



# CGI ANNUAL REPORT 2015



---

## Contents

1. Overall objectives, mission and aims
2. Role within IUGS science policy
3. Organization, Council Members and Officers
4. Extent of national/regional/global support from sources other than IUGS
5. Interaction with other international projects
6. CGI Online Presence
7. Chief accomplishments and products
8. Main problems encountered
9. Summary of expenditure
10. Work plan for next year
11. Critical milestones
12. Anticipated results to be achieved next year
13. Budget for 2015 and potential funding sources
14. Review chief accomplishments over last five years (2011-2015)
15. Objectives and work plan for next 5 years (2015-2019)
16. Suggestions for improvement of IUGS activities, especially in reference to activities of IUGS bodies
17. Contacts – CGI Council members

## 1. Overall objectives, mission and aims

An understanding of geology is crucial in protecting human life, health and assets, and sustaining our environment and resources. As in many areas of life today, information technology (IT) is having a dramatic impact on the way geological data and knowledge is being captured, processed and disseminated. The effective application of IT is the key to the future exploitation of geological knowledge for the benefit of society.

### ***CGI aims to:***

1. Provide the means for transferring knowledge on geoscience information and systems.
2. Stimulate international dissemination of best practice in geoscience information.
3. Stimulate and support initiatives which are developing standards.
4. Establish and occupy an accepted position in the international geoscience information community and represent IUGS on geoscience information matters.

## 2. Role within IUGS science policy

The CGI fills the role of the geoscience information body of the IUGS. It represents IUGS on geoscience information matters, provides the means for transferring knowledge on geosciences information and systems, assists international dissemination of best practice in geosciences information, stimulates and supports initiatives which are developing standards and its Council members hold several significant positions within the international geosciences information community.

## 3. Organization, Council members and officers

### ***Council Officers 2012-2016***

The CGI Council members are:

- François Robida (Chair) – France
- Kristine Asch (Secretary General) - Germany
- Robert Tomas (Treasurer) - Czech Republic
- Gabriel Asato – Argentina
- Zhang Minghua – China
- Kombadayedu K. Mhopjeni – Namibia
- Santiago José Muñoz Tapia - Dominican Republic
- Kazuhiro Miyazaki – Japan
- Oliver Raymond – Australia
- David Percy – USA
- *[Mike Frame – USA (withdrawn in October 2015)]*
- *[Peter Baumann – Germany (withdrawn in July 2015)]*

Ex-officio CGI Council representative: Gemma Nash (BGS, UK), CGI media administrator

The CGI working groups are coordinated by:

- GeoScience MLWorking Group – Oliver Raymond – Australia
- Geoscience Terminology Working Group – Mark Rattenbury, Newzealand
- EarthResourceML Standard Working Group – Jouni Vuollo, Finland
- Geoscience Information Network (GIRAF) – Kristine Asch, Germany

The current CGI secretariat is located at the Federal Institute for Geosciences and Natural Resources, Germany (BGR). The contact is [cgisecretariat@bgr.de](mailto:cgisecretariat@bgr.de).

### ***Council web presence***

The CGI Council provides constantly the necessary updates to the Council web presence. The intent of the CGI web site, which is hosted by the BGS, is to provide easily discoverable information, better highlight CGI activities, emphasize CGI support emerging standards, and provide an area to showcase CGI sponsored Working Groups.

<http://www.cgi-iugs.org>

A CGI LinkedIn group has existed since December 2013. The group provides a forum for CGI and LinkedIn members to connect with other geoscience professionals, to post news of upcoming events, to ask questions and to discuss CGI related issues.

<http://www.linkedin.com/groups?gid=6539642>

### **Membership**

CGI now has 291 members in 68 countries across the world.



## 4. Extent of national/regional/global support from sources other than IUGS

Other than the substantial in-kind contribution of the geological organizations that pay the salaries and expenses of CGI Council and members, the CGI does not receive additional support. Sometimes CGI workshops are co-organized by other organizations such as the UNESCO, the German Federal Ministry for Economic Cooperation and Development (BMZ), the Geological Survey of Namibia, Australian Aid, SEGEMAR, the United Nations Development programme, the UNESCO or SEAMIC who have been contributing to the events.

## 5. Interaction with other international projects

The CGI, in collaboration with OGC, is continuing to review Geoscience ML (GeoSciML). Both, the linked global OneGeology project and the past European EC project OneGeology-Europe are using GeoSciML to make geological data interoperable and accessible via their web portals. The EC Directive INSPIRE used for the Geology and Mineral Resources Implementing Rules CGI products: the GeosciML and Earth Resource ML (ERML) data model and CGI vocabularies. ERML was adopted by major EU funded projects as Mineral4EU or Eurare.

### **News**

Thanks to the work of many people in the GeoSciML Standards Working Group, GeoSciML v4.0 was officially released at the end of November 2015. The schemas and documentation are visible and downloadable from: [www.geosciml.org](http://www.geosciml.org) and [schemas.geosciml.org](http://schemas.geosciml.org).

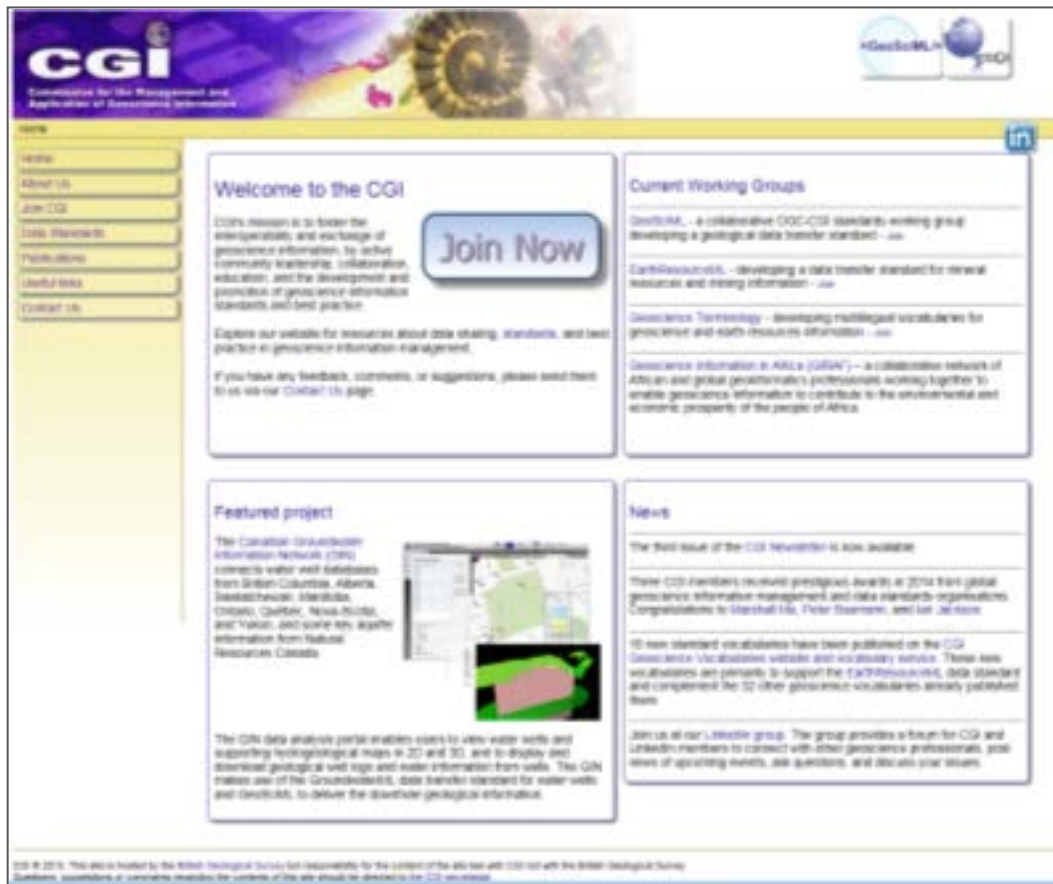


Based on the Memorandum of Understanding between the CGI and the OGC (Open Geospatial Consortium) Geosciml v4 might be formally proposed as an OGC standard by June 2016.

## 6. CGI Online Presence

CGI maintains several websites, online newsletters, a LinkedIn group, and online file repositories for its Working Groups. The main CGI website, online newsletters, and LinkedIn group are addressed in this report. The CGI Working Group reports will address their specific online resources.

**CGI Website –**  
[www.cgi-iugs.com](http://www.cgi-iugs.com)



After the major redevelopment of the CGI website in 2014, only minor changes were made to the CGI website in 2015, mainly to promote the newsletter that was circulated in January 2015 and to fix minor bugs.

The website content continues to be coordinated by Ollie Raymond. The British Geological Survey (BGS) hosts the CGI website: Future work required on the website includes:

- further update the “Commission Documents” pages to include most recent documents
- minor updates to Working Group pages to keep their content current

Google Analytics continues to provide a wealth of information about the number of visits and the behaviour of people visiting the website. Detailed website statistics for the period October 2014 - October 2015, and a comparison with the previous 12 months, are provided in the attached Appendix A.

Key statistics:

- Greatly increased website visits in the past 12 months
  - 8,425 visits
  - 7,329 users
  - this is more than double the amount of the previous 12 months
- But... significantly less time spent on the website per visit

- visitors opened an average of 1.6 pages per session, down from an average of 2.5 in the previous year
- average time per visit decreased to less than a minute
  - 90% of all traffic spent less than a minute on the website (up from 81% last year)
- 82% of visitors did not progress beyond their landing page
- Of the visits where a country of origin could be determined (>90%), the increase in traffic was concentrated in:
  - Russia (2,127 visits, 25% of total visits, up from only 2% in the previous year)
  - USA (1,645 visits, 20% of total, up from 14%)
  - Brazil, China, Japan and Italy also saw very significant increases in visits
- An unusual increase in visits occurred between April and August 2015, with traffic increasing from an average of ~10 visits per day to up to ~100 per day at the peak of activity in June 2015. Almost 50% of all website traffic during this time originated from Russia.
- 96% of sessions were from desktop devices (up from 93% last year). Mobile and tablet platforms continue to be a very small fraction of the market for the CGI website.

The website's Home page is still by far the most popular page and point of entry to the website (60% of all page views, and 75% of all landing pages) so we must continue to be sure that it contains our most critical information, displayed prominently. Outside of the home page, the most popular content on the website is the GeoSciML SWG (936 views), followed by the "About Us" and "Data Standards" information pages (~500 views), and the Geoscience Terminology (456) and EarthResourceML (224) Working Group pages.

### ***CGI Newsletter***

Only one CGI newsletter was circulated to CGI members, in January 2015, due to Ollie Raymond's increased work commitments to his employer, Geoscience Australia. It would be beneficial to CGI publicity if another CGI Council member could take on the task of producing two or three newsletters per year, especially now that there is a standard template that can be used for the newsletter.

### ***CGI LinkedIn group***

The CGI LinkedIn group was created in October 2014 and currently has 46 members, 7 more than this time last year. There has been negligible activity on the LinkedIn group, but it remains a viable option for CGI communications should Councillor or members wish to use it.

### ***CGI Working Group Websites***

All CGI working groups maintain web pages and services.:

GeoSciML: [http://www.cgi-iugs.org/tech\\_collaboration/geosciml.html](http://www.cgi-iugs.org/tech_collaboration/geosciml.html)

EarthResourceML: [http://www.cgi-iugs.org/tech\\_collaboration/earthResourceML.html](http://www.cgi-iugs.org/tech_collaboration/earthResourceML.html)

GIRAF network: <http://www.giraf-network.org>

GeoScience Terminology working group:

[http://www.cgi-iugs.org/tech\\_collaboration/geoscience\\_terminology\\_working\\_group.html](http://www.cgi-iugs.org/tech_collaboration/geoscience_terminology_working_group.html)



## 7. Chief accomplishments and products

### Council, Working groups, Regional groups

#### CGI Council



*CGI Council Meeting in Aron/Ispra. Italy 2015.*

#### **CGI Council Meeting**

The 2015 meeting of the CGI Council took place from 2nd to 3rd November in Ispra, Italy and was kindly hosted by the EC Joint Research Centre in Ispra and organized by the CGI Council member Robert Tomas. The Council met for two days. Among the discussed issues especially the following subjects were important:

- The CGI website
- Release of GeoSciML 4 and its certification as OGC standard
- Regional and Working Group reports
- The successful organization of the Geoscience Information in Africa Workshop in October 2015 in Maputo. Mozambique
- Organization of a Geoinformation Super-Symposium at the International Geological Congress 2016 (IGC) in South Africa.
- The expected change of CGI Council membership in 2016 due to the Council elections

#### GeoSciML Standards Working Group

##### **Membership**

The official OGC GeoSciML Standards Working Group (SWG) membership stands at 36 members and observers. However, the public GeoSciML mailing list (which does not require OGC membership and is a better measure of actual SWG observers) has 77 registered members from Australia, Austria, Belgium, Canada, Czech Republic, Finland, France, Germany, Italy, Japan, Netherlands, New Zealand, Poland, Portugal, Russia, Sweden, UK, and USA. Of these, less than 10 members are active contributors to development and testing work for GeoSciML v4.

Ollie Raymond is still acting in the role of Chair of the SWG. Without a substantive Chair, the work of the SWG continues to be slower than would have been hoped.

## ***Meetings***

In the last 12 months, the GeoSciML SWG has held a teleconference in June 2015, and a face-to-face meeting of the full SWG in Ispra, Italy, 28-29 October 2015. The attendance at the Ispra GeoSciML meeting (15, including teleconference attendees) made it the largest GeoSciML meeting in several years.

Some SWG members also attended OGC Technical Committee quarterly meetings in 2015, but the SWG as a whole did not meet at these OGC meetings. Marcus Sen (BGS) presented a short summary of the work of the GeoSciML SWG at the conclusion of the Nottingham OGC TC meeting in September 2015.

All other SWG communication was done through the GeoSciML mailing list and informal Skype calls between members.

## ***Data Model Development and Documentation***

The work of the SWG towards publication of the GeoSciML v4 data model and documentation in 2015 has been greatly assisted by the links that GeoSciML has with the OneGeology and INSPIRE initiatives. At the January meeting of the OneGeology Steering Committee, the Geological Survey of Canada generously offered to provide resources for Eric Boisvert to assist in the preparation of GeoSciML v4 UML, schemas, and documentation, ostensibly to support the needs of the OneGeology initiative. Eric has generated several rounds of release candidate (RC) schemas for testing, and has made great progress with the OGC specification documentation (a very laborious job). The UML work has been carried out in collaboration with Ollie Raymond at Geoscience Australia.

At the Ispra SWG meeting, a final deadline of 30 October was set for submission of last changes to the GeoSciML v4 UML model and schemas. It is planned to release GeoSciML v4.0.0 schemas and UML documentation almost immediately after the Ispra face-to-face meeting in November 2015. The OGC specification documentation will take longer, probably a few months, but will be ready for a formal vote at an OGC TC meeting in early 2016.

Additionally, as part of their INSPIRE work, Marcus Sen and Tim Duffy from the British Geological Survey have led the testing of the GeoSciML v4 RC schemas and development of Schematron validation scripts. Their testing has indicated that, at least for INSPIRE use cases, the GeoSciML RC schemas are fit-for-purpose and are ready for publication.

A major change to the GeoSciML model was made in April 2015 to make most of the data model properties optional (previously they were mandatory, but nillable), and for profiles of the data model to be defined via the use of Schematron. This was a considerable change of direction for the encoding of GeoSciML data and engendered much discussion within the SWG before it was adopted via a vote of members. Schematrons for various community profiles will now be provided with the GeoSciML v4 schemas and documentation.





*Attendees at the 2015 CGI standards working groups meeting, EC Joint Research Centre, Ispra, Italy.*

*Left to right: Eric Boisvert (GSC), Philippe Calcagno (BRGM), Yoshiharu Nishioka (GSJ), Zhang Minghua (CGS), Christelle Loiselet (obscured, BRGM), Daniel Cassard (BRGM), Kazuhiro Miyazaki (GSJ), Marcus Sen (BGS), Mark Rattenbury (GNS), Kristine Asch (BGR), Tim Duffy (BGS), Gabriel Asato (SEGEMAR), James Passmore (BGS), Jouni Vuollo (GTK), Robert Tomas (JRC), Carlo Cjpolloni (ISPRA), Ollie Raymond (GA)*

### ***GeoSciML file repository and website***

The SWG continues to maintain a Subversion file repository hosted gratis by CSIRO in Perth, Australia. This file repository holds all UML models, schemas, and documentation for the entire history of GeoSciML development, and enables shared editing by many SWG contributors.

The GeoSciML website ([www.geosciml.org](http://www.geosciml.org), [schemas.geosciml.org](http://schemas.geosciml.org)) is also hosted by CSIRO. The only cost to CGI in this arrangement is the very small ongoing fee for the “geosciml.org” hostname. The website contains the published XML schemas and data model documentation for GeoSciML and GeoSciML-Portrayal, and cookbooks for using GeoSciML in web services. The website content is managed remotely by Ollie Raymond from Geoscience Australia in Canberra. The only new content on the GeoSciML website in the last 12 months has been the addition of the RC schemas for GeoSciML v4. These schemas have not been officially released to the public (ie, a “soft” release only) but can be used by SWG members to test GeoSciML v4 web services.

### ***Uptake of GeoSciML***

There continues to be uptake of the GeoSciML data standard (particularly GeoSciML-Portrayal) in national and provincial Geological Surveys, mainly through its adoption by data sharing communities such as OneGeology (global), INSPIRE (Europe), USGIN (USA), AuScope (Australia), and GWIN (Canada). Feedback and requirements from these user communities has largely driven the design and publishing schedule for GeoSciML v4.

### ***Future of the GeoSciML SWG***

It is likely that following publication of GeoSciML v4 as an OGC Specification, the GeoSciML SWG will transform into a Revision Working Group (RWG) which will collect change requests (CR's) from users and evaluate potential bug fixes for the standard. At this stage, it is not planned to undertake additional development work on the GeoSciML data model.

Future work in areas related to GeoSciML (eg, the use of GeoSciML in the delivery of 3D geological information; the use of the SWE Common data model to deliver geochemical data related to geological specimens) may be carried out in new working group(s) under a CGI or combined CGI/OGC purview.

### **Issues:**

#### ***Active Participation of SWG Membership***

While the numbers of SWG members and observers is strong, the number of actively contributing members continues to be very small as previously active members are increasingly diverted on to the work requirements of their employers (notably Ollie Raymond and Steve Richard in 2015).

#### ***GeoSciML as a Global Standard***

Ongoing diligence is required from all SWG members to ensure that major providers of geoscience data support the GeoSciML data standard by using it as intended – as a truly global data transfer standard. In particular, where an agency's requirements are not met by GeoSciML, SWG members should encourage those agencies to work with the SWG to improve or extend GeoSciML (e. g. INSPIRE), and not attempt to establish local parallel data standards.

## **Geoscience Terminology Working Group**

### ***Membership***

The Geoscience Terminology Working Group (GTWG) has a current membership of 25 from Australia, Brazil, Canada, China, Denmark, Finland, France, Germany, Great Britain, Italy, Ivory Coast, New Zealand, Russia, Slovenia, Sweden and USA. Membership is defined through a Google Group with membership rights administered by Steve Richard (AZGS, USA) and current chair Mark Rattenbury (GNS, NZ). Frequent inclusion of the GeoSciML Standards Working Group and the EarthResourceML working group in emailing posts has resulted in cross communication from outside the membership on terminology topics.

### ***Meetings***

The 2015 GTWG face-to-face meeting was held on 30 October at the Joint Research Centre of the European Commission, Ispra, Italy, several days prior to the CGI Council meeting at the same venue. The meeting was held in conjunction with meetings of the GeoSciML Standards Working Group (SWG) and the EarthResourceML Working Group (WG).

### ***Operation***

The GTWG functions through face-to-face meetings (usually annually), email and through a shared document facility hosted on Google Drive. A vocabulary adoption procedure has

been established that involves identifying a geoscience vocabulary and nominating a shepherd to guide the process of its adoption. The shepherd collates a draft vocabulary, calls for and manages input from the membership and their expert colleagues in a review process and ultimately calls for a vote for the vocabulary's adoption. Google Drive spreadsheets are used and various input by different people through the process is recorded through new columns, rows and worksheets in the spreadsheet.

Once adopted the vocabularies are converted into RDF format and moved into the SiSSVoc vocabulary service hosted by CSIRO, Australia (see Issues below).

### ***Work achievements***

The GTWG has had a quieter year with most of the EarthResourceML vocabularies already completed to meet Minerals4EU deadlines. Considerable work on Regional Lithologic Units to support the representativeLithology\_URI requirement of OneGeology has been undertaken and this vocabulary is close to Review status. The commodityCodeValue vocabulary was completed and adopted; a highly hierarchically organised vocabulary of 291 parent and child natural and processed earth resource commodity terms. The adoption of mineralDepositType and mineralDepositGroupType (required for ERML) was rejected. The considered opinion was that these vocabularies categorised mineral deposits inconsistently using many different criteria. A revised version combining these two vocabularies has been developed and much of the critical comment absorbed into it. This mineralDeposit vocabulary will be presented for review in 2016. Completion of a draft of the naturalGeomorphologyFeature vocabulary has been postponed to consider the inclusion of seafloor morphology terms due to the suggestions and requirements of the EC EMODNET 2 project (geology lot) and IQUAME 2500 project (Review of the International Quaternary Map of Europe – a BGR-project under the umbrella of the CGMW and INQUA).

### ***Work planned***

The next year will see more work on remaining ERML data model vocabularies and some of the outstanding GeoSciML data model vocabularies. Review of some existing adopted vocabularies is expected.

In addition to vocabularies in Review, priority vocabularies for adoption include relationRoleTerm, physicalPropertyTerm and boreholeDrillingMethod as well as review of the existing compositionPartRole vocabulary (new terms), simpleLithology (new anthropogenic terms) and minor corrections to recently adopted vocabularies.

Multi-lingual translations of the adopted vocabularies have been identified as a major piece of work for GTWG to make progress on. Legacy work from the defunct Multi-lingual Thesaurus Working Group (largely European languages) and the southeast Asias CCOP has been identified for co-location into the GTWG Google Drive resource. The next face to face meeting of GTWG is likely to be close in location and timing to the IGC 2016 meeting in Cape Town in late August. The activities of the working group are expected to be presented in talks and/or posters in the Geoinformation Super-Symposium and potentially through a pre-conference workshop/information session.

<a href="#">alterationTypeTerm</a>		<a href="#">classificationMethodUsedValue</a>		<a href="#">importanceSize</a>	
<a href="#">compositionCategory</a>		<a href="#">commodityCodeValue</a>		<a href="#">mineralDepositType</a>	In review
<a href="#">compoundMaterialConstituentPartRoleTerm</a>		<a href="#">earthResourceExpressionValue</a>		<a href="#">miningWasterType</a>	
<a href="#">consolidationDegree</a>		<a href="#">earthResourceFormValue</a>		<a href="#">mineralDepositGroupValue</a>	
<a href="#">contactCharacter</a>		<a href="#">earthResourceMaterialRoleValue</a>			
<a href="#">contactTypeTerm</a>	Adopted	<a href="#">earthResourceShapeValue</a>			
<a href="#">conventionCode</a>	(pre 2011)	<a href="#">endusePotentialValue</a>			
<a href="#">descriptionPurpose</a>		<a href="#">environmentalImpactValue</a>			
<a href="#">determinationMethod</a>		<a href="#">explorationActivityTypeValue</a>			
<a href="#">eventEnvironment</a>		<a href="#">explorationResultValue</a>			
<a href="#">eventProcessTerm</a>		<a href="#">geologicHistoryRelationshipTerm</a>			
<a href="#">faultDeformationStyle</a>		<a href="#">importanceValue</a>			
<a href="#">faultMovementSenseTerm</a>		<a href="#">linearDirectedCode</a>			
<a href="#">faultMovementTypeTerm</a>		<a href="#">mineralOccurrenceTypeValue</a>			
<a href="#">faultTypeTerm</a>		<a href="#">mineStatusValue</a>	Adopted		
<a href="#">featureObservationMethod</a>		<a href="#">miningActivityTypeValue</a>	(since 2012)		
<a href="#">foliationTypeTerm</a>		<a href="#">processingActivityTypeValue</a>			
<a href="#">geneticCategory</a>		<a href="#">rawMaterialRoleValue</a>			
<a href="#">geologicalTimescale</a>		<a href="#">reserveCategoryValue</a>			
<a href="#">geologicUnitMorphology</a>		<a href="#">resourceCategoryValue</a>			
<a href="#">geologicUnitPartRoleTerm</a>		<a href="#">samplingFrame</a>			
<a href="#">geologicUnitTypeTerm</a>		<a href="#">UNFC_Value_2009</a>			
<a href="#">lineationTypeTerm</a>		<a href="#">wasteStorageTypeValue</a>			
<a href="#">lithologyConcept</a>					
<a href="#">mappedFeatureObservationMethod</a>		<a href="#">ageEvent</a>			
<a href="#">metamorphicFacies</a>		<a href="#">ageSystem</a>			
<a href="#">metamorphicGrade</a>		<a href="#">beddingPattern</a>			
<a href="#">orientationDeterminationMethod</a>		<a href="#">beddingStyle</a>			
<a href="#">particleAspectRatio</a>		<a href="#">boreholeDrillingMethodCode</a>			
<a href="#">particleShape</a>		<a href="#">boreholeInclinationCode</a>			
<a href="#">particleTypeTerm</a>		<a href="#">boreholePurposeCode</a>			
<a href="#">proportionTerm</a>		<a href="#">boreholeStartPointCode</a>			
<a href="#">simpleLithologyTerm</a>		<a href="#">colour</a>			
<a href="#">sorting</a>		<a href="#">fabricTypeTerm</a>	Draft		
<a href="#">stratigraphicRankTerm</a>		<a href="#">foliationIntensity</a>			
<a href="#">strikeDipMeasurementReportig</a>		<a href="#">isotopicEventType</a>			
<a href="#">valueQualifier</a>		<a href="#">isotopicSystemName</a>			
<a href="#">vocabularyRelationTerm</a>		<a href="#">lineationIntensity</a>			
		<a href="#">materialClass</a>			
		<a href="#">mineralDepositGroupValue</a>			
		<a href="#">mineralDepositTypeValue</a>			
		<a href="#">naturalGeomorphologicalFeatureTypeTerm</a>			
		<a href="#">outcropCharacter</a>			
		<a href="#">planarPolarityCode</a>			
		<a href="#">productValue</a>			
		<a href="#">regionalLithUnit</a>			
		<a href="#">samplingMethod</a>			
		<a href="#">specimenType</a>			
				<a href="#">alterationDegree</a>	
				<a href="#">alterationDistribution</a>	
				<a href="#">analyticalMethodTerm</a>	
				<a href="#">anthropogenicGeomorphologicalFeatureTypeTerm</a>	
				<a href="#">associationType</a>	
				<a href="#">boundaryRelationshipTerm</a>	Proposed
				<a href="#">compositionPartRole</a>	and/or
				<a href="#">continuity</a>	required
				<a href="#">definingElement</a>	
				<a href="#">definingElement</a>	
				<a href="#">definingStructureRelationshipTerm</a>	
				<a href="#">deformationStyleTerm</a>	
				<a href="#">exposureColor</a>	
				<a href="#">extractionMethod</a>	
				<a href="#">foldProfileTypeTerm</a>	
				<a href="#">geneticModel</a>	
				<a href="#">geochronologicEraRank</a>	
				<a href="#">geologicSamplingMethodTerm</a>	
				<a href="#">geologicSpecimenPreparationTerm</a>	
				<a href="#">geologic unit lithology categories</a>	
				<a href="#">geomorphologicalRelationshipTerm</a>	
				<a href="#">hingeLineCurvature</a>	
				<a href="#">hingeShape</a>	
				<a href="#">instrumentTypeTerm</a>	
				<a href="#">interLimbAngle</a>	
				<a href="#">limbShape</a>	
				<a href="#">materialRelationshipType</a>	
				<a href="#">nameOfMeasureTerm</a>	
				<a href="#">nonDirectionalStructureTypeTerm</a>	
				<a href="#">physicalPropertyTerm</a>	
				<a href="#">relationRoleTerm</a>	
				<a href="#">samplingFeatureRelation</a>	
				<a href="#">statisticalMethodTerm</a>	
				<a href="#">supergeneProcessType</a>	
				<a href="#">symmetry</a>	

## Issues

A concern expressed last year was that international standards in geoscience terminology are being decided by too few people and that they are unlikely represent the diversity of thinking around the world. This continues to be the case. The face-to-face meetings are the best opportunity to get progress but these are not well attended. The workaround is still to adopt vocabularies with the input received but accept that these vocabularies can and should be revisited and improved at a later date.

The long term hosting of the CGI vocabulary service is still uncertain. CSIRO, Australia have been providing the service through their SIVSoc hosting facility and have given technical support for service implementation but can't provide operational hosting. A number of alternative host options are being considered including Geoscience Australia (if access and resourcing issues can be overcome), OGC (under the GeoSciML umbrella) and CGI through a fee-payable cloud service.

## External developments

Some vocabulary requirements are needed by other international groups, notably the International Geo Sample Number (IGSN) around sample type, specimen preparation and material class vocabularies. These have been identified as draft vocabularies for GTWG to build and adopt.



## EarthResourceML (ERML) Standards Working Group

### *Membership*

The EarthResourceML Working Group (ERML WG) has eight members (2014-2015):

- Jouni Vuollo
  - Bruce Simons
  - Daniel Cassard
  - John Laxton
  - Michael Sexton
  - Helge Reginiussen
  - Mark Rattenbury
  - Greg Fernette
- GTK – Finland (Chair)
  - Csiro – Australia (Consultant)
  - BRGM – France
  - BGS – Great Britain
  - GA – Australia
  - SGU – Sweden
  - GNS – New Zealand
  - USGS – USA

### *Meetings*

ERML SWG members attended one face-to-face meeting in Ispra, Italy on 29<sup>th</sup> October 2015 hosted by Robert Tomas and Joint Research Centre. The meeting was held in conjunction with meetings of the GeoSciML Standards Working Group (SWG), the Geoscience Terminology Working Group (GTWG).

## Data Model Development and Documentation

### *The ERML conceptual model*

The current release of the ERML v2 has been published in October 2013. See - <http://www.earthresourceml.org/>. This ERML model will now be trialled in projects such as Minerals4EU project (26 European Union Geological Surveys - 09/2015), as well as being used in the implementation of the INSPIRE Mineral Resources data specification.. The report of Minerals4EU project was presented in the ERML meeting (10/2015) at JRC/Ispra, Italy. No major changes have been proposed and only one modification was proposed – establishing link between mine waste and commodities. EU funded ProSum project will do later a proposal to redesign the mining waste part of the model. The Government Geoscience Information Committee (GGIC) has done a proposal for a ERML Portrayal model and at Ispra meeting two other candidates was under discussion. All ERML Portrayal candidates were sent to evaluation and the feedback is coming 12/2015. Then ERML WG will discuss and vote to accept ERML Portrayal 1.0 model (1/2016).

### *Documentation*

All the CGI SWG web pages have been harmonized (09/2014) and the ERML web pages ([http://www.cgi-iugs.org/tech\\_collaboration/earthResourceML.html](http://www.cgi-iugs.org/tech_collaboration/earthResourceML.html)) have been updated. The data model documentation has been published in the ERML web pages.

### *Uptake of EarthResourceML*

It is pleasing to note that there has been wide uptake of the ERML data standard in national and provincial Geological Surveys (Australia - Europe), mainly through its adoption by data sharing communities such as **AuScope**, **INSPIRE/Minerals4EU** and **EGDI**. In the short term, the major challenge is to get USGS/USA and GCS/Canada to join as active participants to



develop/implement the ERML standard. Attempts to get the “Circum Arctic Ore Deposit” project (Nordic countries – Russia/VSEGEI – USGS/Alaska – CGS – Iceland) to use the ERML standard have so far been unsuccessful! Fennoscandian Geodata Framework project will adopt/test the ERML portrayal model next year (2016).

## Issues

### *Work planned*

Future development of EarthResourceML, and a simple-feature variant of EarthResourceML to support simple portrayal requirements (e.g., WMS), will be undertaken by the EarthResourceML Working Group after the feedback from use of EarthResourceML v2 like Minerals4EU project.

The last ERML data model vocabularies (MineralDepositGroup, MineralDepositType, Product and WasteType) will need more work in the future year. Much more activity from the whole GTWG is really needed to review/vote/adopt shepherd’s proposals!

### *ERML and INSPIRE*

Now inside the current ERML model 2.0 and the INSPIRE and the ERML models are identical to facilitate the broad adoption of globally. These changes also help European data providers to provide both ERML and INSPIRE web services with minimal duplication of effort.

## CGI’S REGIONAL GROUPS

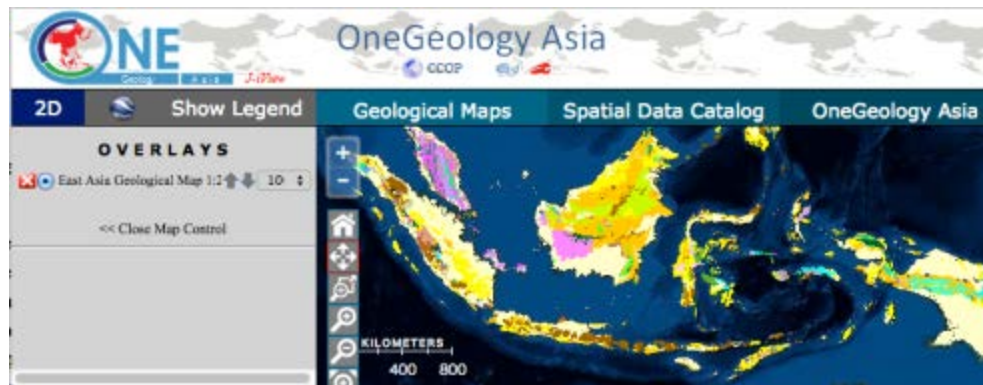
### CGI in Asia

The Geological Survey of Japan (GSJ) is presently implementing four major projects related to geoinformation sharing using OGC-based web services. **1) OneGeology-Asia, 2) the 1:1 M Seamless Geological Map of Southeast Asia, 3) CCOP Geoinformation Sharing infrastructure for East and Southeast Asia (GSi), and 4) Asia-Pacific Region Global Earthquake and Volcanic Eruption Risk Management (G-EVER).** The 3) is similar to INSPIRE project of the European Union. GSJ is also implementing **5) ASEAN Mineral Information System Development training series** (on its second year). The training put emphasis on the use of OGC based web services.

### *OneGeology-Asia*

OneGeology has been operated as a new international consortium since 2013. The activity of OneGeology is now governed by the Board, which is consisting of nine members representing seven regions in the world as well as the United Kingdom and France. The board member representing Asia is currently Dr. Eikichi Tsukuda, Director General of GSJ. The consortium has 20 principal members (including KIGAM and GSJ from Asia), two associate members, and two corporate members as of March 2015. CCOP is planning to join the consortium as a principal member.

GSJ has been playing a key role in operating the OneGeology-Asia portal for CCOP. The portal site, however, has been only slightly updated during the past year. Just like last year, several geological maps served as WMSs in the CCOP region are still hosted by GSJ servers. They are geological maps of Indonesia, Malaysia, Myanmar, Vietnam, Philippines and Papua New Guinea. The WMSs of Laos, Thailand and Korea are hosted by these countries' servers.



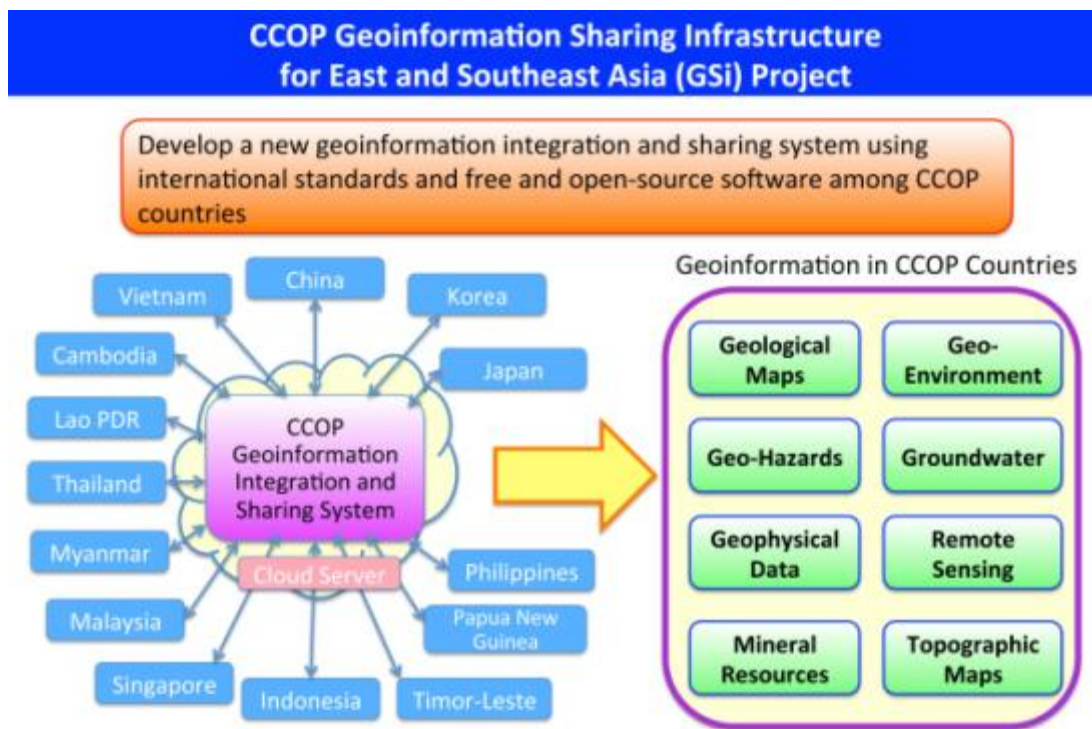
*OneGeology-Asia Portal.*

### ***1:1 M Seamless Geological Map of Southeast Asia***

GSJ has been supporting the ASEAN Seamless Geological Map (1:1,000,000) project since the Department of Mineral Resources (DMR) of Thailand proposed the project at ASOMM+3 held in Bali, Indonesia in November 2013. At the Steering Committee (SC) meeting of CCOP held in Chiangmai, Thailand in March 2014, CCOP decided to support the ASEAN Seamless Geological Map project and called the project the CCOP-ASEAN Seamless Geological Map project. The kick-off meeting was held at CCOP office in Bangkok on 16-17 July 2014, with 21 participants from Thailand, Laos, Vietnam, Cambodia, Indonesia and Japan. At the SC meeting held in Papua New Guinea in October 2014, the CCOP-ASEAN Seamless Geological Map project was listed in CCOP Workplan 2015. Also, at a side meeting of the SC meeting in Krabi, Thailand, the unified legend was adopted and schedule of the project were discussed.

### ***CCOP Geoinformation sharing infrastructure for East and Southeast Asia (GSi)***

The CCOP Geoinformation Sharing Infrastructure Project is implemented by CCOP and GSJ. The main objective of the project is to develop an information system that will encourage sharing of geoscience information among the countries in the Asia-Pacific region. The developed information system will also make geoscience information readily accessible in the region. It provides Web-based functions for spatial data rendering and analysis in the forms of Web Map Service (WMS) and Web Processing Service (WPS), respectively. GSJ developed the CCOP Geoportal site that provides a service for a customized Web-GIS portal creation which enable the users to develop their own Web-based information system for spatial data viewing and processing. A kick-off meeting of the GSi project was held on September 1 to 2, 2015 in Bangkok, Thailand. Twenty-three (23) participants from the CCOP member countries (Cambodia, Indonesia, Japan, Korea, Lao PDR, Malaysia, Myanmar, Papua New Guinea, Philippines, Thailand and Vietnam) including the staff of the CCOP Technical Secretariat (CCOP TS) attended the meeting.



*Schematic diagram of the system for CCOP Geoinformation Sharing Infrastructure.*

### ***Asia-Pacific Region Global Earthquake and Volcanic Eruption Risk Management (G-EVER)***

The Asia-Pacific Region Global Earthquake and Volcanic Eruption Risk Management (G-EVER) is a consortium among the geohazard research institutes in the Asia-Pacific region (<http://g-ever.org>). It was established in 2012 with the objective of formulating strategies to reduce the risks caused by the occurrence earthquakes, tsunamis and volcanic eruptions worldwide. G-EVER provides two web based information system that are useful for the reduction of risks caused by earthquakes, tsunamis and volcanic eruptions. These are the Earthquake and Volcano Hazard Information System (<http://ccop-geoinfo.org/G-EVER/>) and the Volcanic Hazard Assessment Support System (<http://volcano.g-ever1.org/>). The two applications provide users information needed in assessing the risks about volcanic eruptions and earthquake occurrence. They also provide spatial data analysis platform which is needed in mapping and identifying areas that would be affected by the occurrence of the aforementioned geological hazards. The Volcanic Hazards Assessment Support System provides online numerical simulations. It presently has energy cone and Titan2D simulation systems.

### ***ASEAN Mineral Information System Development training series***

Japan International Cooperation Agency (JICA) and Geological Survey of Japan (GSJ) implemented the ASEAN WebGIS and Mineral Database Information System Training Series. The trainings are intended for the countries comprising the Association of Southeast Asian Nations (ASEAN). JICA financed the project while GSJ provides the experts and lecturers. The training mainly focused on the development of the ASEAN Mineral Information System using Free and Open Source Software (FOSS) and Open Geospatial Consortium (OGC) Standards. It includes web based database creation, database population, querying the database using Structured Query Language (SQL) and the formulation of Web Map Services (WMS) and WMS clients. The trainings are mostly attended by the staffs of the geological and mineral

resources agencies. In 2015, the ASEAN Mineral Resources Database Workshop was held in Tsukuba on 5th to 30th Oct., following on site workshop in Cambodia on 2nd to 11th Nov. Before these workshops, field survey of border area between Cambodia and Thailand was carried out for the preparation of the on site workshop.

### **China Geo-information Activity Highlights in 2015**

China kept a high speed development on Geo-information in 2015 in spite of a worldwide slowing-down of carbon and mineral industry. Highlights of geo-information activity and investment are in Geo-Bigdata, geo-data releasing and international geo-technology transfer.

1. A project on Geo-Bigdata infrastructure and application has been carried out in the ministry of Land and resources by China geological survey (CGS), aiming at geo-data and digital geo-resources aggregation and sharing. And a primary trial application on geo-hazard data integration and information release has made a big progress.

The project has also technologically prepared for the national geo-cloud.

2. CGS released 400000 drill data for mineral explorations and started releasing of 1:50000 scale geological map database in 2015. CGS survey also released Chinese version of 1:1million geological map data on the bases of a English version in 2014 via OneGeology portal and also linked to OneGeologyChina at <http://onegeologychina.cgs.gov.cn:8080/en/>.

CGS released *Chinese Arable Geochemical Survey Report(2015)* this year which presents quality conditions of national cultivated land,

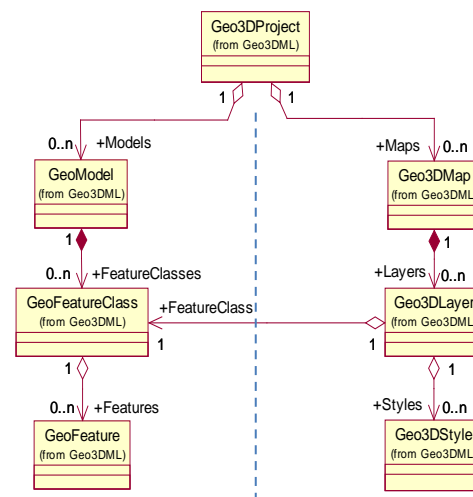
and the Land geochemical survey promotes selenium-rich land resources development.

CGS collected and released Geological Survey Information for 'One belt and One Road' in 2015, which focus on the global mineral resources and information. And a preliminary global geochemical map has been produced and satellite remote sensing interpretation map with respect to the One Belt and One Road is compiled, particularly of geology and mineral resources for a number of important regions.

3. Geo3DML has been put into trial by some GIS software packages which covering regional geology, minerals, oil and gas, urban geology, hydrogeology and geological engineering. Data conversion test from GoCAD is being conducted. 3D metadata standard and 3D database study and application of 3D web services are also in test.

4. China geological survey continued to cooperate with CCOP, ASEAN region and other regions and countries on geo-technology transfer and information sharing.

(1)A training course for 16 ASEAN states professional on Digital Field Geological Mapping has been conducted both in China and Laos in October and November.







Group photo of the training course on geological mapping for ASEAN states. 25 Oct-5 Nov,2015, Nanning, China

Opening ceremony of the geological mapping for ASEAN states. 25 Oct -5 Nov,2015 Nanning, China



(2)The third workshop on Integrated Geophysical and Geochemical Data Processing(IGDP) has been held on 12-14 November for more than 20 professionals from CCOP member countries. Methodology and software training on integration and training for geo-data processing and also geological map data preparation for OneGeology portal were conducted.



Upper left: Group photo of the CCOP-CGS IGDP workshop/training. 12-14 Nov,2015,Beijing, China.

Lower left: Certifications and software presentation.

Upper right: at the training course



## CGI in South/Latin America

The CGI activities in South America are focused on the development of outreach activities to encourage the development of geoinformation, promote the adoption of CGI standards and create awareness about the rule of information technologies in GS activities at decision levels.

### **Meetings**

An on-line meeting with Luis Bermudez, Executive Director of Compliance and E-Learning of Open Geospatial Consortium was made in June 2015. We discussed some issues about training on OGC standards and SDI in South America about. In regards of CGI-IUGS he strongly recommend us to test geosciml with the OGC compliance program (<http://www.opengeospatial.org/compliance>) by using the OGC special test application named Team Engine ( <http://cite.opengeospatial.org/teamengine/> ).

### **Seminars:**

Gabriel Asato, CGI Council member, attended the Research Data Alliance (RDA) webinar. Simon Cox, former CGI-IUGS Council member of the Technical Advisory Board of this organization. His term will end in September 2016.

### **Regional update:**

ASGMI AND EGS Meeting

The past October 21 directors of geological surveys of Latin América, Spain, USA, Canadá and Europe had a meeting in Madrid in order to foresee future ways of cooperation. They signed a MOU and it is expected some financial proposals from World Bank and European Commission in both sides of Atlantic Ocean.

### **Training courses**

Training courses are a common and main activity in SA, unfortunately this year we had no chance to organize a new one. But after the OneGeology meeting in Brazil, Republica Dominicana asked 1G about having an outreach activity in this country. An initial proposal is have the introduction to map web services by Gabriel Asato and GeoSciML Potrayal by Steven Richards.



*Representatives from ASGMI and EGS shaking hands.*

### ***Geological and Mining Survey of Argentina***

At present the Geological and Mining Survey of Argentina (SEGEMAR) is in a transition period. Argentina is in a presidential election period, it is expected that in 2016 all the managerial staff will be renewed. It will a good time to renew SEGEMAR agreements with the IUGS, CGI and OneGeology.

### ***Colombia Geological Survey***

The Geological Survey of Colombia, recently released a new version of their national geological map at 1:1M scale. Compilation of the map involved more than seven years of compilation work.



*Colombia Geological Map 1:1M. Jorge Gomez Tapias, Nohora Emma Montes Ramírez, Maria Fernanda Almanza, Hans DIEDERIX, Fernando Alcarcel Gutierrez, Cesar Augusto Madrid y Alejandra Gomez.*

### ***OneGeology and South America***

At present Brasil took the initiative of pushing forward OneGeology. They are working hard but not without difficulties. In fact OneGeology in Latin America still need attention in order to guarantee the adoption of the CGI-IUGS standards in this region.



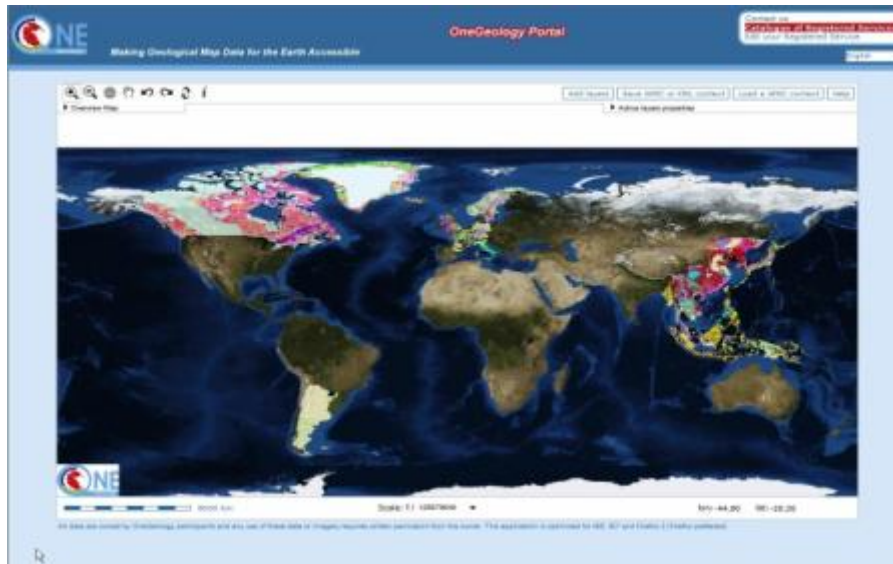
*Mercosur Meeting in Brasil - Mining and Geology Workgroup*

### ***Main Products***

There are no new products for this year.

### ***Main problems encountered in 2014-2015***

Despite the participation of SEGEMAR in the OneG meeting held in Brighton, and the support given by the IUGS and ASGMI in different occasions, the OneGeology map service in Argentina is still shutdown. This situation is in fact a difficult reality because SEGEMAR was the first Latin America GS who published geoscience information in OneGeology. At present the hope is to get the service online again 2016 with the new SEGEMAR authorities.



*First look of the beginning of OneGeology.*

## CGI in Africa

### ***National Spatial Data Infrastructure (NSDI) programs.***

NSDI is a set of policies, standards and procedures to foster more efficient production, management, access and use of spatial data by spatial data agencies in a country. This year a number of NSDI related activities occurred in the region.

### ***National Spatial Data Infrastructure (NSDI) Policy in Namibia***

Significant progress has been made on NSDI in Namibia. The Namibian government has approved the NSDI framework and the NSDI policy was announced in June. Implementation of the policy will be done through the Namibia Statistics Agency (NSA) which will serve as the NSDI coordination body and NSDI clearinghouse. To encourage/foster reasonable stakeholder participation, an outreach workshop on the NSDI Policy was held on 20 July in Windhoek. The NSDI workshop drew participants from government agencies and the private sector. Copies of the NSDI policy booklet were distributed to the participants. The main aim of NSDI is to promote the use of spatial data in support of spatial planning, socio-economic development, and:

- To foster collaboration amongst stakeholders.
- To facilitate the protection of state data copyrights.
- To reduce data duplication within government agencies' data repositories.

Participants were introduced to the NSDI legal framework and provided with an overview of the responsibilities of the NSDI committee, who serve for 3 years. Anna Ngungo from the Geological Survey of Namibia is one of the committee members. The policy will be compulsory to government agencies dealing with spatial data while the private sector is encouraged to apply the policy.





*NSDI Policy socialisation workshop*

### ***NSDI in the region***

SERVIR provides support to regional governments for NSDI programs in Eastern and Southern Africa, about 20 countries including Botswana, Ethiopia, Kenya, Lesotho, Malawi, Mauritius, Namibia, Rwanda, South Africa, Swaziland, Tanzania, Uganda and Zimbabwe. It is a joint collaboration of NASA, USAID and the Regional Center for Mapping of Resources for Development (RCMRD), based in Nairobi, Kenya, to implement a compatible standards framework across Africa. RCMRD provides capacity building, development, and/or the installation of data sharing platforms. To date, the efforts to implement NSDI by government spatial data practitioners in Rwanda, Ethiopia, South Sudan, Swaziland, Zambia, Malawi, and Mauritius have been supported by RCMRD-SERVIR.

About 59 participants from 16 African countries from areas of academia and government entities attended the Regional NSDI Forum on the 27 to 28 July in Kigali, Rwanda. The Forum's main objectives were to:

- Provide the information necessary to implement NSDI
- Launch a community platform for practitioners and policymakers to share ideas
- Improve overall implementation and evaluation of NSDI

During the Forum, the Rwanda Data Portal was launched.

### ***4th Geoscience Information in Africa Network (GIRAF) 2015 WORKSHOP***

The 4<sup>th</sup> Geoscience Information in Africa Network (GIRAF) workshop was held in Maputo, Mozambique from 6 to 9 October. GIRAF has been in existence since 2009, since then it has increased the number of members and affiliations, and is now comprised of a mix of geoscientists from a variety of cultural and technical backgrounds.

The GIRAF Network/initiative now has 392 members from 49 (Kristine to check) countries, 14 of which are non-African: India, Australia and 12 European countries. Today, GIRAF has 17 active ambassadors in Africa.







*GIRAF workshop participants*

The 4<sup>th</sup> GIRAF workshop was organized in joint cooperation with the GIRAF groups of Mozambique (Eduardo Mondlane University and the Ministério dos Recursos Minerais e Energia, Mocambique) and the Federal Institute for Geosciences and Natural Resources (BGR), Germany. Funding is provided by the “Extractives and Development Program” by the German Government (Federal Ministry for Economic Cooperation and Development - BMZ), the UNDP project “Stones for Development”, the UNESCO Nairobi and the Commission for the Management and Application of Geoscience Information of the IUGS. This year’s theme was “Geoscience information for sustainable mining, stones for development and environment”. Special topics of the GIRAF 2015 Workshop were

- Geoscience information, geoinformatics and maps
- Sustainable mining;
- Artisanal and small scale mining management;
- Groundwater;
- Environmental issues;
- GIS, remote sensing and geoscientific data management;
- The future of GIRAF – Transfer of the coordination and management to African GIRAF members.

GIRAF provides a platform for information and experience sharing, networking and facilitates the identification of knowledge gaps and opportunities from an African perspective.

Most African countries in the region have common geoinformation challenges such as human resources (limited skills) and Surveys struggle to manage their data and infrastructure. GIRAF, which has a long-standing partnership with UNESCO, has mutual elements with many of the agency’s objectives. During the workshop the coordination of GIRAF will be handed over GIRAF to the African members.



*4th GIRAF Workshop in Maputo (in two languages: English and Mozambican)*

The future of GIRAF was extensively discussed. Several working groups deliberated on six major themes:

- Organisation, leadership and funding
- Role of ambassadors
- Communication: newspaper and website
- Thematic focus of GIRAF
- Education and training
- Synergies between institutions (should consult with the other stakeholders)



*Dr. Kristine Asch reporting on the progress and future of GIRAF*

A constitution for the future GIRAF was drafted and will be finalized before the next Colloquium of African Geology (CAG) in 23-27 November 2016 in 16 at the International Conference Centre / University of Ibadan, Nigeria. GIRAF ambassadors from Cameroon and Tanzania were nominated as coordinators in the interim period and the current ambassadors will act as interim GIRAF council members.

### ***35th International Geological Congress (IGC): Preparations for the Geoscience Data and Information Systems theme***

The “Geoscience Data and Information System” theme is being championed by Kristine Asch (BGR, Germany), Anna Nguno (GSN, Namibia), Jorgen Tulstrup (GEUS), Francois Robida (BGRM, France) and Annie Laviolette (NRCAN, Canada). A GIRAF session is planned for the Geoscience Information Super-Symposium, spearheaded by Kristine Asch/CGI.

Sources:

<https://servirglobal.net/Global/Articles/Article/1464/regional-national-spatial-data-infrastructure-nsdi-forum-held-in-kigali-rwanda>

## **CGI in Oceania**

### ***Australia/New Zealand Government Geoscience Information Committee (GGIC)***

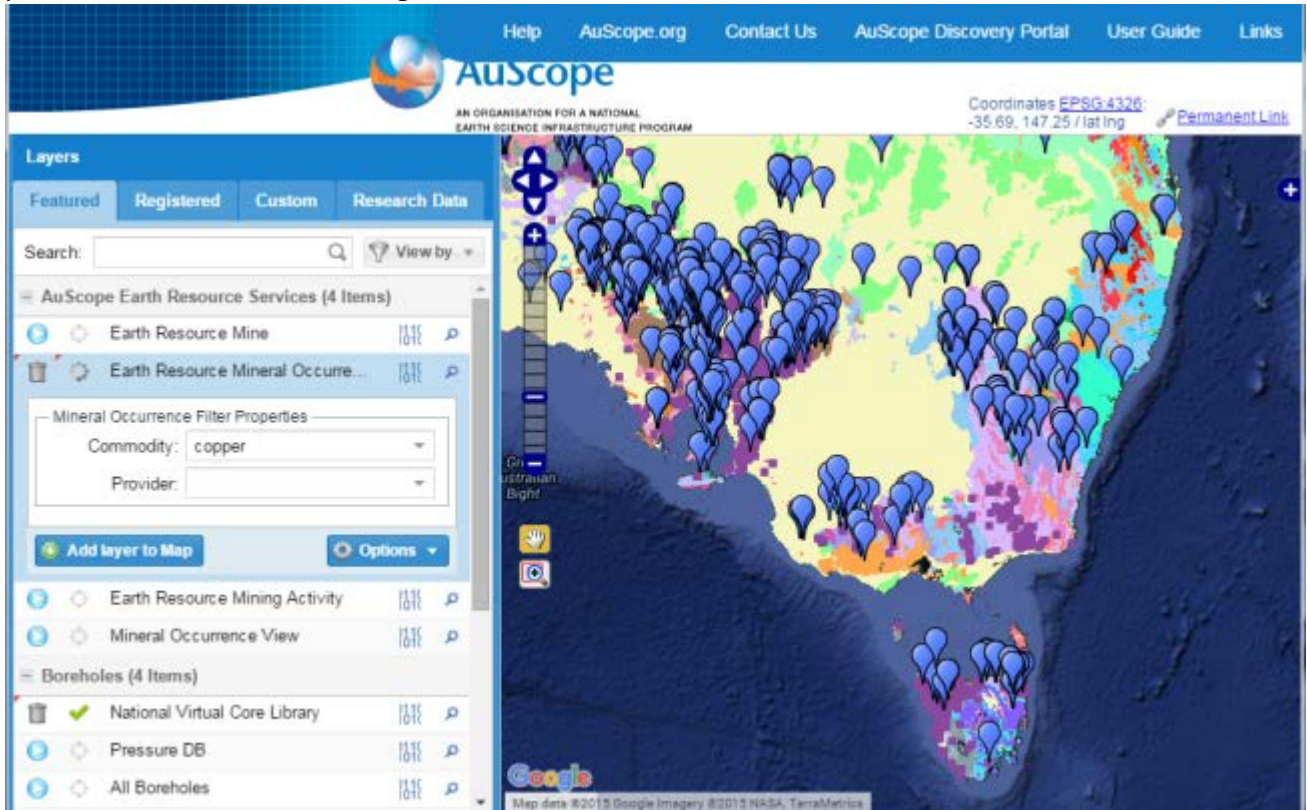
GGIC is comprised of representatives of the geological survey organisations of New Zealand and the Australian Commonwealth, States and Northern Territory. GGIC’s aims and activities in Oceania align with CGI’s global goals to foster interoperability and exchange of geoscience information, by active community leadership, collaboration, education, and the development and promotion of geoscience information standards and best practice.

GGIC continues to promote interoperability of geological data being delivered by its member geological surveys, in particular boreholes, mineral occurrences and mines, and mineral exploration tenement data. Where CGI data transfer standards exist for these data types (eg, GeoSciML, GeoSciML-Portrayal, EarthResourceML) they are being used. Where international data standards are lacking (eg, EarthResourceML-Portrayal, exploration tenements), GGIC is using its own schemas designed around CGI and OGC principles and published at <http://schemas.geoscience.gov.au>. GGIC’s MineralOccurrenceML portrayal schema forms the seed of the CGI EarthResourceML-Portrayal schema which is due to be published in 2016 by CGI. A cookbook for best practice in delivering Australian geoscience data using GeoSciML and EarthResourceML, similar to cookbooks constructed for OneGeology and INSPIRE, is being written for GGIC data providers.

GGIC is funding the construction of a new website - the **Australian Geoscience Information Network (AusGIN)** - to provide a single access point to Australian geoscience spatial data,



publications, and regulatory information for mineral resource explorers. AusGIN will include a web mapping portal for discovery and delivery of Australian geoscience web services. The new portal will include tools for discovery, display, filtering and analysis of web services that have been developed by the AuScope research project over the last 5 years (see figure below). The AusGIN project is also providing a strong incentive for all of the Australian geological surveys to build standards-based CSW services to make their data and publications discoverable using ISO standards.



*The AuScope research data portal provides the basis for development of a new Australian geoscience portal as part of the Australian Geoscience Information Network.*

### ***GNS Science, New Zealand***

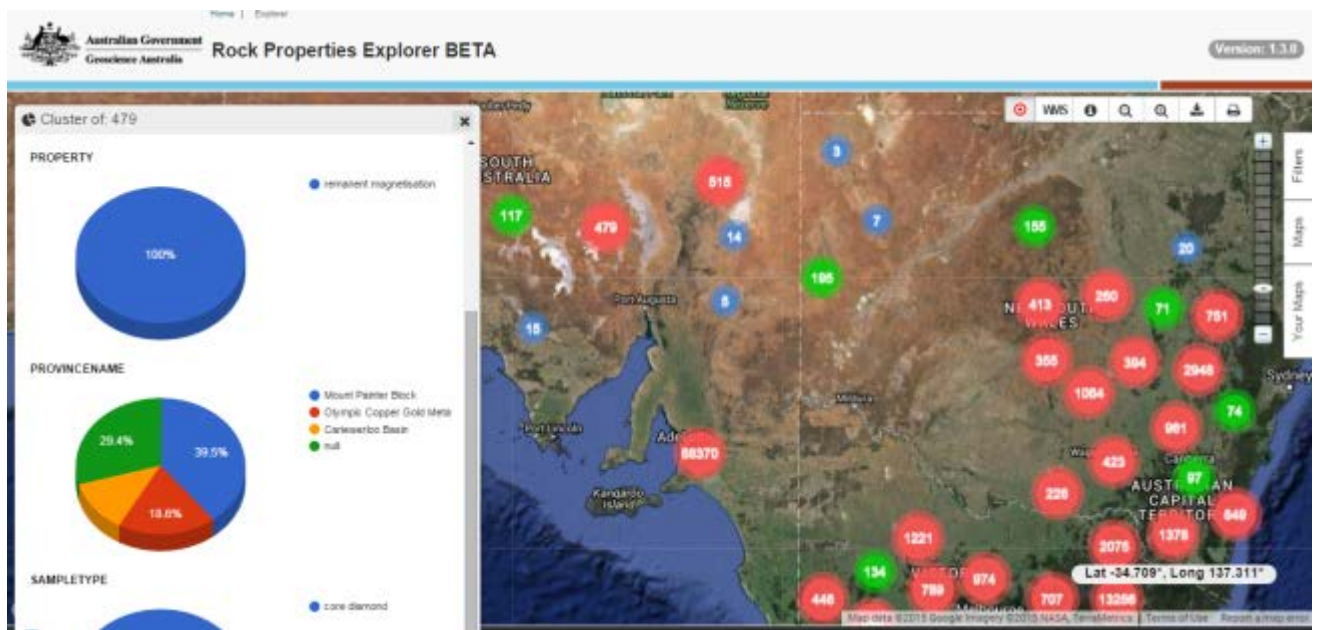
GNS Science has completed GeoSciML Portrayal-compliant web services for the 1:1 million Geological Map of New Zealand dataset and the Southern Victoria Land (Antarctica) dataset. OneGeology 4-star accreditation is being sought for these services. The larger and more complicated 1:250,000 scale QMAP Geological Map of New Zealand dataset is in the early stages of conforming to this standard and to full GeoSciML.

An EarthResourceML Portrayal service is nearing completion that has been developed from a New Zealand mineral occurrence database. The portrayal service is based on a proposed GGIC (Australia-NZ) standard that is under review by the CGI EarthResourceML working group.



## Geoscience Australia

Geoscience Australia (GA) continues to use OGC web services as a prime method of spatial data delivery, with over 100 services now delivered for geoscience, topographic, and legislative data. Most of these services are WMS, but more and more WFS data services are being developed. A recent example is WMS and WFS services constructed using the open source Geoserver application to deliver GA's new Rock Properties database. The database is a repository of several hundred thousand petrophysical property analyses from boreholes, field mapping, and laboratory analyses. A web application has also been constructed to display, filter and download the analytical data from the web services (see Figure below).



*Geoscience Australia has published new web services to deliver petrophysical data from field and laboratory analysis of rock samples.*

## Concerns About Unique Identification of Sample and Borehole Data

GGIC has reviewed the problem of duplication of data in the boreholes databases of all Australian geological surveys. Disparate work practices and data structures in the Surveys have resulted in between 10% and >50% of all boreholes in Survey databases being duplicate or near-duplicate records. Geoscience Australia recently completed a laborious, time-consuming exercise to remove almost 4000 duplicate borehole records from its databases. The inability of Surveys to guarantee unique identity of boreholes either within or between their databases is a concern for integration of distributed boreholes web services.

GGIC has been in contact with the [International GeoSample Number \(IGSN\)](#) consortium to voice concern about the lack of quality control for entering samples and boreholes into its sample registration system. There is nothing in the IGSN registration process to stop different users entering samples and boreholes more than once, thus potentially undermining the potential “uniqueness” of an IGSN number for a sample.

## ***Elsevier International Data Rescue Award in the Geosciences***

Three geoscience agencies in Oceania entered the 2015 [Elsevier International Data Rescue Award in the Geosciences](#). This award recognises efforts to rescue, collate and deliver data that may be languishing in old digital or non-digital formats. The Geological Survey of Western Australia submitted its program of delivering geological field observation data; and Geoscience Australia and GNS Science both submitted their projects which rescued petrophysical and geochemical data. All these projects contributed significantly to best practice in geoscience data management and delivery.

## ***Petroleum-related geoscience data***

Geoscience Australia is responsible for oversight of the data management system behind the [National Offshore Petroleum Information Management System \(NOPIMS\)](#). This is a project to organise and deliver all of Australia's offshore petroleum data repository, including borehole data and seismic survey data. The NOPIMS system will eventually provide all petroleum borehole and survey data through a single web portal.

The work of GGIC and AuScope in minerals-related geoscience data management and delivery is now being recognised by the Australian petroleum data community who are developing a **Resources Data Initiative (RDI)**. The RDI will seek to implement in the petroleum data sphere many of the standards-based data discovery and delivery methods that have been developed by CGI, GGIC, and AuScope in the last 5 to 10 years.

## ***Research Data Storage Infrastructure (RDSI)***

The [RDSI](#) is a project to link eight high performance computing facilities in Australia to provide big data storage and supercomputing resources to the science research community. In the geosciences sphere, the [National Computing Infrastructure \(NCI\)](#) supercomputer site at the Australian National University is being used for storage and processing of large geophysical datasets and 3D geological models. The RDSI is committed to using international data transfer standards, including CGI standards, to consume supporting geoscience “non-big” data such as geological maps, boreholes, and samples.

## ***Oceania Membership of CGI committees***

### CGI Council

- Ollie Raymond – Geoscience Australia

### Standards Working Groups

- Ollie Raymond - Geoscience Australia (acting chair – GeoSciML; ERML, GTWG)
- Mark Rattenbury - GNS Science, New Zealand (chair – GTWG; GeoSciML, ERML)
- Alastair Ritchie - Landcare Research, New Zealand (GeoSciML)
- Bruce Simons - CSIRO, Australia (GeoSciML, ERML)
- Michael Sexton - Geoscience Australia (ERML)
- Simon Cox - CSIRO, Australia (GTWG)

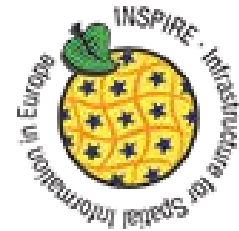
## CGI in Europe

The major selected activities related to the interoperability of geoscience data & information, their accessibility and re(use) in Europe, in which members of IUGS-CGI took active role.

### ***Infrastructure for Spatial Information for European Community (INSPIRE)***

<http://inspire.ec.europa.eu/>

The implementation of the INSPIRE legal and technical requirements = building the European spatial data infrastructure covering 34 data domains (geology, mineral resources included), by 28 European Union Member States (+ some EFTA and EU candidates countries) is right on its way to meet the major completion milestone in 2020. Since the beginning (cca. 2000) the IUGS-CGI experts have been heavily involved utilising fully the geological standardisation work related to e.g. GeoSciML including common geological terminology CGI codelists.



The major relevant activity in INSPIRE was the launch (11.12. 2014) of **the INSPIRE Thematic Clusters collaborative platform** - European Commission initiative, linked to the official EU INSPIRE Maintenance and Implementation Framework, with the objective of supporting INSPIRE implementation in the Member States. The facilitation of the one (Earth Science Cluster) of the 9 thematic clusters has been given to the EuroGeoSurveys.

Currently the Earth Science INSPIRE cluster (covers 5 data themes), facilitated by Mrs. Amelia Baptie – BGS, UK, has 134 registered members that have already created 45 discussion topics. This online platform is supported to be the place to share best practices in implementing INSPIRE (e.g. by using IUGS-CGI GeoSciML, EarthResourceML exchange models or CGI agreed terminology), ask and disused questions issues etc. For example publishing of the updated version of the GeoSciML cookbook that explains how to use GeoSciML for INSPIRE is expected by the communities. <https://themes.jrc.ec.europa.eu/>

The  
INSPIRE portal  
for Thematic  
Clusters

### *Minerals Intelligence Network for Europe (Minerals4EU)*



<http://minerals4eu.brgm-rec.fr/>

The completion of the Minerals4EU project, co-financed by the European Union under the FP7 programme, represented a major milestone in the provision of interoperable geoscience data&information (related to mineral resources) in Europe. Several members of the IUGS-CGI Council and WGs took active part in this project which delivered a fully operational distributed (web services based) system of structured and unstructured data related to the mineral resources in Europe (26 EU countries where members the project consortium). The IUGS-CGI EarthResourceML data model as well as semantics – terminology have been fully utilised in this project together with the relevant INSPIRE SDI rules. Part of the **Minerals4EU Data Platform** is also a new interactive **European Minerals Yearbook** showing important country based statistical information on the production, consumption of Minerals in Europe. The project made a fundamental contribution to the European Innovation Partnership on Raw Materials (EIP RM), seen by the Competitiveness Council as key for the successful implementation of the major EU2020 policies. It is important to mention that not only the Minerals4EU database structure/system is now being used by several under European projects (H2020 EU financial programme) e.g. ProSUM, EURARE, but also there is a follow up European project: **Minerals Intelligence Capacity Analysis (MICA)** that started 1.12. 2015 (again with the IUGS-CGI members active role) and which aims to build new minerals intelligence functionalities on top of the already developed EU minerals data platform (repository of interoperable data and information on minerals EU).



## European Plate Observing System (EPOS)



<http://www.epos-eu.org/>

EPOS (European Research Infrastructure and E-Science for Data and Observatories on Earthquakes, Volcanoes, Surface Dynamics and Tectonics) is one of the research infrastructures selected in the European roadmap of research. It will be supported by different programmes through the H2020 agenda.

EPOS will integrate data from a large number of communities (seismology, GNSS, Geology, Earth observations, near fault observatories, volcanos, etc.) relating to the understanding of the solid earth, with a special focus on geohazards and geo-resources. The implementation of EPOS will first be conducted through the EPOS H2020 project that received an 18 million Euros grant through Horizon 2020. The project started on 1 October 2015. One of the packages of this project is dedicated to geological data, and is driven by some European geological surveys, in partnership with research and academic organisations. The purpose of this package is to give access to European data sets (from surveys and from scientific communities) through standardised protocols, and in particular using GeoSciML for geological maps and boreholes. A special focus will also be given to 3D models and will include a task about standardisation of the metadata and access to 3D models. After the four years implementation project, EPOS will enter into the operational phase that should be financed through member state subscription fees and in kind contributions.

## The European Marine Observation and Data Network (EMODnet)

<http://www.emodnet.eu/>

<http://www.emodnet.eu/geology>



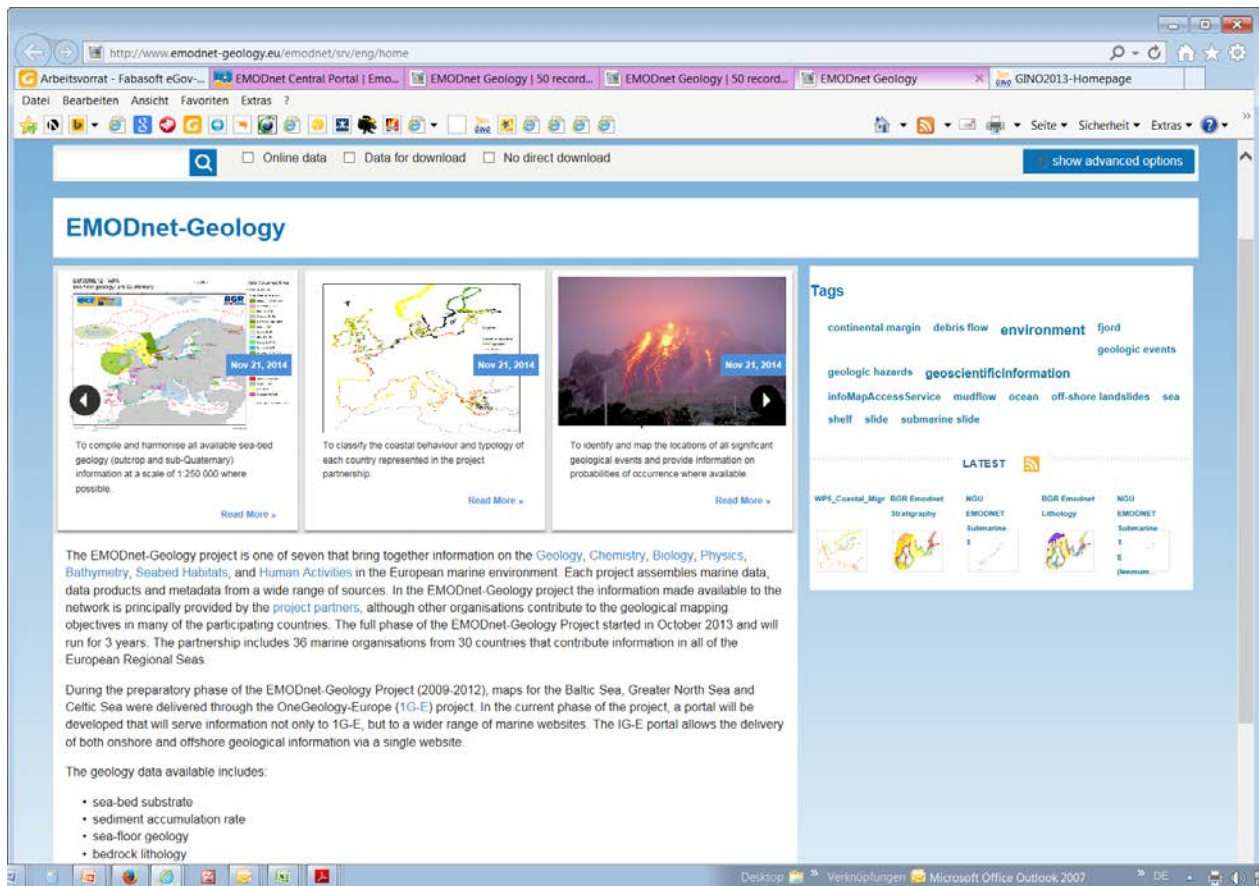
EMODnet was established in 2007 by the European Commission (EC) as part of the Integrated Maritime Policy Action Plan. It is a long-term marine data initiative from the EC DG for Maritime Affairs and Fisheries (DG MARE) underpinning its Marine Knowledge 2020 strategy.

EMODnet consists of more than 100 organisations assembling marine data, products and metadata in a uniform way to make these fragmented resources more available to public and private users relying on quality-assured, standardised and harmonised marine data which are interoperable and free of restrictions on use. The EMODnet data infrastructure is being developed through a stepwise approach in three major phases and is currently in its second development phase with the target to be fully deployed by 2020.

It comprises of 7 thematic projects running in parallel, the so-called “Lots”: Bathymetry, Geology, Seabed, Habitats, Chemistry, Biology, Physics and Human Activities. Currently EMODnet is in the 2nd phase of development.

The EMODnet Geology Lot was initiated in EMODnet Phase I (2009-2013) through the EMODnet-Geology project. During the current Phase II (2013-2016), EMODnet Geology will extend the work carried out during the preparatory Phase 1 to move, together with the six

other EMODnet sub-portals, towards an operational service with full coverage of all European sea-basins, a wider selection of parameters and medium resolution data products.



The EMODnet geology portal <http://www.emodnet-geology-eu/emodnet/srv/eng/home>

## Objectives of EMODnet Geology

The geology portal aims to provide free access to (i) geological data and metadata held by various organisations in Europe based on international standards and (ii) geological data products compiled at a scale of 1:250,000 using the standards - including CGI and INSPIRE vocabularies - developed during the ur-EMODnet-Geology Project (EMODnet phase I from 2009 to 2013). Data are already available on the themes: Seabed substrate, sediment accumulation rate, sea-floor geology, seabed lithology, stratigraphy, coastline migration, aggregate resources and geological events.

The EMODnet Geology lot with its Seabed geology Workpackage shows great interest in the development of the CGI vocabularies and addition of marine geomorphological units – work that has started in spring 2015.

## CGI in North America

### *Executive Summary*

CGI's mission is to foster the interoperability and exchange of geoscience information, by active community leadership, collaboration, education, and the development and promotion of geoscience information standards and best practice.

The United States Geological Survey (USGS), Portland State University (PSU), and the Arizona Geological Survey have a number of significant accomplishments this past year. Highlights related from United States Government Open Data activities, the US Interagency Big Earth Data initiative, the Federal Geographic Data Committee (FGDC), the USGS National Geological and Geophysical Data Preservation Program, the USGS National Cooperative Geologic Mapping Program, and the Arizona State Geological Society are all contained in this yearly report. Details are provided below.

### *US Government Open Data*

Since the White House released the Executive Order, "Making Open and Machine Readable the New Default for Government" in 2013, USGS and its partner agencies in the U.S. Government have undertaken a number of initiatives to more effectively document and share prioritized USGS scientific data. USGS released a Science Data Catalog (SDC) (<http://data.usgs.gov/datacatalog>) in 2014 to provide comprehensive access to data produced from USGS research, and has significantly updated SDC with new capabilities and content in 2015. The USGS SDC currently provides access to over 6,800 resources, an increase of ~15% over 2014's tally. These publicly available resources all include linkages back to source data, visualization tools, and/or data distribution systems. Equally important to the establishment of an integrated search and discovery system, is USGS efforts to improve the overall workflow between the USGS, Department of Interior and Data.gov to aid in the seamless processing and management of science metadata throughout the United States. Significant activities have occurred with all organizations involved to address such challenges as duplicate records, provenance of metadata, authoritative source for publishing metadata, and improved discovery through these various systems.

**USGS**  
Science for a changing world

U.S. Geological Survey Science Data Catalog

USGS Home  
Contact USGS  
Search USGS

Featured Datasets Search Browse About myReports Help

**Advanced National Seismic System (ANSS) Comprehensive Catalog**  
Data Source: Earthquake Hazards Program  
Median Area: Natural Hazards

The ANSS Comprehensive Catalog (ComCat) contains earthquake source parameters (e.g. hypocenters, magnitudes, phase picks and amplitudes) and other products (e.g. moment tensor solutions, macroseismic information, tectonic summaries, maps) produced by contributing seismic networks. [View](#)

**Your source for open data within USGS**

The USGS Science Data Catalog provides seamless access to USGS research and monitoring data from across the nation. Users have the ability to search, browse, or use a map-based interface to discover data.

How to Search for Data  
Contribute USGS Data  
Web Services Access

**Frequently Accessed USGS Data**

- The National Map
- Earthquake Hazards Program
- Energy Resources Program
- Water Resources of the United States

**Currently Highlighted USGS Data**

- Biodiversity Information Serving Our Nation
- South Florida Hydrology
- Ocean Biogeographic Information System USA
- Patient Wildlife Research Center

Accessibility FOIA Privacy Policies and Notices  
U.S. Department of the Interior | U.S. Geological Survey  
Page Contact Information: ASK\_CSAS@  
Page Last Modified: Friday, September 25, 2015

### USGS Science Data Catalog (SDC)

Additionally, USGS “Instructional Memos” for data management, data release, metadata, and data preservation were released in February of 2015. (They will become policies in October 2016.) These policies promote the implementation of data management activities within the USGS to improve overall data accessibility, documentation, and preservation of USGS data and research results. The formal “Data Release” process outlined in these memos, requiring peer review, assignment of a DOI and placement within a publicly accessible repository, will greatly increase both number and quality of USGS datasets available through the USGS Science Data Catalog, Data.gov and related initiatives in the years to come.

USGS Instructional Memoranda on Data Management:


Scientific Data Management Foundation <http://www.usgs.gov/usgs-manual/im/IM-OSQI-2015-01.html>

Metadata for Scientific Data, Software, and Other Information Products <http://www.usgs.gov/usgs-manual/im/IM-OSQI-2015-02.html>

Review and Approval of Scientific Data for Release <http://www.usgs.gov/usgs-manual/im/IM-OSQI-2015-03.html>

Preservation Requirements for Digital Scientific Data <http://www.usgs.gov/usgs-manual/im/IM-OSQI-2015-04.html>





**USGS**  
science for a changing world

**U.S. Geological Survey Manual**

**U.S. Geological Survey Instructional Memorandum**  
**No: IM OSQI 2015-04**  
**Issuance Date: February 19, 2015**  
**Expiration Date: Retain Until Suspended**  
**Subject: Preservation Requirements for Digital Scientific Data**

**1. Purpose and Scope.** This Instructional Memorandum (IM) specifies preservation requirements that apply to all U.S. Geological Survey (USGS) digital scientific data and associated information. The IM is interim policy to allow the time needed for USGS science activities to fully implement the data preservation requirements herein and it will be retained until superseded by a permanent Bureau Survey Manual (SM) policy chapter. This Instructional Memorandum (IM) provides interim requirements and procedures to ensure the preservation of USGS digital scientific data. Preservation requirements for non-digital data (paper records containing data or descriptions of data) or physical samples are addressed in the USGS records disposition schedules.

**2. Policy.** Data created by or on behalf of the USGS are the property of the Federal Government (refer to [SM 502.5](#) for information on USGS and non-USGS data) and the Federal Records Act [36 CFR 1220.14](#) ). It is the policy of the USGS to preserve scientific data and information funded or developed by the Bureau's information and research programs. All scientific data as a result of USGS funding must be preserved as follows.

A. USGS scientific data, databases and information, are accessible, available, and useable on the appropriate media in accordance with the USGS records disposition schedules (<http://www.usgs.gov/usgs-manual/schedule/>) or as appropriate to meet the National Archives and Records Administration (NARA) retention format requirements for permanent records (<http://www.archives.gov/records-mgmt/policy/transfer-guidance-tables.html#digitalstillimages>) and to comply with Federal Government [Open Data](#) and [Open Access](#) initiatives.

B. The USGS will retain an authoritative or original copy of all data for which it is responsible and that are produced for release as a result of its scientific research and related activities. Distribution copies of USGS data may be disseminated through appropriate third parties such as, journal-related storage and external repository. When scientific data are produced in cooperation with non-USGS entities, ownership of that data must be clearly stated in a documented agreement between the parties. In addition, other applicable requirements for scientific work performed and information developed under various agreements or collaborative arrangements with non-USGS entities must also be followed (refer to [SM 502.2](#), section 2. References).

C. Digital data and associated information that USGS is responsible for preserving must be stored and released from properly certified and accredited information systems following USGS information technology systems processes and procedures. These processes ensure important long-term preservation concerns such as those related to fault tolerance, data integrity, and information security are addressed (refer to <http://www.usgs.gov/usgs-manual/600/600-5.html>).

**3. Preservation Elements.** Each element listed below represents a component of required digital scientific data preservation. Detailed guidance and specific implementation details are available on the USGS Data Management Web site: <http://www.usgs.gov/datamanagement/preserve.php>.

A. *Storage and Geographic Location.* Storage and geographic location involves storage systems, locations, and the planning for multiple copies of data. At a minimum, two complete copies of all data, metadata, and documentation must be maintained. These two copies must be geographically separate;

*USGS Data Management Instructional Memos*

## **Big Earth Data Initiative**

The Big Earth Data Initiative (BEDI) seeks to improve the collection, management, and delivery of U.S. Government Earth system data. BEDI represents a specialized implementation of the broader Open Data Initiative, the Administration's signature data sharing effort. The USGS and Department of the Interior, along with the National Aeronautics and Space Administration (NASA), and National Oceanographic and Atmospheric Administration (NOAA), continuing to work on improving data discoverability, use of data, comprehensive treatments (i.e., sufficient metadata) of critical earth observing systems data in support of the BEDI effort.

The USGS/DOI BEDI effort has made considerable progress this past year in cataloging data from its Earth Observing Systems. As of October 2015, more than 3,650 datasets from approximately 18 of its major Earth Observing Systems have been cataloged with FGDC-compliant metadata, including links to the actual data (Table 1). These include all the highest priority systems, and several interagency efforts:

	Earth Observing System Name	Datasets / Products Cataloged
1	Landsat satellite	· <a href="#">150+ Landsat and Landsat-derived datasets</a>
2	USGS Stream Gauge Network	· <a href="#">USGS Surface-Water Data for the Nation—National Water Information System (NWIS)</a>
3	<a href="#">USGS Gap Analysis Program</a>	· <a href="#">National Gap Analysis Program (GAP) Species Range Dataset (NGDA)</a> · <a href="#">National Gap Analysis Program Land Cover Data v2.2</a> · National Gap Analysis <a href="#">Program</a> Species Distribution Models · Protected <a href="#">Areas</a> Database of the United States (PADUS)
4	Global Biodiversity Information Facility Network	· <a href="#">Biodiversity Information Serving our Nation (BISON)</a> · <a href="#">Ocean Biogeographic Information System-USA (OBIS-USA)</a> · <a href="#">Multi-State Aquatic Resources Information System (MARIS)</a>
5	Advanced National Seismic System (ANSS)	· <a href="#">Advanced National Seismic System Comprehensive Catalog</a>
6	USGS National Groundwater Database	· <a href="#">USGS Groundwater Data for the Nation—National Water Information System (NWIS)</a> <sup>v</sup>
7	Bureau of Land Management/NGO Ecoregional Planning Projects	
8	USGS Water Quality Samples	· <a href="#">USGS Water-Quality Data for the Nation—National Water Information System (NWIS)</a>
9	USGS In Situ Water Quality Sensors	· <a href="#">USGS Water-Quality Data for the Nation—National Water Information System (NWIS)</a>
10	Fish and Wildlife Service Inventory and Monitoring Program	· <a href="#">FWS Inventory and Monitoring Program Resources</a>
11	Breeding Bird Surveys	· <a href="#">Breeding Bird Survey Route Locations for Lower 48 States</a> ( <a href="#">Direct Download</a> )
12	Waterfowl Breeding Population and Habitat Survey	· <a href="#">2,000+ Waterfowl Breeding Population Surveys for various years and regions</a>
13	Gaseous Pollutant Monitoring Network	
14	USGS Tide Gauges	· <a href="#">USGS Surface-Water Data for the Nation—National Water Information System (NWIS)</a>
15	Geophysical Field Surveys	· <a href="#">1,500+ Airborne Geophysical Surveys for various regions</a>
16	Airborne and Topography LIDAR	· <a href="#">30+ LIDAR-derived data products</a>

	Earth Observing System Name	Datasets / Products Cataloged
17	Airborne High-Resolution Optical Imagery	<ul style="list-style-type: none"> <li>· <a href="#">USGS High Resolution Orthoimagery Collection – Current – National Geospatial Data Asset (NGDA) High Resolution Orthoimagery</a></li> <li>· <a href="#">USGS High Resolution Orthoimagery Collection – Historical – National Geospatial Data Asset (NGDA) High Resolution Orthoimagery</a></li> </ul>
18	National Phenology Network	<ul style="list-style-type: none"> <li>· <a href="#">Plant</a> and Animal Phenology Data for the United States</li> </ul>

*Datasets and data products resulting from Department of the Interior's (DOI) Earth Observing Systems that have been cataloged with FGDC-compliant metadata. Gray rows represent systems and data from non-USGS DOI bureaus.*

### Federal Geographic Data Committee (FGDC)

The Federal Geographic Data Committee (FGDC) is the U.S. interagency coordinating body for National Spatial Data Infrastructure (NSDI) activities and is composed of representatives from across Federal government and provides opportunities for stakeholder participation. The NSDI leverages investments in people, technology, data, and procedures to create and provide the geospatial knowledge required to understand, protect, and promote our national and global interests. The NSDI encompasses the policies, organizational responsibilities, data, information, technologies, standards (national and international), services, and financial and human resources necessary to achieve this vision. Several activities support the current three main NSDI strategic goals: 1) Develop Capabilities for National Shared Services; 2) Ensure Accountability and Effective Development and Management of Federal Geospatial Resources; and 3) Convene Leadership of the National Geospatial Community:



Geoplatform Home Page



GeoPlatform – implementing the GeoPlatform embodies the principles and spirit of OpenDataandGovernment, emphasizing government-to-citizen communication, accountability, and transparency across the Federal and non-Federal communities. The GeoPlatform supports open formats, data standards, and common core and extensible metadata (e.g., project open data, ISO, OGC, and others). The portfolio of data, applications, and services provided here is stewarded through the use of open licenses and careful review and hosted on an infrastructure that maximizes interoperability. In coordination with Data.gov and FGDC member agencies, it provides access to almost 126,000 geospatial metadata records.



### Datasets Published per Month

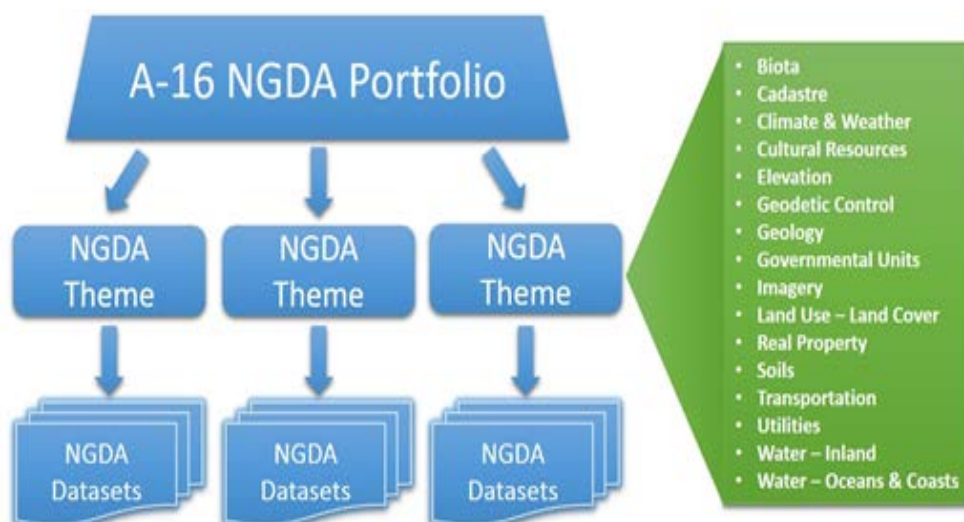
Data last updated on 10/04/2015 12:23 AM.

Agency Name	Number of Datasets published by month												Total in the Past 12 Months
	Nov '14	Dec '14	Jan '15	Feb '15	Mar '15	Apr '15	May '15	Jun '15	Jul '15	Aug '15	Sep '15	Oct '15	
Department of Agriculture	4	-	2	11	10	3	7	9	1	7	23	-	77
Department of Commerce	34	1	1	3	1	1	-	48	30	17	61325	-	61461
Department of Homeland Security	-	-	-	-	-	1	-	6952	1159	-	-	-	8112
Department of State	-	-	-	-	-	-	-	15	5	2	2	-	24
Department of the Interior	31	47	31	119	42	107	109	105	249	284	61	20	1205
Department of Transportation	-	-	-	-	-	-	-	-	57	-	-	-	57
Environmental Protection Agency	-	-	-	-	-	621	48	371	29	641	520	1	2231
National Aeronautics and Space Administration	358	-	-	2035	-	-	-	-	14567	-	-	-	16960
<b>Total</b>	<b>427</b>	<b>48</b>	<b>34</b>	<b>2168</b>	<b>53</b>	<b>733</b>	<b>164</b>	<b>7500</b>	<b>16097</b>	<b>951</b>	<b>61931</b>	<b>21</b>	<b>90127</b>

Datasets Published by Month

National Geospatial Data Assets – building a nationally significant portfolio consisting of a core set of A-16 National Geospatial Data Assets (NGDAs) that are sufficiently complete, current, and accessible to support the critical business and mission requirements of the Federal Government, its partners and stakeholders. One hundred and seventy-nine (179) NGDA Datasets are included across 16 Themes including Geology, which is defined geographically-referenced data pertaining to the origin, history, composition, structure, features, and processes of the solid Earth, both onshore and offshore. Each of the 16 Themes are organized in communities on the GeoPlatform to improve information sharing about these data, supporting standards, and other resources.

Structure of the A-16 NGDA Portfolio & NGDA Themes





National Geospatial Advisory Committee (NGAC) - offering non-Federal perspective and recommendations related to implementation of the NSDI. Some key initiatives include participation in the National Telecommunications and Information Administration's multi-stakeholder engagement process regarding Unmanned Aircraft Systems privacy as well as in the CIO Council's upcoming Privacy Summit on geospatial data privacy.

### ***USGS National Geological and Geophysical Data Preservation Program***

The Energy Policy Act of 2005, Public Law 109-58, Sec 351, (<http://www.gpo.gov/fdsys/pkg/PLAW-109publ58/html/PLAW-109publ58.htm>) established the National Geological and Geophysical Data Preservation Program in the U.S. Geological Survey and outlined the following goals:

- Archive geological, geophysical, and engineering data, maps, well logs, and samples;
- Provide a national catalog of archived materials; and
- Provide technical and financial assistance to State geological surveys and relevant Department of the Interior (DOI) bureaus for archived materials.

**USGS**  
science for a changing world

[datapreservation.usgs.gov](http://datapreservation.usgs.gov)  
National Geological and Geophysical Data Preservation Program

Home About Grants National Digital Catalog Success Stories

Preserving geoscience samples for today and future generations

**Our Home is at the Denver Federal Center**  
Building 1105, 470,000 square foot, roof is covered by solar panels

**News**

Publication: U.S. Geological Survey Geologic Collections Management System (GCMS)  
Publication sponsored by the National Geological and Geophysical Data...  
7 September 2015

AAPG Conducts Course at USGS Core Research Center  
American Association of Petroleum Geologists Rocky Mountain Section...  
4 June 2015

NGGDPP Receives Bipartisan Support  
Eos, Transactions American Geophysical Union, reports on Geophysical...  
30 September 2014

[More News...](#)

**Help Save My Collection!**

Do you represent a state agency or a Department of Interior Bureau that maintain geological and geophysical data and samples? [Click here to learn more...](#)

U.S. Department of Interior | U.S. Geological Survey | USA.gov

[Datapreservation.usgs.gov](#)

## *USGS National Cooperative Geologic Mapping Program*







Under authority of the National Geologic Mapping Act of 1992 ([http://ncgmp.usgs.gov/about/ngm\\_act/ngmact1992.html](http://ncgmp.usgs.gov/about/ngm_act/ngmact1992.html)), the mandated National Geologic Map Database (NGMDB, <http://ngmdb.usgs.gov/>) consistently has coordinated, or contributed to, development of improved geoscience database content, science and technical standards, and data interoperability, both within the Federal and State geological surveys, and internationally. Regarding standards development, during this past year the NGMDB coordinated testing and evaluation of “NCGMP09” (<http://ngmdb.usgs.gov/Info/standards/NCGMP09/>), the draft standard for geologic map publication that is supported by the National Cooperative Geologic Mapping Program for use by the Federal government and State geological surveys. This relatively simple data schema was devised in response to difficulties in implementing more complex proposed schema. Completion of revisions to NCGMP09, and proposal as the Federal Geographic Data Committee (FGDC) Standard for geologic map databases, is anticipated in 2016.

Collaboration among the State geological surveys, the NGMDB, and the U.S. Library community have served to significantly improve the quality and accessibility of geoscience maps, reports, and data. More than 99,000 maps and reports by >600 publishers are now available through the NGMDB, with standard citations and regularly verified links to the publications and data. This content is shared between the NGMDB and cooperators in the States and the USGS Library. Maps, stratigraphic charts, and other plates from more than 21,000 of these publications are now available for direct download from the NGMDB; many of those maps also are available for viewing through the NGMDB’s mapView application (<http://ngmdb.usgs.gov/maps/mapview/>). Development of this image library required close cooperation between agencies in order to produce a standardized, efficiently maintained collection that currently exceeds 20 TB. Because geologic mapping depends on standardization of stratigraphic nomenclature, the NGMDB developed and maintains the U.S. Geologic Names Lexicon (<http://ngmdb.usgs.gov/Geolex/>); this is a significant undertaking, in cooperation with the State geological surveys. In addition, in support of the USGS’s National Geospatial Program, the NGMDB designed and built a topographic map viewer (topoView, <http://ngmdb.usgs.gov/maps/TopoView/>) that provides downloadable images of all USGS printed topographic maps. The code for this viewer is written in Leaflet/JavaScript, in part to enable use on mobile devices. The new interface and file formats have been extremely popular, and have been featured in numerous online magazines, newspapers, and other media outlets. Each month, the NGMDB site is accessed by more than 60,000 unique users during > 185,000 visits.

# THE NATIONAL GEOLOGIC MAP DATABASE

Developing a distributed archive of standardized geoscience information for the nation.

<http://ngmdb.usgs.gov>

MAPS & DATA	LEXICON	MAPVIEW	STANDARDS
 <p>Find over 90,000 products from over 600 publishers</p>	 <p>Find geologic names, charts, and guidelines</p>	 <p>Discover geologic maps through our map interface</p>	 <p>Technical standards and resources for creating maps</p>
<ul style="list-style-type: none"> <li><span style="color: green;">✓</span> <b>Robust Catalog Search</b> Find maps fast through our online catalog. Filter results for custom needs.</li> <li><span style="color: green;">✓</span> <b>Download maps for free</b> Download maps in a variety of formats including GeoTiff, pdf, and high-resolution jpeg.</li> </ul>	<ul style="list-style-type: none"> <li><span style="color: green;">✓</span> <b>Geolex Search</b> Quickly search our publication repository by geologic unit name, location, or geologic age.</li> <li><span style="color: green;">✓</span> <b>Stratigraphic Resources</b> Browse through a collection of stratigraphic and related resources.</li> </ul>	<ul style="list-style-type: none"> <li><span style="color: green;">✓</span> <b>Web mapping Interface</b> Get easy access to maps and additional geologic related data through our mapping portal via your web browser.</li> <li><span style="color: green;">✓</span> <b>Geographic Search</b> View maps in your area of interest in a seamless geographic environment.</li> </ul>	<ul style="list-style-type: none"> <li><span style="color: green;">✓</span> <b>Map Standards</b> Access map templates and cartographic resources to get you building high-quality standardized maps quickly.</li> <li><span style="color: green;">✓</span> <b>FGDC Symbolization</b> Download FGDC standardized map symbols.</li> </ul>
			

*National Cooperative Geologic Mapping Program*

## ***The Arizona Geological Survey:***

Support for the Interoperability working group GeoSciML team has continued this past year related to draft version 4 document ready for the upcoming OGC meeting.

GeoSciML v4 is designed to be modularized along use-related criteria, with a flat-file format for simple map and feature services (portrayal), basic package for geologic map data (meets the European INSPIRE geology requirements), an extended package for more detailed, in depth data, and packages for laboratory analysis, geologic Time detail, and supporting boreholes.

Related to terminology activity, some minor (spelling) corrections to term URIs are in the development process for release in 2016. These will be implemented by adding the corrected URIs with owl:sameAs links to the existing URIs. Some progress has been made on the regional lithologic unit category vocabulary, but it is anticipated that progress will be made at the Ispra November 2016 meeting. Two draft vocabularies have been introduced for describing geologic samples (specimenType and materialClass), in connection with IGSN sample registration.

23 US States now have OneGeology WMS and WFS services using GeoSciML portrayal, but formal registration with OneGeology has not been completed. It is anticipated this will occur in early 2016.

### ***Contributors:***

Thanks to Mike Frame, Betty Adrian, Dave Soller, Ben Wheeler, Madison Langseth, Ken Shaffer, Jennifer Carlino, Vivian Hutchison, and Chris Garity from the U.S Geological Survey (USGS). Additional information was provided by Steve Richard from the Arizona Geological Survey.

## **8. Main problems encountered**

The World's economic and political crisis is having strong impact on monetary support for regional activities of the CGI, e.g. in South America by usually supportive countries such as Spain, or in Africa.

The difficulties in cross-border communication and low budget meeting organization make it a challenge to maintain the group cohesion and stay informed on the problems and issues that each of the CGI member countries are struggling with.

This the CGI Council acknowledges the financial plight of representatives from lesser funded nations, and that travel expectations of Council members should not be applied as strictly to them. While every effort should be made by all Council members to attend annual meetings in person, if this is not possible, then Council members are expected to participate in meetings via teleconference. Council members acknowledge that these teleconferences may require participation at difficult hours of the night. In this context, the CGI Council endeavours to organise face-to-face meetings conjoined with other events such as conferences and seminars, so that Council members may more easily justify their travel costs to their employers if required.

Also other outreach activities are often being organized synergetically, based on any opportunities given, rather than merely on medium term planning.

Another difficult issue is that the IUGS is building on the IUGS commissions' willingness to open private accounts in order to administer IUGS finances. Due to governmental issues, the transfer of the CGI finances from the former CGI treasurer to the new one could still not be accomplished. This matter was discussed by the IUGS treasurer - Prof. Dong Shuwen and the CGI treasurer Robert Tomas, but was not solved. It would be excellent, if a common way could be found to open IUGS-CGI accounts not as a private person in order to establish a transparent process of the use of IUGS resources to support CGI activities (see also



## 9. Summary of expenditure

	\$ account		€account	
	in	out	in	out
<b>October 2002 kickoff "new" CGI</b>	<b>2 172.81</b>		<b>1 113.59</b>	
2002 allocation IUGS (3000\$)	3 000.00			
2001/2002 grant ICSU (5000\$)	5 000.00			
Council meetings				-10.00
new web site		-2 512.32		
CGI bank account costs		-0.60		
<b>balance 2002</b>	<b>7 659.89</b>		<b>1 103.59</b>	
<b>2003</b>				
2003 allocation IUGS (5000\$)			4 104.75	
Council meetings				-826.27
MT workinggroup				-426.00
CGI bank account costs				-25.00
<b>Balance 2003</b>	<b>7 659.89</b>		<b>3 931.07</b>	
<b>2004</b>				
2004 allocation IUGS (5000\$)			4165.28	
debudgetting unclaimed expenses 2003			426.00	
Council meetings				-138.00
CGI Flyer				-696.00
MT Workinggroup				-426.00
Firenze prep. & participation				-294.60
Website				-2006.05
CGI bank costs				-20.00
<b>Balance 2004</b>	<b>7 659.89</b>		<b>4 941.70</b>	
<b>2005</b>				
domain name CGI website (28.2£)				-43.00
2005 allocation IUGS (5000\$)	5000.00			
council meetings				-286.30
Cost CGI bank account 2005				-20.00
<b>Balance 2005</b>	<b>12659.89</b>		<b>4 592.40</b>	
<b>2006</b>				
IUGS Grant outreach workshop (10000\$)	10 000.00			
UNESCO Grant outreach workshop leaflet (5000\$) contract	5 000.00			
2006 IUGS allocation (5000\$)	5 000.00			
Refund Datamodel workshop Perth dec 2004		-367.68		-27.83
Maputo outreach workshop		-2941.23		-3510.85
Printing and Shipping leaflet		-4690.00		-2390.49
internal transfer \$ => €		-5000.00	3857.73	
<b>Balance 2006</b>	<b>19660.98</b>		<b>2 520.96</b>	
<b>2007</b>				
cost CGI bank account 2006				-20.00
2007 IUGS Grant allocation	7500.00			
Cost domain name CGI website (24.99£)				-41.79
cost CGI bank account 2007				-30.00
<b>Balance 2007</b>	<b>27160.98</b>		<b>2 429.17</b>	
<b>2008</b>				
Travel expenses preparation Giraf Schutte				-240.00
cost CGI bank account 2008				-30.00
cost transfer accounts Fortis--> LCL				-43.26
<b>Balance 2008</b>	<b>27160.98</b>		<b>2 115.91</b>	
<b>2009</b>				
<b>ACCOUNTS TRANSFERED</b>				
Travel expenses Broome CODATA		-1139.69		
Repro banner Giraf				-216.91
2009 IUGS allocation	15 000.00			
cost transfer IUGS --> CGI		-23.01		
Travel expenses S. Richard - MLT St Petersburg		-2808.85		
transfer charges		-24.60		

	\$ account	€account
<b>2010</b>		
Payment maintenance of CGI web site (NERC/BGS)	-2300.00	
2010 IUGS allocation	7 500.00	
transfer charges	-23.17	
transfer charges	-21.16	
<b>2011</b>		
2011 IUGS allocation	10000.00	
transfer charges	-23.54	
Payment maintenance of CGI web site (NERC/BGS)		-1779.01
transfer charges		-30.00
transfer charges		-22.00
transfer account USD --> €	-1900.00	1377.81
transfer account USD --> €	-19000.00	13777.10
transfer charges		-25.90
Payment to BGR - GIRAF workshop		-13783.00
transfer account USD --> €	-8900	6610.71
transfer charges		-22
Payment to BGS (update cookbooks, schematron rules)		-6600
Transfer charges		-3,90
<b>Balance December 2011</b>	<b>23 496.96</b>	<b>1 398.81</b>
<b>Balance 2011</b>	<b>23.496,96</b>	<b>1.398,81</b>
<b>2012</b>		
<i>Bank account charge</i>		-5,96
<i>CCOP hosted CGI meeting</i>	--12.000,00	
transfer charges	-21,75	
<i>IWG developments</i>	-6.580,00	
transfer charges	-21,64	
<i>2012 IUGS allocation</i>	10.000,00	
transfer charges	-21,59	
Payment from CCOP	858,43	
transfer charges	-20,15	
transfer account USD --> €	-715	546,34
transfer charges		-22
<i>CSIRO hosting CGI-IWG websites</i>		-550,00
transfer charges		-16,5
<b>Balance November 2012</b>	<b>14.975,26</b>	<b>1.350,69</b>
Back payment from BGR (balance from Giraf 2011) December 2012		4.967,79
<b>Balance 2012</b>	<b>14.976,26</b>	<b>6.318,48</b>
<b>2013</b>		
<i>transfer charges</i>		-3,98
<i>Payment to BGR – Giraf workshop 2013</i>		-5.000,00
<i>Subscription Visa card</i>		-39,96
<b>Balance 2013</b>	<b>14.976,26</b>	<b>1.274,54</b>
<b>Balance 31/12/2013</b>	<b>14.975,26</b>	<b>1.274,54</b>
	\$ account	€account
<b>2014</b>		
transfer account USD --> €		-47,07
Payment to BGS for CGI website (2479.04£)	-4160	
2014 IUGS allocation	7.967,00	
transfer charges	-23,38	
bank charges		-2,69

	\$ account	€account
<b>Balance October 25th 2014</b>	<b>18.758,88</b>	<b>1.224,78</b>
	\$ account	€account
<b>2015</b>		
subscription VISA card		-39,96
Travel cost IUGS Council Kombada (meal)		-18,43
Travel cost IUGS Council Kombada (hotel)		-522,60
transfer account USD --> €	-6000	
transfer account USD --> €		5371,43
Payment to BGR - Giraf workshop 2015)		-5000,00
transfer charges		-4,40
2015 IUGS allocation	7.980,00	
transfer charges	-18,88	
subscription VISA card		-41,40
<b>Balance 30/11/2015</b>	<b>20.720,00</b>	<b>969,42</b>
	\$ account	€account

Still no solution has been found for the transfer of the CGI accounts, kept as private ones by the former Treasurer (Francois Robida) to the actual CGI Treasurer (Robert Tomas). Therefore, Francois Robida is factually still acting Treasurer provisional solution was found and agreed that the accounts are still operated by the former CGI treasurer on behalf of the new one (including the formal control checking). A solution has been and will be sought with the support of IUGS Secretariat.

## 10. Work plan for next year

- Organize the CGI-GIC Geoscience Information Supersymposium at the IGC in Capetown successfully
- Make GeoSciML an OGC Standard
- Continue the development of Earth ResourceML
- Update the CGI website
- Publish the CGI newsletter regularly
- Publish more publications of CGI related issues within IUGS "Episodes"
- Represent the IUGS in Geoscience information matters

## 11. Critical milestones

- Organisation of a Geoinformation Super-Symposium at the International Geological Congress 2016 (IGC) in South Africa.
- Council election at the IGC in South Africa

## 12. Anticipated results to be achieved next year

See section 10. "Work plan for next year".

### **13. Budget for 2016 and potential funding sources**

CGI Council expects a similar budget to that provided by IUGS in previous years.

### **14. Review chief accomplishments over last five years (2011-2015)**

CGI set up overall aims which are listed in section 1 of this report. Evidence indicates that, despite issues of resources and travel constraints, CGI through its Working Groups, members and associated initiatives, has been extremely successful. The Commission has: catalyzed alliances, vide OneGeology (1G), OneGeology-Europe (1G-E), GIC, ICSU, IAMG, INSPIRE, GGIPAC, AUSCOPE, ICS, CGMW, EGS, OGC, USGIS; stimulated progress and standard geological concepts, vide the GeoSciML, EarthResourceML and Geoscience Terminology Working Groups CDTG, MTG and the 1G-E multilingual vocabulary; promoted the use of data exchange standards, vide the above listed working groups, OneG and 1G-E; facilitated outreach, vide the GIRAF (2011, 2013, 2015), South American, European and Asian workshops and OneGeology; and played a full role in the coordination of and participation in regional initiatives. This includes several INSPIRE Working Groups (the Drafting Teams Data Specification and Metadata, the Thematic Working Groups Geology and Mineral Resources), EuroGeoSurveys (within the Spatial Information Expert Group) , OneGeology-Europe, CCOP, South American initiatives, and the GIRAF network.

The CGI-GIC Geoscience Information Super-Symposium at the IGC in Brisbane in 2012 has been a full success – the next supersymposium at the IGC 2016 (in Capetown) is well in preparation (several CGI Council members have been asked to be “Theme champions” for the “Geoscience Data and Information Systems” topic).

In addition parts of the CGI vocabularies are being used for the INSPIRE themes “Geology” and “Mineral Resources”, and so are derived variations of the GeoSciML and EarthResourceML data models. The CGI GeoSciML is very close to be accepted as OGC standard.

The GIRAF Network has from its start in 2009 with around 100 members grown to an established African Network on Geoscience Information with about 400 members from 35 African and 14 non-African countries, ready to be handed over into a fully African administration in 2016 at the Colloquium of African Geology in Ibadan, Nigeria.

So the CGI now has a well recognized established position in the international geoscience information community and represents IUGS well on geoscience information matters.



## 15. Objectives and work plan for the next 5 years (2014-2019)

- Catalyze productive alliances between geo-information bodies, including OGC;
- Stimulate progress in development and application of standard geoscience concepts and their representation in multiple languages.
- Promote international use of data exchange standards (specially broad adoption of GeoSciML and EarthResourceML); Facilitate outreach, knowledge transfer and take-up of best practice in geo-information (e.g. with the South America initiative, the Asia initiative and GIRAF, the African geoinformation network).
- Create a task force to evaluate the feasibility of developing interoperability of 3D - 4D geosciences data models
- Enhance collaboration with other IUGS commissions, e.g. ICS.
- Play a role in coordination of regional initiatives, e.g. by organizing workshop and training courses on geoscience information management, standards and language.
- Adoption of GeoSciML as an OGC Standard in 2016
- Organize a Geoinformation Super-Symposium at the IGC 2016 in South Africa.

## 16. Suggestions for improvement of IUGS activities, especially in reference to activities of IUGS bodies

It would be excellent, if a common way could be found to open IUGS-CGI accounts not as a private person in order to establish a transparent process of the use of IUGS resources to support CGI activities (see also

### In conclusion

We would like to express our thanks to all members of the CGI and its regional and thematic working groups, and also to the members of the IUGS Executive for their help and encouragement. We look forward very much to continued productive cooperation in 2016.

*CGI Council*

*22. December 2015*

## 17. Contact – CGI Council members

### **François Robida** (Chair)

BRGM  
3 Avenue C Guillemin  
BP 36009  
4506 Orleans cedex 02  
France  
Telephone: +33 2 38 64 31 32  
Email: f.robida@brgm.fr

### **Zhang Mhingua**

Development and Research Center  
China Geological survey  
45 Fuwai St.  
Beijing, 100037  
China  
Telephone: +86-10-58584305  
Fax: +86-10-58584359  
Email: zminghua@mail.cgs.gov.cn

### **Kombadayedu K. Mhopjeni**

Geological Survey of Namibia  
Ministry of Mines and Energy  
P.O.Box 3984, Windhoek  
Namibia  
Telephone: +264-812 317919  
Email: kkmhopjeni@mme.gov.na

### **Kazuhiro Miyazaki**

Geological Survey of Japan/AIST  
The Institute of Geology and Geoinformation  
Tsukuba Central 7  
1-1-1 Higashi  
Tsukuba, Ibaraki, 305-8567  
Japan  
Telephone: +81-29-861-2390  
Fax: +81-29-861-3742  
Email: kazu-miyazaki@aist.go.jp

### **Kristine Asch** (Secretary General)

BGR  
Stilleweg 2  
30655 Hannover  
Germany  
Telephone: +33 2 38 64 31 32  
Email: Kristine.Asch@bgr.de

### **Santiago José Muñoz Tapia**

Servicio Geológico Nacional  
Edificio Gubernamental "Juan P. Duarte"  
10mo. Piso  
Ave. México Esq. Leopoldo Navarro  
Santo Domingo  
República Dominicana  
Telephone: +1 809 689 2769  
Email: yuboa@hotmail.com

### **David Percy**

Department of Geology  
Portland State University  
1721 SW Broadway Rm 17x  
Portland  
OR 97201  
USA  
Telephone: +1 503 725 3373  
Fax: +1 503-725-3025  
Email: percyd@pdx.edu

### **Oliver Raymond**

Continental Geology Section  
Minerals and Natural Hazards Division  
GEOSCIENCE AUSTRALIA  
Cnr Jerrabomberra Avenue and Hindmarsh Drive  
Symonston ACT, GPO Box 378  
Canberra ACT 2601  
Australia  
Telephone: +61 2 6249 9575  
Fax: +61 2 6249 9971  
Email: Oliver.Raymond@ga.gov.au