



INTERNATIONAL UNION OF GEOLOGICAL SCIENCES

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2016 REPORT

Fostering a global voice for the geosciences

In association with ICSU and UNESCO
120+ adhering organizations
50+ affiliated organizations



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THE UNION'S AIMS

The International Union of Geological Sciences (IUGS) was founded in 1961 with the mission to unite the global geological community in promoting development of the earth sciences.

The Union is the largest member organization (about 1 million earth scientists) of the International Council for Science (ICSU) and one of the world's largest scientific organizations.

Origins

2012 Strategic Plan

In 2012, IUGS redefined its missions according to a new Strategic Plan:

- Produce authoritative scientific standards
- Contribute to earth science education and public understanding of geosciences
- Represent the geological sciences in forums to inform, advise, and influence public policy and decision-makers
- Encourage and support new original ideas in basic and applied geological research
- Foster collaboration between developed and developing countries in earth science research, capacity building, and applications
- Encourage more interdisciplinary involvement within the broad spectrum of the geosciences.

For the period 2016, the Union had the following aims:

- Encourage and substantiate the participation of the Adhering organizations and National committees in promoting Geosciences
- Develop initiatives, (i.e. Resourcing Future Generations, Forensic Geology) of wide societal and applied interest
- Renew and establish closer links to UNESCO, ICSU, and Geo-Unions, as well as develop new initiatives together with these organizations
- Improve visibility of IUGS through publications and presence at scientific forums.

Present Strategic Plan

GOVERNING THE UNION

The Council

Meets every four years at the International Geological Congress

Representatives appointed by the Adhering Organizations from the active IUGS member countries/regions

Inactive or non-member countries/regions may send observers (without voting rights) to Council meetings.

Executive Committee (2012-2016)

Bureau

Day-to-day decisions and responsibilities

Secretary General



Prof. José P. CALVO

President



Prof. Dr. Roland OBERHÄNSLI

Treasurer



Prof. Shuwen DONG

Past President



Prof. Alberto RICCARDI
(resigned Jan 2013)

Vice Presidents



Prof. Marko KOMAC

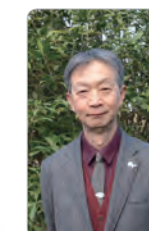


Prof. Yildirim DILEK

Councilors
(2012-2016)



Prof. Hassina MOURI



Prof. Yujiro OGAWA

Councilors
(2014-2018)



Dr. Amel BARICH



Prof. Stephen JOHNSTON

Executive Committee (2016-2020)

Bureau

Day-to-day decisions and responsibilities

Secretary
General



Prof. Dr. Stanley FINNEY

President



Prof. Dr. Qiuming CHENG

Treasurer



Prof. Hiroshi KITAZATO

Past President



Prof. Dr. Roland OBHÄNESLI

Vice Presidents



Dr. Kristine ASCH



Prof. William CAVAZZA

Councilors
(2014-2018)



Amel BARICH



Prof. Stephen JHNSTON

Councilors
(2016-2020)



Prof. Ben MAPPI



Edmund NICKLESS



Members of both the ongoing and outgoing IUGS executive committees and Secretariat during the 35th IGC in Cape Town, South Africa



Participants of 71st Meeting of IUGS Executive Committee held in Paris
February 15th-17th, 2017

Prof. Dr. Roland OBERHÄNSLI



PRESIDENT (2012-2016)

In the years before IGC IUGS started with the implementation of the recommendations delivered in the strategic plan. A new focus towards Resources and towards the general topic Risk and Hazard was suggested and thus a new initiative and the formation of a new commission restructuring all aspects of geoheritage were implemented.

UNESCO geosciences was down rated in 2012 and thus a long struggle ending with a new concept for the UNESCO Geoscience bureau was fought. Finally UNESCO has re-implemented geosciences combined with the hazard and geoparks.

The transfer of the IUGS secretariat from USGS in USA to CAGS in Beijing was made, which offered enormous challenges on the financial sector. The secretariat was organised and supported by Anne Linamaa-Diehl's former IUGS secretary in Norway. Besides its regular work the secretariat lead by Dr. Wang produced a series of new outreach documents and started to work on a new website and an android app. The major challenge posed administrative and legal topics related to web site and management.

The financial situation of IUGS was kept on a very good level despite the fact that some of the Italian deposits had to be released for a better flexibility mostly related to the new initiative, the problems of UNESCO and IGC. Several ARC were made and consequences were implemented.

Episodes was brought up to the level of an internationally well rated journal again. As from

the ARC recommendations the editorial management and printing was transferred from India, where the contract and MoU ended, to Korea.

During this period IUGS failed to reactivate its members and to establish a better system of communication with the national committees.

Over the last EC period several activities with respect to seek a closer cooperation with IUGG were undertaken.

IUGS was active in the GeoUnion and ICSU and a group of scientists compiled a paper analysing the science plan of the Future Earth Program with respect to possible inputs for geosciences at large. This action was a failure since no publisher for the paper could be found and neither ICSU nor FE replied to our letters.

The preparation of IGC although it was started well ahead of the congress was by far more complicated than expected. There were problems with finances and sponsoring as well as the scientific program where last minute inflictions of participants complicated the situation since the whole, in my opinion very well setup, program was not handled professionally with modern IT means (may be again due to financial reasons). Remarkable problems were generated by single participants and especially by a group working on latest Quaternary stratigraphy and promoting the term anthropocene in a strange way.

After IGC

Potsdam, 26 August 2017

Roland Oberhänsli

Prof. Dr. Qiuming CHENG



PRESIDENT (2016 – 2020)


After my election September 2016 in Cape Town I released my teaching requirements, which enables me to fully engage in IUGS business. For the past year, my main objectives have been to become increasingly involved in learning about and developing strategies for improving IUGS. I sincerely thank the previous President (Prof. Roland Oberhänsli) and Secretary General (Prof. José P. Calvo) as well as many others for their comments and assistances on defining priorities and pending businesses. I have participated in several important events of IUGS from the last EC meeting held in January 2016 in China, to the 35th IGC and IUGS-IGC Council Meeting held during the 35th IGC, to the first Bureau meeting held in Beijing in November. I have also participated other events to communicate with organizations and individuals to exchange opinions and develop ideas about the earth science frontiers and opportunities for IUGS to play leading roles, making important contributions to today's science and society. Numerous issues and initiatives have been elaborately discussed during the Bureau meeting in Beijing and the EC meeting in Paris. In this report, I will highlight several activities.

(1) The success of the 35th International Geologi-

cal Congress (IGC) in Cape Town, South Africa from August 27-September 3, 2016. Qiuming attended all the main activities organized during the congress. Prior to the congress, Qiuming researched the history, status, challenges and opportunities of IUGS and conducted a SWOT analysis of the Union. Comparative studies of IUGS with other Unions including IUGG, AGU, EGU etc. helped prepare the commentary statement and vision presented at the election. The document has been included in E-Bulletin No.124. Some of these points are under implementation.

(2) During the entire two-day meeting of the 4th Ordinary Session of the IUGS-IGC Council Meeting held during the 35th IGC, Qiuming has not only contributed his own comments to the discussion but more importantly, learned diverse opinions that came forth in the meeting. Some of the solutions, actions, motions and suggestions from the IUGS-IGC Council Meeting have been implemented and others are in progress, for example, rectification of leaders of constituent groups. Various strategies and opportunities have been explored to communicate with national committees as well as affiliated organizations.

(3) Preparations for the 36th IGC (New Delhi,



India), the 37th IGC (Busan, South Korea) and the “Resourcing Future Generations” (RFG) 2018 Conference (Vancouver, Canada) have been reviewed positively with constructive comments at Bureau meeting in Beijing as well as EC meeting in Paris. Various collective efforts have been taken by IUGS and LOC to promote IGCs and RFG2018. Conference information are periodically included in the E-Bulletins distributed to all adhering national committees and affiliated organizations as well as posted on IUGS website as IUGS main events. I encourage all IUGS constituent groups to actively participate and contribute to the IGCs and RFG2018 by proposing new sessions, sending abstracts and other business meetings to be held at the conference. IUGS wishes the very success of RFG2018, which is the trail-blazing event that could lead to regular inter-IGCs in the future. The new series of conferences will focus on state of the art topics specifically associated with new initiatives of IUGS. Considering the opportunities and challenges of sponsoring conferences and meetings of IUGS the EC has discussed and in principle approved for a new meeting committee to be formed to take care of the strategic and management issues of all meetings.

Qiuming attended the brief meeting of the Committee of the International Geological Congress (IGCC) held right after the IUGS-IGC Council Meeting on September 1 during the 35th IGC

and Qiuming encourages next meeting should be held soon to review the experience of the past IGCs and to provide helps for future events preparation. A meeting now has been scheduled and will be held in New Delhi, India November 2017.

(4) The first Bureau Meeting of the new EC was successfully convened at the IUGS Secretariat based in Beijing in November 11-12, 2016, which gained help and support from the China Geological Survey (CGS). CGS has appointed Dr. Qingcheng He as the new director of the Secretariat office and former director, Mr. Wei Wang kindly agreed to remain as a deputy director of the office to facilitate the transition. Several urgent matters have been addressed during the Bureau Meeting (i.e. formation of publication committees, e-Bulletin, website contents and journal of Episodes.). It was decided that the venue and main agenda for the next EC meeting would be held in Paris at the headquarter of UNESCO in Feb 2017.

(5) There were several business meetings Qiuming attended on behalf of IUGS, i.e. Past President Professor Roland Oberhänsli and Qiuming attended the ICSU and ISSU Extraordinary General Assembly held in Oslo Oct. 28, 2016. The main outcome of the ICSU meeting was the decision on the proposal for merging ICSU and ISSU in principle. GeoUnions has raised their concerns at the meeting. The final decision about

the merger will be made during the General Assembly of ICSU to be held in Taipei in October 2017. Prior to the Taipei ICSU meeting, the GeoUnions has planned to meet in Europe to develop collective ideas, to be presented in Taipei, Vice President Prof. William CAVAZZA is going to attend both meetings in Europe and Taipei on behalf of IUGS.

(6) Qiuming attended the General Assembly of CoDATA in Denver Sept 11, 2016 at which the new EC of CoDATA was elected. Several key officers of CoDATA are of geoscience background and IUGS has a close relationship with CoDATA which provides a sound base for further collaboration on geoscientific data sharing and geo-intelligence development. A young member, Dr. Marshall Ma from Commission of Geological Information of IUGS (CGI) and International Association for Mathematical Geosciences (IAMG) has been designated to be the representative of IUGS in the CoDATA.

(7) Qiuming has actively participated activities organized by IUGS associated organizations including serving on Advisory Board of FORAM “Advancing the idea of a World Forum on Raw Materials”, a project awarded to World Resources Forum Association by the European Commission.

(8) Qiuming has communicated with UNSECO and met with the leaders, Dr. Flavia Schlegel, Dr. Qunli Han, and Dr. Patrick McKeever. Qiuming

signed Implements Partners Agreement on IGCP with UNSECO, co-signed Appointment Letters with UNESCO for six new council members of IGGP program chaired by Guy Narbonne, and co-signed letters sent to leaders of all accepted new IGCP projects. Given the limit amount of fund available from UNESCO and IUGS for IGGP, Qiuming welcomes and suggests more collaboration needed to be explored to encourage new shareholders to contribute funds to IGGP to sustain and further enhance the program.

Regarding the priorities for 2017, Qiuming's emphases will be given to promote IUGS both from science and membership point of views. Special efforts and effective approaches are required to achieve this objective. For example, IUGS needs to find ways to demonstrate how the global earth science issues tackled by international collaboration could affect the national and regional problems that individuals or groups of nations may face. Additionally, IUGS has to convince nations and organizations of the benefits to join IUGS in order to upgrade and share new knowledge and adopt cutting-edge technology. It should not be difficult to demonstrate the critical earth science problems to any nation if we put them into the perspective of Earth tectonics and global change. As one can feel that almost every moment there are events caught in headline news from social media that are related to earth

science issues. Such events may range from hazardous problems such as earthquakes, volcanic eruptions, flooding, and hurricanes, to resources and energy issues including clean water, air, food, energy as well as utilization of urban space including subspace, agricultural and health issues. Lots of these issues are related to converging plates boundaries, which act as interface of interaction of moving plates as well as originates of extreme and singular events. Along the two young and still active converging boundaries and orogens (Circum Pacific belt and Tethys belt) there are major cities with high population density, large number of man-made infrastructures such as nuclear power plants and dams etc. Understanding and predicting the complex evolution of the converging plates and

effects on resources, environment, hazards and human resilience requires international collaborative efforts.

To finish this report, I would like to thank for the support and assistance received from all the leaders of bodies of IUGS and those individuals during the transition period from the former to current EC. I am proud that the current EC has been proactively working together to catch up with the former EC. I must thank the Secretariat staffs for their cooperation and hard work that maintains operation and high efficiency of communications. I am looking forward to working with everyone for the best of 2017!

Prof. Dr. Jose P. Calvo



SECRETARY GENERAL (2014 – 2016)

The organization of the 69th Executive Committee held in Kunming, China on 18-22 January 2016 was undertaken with the assistance of members of the Secretariat. Both the agenda and the documents needed for the 50 attendees to follow the meeting were prepared and distributed on time. The EC meeting was jointly hosted by the Chinese Ministry of Land and Resources and the Stone Forest Global Geopark in the Yunnan Province. UNESCO organized the annual IGCP Meeting on 22-24 February. The meeting comprised technical sessions devoted to the evaluation and approval of IGCP projects by the Advisory Board as well as a session open to representatives of the national IGCP committees.

As a representative of IUGS, Jose P. Calvo participated in the General Assembly of the Association of European Geological Surveys (EGS) in Brussels, 15-16 March 2016. A talk dealing with innovation in geological heritage was presented by the IUGS Secretary General.

An Ad-hoc Review Committee meeting for evaluating activities of the IUGS Initiative Forensic Geology was organized in Manchester, 4-5 April. Together with the IUGS President R. Oberhänsli, the Secretary General attended the ICSU Meeting in Paris on 11-12 April. Before the event, a meeting of the Geo-Unions included in ICSU was held at La Maison de la Géologie hosted by the Société Géologique de France. A few days later (15-16 April) Jose P. Calvo attended a meeting of the UNESCO-IGCP Spanish Committee in Priego de Cordoba, with occasion of its 40th Anniversary. The IUGS Secretary General Jose P. Calvo and Vice-President Marko Komac travelled to Busan,

South Korea for inspecting one of the venues proposed for the organization of the 37th International Geological Congress in 2024. The visit to Busan, held from 18 to 20 April was followed by a 2-day visit to the Mudeungsang National Geopark, located the city of Gwang-ju, which had been proposed to approach the UNESCO Network of Global Geoparks.

On 17-20 May, the IUGS Bureau Meeting was held in Madrid and Toledo, Spain. A significant part of the meeting was devoted to discussions on the organization of the 35th IGC in Cape Town, South Africa. In particular, the agenda of IUGS business meetings during the congress was discussed in detail. Other aspects such as re-organization of some IUGS bodies, current status of IUGS membership, changes in management of IUGS publications, etcetera, were largely discussed during the Bureau meeting.

Main activity of the IUGS Secretary General during June and July 2016 was devoted in close relationship with the Secretariat to the organization of the 35th IGC. On 25 August the IUGS Bureau met in Cape Town in order to prepare the 70th IUGS EC Meeting (held on 26-27 August), the meeting of the International Geological Congress Committee, several business meetings during the 35th IGC, and, in particular, the 4th IUGS-IGC Council, which ran on 31 August-1 September. A final event organized by the IUGS Secretary General in Cape Town was the hand-over meeting of the IUGS Executive Committee, which introduced the new EC formed by new officers elected in the 4th IUGS-IGC Council.

Prof.Dr. Stanley C. FINNEY



SECRETARY GENERAL (2016 – 2020)

With election as Secretary General at the IGC in Cape Town, I was faced with a mountain of information to learn and many responsibilities to take up immediately. Information, documents, and advice from Jose Calvo greatly helped me. The constituent groups in IUGS are many and varied. The commissions, task groups and joint programs offer a diverse range of activities of international impact. The committees, particularly Publications, are critical to the operation of IUGS. The Secretariat staff is talented, experienced, and incredibly helpful.

The Bureau Meeting in Beijing, 11-12 November 2016, allowed for extensive discussions among the new President, Secretary General, Treasurer and two Vice Presidents, and from these discussions we set our plans and goals for IUGS for the next 3+ years. Organizing the agenda for this meeting gave me excellent insights into all the continuing concerns and responsibilities of the IUGS Executive Committee and particularly of the IUGS Bureau. The meeting was a valuable opportunity to visit the Secretariat office, to meet all the staff, to learn the operations of the office, and to learn of the help that is available to the EC members. At the meeting we faced matters that needed immediate attention with regard to the Publications Committee, the IUGS Website, the E-Bulletin, and Episodes. The terms of the members of the PC ended at the IGC and had not been renewed. The planned changeover in webmaster and design of the website had stalled, and the

website was not operating. Several issues of the E-Bulletin were missed, and the production of Episodes was moving from India to Korea. At the Bureau Meeting, it was immediately decided to extend the terms of the PC members to 2018, to appoint Brian Marker as continuing chair of the PC, and to reinstate Peter Bobrowsky as webmaster.

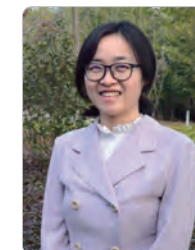
It was decided at the Beijing Bureau Meeting to hold the 2017 Executive Committee Meeting Paris, at UNESCO headquarters, 15-18 February 2017 with a one-day Bureau Meeting 14 February. The later part of 2016 was spent preparing for the EC Meeting, issuing invitations and announcements, calling for annual reports from IUGS constituent groups, adhering members and affiliated organizations, coordinating with staff at UNESCO, and developing the agenda.

PROF. DONG SHUWEN



TREASURER (2012 – 2016)

WEN Jun



ASSITANT TO TREASURER

General Financial Situation of IUGS

During the period from 01/01/2015 to 31/12/2015, IUGS was in a healthy financial position. The revenue and expenditure were USD 519,655.44 and USD 424,780.01 respectively, thus contributing a net income of USD 94,875.43. Therefore IUGS had revived financially after the negative net income in the previous year. This was a consequence of the receipt of more dues combined with cuts in unnecessary expenditure.

The table below reflects more detailed information of the financial situation during the recent four years.

➤ Financial Situation by 31st August 2016

During the period of 01/01/2016 to 31/08/2016, IUGS' revenue and expenditure are USD 437,551.54 and USD 373,974.51 respectively, contributed to the net income of USD 63,577.03. This reflects a quite optimistic financial position.

➤ Revenue

The total revenue we received is USD 437,551.54, including USD 313,708.47 for membership dues, and USD 112,367.04 (EUR100,000) from the deinvestment of IUGS' reserve in Italy (included in the "Other Income" item)

The detail items are as follows:

Expenditure			
		2016	
Income			
Membership Fees			
	Previous years	55462.75	
	Current year	258,245.72	
			313,708.47

Contribution from UNESCO			
	final payment for last year	6,967.00	
	1 st payment for current year	-	
			6,967.00
Other Income			116,876.07
Total Income			437,551.54

➤ Expenditure

The total expenditure was USD 373,974.51 of this period. Most expenditure is related to our support to scientific projects(IGCP Program,Commissions,Task Groups, Affiliated Organizations etc.), some for the travel reimbursement for IUGS related meetings, and the others are for the management of IUGS(web-site,promotion,bank charges etc.). Moreover, there is also special expenses for IGC in 2016, The detail items are as follows:

Expenditure			
	IGCP		81,000.00
	Joint Programmes		15,000.00
	IUGS Commissions		64,000.00
	IUGS Task Groups		10,000.00
	Initiatives		35,000.00
	Committees		14,603.15
	Affiliated Organizations		24,500.00
	Contributions		12,147.65
	Episodes		30,000.00
	Contingency		6,300.00
	Secretariat expenses		-
	Russian Reserve expense		1,670.00
	Other expenses		57,667.14
	IGC Special Expense		22,086.57
Total Expenditure			373,974.51

Prof. Dr. Hiroshi KITAZATO



TREASURER (2016 – 2020)

General Financial Situation of IUGS

During the period from 01/01/2016 to 31/12/2016, IUGS was in a healthy financial position. The revenue and expenditure were USD 597,039.88 and USD 499,247.90 respectively, thus contributing a net income of USD 97,791.98. Therefore IUGS had revived and been stable financially after the negative net income in . This was a consequence of the receipt of more dues combined with cuts in unnecessary expenditure.

The table below reflects more detailed information of the financial situation during the recent four years.

	(USD)		
年	revenue	expenditure	net income
2016	597,039.88	499,247.90	97,791.98
2015	519,655.44	424,780.01	94,875.43
2014	416,140.38	433,809.48	-17,669.10
2013	522,377.71	449,052.76	73,324.95

Description of income

In comparison with the previous year, total revenue increased by USD 77,384.44. Membership receipts decreased USD 28,617.01 due to the several members, e.g. Cuba, Germany etc., making payments for both the previous and current dues during this year.It is noteworthy that several countries, like Latvia, Bulgaria, Chile, Uruguay and Columbia changed their status from “Inactive” to “Active” IUGS members. In contrast, a couple of countries have not paid membership fees for 2016, in particular to the countries from the near-east to middle-east.

The table below reflects detailed information of the income situation in 2015 and 2016.

Income		(USD)	
° °	° °	2016	2015
Membership Fees	° °	419,704.67	448,321.68
° °	Previous years	58,973.95	99,847.51
° °	Current year	360,730.72	348,474.17
Contribution from UNESCO	° °	56,929.00	64,919.00
° °	Final payment for last year	6,967.00	4,967.00
° °	1st payment for current year	49,962.00	59,952.00
Other Income	° °	120,406.21	6,414.76
Total Income	° °	597,039.88	519,655.44

Description of Expenditure

Almost all projects in the allocation table have been paid except IGCP 608 and 641. The payment to ICSU includes the dues of IUGS in 2016 and 2015, which seems have been overspent.

The table below reflects more detailed information of expenditure situation in 2015 and 2016.

Expenditure	(USD)	
° °	2016	2015
IGCP	119,000.00	120,500.00
Joint Programmes	20,310.00	20,641.33
IUGS Commissions	64,000.00	74,500.00
IUGS Task Groups	17,000.00	17,000.00
Initiatives	35,000.00	65,000.00
Committees	14,603.15	5,409.33
Affiliated Organizations	34,500.00	25,500.00
Contributions	12,147.65	23,807.82
Episodes	30,000.00	28,000.00
Contingency	6,300.00	2,995.06
Secretariat expenses	8,430.00	15,000.00
Russian Reserve expense	1,670.00	1,670.00
IGC Special expense	86,744.20	° °
Other expenses	49,542.90	24,756.47
Total Expenditure	499,247.90	424,780.01



PERMANENT SECRETARIAT

WANG Wei

Head of the IUGS
Secretariat till
September, 2016
Full Time

The IUGS Secretariat is hosted within the premises of the Chinese Academy of Geological Sciences (CAGS) under the China Geological Survey, the Ministry of Land and Resources of China (MLR). Since the relocation of the Secretariat to Beijing in December, 2012, the Chinese government has been providing tremendous and stable financial and logistical support for the smooth operation of the Secretariat.

The year of 2016 is an extraordinary year for the IUGS permanent Secretariat.

In 2016, In addition to the Secretariat assisting in the organization of several regular administrative meetings, including the 69th EC Meeting (Kunming, China on Jan. 18-22, 2016), the 70th EC Meeting (Cape Town, South Africa on August 26-27, 2016) and three Bureau Meetings (Madrid, Spain on May 16-19, 2016; Cape Town, South Africa on August 25, 2016 and Beijing, China on Nov. 11-12, 2016), all the Secretariat staffs went all out and devoted lots of time and great efforts to prepare and organize the IUGS activities during the 35th International Geological Congress, including a series of business meetings, the IUGS Reception and Awards Ceremony on August 29th, 2016, the IUGS Meeting with Affiliated Organizations on August 30th, 2016, the 4th Ordinary Session of the IUGS-IGC Council on August 31st to September 1st, 2016 when the new IUGS Executive Committee Members and the Nominat-



HE Qingcheng

Director of the
IUGS Secretariat
starting from
October, 2016

ing Committee members were elected and the Venue of 37th IGC was decided and, as well as the Handover Meeting between the outgoing and incoming IUGS Executive Committees on September 2nd, 2016.

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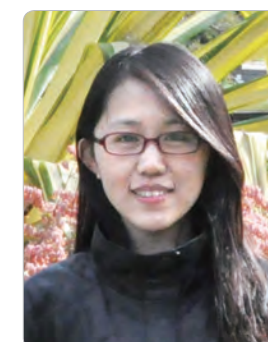
Ms. LI Wei
Secretary
Part time



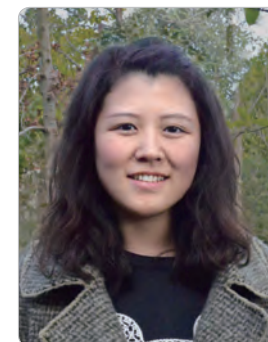
Mr. CHEN Zhu
IT Specialist
Full time



Ms. Anne LIINAMAA-DEHLS
Executive Secretary
Till July 2016
Part time



Ms. GU Yanfei
Secretary
Part time



Ms. XU Yaqi
Secretary
Part time

To prepare the 4th Ordinary Session of the IUGS-IGC Council, the Secretariat made the following efforts:

1. Compiled two volumes of documents of the 4th Ordinary Session of the IUGS-IGC Council;
2. Assisted in completing the general election of the IUGS Executive Committee and Nominating Committee, and the election of the host country of the 37th IGC and designed ballots in accordance with the IUGS and IGC Statutes, thus ensuring the smooth progress of the election.
3. Collected relevant rules of the 5 awards to be bestowed during the 35th IGC and accomplished the design and making of medals and certificates

for the awards.

With all the efforts of the Secretariat staffs, the 4th Ordinary Session of the IUGS-IGC Council was very successful and highly appreciated.

In addition to the IUGS activities above, the Secretariat also designed, built and manned the IUGS booth at the GeoExpo of the 35th IGC which is appreciated as the biggest and best booth in the IUGS history, designed, produced and distributed a variety of IUGS outreach materials and gifts including the IUGS 2015 Annual Report, brochures, flyers, badges, Fridge magnets, mouse pads, neckties, notepads, notebooks, bags, scarves and shirts, etc.



General view of the IUGS booth at the Exhibition Centre of the 35th IGC in Cape Town, South Africa



José P. Calvo, Secretary General of IUGS, together with the members of the IUGS Secretariat during the celebration of the 35th IGC in Cape Town, South Africa



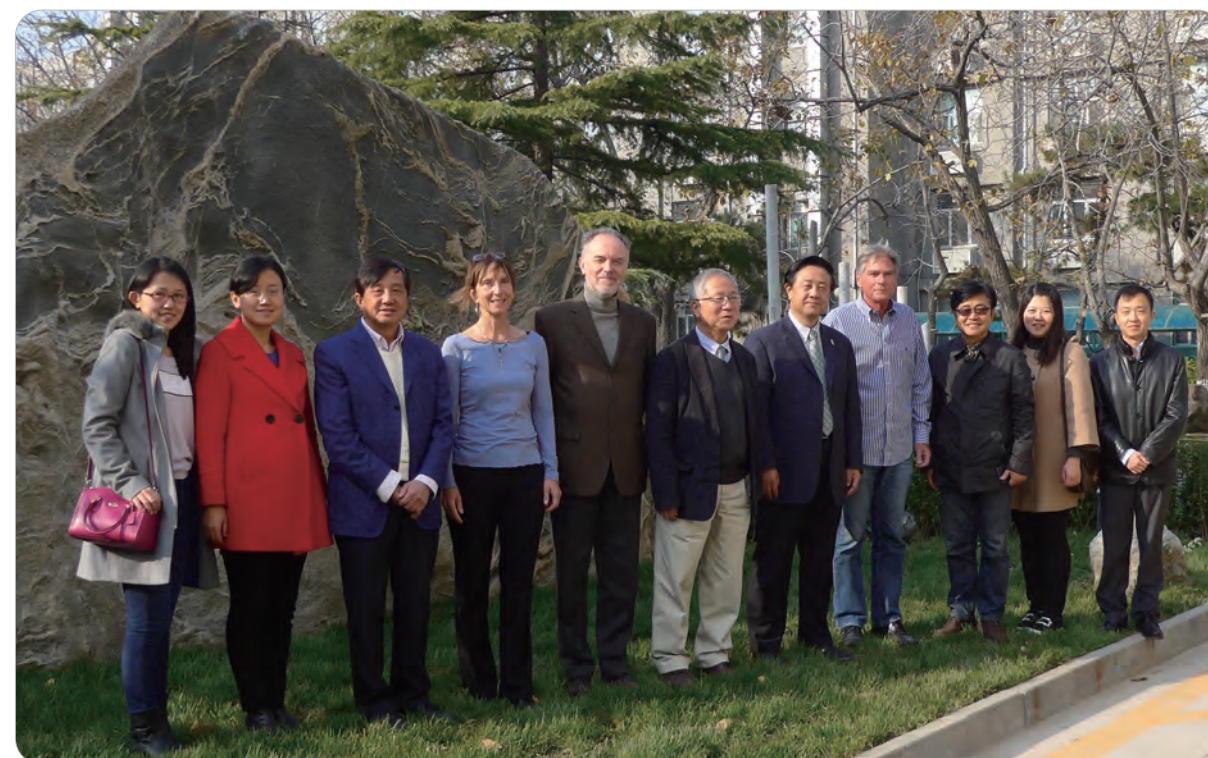
Members of the IUGS Secretariat working at the IUGS booth

It should be mentioned specially that the Chinese Government increased 200,000 Yuan RMB to the operation budge of the Secretariat in 2016 for supporting the preparation and organization of IUGS activities during the 35th IGC.

Major work of the Secretariat in 2016 also includes: updating of the Contact Database and strengthening links with IUGS bodies; improved the IUGS Information Management System; revision and dispatch of the 2015 IUGS Annual Report; assisting in membership maintenance; distributing E-Bulletins monthly to over 17,000 persons and designing name cards for all the new

EC members.

In September 2016, Mr. He Qingcheng was appointed as the new Director of the IUGS Secretariat taking over the leading role and began to operate the IUGS Permanent Secretariat.



Bureau and Secretariat members during the first IUGS Bureau Meeting held after the 35th IGC

2016 HIGHLIGHTS

JANUARY 2016

The IUGS Executive Committee held its 69th Meeting in Kunming, southern China. The meeting was sponsored by the Department of Land and Resources of the Yunnan Province and the Stone Forest Global Geopark and was organized by the Stone Forest Global Geopark, Kunming City, and the Secretariat of IUGS. The EC meeting opened with a very emotive event to honor our greatly respected Former IUGS President Prof. Zhang Hongren. The agenda of the meeting included discussion on some relevant aspects, amongst others the current status of the Initiative on Resourcing Future Generations (RFG), progress of the New Activities Strategic Implementation Committee (NASIC) and advances in the organization of the RFG2018 in Vancouver, Canada. With regard to activities of the IUGS bodies, reports by representatives of the IUGS Commissions (ICS, COGE, CGI, INHIGEO, TEC TASK and GEM), Task Groups, IUGS Committees and Initiatives, other than the RFG, were provided. Important reorganizations of certain IUGS bodies were discussed: the Task Group on Global Geochemical Baselines (TGGGB) was proposed to be upgraded into a Commission. The two task groups dealing with aspects of geoheritage (Global Heritage Stone and Geo-Heritage Task Groups) will merge into a new Commission. A new Task Group dealing with Geo-Hazards will be launched if approved when the IUGS Council meets at the 35th International Geological Congress in Cape Town. Progress towards the organization of the 35th IGC was presented by the Secretary General of the congress, Dr. Greg Botha. Representatives of the 36th IGC in Delhi 2020 reported on the organization of the event. The EC took note that four expressions of interest for organizing the 37th IGC in 2024 had been

received by the deadline. South Korea (Busan venue), Russia (Saint Petersburg venue), Germany–France–Poland (Berlin venue) and Turkey (Istanbul venue) expressed interest for hosting the 37th IGC.

A call was issued for applications for a roster of evaluators for the UNESCO Global Geoparks.

FEBRUARY 2016

According to the decision taken during the IUGS 69th Executive Committee meeting, the existing Precambrian Subcommission of the International Commission on Stratigraphy (ICS) was dissolved. Bruce Eglington of the University of Saskatchewan, Canada, as a recognized authority on Precambrian geology agreed to serve as Interim Chair. He took up the task to recruit a full contingent of active members for the new Subcommission who will be ratified during the 35th IGC.

The annual meeting of the International Geoscience Programme (IGCP) Council took place in Paris on 22-23 February 2016. The meeting included presentation of the new UNESCO Global Geoparks applicants. Thirty-two IGCP projects were evaluated of which 20 will be continued or are newly funded. In 2016 UNESCO will lower its contribution to IGCP to 55,000 USD whereas IUGS will provide 70,000 USD. The budget of the IGCP programme will be completed by a 20,000 USD contribution from China.

On 23 February, the Disaster Risk Reduction Unit of UNESCO presented a report that described straightforward lines and current actions of UNESCO in this field placing emphasis on development and outreach concerning early warn-

ingsystems. Discussion on the report was of real interest for IUGS because the presence of Geohazards in the scientific programmes of the Union had recently increased through a recent proposal of creation of a Geohazards Task Group to be ratified by the IUGS Council at the 35th IGC. On 24 February, there was a joint meeting of the IGCP Council, the IGCP National Committees, and the UNESCO delegations. Dr. Qunli Han, Director of the Ecological and Earth Sciences Division of UNESCO, welcomed all the participants.

The International Year for Global Understanding was officially inaugurated on 2 February 2016.

After recent alarming statistics on sexual harassment in the Geoscience community, several unions and earth science departments reacted to denounce openly this phenomenon.

MARCH 2016

A call for proposals to be granted by the IUGS Initiative Resourcing Future Generations (RFG) was opened. The closing date for the first round of applications was fixed by 31 May 2016. A second round will be announced after the 35th IGC. Applications will be decided on the basis of excellence, novelty, timeliness and relevance to RFG by an awards panel comprising members of the RFG Core Group.

Early Warning Systems for Subduction Type Earthquakes and Tsunamis were installed in two Japanese trenches. The process is closely followed by the IUGS Working Group on Geohazards.

IUGS participated in the 40th EuroGeoSurveys (EGS) meeting held in Brussels, March 14–16.

Representatives from the 32 member states integrated in EGS plus 40 invited guests met during the EGS Directors Workshop dealing with “Scientific priorities for a modern Geological Survey”. IUGS was represented in the meeting by Secretary General José P. Calvo who gave a talk on Science and Innovation in Geoheritage. Most of the ideas included in the presentation were furnished by the IUGS task groups on Geoheritage and Heritage Stone.

APRIL 2016

A meeting of the Unions of the International Council for Science was celebrated on April 12-13, 2016. The event was preceded by the GeoUnions (GU) Steering Committee Meeting in April 11, hosted by Société Géologique de France and held at La Maison de la Géologie. The GeoUnions attending the meeting were the following: International Union of Geological Sciences (IUGS), International Union of Geodesy and Geophysics (IUGG), International Geographical Union (IGU), International Association for Quaternary Research (INQUA), International Society for Photogrammetry and Remote Sensing (ISPRS), International Union of Soil Sciences (IUSS), International Astronomical Union (IAU), International Cartographic Association (ICA), and International Union of Radio Science (URSI). Significant time of the meeting was devoted to the preparation of the ICSU meeting, in particular the position of the GeoUnions about the changes in voting for the ICSU Executive Board membership, participation of GeoUnions in ICSU interdisciplinary programs, and proposals in the future call for the ICSU Grants Programme.

The meeting of Scientific Unions (Physical, Chemical and Mathematical Sciences; Biological Sciences; Earth and Space Sciences; and Social

Sciences) of ICSU took place at the Fondation Simone et Cino del Duca. The first day was focused on presentations by the Unions, updates of ICSU activities, discussion of voting procedures and description of the next call for the ICSU Grants Programme, which should be launched by the end of April; final decisions on grants will be made by the end of 2016. Joint applications of Unions were encouraged. Second day of the ICSU meeting focused on a new Strategic Planning process. Health and wellbeing, relations with mass media, outreach strategies of the Scientific Unions were some outstanding points under discussion. Geo-Unions representatives emphasized the need to integrate earth studies with other disciplines. IUGS President Roland Oberhänsli pointed out the importance of including resources in ICSU interdisciplinary programs.

The activities of the IUGS Initiative on Forensic Geology (IFG) were evaluated in Manchester, UK on April 4, 2016. The meeting was held at the offices of ARUP hosted by Dr. Laurance Donnelly, Chair of the IFG. According to the Terms of Reference for Ad-hoc Review committees (ARC), evaluators were two members of the IUGS Executive Committee, Jose P. Calvo (Secretary General of IUGS) and Marko Komac (Vice-President of IUGS) and Colin Hope (National Search Adviser at the UK National Crime Agency), who acted as secretary of the ARC. Dr. Laurance Donnelly (Chair of IFG) and Dr. Alastair Ruffel (Queens University, Belfast) participated as active members of the IFG. The ARC meeting included presentations on the past and current status of the IFG. Annual reports (2011 – 2015) presented by the IFG were commented on by the participants who identified any shortcomings and problems. This was followed by open discussion on expectations of the IUGS IFG for the period

2016 – 2020.

Lola Pereira, Björn Schouenborg and Sabina Kramar, all from the IUGS Heritage Stone Task Group (HSTG) Board, convened a HSTG session on Natural Stone Research and Heritage Stone Designation at the EGU General Assembly, Vienna (Austria), in April 2016. Twenty oral and poster contributions were presented at this session, including possible examples of Global Heritage Stone Resources.

MAY 2016

The IUGS Bureau held its meeting in Madrid and Toledo, Spain on 16 – 20 May 2016. The meeting was hosted at the Department of Petrology and Geochemistry of the Universidad Complutense of Madrid (UCM). The agenda of the IUGS Bureau meeting focused on three main items besides usual business themes. One of the central items was the new Memorandum of Understanding for the publication of the journal *Episodes*. A second main topic was information from the IUGS Nominating Committee. The third relevant item dealt with organization aspects of the 35th IGC in Cape Town, August 28 – September 3, 2016. The timetable for IUGS business meetings during the congress was updated and aspects such as the organization of the IUGS-IGC Council Meeting, awards, voting systems for the new IUGS Executive Committee and for the venue of the 37th IGC were discussed in detail. The IUGS booth management and related matters were also dealt with.

The proposal for the Global Stratotype Section and Point (GSSP) defining the base of the Albian Stage (Cretaceous System) was ratified by the IUGS Executive Committee.

JUNE 2016

The June 2016 issue of the *Episodes* was devoted to “The Great Mineral Fields of Africa”, thus following a tradition of the IUGS journal to be published as a special extended issue related to the place in which the International Geological Congress is going to be held. The organizers of the Congress coordinated a set of expert papers covering: goldfields in the Witwatersrand Basin, the Lake Victoria area and in West Africa; diamond resources in Africa; the platinum, chromium and vanadium resources of the Bushveld Complex; banded iron deposits in the Transvaal Super-Group; papers on manganese, nickel, uranium, rare earth elements, tin and potash as well as reviews of the oil and gas basins of Africa and coalfields in south-central Africa. While associated with the Congress, this issue is also relevant to the IUGS flagship initiative “Resourcing Future Generations”.

IUGS was invited to celebrate the 100 year Anniversary of the Colombian Geological Survey. IUGS was represented by its President and the Chair of the Stratigraphic commission Stan Finney. The event took place in Bogotá from 27 June to 1 July 2016. The celebration included a scientific congress that was held in a modern venue near the Survey and the University and was very well attended. Alongside scientific program, visits to the modern laboratories at the Servicio were offered and the Directors of the Ibero-American geological surveys held business meetings. CGMW was represented by its President and Eurogeosurveys by its Secretary General. Following the Congress the foreign guests had the opportunity to join a 3 day excursion to Ibague and its surroundings in the Central Cordillera.

JULY 2016

A call was announced for partners/evaluators to review the geological interest of new proposals that the International Union for Conservation of Nature (IUCN) will need to evaluate for the 41st Session of the World Heritage (WH) Committee in 2017. IUGS is responsible for the evaluation of the nominated sites under World Heritage Convention Criterion (viii) for outstanding geological value.

The International Union of the Geological Sciences (IUGS) community received the news of the passing away of Professor Zhang Hongren in Beijing on July 16, 2016 at the age of 82 years. During his lifetime career as a geologist, Zhang Hongren was devoted to scientific research and administration in relation to mineral exploration, groundwater resource evaluation and geohazards prevention and mitigation. Professor Zhang Hongren had been engaged in IUGS activities since the early 1990s. He served as Secretary-General of the Organizing Committee of the 30th International Geological Congress held in Beijing in 1996, Editor-in-Chief of *Episodes* from 1997 to 2004, President of IUGS from 2004 to 2008 and Past President and Chair of the IUGS Nominating Committee from 2008 to 2012. During his service as the IUGS President, he actively promoted collaboration with a strong network within GeoUnions and close cooperation with ICSU, UNESCO and other related international scientific organizations. To strengthen global public awareness of geology, IUGS actively promoted the International Year of Planet Earth (IYPE) under his leadership.

AUGUST - SEPTEMBER 2016

The 35th International Geological Congress was held during the period of 27 August - 4 September. It was preceded by an IUGS Bureau Meeting on 25 August to prepare for the 70th Executive Committee meeting held on 26 and 27 August, which, in turn, was used to prepare for the 4th IUGS-IGC Council meeting on 31 August and 1 September. Many important decisions were made by the Council. The Task Groups on GeoHeritage and Global Geoheritage Stone were elevated to Subcommissions and comprise a new Commission on GeoHeritag was ratified by the Council. The Council also approve the elevation of the Task Group on Global Geochemical Baselines the rank of Commission. The Commission on Geoscience for Environmental Management terminated its activities. Four groups were approved by Council as new affiliated organizations: International Association of Geoethics, International Association for Promoting Geoethics, Geological Association of Canada, Earth Science Matters. Germany, South Korea, Russia, and Turkey presented bids to host the 37th IGC. South Korea was chosen by Council, and the 37th IGC will be held in the city of Busan, 25-31 August 2024. The Council elected new officers of the IUGS Executive Committee. They are President Qiuming Cheng, Secretary General Stanley Finney, Treasurer Hiroshi Kitazato, Vice Presidents Kristine Asch and Wiliam Cavazza, Councilors for 2016-2020 Benjamin Mapani and Edmund Nickless, and Councilors for 2018-2022 Silvia Peppoloni and Thierry Mulder. The Council approved a new Nominating Committee with IUGS Past President Roland Oberhaensli as Chair of the committee. The chairmanship of the IGCC was handed over from Neil Williams, the head of the Australian delegation, to Richard Viljoen, Co-President of the 35th IGC.

Following approval by the IUGS EC of the transfer of the publication of Episodes from

Geological Society of India to Geological Society of South Korea, the Memorandum of Understanding between IUGS and the Geological Society of South Korea was signed at the IGC. In addition, the Memorandum of Understanding for the 35th IGC was signed by the IUGS and representatives from India.

The IUGS EC hosted a reception and awards ceremony on 29 August. Judith McKenzie was recognized with the prestigious IUGS Emile Argand Award during the Opening Ceremony of the 35th IGC. At the reception, Jean-Paul Cadet received the James Harrison Award; Andrew Miall, Stephen Richard, Martin Rudwick, and Bruce Hobbs were recipients of the IUGS Science Excellence Award. The best paper award for Episodes was presented to the co-authors. Photos and citations of the recipients are published in IUGS E-Bulletin 133 for August 2017, available on the IUGS website (www.iugs.org).

In late September, the IUGS Executive Committee voted for ratification of the Global Stratotype Section and Point (GSSP) for the base of the Chattian Stage (Oligocene Series).

October 2016

At a joint General Assembly of the International Council of Sciences (ICSU) and the International Council of Social Sciences (ISSC) and ISSC, their members voted in favor of merging ICSU and ISSC to form a new International Science Council. Both former and newly elected IUGS Presidents Roland Oberhansli and Qiuming Cheng attended the general assembly in Oslo on Oct. 24. Prior to the assembly, Roland Oberhansli and Qiuming Cheng met other leaders from other members of the GeoUnions to discuss the development of the latter. Qiuming Cheng also met Richard Sinding-Larsen, former Secretariat General of IUGS, and both discussed an initiative regarding GeoIntelig encefor Resource-Based

Economic Development in Africa.

November 2016

The new IUGS Bureau (President Cheng, SG Finney, and Treasurer Kitazato) and IUGS Vice Presidents Cavazza and Asch meet in the office of the IUGS Secretariat in Beijing, 11-11 November 2016 for their first Bureau Meeting. The meeting in Beijing provided the opportunity for the new IUGS officers to meet the Secretariat staff and to view the facilities. Among decisions made was the appointment of a new Publications Committee composed of Brain Marker (chair), Fareedudin Fareedudin, Lola Pereira, the IUGS

IUGS BODIES

THE REAL LIFE OF THE UNION

The International Union of Geological Sciences promotes and encourages the study of geological problems, especially those of worldwide significance throughout the activities of IUGS Commissions, Task Groups and Initiatives.

At present IUGS gives special consideration to:

- International standards;
- Geoscience education;
- Geoscience information;
- Environmental management.

IUGS believes that it is of mutual benefit to establish close links with other organizations engaged in geosciences activities and especially those organizations whose work relates to some of the major activities of IUGS.

The list of currently active IUGS bodies testifies to these major aims of the Union. Links allowing description of the organization and activities of the IUGS bodies are provided on the IUGS website (www.iugs.org):

webmaster, the new editor of Episodes, and Stan Finney as a liaison to ensure direct connection between the PC and EC. The Bureau approved the motion to ask Peter Bobrowsky to continue as IUGS webmaster until a new person can take his place. The Bureau decided to hold the 71st EC Meeting in Paris in February 2017.

December 2016

The European Federation of Geologists (EFG) updated its code of ethics with the introduction of a new point dedicated to harassment and discrimination in the working environment.

Scientific Commissions

Geoscience Education, Training & Technology Transfer (COGE)
International Commission on GeoHeritage (ICG)
History of Geological Sciences (INHIGEO)
Geoscience Information (CGI)
International Commission on Stratigraphy (ICS)
Tectonics and Structural Geology (TECTASK)
Global Geochemical Baselines (GGB)

Joint Programs

International Geoscience Programme (IGCP)
International Lithosphere Program (ILP)
International Geological Congress (IGC)
Isotope Geology and Geochronology (TGIG)

Task Groups

Task Group on Global Geoscience Professionalism (TGGGP)
Task Group on Geohazards (TGG)

Initiatives

Initiative on Forensic Geology (IFG)

Edmund NICKLESS Chair of NASIC



Resourcing Future Generations

Realising the United Nations Agenda 2030 with its seventeen Sustainable Development Goals and implementing the Paris Agreement will add significantly to the demand for metals and minerals by both developed and developing countries. Figure 1 shows the historical production of copper as an example of the expected demand of one of a wide range of materials used in infrastructure development. Figure 2 shows the changing pattern and additional demand for a wide range of metals which will be needed to create the new energy generation and transmission technologies needed to decarbonise the global economy.

Supplying those resources in the short to medium term without disadvantaging future generations will depend on cutting edge research across the geosciences and other disciplines including mathematics, engineering, economics and other social sciences. For such reasons in 2013 the IUGS had established a new initiative, Resourcing Future Generations as a contribution of the geoscientific community to such contemporary societal concerns. Implementing RFG is being overseen by the New Activities Strategic Implementation Committee.

Since it was established RFG has published various reports, information leaflets and brochures. Particular effort has been made this year to submitting papers for publication in scientific journals (Text box 1). We have also presented at various scientific and other international meetings, including a two-day symposium during

IUGS INITIATIVES ADDING NEW IDEAS TO SERVE GEOSCIENCE COMMUNITY

the 35th IGC in Cape Town (August/September 2016) and have submitted four session proposals to the RFG2018, the first inter-IGC to be held in Vancouver, British Columbia during June 2018. We have continued to raise the profile of RFG. The need for a new international resource governance agreement to secure the future supply of metals and minerals from discovery of new deposits to extraction and refining in the least environmentally damaging way is increasingly recognised. During 2016 among the invitations to present at meetings, particular highlights were to the Expert Group of Resource Classification of the United Nations Economic Commission for Europe, to a Raw Materials Conference organised by the Dutch Foreign Ministry, and at various European Union project meetings under the Horizon 2020 programme, including IM@CT, MINATURA and STRADE.

With a view to broadening engagement in RFG particularly among younger researchers, in April we launched a small grants scheme. Of the eleven applications received, six were funded, the average award being \$3k (Text box 2). A Second Call was announced during the 35th IGS with a closing date for bids of end January 2017.

Over the coming year we will work with Canadian colleagues to ensure the success of RFG2018 and in particular to ensure the participation in the meeting of the widest range of discipline interest, to attract policy advisers and opinion formers and especially those early in their career who will be future leaders in their field..

RFG PUBLICATIONS (published, in press or submitted for publication at end 2016)

Lambert, I., Durrheim, R., Godoy, M., Kota, M., Leahy, P., Ludden, J., Nickless, E., Oberhänsli, R., Anjian, W., Williams, N. Resourcing Future Generations: A proposed new IUGS initiative. June 2013. Episodes. Vol. 36/2, pp 82-86. <http://www.episodes.org/index.php/epi/article/view/57474/44844>

Resourcing Future Generations: A Global Effort to Meet the World's Future Needs Head-On. October 2013. <http://iugs.org/uploads/RFG.pdf>

Nickless, E., Bloodworth, A., Meinert, L., Giurco, D., Mohr, S., Littleboy, A. Resourcing Future Generations White Paper: Mineral Resources and Future Supply. International Union of Geological Sciences. 2014, 30pp. http://iugs.org/uploads/Consultation%20Paper%202014_Oct_12_AL_EN_DG%20FINAL.s wf

Nickless, E., Ali, S., Arndt, N., Brown, G., Demetriades, A., Durrheim, R., Enriquez M.A., Giurco, D., Kinnaird, J., Littleboy, A., Masotti, F., Meinert, L., Nyanganyura, D., Oberhänsli, R., Salem, J., Schneider, G., Yakovleva, N. Resourcing Future Generations: A Global Effort to Meet The World's Future Needs Head-on. International Union of Geological Sciences. 2015, 77pp. <http://iugs.org/uploads/RFG%20Report-sm.pdf>

Materials for a Low-Carbon Energy Future: Resourcing Future Generations. December 2105. <http://www.geolsoc.org.uk/~media/Files/RFG%20Policy%20Statement.pdf?la=en>

First Open Call for proposals. April 2016. <http://iugs.org/uploads/RFG%20Call%20for%20Proposals%202016.pdf>

Second Open Call for proposals. September 2016. <http://iugs.org/uploads/29942%20Second%20Open%20Call%20for%20Proposals%20proof.pdf>

Ali, S.1., Giurco, D., Arndt, N., Nickless, E., Brown, G., Demetriades, A., Durrheim, R., Enriquez M.A., Kinnaird, J., Littleboy, A., Meinert, L.O., Oberhänsli, R., Salem, J., Schodde, R., Schneider, G., Vidal, O. Yakovleva, N. Sustainable Mineral Sourcing Requires International Action. In press. Nature Perspectives.

Nickless, E. 2016. Resourcing Future Generations: a global effort to meet the world's future needs head-on. European Geologist Journal. Vol 42, p 48-52.

Nickless, E. Submitted for publication. Resourcing Future Generations – a contribution by the Earth science community. Special issue publication on "Mineral Resources of the Future", Natural Resources Research, Springer.

Figure 1

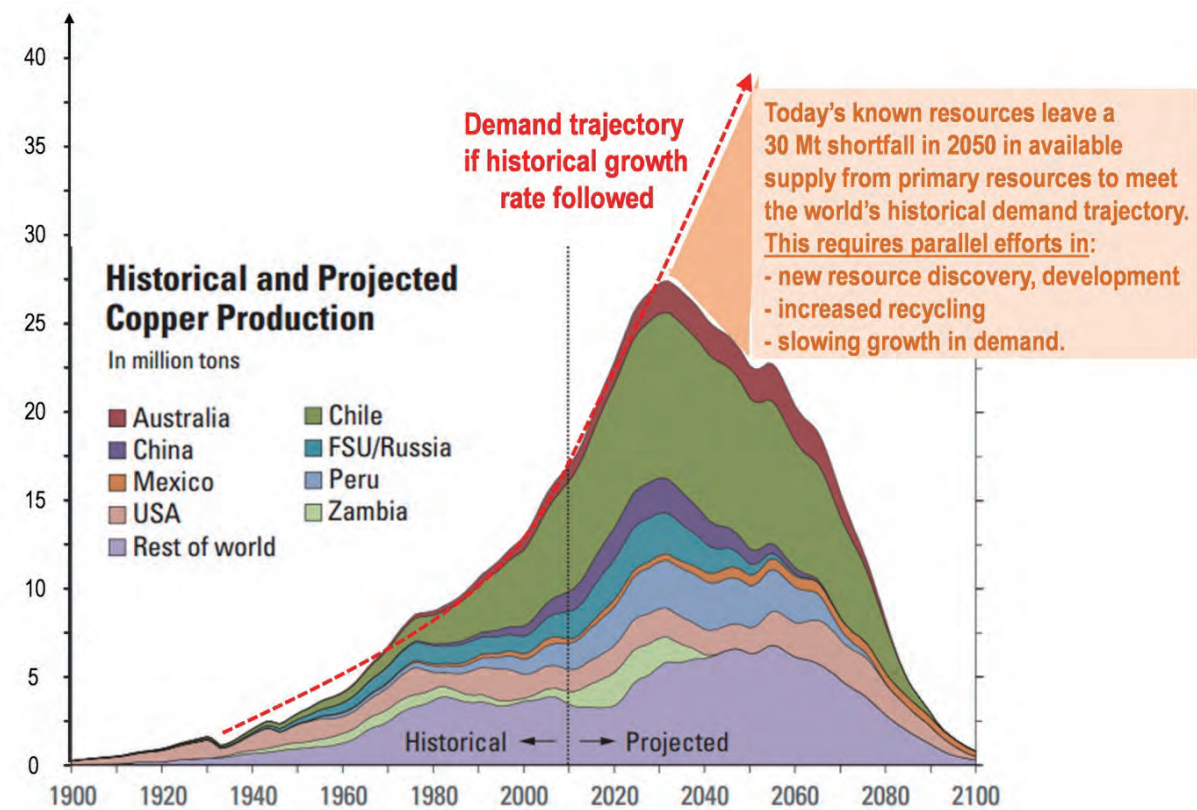


Figure 1: Historical and projected primary copper production (Modified from Kerr 2014 and Northey et al. 2014)

The illustration here is for copper but might equally be for iron or similar materials in high demand for infrastructural development. Given the life expectancy of infrastructure much of these materials may be locked away for 80 to 120 years. Even under the most efficient recycling processes the need for primary production will continue, albeit potentially at a lower level

Figure 2

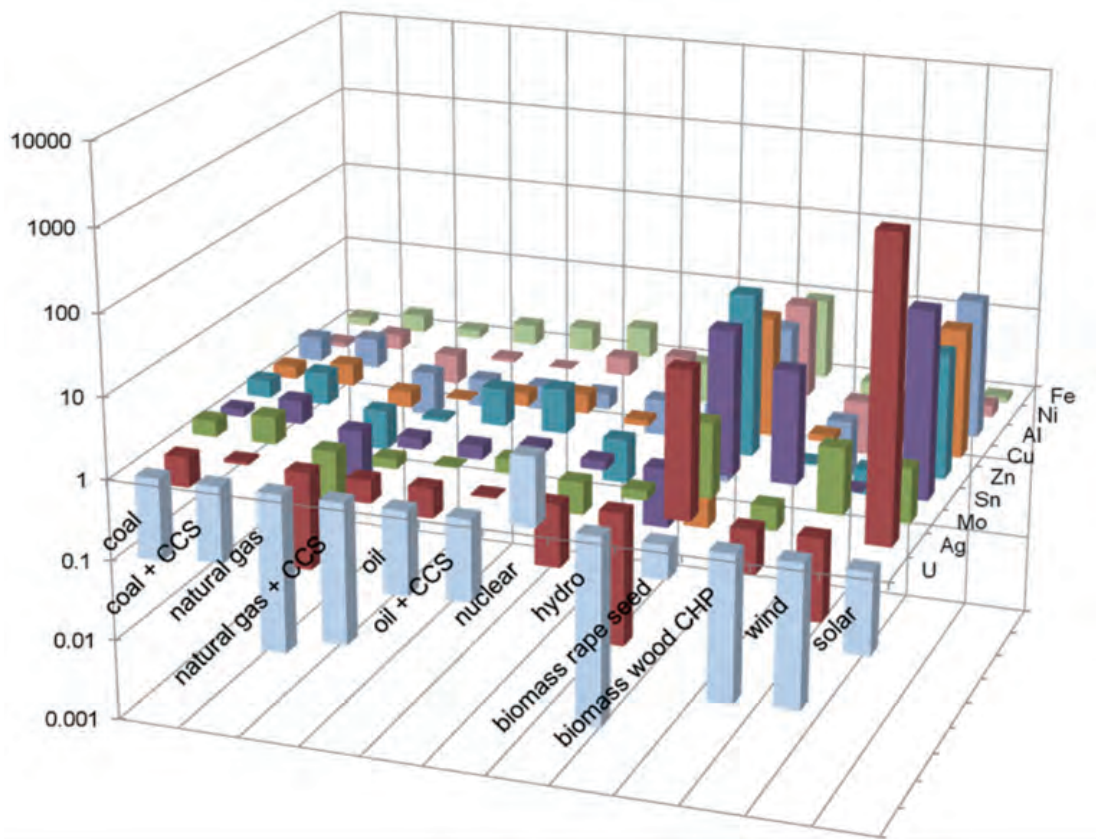


Figure 2: Requirements of selected metals in different power generation technologies relative to the metal demand of the current mix. (Kleijn et al. 2011)

The estimated metals demand of new energy generating and transmission technologies is shown to the right. The traditional energy generating technologies lie to the left. The transition to a low-carbon energy system required to tackle climate change, implies a steep increase of the metals intensity of the energy system, which in turn will cause a substantial increase in the demand for metals (by a factor 2 to 100).

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Northey, S., Mohr, S., Mudd, G., Weng, Z., & Giurco, D. (2014). Modelling future copper ore grade decline based on a detailed assessment of copper resources and mining. *Resources, Conservation and Recycling*, 83, 190-201.

Title of proposal

Principal Investigator	Institution	Title of proposal	\$k
Qiuming Cheng & others	China Univerisity Beijing & York University, Canada	Quantitative assessment and prediction of deeply buried mineral resources in covered regions	2.0
Kedia Chi & others	University of Buea, Cameroon	Capacity building for stakeholders in artisanal gold mines, Eastern Cameroon	3.7
Judith Kinnaird & others	University of Witwatersrand, South Africa	Germanium for Society – now and in the future	3.4
Gavin Mudd/Simon Jowitt	Monash University, Melbourne, Australia	Validating New Methods for Global Resource Estimates of Critical Metals	3.0
Andrea Rielli	Monash University, Melbourne,Australia	Metasomatic alteration of the sub-arc mantle: implication for arc metallogeny and the redox state of the Earth	3.1
Isobel Yeo	GEOMAR, Kiel, Germany	Acoustic properties of ferromanganese crusts and substrates as a tool for e-tech exploration	3.1

Brian MARKER
Chair of IUGS



Publications
Committee

In March 2016 the IUGS Executive endorsed a Memorandum of Understanding providing for the transfer of publication of the IUGS journal Episodes from the Geological Society of India to the Geological Society of Korea (GSK) with an implementation date of 1st January 2017.

The term of the 2012-2016 Publications Committee ended during the 35th International Geological Congress (35th IGC) at Cape Town in September 2016, but in November most of the members were reappointed for 2 years to guide the journal transition, joined by a representative from the GSK.

To ensure a smooth transition the GSI edited papers already accepted for publication in the March 2017 issue while other submitted papers and new submissions were transferred to the GSK during December 2016.

In 2014 the Impact Factor of Episodes was 2.0, but the 2015 Factor, announced in June 2016, reached an all time high. The March issue was an extended issue on the mineral resources of Africa ready for distribution at the 35th IGC. The membership of the Editorial Board was doubled to 20. Re-design of the IUGS website was commenced in early 2016 with an intended re-launch during the 35th IGC. Therefore, the webmaster trans-

ferred content to the IUGS Secretariat, and stood down, in May 2016. However the target for launch proved to be unrealistic. Therefore the former webmaster was reappointed in November 2016 and immediately worked to update the existing website.

The Geological Society of London continued to publish books arising from IUGS activities. During 2016, two books were at publication online-first stage, two were nearly complete for printing and two new titles had been approved.

The Publications Committee continued with: updating of guidance to contributors to, editorial board members and guest editors of, and advertisers in Episodes; revision of a draft statement of IUGS publications policy; discussion of a communications strategy to better integrate the content of the IUGS E-Bulletin, Episodes and IUGS social media outlets.

COLLABORATIVE JOINT PROJECTS

INTERNATIONAL GEOSCIENCE PROGRAMME (IGCP)

Since its inception in 1972, IGCP has been an international programme in the UNESCO system and a "flagship" activity within its earth sciences sector. Its 'international programme' status within the UNESCO, as opposed to being an inter-governmental programme, has been highly beneficial in providing the IGCP with the freedom of operation involving earth scientists of the global community in its capacity-building activities.

IUGS and UNESCO are equal partners in the delivery of IGCP's mandate as a global scientific entity with a main mission for "geoscience in the service of society". The IGCP has evolved in its 44 years of existence, during which its objectives and structure have changed several times.

On November 17, 2015, the General Conference of UNESCO at its 38th session unanimously adopted the statutes of the new International Geoscience and

Geopark Programme (IGGP). These statutes replaced the previous statutes of the International Geoscience Programme that remained essentially unchanged since 1972. A significant change is that the scope of projects supported has been expanded to include five themes: Global Change, Geodynamics, Earth Resources, Hydrogeology, and Geohazards. New operational guidelines are now in effect, and the changeover has been successfully managed. IUGS remains as a primary financial supporter of IGCP.

In 2016, 26 continuing and new projects received financial support from IUGS and UNESCO. Project participants came from 133 countries. In general both on project leader and project participant level about 25-30% of the scientists are women. Overall about 55% of the participating scientists are coming from developing nations. Projects funded in 2016 are as follows:

N°	Project Title	Project Leader (country)	IGCP Theme	Duration
587	Identity, Facies and Time – the Ediacaran (Vendian) Puzzle	Patricia Vickers-Rich (Australia), Mikhail Fedonkin (Russia), Jim Gehling (Australia), Guy Narbonne (Canada)	Global Change	2010-2014
589	Development of the Asian Tethyan realm	Xiaochi Jin (China), Katsumi Ueno (Japan), Graciano Yumul JR (Philippines), Pol Chaodumrong (Thailand)	Geodynamic	2012-2016
591	The Early to Middle Palaeozoic Revolution	Bradley D. Cramer (USA), Žilvė Žigaitė (Lithuania), Thijs R.A. Vanderbroucke (France), Kathleen Histon (Italy), Renbin Zhan (China), Guillermo L. Albanesi (Argentina), Michael J. Melchin (Canada), Mikael Calner (Sweden)	Global Change	2011-2015
592	Continental Construction in Central Asia	Inna Safonova (Russia), Reimar Seltmann (UK), Min Sun (China)	Geodynamic	2012-2015
596	Climate Change and Biodiversity Patterns in the Mid-Paleozoic	Peter Königshof (Germany), Thomas J. Suttner (Austria), Iliana A. Boncheva (Bulgaria), Nadezhda G. Izokh (Russia), Phuong Ta Hoa (Vietnam), Thasinee Charoentitirat (Thailand), Johnny A. Waters (USA), Wolfgang Kiessling (Germany)	Global Change	2011-2015
600	Metallogenesis of Collisional Orogens	Zenqian Hou (China), David Leach (USA), Jeremy Richards (Canada), Richard Goldfarb (USA)	Earth Resources	2011-2014
608	Asia-Pacific Cretaceous Ecosystems	Hisao Ando (Japan), Xiaogao (China), Daekyo Cheong (Republic of Korea), Sunil Bajpai (India)	Global Change	2013-2017
609	Cretaceous Sea-Level Changes	Michael Wagreich (Austria), Silke Voigt (Germany), Svetlana Zorina (Russia), Xiumian Hu (Russia), Juleh Jalalur Rahman (Bangladesh), Ismail Omer Yilmaz (Turkey)	Global Change	2013-2017
610	From the Caspian to Mediterranean: Environmental Change and Human Response during the Quaternary	Valentina Yanko-Hombach (Ukraine), Nikolay Panin (Romania), Olena Smyntyna (Ukraine), Mehmet Celal Ösdoğan (Turkey), Tamara Yanina (Russia)	Global Change	2013-2017

618	Palaeoclimate information obtained from past-recharged groundwater	Dioni I. Cendón (Australia), Jianyao Chen (China), Jason J. Gurdak (USA), Ofelia Tujchneider (Argentina), Emerit, Sylvi Haldorsen (Norway), Ir. M.J. (Martine) van der Ploeg (The Netherlands), Rein Vaikmäe (Estonia), Roland Purtschert (Switzerland) Najiba Chkir Ben Jemaa (Tunisia)	Hydrogeology	2012-2016
624	OneGeology	Tim Duffy (UK)	Global Change	2013-2017
628	The Gondwana Map Project	Renata de Silva Schmidt (Brazil), Maarten De Wit (South Africa), Alan Collins (Australia), Philippe Rossi (France), Colin Reeves (The Netherlands), Edison José Milani (Brazil), Umberto Giuseppe Cordani (Brazil)	Geodynamic	2013-2017
630	Permian-Triassic Climatic and Environmental Extremes and biotic responses	Zhong Qiang (China), Thomas J. Algeo (USA), Margaret L. Fraiser (USA), Steve Kershaw (UK), Jinnan Tong (China), Sylvie Crasquin (France), Michael J. Benton (UK), Guang R. Shi (Australia), Charles Henderson (Canada), Arne Winguth (USA), Paul B. Wignall (UK), Kunio Kaiho (Japan), Ghulam Bhat (India), Yuri D. Zakharov (Russia)	Global Change	2014-2018
632	Continental Crisis of the Jurassic	Jongeng Sha (China), Vivi Vajda (Sweden), Paul E. Olsen (USA), Emma Sammel Msaky (Tanzania), Mohammed Et-Touhami (Morocco), Olena Shevchuk (Ukraine), Hamish Campbell (New Zealand), Wolfram M. Kürschner (Norway)	Global Change	2014-2018
636-Y	Characterization and sustainable exploitation of geothermal resources	Daniela Bessant (Columbia), Jasmin Raymond (Canda), Pascal Godeniaux (Belgium), Idalia Jacqueline Loez Sanchez (Columbia), Chrystel Dezayes (France), Paulo Herrera (Chile), Tanguy Le Borgne (France), Michel Malo (Canada)	Earth Resources	2016-2018
637	Heritage stone designation	Barry Cooper (Australia), Björn Schouenborg (Sweden), Dolores Pereira (Spain), Sabina Kramar (Slovenia), Jan Elsen (Belgium), Joseph Hannibal (USA), Brian Pratt, (Canada), Nelson Shaffer (USA), Fabiano Cabanas Navarro (Brazil), Hirokazu Kato (Japan), M. Jayananda (India), Phil Paige-Green (South Africa), Brian Marker (UK)	Earth Resources	2015-2019
638	Paleoproterozoic Birimian geology for sustainable development	Moussa dabo (Senegal), Tahar Aifa (France)	Earth Resources	2016-2020
639	Sea Level Changes from minutes to Millenia	Simon Engelhart (USA), Gosta Hoffman (Oman), Fengling Yu (China), Alar Rosentau (Estonia)	Global Change	2016-2020
640	Significance of Modern and Ancient Submarine Slope and Landslides	Lorena Moscardelli (USA), Aaron Micallef (Malta), Michael Strasser (Switzerland), Jason Chaytor (USA), Joshua Mountjoy (New Zealand), Davis Mosher (Canada), Sebastian Krastel (Germany), Claudio Lo Lacono (UK), Maarten Vanneste (Norway), Yasuhiro Yamada (Japan)	Geohazards	2015-2019
641	Deformation and fissuring caused by exploitation of subsurface fluids	Dora Carreon-Freyre (Mexico), Devin Galloway (USA), Pietro Teatini (Italy), Shujun Ye (China)	Geohazards	2015-2018
643	Water Resources in Wet Tropics of West-Central Africa	Bamory Kamagate (Côte d'Ivoire), Mandem-Bitom (Cameroon), Nicaise Yalo (Benin), Luc Seguis (France)	Hydrogeology	2015-2019
646	Dynamic interaction in tropical Africa	Kankeu Boniface (Cameroon), Izuchukwu Mike Akaegbodi (Nigeria), Asiedu Daniel (Ghana), R. O. Greiling (Germany), Jurgen Runge (Germany)	Geodynamic	2015-2018
648	Supercontinent Cycles an Global Geodynamics	Zheng-Xiang Li (Australia), David Evans (USA), Shijie Zhong (USA), Bruce Eglinton (Canada)	Geodynamic	2015-2019
649	Diamonds and Recycled Mantle	Jingsui Yang (China), Yildirim Dilek (USA), William Griffin (Australia), Paul Robinson (Canada), Ibrahim Milushi (Albania), Mohammad Metwaly Abu Anbar (Egypt)	Geodynamic	2015-2019
650	3rd Pamir High Elevation International Geophysical Expedition	Vladimir Aizen (USA), Paul Mayewski (USA), Christoph Mayer (Germany), Frank Wilhelms (Germany), Pascal Bohleber, (Germany), Nozomu Takeuchi (Japan), Koji Fujita (Japan)	Global Change	2015-2019
653	The onset of the Great Ordovician Biodiversification Event	Thomas Servais (France), David A.T. Harper (UK), Olga T. Obut (Russia), Christian Mac Ørum Rasmussen (Denmark), Alycia L. Stigall (USA), Yuandong Zhang (China)	Global Change	2016-2020

GEOSCIENCE INFORMATION IN AFRICA NETWORK(GIRAF) HANDOVER AT THE 26TH COLLOQUIUM OF AFRICAN GE- OLOGY, NOVEMBER 2016

At the 26th Colloquium of African Geology (CAG26) in Ibadan the GIRAF Network was ceremonially handed over to the African colleagues and GIRAF members.

GIRAF had been founded in 2009 with a conference-workshop in Windhoek Namibia and had grown ever since. Since then the network was coordinated by Dr. Kristine Asch, BGR and the IUGS Commission for the Management and Application of Geoscience Information (CGI), who ceremonially consigned the network to Mr. Ibrahim Shaddad, Director of the African Mineral and Geosciences Centre (AMGC) in Dar es Salaam, Tanzania.

"Knowledge-based Geoscience information is more important than ever, especially in Africa" says Kristine Asch during the Transfer and wishes the network all the best for the future.

GIRAF was initiated by the Commission for the Management and Application of Geoscience Information (CGI) of the International Union of Geological Sciences (IUGS) 2007 in Mozambique at a planning workshop the 21. Colloquium of African Geology in Mozambique and coordinated since then by Dr. Kristine Asch of BGR, then Secretary General of the CGI together with the GIRAF Steering Committee consisting of eminent African key players such as Prof. Aberra Mogesie (President of Geological Society of Africa, GSAf), Dr. Felix Toteu (UNESCO Nairobi), Prof. Ezzoura Errami (President of the African Association of Women Geologists) and others.

Since its inauguration the GIRAF network was primarily supported by the German Federal Ministry for Economic Cooperation and Development (BMZ), the German Federal Institute for Geosciences and Natural Resources (BGR), UNESCO

Nairobi, the Geological Surveys of Namibia, Ghana, Mozambique, SEAMIC, the Geological Society of Africa, Australian Aid, the United Nations Development Programme, the Commission for Geoscience Information (CGI) of the IUGS (International Union of Geological Sciences), and many more organizations. GIRAF has more than 400 members from more than 30 African Countries and 12 non-African ones. 17 GIRAF ambassadors are active in their countries of origin.

Since its inception in 2009, GIRAF has served as a platform for African geo-information experts to share information and experiences in the fields e.g. of artisanal mining, environmental impact studies, socially acceptable living conditions in mining housing estates, securing and protection of water resources; soil protection. Also GIRAF is facilitating the inclusion of African geoscience information experts into international initiatives.

Four main GIRAF conference workshops were held: in 2009 (Windhoek, Namibia), in 2011 (Dar es Salaam, Tanzania), in 2013 (Accra, Ghana) and in 2015 (Maputo, Mozambique).

The new GIRAF Secretariat is based in Dar es Salaam, Tanzania, at AMGC. The new GIRAF Council, President Prof. Olugbenga Okunlola (University of Ibadan, Nigeria) and Secretariat led by Dr. Mesfin Wubeshet Gebremichael of AMGC will invite new members to the network and continue promoting GIRAF to African member states. Dr. Asch will continue her association with GIRAF as a member of the Advisory board for the next four years.



GIRAF Initiating and Supporting Organizations



GIRAF Associated Organisations



Dr Laurance DONNELLY Chair, IUGS-IFG



INTERNATIONAL UNION OF GEOLOGICAL SCIENCES (IUGS), INITIATIVE ON FO- RENSIC GEOLOGY (IFG)OVERVIEW OF 2016

In 2016 IUGS-IFG held approximately 50 events in; Australia, Austria, Brazil, China, Colombia, England, France, Italy, Japan, Portugal, New Zealand, Northern Ireland, Republic of Ireland, South Africa and USA. These included; outreach, knowledge exchange and capacity building, training and operation support to Police and Law Enforcement. Dr Guo Hongling, Institute of Forensic Science, Ministry of Public Security, Division of Trace Evidence Analysis, in China, was assigned to the IUGS-IFG Committee as the Officer for China.

A seminar on, 'Forensic Soil Science and Geology' was held in collaboration with the, '5th International Conference on Criminal & Environmental Soil Forensics' and Soil Forensic International, at the 35th International Geological Congress, Cape Town, South Africa. This provided a forum for forensic geologists to showcase development of new sophisticated field and laboratory methods and strategies and to explore their experiences through case study analysis. Over 100 attendees were present and this included students, research scientists, serving police officers and forensic geologists. There were 3 keynote speakers, 17 presentations and 6 posters. The main themes were; search for burials; history and future of forensic soil science and geology; recent developments in forensic geology and soil and geology trace evidence.

Environmental crime has been reported by UNEP-INTERPOL to be a growing concern. An IUGS-IFG Officer spoke at Stormont, in Northern Ireland, about this to help inform Government on Policy. Five members of the IUGS-IFG committee

attended a meeting at An Garda Síochána (the Irish Police) Headquarters, in Dublin, Ireland, to discuss ground searches for burials with the Independent Commission for the Location of Victims' Remains (ICLVR). Training in Forensic Geology was also provided for the Brazilian Federal Police and the Police in Sicily, Italy.

IUGS-IFG was invited by Interpol to attend a meeting in Lyon, France. This included over 200 laboratory managers, police officers, Interpol agents, forensic scientists and university researchers from all over the world. Global developments and advances in forensic geology were discussed.

The University of Technology, in Sydney (UTS) opened the, 'Australian Facility for Taphonomic Experimental Research (AFTER).' IUGS-IFG officer for Pacific region helped develop and now manages part of this facility. Other IUGS-IFG members have provided advice on geology, geophysics and geochemistry.

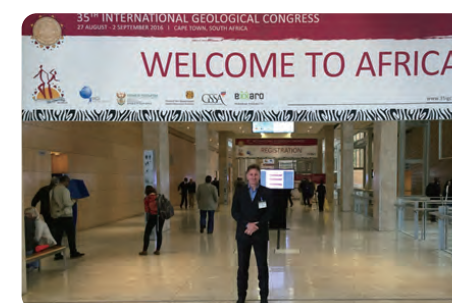
IUGS-IFG collaborated with the media and as a result numerous TV, radio, popular press and web sites articles were produced. Events were also held for schools and the public with interest in the forensic geology. Forensic science and geology continue to attract attention from writers of Crime Fiction and IUGS-IFG provided advice to crime novel authors.

The IUGS Ad Hoc Review Committee (ARC) interviewed IFG Chair to review the progress of IFG. This was conducted under the Chairmanship of Prof Jose Calvo (IUGS, Secretary General), Prof Marko Komac (Vice-President of IUGS). The meeting concluded that during the period

2011-2016 IFG has met and exceeded its objectives. IUGS, via IFG, has provided the opportunity for the development and advancement of forensic geology throughout the world. This has resulted in this multidisciplinary science being firmly

established in the geology profession, policing and law enforcement. Looking forward, IUGS suggested several further goals and recommended their continued support for IFG.

Possible Accompanying Photo(s):



IUGS-IFG Chair, at the opening of the Forensic Geology Session, 35th International Geological Congress, Cape Town, South Africa (Photo: Dr Laurance Donnelly).



IUGS-IFG at the Geological Survey of Ireland (Photo: Dr Laurance Donnelly).



IUGS-IFG deliver training in Forensic Geology with the Brazilian Federal Police, the LAMIR, Isotope laboratory for analyses of minerals and rocks and 2nd Coloquio Sul Brasileiro en Ciencias Forenses, Brazil, December 2016 (Photo: Dr Fabio Augusto Da Silva Salvador, Dr Carlos Molina Gallego and Dr Rosa Maria Di Maggio).



Research in decomposition and search, in Colombia (Photo: Dr Carlos Molina Gallego).



South Africa, particularly Cape Town, was an excellent venue for the 35th International Geological Congress, 27 August - 4 September 2016. It attracted 4,052 delegates and 102 accompanying guests. More than 5,000 abstracts were presented; ,309 oral presentations were accepted; 1,162 posters were accepted. There were 10 Plenary talks and 157 Keynote talks. More than 20% of the delegates

(844 persons) participated in 41 geological excursions. Cape Town itself provided a spectacular geologic setting with Table Mountain towering above the convention center, and many participants enjoyed excursions to Table Mountain, the Cape of Good Hope, local wine regions and local townships.



Prof. Roland Oberhänsli the IUGS President addressed at the opening ceremony of the 35th IGC



Prof. Roland Oberhäns presented Emile Argand Award to Prof. J. McKenzie



The 4th Session of the IUGS-IGC Council



Prof. Ezzoura ERRAMI, the other Candidate for IUGS President,warmly congratulated Prof. Dr. Cheng Qiuming for his being elected as the New IUGS President



Prof. Dr. Stan Finney gave campaign speech for IUGS Secretary General



36th INTERNATIONAL GEOLOGICAL CONGRESS 2-8 MARCH 2020 , DELHI, INDIA

The theme of the 36th IGC has been established. It is “Geosciences – the basic science for a sustainable future”. Shailesh Nayak, distinguished Scientist and Former Secretary, Ministry of Earth Sciences, GOI and Mr. M Raju, Director General (Ex-Officio), Geological Survey of India was nominated as President and Co-President respectively. Dr. Niranjana K Singh, Joint Secretary, Ministry of Mines was appointed as Secretary General for the 36th IGC. The Secretariat comprised three senior geoscientists. The Scientific Programming Committee was chaired by Prof. A K Singhvi. Government of India assured budgetary support for organization of 36th IGC. The salient themes of the 36th IGC included:

- | | |
|---------------------------------------------------------------------|-------------------------------------------------------------------|
| λ Planetary Explorations - Geo + Planetary Sciences | λ Energy for all – Nuclear, Coal, Hydrocarbon and Nonconventional |
| λ The Earth's Dark Age | λ The Three Poles and its Climatic Implications |
| λ Life and Earth - Origins, Symbiosis and Sustainability | λ Climate: Causes, Amplitudes and Timescales |
| λ Tracking the mineralised systems - Proximal and Distal Footprints | λ Extreme Events, Modelling and Prediction |
| λ Understanding the Deep & Concealed Deposits | λ Tectonics, Topography and the Monsoon |
| λ 4D Geodynamic and metallogenic Evolution of the continents | λ The Critical Zone in the Tropics |
| λ Strategic Minerals : Exploration, extraction and Budgeting | λ Geology and Geophysics of the first kilometer |
| λ Geophysics in Mineral Exploration | λ Dynamics of fluid transport through the crust |
| λ Proterozoic Sedimentary Provinces and their Economic Potential | λ Molecular Paleontology |
| | λ Nanogeosciences |
| | λ Earth Surface Processes - Large Scale Connection |

41 field trips in India along with trip coordinators and members were identified and other co-host countries were developing their field trips (Bangladesh - 4 traverses, Myanmar - 5 traverses, Nepal - 5 traverses, Sri Lanka - 1 traverse). The 36th IGC would offer 1,000 free Registrations, 1,000 Hospitality and 1,000 Travel supports, the Youth Geo-host Program would support 121 Graduate students as full delegates, and the Youth Volunteer INSPIRE Program would have 500 volunteers at Graduate level.



37th International Geological Congress 25-31, August 2024, Busan, Korea

Korea (Republic of) along with neighboring countries China and Japan will host the 37th Session of International Geological Congress (IGC) at Busan, 25 to 31 August, 2024. To ensure a successful congress, the 2024 IGC would be co-hosted by the Geological Society of Korea (GSK) and Korea Institute of Geoscience and Mineral Resources (KIGAM). Furthermore, enthusiastic cooperation and support is expected from academia, the central government and host city, Metropolitan Busan.

The official slogan for the 37th IGC, ‘The Great Travelers: Voyages to the Unifying Earth’, reflects tireless efforts of geologists around the world, from the past, present and future, and also contains the future-oriented meaning of ‘Smart Unifying Earth,’ which can be achieved by utilizing cutting edge IT.

The congress is planned from August 25 to 31st, which is the ideal time to visit Busan, as it's just after peak summer time, but still warm enough for delegates to enjoy the beaches and mountains. The city, Busan, sits at the southeastern tip of Korean Peninsula, which is located on the exciting geological point and dynamic plate margin of the Eastern Eurasian Plate.

As for joint field trips with China and Japan there are 24 proposed field excursion sites from Korea,



6 sites from China and 11 sites from Japan. Some field trips will be added from Taiwan and Mongolia. All of these destinations in East Asia are within a two-hour flight distance from Busan. Furthermore, we plan to link the GEO Host program by KIGAM with IGC. The annual program will be aligned with the 37th IGC session to boost interest and participation by young scientists, especially in Asian and African developing countries. The program includes diverse education training of geological workshop, short courses, and field trips.

And we would raise public awareness of geology. Our host city is well known for hosting the Busan International Film Festival, the largest film festival in Asia. During the IGC2024 we propose hosting a Geo Film Festival inside the convention complex BEXCO. The festival can be held in the same venues as the film festival (BIFF) and provide locals and visitors with a combined lineup of movies that are related to earth science and natural disasters.

As the host country of the 37th IGC many Korean delegates will take part in the 36th IGC at Delhi, India, and open a big unique national booth including performance of the closing ceremony of the 36th IGC.

ACKNOWLEDGEMENT

The invaluable contributions of the following persons are acknowledged with deep appreciation and gratitude:

Prof. Dr. Stanley FINNEY, the IUGS Secretary-General, for his great efforts in and contributions to compiling the IUGS 2016 Report.

Prof. José P. Calvo, the former IUGS Secretary-General, for his careful and conscientious review and modification of the Report and contribution to some part of the Report.

Sincere gratitude are also given to those who have contributed the 2016 IUGS Annual Report.

