic and geographic relationships of Indiana rock unit names in ways that were not possible using paper documents. Users can scroll and view the formal names and relationships of stratigraphic units from the Precambrian to the Pennsylvanian, read and download abbreviated descriptions of stratigraphic units, link to more detailed descriptions of units, or view the geographic distribution of units.

The IGNIS currently links to and draws information from the following internal sources: (1) the IGS Stratigraphic Names Database; (2) the IGNIS Reference Database of pertinent literature in which bedrock stratigraphic units have been described; (3) the IGS Image Database, which contains photographs and illustrations of Indiana type localities and reference sections, structure and isopach maps, and other figures showing key characteristics of units; and (4) the IGS Publications Database. Current major external sources of information include: (1) the American Association of Petroleum Geologists Correlation of Stratigraphic Units in North America (COSUNA) chart for the Midwestern basin and arches region; and (2) the online U.S. Geological Survey Geologic Names Lexicon ("Geolex").

In the near future, the IGNIS website will be linked to the Indiana University Paleontology Collection to access: (1) additional fossil images and descriptions; and (2) related information on their stratigraphic distribution.

USING THE JAMAICA EDUCATIONAL SEISMIC NETWORK (JAESN) TO ADVANCE EARTHQUAKE RESILIENCE IN JAMAICA

Katherine K. Ellins
Office of Outreach and Diversity, Jackson School of Geosciences, University of Texas at Austin
10100 Burnet Rd., Bldg. 196, Austin, TX 78758, kellins@jsg.utexas.edu

Arpita Mandal
Department of Geography and Geology, University of the West Indies
Mona, Kingston, 7, Jamaica

Paul Coleman
University of the West Indies, Mona, Earthquake Unit, Kingston, 7, Jamaica

Tammy K. Bravo
IRIS, 1200 New York Ave. NW, Suite 400, Washington, DC 20005

Delmares White
Amoy Kelly
Office of Disaster Preparedness and Emergency Management (ODPEM)
2-4 Haining Road, Kingston, 7, Jamaica

Sherene James-Williamson
Department of Geography and Geology, University of the West Indies, Mona
Mona Campus, Kingston 6, Jamaica, Kingston

John Taber
IRIS, Washington, DC 20005

Karleen Black
University of the West Indies, Mona, Earthquake Unit, Kingston, 7, Jamaica

Abstract—The Jamaican Educational Seismic Network (JAESN) is a new initiative to increase Jamaicans' awareness about earthquakes. Located in the plate boundary zone between the North America and Caribbean plates, Jamaica experiences numerous small earthquakes each year and infrequent, devastating earthquakes. The 1692 Port Royal and 1907 Kingston historic earthquakes are noteworthy and were comparable to the January 12th, 2010, Haiti earthquake. Along with Haiti and the Dominican Republic, Jamaica is located in the Enriquillo Plantain Garden Fault zone (EPGZ). The capital city Kingston is particularly vulnerable to earthquakes because of its location at the foothills of the Blue Mountains on an alluvial plain in the vicinity of a major restraining bend associated with the EPGZ.

Organized within the framework of the IRIS Seismograph in Schools program, JAESN aims to promote geoscience knowledge, hazard awareness, and community resilience to Jamaica's seismic risk among precollege and undergraduate students. The network comprises six seismograph stations at Jamaican high schools and in the Geology Museum at the University of the West Indies (UWI), Mona. Each JAESN station has an official designation and streams data live via the Internet. In this presentation, we describe how the network functions and discuss the ways in which JAESN (1) Involves students in gathering, analyzing, and sharing earthquake event data from their AS-1 seismograph stations with other network institutions; (2)

connects science classrooms to researchers at UWI by monitoring local and regional earthquakes, and by encouraging collaboration on local research in seismology and related geohazards; and (3) promotes earthquake preparation and response through activities such as earthquake drills and community outreach.

JAESN is a collaboration involving the U.S Fulbright Program, the U.S. Embassy in Jamaica, UWI's Department of Geography and Geology, the Earthquake Unit, Jamaica's Office of Disaster Preparedness and Emergency Management, and public and private secondary schools. It brings together multiple voices and expertise to build Jamaica's resilience to earthquakes through education. The JAESN project also has the potential to strengthen STEM education in Jamaica and raise the visibility of geoscience as a career.

BRINGING THE SAN ANDREAS TO COLOMBIA: USE OF OPENSOURCE AIRBORNE LIDAR, TERRESTRIAL LIDAR, AND FRACMAN SOFTWARE TO STUDY FAULT AND FRACTURE RELATIONSHIPS

Caroline Whitehill
Geological Sciences, Central Washington University
Ellensburg, WA 98926-7523, whitehillgeosciences@gmail.com

Paul LaPointe
Golder Associates Inc, 2200 6th Avenue, Suite 600, Seattle, WA 98121

Diego Cobos
Dynami Geoconsulting Colombia, Medellin, Colombia

Oscar Correa
Ingeniero Civil, Universidad Nacional de Colombia, Manizales, Colombia

Gustavo Hincapie
Luz Mary Torro
Geociencias, Universidad de Caldas, Manizales, Colombia

John Ceron
Unconventional Resources, Ecopetrol, Bogota, Colombia

Carlos Alberto Vargas Jimenez
Geociencias, Universidad Nacional de Colombia, Bogota, Colombia

Sebastian Vargas
Geociencias, Universidad de Caldas, Manizales, Colombia

Julian Lopez Palacio
Recursos Geotermicos, CHEC, Grupo EPM
Km 1 Autopista del Café, Manizales, Colombia

Abstract—The objective of the Fulbright Colombia collaboration between Central Washington University (USA), Universidad de Caldas (COL), Universidad Nacional de Colombia (Bogota/Manizales), and industry mentors from Golder Associates, Inc. (USA/COL), EcoPetrol, Inc. (COL), and CHEC- Grupo EPM (COL) was to bring students together with industry professionals for more intensive technical training and introduction to new technologies. Collaborators led intensive technology exchange training sessions to introduce the concepts behind, and hands-on experience with, open portal data access to Airborne LiDAR, terrestrial LiDAR Scanner methodology and Landslide Mapping applications, 4D modeling of fluids through fault and fracture networks and geothermal exploration concepts.

The Fulbright Colombia program was based in Manizales, Caldas, Colombia at the Universidad de Caldas. The projects, technology, and instruction presented here represent part II of the discovery-based immersion program and include intensive labs and instruction for LiDAR (terrestrial and Airborne), reservoir modelling, landslide mapping, and geothermal exploration. Students worked alongside professionals in the classroom environment and professionals led field-based projects for hands-on training and guidance in field methods, data acquisition, and data management.

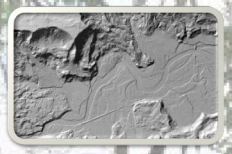
Through the use of open source LiDAR (Open Topography Portal) students were introduced to LiDAR mapping and interpretation of geomorphic features along the San Andreas fault, a system very similar to the regional Romeral fault system of central Colombia. Students from UCALDAS and Universidad de Los Andes were involved in proposal writing, professional meetings/presentations, and TLS data acquisition for a proposed landslide, geohydrology and fracture studies project at El tablazo landslide. An intensive short course was provided by CWU/Golder and Ecopterol in which industry professionals and students worked on fluid flow and reservoir modeling in fractured environments. Extended program involvement between CWU/UCALDAS/CHEC allowed for direct instruction of undergraduates, graduates, and local community stakeholders in the methods and perspectives of geothermal exploration and fractured reservoir modeling.

Posters on following pages.

BRINGING THE SAN ANDREAS TO COLOMBIA: USE OF OPENSOURCE AIRBORNE LIDAR, TERRESTRIAL LIDAR AND FRACMAN SOFTWARE TO STUDY FAULT AND FRACTURE RELATIONSHIPS

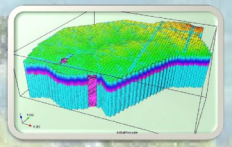
WHITEHILL, Caroline[1], LAPOINTE, Paul[2], COBOS, Diego[3], CORREA, Oscar[4], HINCAPIE, Gustavo[5], TORRO, Luz Mary[5], CERON, John[6], VARGAS JIMENEZ, Carlos Alberto[7], VARGAS, Sebastian[5] and LOPEZ PALACIO, Julian[8]:

(1)Department of Geological Sciences, Central Washington University, Ellensburg, WA 98926-7523, (2)Golder Associates Inc., 2200 6th Avenue, Suite 600, Seattle, WA 98121, (3)Dynami Geoconsulting Colombia, Medellin, Colombia, (4)Ingeniero Civil, Universidad Nacional de Colombia, Manizales, Colombia, (5)Geociencias, Universidad de Caldas, Manizales, Colombia, (6)Unconventional Resources, Ecopetrol, Bogota, Colombia, (7)Geociencias, Universidad Nacional de Colombia, Bogota, Colombia, (8)Recursos Geotermicos, CHEC, Grupo EPM, Km 1 Autopista del Café, Manizales, Colombia
Contact: whitehillgeosciences@gmail.com



AIRBORNE LIDAR SURVEYING

TERRESTRIAL LIDAR SURVEYING



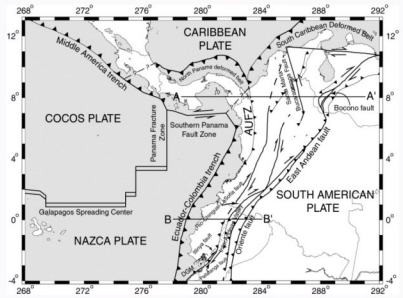
FRACTURED RESERVOIR MODELING

The objective of the Fulbright Colombia collaboration between Central Washington University (USA), Universidad de Caldas (COL), Universidad Nacional de Colombia (Bogota/Manizales) and industry mentors from Golder Associates, Inc. (USA/COL), EcoPetrol, Inc. (COL) and CHEC-Grupo EPM (COL) was to bring students together with industry professionals for more intensive technical training and introduction to new technologies.

Collaborators led intensive technology exchange training sessions to introduce the concepts behind, and hands-on experience with, open portal data access to Airborne LiDAR, Terrestrial LiDAR Scanner methodology and Landslide Mapping applications, 4D modeling of fluids through fault and fracture networks and geothermal exploration concepts. The Fulbright Colombia program was based in Manizales, Caldas, Colombia at the Universidad de Caldas.

The projects, technology and instruction presented here represent Part II of the discovery-based immersion program and include intensive labs and instruction

COLOMBIAN TECTONIC FRAMEWORK



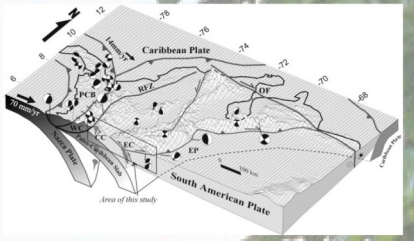


Figure 2. Structure and tectonics of the central segment of the Eastern Cordillera of Colombia (Cortés, et. al. 2006).

Figure 1. Wide plate margin deformation, southern Central America and northwestern South America, CASA GPS observations. (Trenkamp, et. al. 2002)

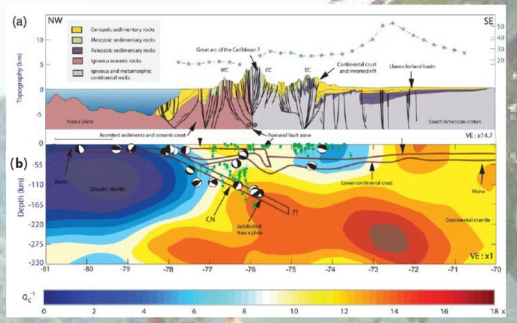
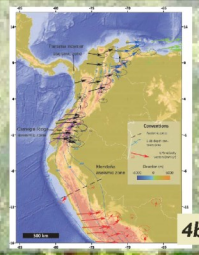
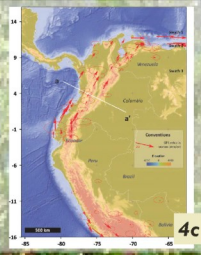
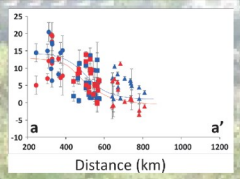


Figure 3. Romeral fault system as plate boundary (a) and tomographic model of subducting Nazca plate (b). Vargas and Mann, 2012.


4a


4b


4c



Veloza, 20012 4d

The Romeral fault system is a complex zone of deformation that demarks the paleo-plate boundary and the transition from South American autocthonous terrane and accreted allocthonous materals transported eastward by the subducting Nazca plate. The modern tectonic framework of Colombia includes the Panama-Choco indention from which northern Colombia/South American plate were impacted by arc-continent collision beginning about 12 Ma, continuing through to present-day and defining a complex Romeral fault system that is highly compressional at about latitude of Manizales (~5 deg. N), right lateral slip north of the maximum indention and left lateral displacement south of Manizales.

Golder Associates

Universidad de Caldas

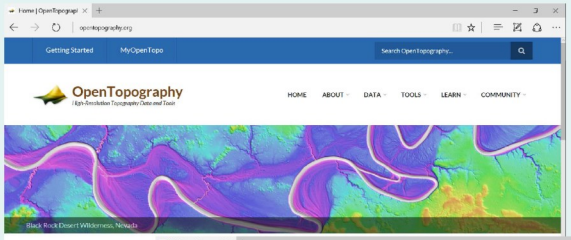
FULBRIGHT COLOMBIA

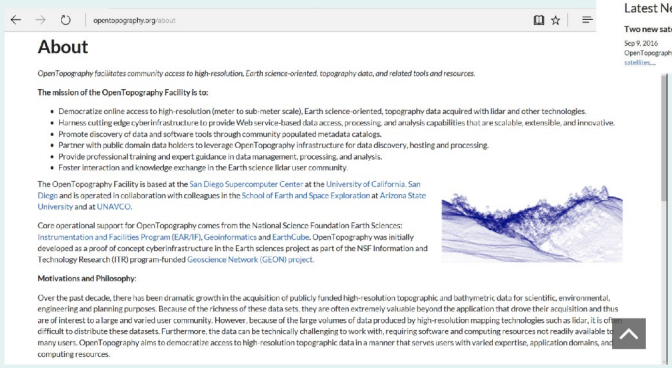
OPENTOPOGRAPHY: LIDAR PORTAL

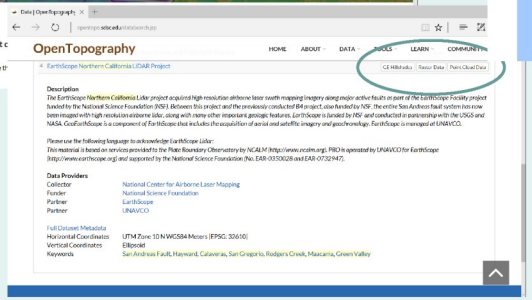
For considering investigations into the tectonic geomorphology of the Romeral system, we accessed the OpenTopography LiDAR portal for portions of the Northern California San Andreas fault system captured during the 2007 data acquisition survey.

Like much of northern California, the Central Cordillera of Colombia is characterized by steep, fault-controlled slopes, and dense vegetation. As such, it is ideal location for the application of LiDAR capabilities for bare-Earth imagining in hard to access areas of low visibility.

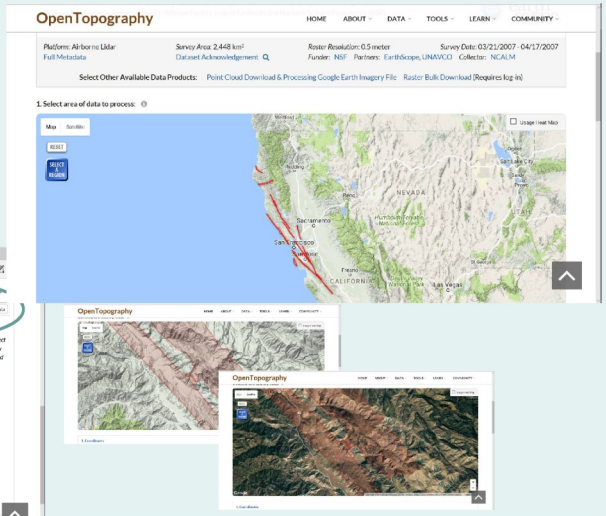
To teach the students and professionals some of the methods used in identifying geo-morphic features characteristic of active faults, we worked together on portions of the San Andreas system.



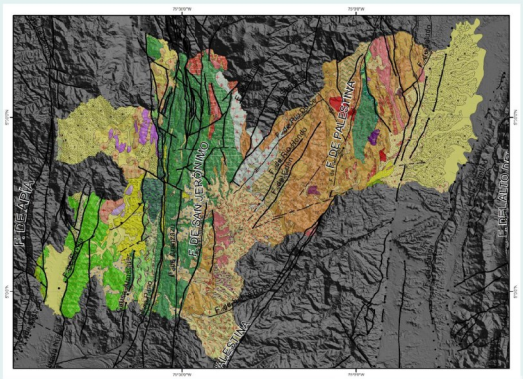




This material is based on services provided to the Plate Boundary Observatory by NCALM (http://www.ncalm.org).
PBO is operated by UNAVCO for EarthScope (http://www.earthscope.org) and supported by the National Science Foundation (No. EAR-0350028 and EAR-0732947).



Data from the OpenTopography can be easily downloaded as hillshades as a zip file, or delivered as unprocessed and processed raster data or as original point cloud data. Data processing batches can be requested and manipulated by OpenTopography personnel using Supercomputing power housed at UCSD in San Diego, Ca.
To gain access: Users simply need to apply demonstrating academic affiliation: < 24hr response.



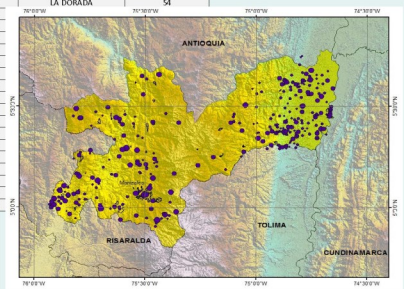
Above left: Geologic map of the State of Caldas draped over 90m ASTER DEM. North-south trending fault traces delineate the presence of the active Romeral fault system, formerly the subduction zone boundary, now reactivated following the collision of the Choco-Panama indentor.

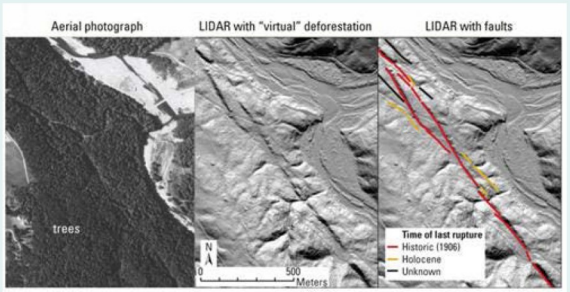
Left: Students working on tectonic geomorphology interpretations of the San Andreas system as an analogy to the local Romeral System. **USGS terms shown at right.**

Dates	UTC Time	MI	Lon W	Lat N	Departamento	Municipality	Depth
14/06/1993	03:29:56	3.2	-74,755	5,630	CALDAS	LA DORADA	4
07/07/1993	22:28:29	2.3	-74,789	5,627	CALDAS	LA DORADA	4.1
27/07/1993	08:46:33	1.8	-74,716	5,562	CALDAS	LA DORADA	54
31/08/1993	00:31:55	1.8	-74,923	5,457	CALDAS		
29/09/1993	13:08:32	2.2	-75,611	4,940	CALDAS		
20/10/1993	12:41:42	2.3	-75,243	4,615	CALDAS		
20/10/1993	12:41:43	2.5	-75,213	4,592	CALDAS		
31/10/1993	00:52:21	2.8	-75,603	5,285	CALDAS		
03/11/1993	11:25:22	1.9	-75,797	5,039	CALDAS		
31/12/1993	04:23:36	1.5	-74,790	5,390	CALDAS		
02/03/1994	12:37:34	3.1	-75,049	5,506	CALDAS		
01/05/1994	06:59:24	1.7	-74,894	5,376	CALDAS		
01/05/1994	18:23:42	2.4	-74,868	5,422	CALDAS		
01/06/1994	12:41:35	1.5	-75,120	4,330	CALDAS		
08/07/1994	11:46:37	2.8	-75,797	5,155	CALDAS		
15/07/1994	16:46:35	2.8	-75,494	5,062	CALDAS		
17/07/1994	06:15:24	2.5	-74,968	5,327	CALDAS		
23/07/1994	02:41:44	2.3	-74,948	5,367	CALDAS		
24/07/1994	04:10:25	2.1	-74,726	5,367	CALDAS		
02/08/1994	02:00:16	2.3	-75,789	5,443	CALDAS		

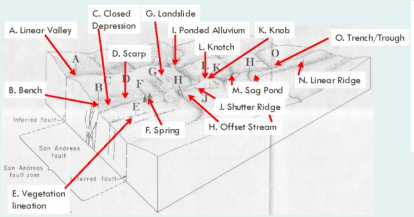
Table 1 (above).
Example of Earthquakes catalog of Caldas Departamento (From RSNC). Earthquakes recorded from 1991 –to –present. This database was used as part of Seismic Hazards modeling project, Part I of Fulbright Research

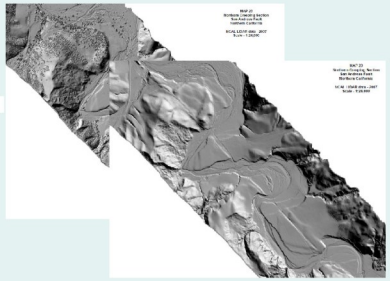
Right: *Map show extent of Caldas, the capital Manizales, and the distribution of recent activity. The larger the circle, the bigger the quake.*

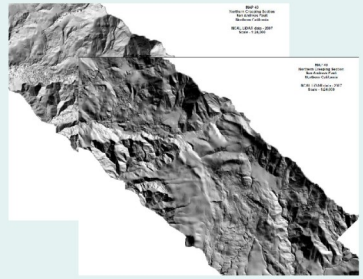




Above: Series of images comparing the use of air photos, and 0.5m spatial resolution LiDAR to map recent ground rupture.







VISUALIZING AND STUDYING PLATE TECTONIC FEATURES IN AN UNDERGRADUATE CLASS FOR SCIENCE TEACHING CANDIDATES

Michael J. Urban
Department of Professional Education, Bemidji State University
1500 Birchmont Dr. NE, Bemidji, MN 56601, murban@bemidjistate.edu

Abstract—Google Earth and GeoMapApp are two visualization tools that can be used in science classes to investigate plate tectonics and associated features. The United States Geological Survey (USGS) provides KML datasets for Google Earth, which can be incorporated into simple or integrated lessons related to earthquakes, faults, plate tectonics, volcanism, and more. By itself Google Earth provides a means to visually examine the geologic context of features and regions, but when united with layers of data a more comprehensive examination of interrelationships is possible. GeoMapApp provides access to global elevation data and enables users to construct vertical profiles of the features of the Earth. GeoMapApp may be used along with Google Earth to provide a better visual understanding of plate tectonics. Both tools are user-friendly and appropriate for use in college and K-12 science classrooms.

A pilot investigation initiated with students taking an undergraduate integrated science course for secondary science teaching licensure provided findings about the value of utilizing Google Earth with USGS data layers in conjunction with GeoMapApp for understanding plate tectonics and associated features and phenomena through visual analysis. Participants completed an activity designed to teach about earthquakes, plate tectonic features (e.g., trenches, mountains, island arcs, faults, etc.), and geography (i.e., names and locations). The relevance and applicability of the software and data for use in K-12 classroom settings was also explored. The findings include survey data about student experiences, in addition to pre- and post-test scores. The activity will be shared and the classroom context and implementation will be described.

TURNING COLLEGE COLLECTIONS INTO ONLINE ROCK AND MINERAL DATABASES FOR TEACHING AND RESEARCH

Abby Ackerman
Emily Kampmeyer
Matthew Willig
Chloe Li
Department of Geology, Bryn Mawr College
101 N. Merion Avenue, Bryn Mawr, PA 19010, aackerman@brynmawr.edu

Angela Bertagni
Geosciences, Penn State
505 Deike Building, University Park, PA 16802

Selby Cull-Hearth
Department of Geology, Bryn Mawr College
101 N. Merion Ave, , Bryn Mawr, PA 19010

Abstract—The Bryn Mawr College Mineral Collection is one of the largest private collections in the world. With over 25,000 samples, the collection is a valuable tool for education, display, and historical stewardship. Minerals, rocks, and paleontological samples have been added throughout the years thanks to research efforts and private donations. These samples, their locations, thin section photomicrographs, and compositional information are currently being compiled in an easily searchable and accessible online database. This project aims to make metadata and images of the Bryn Mawr College Collection a globally available teaching aid and research tool, in order to allow for remote or digital petrology, petrography, and other research of the samples featured in Bryn Mawr's Collection—including irreplaceable samples from sites that no longer exist. Digitization of this collection will also facilitate the use of mineral, rock, and paleontological samples in student thesis projects and undergraduate classes. The end goal is to create a cohesive and interactive way to experience the collection and a database that can be used to further education and research.

DEVELOPING EFFECTIVE LEARNING EXERCISES IN THE GEOSCIENCES: UTILIZING ONLINE DATABASES AND DATA REPOSITORIES

Kenneth Brown
Department of Geology and Geography, West Virginia University
330 Brooks Hall, 98 Beechurst Ave., Morgantown, WV 26506, brownkl3@miamioh.edu

Abstract—Using data to explain difficult geologic concepts and to illustrate fundamental spatial relationships has long been an important aspect of geoscience education. Because online databases and mapping tools are readily available, students can now collect, manipulate, visualize, and analyze large geoscience datasets easily. As such, these online resources give educators an excellent opportunity to develop a large range of active and experiential learning exercises. Within the classroom, these exercises foster open discussions and challenge students to explore current geoscience issues. These exercises are also an important way for students to apply knowledge and to develop fundamental skills necessary for a career in the geosciences. This contribution focuses on the development of online exercises specific to upper- and lower-division geoscience courses. At the lower-division level (physical geology, environmental geology, and natural hazards), some specific online exercises include: 1) evaluating trends in water usage through online data from the USGS National Water Information System; 2) evaluating the rate of plate movements using JPL GPS time series data; and 3) evaluating climate data using NOAA National Centers for Environmental Information. In upper-level igneous petrology courses, research specimens and bulk geochemical rock analyses can be incorporated into lab activities, giving students a first-hand opportunity to explore data with a real geologic context. By comparing bulk rock analyses to analytical data retrieved from online repositories (e.g., EarthChem, NAVDAT, GEOROC), students are better able to recognize the fundamental relationships between the chemistry of an igneous rock and its associated tectonic setting. Thus, activities like these give students a greater appreciation for hypothesis testing, data collection, analysis, and interpretation. These exercises also increase the amount of time students spend in the learning cycle outside of class, which is arguably an important factor influencing student performance.

MARS-LEARNING: AN OPEN ACCESS EDUCATIONAL DATABASE

Sophia Kolankowski
Earth and Environmental Science, Rensselaer Polytechnic Institute
22 Meadow Lane, Albany, NY 12208, kolas54@suny.oneonta.edu

Peter Fox
Department of Computer Science, Rensselaer Polytechnic Institute
110 Eighth Street, Troy, NY 12180

Abstract—Schools across America have begun focusing more and more on science and technology, giving their students greater opportunities to learn about planetary science and engineering. With the development of rovers and advanced scientific instrumentation, we are learning about Mars' geologic history on a daily basis. These discoveries are crucial to our understanding of Earth and our solar system. By bringing these findings into the classroom, students can learn key concepts about Earth and planetary sciences while focusing on a relevant current event. However, with an influx of readily accessible information, it is difficult for educators and students to find accurate and relevant material. Mars-Learning seeks to unify these discoveries and resources. This site will provide links to educational resources, software, and blogs with a focus on Mars. Activities will be grouped by grade for the middle and high school levels. Programs and software will be labeled, open access, free, or paid to ensure users have the proper tools to get the information they need. For new educators or those new to the subject, relevant blogs and pre-made lesson plans will be available so instructors can ensure their success. The expectation of Mars-Learning is to provide stress-free access to learning materials that falls within a wide range of curriculum. By providing a thorough and encompassing site, Mars-Learning hopes to further our understanding of the Red Planet and equip students with the knowledge and passion to continue this research.

Part 10

Proceedings of the 51st Meeting of the Geoscience Information Society

GSA Technical Session 222

T92. Open Data, Open Access:
Trends in Geoscience Publications and Data Sources

Technical Session Convener

Christopher Badurek
September 27, 2016
1:30 p.m. – 5:30 p.m.

OPEN ACCESS PUBLISHING TRENDS AT TWO GEOSCIENCE RESEARCH ORGANIZATIONS: COLUMBIA UNIVERSITY AND CARNEGIE INSTITUTION FOR SCIENCE

Amanda Bielskas
Geology Library, Columbia University
601 Schermerhorn, 1190 Amsterdam Ave, New York, NY 10027
asb2154@columbia.edu

Shaun J. Hardy
Dept. of Terrestrial Magnetism and Geophysical Laboratory - Library
Carnegie Institution for Science, 5241 Broad Branch Rd. NW, Washington, DC 20015
shardy@carnegiescience.edu

Abstract—Open access (Gold OA) journals currently account for around 8% of all geoscience articles published annually. That proportion has been growing steadily for the past decade, but considerable variation exists among geoscience disciplines in the degree of uptake of OA. We report the results of an analysis of publishing patterns of geoscientists at our two institutions—a major research university and an independent research institute—from 2000 to 2015, to identify trends in authors' acceptance of Gold OA as a publishing option, and discuss factors affecting OA uptake. We conclude that the adoption of Gold OA by authors in the geoscience departments at Columbia University and the Carnegie Institution is increasing—in fact, now growing at a faster rate than in the geoscience literature overall—but still accounts for a small fraction of each institution's publication output.

INTRODUCTION

The Geoscience Information Society (GSIS) defines open access (OA) as the "practice of providing free, unrestricted access to research results and literature. It means that research results can be read by anyone at any time without having to go to a library that subscribes to a journal or request it through interlibrary loan" (GSIS, 2016).

For the purposes of this study we define the major OA publishing modes in the following way:

- Gold OA = All content immediately free to read (authors usually pay APC);
- Hybrid OA = Authors pay to make individual articles in subscription journals free to read;
- Delayed OA = All content becomes free to read after some period of time (6–48 months); and
- Green OA = Self-archiving/posting in open repositories.

Few studies of OA specific to the geosciences (Hardy, 2012; Wirth, 2011) have been published. We investigated the uptake of Gold OA by geoscientists in our own institutions with the hope that such a study might yield some generalizable insights, as both Columbia University and the Carnegie Institution for Science are research-intensive organizations with strong geoscience programs. Specifically, we sought to quantify the levels of Gold OA adoption at each institution, identify trends over time, and compare them to discipline-wide trends.

Geoscience research at Columbia University is centered in the Department of Earth and Environmental Sciences and at the Earth Institute—an umbrella of multiple research units and centers. Chief among these is the Lamont-Doherty Earth Observatory, which employs around 200 Ph.D. level researchers as well as 80–90 graduate students. Other components include the Center for International Earth Science Information Network (CIESIN) and the International Research Institute for Climate and Society (IRI). The Earth Institute bridges traditional disciplinary boundaries to tackle complex issues in climate

and society, global health, and sustainable development.

The Carnegie Institution is an independent, nonprofit organization for scientific research with multiple departments around the country. Geoscience research is centered in the Department of Terrestrial Magnetism (DTM) and the Geophysical Laboratory, both located in Washington, D.C. Together the two units employ 60 staff/research scientists and 40–50 postdoctoral fellows and research associates. These investigators conduct fundamental research in the physics and chemistry of the Earth, the behavior of matter at extreme conditions, the nature of extrasolar planets, and the origin and evolution of planets and life.

METHODOLOGY AND RESULTS

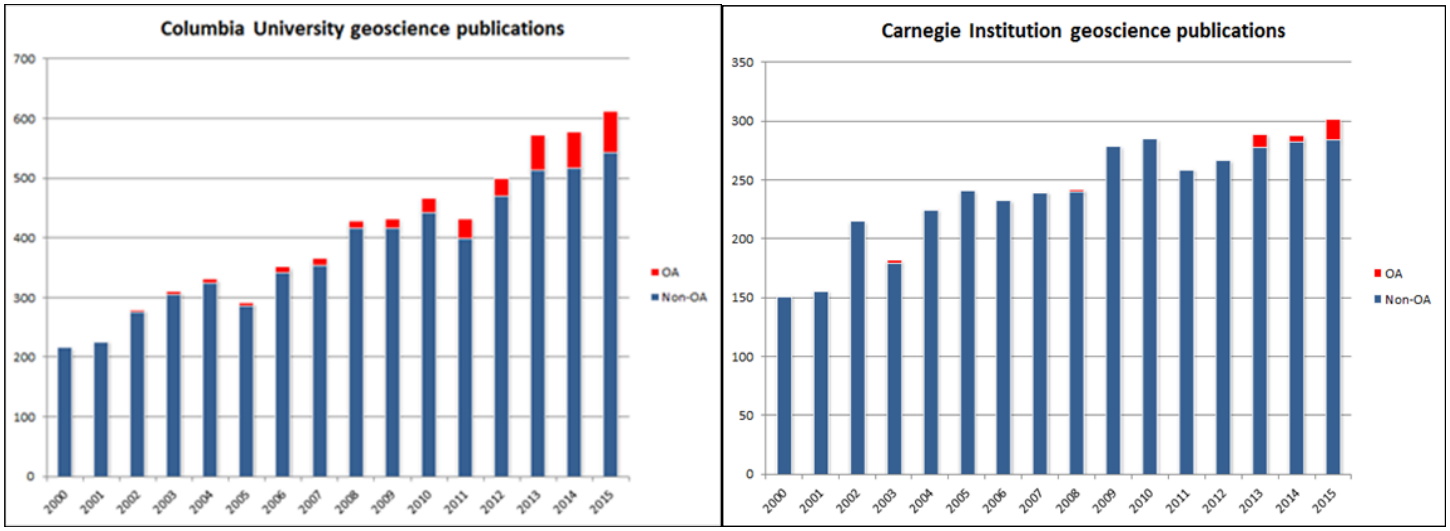
Using the Web of Science (WoS) Core Collection (see Table 1 for the WoS categories included in this study), we tallied the number of papers published annually from 2000 to 2015 in the 142 Gold OA geoscience journals indexed by WoS. We also tallied the output from each of our institution's geoscience departments for the same period (Fig. 1). The data collection was performed in July 2016. Address searches were used to restrict the results to the specific organizational units discussed above. While no restriction was placed on document types, the tallies reflect primarily journal articles. Results for each year were broken down into Gold OA and non-OA totals. Figure 2 shows the Gold OA tallies as percentages of each institution's total output and compares them to the Gold OA percentages for geoscience literature as a whole. The graph in Figure 2 reflects an adjustment for *Acta Crystallographica E*. We discovered that from 2007 to 2013 WoS indexed thousands of crystal structure determinations (3,000–5,000 per year) from this journal—an indexing practice which was subsequently discontinued. By removing these brief communications from the search results, a steady increase in the OA percentage over the entire study period was revealed. The data for Columbia and Carnegie are tabulated in Appendix 1.

TABLE 1: WEB OF SCIENCE SUBJECT AREAS INCLUDED IN THIS STUDY

Geology
Geochemistry & geophysics
Geosciences, multidisciplinary
Mineralogy
Crystallography
Paleontology
Environmental sciences
Soil science
Engineering, geological
Oceanography
Meteorology & atmospheric sciences

Our results show that the proportion of geoscience literature published in Gold OA journals quadrupled over the study period and currently stands at around 8%, but we also found considerable variation in OA uptake among geoscience sub disciplines. For papers published in the past ten years the Gold OA proportion ranged from less than 1% (in mineralogy) to nearly 20% (in crystallography and atmospheric sci-

Figure 1. Number of publications in Web of Science Core Collection from geoscience research units at Columbia and Carnegie.



ences). Only 2.3% of papers in geochemistry and geophysics appeared in Gold OA journals during this period. Results are shown in Figure 3.

While neither Columbia nor Carnegie authors were particularly early adopters of Gold OA, the proportion of OA publishing at Columbia increased rapidly in the past decade. By 2015 more than 11% of Columbia's geoscience output was in OA journals—considerably above the Gold OA proportion of geoscience literature overall. At Carnegie Gold OA adoption had been negligible until just the past three years, but since then has increased to 6% of total output. The difference in these trends could reflect differences in institutional research focus. For example, much of Carnegie's output is in geochemistry and geophysics—fields with comparatively low OA uptake.

The specific Gold OA journals in which authors most frequently published likewise differed between our institutions. Columbia's 347 OA publications from 2000 to 2015 appeared in 71 of these journals; Carnegie's 45 OA papers appeared in 12 journals. Table 2 lists the journals that accounted for >5% of each institution's Gold OA publications. The complete list appears in Appendix 2. The diversity of titles reflects the interdisciplinarity of geoscience research at both institutions. Columbia has earth scientists who publish in public health and ecology journals. Carnegie's faculty also include astrophysicists and materials scientists. For both institutions the "top" Gold OA journal was a general science one, not a discipline-specific publication: *PLOS ONE* for Columbia and *Scientific Reports* for Carnegie.

Our study did not consider the contribution of other forms of OA (hybrid and delayed) at Columbia and Carnegie, but based on work by Jubb et al. (2015) we expect these could account for a significant part of our institutions' total OA output.

The data on OA acceptance at Columbia and Carnegie led us to consider what factors might be influencing authors' decisions to publish in OA journals, and which ones in particular. From our own discussions with faculty members and postdocs, and from the literature (Dallmeier-Tiessen et al., 2011; Teplitzky and Phillips, 2016) significant factors include cost; funder and institutional mandates; availability of funding; perceived quality of the journal; journal impact factor; and personal preference.

Data compiled by GSIS (2016) show a wide variation in article processing charges (APCs) among Gold OA geoscience journals. Charges range from free (subsidized publications) to around $3,000. APCs may differ depending on the type of submission (research paper, review, letter, etc.), the kind of Creative Commons license selected, and applicable membership discounts.

Some of the differences we have observed in OA publication trends at our institutions may stem from differences in policies and available OA funding. Lamont-Doherty Earth Observatory (LDEO) adopted

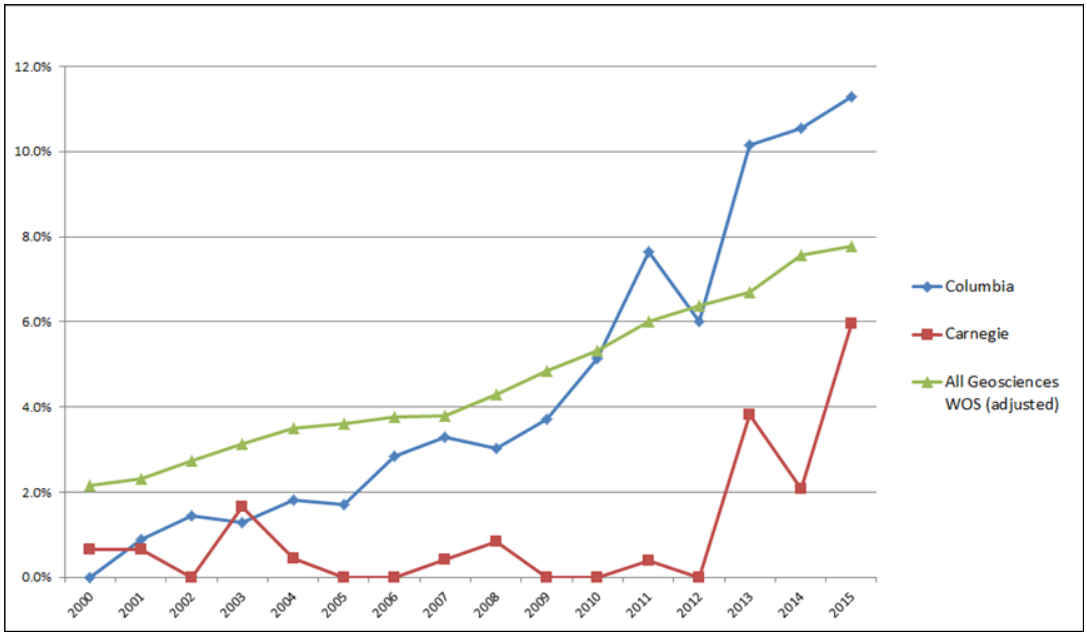


Figure 2. Gold OA percentage of geoscience publications in case study and overall.

an open access policy that went into effect on 1 March 2011 ("Lamont-Doherty Earth Observatory Open Access Policy | Scholarly Communication Program"). LDEO officers and professional staff members committed to making their scholarly journal articles accessible to the public through a digital repository based at Columbia University or through appropriate alternative open access repositories. While not everyone publishes OA articles (the policy allows for waivers to be granted) the sentiment behind it carries institutional weight. Columbia also supports OA monetarily with the Columbia Open-Access Publication (COAP) Fund ("Columbia Open-Access Publication (COAP) Fund | Scholarly Communication Program"). The fund underwrites reasonable article processing fees for Gold open access journals when funds are not otherwise available for articles published by Columbia authors.

Carnegie does not have a formal, institution-wide OA policy or a dedicated publishing fund, but public access to published research is tacitly encouraged. OA fees are paid with grant funding or with discretionary funds through the department director's office. The Deep Carbon Observatory, a global research program headquartered at Carnegie, has an explicit policy encouraging its community members to adopt open access and provides support through its grant program to help defray OA publishing expenses ("DCO Open Access and Data Policies | Deep Carbon Observatory Portal").

CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

The adoption of Gold OA by authors in the geoscience departments of our own institutions—Columbia University and the Carnegie Institution of Science—is increasing, but still accounts for a small fraction (11.3% and 6.0%, respectively, in 2015) of each institution's publication output. While hybrid and delayed OA publications were not in scope for this study, we expect that their contributions to our insti-

TABLE 2: GOLD OA JOURNALS ACCOUNTING FOR >5% OF COLUMBIA AND CARNEGIE OA PAPERS DURING 2000–2015

Columbia University (71 Gold OA journals)			Carnegie Institution (12 Gold OA journals)		
	papers	% of total Gold OA		papers	% of total Gold OA
PLOS ONE	38	11.0	Scientific Reports	19	42.2
Environmental Research Letters	33	9.5	Nature Communications	8	17.8
Environmental Health Perspectives	28	8.1	Low Temperature Physics	7	15.6
Climate of the Past	26	7.5	PLOS ONE	3	6.7
Atmospheric Chemistry and Physics	21	6.1			
Biogeosciences	18	5.2			

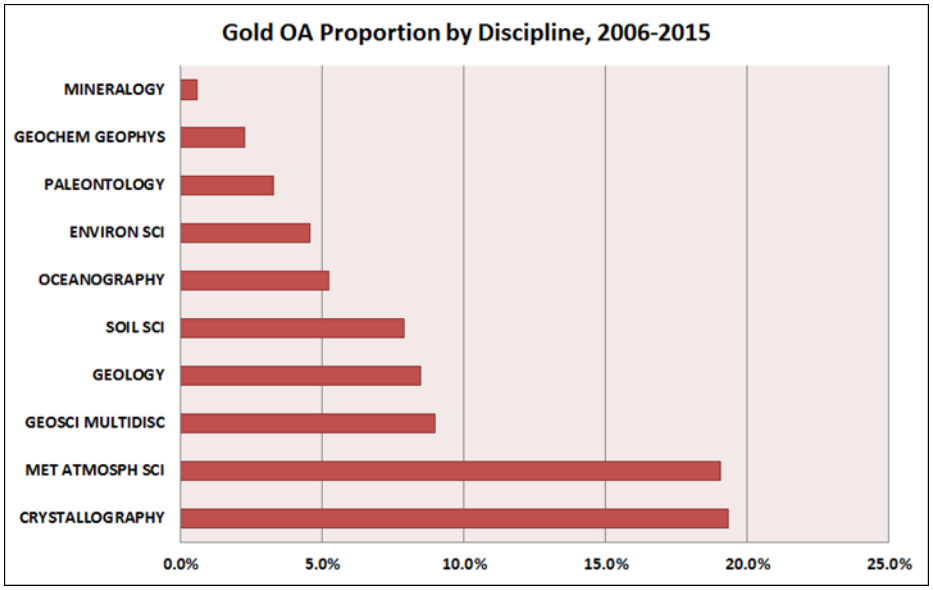


Figure 3. Cumulative Gold OA proportion of articles in Web of Science by subject area.

tutions' total OA output could be considerable and would be worth investigating.

Differences between the Gold OA outputs at the two institutions are likely due to differing institutional research agendas and discipline-specific variation in Gold OA uptake rates. Since Columbia has an institutional repository and Carnegie does not, there could be additional differences between green OA outputs at the two institutions as well. Quantifying these green OA outputs could yield a clearer picture of the publishing preferences and priorities of geoscience researchers at these institutions.

Altmetrics is another avenue that could provide further understanding into the possible citation advantage that OA publishing might offer to authors. Analyzing mentions on social networks and the like was outside the scope of this study, but could be a useful complement to our citation-based approach.

Our understanding of authors' attitudes toward, and perceptions of, OA at our institutions is largely anecdotal. Formally surveying these communities could provide useful insight into efforts to promote OA adoption. Few studies have focused on these aspects. Teplitzky and Phillips (2016) surveyed University of California, Berkeley, researchers who received funding through the university's OA fund and found that most respondents believed that their articles had greater impact as open access and wanted more institutional support for OA.

We are not sure how applicable this case study would be in a broader context. It would be interesting to learn more about the implementation of OA at other geoscience institutions, smaller universities, and in industry settings.

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Appendix 1: Number of publications in Web of Science Core Collection from geo-science research units at Columbia and Carnegie.

	Columbia University			Carnegie Institution		
publication year	total publications	Gold OA publications	OA % of total	total publications	Gold OA publications	OA % of total
2000	216	0	0.0%	152	1	0.7%
2001	227	2	0.9%	156	1	0.6%
2002	279	4	1.4%	215	0	0.0%
2003	310	4	1.3%	182	3	1.6%
2004	331	6	1.8%	225	1	0.4%
2005	291	5	1.7%	241	0	0.0%
2006	352	10	2.8%	233	0	0.0%
2007	366	12	3.3%	240	1	0.4%
2008	429	13	3.0%	242	2	0.8%
2009	432	16	3.7%	279	0	0.0%
2010	467	24	5.1%	285	0	0.0%
2011	432	33	7.6%	259	1	0.4%
2012	500	30	6.0%	267	0	0.0%
2013	572	58	10.1%	289	11	3.8%
2014	578	61	10.6%	288	6	2.1%
2015	612	69	11.3%	302	18	6.0%

Appendix 2: Gold OA journals in which Columbia and Carnegie authors published during 2000–2015.

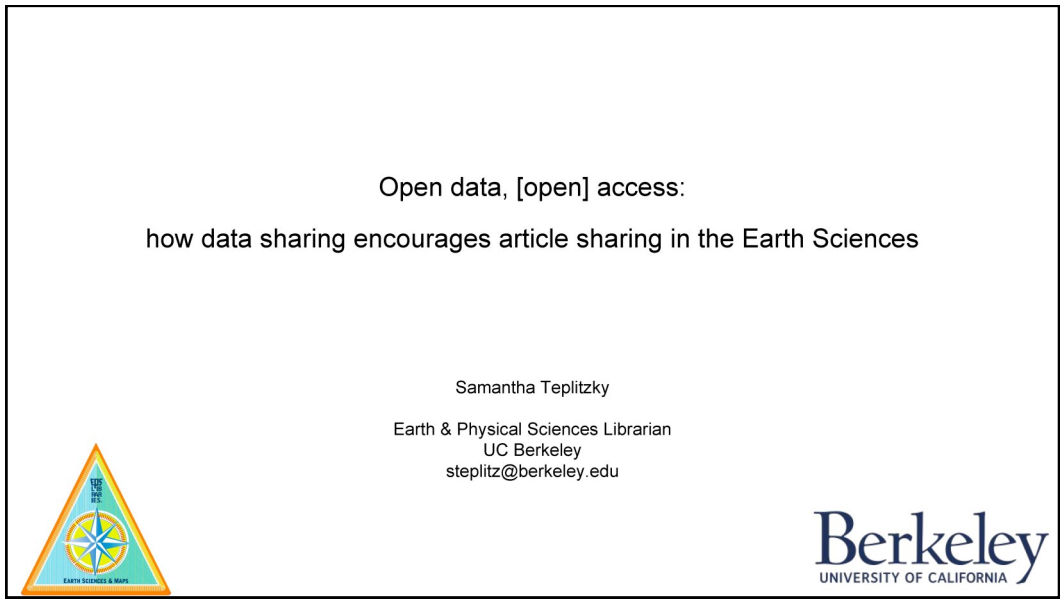
Columbia University			Carnegie Institution		
Gold OA source title	publications 2000-2015	% of total OA publications	Gold OA source title	publications 2000-2015	% of total OA publications
PLOS ONE	38	10.95	SCIENTIFIC REPORTS	19	42.22
ENVIRONMENTAL RESEARCH LETTERS	33	9.51	NATURE COMMUNICATIONS	8	17.78
ENVIRONMENTAL HEALTH PERSPECTIVES	28	8.07	LOW TEMPERATURE PHYSICS	7	15.56
CLIMATE OF THE PAST	26	7.49	PLOS ONE	3	6.67
ATMOSPHERIC CHEMISTRY AND PHYSICS	21	6.05	PROCEEDINGS OF THE INDIAN ACADEMY OF SCIENCES EARTH AND PLANETARY SCIENCES	1	2.22
BIOGEOSCIENCES	18	5.19	NEW JOURNAL OF PHYSICS	1	2.22
JOURNAL OF ADVANCES IN MODELING EARTH SYSTEMS	13	3.75	GEOCHEMICAL TRANSACTIONS	1	2.22
NATURAL HAZARDS AND EARTH SYSTEM SCIENCES	11	3.17	EARTH PLANETS AND SPACE	1	2.22
ACTA PROTOZOOLOGICA	10	2.88	CURRENT SCIENCE	1	2.22
MALARIA JOURNAL	9	2.59	CLIMATE OF THE PAST	1	2.22
HYDROLOGY AND EARTH SYSTEM SCIENCES	8	2.31	BIOGEOSCIENCES	1	2.22
EARTH SYSTEM SCIENCE DATA	8	2.31	ANNALS OF GEOPHYSICS	1	2.22
SCIENTIFIC REPORTS	7	2.02			
GEOSPATIAL HEALTH	7	2.02			
TELLUS SERIES B CHEMICAL AND PHYSICAL METEOROLOGY	6	1.73			
SUSTAINABILITY	6	1.73			
INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH	5	1.44			
FRONTIERS IN MICROBIOLOGY	5	1.44			
PLOS MEDICINE	4	1.15			
OCEAN SCIENCE	4	1.15			
LANCET GLOBAL HEALTH	4	1.15			
ENVIRONMENTAL HEALTH	4	1.15			
EMERGING INFECTIOUS DISEASES	4	1.15			
CRYOSPHERE	4	1.15			
NEW JOURNAL OF PHYSICS	3	0.87			
ECOLOGY AND SOCIETY	3	0.87			
ANNALS OF GEOPHYSICS	3	0.87			
WATER	2	0.58			
TELLUS SERIES A DYNAMIC METEOROLOGY AND OCEANOGRAPHY	2	0.58			
POLAR RESEARCH	2	0.58			
PLOS NEGLECTED TROPICAL DISEASES	2	0.58			
PLOS BIOLOGY	2	0.58			
NONLINEAR PROCESSES IN GEOPHYSICS	2	0.58			
NATURE COMMUNICATIONS	2	0.58			
ISPRS INTERNATIONAL JOURNAL OF GEO INFORMATION	2	0.58			
INTERNATIONAL JOURNAL OF INFECTIOUS DISEASES	2	0.58			
GEOSCIENTIFIC MODEL DEVELOPMENT	2	0.58			
ACTA PALAEONTOLOGICA POLONICA	2	0.58			
TRIALS	1	0.29			
TERRESTRIAL ATMOSPHERIC AND OCEANIC SCIENCES	1	0.29			
SOUTH AFRICAN JOURNAL OF SCIENCE	1	0.29			
REMOTE SENSING	1	0.29			
PLOS PATHOGENS	1	0.29			
NANOSCALE RESEARCH LETTERS	1	0.29			
NANOMATERIALS	1	0.29			
MEDITERRANEAN MARINE SCIENCE	1	0.29			
MATERIALS TODAY	1	0.29			
JOURNAL OF THE METEOROLOGICAL SOCIETY OF JAPAN	1	0.29			
JOURNAL OF NANOMATERIALS	1	0.29			
JOURNAL OF MEDICAL INTERNET RESEARCH	1	0.29			
JOURNAL OF IBERIAN GEOLOGY	1	0.29			
INTERNATIONAL JOURNAL OF CIRCUMPOLAR HEALTH	1	0.29			
GLOBAL HEALTH ACTION	1	0.29			
GEOSCIENCE DATA JOURNAL	1	0.29			
GEOCHEMICAL TRANSACTIONS	1	0.29			
ENTROPY	1	0.29			
ENERGIES	1	0.29			
ECOLOGY AND EVOLUTION	1	0.29			
EARTHS FUTURE	1	0.29			
EARTH SURFACE DYNAMICS	1	0.29			
BMC PUBLIC HEALTH	1	0.29			
BMC PREGNANCY AND CHILDBIRTH	1	0.29			
BMC MICROBIOLOGY	1	0.29			
BMC MEDICAL INFORMATICS AND DECISION MAKING	1	0.29			
BMC INFECTIOUS DISEASES	1	0.29			
BMC HEALTH SERVICES RESEARCH	1	0.29			
ATMOSPHERE	1	0.29			
ANNALES GEOPHYSICAE	1	0.29			
AIP ADVANCES	1	0.29			
AFRICAN JOURNAL OF BIOTECHNOLOGY	1	0.29			
ADVANCES IN METEOROLOGY	1	0.29			

OPEN DATA, [OPEN] ACCESS: HOW DATA SHARING ENCOURAGES ARTICLE SHARING IN THE EARTH SCIENCES

Samantha Teplitzky
UC Berkeley Library, Earth Sciences & Map Library
50 McCone Hall, Berkeley, CA 94720, steplitz@berkeley.edu

Abstract—The norms of a research community influence practice, and norms of openness and sharing can be shaped to encourage researchers who share in one aspect their research cycle to share in another. Different sets of mandates have evolved to require that research data be made public, but not necessarily articles resulting from that collected data. Using the Pangaea repository as an example, I ask to what extent publications in the earth sciences are more likely to be open access (in all of its definitions) when researchers open their data. Pangaea data sets from 2010 to 2015 were matched to their related articles and the level of open access was determined for each article. An increase in gold open access from 2010 to 2015 was found, as was a shift in preference for open access publishers. This presentation also considers the factors that may have influenced researchers' decision to open their findings, including the adoption of open access mandates, and discusses the implications for library collections.

For a fuller description of this topic, see "Open data, [open] access: linking data sharing and article sharing in the Earth Sciences," *Journal of Librarianship and Scholarly Communication*, v. 5, n. 1, p. eP2150, https://doi.org/10.7710/2162-3309.2150, https://jlsc-pub.org/articles/abstract/10.7710/2162-3309.2150/.
What follows are the original slides from this presentation.



Motivating question

Are publications in the Earth Sciences

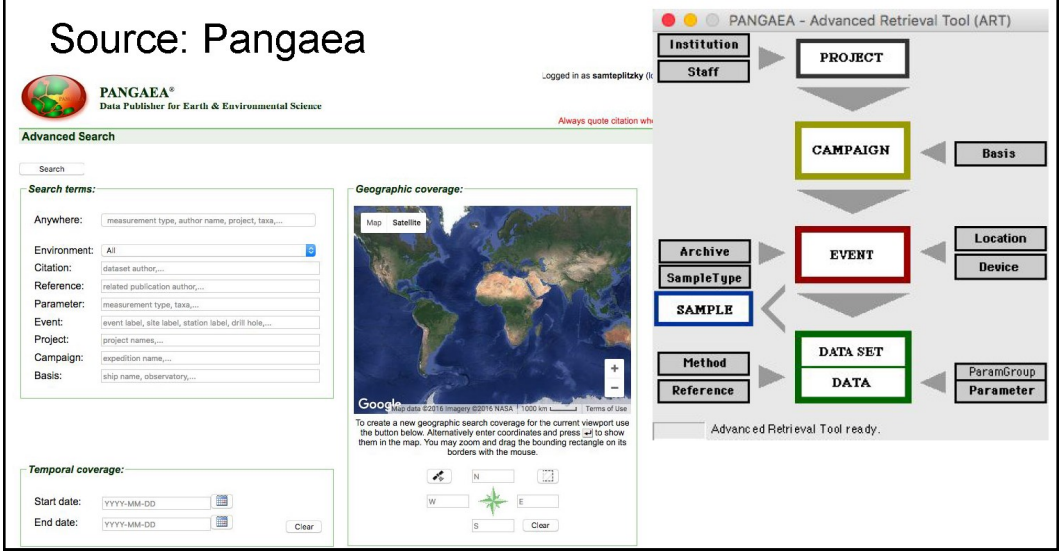
more likely to be open access (in all of its definitions)

when researchers open their data?

Outline

- Methods
- Results
  - Open availability
  - Overlapping access
  - Publisher trends
- Context & Future directions

Source: Pangaea



Methods (1): open availability

1. All article citations from 2010 and 2015 were downloaded from Pangaea using Pangaea's advanced retrieval tool.
2. Each article was searched in Google Scholar for its availability as:
   - Gold Open Access: open articles published in a Full Open Access Journal
   - Hybrid Open Access: open articles published in a subscription or hybrid journal
   - Green Open Access: open before or immediately after publication through an institutional or subject repository, or personal/author website
   - Posted on Researchgate: (Robin Hood or Rogue OA) papers archived in non-institutional repositories or sites such as ResearchGate and Academia.edu
   - If available, status of rolling, delayed open access, embargoes was noted.

(OA definitions from: Archambault et al., Science Metrix, 2014)

Methods (2): publisher trends

1. For each year, from 2010 through 2015, journal titles were examined and assigned to their appropriate publisher.
2. The number of articles from each publisher was noted for each year.
3. Articles published in full open access journals were then counted for each year.

Status of journals as open access was checked on journal websites, as well as DOAJ (doaj.org) and the Geoscience Information Society list of open access journals relevant to the Earth Sciences

Results:

Open availability of articles linked to Pangaea data

	2010	2015
Total articles searched	744	482
Gold	10%	31%
Hybrid	7%	10%
Green	46%	34%
Researchgate/Rogue	65%	49%
% of total articles openly available in at least one of above	75%	72%
Not openly available	25%	28%

Results:

Open availability of articles linked to Pangaea data

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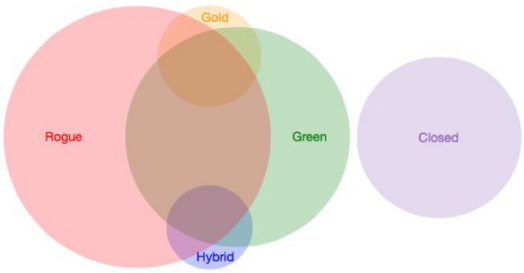
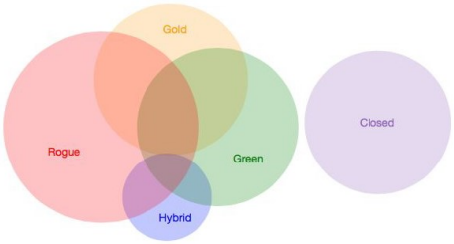
Hybrid	7%	10%
Green	46%	34%
Researchgate/Rogue	65%	49%
% of total articles openly available in at least one of above	75%	72% ➡ 80-85%
Not openly available	25%	28%

Overlap in access

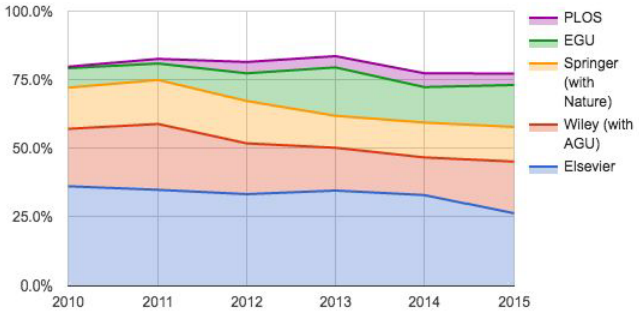
2010
Total = 744



2015
Total = 482



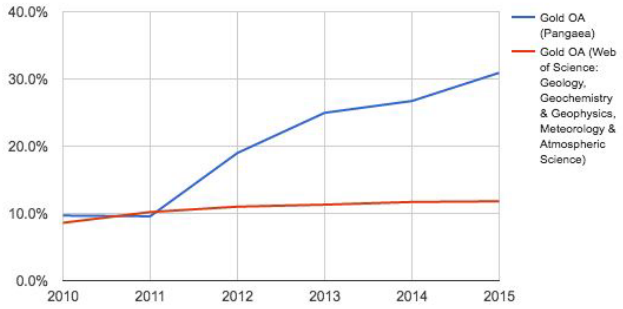
Publishers represented by Pangaea articles



*Publishers with less <3% articles not shown above include AAAS, GSA, Oxford, Taylor & Francis

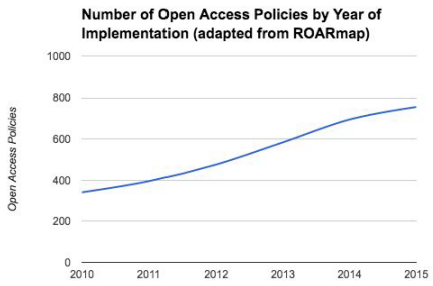
How do Pangaea depositors' publishing choices compare to Earth Scientists in general?

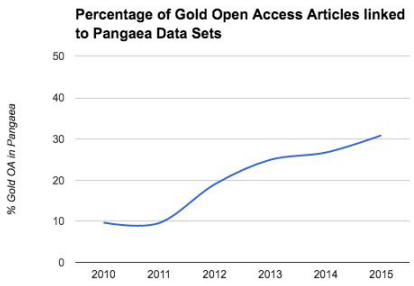
Gold Open Access Articles in the Earth Sciences



Why have Pangaea depositors increasingly chosen gold open access venues for publication?

Trends in open access





Conclusions/Implications

1. Data sharers are more likely than researchers in general to publish their articles open access.
2. The adoption of institutional, funder and publisher mandates influence all areas of open science. The promotion of research data management, sharing and deposit should consider the entire research life cycle, and encourage the opening of articles as well as data.
3. Increasing preference for gold open access journals among Earth Scientists, calls into question the journal subscription model and suggests that individual disciplines might have their own “tipping point” in favor of open access.

Thank you!

Questions?

PROJECT TO COMBINE A GUIDEBOOKS DATABASE INTO GEOREF; STATUS REPORT

Lura E. Joseph
University of Illinois Library
1408 W. Gregory Dr., Urbana, IL 61801, luraj@illinois.edu

Abstract—The Geologic Guidebooks of North America Database (Guidebooks Database) is a freely searchable online index maintained cooperatively by the Geoscience Information Society and the American Geosciences Institute (AGI)/GeoRef. In 2014, at the Vancouver Geological Society of America Annual Meeting, a presentation addressed the need to combine the Guidebooks Database into GeoRef. AGI is changing its server to a new platform, and the Guidebooks Database is not compatible, making consolidation into GeoRef a necessity. As many as 2,945 entries in the Guidebooks Database need to be fully indexed and added to GeoRef. That project is well underway. After the consolidation, it will be possible to pull the guidebook records into a new database on the new AGI platform. The new configuration would be similar to that of the newly migrated Cold Regions Bibliography. Problems in some Guidebooks Database records were discovered during this project; these will be corrected, resulting in a much more useful resource, and the additions to GeoRef will enhance that index.

INTRODUCTION

The Geologic Guidebooks of North America Database (Guidebooks Database) began as the *Union List of Geologic Field Trip Guidebooks of North America*, a print resource originally produced in 1968 by the Geoscience Information Society (GSIS), and ending with the 6th edition in 1996. The Union List was created to facilitate the identification of geologic field trip guidebooks, many of which had limited distribution, making it less likely that they would be included in the GeoRef database. Members of GSIS sought out information about local and regional guidebooks and compiled the information into a listing of these resources, including which libraries owned them. The *Union List* was converted to digital format in 2002 and hosted online by the American Geological Institute (now the American Geosciences Institute, AGI). Currently, as guidebook titles are added to GeoRef, they are also added to the Guidebooks Database.

Despite the best efforts of the compilers, neither the Guidebooks Database nor GeoRef has complete coverage of geologic field trip guidebooks. The Guidebooks Database lists field trip guidebooks that are not indexed in GeoRef (especially early years), and GeoRef contains many titles that are missing from the Guidebooks Database (especially for non-North American trips). There are many guidebook titles that are not contained in either resource, some of which can be identified in WorldCat.

AGI/GeoRef staff members are in the process of migrating the various independent databases maintained by AGI to a new platform; however, it is not practical to migrate the Guidebooks Database to the new platform due to incompatibility issues. In 2015, a project to compare the two databases was begun in order to determine the amount of work necessary to bring the information in the Guidebooks Database into GeoRef.

THE PROJECT

First Phase

AGI/GeoRef provided an Excel spreadsheet of the Legacy Database. The Legacy Database contains the content of the Guidebooks Database immediately after the 6th edition of the Union List was converted to digital format, and before any updates were added. Any additions to the Guidebooks Database after that point were first added to GeoRef, and therefore did not need to be checked.

A task force (see Acknowledgments) was formed from the GSIS membership to compare the items in the Legacy Excel spreadsheet with GeoRef to see

how many were missing from the GeoRef database. Most of the individuals in the task force serve on the GSIS Guidebooks Committee. The work of the task force members is now finished, and individual sections were merged back into one Excel spreadsheet.

Problems Encountered During the First Phase:

There are a number of factors that created problems in comparing the two databases:

1) The differences between the two databases (Joseph, 2016): The Union List was focused on trips; it is often necessary to examine the detailed record in the Guidebooks Database to determine the guidebook title and information. One guidebook may contain a number of trips, all of which are listed separately in the Guidebooks Database. GeoRef indexing includes both the monograph title and also any separately authored content, which may include both trips and articles. However, if a trip is not separately authored, it will not have a separate record in GeoRef.

2) A single guidebook may have been sponsored by multiple organizations, making it more difficult to find in GeoRef if all of the sponsors were not included in the record.

3) For a number of years, GeoRef used various abbreviations for societies.

4) When generating the Excel spreadsheet for the Legacy Database, a number of errors were introduced, including incorrect publication dates and issue information. For the items not found in GeoRef by the task force members, it was often necessary to refer back to the Guidebooks Database to find the correct information. This accounted for many of the items that were missed by the task force, but later found already to be in GeoRef.

5) Weird Union List entries: A large number of confusing titles were contributed to the original Union List. Some are typographical errors. Some result from differences between the covers and title pages of guidebooks. There are sometimes differences between the title of a trip in the table of contents and the actual article in the guidebook; the Union list contributors sometimes used the table of contents title, whereas GeoRef uses the title on the article. And most problematic, in a number of instances, the Union List contributors used a description of the trip or geographic location of a trip instead of a title. All of these factors contribute to difficulties in comparing entries in the Guidebooks Database with WorldCat and GeoRef.

Results of First Phase:

As of July 13, 2014, the number of records in the Guidebooks Database was 12,394. There are 9,326 total records in the Legacy Database (a combination of trips and monograph titles). After comparing the two databases, the task force identified 3,256 entries in the Guidebooks Database that they were unable to find in GeoRef. That number will change as indexing progresses, since some of the "missing" ones are actually already in GeoRef. Reasons for the difficulties in comparing across the two database have been discussed above. Some of the 3,256 entries are trips within guidebooks, and some are guidebooks.

TABLE 1. RESULTS

12,394 records in the Guidebooks Database (July 13, 2014) (both trips and guidebooks)
9,326 records in the Legacy Database
3,256 records identified as missing from GeoRef by task force 264 already in GeoRef
2,945 entries in Guidebooks Database needing to be indexed for GeoRef 830 at UIUC 349 additional at Austin 220 available online 1,005 available at other libraries 2,404 available (82%) 80 conditionally identified locations 357 not in WorldCat, but locations in Guidebooks Database
104 no location in WorldCat nor Guidebooks Database

Second Phase

Copies of the guidebooks missing from GeoRef must be found in order to index them according to GeoRef standards. After the task force finished their comparisons, the task force chair examined each of the entries from the Guidebooks Database that were not identified in GeoRef. WorldCat was used to find locations for those guidebooks so that a copy can be used for indexing into GeoRef.

Results of Second Phase:

As the 3,256 entries were checked to find locations of print copies, 264 were found to already be in GeoRef. Another 47 were found to be "not applicable;" the Guidebooks Database stated that there was no guidebook, the trip had been cancelled, etc. Therefore, at this point, there appear to be 2,945 entries that need to be indexed for GeoRef. Again, as the project continues, it is likely that some of these will be found to be in GeoRef already.

AGI has indexers working in the Champaign-Urbana, IL, and Austin, TX, areas. The University of Illinois holds 830 of the items needing to be indexed, and Austin, TX, holds an additional 349 items. There are 220 guidebooks that are known to be online, and AGI/GeoRef will index those. Using WorldCat, an additional 1,005 items have been identified in other libraries. Therefore, 2,404 of the 2,945 (82%) that need to be indexed can be accessed without much difficulty.

Another 80 items have been conditionally identified, but will need to be checked. There are an additional 357 that were not found in WorldCat, but for which there are library locations in the Guidebooks Database, and 104 do not appear to be in WorldCat, and do not have locations listed in the Guidebooks Database. The 357 items will require a lot of effort, since it will be necessary to contact the individual libraries to see whether they still have the items, and are willing to lend them for indexing. Since they are not in WorldCat, they may be difficult to borrow through interlibrary loan . The 104 items pose the greatest problem. On the other hand, if multiple librarians can't find them, and there is no known location, then perhaps they are not worth worrying about. Perhaps there can be an appeal to the GSIS community to help identify any of the last 104 items.

Final Phases

The third phase will be to index the missing guidebooks, and the last phase will be to create a new and improved searchable guidebooks database on the new AGI platform. With AGI's blessing, this would remain free of charge. Work should continue to identify guidebooks that were produced after the Legacy Database and that are missing from GeoRef.

DISCUSSION

The final result of this project will be improvements to both the Guidebooks Database and GeoRef. As discussed above, there are many problems with the entries in the Guidebooks Database resulting in problems identifying and locating copies of the guidebooks, and reducing the value of the resource. By indexing the items according to the high standards of GeoRef, the quality of the Guidebooks Database will be increased. Adding the missing items to GeoRef will also improve that resource. The final configuration of the Guidebooks Database is still being considered. If all of the guidebook entries from GeoRef are made available, it will vastly increase the size of the Guidebooks Database. Currently, the Guidebooks Database consists mostly of trips in North America. If GeoRef is willing, guidebook titles to trips in the rest of the world could be added. The new platform will enable enhanced geographical searching, such as for the new Cold Regions Bibliography (http://www.coldregions.org/vufind/).

ACKNOWLEDGMENTS

Task force members: Amanda Bielskas, Marie Dvorzak, Jody Foote, Lura Joseph (chair), Dorothy McGarry, Linda Musser, and Linda Zellmer. Anne Huber helped with ISGS titles. AGI/GeoRef staff member Lawrence Berg provided an Excel spreadsheet of the Legacy Database, and ran an initial match against GeoRef; without the spreadsheet the project would have been essentially impossible. Sharon Tahirkheli (AGI/GeoRef) continues to provide support and encouragement.

REFERENCES CITED

Joseph, L.E., 2017, Geologic Guidebooks of North America Database vs GeoRef; Proposed project to combine the Guidebook Database into GeoRef: Geoscience Information Society Proceedings, v. 44 (this volume), p. 71.

PROSPECTING THE USGS LIBRARY MATERIALS FOR GIS NUGGETS

Emily C. Wild
U.S. Geological Survey, Denver Library
Box 25046, MS 914, Denver Federal Center, Denver, CO 80225, ecwild@usgs.gov

Abstract—The U.S. Geological Survey (USGS) Libraries Program has the largest geoscience collection in the United States, and worldwide. Though access and availability to electronic and georeferenced documents have been exponentially increasing each year, there are still many "print-only" materials that have useful "GIS nuggets" for scientific research, natural resource mitigation, legal issues, and general interest inquiries from library users. Likewise, many federal documents and other print materials from the 20th Century have yet to be index within online bibliographic databases, though the information is indexed within print indexes and bibliographies. Come discover hidden gems within our own USGS Library!

PROTECTING PLACES: RESPONDING TO REQUESTS FOR INFORMATION ABOUT SENSITIVE PLACES

Linda R. Zellmer
University Libraries, Western Illinois University
One University Circle, Malpass Library, 415, Macomb, IL 61455-1390, LR-Zellmer@wiu.edu

Abstract—Librarians are strong advocates of open access, from journal articles to data. Geoscience librarians who oversee collections containing maps and other forms of spatial information are sometimes asked for information about the location of a place. Those questions could deal with anything from the location where an ancestor lived to finding a map showing the location of quarries that existed in an area during the late 1800s so an architect can find the source of the stone that was used to build a historic building. Most librarians will attempt to answer these types of questions by directing users to resources such as gazetteers, atlases, current and historic maps, and plat books. However, there are some locational questions that should give librarians cause for concern:

- I want to go spelunking this weekend. Are there any caves nearby that I can visit?
- I want to visit Truitt cave. What is its exact location?
- Where can I go prospecting for dinosaur bones?
- I am going four-wheeling this weekend and want to visit some ruins. Is there an area in the back-country that has ruins?

There are several reasons why librarians might want to think twice about answering these questions. Caves on federal lands are protected by federal law and some states also have laws protecting caves and speleothems. Fossils are also protected on federal lands and in some states. Archaeological sites are also protected by both federal and state laws. This presentation will discuss federal and state laws protecting caves, fossils, and archaeological sites, the reasons for these laws, and other issues to consider when asked for cave information, including ecology, safety, property ownership, and liability. It also proposes a policy for dealing with users requesting information about caves, fossils and archaeological sites and suggests other steps for librarians to consider to help protect information about sensitive places.

RESEARCH DATA COMPETENCIES FOR ESCIENCE USE OF GIS AND IMAGERY DATA IN THE GEOSCIENCES

Chris Badurek
State University of New York at Cortland,
Department of Geography, Cortland, NY 13045, christopher.badurek@cortland.edu

Abstract—Assessment of research data competencies are the focus of recent data information literacy related initiatives by major funding agencies, professional societies, and university-led science data portals. The National Science Foundation has also emphasized a need for data and computing savvy scientists, particularly to take advantage of technological investments in cyberinfrastructure initiatives. This paper examines research data competencies for the geosciences relevant to these needs beyond core-level data literacy. A sample of data sets from three areas of the geosciences are examined to determine bottlenecks in their appropriate use: USGS web GIS geological resources, NASA satellite imagery resources, and georeferenced natural history data. The parameters of scale, resolution, depth of metadata, lack of cartographic knowledge, misunderstandings of uncertainty, and selection of covarying variables are found to be areas for potential bottlenecks for novice and moderately experienced users. These issues represent areas that could be included in more effective data information literacy trainings and support materials.

METHODS FOR VISUALIZING WATER RESOURCE EVOLUTION WITH APPLICATION TO THE HIGH PLAINS AQUIFER IN WESTERN KANSAS

Misty E. Porter
Mary C. Hill
Geology, University of Kansas
1475 Jayhawk Blvd, Lawrence, KS 66045, misty.porter@ku.edu

Abstract—Environmental assets like arable land and water have been developed extensively with consequences such as large-scale groundwater depletion evident in satellite imagery. Agricultural irrigation is supplied by groundwater pumping. Yet even in such a dramatically affected area, many people are still unaware of the consequences of large-scale groundwater depletion. Combining open data sources with modern computer technology will enable the development of a visual representation of data that will aid in understanding the impacts of historical, current, and future decisions of pumping. In this project, we explore the landscape that develops as irrigation increases and then is no longer supported after groundwater storage has diminished. A time-evolving participative map showing the decline in water levels in the High Plains aquifer would allow the evolution of this resource to be more visceral to people than has previously been possible. The map will correlate pumping and drought indices with the timing of the conversion of perennial streams to ephemeral using both satellite and field measurements from open databases. Online, interactive aspects will include control of the spatial and temporal display, along with selection of point-specific series plots and data. This work will result in a dynamic interface developed using GIS and other visualization tools that will improve community education and assist in policy making as stakeholders are enabled to clearly envision the relations between data and landscape.

CITIZEN SCIENCE AS A SOLUTION FOR LOCATING LEGACY OIL AND GAS WELLS IN PENNSYLVANIA

Nooreen A. Meghani
Earth and Environmental Systems Institute, The Pennsylvania State University
318B EES Building, University Park, PA 16802, nam243@psu.edu

Anna K. Wendt
Department of Geosciences, The Pennsylvania State University
318B EES Building, University Park, PA 16802

Abstract—Legacy oil and gas infrastructure is a significant contributor to methane emissions in Pennsylvania. Orphan and abandoned wells (OAWs), typically unplugged or with failed plugs, provide conduits for methane, ethane, and other substances between rock layers and to the surface. Estimates of the number of OAWs in PA range from as low as 200,000 to higher than 400,000; however, fewer than 15,000 of these have been located in any fashion and less than 4,000 have had locations confirmed in the field by the government organizations typically responsible for plugging such wells.

In an effort to find these wells, the Orphan and Abandoned Well program at Penn State educates citizen volunteers to find and document OAWs. We have created an online database dedicated to OAW locations, both suspected and confirmed, which serves as both a community-owned data repository and as a resource for new volunteers. We have worked with three separate community organizations to bring their OAW location data to this single repository, adding over 100 citizen-located wells to our database that don't currently appear in the Pennsylvania Department of Environmental Protection's records. In addition, we have engaged with related citizen science programs like the Shale Network in order to link well locations with methane concentrations in nearby streams and rivers. Whenever possible this information is also included in the database.

We have recruited new citizen science volunteers, worked with the Department of Environmental Protection to develop a reporting methodology for volunteers, led educational workshops and field trips, and located more than 30 previously unknown OAWs. Results from in situ methane detection and stream sampling with the Shale Network implicate several OAWs as high methane emitters, with concentrations >30 ppb in water, and >640 ppm in the air. This data, collected by volunteers, is critical to prioritizing wells for plugging, particularly given the scale and complexity of this legacy issue.

HOW WE COMMUNICATED WITH LOCAL, STATE, AND FEDERAL AGENCIES WITH RESPECT TO HURRICANE STORM SURGE: THE PROCESS

Alan I. Benimoff
Department of Engineering Science and Physics
Masters Program in Environmental Science
The College of Staten Island/CUNY, 2800 Victory Boulevard, Staten Island, NY 10314
Alan.Benimoff@csi.cuny.edu

William J. Fritz
College of Staten Island/CUNY
2800 Victory Boulevard, Staten Island, NY 10314

Michael Kress
CUNY Graduate Center, College of Staten Island/CUNY
2800 Victory Boulevard, Staten Island, NY 10314

Abstract—We have been studying hurricane storm surges since 2011, and in 2014 we noted in our Northeastern GSA abstract and presentation, "Throughout history geologists have given warnings and in many cases no one listens." Furthermore, we cited the GSA Position Statement Draft in *GSA Today*, June 2013, "Geoscientists have a professional responsibility to inform government, the private sector, and the public about coastal hazards and the risks they pose, thereby encouraging and supporting responsible and sustainable policies and actions." With an interdisciplinary approach, decision makers on the local, regional, and national scale have joined forces to prepare for future storm surges and rising sea levels. In this process it was important to include scholars from various disciplines (e.g.s creative writing, sociology, psychology, economics), elected officials (city, state, and national), community leaders, urban planners, offices of emergency management, public transportation leaders. We cannot emphasize enough that to effect change in public perception of natural disasters, geologists cannot speak alone. Change requires an interdisciplinary voice. Hurricane Sandy resulted in 23 fatalities on Staten Island and millions of dollars in property damage. We used GIS and ADCIRC in modeling the effects of hurricane storm surge on a Cray XE6™ super computer in the college's Interdisciplinary High Performance Computer Center. In 2013 we held an interdisciplinary forum (http://www.csi.cuny.edu/sandyforum/news.html) in which we brought together community experts and stake holders to deal with a number of aspects of storm surge and flooding. In addition to the geologic issues we also dealt with issues such as the human impact, the economic and political aspects, and the need for more education. A key regional activity was the formation of the governor's task force for storm recovery where we presented our hurricane storm research. Recently, we received a grant from the Governor's Office of Storm Recovery titled "Go To High Ground" in which we are modeling evacuation strategies for automobiles. In this study we are collaborating with the NYC office of emergency management and as a result of this collaboration the evacuation signage has been changed on Staten Island. We hope that other geologists can learn from our experience.

Slides on subsequent pages.

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How we communicated with local, state and federal agencies with respect to hurricane storm surge: the process

Alan I. Benimoff
William J. Fritz
Michael E. Kress

GSA 2016 Annual Meeting September 27, 2016

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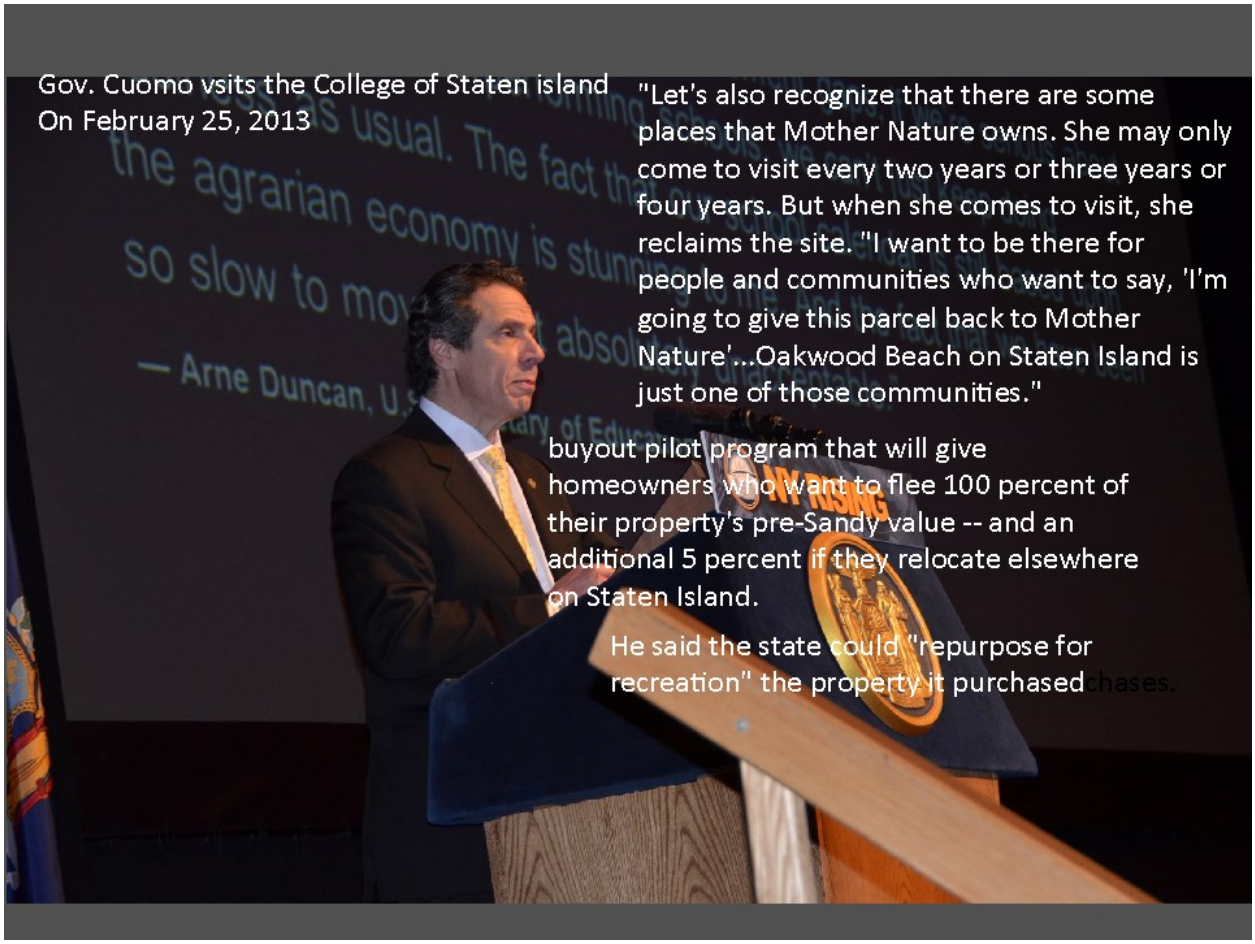
GSA POSITION STATEMENT

- Geoscientists have a professional responsibility to inform the public about natural hazards and the need to build a more resilient society, thereby enabling more responsible actions and decisions. This includes clearly explaining research results, particularly with respect to uncertainty, and promoting individual and collective behaviors that may minimize disaster impact, increase individual and community capability function during and after a disaster, and to understand and adapt to a changed environment.



NY Rising Communities

- Governor appointed task force
  - Chaired by Gov. Cuomo
  - Very active role
  - "Grass Roots" community based membership
- William Fritz – CSI president & Geologist appointed a member
  - Rising sea level
  - Geologic hazards
  - Climate change
  - Education!
  - Interdisciplinary approach & teams

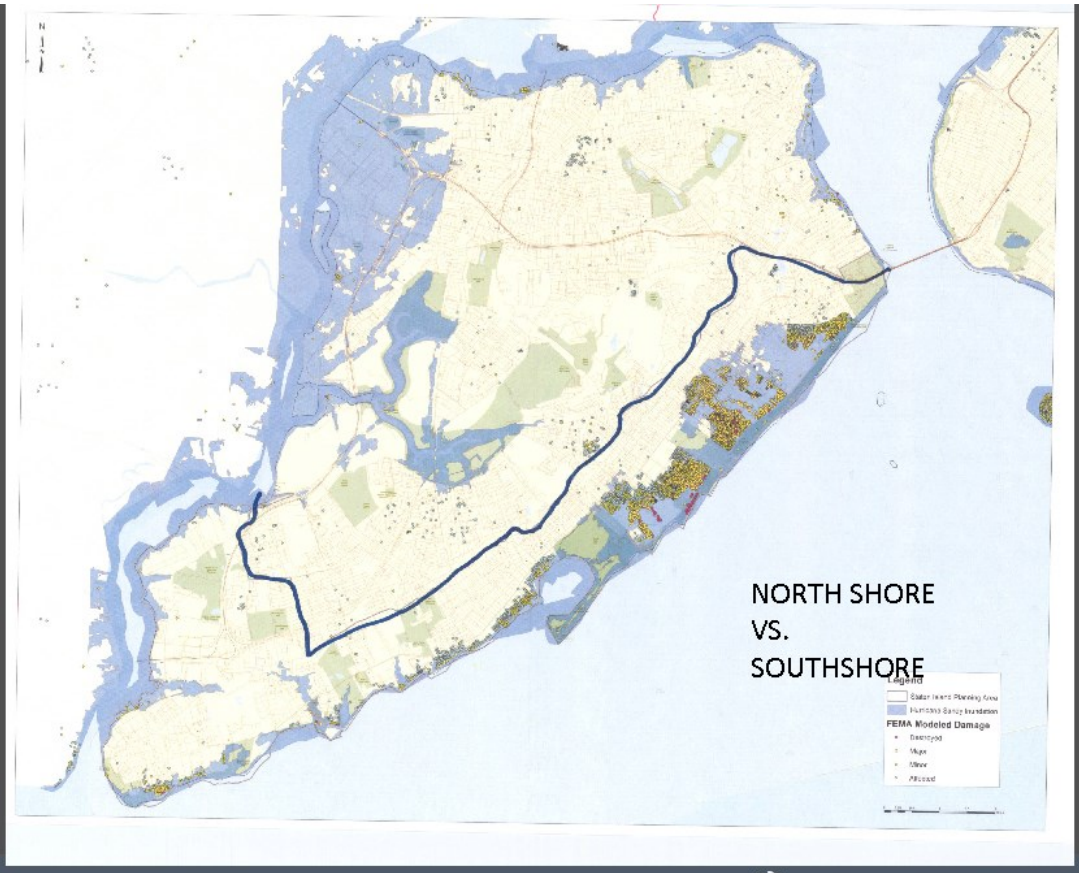
Complexities – NYC Layers of Government

- City
  - Mayor
  - City Council
  - Borough president
  - Community Boards
- State
  - Governor
  - Senate
  - Assembly
- Federal
  - Congress
  - National Park Service
  - Army Corps of Engineers
- Regulatory Agencies
  - NYC DEP
  - NYC Parks
  - NYS & NYC OEM
  - NYS DEC

Frustration at times – NY Rising Communities

30 or more people in room

- Competing interests
  - Life support
  - Rebuilding Homes
  - Small business recovery
  - Emergency plan
  - Property values
  - Political
  - Long term planning (Go To High Ground)



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Message

- Geoscientists must be willing to take on grass roots community leadership
- Education and Long Range Planning was often one voice in the room
- How do you present scientific arguments to value long term over disaster recovery?
- Geoscientists must understand that change is a long-term decade-long process that requires persistance and repetition
- Must be willing to get involved in grassroots community activism

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Become engaged

- On the surface, planners seem to care less about scientific publications
  - Not enough to publish
  - BUT if we had not published in peer-reviewed sources no one would have taken us seriously
- You need to get in and fight it out
- How do you effect change
- Role of geoscientists – become engaged and fight for the principles that are important

Bully pulpit

- Fritz - CSI president and geologist - appointed to governors task force; used regular public presentations & speeches to advocate for long-term planning
- Kress – VP, computer scientist & long-term community activist
- Benimoff – Professor of geology, long-term community activist and producer of CTV show "Geology Forum" for over 10 years before disaster
- Education on multiple layers
- Took advantage of our roles and long-term relationships

Go To High Ground

- … and take your car
- Idea – How do you it?
- Community action
- Scientific research
- Feedback loop

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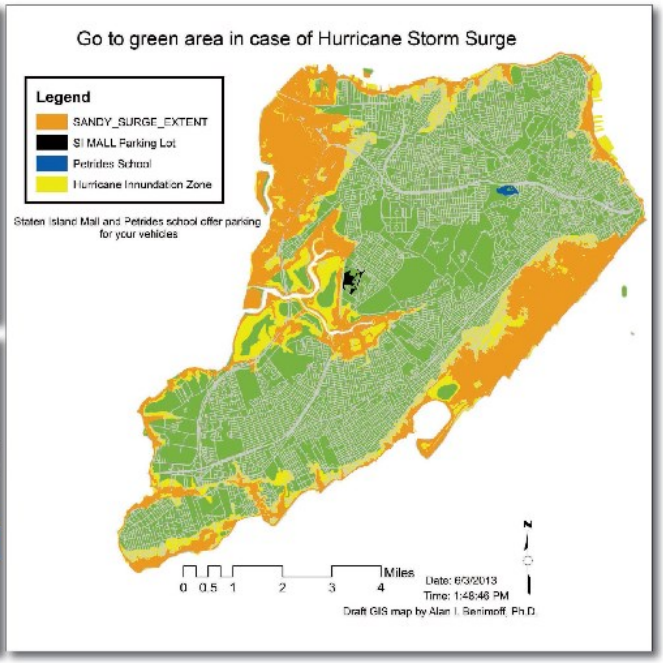

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Signage

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The City University of New York

Agencies

NEW YORK CITY DOT

STATEN ISLAND NFP ASSOCIATION

NY RISING

NYC Emergency Management

STATEN ISLAND Chamber OF COMMERCE

NYC Emergency Management

NYC Emergency Management

SIEDC
Leading In Action

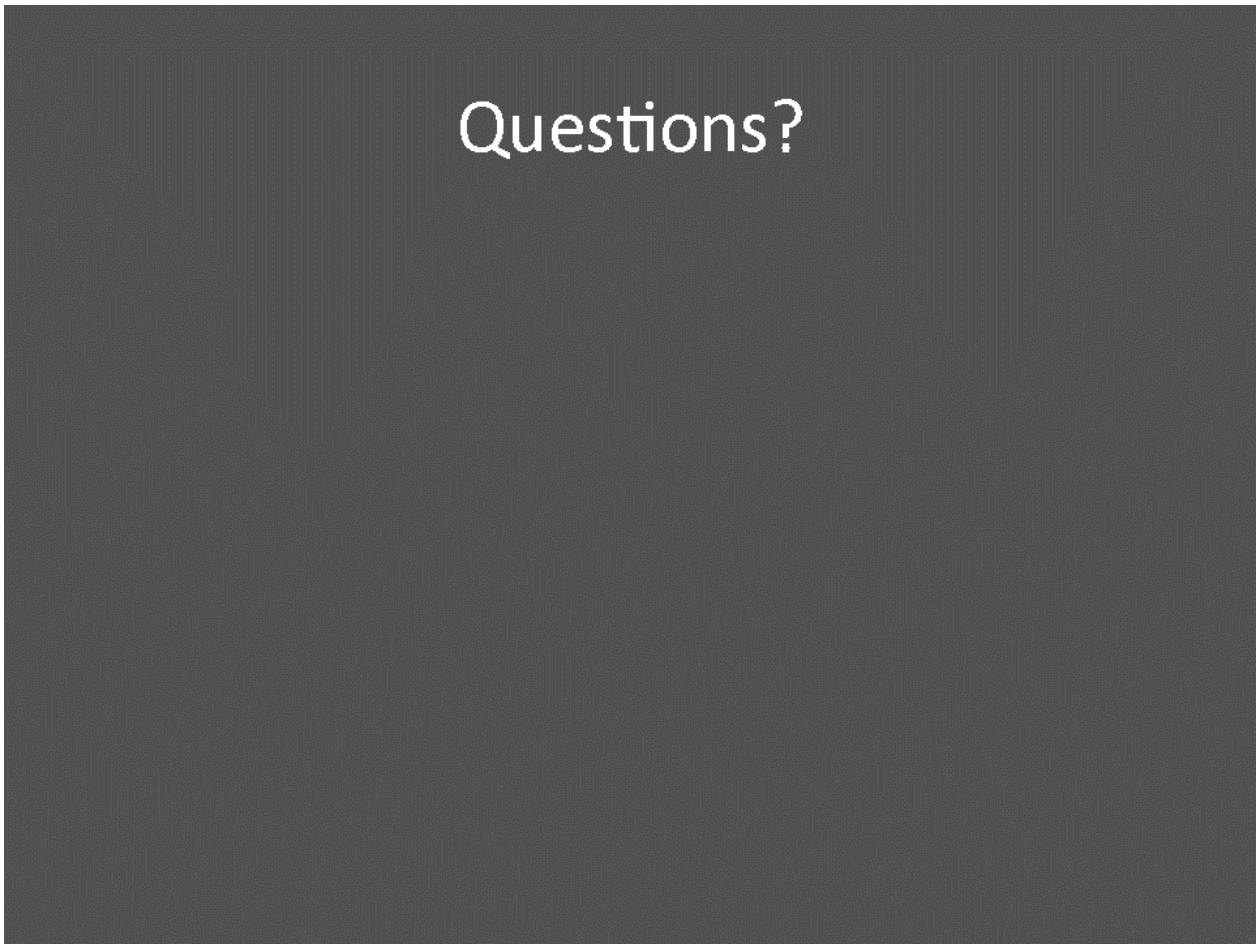
NYC PLANNING

NYC Mayor's Office of Sustainability | Mayor's Office of Recovery & Resiliency

AMERICA'S SBDC NEW YORK
Serving the Staten Island and Brooklyn Communities for Over 20 Years
SBDC AT CSI
Education, Entrepreneurship, Economic Development

Go to High Ground

College of Staten Island
The City University of New York


Questions?

TANGIBLE TRANSFORMATIONS: SCIENCE RESEARCH AND EDUCATION THAT EXPLORE INTERACTIVE 3D OBJECTS

Suzanne A. Pierce
Texas Advanced Computing Center and
Universidad Nacional Autónoma de México, Mexico City, Mexico, spierce@tacc.utexas.edu

James Pippin
Fort Valley State University, Fort Valley, GA 31030

Megan Matheney
Texas Advanced Computing Center, The University of Texas at Austin
J.J. Pickle Research Campus, 10100 Burnet Road, Austin, TX 78758

Giselle Rosado
Universidad Nacional Autónoma de México
Mexico City, 04510, Mexico

Zoi Thompson
Texas Advanced Computing Center, The University of Texas at Austin
J.J. Pickle Research Campus, 10100 Burnet Road, Austin, TX 78758

Noe Naredo-Martinez
Universidad Nacional Autónoma de México
Mexico City, 04510, Mexico

John Gentle Jr.
Texas Advanced Computing Center, The University of Texas at Austin
J.J. Pickle Research Campus, 10100 Burnet Road, Austin, TX 78758

Abstract—Three-dimensional (3D) structures and relationships are key to understanding geoscience systems and processes. Hydrogeology can benefit from techniques and innovative models that share information and knowledge about underground systems. The emergence of additive manufacturing, or 3D printing, provides a new approach for representing geologic systems. This presentation explores the role of 3D printing and tangibles for geosciences from the perspectives of enabling software, hardware, and applications to both research and educational use cases. Enabling technology development is needed to streamline the use and application of 3D printing. Available conversion processes are limited to expensive commercial software or sets of complex steps that combine applications or code snippets together with unreliable results. 3DDY is a prototype application that addresses this and provides a data pipeline and workflow for converting geospatial data. Version 0.01 combines the use of scripts, GDAL commands, and high performance computing resources to enable conversion of digital elevation models, topographic and subsurface datasets. Outputs are intended for use in data visualization, data analysis, web mapping, and 3D printing applications. The 3D files can then be printed on large-format printers like the "Gigabot" hardware project creating tangible objects based on scientific information. Use cases for 3D tangibles can include research or educational applications. Tangibles inform geoinformatics research by combining elements from cyberinfrastructure, touchscreens, and 3D printing to make interactive objects. 3D tangibles can create a cognitive bridging mechanism between complex information and contextual meaning for people. Current re-

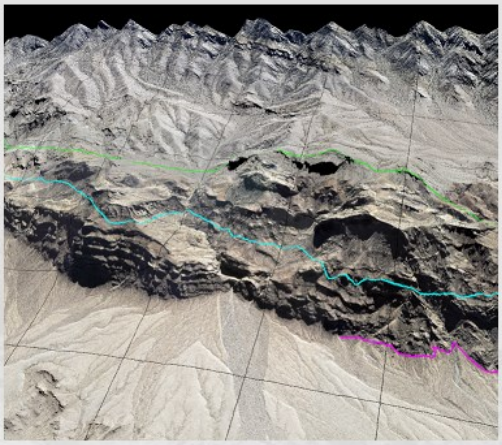
search implements creation of cave maps by testing computer vision libraries and hardware to capture cave conditions. From the field to the lab, digital formats enable interactivity and new forms of use that can help scientists communicate information to broader audiences and increase understanding of information. Interactive tangibles, when combined with data, algorithms, models, and gesture enabled technologies provide substantive mechanisms for conveying complex scientific ideas to audiences of all age levels in formal, informal, and policy settings.

USING 3D GIS TO REVEAL EXTENSIONAL FAULT AND MEGABRECCIA GEOMETRY, WEST SIDE OF THE SHEEP RANGE, NEVADA

Peter L. Guth
Oceanography, US Naval Academy
572C Holloway Road, Annapolis, MD 21402, pguth@usna.edu

Abstract—The west side of the Sheep Range in southern Nevada exposes a terrain about 5 km wide and 28 km long between the Quaternary alluvium and main structural block of the range. In the south, adjacent to the Las Vegas Valley Shear Zone, this consists of a series of very large, mostly coherent blocks of Paleozoic bedrock, which grade along strike into a 1500 m thick Tertiary basin with isolated, discrete megabreccia slides. Three dimensional GIS allows reconstruction of the geometry of the individual fault and megabreccia blocks. This work can be done in a platform like Google Earth, which requires no downloading of digital data and limited user training, and can be done anywhere in the world. Scanned maps, including many from the USGS National Geologic Data Base, can be overlaid. Users must understand map scale issues, the resolution of the digital elevation models, and issues with image seams, clouds, and color contrast in the Google Earth imagery. Moving the analysis partly or entirely to the desktop GIS allows higher resolution topographic data, and the choice of imagery. For the Sheep Range, USGS currently has 4 different sets of orthoimagery at 1 m or better pixel resolution. In the megabreccia regions with extreme slopes, this allows several looks with potentially different shadows. The Sheep Range does not yet have high resolution 3DEP coverage, but a rapidly increasing portion of the US has 1–3 m resolution topography, including parts of the Tin Mountain landslide. Previous solutions have automated the computation of three point problem, but the GIS can automatically compute a planar trend surface along each line segment, and a series of three point problems. This can highlight changes along strike, errors in contact tracing or digitization, and limitations of the input digital data. Digital investigation allows better visualization of this large area with rugged topography and limited road access, and shows multiple generations of sliding, different fault and block geometries, and the changes in structures along strike of the mountain front.

Slides on subsequent pages.



USING 3D GIS TO REVEAL EXTENSIONAL FAULT AND MEGABRECCIA GEOMETRY, WEST SIDE OF THE SHEEP RANGE, NEVADA

Professor Peter L. Guth
Department of Oceanography
United States Naval Academy
Annapolis MD, USA
pguth@usna.edu

T92. Open Data, Open Access: Trends in Geoscience Publications and Data Sources

25-28 SEPTEMBER
GSA 2016
Denver, Colorado, USA

Megabreccias of the Sheep Range
Clark County, Nevada

Nevada Petroleum & Geothermal Society
2016 Field Trip Guidebook

Don E. French
Peter L. Guth

NEVADA PETROLEUM & GEOTHERMAL SOCIETY
1986

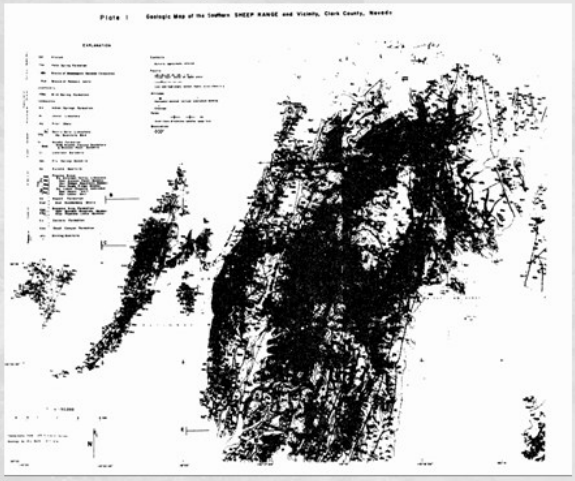
- New look at old data
- Field trip week after meeting

Publisher:
Nevada Petroleum and Geothermal Society, Inc.
P.O. Box 11526
Reno, Nevada, 89510-1526

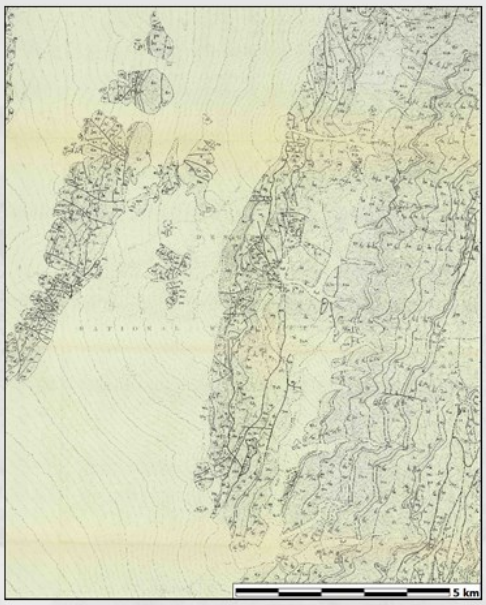
Volume citation:
French, Don E., and Guth, Peter L., 2016, Megabreccias of the Sheep Range, Clark County, Nevada: 2016 Field Trip Guidebook, Nevada Petroleum and Geothermal Society, 50 p.

Field Mapping—Pre GIS, Pre DEMs

- 1977-1979, PhD Mapping
- 1984-1987, unpublished mapping
- GSAB paper, 3 field trip guidebooks

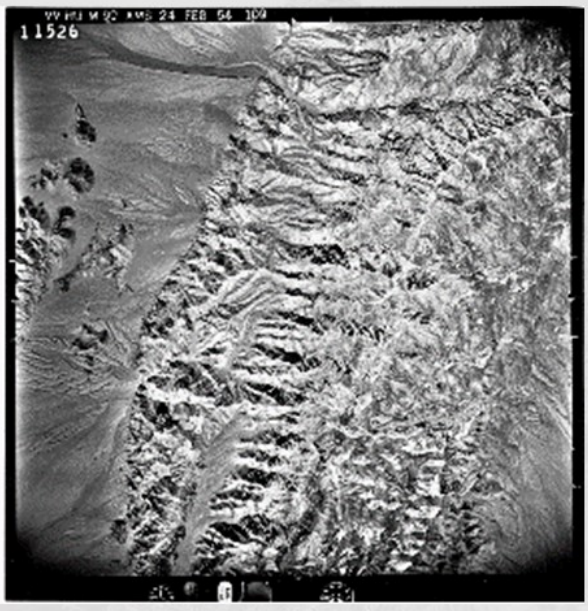


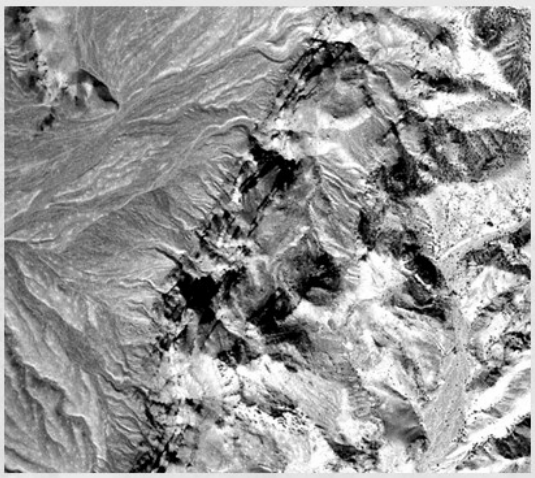
Guth, 1980 (illegible mess in library copy of thesis)



Guth, 1986 (KMZ online)

1954 Photos, for 1:62.5K Quads

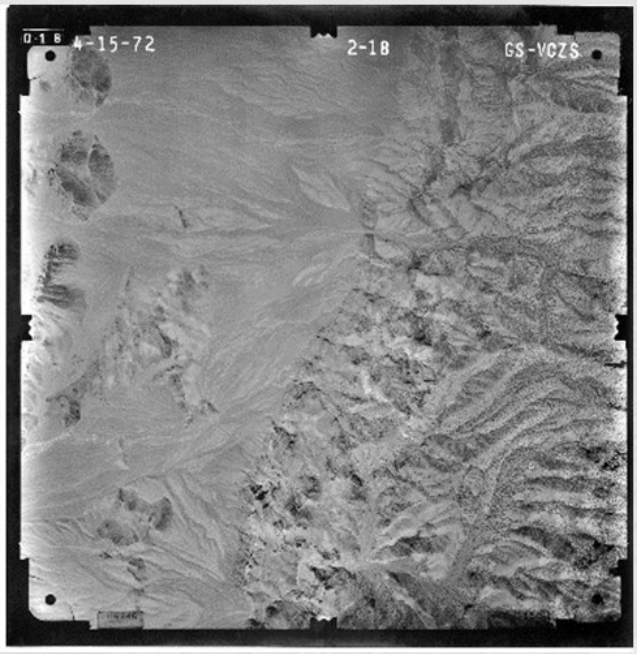


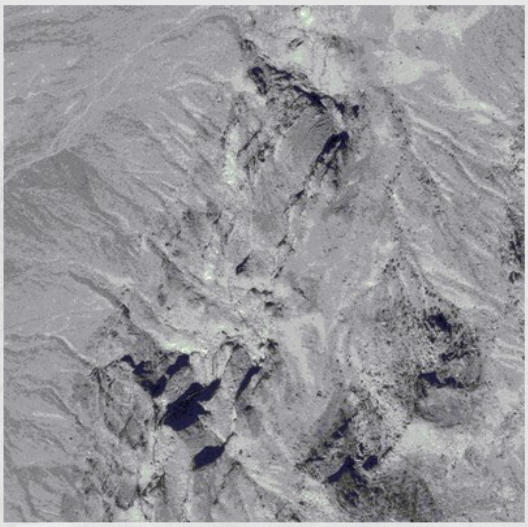


600 dpi scans, full resolution

Not free, then or now

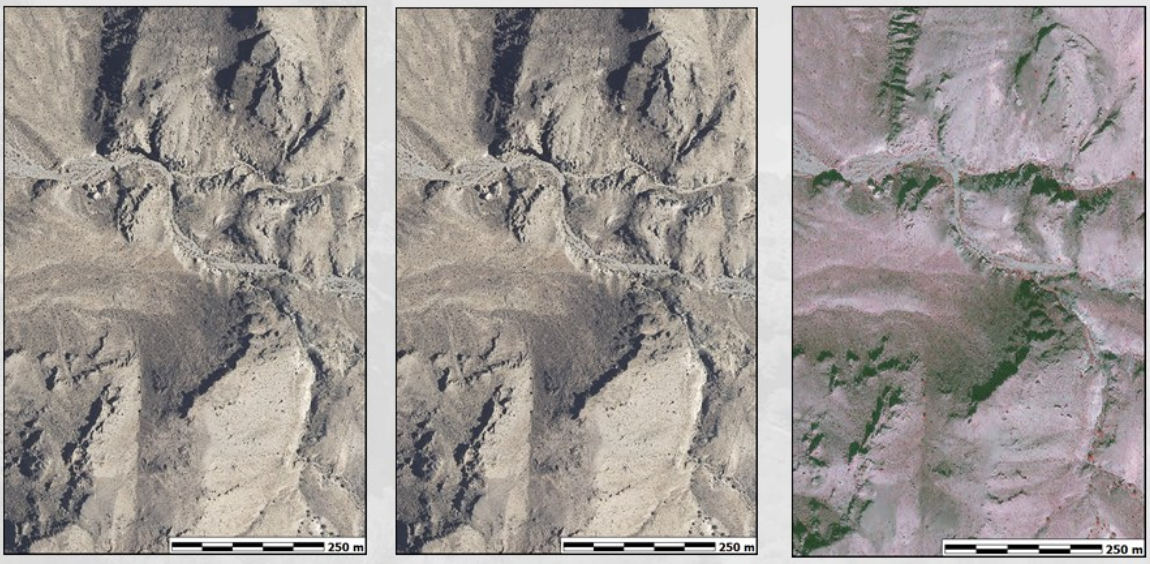
1972 Photos for 1:24K Quads



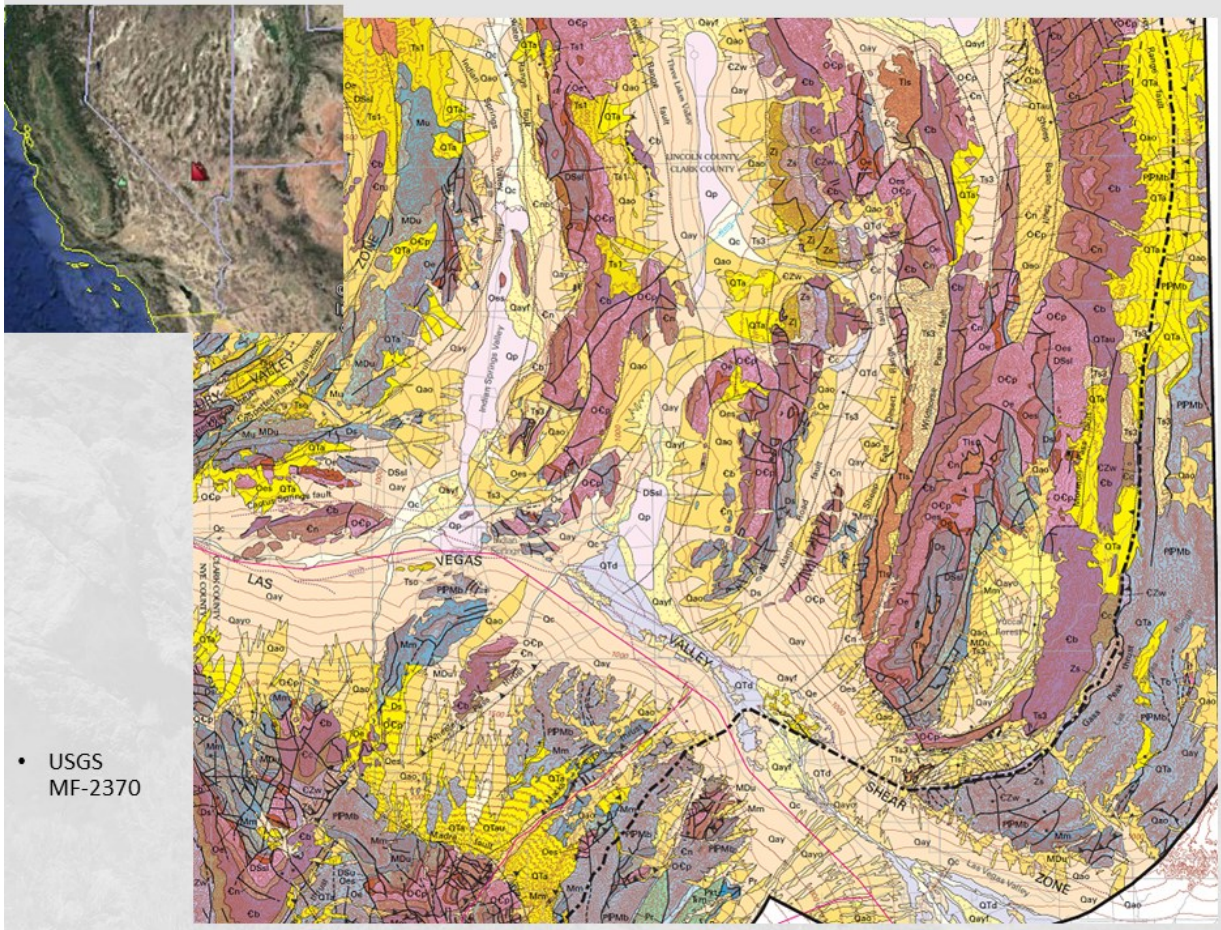


Not free, then or now

Today's Free 1m True and False Color



Download (about 5 GB) or WMS delivery (parts missing due to Nellis flight restrictions)
Multiple looks have different shadows, which are severe in this terrain



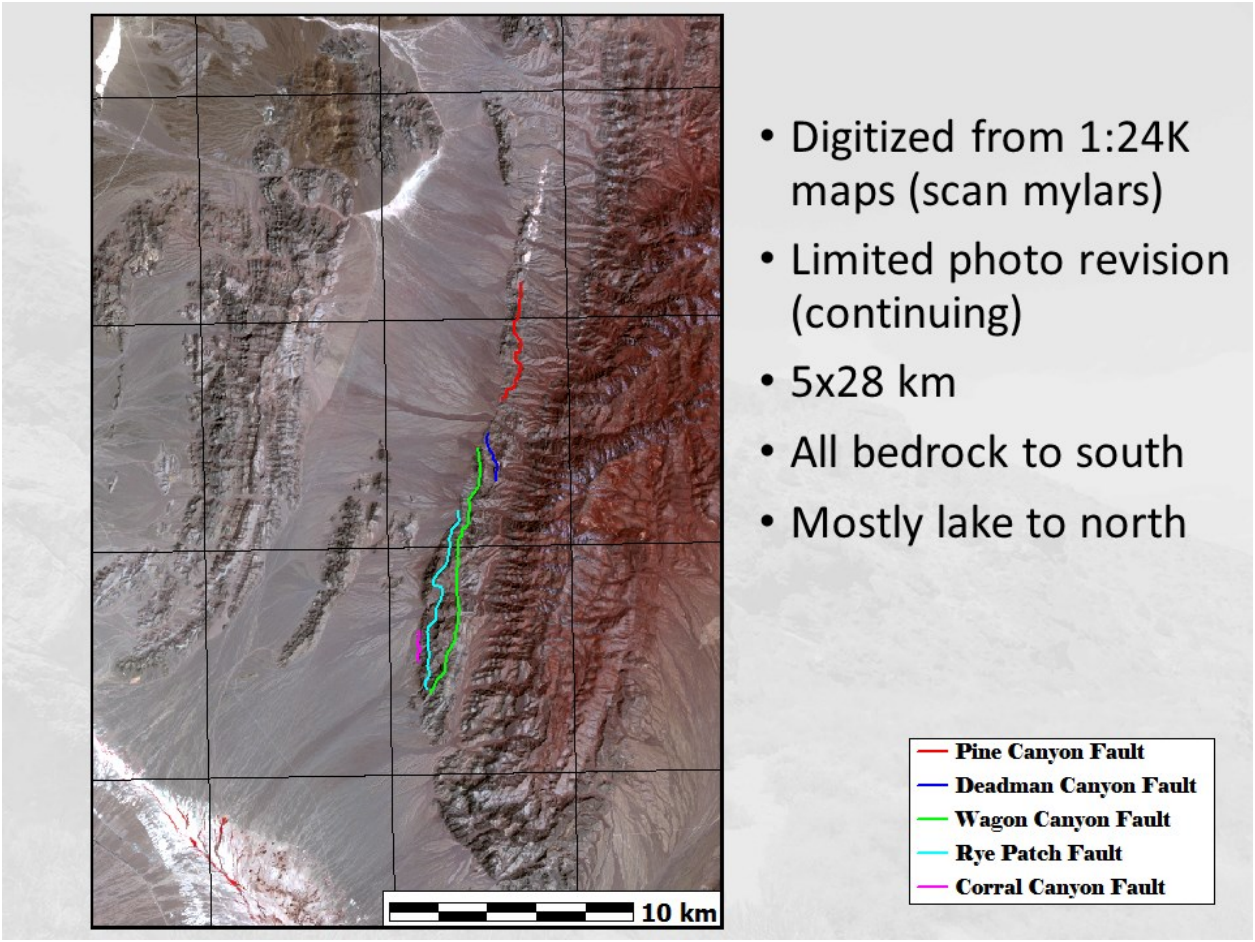
- USGS MF-2370

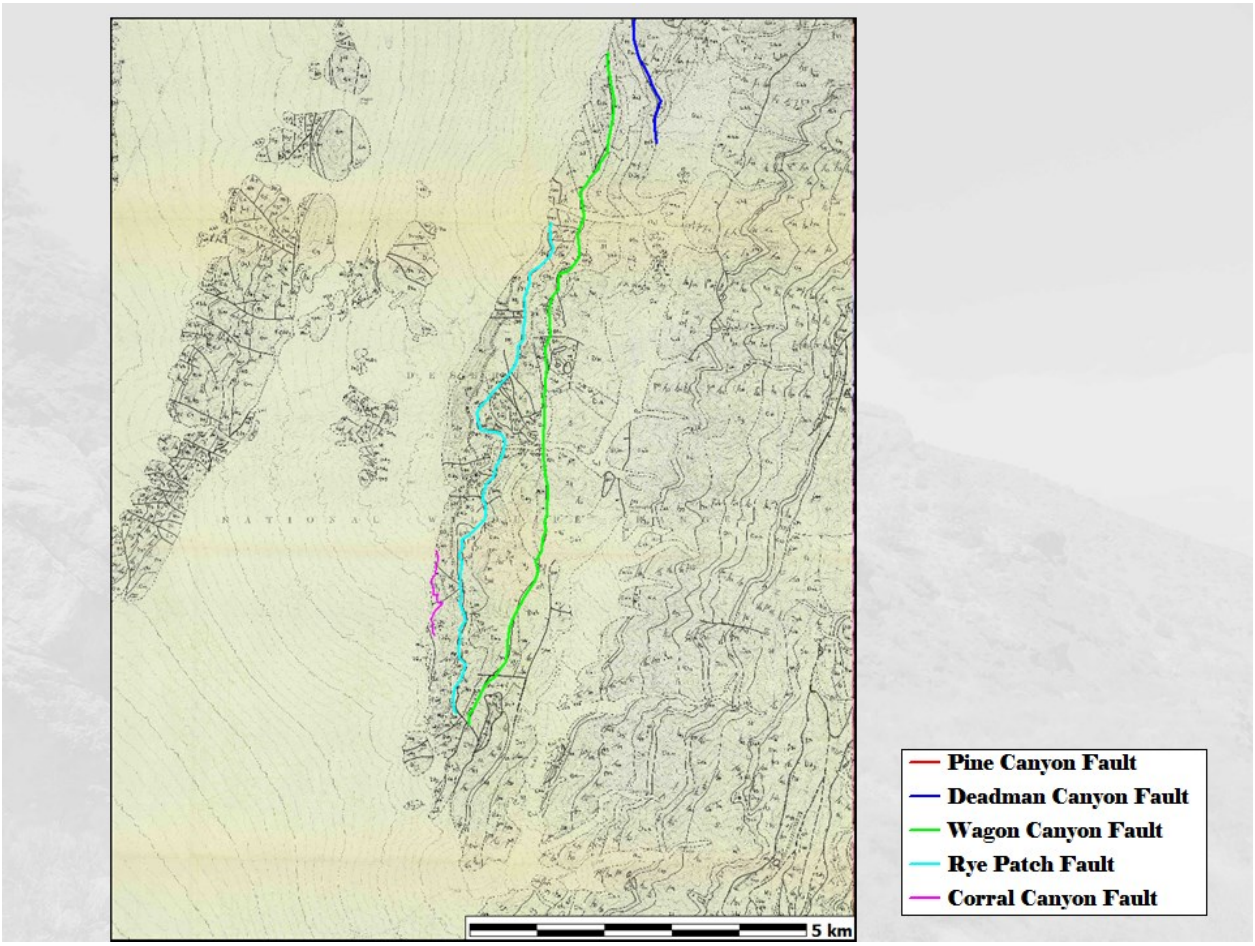
GIS

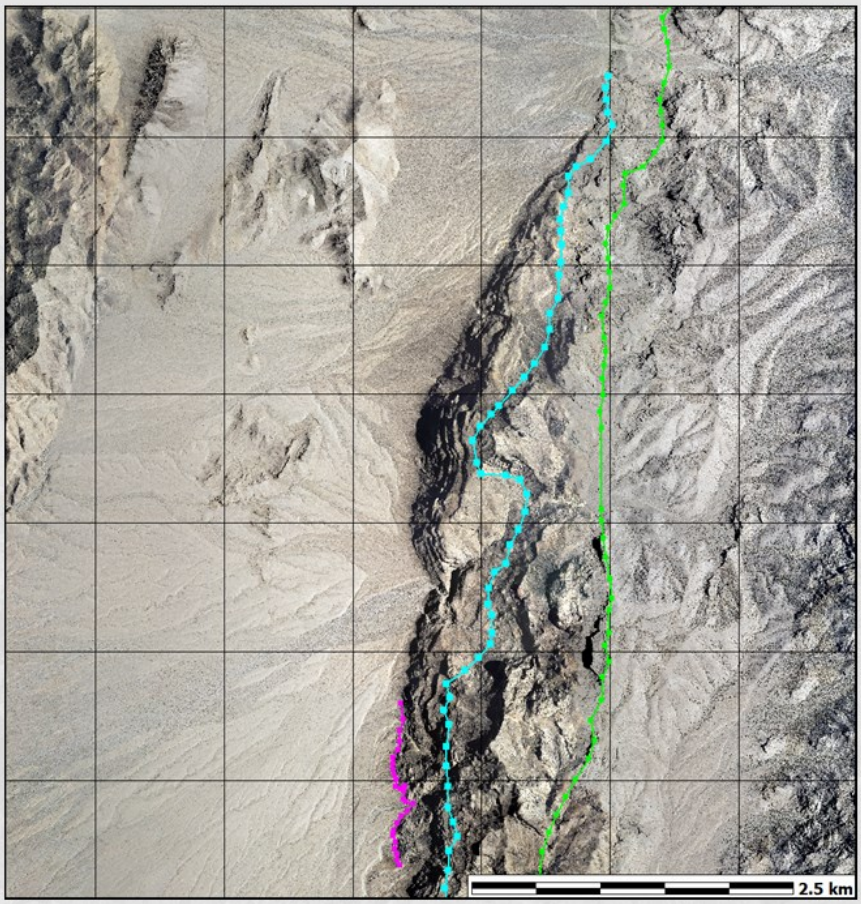
- Map based, visual
- Interactive analysis
- Common data formats
  - Rasters in Geotiff or KML/KMZ
  - Vectors in shapefile or KML/KMZ
  - Easily use multiple programs

Google Earth

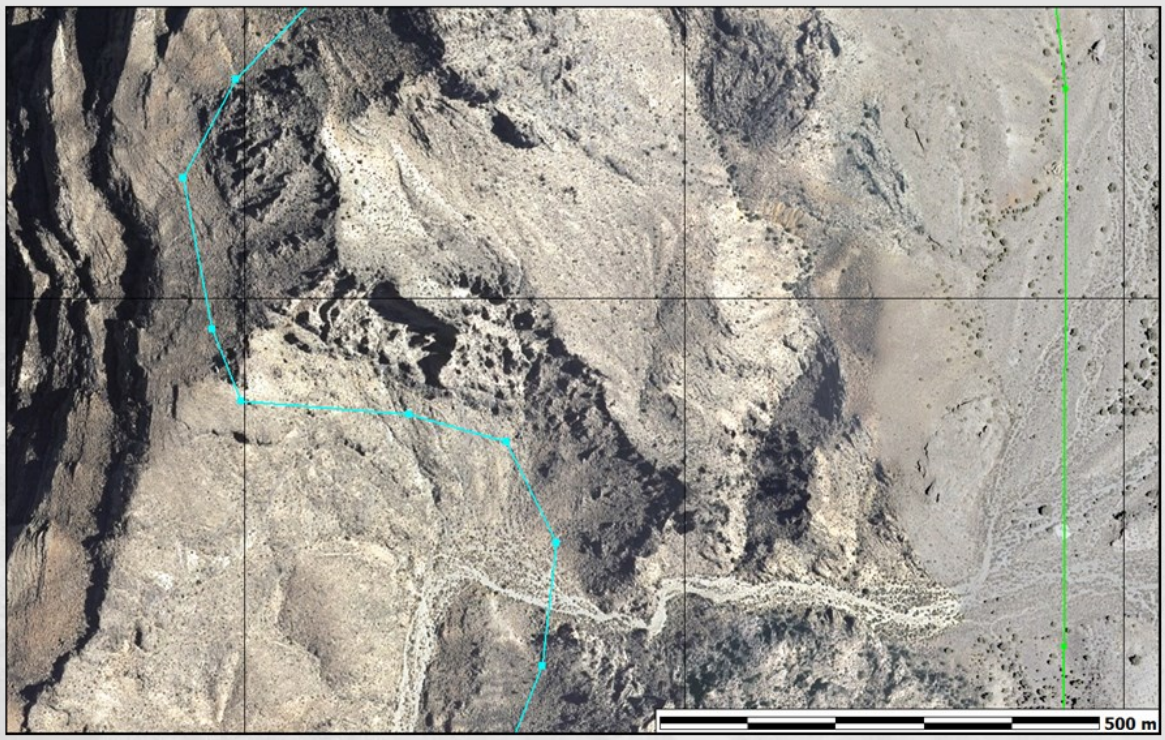
- Simplicity
- Cost (some license restrictions)
- Digitize
- Display
- Not analysis


10 km
• Digitized from 1:24K maps (scan mylars)
• Limited photo revision (continuing)
• 5x28 km
• All bedrock to south
• Mostly lake to north
Pine Canyon Fault
Deadman Canyon Fault
Wagon Canyon Fault
Rye Patch Fault
Corral Canyon Fault

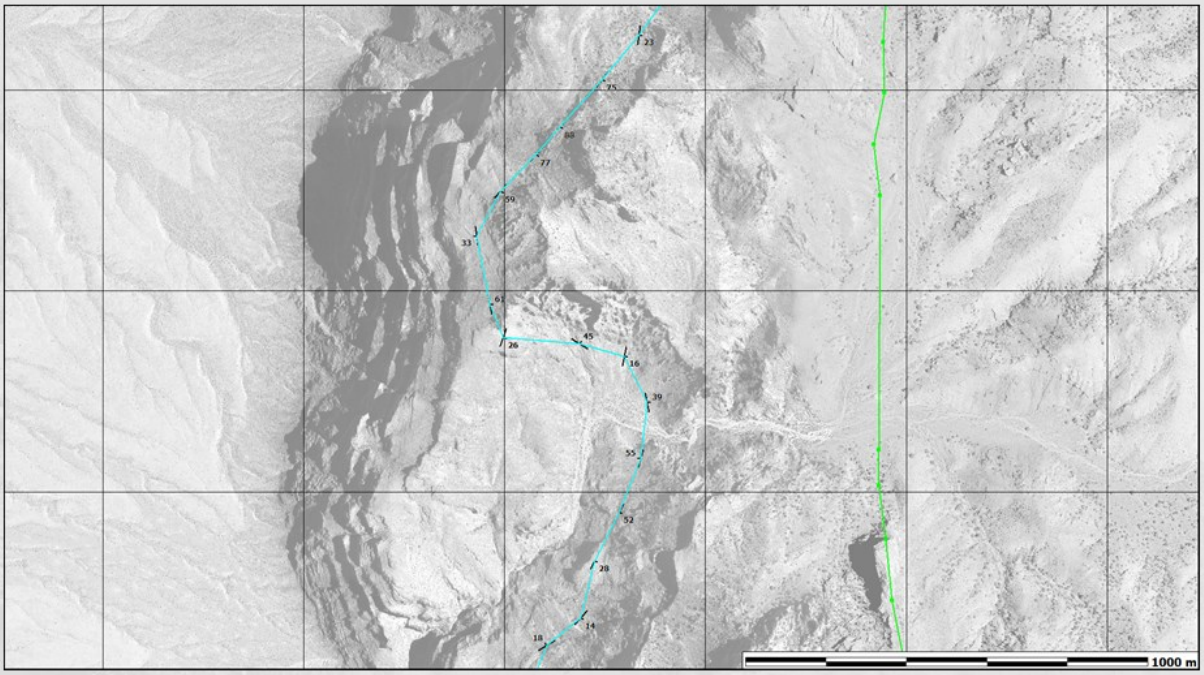

5 km
Pine Canyon Fault
Deadman Canyon Fault
Wagon Canyon Fault
Rye Patch Fault
Corral Canyon Fault



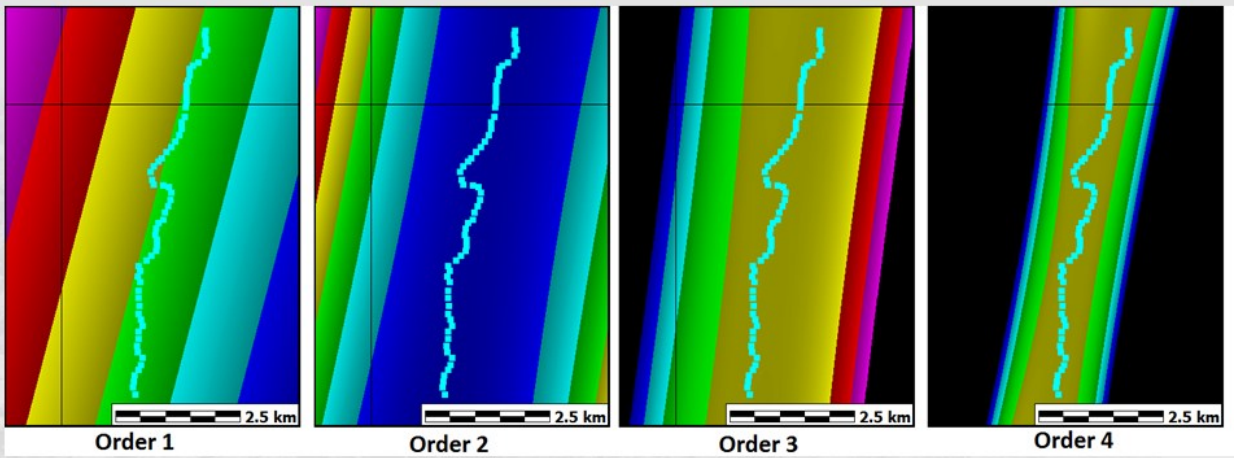
- Points
- Lines



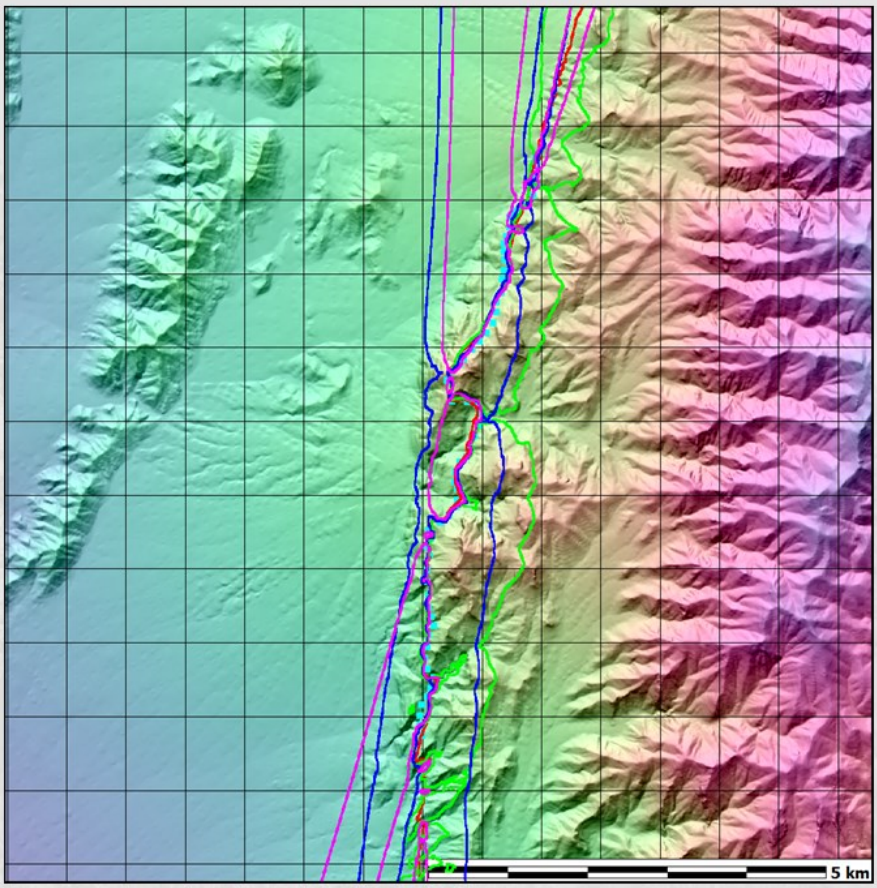
- 1 m photo resolution (much better than quads available when mapping was done)

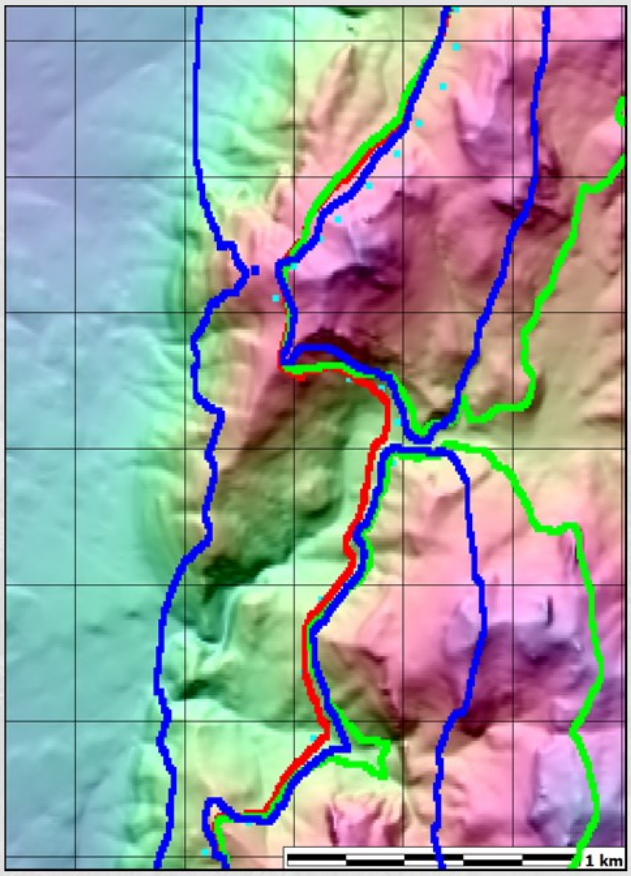


- Sequential three point problems along contact



- Trend surface, best fit to all points along contact/fault
- Narrow elevation range for fault trace
- Inflection points in higher order surfaces mostly parallel fault trace
- Deviations grid can be used for parallel planes (formation boundaries)





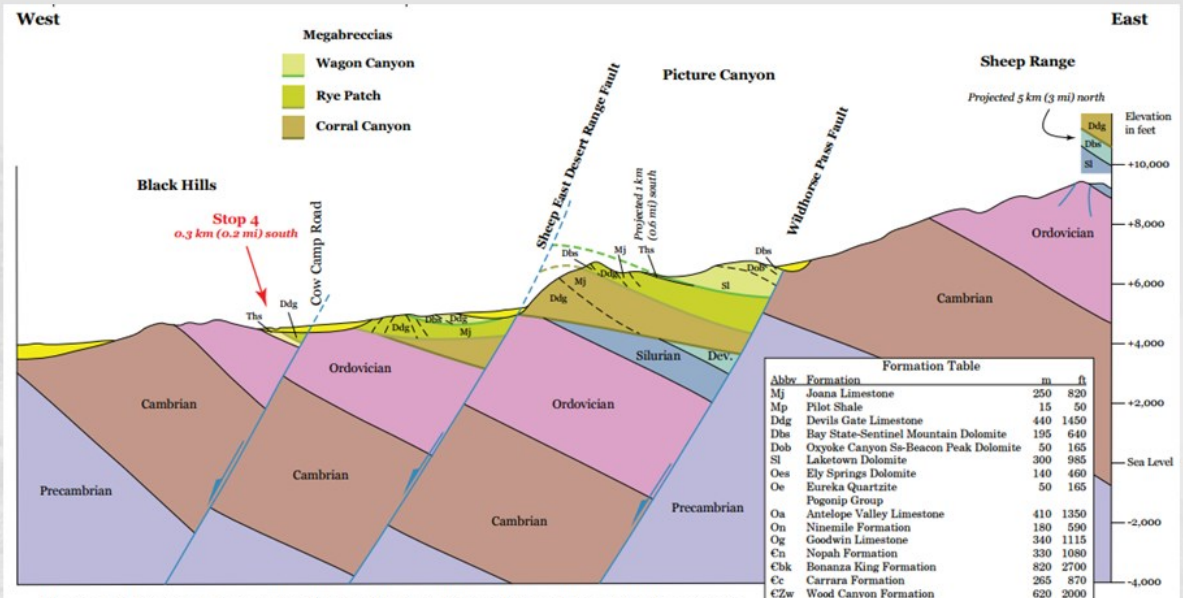
Trend surfaces

- **Order 1 (best?)**
- **Order 2**
- **Order 3**

Table 1. Major fault blocks, Hoodoo Hills Havoc

Fault	Long	Fault trend	Age of upper plate	Notes
Pine Canyon Fault (?)	9 km	N23E 5NW	Ordovician to Silurian	Limited ground control, and may be part of the Deadman Canyon block
Deadman Canyon Fault	5 km	N50E 8NW	Ordovician to Silurian	
Wagon Canyon Fault	11 km	N9E 20W	Ordovician to lower Devonian	Correlated with Cow Camp Road Fault
Rye Patch Fault	8 km	N14E 24E	Ordovician to Mississippian	Correlated with Black Hills Gap fault
Corral Canyon Fault	2 km	N11W 17W	Devonian-Mississippian	
Bedrock or unexposed fault			Devonian-Mississippian	

Low angle, initial movement to west, some rotated back to east



Formation Table

Abbv	Formation	m	ft
Mj	Joana Limestone	250	820
Mp	Pilot Shale	15	50
Ddg	Devils Gate Limestone	440	1450
Dbs	Bay State-Sentinel Mountain Dolomite	195	640
Dob	Oxyoke Canyon Ss-Beacon Peak Dolomite	50	165
Sl	Laketown Dolomite	300	985
Oes	Ely Springs Dolomite	140	460
Oe	Eureka Quartzite	50	165
	Pogonip Group		
Oa	Antelope Valley Limestone	410	1350
On	Ninemile Formation	180	590
Og	Goodwin Limestone	340	1115
€n	Nopah Formation	330	1080
€bk	Bonanza King Formation	820	2700
€c	Carrara Formation	265	870
€Zw	Wood Canyon Formation	620	2000

Figure 4-2. East-west cross section through the Black Hills and Sheep Range. Megabreccia relationships and internal deformation are more complex that shown here. (after Guth, 1986)

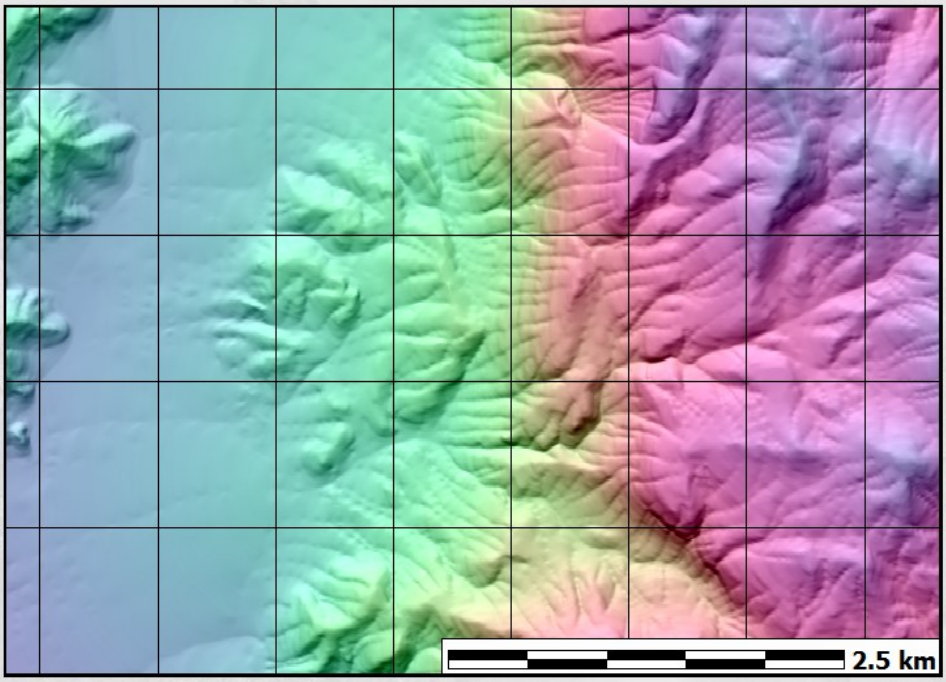
- Down to west motion
- Crossing higher angle faults
- Later rotation of faults to the east

Compare

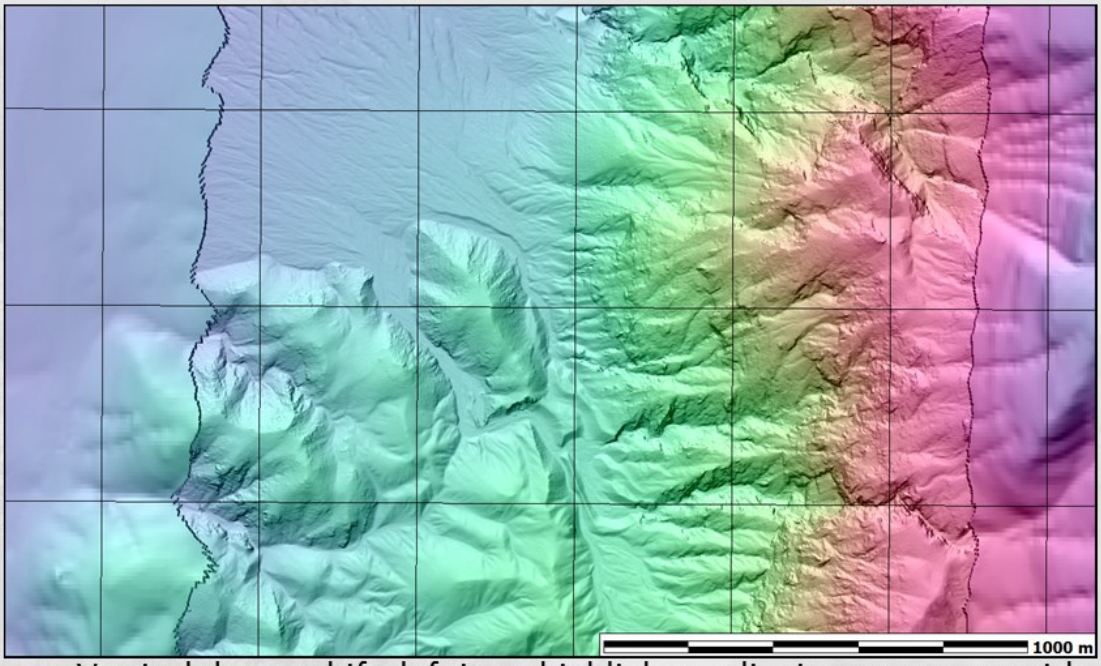
Table 2. Selected megabreccia deposits, western Great Basin

Location	Extent, length x width	Vertical drop	Slide Thickness	Age	References
Blackhawk	8 km x 3.2 km	~1200 m	10-30 m	~6.5–31 k.y.	Shreve, 1968 Nichols and others, 2006
Eureka Valley	1.7 km x 0.4 km	~700 m	20 m	8.2 – 9.5 k.y.	Wrucke and Corbett, 1990 Watkins and others, 2012 Watkins and others, 2015
Tin Mountain (4 scars)	Overall 4 km x 8.5 km	900-1100 m	40-120 m		Burchfiel, 1966
Sheep Range (at least 5 blocks)	Overall 5 km x 28 km; individual blocks to ~10 km wide	~1000-3000 m (?); depends on bedding dip at time, and position along strike		Miocene (?)	

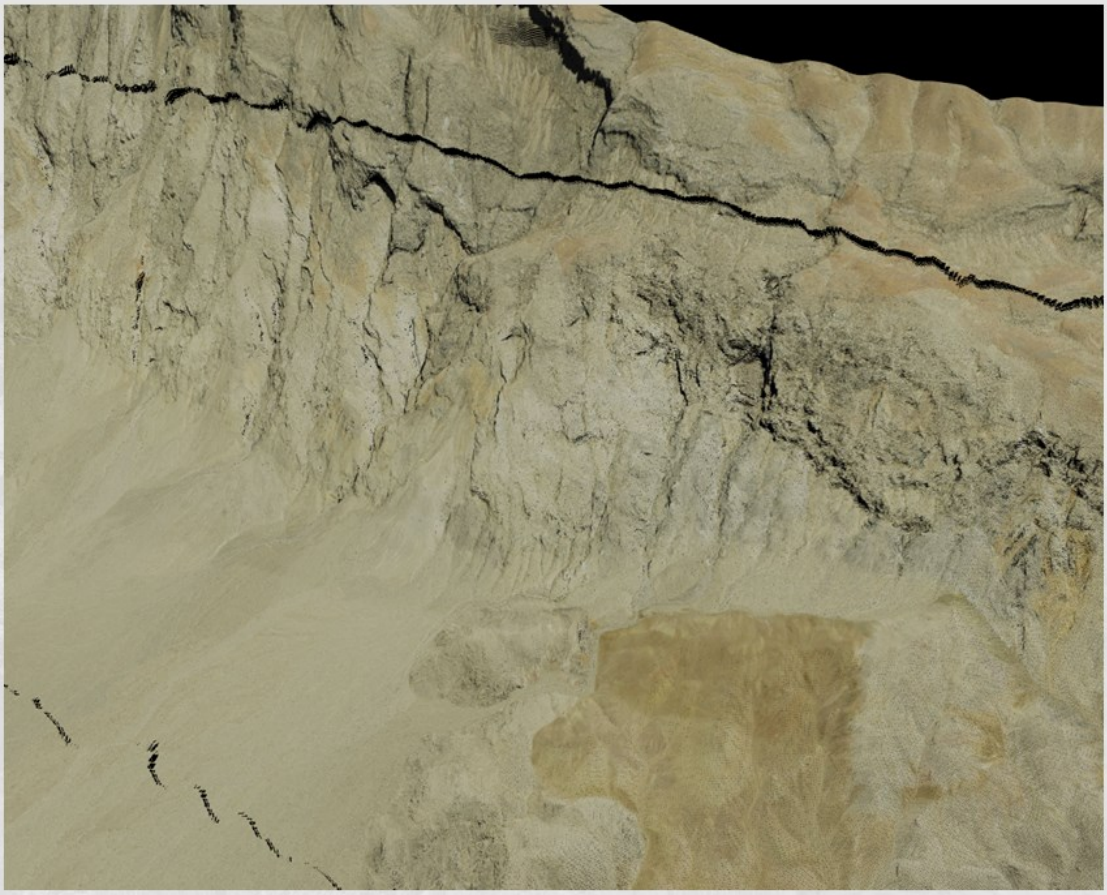
Tin Mountain, 1/3” (~10 m) 3DEP



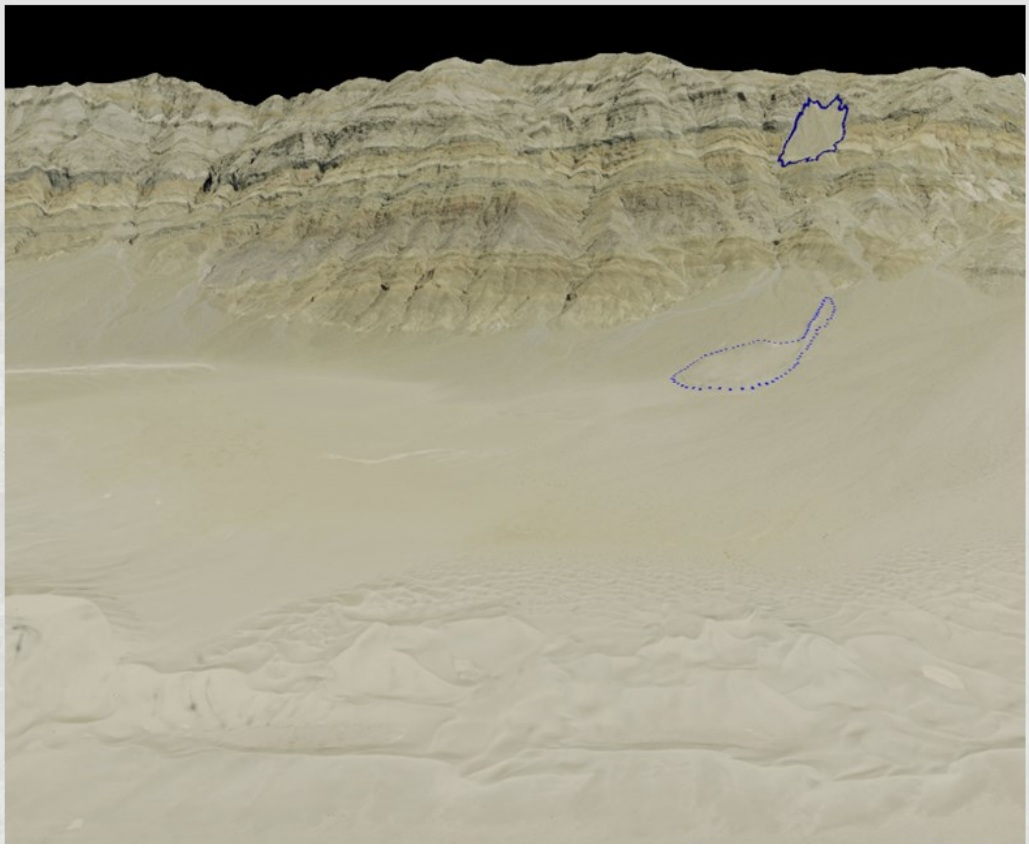
Tin Mountain, 2 m lidar with 1/3” 3DEP hole fill along edges

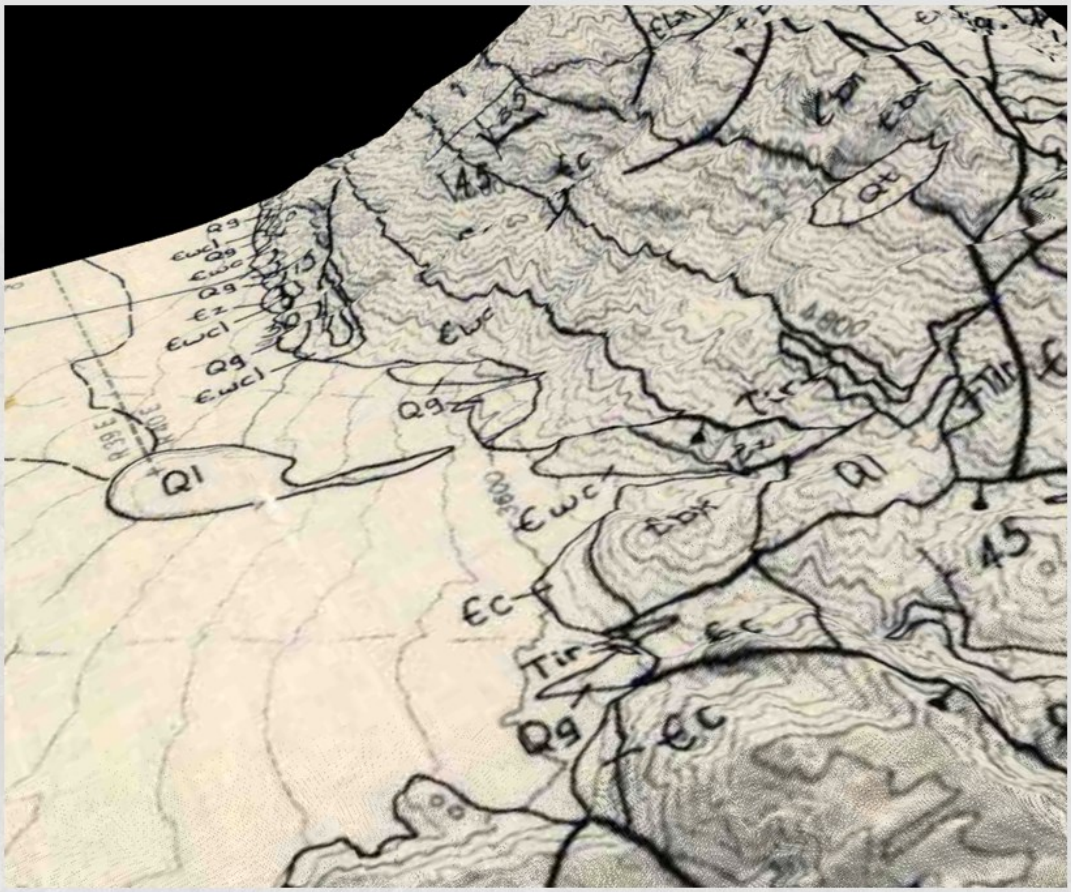


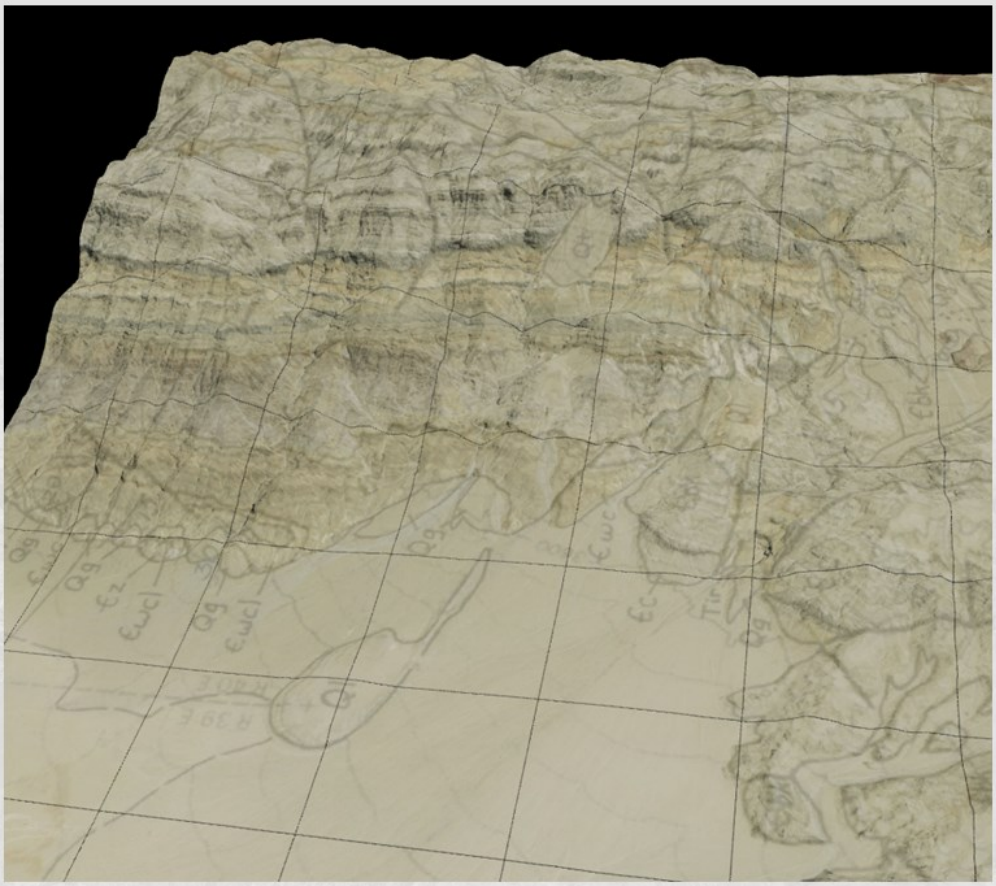
- Vertical datum shift, left in to highlight quality improvement with lidar in center compared to NED on each side



Eureka Valley Landslide (Wrucke and Corbett, 1990)

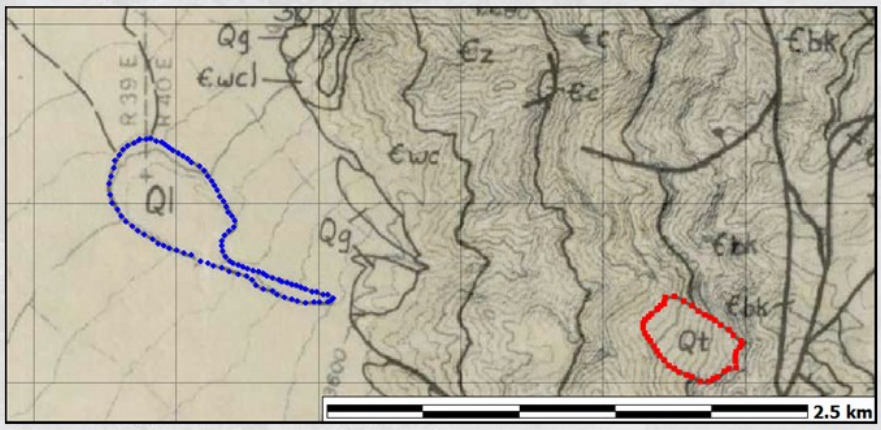


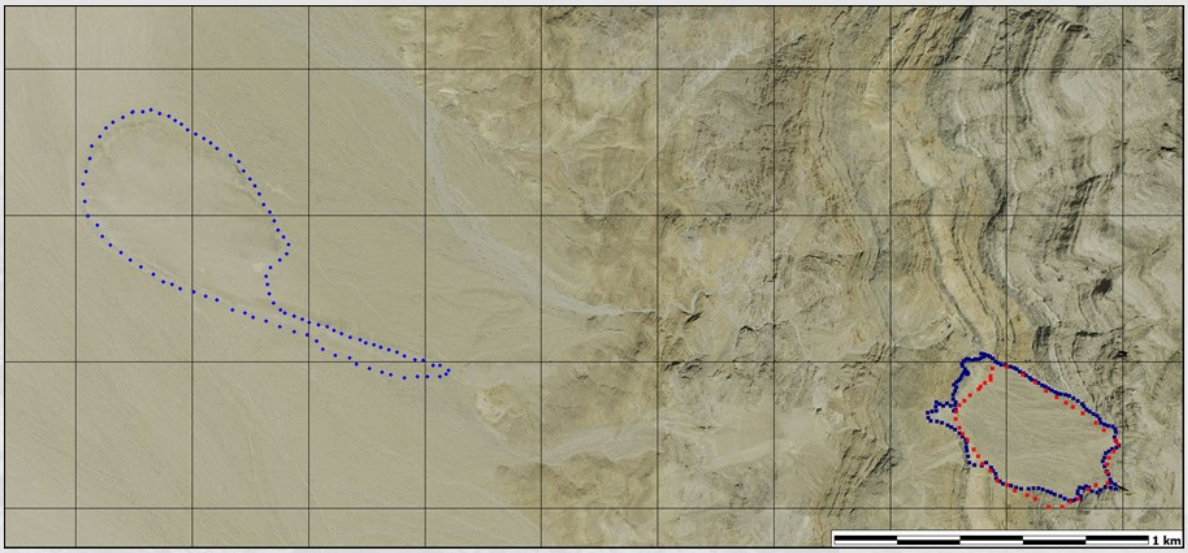


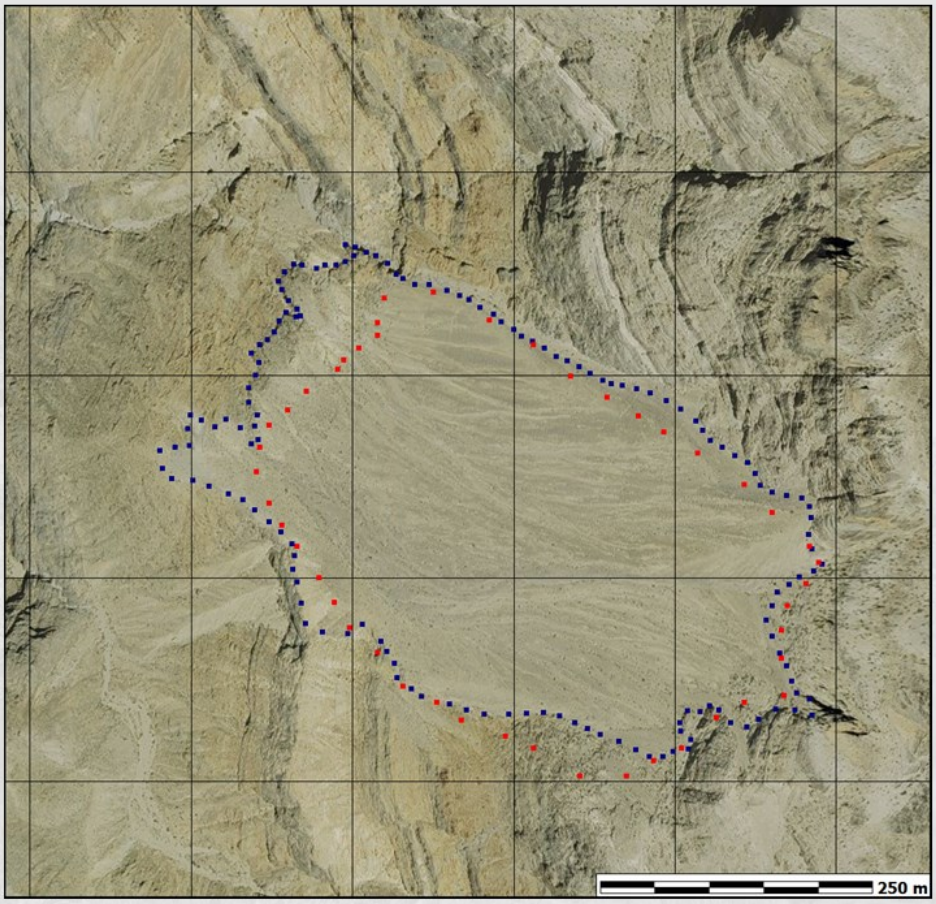


Planar Trend Surface from map/imagery and 1/3” 3DEP

- Talus, geologic quad, N25E 29NW (55.87% slope)
- Talus, 1 m imagery: N27E 29NW (55.12% slope)
- Slide block, N57E 5NW (8.77% slope)







- Red: geologic quad
- Blue: 1 m imagery

Conclusion—Free Data

- High resolution imagery and 10 m DEMs allow geometric tracing and modelling of faults
- 1 m DEMs from 3DEP increasingly available
- OpenTopography and other sources have 1 m DEMs, and point clouds to make your own with sub meter grid spacing
- Improved understanding of Hoodoo Hills Havoc

The following slides were not shown in Denver

Sheep Range References

- French, D.E., and Guth, P.L., 2016, Megabreccias of the Sheep Range, Clark County, Nevada: 2016 Field Trip Guidebook, Nevada Petroleum and Geothermal Society, 50 p.
- Guth, P.L., 1980, Geology of the Sheep Range, Clark County, Nevada: unpublished PhD dissertation, Massachusetts Institute of Technology.
- Guth, P.L., 1981, Tertiary extension north of the Las Vegas Valley shear zone, Sheep and Desert Ranges, Clark County, Nevada: Geological Society of America Bulletin, vol.92, no.10, p.763-771.
- Guth, P.L., 1989, "Day 4. Tertiary extension in the Sheep Range Area, Northwestern Clark County, Nevada", p.33-39 in Wernicke, B.P., Snow, J.K., Axen, G.J., Burchfiel, B.C., Hodges, K.V., Walker, J.D., and Guth, P.L., 1989, Extensional tectonics in the Basin and Range Province between the Southern Sierra Nevada and the Colorado Plateau: Field Trip Guidebook T138, 28th International Geological Congress, American Geophysical Union, 80 p
- Guth, P.L., 1990, Superposed Mesozoic and Cenozoic deformation, Indian Springs Quadrangle: in Wernicke, B., ed., Basin and Range extensional tectonics near the latitude of Las Vegas, Geological Society of America Memoir 176, p.237-249.
- Guth, P.L., Schmidt, D.L., Deibert, J., and Yount, J., 1988, Tertiary extensional basins of northwestern Clark County: in Weide, D.L., and Faber, M.L., (eds.), This Extended Land, Geological Journeys in the southern Basin and Range, Geological Society of America, Cordilleran Section, Field Trip Guidebook, p.239-253.

Other References

- Burchfiel, B. C. 1966. Tin Mountain landslide, southeastern California, and the origin of megabreccias. Geol. Soc. Amer. Bull. 77, pp. 95-100.
- Shreve, R.L., 1968, The Blackhawk Landslide: Geological Society of America Special Paper 108, p. 1-48, doi:10.1130/SPE108-p1.
- Watkins, J., Scully, J.E.C., and Yin, A., 2012, Emplacement and subsequent modification of the Quaternary Eureka Valley landslide, eastern California: Geological Society of America Abstracts with Programs Vol. 44, No. 7, p.419.
- Watkins, J., Scully, J.E.C., Lawson, M., Rhodes, E., Yin, A. Emplacement Mechanisms and Evolution of the Long-runout Quaternary Eureka Valley Landslide in Eastern California. American Geophysical Union Fall Meeting, Abstract #81953, December 2015.
- Wrucke, C.T., and Corbett, K.P., 1990, Geologic map of the Last Chance quadrangle, California and Nevada - 1990: U.S. Geological Survey OF-90-647-A, scale 1:62,500.

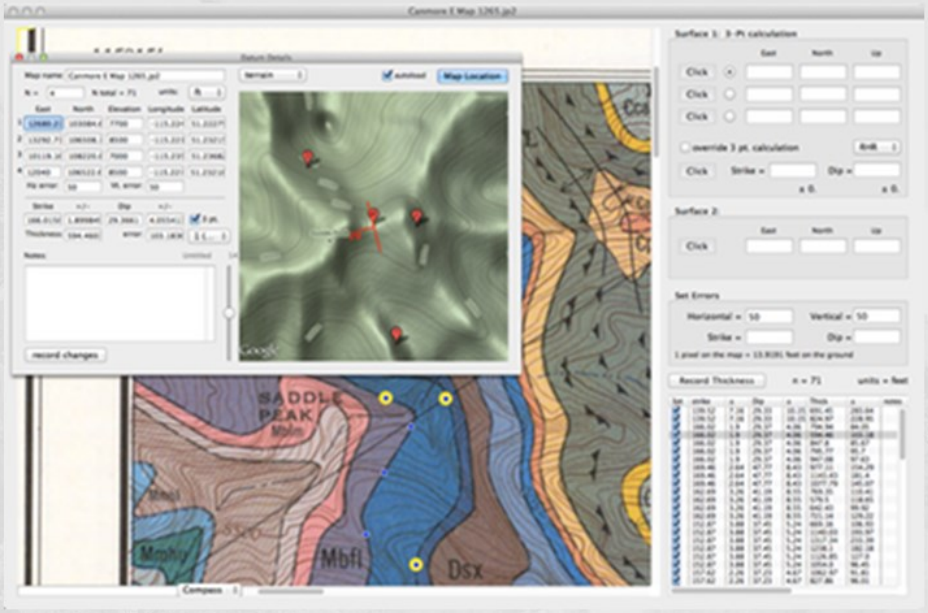
History of DEMs and 3D Problems

- MICRODEM has handled since at least 1999
  - Guth, P.L., 2014, Structural geology geometric operations in a GIS program and Google Earth: Geological Society of America Abstracts with Programs, vol.43, no.3, p.6. [Southeastern section meeting, Blacksburg VA, 10-11 April 2014]
  - Guth, P.L., 2004, Computer manipulation of simple 3D structures: supplement, complement, or replace the field experience? Geological Society of America Abstracts with Programs, vol.36, no.5, p.157. [national meeting Denver, CO, Nov 2004]
- Other options on next two pages
- With standard data formats, programs can work together

Dynamic 3-Point Geological-Plane Solver

- By Jack Jamieson and Gregory C. Herman
- http://impacttectonics.org/geoTools/3ppops.html
- May stop working "imminently" due to scheduled Google changes
- NASA World Wind 3-Point Problem Solver (Java)

GMDE (GeolMapDataExtractor)



- http://www.geo.cornell.edu/geology/faculty/RWA/programs/strikedipthickness.html

PART 11:

GEOSCIENCE INFORMATION SOCIETY EVENTS

2016 Annual Meeting, Denver, Colorado, USA

September 24th–28th

GEOSCIENCE INFORMATION SOCIETY
2016 SCHEDULE OF EVENTS

Note: GSIS Committees met separately as arranged by committee chairs

		Location
Saturday, September 24		
9:30 a.m. – 4:00 p.m.	Geoscience Librarianship 101	Auraria Library 1100 Lawrence Street
5:00 p.m. – 7:00 p.m.	Early Bird No-Host Dinner & Meet-n-Greet	The Corner Office Restaurant 1401 Curtis Street.
Sunday, September 25		
8:30 a.m. – 9:00 a.m.	GSIS Executive Board Meeting	Hyatt Regency Denver Mineral E Hall
9:00 a.m. – 12:00 p.m.	GSIS Business Meeting	Hyatt Regency Denver Mineral E Hall
12:30 p.m. – 2:00 p.m.	GSIS Mentors Lunch (no host)	Range Restaurant 918 17th St.
2:00 p.m. – 5:00 p.m.	GSIS Professional Issues Roundtable includes round robin lightening talks	Hyatt Regency Denver Mineral E Hall
5:00 p.m. – 6:00 p.m.	GSIS Executive Board Meeting	Hyatt Regency Denver Mineral E Hall
2:00 p.m. – 7:00 p.m.	Exhibits Opening	Colorado Convention Center
Monday, September 26		
9:00 a.m – 6:30 p.m.	GSIS Poster Session T93—Use of Geoscience Data Resources in Education and Research	Colorado Convention Center Exhibit Hall E/F
3:00 p.m. – 5:00 p.m.	GSIS Vendor Updates Presentation schedule: AAPG Datapages American Geophysical Union Elsevier/Geofacets GeoScienceWorld Geological Society of London	Hyatt Regency Denver Granite B-C
Tuesday, September 27		
1:30 p.m. – 5:30 p.m.	GSIS Technical Session T92—Open Data, Open Access: Trends in Geoscience Publications and Data Sources	Colorado Convention Center Room 504
6:30 p.m. – 10:00 p.m.	GSIS 50th Anniversary Celebration Dinner and Awards Ceremony	The Broker Restaurant 821 17th St.
Wednesday, September 28		
9:00 a.m. – 12:00 p.m.	U.S. Geological Survey Field Trip	U.S. Geological Survey Library Denver Federal Center

"GEOSCIENCE LIBRARIANSHIP 101"
A SEMINAR PRESENTED BY THE GEOSCIENCE INFORMATION SOCIETY

Saturday, September 24, 2016
Auraria Library, Community College of Denver Collaborate Classroom
Room 116, 1100 Lawrence St.
Denver, CO 80204

Workshop overview

9:30 a.m. – 9:45 a.m.	Check In Welcome/Introductions	Clara McLeod Washington University in St. Louis
9:45 a.m. – 10:45 a.m	Geoscience Overview/Instruction	Emily Wild, U.S. Geological Survey
10:45 a.m. – 11:45 a.m	Reference/Research and Publication	Lura Joseph, University of Illinois, Champaign-Urbana
11:45 a.m. – 1:00 p.m.	Lunch and networking	
1:00 p.m. – 1:45 p.m.	Collection Development	Amanda Bielskas, Columbia University
1:45 p.m. – 2:45 p.m.	Geospatial Information	Linda Zellmer, Western Illinois University
2:45 p.m. – 3:00 p.m.	Break	
3:00 p.m. – 3:45 p.m.	Geoscience Data Management	Hannah Hamalainen, Univesity of New Hampshire
3:45 p.m. – 4:00 p.m.	Feedback and Wrap Up	Clara McLeod Washington University in St. Louis

Thanks to the following sponsors for their generous support of ***Geoscience Librarianship 101:***

AURARIA LIBRARY
Engage your mind. Enrich your future.

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GEOSCIENCE INFORMATION SOCIETY
2016 BUSINESS MEETING MINUTES

Sunday, September 25, 2016, 9:00 am –12:00 pm
Hyatt Regency Denver, Mineral E Hall, Denver, Colorado

Respectfully submitted by Louise Deis, Secretary

I. Call to order (Matt Hudson) 9:08 AM

26 in attendance: Dena Hanson, Jim Mehl, Monica Pereira, Linda Musser, April Love, Cynthia Prosser, Mary Ellen Vedas, Chris Badurek, Dona Dirlam, Amanda Bielskas, Mea Warren, Paula Rucinski, Shaun Hardy, Matt Hudson, Jane Quigley, Lori Tschirhart, Samantha Teplitzky, Louise Deis, Hannah Hamalainen, Robert Tolliver, Michael Noga, Linda Zellmer, Lisa Dunn, Rusty Kimball, Clara McLeod, and, later, SharonTahirkheli.

II. Welcome and General Introductions (Matt Hudson)

III. Introduction of Executive Board

a. President, Matt Hudson
b. Vice President, President-Elect (2016), Hannah Hamalainen
c. Vice-President, President-Elect (2017), Robert Tolliver, also currently newsletter editor.
d. Secretary and Secretary-elect, Louise Deis and Samantha Teplitzky (Sam noted that she is the designated member for Berkeley as an institutional member.)
e. Treasurer, Lori Tschirhart
f. Immediate Past-President, Emily Wild (Elsewhere at GSA, leading a workshop for undergraduates wanting to find employment in the Federal Government.)
g. Newsletter Editor, Bob Tolliver
h. Publications Manager, Richard Huffine (not present)
i. Publicity, Shaun Hardy (Not part of Board, but listed and thanked anyway.)
j. Topical Session Convener, Chris Badurek (Position not currently a member of the Board, but under discussion.

Matt also recognized the recent retirees: Jody Foote, Joni Lerud Heck, Nancy Sprague, and Ann Coppin.

IV. Approval of the Agenda

Motion was made by Lori and seconded by Michael; all approved.

V. Approval of the Annual Business Meeting Minutes 2015 (November 1, 2015)

Distributed by Louise on 15 September via Geonet. Correction offered by Shaun: "Randy" should be Rusty, p. 3. Mary Ellen moved to accept, and Clara seconded the motion. All approved.

VI. Reports

A. President Report (Matt Hudson)

The D.C. **i**ncorporation has been reestablished. Matt thanked Graham Green and Dennis Allen of Sutherland Asbill & Brennan LLP. Thanks to a brief amnesty window, the Society avoided significant penalty fees and is now up to date with D.C. for the first time since the 1970s. Shaun Hardy also deserves thanks for acting as GSIS's registered agent in D.C. Total fees ~$400.

Gmail addresses were created for the GSIS President, Vice President, Secretary, and Treasurer. They are free, branded with @geoinfo. We now have sharable storage space with consistent contact information, which will be helpful for using with banks, subscription agents, and so forth. Also a record of prior conversations will be maintained. Can be forwarded for people that prefer to maintain their own. Thanks to Courtney Hoffner and Chris Keane at AGI.

The embargo has been removed on the Proceedings and newsletter. The Board voted in July to eliminate the six month embargo that had been in place. Matt noted that it had been inconsistently applied, and the Board could not find in the manual or elsewhere that this embargo had been officially established. Free access to the publications would expose GSIS to more nonmembers, potentially making them more interested in membership. If the Geological Society of America encourages open access, GSIS ought to follow the same standards. This may be viewed as a decrease in the value of membership; however, it was noted that the real member benefit is the ability

2016 GSIS BUSINESS MEETING MINUTES
CONTINUED

to contribute to the newsletter, not just read it. Related, Bob started distributing the newsletter via Geonet.

Nominations. Out-going president, Emily, couldn't organize it because of governmental regulations. Thank you to Dena, Samantha, and Bob for running the election. There were 51 votes cast, the highest since we began using SurveyMonkey in 2011. A few hiccups, but overall quite smooth.

Miscellaneous: Matt said he did not get to the GeoRef webinar, which he had hoped to accomplish. He hopes to do that this year. Matt also noted that we have many unfilled representatives and appointments. Membership went up, which is great, but still some concerns as we are seeing pretty high retirement numbers this year.

B. Vice President Report (Hannah)

Hannah intends to engage in social media, Facebook and Twitter, at the conference: @geoinfosoc and #GSA2016

The Broker Restaurant will be the venue for our 50th Anniversary party. 7 p.m. is the start. Michael and Shaun will reminisce on our history. The keynote speaker will be Salim Mohammed, the Head and Curator of the new David Rumsey Map Center at Stanford.

A mentoring program was introduced: new members, new professionals should be mentored by the experienced. Hannah will work with Bob to give him a start on executive leadership for GSIS in 2018. Mea Warren found a mentor.

Proceedings volume is a work in progress. Richard and Hannah have started work on it, but they don't have an expected publication date yet.

C. Treasurer Report (Lori Tschirhart)

Things have been going smoothly after a rocky start (due to difficulties setting up banking).

Ansari Balance Information

9/23/16 Balances	
Checking	$24,429.18
Savings	$9,704.34
General Fund	$25,866.59
Ansari Dist. Serv.	$1,550.00
Ansari Best Research Res.	$2,350
Pooled Spons.	$4,313.23
Prof. Dev.	$1,668.78

- Incomplete information was available regarding Ansari award funds.
- Special thank you to Renee Davis, Patricia Yocum, and Carolyn Bishoff for providing clarity that helped determine the remaining balances.
- Our organization didn't follow any one standard for tracking contributions and withdraws year to year.
- Sometimes award funds were locked up in CDs, so awards were paid with different funds (and the documentation isn't always clear on where awards were sourced or whether the source was consistently replenished)
- For at least some periods, Distinguished Service and Best Reference funds were lumped together, further confusing things.
- Lori did considerable "forensic accounting", constructing beginning and ending yearly balances to the best of her ability
  - Pulled and consulted Q4 Treasurer reports for 1994-2015
  - Estimated awards drawn in some years based on next year's balance factoring in interest.
  - Contacted and conferred with former treasurers including Carolyn Bishoff, Renee Davis, and Patricia Yocum
  - Reviewed documentation provided by Renee Davis for years 2006–09.
  - Reviewed the "Mary B. Ansari Distinguished Service Award History and Current Status" document prepared by Patricia Yocum, 9/30/12.
- Distinguished Service Award best path forward:
  - Received a $5,000 contribution, and sufficient documentation has shown that we have paid out $4,000 as of 2015, It would be best to say that we have $1,000 of principal left to spend in 2016 and 2017, plus interest. Lori used the best information available to estimate the interest earned from 2005–2015 at $540.42 for a total of $1,540.42. She rounded up to $1,550 in acknowledgement of some incalculable but likely negligible interest from portions of fund that were sometimes held in money market accounts and interest earned so far in 2016.
  - We have enough to award $500 in 2016, 2017, and 2018. In absence of an influx of cash for this award fund, any remaining balance after 2018 could either be transferred into general fund or used to pay portion of administrative costs for award processing (plaque, engraving, shipping ,etc.).
- Best Reference/Best Resource best path forward:
  - Received an initial $5,000 contribution plus an additional $5,100 contribution, and sufficient documentation has shown that we have paid out $10,500 over 21 years as of 2014. Clearly, we have no princi-

pal left. However, Lori used the best information available to estimate that the account has earned $2,720.93 in interest between 1994–2015. She rounded that figure up to $2,750.00 in acknowledgement of some incalculable but likely negligible interest from portions of fund that were sometimes held in money market accounts and interest earned so far in 2016. This means that the account has taken in a total of $12,850 over time. Subtracting the $10,500 that we have paid out through 2014, we are left with $2,350. We will cut a check retroactively for $500 for last year's (2015) winner. After that, we have enough money to pay out $500 awards in 2016, 2017, and 2018. In absence of an influx of cash for this award fund, any remaining balance after 2018 could either be used to make a substantial gift (over $350, but under $500), transfer it into general fund, or use to pay portion of administrative costs for award processing (plaque, engraving, shipping ,etc.).

2015 Audit Progress

- Thank you to Angelique Jenks-Brown for volunteering to audit our 2015 books.
- 4/16. Auditor formally accepted request to audit. Binder mailed. Tracking no. 28777 (2USPS).
- 7/22 Sent email seeking progress report, but sent it to ajbrown@binghamton.edu instead of angeliquejb15@gmail.com. Mistake not realized until 9/23.
- 9/2 Sent another inquiry to: angeliquejb15@gmail.com to inquire about audit progress.
- 9/9 Asked GSIS President to try contacting auditor - there is concern that we don't have current contact information for her.
- 9/23 Forwarded email seeking progress report from 7/22 to angeliquejb15@gmail.com.

2016 Sponsorships

Outstanding Concerns

- Still awaiting 1 outstanding invoice for 2015 conference sponsorship - GeoFacets - Invoice 15-07 dated 9/9/15. Matt has meeting on Monday, 9/26, will hopefully get some resolution then.

2016 Sponsorships

Organization	Amount
GeoScienceWorld (GSW)	$1,000
AAPG Datapages	$1,000
Geological Society of London (GSL)	$750
Society of Economic Geologists (SEG)	$250
American Geophysical Union (AGU)	$1,000
SEPM (Society for Sedimentary Geology)*	$750
American Geological Institute (AGI)**	$330
Total Rec'd for 2016 conference: Thank you sponsors!	$4,000

*Received 1/29/16 (possibly for 2015 sponsorship).
**Received 3/2/16 (possibly for 2015 sponsorship).

Estimated Amount Spent on 2016 Conference So Far

When	What	Amount
May 4, 2016	2016 GSIS Annual Conference Room Reservation fees (Business Meeting/Professional Issues Forum/Vendor Update).	$225
	Rooms	
	Internet/AV	
	Awards	

- GIA wants to provide sponsorship ($750) - There was some confusion which prevented sponsorship to be received prior to annual meeting. W9 provided on 10/10/16.
- A few minor membership questions (which could probably be resolved with access to 2015 binder).
- Need to revise Treasurer duties information in President's guidebook. Much information is outdated and/or absent. Possibly useful to create a brief Treasurer's guidebook for future treasurers.

2016 GSIS BUSINESS MEETING MINUTES
CONTINUED

D. Secretary Report (Louise Deis)

79 current members, 12 institutions. Up from last year when we were in the 60s. Any new ones from Librarianship? Geonet numbers given (off to right). Louise thanked the new members and noted some of the recent retirements. One new member from Italy using the fellowship money.

Concerns about spam in Geonet? We have very little really, and we've left it open. We can block individual spammers without losing our "open access." There was a suggestion to distribute the list of members to membership committee.

GEONET SUBSCRIBERS FOR 2016

Country	Subscribers
Australia	7
Austria	1
Belgium	2
Canada	24
China	1
France	3
Germany	3
Italy	1
Mexico	2
Netherlands	1
New Zealand	3
Norway	1
??? (RS)	1
Spain	1
Sweden	3
United Kingdom	7
United States	326
Total subscribers: 387	
Total countries: 17	
Total local host users: 0	

E. Publication Manager Report (Matt delivered this on behalf of Richard)

All publications are now being distributed online only.

The Proceedings are completely digitized and available from Texas A&M. Thank you to Rusty and the Archives Committee. Links to these are also on the GSIS site. Richard also confirmed that a full print archive is now at UIUC and Denver USGS. Thank you to Anne Huber and Emily Wild.

Remaining print inventory to be distributed via Geonet by end of September.

Richard feels that the Publications Manager position is no longer needed and he recommends eliminating it and moving the remaining responsibilities for the new proceedings into the topical session convener. This position is currently listed in the bylaws, but those may be changed later today, which would eliminate this specific language and give the Board the power to adjust these positions. If the bylaw change happens, Matt would take Richard's advice and eliminate this position and replace it on the board with the topical session convener. However, Shaun thought that someone should stay in charge of these proceedings to make sure they become available online. Cynthia seconded his motion. Lisa also wanted the position retained, and suggested that a photo archive would be nice. Bob thought that it could be the webmaster's duty.

F. Topical Session Convener Report (Chris Badurek)

Chris went over the schedule of events. It is thought that to set up a poster session, we no longer need 9–11 presenters.

G. Webmaster Report (Matt on behalf of Courtney Hoffner, who was absent)

There have been many updates to the site. Contact Courtney if you notice things that are out of date. Google Analytics installed 25 August. We are now tracking usage, receiving as many as 43 visits per day. 68% are from U.S., the Philippines is #2. The most popular areas are membership and meetings.

The Website domain was renewed for two more years, and will now expire February 18, 2018. The renewal will fall to Bob as our next president.

H. Geoscience Librarianship 101 (Clara McLeod)

Clara thanked Gayle Bradbeer and the Auraria Library at the University of Colorado for hosting GL101 again this year and ESRI for another year of sponsorship. She also thanked the instructors, Emily Wild, Lura Joseph, Amanda Bielskas, Linda Zellmer, and Hannah Hamalainen. In addition to the 19 attendees, including some who traveled from out of state to attend the event, Clara also received 4 inquiries about the seminar from people requesting that material be sent to them.

VII. Committee Reports

A. **Membership** (Cynthia Prosser, chair)

The membership committee produced a new online form.

A vote was called for the new membership dues structure. The vote, by simple majority of the members present at the meeting, passed and is as follows: Personal: $25; Personal (1st year) $20; Student: $10; Retired: $10; Institutional: $50.

There was some discussion about the purpose of the institutional membership now that publications are open access.

B. Ad Hoc Bylaws (Dena Fracolli Hanson, chair)

Dena noted that the suggested bylaw changes had been sent out in advance of the meeting. She walked through the primary changes and the reasons behind them. There was discussion about the role of the publications manager, with some favoring to keep the position, and there was discussion about the numbers needed to have a quorum at a meeting. The group also discussed the need for a parliamentarian. The membership voted and the

new bylaws were adopted. The committee was encouraged to review the parliamentarian idea and Article XI.

C. Ad Hoc 50th Anniversary Celebration (Marie Dvorzak, chair)

Hannah outlined the plan for the 50th anniversary dinner and awards celebration at The Booker Restaurant. GSIS made 50th anniversary pens and luggage tags. G. Salim Mohammed, the head and curator of the new David Rumsey Map Center at Stanford University, will be the keynote speaker.

D. Guidebooks (Linda Musser, chair)

Linda M. announced that Patrick Muffler and Michael Clynne won the Guidebook Award for *Geologic Field-trip Guide to Lassen Volcanic National Park and Vicinity, California*. The Guidebook Series award was won by the Institute on Lake Superior Geology. Linda also mentioned that they planned to expand the award into three categories next year by adding a popular guidebook award. She also thanked the committee members for their hard work on the legacy data.

E. Exhibits (Linda Zellmer, chair)

Linda Z. reported that the booth highlights 50 years of geoscience information, including how we used to do research with print volumes of the Bibliography & Index of Geology and the database platforms that now provide information. It also provides information on the growth of the geoscience literature, including the number of journal titles and journal articles over the last 50 years. A graph of price changes for core GeoRef journals is also included. Linda also encouraged people to sign up to work the booth.

F. Distinguished Service Award (Clara McLeod, chair)

Clara announced that Shaun Hardy, of the Carnegie Institution of Washington, was selected by the committee as the recipient of the 2016 Mary B. Ansari Distinguished Service Award. Shaun will receive a certificate, a check, and an engraved stone at the GSIS 50th Anniversary Celebration. Clara noted that when Mary B. Ansari was notified of Shaun's selection, she recalled that he joined GSIS while she was still active. She was impressed by his record of service and "thrilled that he is the recipient."

G. Best Research Resource (Rusty Kimball, chair)

Rusty announced that Jack Rink and Jeroen Thompson won the Mary B. Ansari Best Research Resource Award for *Encyclopedia of Scientific Dating Methods.* Jack Rink will be at the award ceremony to receive the award.

H. Best Paper Award (Michael Noga, chair)

Michael Noga announced that Leslie Hsu, Raleigh L. Martin, Brandon McElroy, Kimberly Litwin-Miller, and Wonsuck Kim won the Best Paper Award for "Data management, sharing, and reuse in experimental geomorphology: Challenges, strategies, and scientific opportunities," which was published in *Geomorphology*, v. 244. He also announced that he thought the scoring system should be reviewed at some point in the near future.

VIII. Any Other Business

- Linda Z. offered to do a GIS project of the membership or Geonet members.
- Linda also made a proposal for digitizing GeoInfo5 (1985-6) and GeoInfo6 (1999).
- Matt mentioned that the Atmospheric Science Librarians International (ASLI) membership was down quite a bit. 42 members last year, 29 this year. Amy Butros has provided some updates.
- Shaun mentioned the new Geotimes blog: https://www.americangeosciences.org/geotimes

Matt reminded everyone of personnel needs: newsletter editor, newsletter reviews editors, committee volunteers, appointed positions, society representatives (ALA, ASLI, NEMO, SLA, or WAML), auditor.

- There was a discussion about the pooled fund to sponsor a member from outside the U.S. We had one member use that fund this year, Nazareno Deodata, but the fund is not well used and needs to be better promoted.
- There was a request that retiring members encourage their successors to become members.
- Big thank you to Louise and Emily who are both rotating off, and to all of the GSIS committee members, appointees, representatives.
- Someone noted the untimely death of Lee Allison. He was a fellow of the GSA and a founder of the Geoinformatics Division.

IX. Adjournment

Matt passed the gavel to Hannah at 11:55 and the meeting was adjourned.

2016 GEOSCIENCE INFORMATION SOCIETY AWARD WINNERS

Presented at the GSIS 50th Anniversary Celebration Dinner and Awards Ceremony
Tuesday, September 27, 2017, 6:30–10:00 p.m.
The Broker Restaurant
821 17th St., Denver, Colorado

Mary B. Ansari Distinguished Service Award

Shaun Hardy
Carnegie Institution for Science, Washington, D.C.

Shaun Hardy, librarian at the Carnegie Institution for Science, Department of Terrestrial Magnetism and Geophysical Laboratory, is the recipient of the 2016 Mary B. Ansari Distinguished Service Award from the Geoscience Information Society (GSIS). GSIS is an international professional organization devoted to improving the exchange of information in the geosciences through cooperation among scientists, librarians, editors, cartographers, educators, and information professionals.

Shaun joined the Geophysical Laboratory Library of the Carnegie Institution of Washington as its librarian in 1989. He directs all operations for the 40,000-volume library supporting advanced research in the earth and space sciences. In 2012 the Carnegie Institution presented him the Service to Science Award.

Shaun is highly regarded in GSIS for his willingness to step in when help is needed. Letters in support of his nomination emphasized his supportive and collegial nature. One letter said, “He is the epitome of the engaged professional—serving the GSIS as an officer and committee member, the broader geoscience community via his service on the GeoRef Advisory Board, and sharing his expertise with his colleagues in an upbeat, always supportive manner.” Another letter stated, “His service to GSIS and other professional societies, his outstanding work at Carnegie, his publication record, and his support of individuals in the profession are all notable.”

Shaun joined GSIS in 1994. He served the society as secretary in 1999-2000, as acting treasurer in 2001, and as publicity officer from 2005-2010 and 2013 to present. He currently serves on the Ad Hoc Committee for the GSIS 50th Anniversary Celebration. For fourteen years he has been a member of the GeoRef Advisory Committee of the American Geosciences Institute. In addition to his service 8 GSIS Newsletter Number 271, September 2016 in GSIS, he is also a member of the PhysicsAstronomy-Math Division of the Special Libraries Association, the American Geophysical Union, and DC Science Librarians.

Shaun has developed a passion for open access and has shared it with his profession. His paper “Open Access Publishing in the Geosciences: Case Study of the Deep Carbon Observatory,” published in the GSIS Proceedings v. 43, 2012, p. 73-81, won the 2014 GSIS Best Paper Award.

Shaun graduated summa cum laude with a B.S. degree in geological sciences and physics from the University of Rochester. He received an M.L.S. degree from the School of Information and Library Studies at the State University of New York at Buffalo. He previously was chief librarian for the Buffalo Society of Natural Sciences, Buffalo Museum of Science.

Mary B. Ansari Best Geoscience Research Resource Award

W. Jack Rink
McMaster University, Hamilton, Ontario, Canada

Jeroen W. Thompson
McMaster University, Hamilton, Ontario, Canada

Editors, for their book, "Encyclopedia of Scientific Dating Methods," Springer Nature, 2015.

Best Paper Award

Leslie Hsu
Lamont-Doherty Earth Observatory, Columbia University, Palisades, New York

Raleigh L. Martin
University of California–Los Angeles, Los Angeles, California

Brandon McElroy
University of Wyoming, Laramie, Wyoming

Kimberly Litwin-Miller,
University of Texas, Austin, Texas

Wonsuck Kim
University of Texas, Austin, Texas

For their 2015 paper "Data management, sharing, and reuse in experimental geomorphology: Challenges, strategies, and scientific opportunities ," published in *Geomorphology*, v. 244, 1 September 2015, 23 p., https://doi.org/10.1016/j.geomorph.2015.03.039.

Many scientific fields have seen vast amounts of data produced in recent decades. Finding and accessing data has become a critical dimension of research. This paper addresses data management, access, and reuse with a focus on experimental geomorphology. The team covers the needs and challenges of data management in ways applicable to many sciences. The authors propose guidelines and suggestions, address incentives and training, and discuss the importance of data management across the entire data life cycle. The authors bolster their work with a thorough review of the literature, including both research in their scientific field and research in the library and data science literature.

Best Guidebook Award

L.J. Patrick Muffler
Zeigler Geologic Consulting

Michael A. Clynne
New Mexico Bureau of Geology, Socorro, NM

Authors, for their 2015 guidebook *Geologic Field-Trip Guide to Lassen Volcanic National Park and Vicinity, California,* published by the U.S. Geological Survey, U.S. Geological Survey Scientific Investigations Report 2015-5067, 67 p., https://doi.org/10.3133/sir20155067.

This geologic field-trip guide provides an overview of quaternary volcanism in and around Lassen Volcanic National Park in northern California. The guide begins with a comprehensive overview of the geologic framework and the stratigraphic terminology of the Lassen region, followed by detailed road logs describing the volcanic features that can readily be seen in the park and its periphery. Twenty-one designated stops provide detailed explanations of important volcanic features. The guide also includes mileage logs along the highways leading into the park from the major nearby communities. The field-trip guide is intended to be a flexible document that can be adapted to the needs of a visitor approaching the park from any direction. It is available in print or as a free publication online. The Guidebooks Committee found this work to 10 GSIS Newsletter Number 272, December 2016 be informative, authoritative, featuring excellent road

2016 GEOSCIENCE INFORMATION SOCIETY AWARD WINNERS
CONTINUED

logs and descriptions of stops. Supplemental fact sheets, photos and maps added to the richness of the work.

Best Guidebook Series Award

Institute on Lake Superior Geology

For their Field Trip Guidebook series.

The Institute on Lake Superior Geology is a non-profit professional society with the objectives of providing a forum for exchange of geological ideas and scientific data, and promoting better understanding of the geology of the Lake Superior region. The ILGS has held meetings annually for over 60 years featuring field trips for myriad interesting locations in their region. Comprising over 100 individual titles and trips, these geologic field trip guidebooks are excellent signposts to the local geology, well produced and illustrated, and freely available online to amateur and professional geologists alike. This award recognizes the excellent work of the current and past members of the Institute of Lake Superior Geology for creating and sharing this wonderful wealth of geologic field trip options.

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