ANNUAL REPORT TO THE INTERNATIONAL UNION OF GEOLOGICAL SCIENCES FOR 2006

2006 in a few words

CGI has enjoyed another good year. Great progress has been made on the global data model and exchange language and the pre-Outreach Workshop in Maputo was very successful. You can read more about these and the other topics below within this report.

Developing interoperability

The CGI Interoperability Working Group has been working on the development of an XML-based document format for the exchange of geology data. A standard content format, designed and accepted by the community, supports the deployment of interoperable web-based data access services by both statutory custodians (e.g. geological surveys) and other data providers (e.g. laboratories, contractors). This enables data analysis, processing and decision support applications to have access to the most current data, served from its point-of-truth, in a predictable form that significantly reduces the conventional burden of data-assimilation.

GeoSciML has been designed as an application language based on Geography Markup Language (GML), which is an international standard for designing XML formats for geospatial information. A particular advantage of GML is that it is used by the standard data-access interface Web Feature Service (WFS). GeoSciML is based on models for geological information developed in predecessor projects run in several of the participating organizations. A key feature of GeoSciML is that while it supports the production of geologic maps in 2-D and 3-D, it is not a cartographic data model, but rather is a model of classified geological objects. The classifiers can accommodate very rich descriptions of geology, with the notions of geologic units, structures and materials built in. It incorporates components developed for more general applications, including for sampling and observations.

The main focus in 2006 was the development of a testbed to demonstrate the feasibility and applicability of GeoSciML. The testbed was based on WFS services set up in several geological surveys providing data live from corporate databases. The participating surveys were from US, Canada, UK, France, Sweden and Australia, and they deployed a variety of different software which conformed to the WFS interface standard with the GeoSciML content standard. In order to demonstrate the interoperable data services, a variety of client applications were developed and demonstrated. Data portrayal included both maps and cross-sections, and the data model supported colouring, some generalization and reclassification by age and gross lithology.

The testbed was described in a series of papers presented at the IAMG Conference held in Liege, Belgium in September 2006, and demonstrated to an audience of several hundred in a special session at that meeting. The following week it was demonstrated to 14 geological surveys as EuroGeoSurveys in Brussels, and has subsequently been shown in many other venues around the world. GeoSciML v2 is now under development, and will be used in the upcoming OneGeology global compilation. This will include both extensions and refinements to the current scope, and also significant attention will be paid to the development of standard vocabularies for use as values of classifiers.

CGI and Outreach

In July CGI organized a Pre-Outreach Workshop at the 21st Colloquium on African Geology in Maputo, Mozambique. The Workshop was opened by Professor Zhang Hongren, President IUGS, who stressed the importance of geoscience information to our society and regarded the workshop as very important. The morning began with an introduction to CGI and the Workshop aims. This was followed by a summary of international trends in geoscience information and to precede the discussion there was a presentation on the needs and requirements for geoscience information management and delivery in Africa**.** Specific questions on these presentations were followed by a general discussion of the issues (based around three questions):
a) What are the needs of African organisations for geoscience information management, application, delivery and technology? b. What are the reasons for these needs? c. What are the issues and problems that are faced in meeting these needs?

The discussion was lively and informative and the Workshop was viewed by all as a successful event (even though it had to be reduced in time by 50% because of a change to the President of Mozambique's schedule!). The attendees were also provided with a brief questionnaire that contained these questions and asked to complete and return it to allow CGI to better prepare for the major Outreach Workshop in 2008. CGI are now actively planning for the major Workshop in Africa, (see below for the preliminary programme).

Geo-information in Africa - Quo vadis

The preliminary outline programme and details for this are:

Date: February or March 2008 *Length:* 4-5 days
Location: Windhoek, Namibia: Geological Survey *Organisation*: CGI and GSN
Invitees: Geo-information personnel and managers of all Geological Survey and research institutions of Africa, politicians and decision makers, universities, mining and hydrogeological companies, counterpart organisations, NGOs
Languages: English, French (possibly Portuguese)
Budget: ca. 250 000 € (of which we hope to receive 50% from German Ministry of Technical Cooperation). *Other potential sponsors:* UNESCO, IUGS, Surveys represented in CGI
Preliminary content:
- Introduction by key decision makers and geo-information scientists
- Presentations by African and other speakers about their achievements and problems in the area of geo-information
- Identification and discussion of needs in the geo-information area
- Short courses e.g. in GeoSciML

Anticipated outcomes: exchange of know-how and understanding; building a pan-African geo-information network and strengthening of the international geo-information networks by the incorporation of African partners; new geo-information projects and initiatives in/with African partners

News from the continents

These 3 brief articles highlight some of the geoscience information issues that have been engaging members of the CGI through 2006.

North America

Scientific and technical representatives of Federal, State, and Provincial geological survey agencies in North America continued to provide substantive contributions to the development of geologic map databases and standards. Regarding standards, the following are noteworthy: continued participation by North American experts in the development of the CGI/IUGS GeoSciML data-exchange format and its operational implementation (described elsewhere in this document), U.S. Federal approval of a comprehensive standard for geologic map symbolization, collaboration with ESRI on implementation of that standard, and U.S. and Canadian evolution of North American Data Model (NADM) standards for database structure and science terminology. In Canada, the Canadian Geoscience Knowledge Network (CGKN) continues to act as the liaison between Canadian government geoscience agencies and the CGI and promotes CGI-recommended approaches for geoscience data management and dissemination. In 2007, some Canadian geological surveys will begin operational implementation of the GeoSciML data exchange format. Regarding the development of standards-based map databases, work has commenced on conversion of the recently-published Geologic Map of North America to a GIS database. This database is intended to be compatible with the Geological Map of Europe (IGME5000). Each of these activities was highlighted and documented in the 10th annual international technical workshop “Digital Mapping Techniques ‘06”, held in Columbus, Ohio.

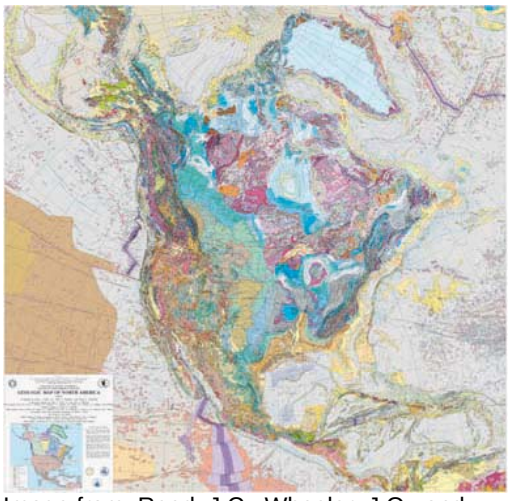


Image from: Reed, J.C., Wheeler, J.O., and Tucholke, B.E., compilers, 2004, Geologic Map of North America: Geological Society of America DNAG Map-001, scale 1:5,000,000.

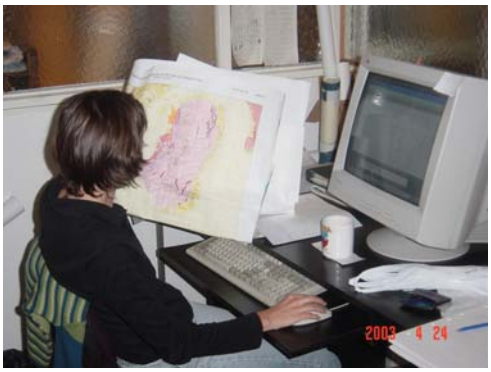
South America

Informal contacts were made with several Geological Survey geoscience information department staff in order to explore the possibility of creating a CGI South America working group. In general, people were very enthusiastic with the idea but there are some difficulties to face with permissions and financial support. It is desirable that a CGI regional working group meet at least once a year. But because of these funding problems probably the best way to have an annual meeting is to fit it in with other meeting programmes in the context of a current project with external funds, (eg the Canadian MAP-GAC: Geosciences for Andean Communities).

As part of a strategy for the development of geo-information systems in developing countries an introductory document about information technology is being progressed. The

aim of the document is to introduce the different categories of information systems, explain their complexity and importance and give some directions about where people can get training and new learning resources. On the other hand, this document is intended to create awareness about the importance of geo-information systems at decision and technical levels. Some of the significant items are:

- Relevance of Geoinformation systems
- Information systems descriptions.
- Case Studies
- Information Infrastructure Capability
- Training on information systems
- Free software systems in geosciences



Informal contacts were made with the National Space Research Institute (INPE-Brasil) in order to understand the training course availability in geo-information systems. Similar contacts were made with the FAO Open Source Group named GeoNetwork in order to explore the possibilities of Open Source Software as a software and tools source for GS in developing countries. The GeoNetwork package developed by FAO OSG could be considered as an interesting, well integrated and serious group of software and applications useful in the development of geo-information infrastructures. Another important source of on-line training material evaluated was the British Geological Survey Project named "Strategies and systems for maximising geoscience data value".

Europe

By far the most dominant subject in the spatial data domain in Europe is the upcoming European Commission directive known as INSPIRE – a proposal to create a Spatial Data Infrastructure for Europe. This Directive will have a profound impact on the way in which public sector holders of environmental spatial data (including geological surveys) manage and provide access to their data. INSPIRE aims to improve the interoperability and integration of spatial information across the Union. The vision is to facilitate the sharing of spatial information between public authorities and provide improved public access and better policy development. Initially INSPIRE will cover environmental data, but other themes, such as agriculture and transport, are to be added at a later date. INSPIRE will introduce regulation across Europe about the specifications for data and how it may be shared and made available. Two of the CGI Council are members of the INSPIRE Drafting Teams – effectively the bodies who are drafting the technical regulations. The CGI developing standard GeoSciML has been submitted as a reference document to the INSPIRE Teams and the GeoSciML working group have met with key European GI players. There are few with a stake in the geographic information or environmental domains that do not see INSPIRE as essential and long overdue. After a process of “Conciliation” INSPIRE finally obtained political agreement on 23 November 2006.

CGI and IUGS at CODATA

The CGI coordinates IUGS representation at the IUGS "Committee on Data for Science and Technology", or CODATA (http://www.codata.org). CODATA is an interdisciplinary scientific committee established by the ICSU to improve the quality, reliability, management and accessibility of data of importance to the fields of science and technology. A member of the CGI Council, attended the CODATA Conference, CODATA General Assembly, and associated meetings as IUGS delegate and presented a paper on CGI activities.

The 2006 CODATA conference (http://www.codataweb.org/06conf/index.html) was a medium-sized event (~700 participants, 30 countries) that provided an opportunity to collect and share information on management, exchange, and delivery of scientific information, data, and knowledge across scientific discipline boundaries. A report on CODAT 2006 was submitted to CGI Council and the IUGS Executive. This report helps IUGS and the CGI to identify the information management standards they will endorse to optimize the value and interoperability of geological data, and ultimately its utility and societal relevance. One important CODATA initiative is the development of a “Global Information Commons for Science Initiative” (GICSI). This initiative will establish tools and standards for interoperable online access to scientific and technical data. It was recommended that IUGS and CGI monitor this initiative and look for opportunities for incorporation of geoscientific data in the “Commons”.

Geoscience session at IGC33

A proposal for of a Geoscience Information Super-Session (Topical Symposium) has been submitted by CGI to the IGC33 Organising Committee. The proposal is supported by the International Association of Mathematical Geologists (IAMG) and the Geoscience Information Consortium (GIC). The basic framework for the Super-Session also proposes session titles and chairs and will allow the IGC33 organisers to include such a Super-Session in the Second Circular.

The central concept is that there will be one 3 day Super-Session, which will be sub-divided into five main Sessions running as 4 concurrent “strands”. These five Sessions will be further sub-divided into Sub-Sessions. The eventual final number of Sub-Sessions will reflect interest and submissions from the potential oral/poster contributors and other session proposers and thus may be greater or less than the number presented. The aim is to provide a flexible structure that may be adapted to maintain a logical and coherent overall programme for the Super-Session and produce a comprehensive and rewarding conference with the minimum of under- or over-lap.The proposal envisages an Opening Plenary Session, which will include keynotes introducing each of the 5 main Sessions. The Super-Session will then break into 4 concurrent strands and conclude with a Wrap-up Plenary Session. In addition a novel “Short-Sharp-Share” session has also been included.

Mapping the Planet

In February of 2006 a first concept was presented to the General Assembly of the Commission for the Geological Map of the World (CGMW) in Paris – a concept to create an interoperable 1:1 million scale global map dataset. The proposal was to use the UN International Year of Planet Earth (IYPE) in 2008 as a stimulus mobilise geological survey organisations around the world to act as the drivers and sustainable data providers of this global dataset. The creation of this geological map dataset will be used as a vehicle to accelerate progress on an emerging global geoscience data model and interchange standard. The project will also transfer know-how to developing countries and shortening and cutting the cost of their learning curves, while at the same time producing geoscience maps and data that could attract interest and investment. The proposed project will generate a global dataset to assist in the understanding of global environmental problems will also raise the profile of geoscience as part of IYPE2008. The project is seen as a partnership between geological surveys and the CGMW (especially the linkages with its other small scale coverages) and other global bodies.

Since then the concept has been disseminated around the globe and has matured considerably. The project, now known by the working title OneGeology, has attracted the support of the International Union of Geological Sciences (IUGS), UNESCO, and the International Steering Committee for Global Mapping (ISCGM), and of course the IYPE2008 Management Team and CGMW. Crucial to the success of the concept is getting geological surveys to commit their data and resources and to date 39 Surveys have now done so.

The initial project kick-off meeting is scheduled to take place in March 2007 in Brighton, UK.

The proposed methodology to be used in the project differs from the usual approach of making available geological data for a continent or the globe. The OneGeology proposition is a completely modern paradigm: it is planned as a distributed model - a web feature service, a dynamic set of geological map data served mostly on a national basis by individual geological surveys and other bodies (polar surveys, marine surveys, research institutions etc) to a web portal, or portals. The project will obviously be closely interlinked with the CGI and especially the geoscience data model and GeoSciML exchange language, as the project's first goal is data structure interoperability; geological harmonisation will follow.

The March kick-off meeting will initiate the project and discuss and agree the detailed project plan and the first specifications for the geological and information systems. During 2007 the first test datasets are anticipated to become available and data will be added progressively through 2008 so that the first results are presented at the International Geological Congress in Oslo in 2008.

See *www.onegeology.org*

CGI Infrastructure

Meetings

The CGI Council Annual Meeting was held in Liege in September. Liege was chosen as this was the venue for the Annual Conference of the International Association of Mathematical Geologists. All Council members were able to attend and the minutes and actions of the meeting can be found on the CGI web site. Several Council members also met opportunistically at a number of conferences throughout the year, in particular at the meeting of the Geoscience Information Consortium in May in Warsaw, in Maputo in July and at the GIS in Geology Conference in Moscow in November. The work of CGI was discussed and presented at these conferences and in addition at the CODATA meeting in Beijing, the GGIPAC Annual meeting in Adelaide, and the Digital Mapping Techniques meeting in Columbus, Ohio.

Communication

This year with the support of UNESCO we produced a new 12 page full colour leaflet, providing information on the work of CGI. The leaflet was designed and produced by a team from the Namibian Geological Survey.

The CGI web site continues to play a prominent part of the CGI communication strategy: it is regularly updated and kept dynamic by the CGI Secretariat (our continuing thanks to Kathryn Bull of BGS). In addition to containing all the documentation about the Commission, it has news about related projects, events and web resources and it provides space for technical information posting and exchange. In 2006 the website received approximately over 400000 visitor sessions.

Membership

CGI now has 161 members in 50 countries across the world.

During the year we appointed a new member of Council. Gabriel Asato is the GIS Manager of the GIS and Remote Sensing Unit at the Mining and Geological Survey of Argentina (SEGEMAR)

Finance and budget

CGI receives funding from the IUGS but no direct regular financial support from other bodies. It does however receive considerable indirect support in terms of staff-time and meetings and infrastructure facilities from the parent organisations of its Council members and organisations such as CGMW. In addition to the normal funding award IUGS allocated CGI $10000 to run the pre-Outreach Workshop in Maputo. The event was regarded by all as successful and a credit to IUGS and CGI. Also in 2006 UNESCO kindly provided $5000 for CGI to prepare a brochure on our activity especially as useful material for our planned major Outreach workshop.

The detailed planned CGI budget and spending details for 2007 have yet to be ratified by the Council, but will continue to include underlying spend on the maintenance of the CGI web site and other communications items.

Specifically, CGI would wish to bid to IUGS for two sums of money in 2007: $5000 - primarily for publicity and communication material for GeoSciML. This will include costs associated with documenting the model and standard and preparing information for its dissemination and acceptance. CGI would also like to register a headline bid for a further $10000 for preparatory work in relation to the planned Outreach Workshop in Africa (Namibia) in 2008.

The CGI Accounts are attached as Appendix B. These show that the financial situation of CGI at the end of 2006 is positive; this results from a CGI Council decision to create sufficient budget reserve to organise the Outreach Workshop in Namibia in 2008.

In conclusion

We would like to record our thanks to all members of CGI and its working groups and secretariat, and to members of the IUGS Executive for their help and encouragement. We would also like to express our particular gratitude to Robert Missotten and UNESCO for their tangible support. We look forward to continued productive cooperation in 2007.

CGI Council
21 November 2006

Appendix A: List of Council Members

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Appendix B: CGI Accounts for 2006

	$ account		€ account	
	in	out	in	out
October 2002 kick off "new" CGI	**2172.81**		**1113.59**	
2002 allocation IUGS (3000$)	3000.00			
2001/2002 grant ICSU (5000$)	5000.00			
Council meetings				-10.00
New web site		-2512.32		
CGI bank account costs		-0.60		
Balance 2002	**7659.89**		**1103.59**	
2003				
2003 allocation IUGS (5000$)				
Council meetings			4104.75	-826.27
MT working group				-426.00
CGI bank account costs				-25.00
Balance 2003	**7659.89**		**3931.07**	
2004				
2004 allocation IUGS (5000$)			4165.28	
De-budgeting unclaimed expenses 2003			426.00	
Council meetings				-138.00
CGI Flyer				-696.00
MT Working group				-426.00
Firenze prep. & participation				-294.60
Website				-2006.05
CGI bank costs				-20.00
Balance 2004	**7659.89**		**4941.70**	
2005				
Domain name CGI website (28.2£)				-43.00
2005 allocation IUGS (5000$)	5000.00			
Council meetings				-286.30
Cost CGI bank account 2005				-20.00
Balance 2005	**12659.89**		**4592.40**	
2006				
IUGS Grant outreach workshop (10000$)	10000.00			
UNESCO Grant outreach workshop leaflet (5000$) contract 4500027900	5000.00			
2006 IUGS allocation (5000$)	5000.00			
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	
Balance 2006	**19660.98**		**2520.96**	