GSSA
Geological Society of South Africa

geobulletin

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SACNASP and the winds of change...
Geophysics for Elephant Country
Karoo Research Project

news

MSA
THE MSA GROUP

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Oli rig at sunset courtsey of Shell

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from the editor's desk

Chris Hatton

To frack or not to frack, that is the question. Whether it's better for the farmers to suffer the drills and trucks of multinational companies, or to forget about long hot showers and do without them.

Attendance at this year's Fellows Dinner was at an all-time high, due no doubt to the opportunity to listen to Jan Willem Eggink presenting Shell's case for looking to see whether it would be worthwhile to frack in the Karoo. Whatever your opinions on the matter may be, even Shell's opponents give them credit for engaging the public (e.g. http://karoospace.co.za/fracking-shell-and-bobs-swimming-pool/). Part of the audience was somewhat sceptical of Shell's professed intention to do no harm to the water supplying our succulent Karoo sheep, but the majority was probably in favour of at least finding out whether there is really a bonanza waiting to be tapped. Some might be suspicious of Shell's protestations that they don't really know whether there is shale gas down there, assuming that a bunch of accountants wouldn't be acting like James Bond walking into the casino and tossing $200 million worth of chips on the table. Fortunately, exploration isn't run by cautious clerks and it really is an exciting high-risk, high-reward business. This is not to say that Shell wouldn't be looking at every opportunity to minimise risk. An example is the Karoo Research Project on p. 27 of this issue. Shell's willingness to fund a drill hole anywhere that a group of academics think would be best is a clear-sighted exercise in risk reduction. This is a win-win situation in which academics learn more about the Karoo and the possibility of early warning signals means that Shell exploration geologists keep their bean-counters happy.

The knowledge that oil exploration geologists gain can take time to filter into the academic community. The celebrated Exxon sea level curves were initially dismissed on the grounds that Vail, an Exxon geologist, compiled them from confidential company files. Later versions that used publicly accessible outcrops were gradually, if reluctantly, accepted. Even now, there is widespread refusal to accept the Vail version of sequence stratigraphy. This is because "Sedimentary basins are….formed as a result of tectonic processes that generally operate on regional to continental scales, so stratigraphic cycles around the world are unlikely to be synchronous." "In reality, no surface can possibly be an absolute time line" (Catuneanu 2006, Principles of Sequence Stratigraphy). The involvement of oil exploration geologists in the finer details of Karoo stratigraphy will be an interesting test of the various versions of sequence stratigraphy.

The tension between academia and commerce also manifests itself in more mundane activities. In a letter Stephen Davey expresses dissatisfaction with the high price of maps from the Council for Geoscience. In the days when the Geological Survey was a fully-funded state institution, maps were provided at a price which barely covered the cost of the paper they were printed on. After the transition to a partially-funded state institution the Council for Geoscience attempted, apparently with little success, to use map sales as a source of revenue. As the Council for Geoscience adopts Mxolise Kota's new operating model that will establish it as a customer facing organisation, this is one strategy that will need to be re-examined.

In the other letter, Roger Scoon traces the earliest description of the iron-rich ultramafic pegmatoids to the visit of American geologists in the Shaler expedition of 1922. In the previous issue of Geobulletin the origins of the 19th International Geological Congress, held in Pretoria in 1929, were traced to this expedition. As 2014 draws closer, preparations for the return of the IGC, to Cape Town in 2016 become more urgent. Jeanette McGill and Richard Viljoen recount the presentation of the 35th IGC to the American geological community at the 125th anniversary of the Geological Society of America in Denver.

Hopefully, the imminent return of the IGC to South African shores will stimulate members of the GSSA to sharpen their pencils and submit high-quality presentations to the South African Journal of Geology. As our Executive

Manager laments, there has been a decline in the number of submissions, but he is insistent this will not lead to a lowering of standards. A quote from Oliver Davies, the sadly deceased Professor of Classics at the University of Natal illustrates the enduring regard for our society's journal. Writing about the Pleistocene Beaches of Natal and clearly dismissive of the venerable Lester King's views on the topic, in 1970 he sniffingly observed "It would not be worth while to notice a recent article by King (1966. Trans. Geological Society of South Africa 69: 201-210), were it not published in a journal which maintains a high scientific standard"..

Whilst it is the job of the SAJG to uphold the standards expected of a formal scientific journal, the Geobulletin has very different functions. Among these is exposure to the geological marvels that exist outside our borders. In his regular contributions to Geotraveller, Roger Scoon has consistently delivered superbly illustrated articles on classic sites that many of us will never have the opportunity to experience first-hand. His latest contribution takes us to Cappadocia where rooms, churches and even underground cities are excavated from volcanic ash. In this issue Roger is joined by Luke Longridge who reminds us of the geological riddles that exist right under our noses. The Zwartkops hills, lying between Johannesburg and Pretoria, record evidence of an Archaean tectonic event that Chris Roering identified in 1983, and is now ready for re-examination. As the 35th IGC draws near, sites like these will be invaluable in comparing and contrasting Archaean tectonism with the more recent tectonic activity that many overseas visitors will be familiar with. I hope that there are more Geotravellers out there to draw our attention to forgotten or novel sites across our country.

In conclusion I would like to join Avinash and Craig in wishing you all the best for the festive season, and thank all those working so hard to bring the extraordinary geology of South Africa to as wide an audience as possible.

Chris Hatton

executive managers corner

Craig Smith

I would like to open this column by congratulating our Members and Fellows involved in the recently released paper in Earth and Planetary Science Letters, documenting the first fragment of a comet found on Earth. See Earth and Planetary Science Letters 382 (2013) pp. 21-31. The lead author of the paper is Professor Jan Kramers of the University of Johannesburg, in collaboration with thirteen other authors. Of those, all but two are from South African institutions. Pardon the pun, but this paper will make a major impact on extra-terrestrial science, and you should read it. For those of you who may have seen the work documented on Carte Blanche, I think it's fair to say that most of us have never realized the extent of Dr. Andreoli's acting skills. As temping as it is, however, the GSSA is unlikely to initiate a thespian award category.

The geoscience community is diverse, and global. I think that in Southern Africa we sometimes lose sight of that insofar as the majority of geologists in this corner of the planet work in the minerals industry in

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one capacity or another. Research done in Southern African universities, as well as research done in industry and government, is of vital importance in advancing the knowledge base about the planet we live on, maintaining sustainability in water resources, and responsibly discovering and developing the mineral resources we have stewardship over. One of the responsibilities of any professional geoscientist is to maintain currency in research advances in the geosciences, and to assist with this the GSSA will run some ten meetings or workshops in 2014, in addition to two larger research conferences, and the Alex du Toit lecture series. The schedule is being finalized now, and will shortly be published on the website. Dr. Jeannette McGill is our meetings Vice President, and is responsible for overseeing the Meetings program.

Readers are reminded that registration and abstract submission are now open for the International Mineralogical Association meeting in September of 2014. See http://www.ima2014.co.za/ for details. This will be a large international five day meeting to be staged in the Sandton Convention Centre which will be opened by the Minister of Science and Technology, Mr. Derek Hanekom. The program has close to seventy sessions, and there is a strong field excursion program as well as a variety of pre- and post-conference workshops. I remind our members that the early bird registration rate closes on January 15, and that there are significant savings if you register early. There are still sponsorship and exhibition opportunities available, and there are special exhibition rates for universities and not-for-profit organizations that may wish to obtain local and international exposure. This meeting will be a great opportunity for local and regional students, researchers and industry specialists to interact with the broader international community without having to incur the cost of an international flight; come to Johannesburg in September for the science and the networking. The meeting champions are Dr. Desh Chetty of Mintek, and Dr. Sabine Verryn (XRD Consultant). Professor Judith Kinnaird is organizing the field excursion program.

A second key event for 2014 is being organized by Dr. John Bristow and Dr. Mike de Wit, and is timed to complement IMA 2014. The Kimberley Diamond Symposium is being staged shortly after IMA 2014 to allow scientists from international destinations attending IMA to also attend the industry focused Diamond Symposium, on one international flight. We expect this to be a well-attended event where industry experts and researchers can interact. Registration for this meeting will open shortly, and sponsorship opportunities are available.

The Fellows Committee led by Mr. Gordon Chunnett is very pleased to announce that Professor Nick Beukes of the University of Johannesburg has accepted the offer to become the 2014 Alex du Toit lecturer for the GSSA. The lecture tour is staged every two years, and by tradition alternates between a local (i.e. Southern African) and an international scientist of note, and 2014 is the turn of a local luminary. The tour will take place in the latter half of 2014, and branches and divisions can contact me for more information. As with all such events, some sponsorship will be required; enquiries about sponsor opportunities can be directed to the office.

On matters of research, I encourage all of our readers to see the October 19 issue of The Economist, in which problems in the world of science are deemed serious enough to make the front cover. Back issues are available on line, and while it may cost a bit to download, there are two articles that we as scientists need to digest and ponder a bit. One article is entitled 'Unreliable Research: Trouble at the Lab". The second, an opinion leader, is entitled "How Science Goes Wrong". In short, the theme of the articles is that while the practice of science since the 17th century is arguably the cause of the greatest advances in human civilization ever, the ship is in danger of floundering because bad science is becoming more prevalent. Currently there are 1.4 million scientific papers published annually by an army of researchers that has probably increased by a factor of ten since the 1950's. It can be expected that some bad science (at times actually fraudulent) will go unrecognized prior to publication, but the problem is worsening. There may be a number of reasons for this. Because of the 'publish or perish' requirement for career advancement, poor papers get submitted for publication. It's also not cool to publish papers with negative results. In an era where data farming enabled by high powered computing is possible, correct

application of statistics becomes ever more important – while arguably being less well understood. Peer review is becoming worse. Many new on-line journals will accept papers with little if any screening in the interests of 'informing the public'. In addition to factors mentioned in The Economist, I believe we start to run into trouble when scientists cannot separate objectivity from advocacy (I've complained about this before!). And of course, world-wide there is huge political pressure for science to become 'more relevant', and of direct and immediate benefit to society. It's no wonder that advocacy makes inroads on objectivity.

You may believe this affects mostly the biological and medical research fields. Not so. In the past two years we have seen earth science papers in mainstream journals that arguably deserve a formal request for recall. Two in particular (from North America) were clearly appallingly reviewed. In my opinion, climate science is rife with this problem – from both denialist and alarmist camps. But does the GSSA have the resources necessary to defend a recall? The answer is probably no. Does the problem affect the GSSA and its members? Yes. This year we will at best see only two or possibly three issues of the South African Journal of Geology published. Our editors are receiving reduced numbers of submissions, and the quality of submissions is poorer. The rejection rate is over 50 per cent, but we will not compromise standards in order to fill pages. There is good South African earth science research out there deserving of publication in the Journal – a good deal of it by graduate students, and we encourage you to submit your research. The worst that can possibly happen is that you will receive a rejection letter – with comment on why it was rejected and how it can be improved. We also take the opportunity to thank the editorial board and the people who review for all of their efforts. Your high standards are both appreciated and safe.

This will be the final issue of Geobulletin in 2013, and the GSSA staff, Council, Editors and myself all wish you all of the best for the year end and for 2014. Please drive safely, defensively, and courteously. The GSSA office will formally close on the afternoon of December 13, and re-open on January 6, but we are in email and phone contact.

Craig Smith

president's column

Avinash Bisnath

This article will focus on current GSSA activities that I feel need to be brought to the attention of the membership. Top of the list is Sponsorship. It's becoming increasingly difficult to raise funds in today's climate. The traditional Majors are not being as generous as was previously enjoyed by the GSSA and Junior companies are running on a very tight "shoe string" budget - or that's at least what we are told!

There has been discussion around widening the Fellows Committee portfolio to include a fundraising subcommittee. This initiative is vital and key to future Sponsorship; therefore, MANCO, COUNCIL and I would welcome any suggestions, volunteers and participation to assist in driving this initiative. Directly linked to Sponsorship are our two upcoming

internationally recognised flagship conferences: the International Mineralogical Association (IMA) Meeting in September 2014 and the 35th International Geological Congress (IGC) in Cape Town 2016. Both these meetings are being planned and managed by their dedicated team of volunteers, but Sponsorship continues to be a major issue and concern.

The IMA meeting is looking to attract 1000 delegates and the IGC in excess of 6000 delegates. Judging from the reception at previous meetings, I would suggest you book your seat ASAP to avoid disappointment. Both meetings promise to be cutting edge with both local and international speakers. I urge the membership to bookmark and follow the websites (IMA: http://www.ima2014.co.za/; IGC: http://www.35igc.org/html/index.html) to keep abreast of any new developments and deadlines.

Talking of websites, our new GSSA website is now up and running, complete with a refreshed interface (see image below). I hope that you are enjoying the new look, feel and ease of navigating the website, as we have tried to make the website as modern and intuitive as possible.

Content of any website is always an issue, so please feel free to use the online submission button to submit your comments, complaints and content suggestions. One can now pay online, print membership cards, purchase books and post comments as part of our aim of making the website more user-friendly and content-rich. George Henry is the current content and website manager. Please contact him if you have any concerns or troubles with the website.

The website now also has an online submission section for technical papers to the South African Journal of Geology (SAJG). The aim of this was to facilitate a smoother submission, as well as set up a tracking process so that authors can track the review process until final acceptance. I urge authors to make use of this handy submission tool.

It's also been brought to my attention that the number of submissions to the SAJG has reduced. I encourage

industry, academics and students to submit research papers to the SAJG. I understand that there have been frustrations regarding turnaround times, feedback etc., but hopefully the new process outlined above will fast track most of these obstacles.

In other matters, a meeting was held between SAIMM's president and myself to discuss the strengthening of the relationship between our two societies. The SAIMM are very keen to participate in the IGCP 2016 and we welcome and appreciate their involvement. Additionally, we hope that their involvement will assist in obtaining sponsorship and a wider audience of participants.

We were informed that Alistair MacFarlane will be taking over as the SCC chairman and we wish him all success as well as continued support from the GSSA. A discussion was also held around the influx of foreign geologists and engineers, particularly from the east. Initial investigations suggest that most of these professionals are not registered with GSSA, SAIMM, SACNASP and/or ECSA.

It is common knowledge that to operate as either an engineer or geologist in South Africa one is required to be registered with a professional body. Prior to my discussion with the SAIMM president I was approached by an official of the DTI, who expressed their concern about the very same influx, and requested assistance in trying to combat this problem. It was agreed that a task team comprising the DTI, GSSA, SAIMM and SACNASP (at this stage) is set up. We are working towards this problem and will keep the membership informed of any developments.

The issues around ECSA registration of SAIMM membership were also discussed. The following was brought to our attention:

1. Cost of ECSA Registration is R2400.00, whereas SACNASP is R750.00;
2. Universities encourage their academics to sign up with ECSA by providing university incentives;
3. Most of the engineers are happy to sign up with ECSA and enjoy the benefits.

In highlighting the above and being aware of the concerns by academics from the geological sciences, I think it's important that we explore the options enjoyed by engineering academics. If incentives are truly in place on condition of registration it could be a potential benefit to academics in geological sciences to register with SACNASP. I will request the VP Academic Affairs to enquire and provide feedback via the website and subsequent Geobulletin publications.

On this note Jan Kramers has tendered his resignation from MANCO; he will, however, remain on Council. I wish to thank him for his efforts and wish him well. We are in discussion with Council about a replacement on Manco; this is an important portfolio.

The issues touched upon above are some that I wish to highlight and attempt to deal with in the coming year. I urge all members of the geosciences, be they professional, academic or student, to take an interest in these issues and actively participate to make your GSSA more relevant in the future. As always, any suggestions or comments are extremely welcome.

Finally I would like to take this opportunity to wish GSSA staff, MANCO, COUNCIL and the GSSA membership a happy and prosperous 2014.

Avinash Bisnath

GSSA
Geological Society **of South Africa**

SACNASP

and the winds of change.....

SACNASP originated from the Joint Council of Scientific Societies (JCSS) in the early 1980's. The formation of the Council was driven by scientists seeking credibility for their profession, and who wanted to be associated with good service delivery to their clients. Interestingly, this basic philosophy has not changed with time. A recent survey indicated that 75% of the SACNASP registered persons are registered with the Council because they want certification and recognition of their experience. Only 43% indicated that they have registered because it is compulsory. However, what has changed, as will become evident in the document, is that there is an increased drive from employers, both private and public, demanding proof of registration as a consideration for employment.

DRIVERS OF REGISTRATION

The question may well be asked: "What drives the need for registration with a statutory council such as SACNASP"? The answer is multi-faceted. There are several drivers enforcing the implementation of the Act and they represent all aspects of the community in which a scientist may ply his or her profession.

REGISTER TO BE RECOGNIZED

Many natural scientists feel the need to have their professional status confirmed through an independent process in addition to the traditional tertiary qualifications.

On the other hand, there is also a growing demand from the private sector for verification of an individuals' competencies and the individuals standing in the working environment. This concept is well manifested in the earth and geological sciences, through recognition of "competent persons" that may sign off on certain projects.

These principles are also widely recognised and

Table 1 **SACNASP numbers from 30 April 2006 - 30 April 2013**

Category of registration	2007	2008	2009	2010	2011	2012	2013	31 Oct 2013
Candidate	145	158	174	179	220	310	460	592
Certificated	78	103	108	107	151	288	391	583
Professional	3180	3380	3549	3655	3867	4340	4429	4768
Total	3403	3641	3831	3941	4238	4938	5280	5943

implemented in the animal feed industry and the food sciences.

Similar demands are rapidly spreading through many of the other Fields of Practice, with very strong needs for registration emerging in the agricultural, environmental and water resource sciences, to such an extent that in many instances proof of registration is mandatory for applications for employment.

REGISTER TO BE ACCREDITED

Most recently the general public has entered the fold and it is not uncommon that only SACNASP accredited scientists are viewed as having the necessary competence in dealing with matters of public interest coupled to science. Typical examples are often found in, but not restricted to, issues dealing with environmental impact assessments.

Particularly important in this regard is the registration of scientists operating within companies in the SMME sector. SACNASP plays a very important role in providing credibility to the scientists driving these entities and in addition, provides a sound legal framework for the protection of the public through the SACNASP Code of Conduct. A contravention of this code by a practicing scientist gives the public legal recourse through SACNASP's disciplinary procedures.

The public sector has also realised that there is merit in utilising independent bodies such as SACNASP in evaluation of their human capital. Recently the Department of Public Service and Administration (DPSA) has formulated Occupation Specific Dispensation (OSD) in an attempt to prevent the migration of scientists and engineers out of the public sector. One of the stipulations of this programme is that the person to be translated for OSD must be registered with the appropriate statutory body. For the natural sciences this body is SACNASP. To date OSD has been implemented in the Departments of Agriculture, Forestry and Fisheries (DAFF) and Water Affairs (DWA).

REGISTER TO BE CONSIDERED

Furthermore, the DPSA has also stipulated that scientists in the employ of the state must be registered with SACNASP before they may be short-listed for employment. These requirements are now implemented by DAFF and the DWA.

The Department of Home Affairs also relies for assistance from SACNASP when evaluating applications for work permits, particularly in areas of scarce skills. It is anticipated that SACNASP will also play a key role in vetting scientists entering the country to work on the Square Kilometre Array.

REGISTER TO BE LISTED

SACNASP is mandated to create and maintain a register of practicing natural scientists in South Africa. At present there are almost 6 000 scientists registered with SACNASP, representing a broad spectrum of the natural sciences. Maintaining current registration trends this number will increase to 20 000 by 2020 and it is envisaged that 50 000 registered persons can be on the books by 2025.

Such a collection of scientists on one register would represent a phenomenal resource, making it relatively easy to tap into the intellectual capital vested within the natural sciences. However, even more valuable would be the potential information that can be attained from the database accompanying the SACNASP register. The boundaries of the information that can be gathered are virtually limitless and will only be curtailed by the extent to which the database is developed and the resources allocated to its maintenance.

This places SACNASP is in a unique position to develop a comprehensive database of South African scientists and the industries employing them. This database can be converted into a powerful tool that can provide data for policy development and then be used as a

vehicle to implement such policies.

No other entity in South Africa is currently in this position, where the career of each individual scientist can be followed from university to retirement. Not only will it be a good indicator of the demographics of our scientists, but it can be set up to provide up to date information on the latest trends in the industries employing scientists.

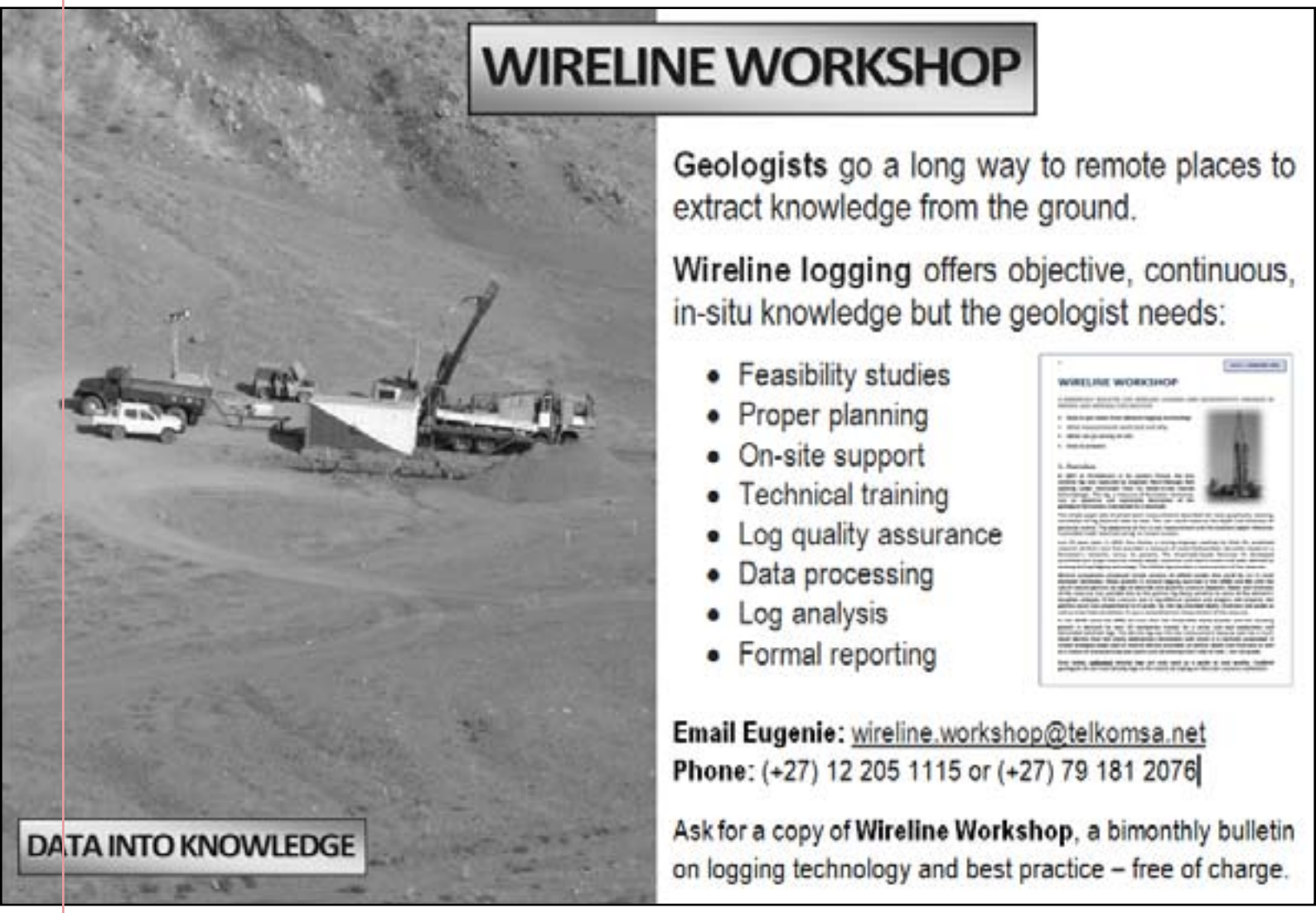
There are literally countless examples of the potential uses of this data. The added advantage is that the concept comes partially funded through the annual fees of the registered persons.

The winds of change and peer review....

What has remained constant throughout the evolution of the Council is the requirement for peer evaluation of qualifications and vocational experience. However, of late the Council has changed its approach from exclusivism (a so called "Old Boys Club") to becoming more relevant in the contemporary South African context by taking a more enabling attitude to fulfilling its duties and advancing the sciences. This fresh approach has paid dividends and over the last two years SACNASP has been flooded by applications for registration. This new found life is gaining momentum and does not show any signs of abating. But more on this in the next issue.

Rolf Becker Pr. Nat Sci

SACNASP
South African Council for Natural Scientific Professions



applications

to the research, education and investment fund of the the GSSA.

Geological Society of South Africa

!! DEADLINE FOR APPLICATIONS: 31 JANUARY 2014 !!

The GSSA Research, Education and Investment Fund (REI Fund – formerly known as the GSSA Trust Fund) is inviting applications from GSSA paid up-members (including post-graduate student members) for grants from the Fund, to be received at the GSSA office not later than 31 January 2014. Applications can be made using the prescribed application form available on the GSSA web site (www.gssa.org.za) or by letter outlining relevant details such as a short description of the project, motivation and budget, and should be forwarded to any of the following addresses:

E-mail: info@gssa.org.za
Postal: GSSA Secretariat
P O Box 61809 Fax: 011 492 3371
Marshalltown 2107
to be received no later than 31 January 2014

Grants can be applied for to support a variety of Earth Science applications, e.g. to offset analytical and/or publication expenses with regard to research projects, to promote Earth Science awareness through geotourism, geoheritage and geo-education, to attend local and international conferences relevant to particular research projects, and to present research results, for travel grants, or for other worthwhile purposes related to the Earth Sciences. These grants are normally only considered for students enrolled for MSc or higher degrees or for any members involved in specific research or other projects related to the Earth Sciences or to the Society. In particular we welcome applications from post graduate student members and would appreciate it if Heads of Departments at Higher Education Institutions and their staff would inform their students of this opportunity. Grants are usually limited to R15 000 to R20 000 per application but applications for larger amounts are also welcome. All applications will be judged on merit and/or the importance to the Society in promoting its image. Note that grants are only awarded to members/student members in good standing.

Applications are screened by the REI Fund Committee by mid-March with input and ratification by the GSSA Management Committee and Council respectively. In evaluating the applications and recommendations, the Committee considers the merit of each application, and depending on the amount of money available for that year, makes a final decision on the allocation of grants for that year. The decision of the Committee is final and no further correspondence on the matter will be entertained. By following this procedure it is anticipated that applicants will be informed by early to mid-April 2014 whether or not their applications are successful.

The current members of the REI Fund Committee are: Reinie Meyer (Chairman), Rob Ingram (Treasurer), Frank Gregory, Richard Viljoen, Mike Wilson, Derek Kyle and two office bearers of the Society who have ex officio status, namely the President (Avinash Bisnath) and the Executive Manager (Craig Smith).

letters

COUNCIL FOR GEOSCIENCE –
Price of Geological Maps

Knowledge leads to better understanding, wise decision making and informed management of our natural resources. Access to the best available scientific information is required in order to inform policy, planning and implementation.

The need to mainstream the conservation and sustainable use of biological resources across all sectors of the national economy, society and the policy-making framework was recognised by conservation scientists in South Africa more than 10 years ago and this is referred to as 'mainstreaming biodiversity'.

The biodiversity sector, led by the South Africa Biodiversity Institute (SANBI) (www.sanbi.org.za) and the Botanical Society of South Africa (www.botanicalsociety.org.za) in particular, has been extremely successful in ensuring that biodiversity concerns are taken into account in policy and legislation in South Africa.

Providing biodiversity information is central to SANBI's mandate. By way of example, BGIS (the Biodiversity GIS) website provides access to interactive maps showing the Vegetation of South Africa and Critical Biodiversity Areas mapping.

The National Geospatial Institute (www.ngi.gov.za) (Surveys & Mapping) provides high quality topographic maps and images at a nominal price for hard copies and digital copies for free. The Water Research Commission (WRC) (www.wrc.org.za) and the Department of Water Affairs (www.dwa.gov.za) ensures that water resource information is accessible to the public for free or at a reasonable price.

The quality of the geological information currently included in many planning documents at project, municipal or provincial level is often sub-standard. This is not surprising because the Council for Geoscience does not make it easy for the South African public to access geological maps and reports.

Geological aspects should be included in the Spatial Development Framework (SDF) and Environmental Management Framework (EMF) required as part of a Municipality's Integrated Development Plan (IDP). Mineral resources (including construction materials), engineering geology and the protection of geoheritage sites should be included in town and regional planning.

It is stated on the Council for Geoscience's (CGS) website (www.geoscience.org.za) that "Geoscience Mapping forms the core function of the CGS". More formally it is recorded that the CGS was established by the Geoscience Act 1993, (Act 100 of 1993) and that "the mandate of the CGS includes:

- The systematic reconnaissance and documentation of the geology of the earth's surface and continental crust, including all offshore areas within the territorial boundaries of South Africa.
- The compilation of all geoscience data and information, particularly geological, geophysical, geochemical and engineering-geological data in the form of maps and documents, which are placed in the public domain."

The Council of Geoscience (formerly the Geological Survey of South Africa) has a proud history going back more than 100 years. The preparation of a geological map is a huge task that requires many person-hours and tribute needs to be paid to the CGS geologists for all their dedication and hard work.
1:250,000 geological maps have been published for the entire country, whilst published 1:50,000 geological maps are available for limited (mainly urban) areas around the country.

The CGS has changed its pricing policy for geological maps. It is no longer possible to purchase a hardcopy geological map. Only digital (jpg/pdf/tif) copies of geological maps are for sale. The price of a 1:250,000 geological map is now R1000 and the price of a

1:50,000 geological map is now R1100!

Previously the price of a geological map used to be R100, so there has been a ten-fold increase in the price of geological maps in South Africa.

It is not only multinational petroleum and mining companies that require geological maps and are prepared to pay US$ rates to acquire them.

Good quality geological information is required by the general public and decision-makers at many levels. For example geological aspects of a project site should be included in an Environmental Impact Assessment (EIA) Report, a farmer may wish to check on a geological map in order to identify favourable locations for drilling for groundwater and school teachers should use geological maps to introduce earth science to pupils etc.

Instead of "mainstreaming" geological information the current pricing policy of the Council for Geoscience will result in geological information being omitted or ignored to the detriment of wise decision-making.

In order to promote Earth Science in South Africa and to ensure that good quality geological information is included in planning and decision-making it is vital that the geological maps and reports are placed in the public domain either free or at a price that is affordable to the majority of the population.

Stephen Davey
Klipberg Consulting (Pty) Ltd
7 November 2013

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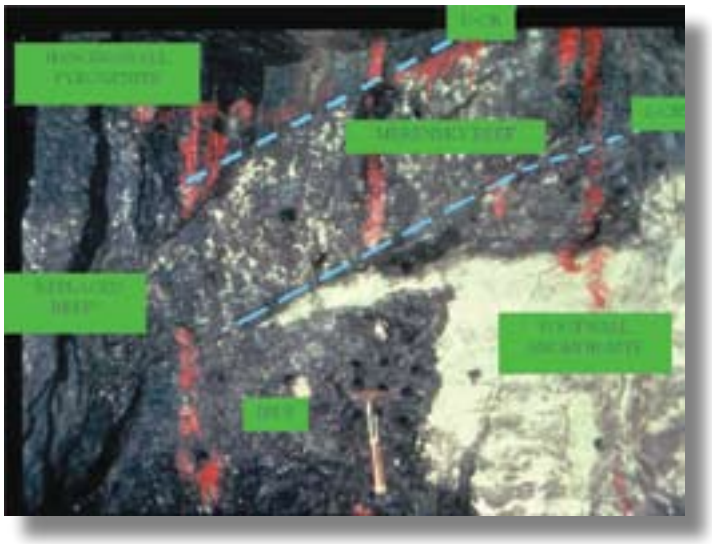
IRUPS and the Shaler Memorial Expedition

As a follow-up to the discussion on contributions made by American geologists toward the geology of South Africa (Geobulletin, September 2013) the reader may be interested to know that the rock-name IRUP ("iron-rich ultramafic pegmatite") was an original contribution to the scientific literature made by Morris Viljoen and Roger Scoon (in 1985). Usage of the description IRUP, despite not fitting accepted IUGS nomenclature, is now widely accepted and, as previously reported, includes the magnetite-bearing pegmatites described from the Steelpoort Valley by Cameron and Desborough. This description is in line with the general usage of the term "pegmatite", in which, as discussed by Eugene Cameron in his monograph on granitic pegmatites published in 1949, there should be a prefix modifier indicative of composition. The first IRUP (or hortonolite dunite-wehrlite pegmatite) to be reported was not the core-zone to the Mooihoek pipe (discovered by Hans Merensky in 1924), as is often erroneously thought, but a poorly known locality described by A L Hall (1932): "it was while camped on the farm Mecklenburg on the left bank of the Mutze River in eastern Sekukuniland, in June 1922, that Mr C Ward drew the attention of the members of the Shaler Memorial Expedition (including three well known American geologists) to a peculiar feature in the local geology, described as a crater-like hollow filled with a black rock looking like coal, but very dense". The main constituent of the rock was identified as coarse-grained hortonolite (iron-rich olivine).

Roger Scoon



The IRUP in this occurrence from the Amandelbult mine reveals the selective replacement of anorthosite below ultramafic layers that constitute the Merensky Reef. The transition from a normal reef section (right) to "Replaced Reef" (left) is gradational over a few tens of cm. The hangingwall pyroxenite typically remains unaffected even though the pegmatoidal component of the reef is replaced and the lower and upper chromitite stringers have been converted to Cr-rich Ti-magnetite. These unique spinels were first described in detail by Cameron and Glover (1973) from replaced layers of the MG chromitites near Steelpoort.

all the news fit to print

RHODES UNIVERSITY

Shell Lecture Series at Rhodes University continued in 2013

In 2013, the Geology Department at Rhodes University continued the Shell Lecture Series to address energy resources and their important part in the future energy mix within an African context. In June, the department hosted the workshop Basin Analysis and Seismic Interpretation Technologies. Following the first Shell Lecture Series held in November 2012, this workshop was attended by 24 researchers and students from South Africa, Botswana, DRC, Guinea, Mozambique, Namibia, Tanzania, Zimbabwe, Nigeria, Canada and USA. Presenters were Dr Manuel Poupon (Shell), Dr Hermann Läuferts (Shell), and Prof Annette E. Götz (Rhodes University). After an introduction on basin analysis and sequence stratigraphy, lectures and practical exercises addressed various aspects of seismic interpretation in both conventional and unconventional settings, with a focus on sharing best practices and avoiding/recognizing common pitfalls in seismic processing and interpretation. The course provided a complete review of seismic attributes and their use in fault detection, lithology determination, pressure and fluid prediction. Lectures and case studies demonstrated seismic interpretation from structural analysis of prospects to basin-scale seismo-stratigraphic techniques and direct hydrocarbon indicators. Participants learnt how to integrate seismic data into

Participants of the 2013 Shell Lecture Series Basin Analysis and Seismic Interpretation Technologies at Rhodes University, South Africa. Front row (from left): Joseph Dopavogui (Guinea), Tsholofelo Malatji (Botswana), Paul Katombe (DRC), Massa Beavogui (Guinea), Chris Male (South Africa), Matt Terracin (USA), Prof Annette E. Götz (Rhodes University), Adriaan Odendaal (South Africa). Second row (from left): Pieter Creus (South Africa), Stefanus Sitoka (Namibia), Lebogang Ledwaba (South Africa), Dr Manuel Poupon (Shell), Moshood Olayiwola (Nigeria), Dr Hermann Läuferts (Shell), Nkani Sonwabo (South Africa). Third row (from left): Demand Gwatinetsa (Zimbabwe), Jarred Land (Rhodes University), Thomas Branson (Canada), Luckmore Salimo (Zimbabwe), Tava Mavuwa (Zimbabwe), Ali Assane (Mozambique). Back row (from left): Mark Raines, Brenton Fairey (Rhodes University), Godfrey Bitesigirwe (Tanzania), Gcobani Gcayi (South Africa), Manoko Maggie Marokane (Rhodes University), Niall Kramer (Shell), Boubacar Bah (Guinea), Prof Yong Yao (Rhodes University, not on photo). Photo: P. Horváth.

Participants of the 2013 Shell Lecture Series Biostratigraphy for Palaeoenvironmental Reconstructions and Correlations at Rhodes University, South Africa. Front row (from left): Prof Annette E. Götz (Rhodes University), Lara Sciscio (University of Cape Town), Prof Marion Bamford (University of the Witwatersrand), Estelle Pretorius (University of Pretoria), Claire Browning (University of Cape Town), Sonwabo Nkani (University of Fort Hare), Adriaan Odendaal (University of the Free State), William Krummeck (University of Cape Town). Middle row (from left): Dr Katrin Ruckwied (Shell), Ernest Uzodimma Durugbo (Lagos, Nigeria), Dr Rose Prevec (Rhodes University), Robert Muir (University of Cape Town), Marakeng Rhudolf Madigoe (University of Fort Hare), Shereen Slamang (Nelson Mandela Metropolitan University), Susan Serfontein (University of Pretoria). Back row (from left): Brenton Fairey, Jarred Land (Rhodes University), Adam Moodley (University of Cape Town), Dr Iain Prince (Shell), Moshood Olayiwola (University of the Witwatersrand), Manoko Maggie Marokane (Rhodes University). Photo: G. Costin.

their geological analyses of the subsurface and finally executed their own exploration project by seismic data interpretation and integration.

In November, the department hosted another one week workshop on Biostratigraphy for Palaeoenvironmental Reconstructions and Correlations which was attended by 18 researchers and students from seven South African universities (University of Cape Town, University of the Free State, University of the Witwatersrand, University of Pretoria, Nelson Mandela Metropolitan University, University of Fort Hare, Rhodes University) and Nigeria. The workshop was presented by Dr Katrin Ruckwied (Shell), Dr Iain Prince (Shell), and Prof Annette E. Götz (Rhodes University) and main emphasis was placed on palynology and palynofacies, but a short introduction was also given for all other microfossil groups used in industrial biostratigraphy. Lectures and microscopic exercises during the first two days of the workshop provided the participants with the necessary knowledge on the different terrestrial and marine palynomorphs and their application in biostratigraphy. This introductory part was followed by three days of exercises focussing on data interpretation and standard biostratigraphic work flows during exploration as well as palaeoenvironmental reconstructions and correlations. Several case studies from the hydrocarbon industry were presented to demonstrate the different applications of biostratigraphy during exploration, appraisal and production in conventional and unconventional plays.

The Shell Lecture Series at Rhodes University promotes inter-university exchange and is already an established teaching component of the newly designed Exploration Geology Course Programme to strengthen the link between industry and academia. This lecture series is an important contribution to ensure that our MSc programme produces highly competitive graduates for both the academic and industrial labour markets, nationally and internationally. Rhodes University provides this platform and actively takes part in being think tank and education forum in energy research and its application.

The next Shell Lecture Series workshops at Rhodes University are planned for June and November 2014 and for further information and registration please regularly visit our webpage: http://www.ru.ac.za/geology/shelllectureseries/ or contact the course organizer (a.gotz@ru.ac.za).

Annette E. Götz.

WITS

The first semester of 2013 has been momentous for the School of Geosciences in several ways. First, the second Quinquennial Academic Review of the School since its formation in 2003 provided an opportunity to holistically evaluate the School's achievements over the past 5 years and current and future challenges and opportunities. Given the research theme of this newsletter, a short assessment of research aspects of the QQR is provided below. Second, after several years of lobbying for stronger support for palaeosciences research in South Africa, the BPI Palaeontology and Institute for Human Evolution were awarded leadership of the new DST/NRF Centre of Excellence in Palaeosciences in April. Third, shortly after this, the outgoing Vice Chancellor, Prof. Loyiso Nongxa, announced the merger of the BPIPal and IHE into the new Evolutionary Studies Institute. The formal creation of the ESI on 1 July thus saw the BPIPal moving out of the School, under the Interim Director Bruce Rubidge; however, staff in the ESI retain links with the School in their roles as postgraduate supervisors, through joint research projects, and through their teaching. Finally, the University Research Committee agreed to fund a state-of-the-art Field-Emission Electron Microprobe, currently under construction by Cameca in France, which when installed in June 2014, will become the only instrument of its type on the continent.

The QQR research report highlights the leading role that the School continues to play in geosciences research both nationally and internationally. At the end of 2012, staff included no fewer than 8 B-rated scientists in addition to one A-rated and 6 C-rated scientists. Annual research output has averaged slightly more than 30 publication units (approximately 80 papers and book chapters), and 6 MSc and 4 PhD graduates per year over the past 5 years The School continues to make significant contributions to several long-term regional and continental research programmes, such as AfricaArray, the West African Craton Exploration Initiative (WAXI) and the Rio Tinto-sponsored Damaran-Lufilian Correlation Project. What has been particularly pleasing has been the steady growth in postdoctoral fellows in the School over the past 5 years, with nine in the School in 2012. Of these, only three have had to rely on NRF funding.

Under the leadership of Prof Judith Kinnaird, EGRI has uploaded e-copies of its entire Information Circular set, stretching back to 1971. These Information Circulars remain an invaluable (and sometimes the only) source of information on aspects of southern African and African ore deposits and their settings. What has been particularly pleasing to see is the broadening and strengthening of collaborative links between researchers in the School and minerals exploration and mining companies …

On the international academic citizenship front, Judith Kinnaird assumed the role of President-Elect of the Society of Economic Geologists in January, and has a busy year of travelling as she prepares to take the reins of the 7000-strong Society in 2014; and Sue Webb is settling into her role as the International Secretary of the American Geophysical Union.

With the 110th Anniversary of the founding of the South African School of Mines taking place next year, the School of Geosciences will be looking to mark the occasion with a suitable celebration. Alumni are urged to contact us to update their details.

Roger Gibson

Participants and staff on the 2013 AfricaArray Field School

NEW ROCKS AND MINERALS SHORT COURSE: A BIG HIT

Short Course participants applying their new-found knowledge in the laboratory

In the first half of the year the School debuted a 20-week introductory geology evening course called Rocks and Minerals Revealed: An Introductory Course in Geology, organised by Judith Kinnaird and Grant Bybee. The idea of this short course was initiated by Judith at the behest of industry professionals who have to deal with geology topics or geologists daily, but do not themselves have a geological background, but was designed to appeal as well to the general public. The group met for a 1-hour lecture followed by a 2-hour practical session each Wednesday evening, although repeated requests for extra practical time (take note, undergraduates!) led to the Geosciences Building doors staying open a lot longer! Lectures covered various aspects of crystallography, mineralogy, petrology, ore deposits, geochemistry, geological map interpretation and geophysics, with practicals designed to reinforce the theory.

The course attracted a diverse audience, from teenagers to industry professionals and retired academics. It covered a range of material from first- to third-year-undergraduate level, with topics often expanded to follow questions posed by the class. At the request of the class, day-long field trips were organised to the Johannesburg Dome, Walter Sisulu Botanical Gardens and the Vredefort Dome, led by Carl Anhauesser, Grant Cawthorn and Roger Gibson, respectively.

Whilst the participants took away invaluable geological knowledge, the many lecturers from the School were thoroughly impressed by the enthusiasm and dedication of the participants. The course ended with a Q&A session at the Course Graduation, where participants could pose any geological questions to a panel of lecturers, who were then treated to dinner at Hofmeyer House.

For those interested, another short course will run in 2014 from February to June and will cost approximately R4,200. Contact grant.bybee@wits.ac.za

UCT

RETIREMENTS AND NEW APPOINTMENTS

UCT bids farewell to Professor David Reid, one of its stalwarts, who retires after having been affiliated with the Department for 40 years. Dave joined the then Department of Geochemistry as a PhD student in 1973 from Wellington, New Zealand, and completed his research on the Orange River Group lavas in the Richtersveld. After his PhD, he was a Research Officer in the Department of Geochemistry, before being appointed as an Associate Professor in economic geology in 1993. The Namaqualand has remained close to Dave's heart and his research interest throughout his career, with his other interest being the mineralization in the Bushveld Complex. More recently, he has been interested in mineral beneficiation, and the feasibility of mine tailings for possible carbon sequestration. The Department will miss him and wishes him all the best for his well-deserved retirement.

With the retirement of Professor Reid, we are very pleased that Dr Lynnette Greyling has been appointed as his replacement and will take responsibility for the promotion of economic geology at UCT. Lynnette started her academic career at UJ, before completing her PhD at Wits and joining Randgold Resources to work mainly on gold deposits in West Africa. She joined UCT two years ago as a post-doc, and we look forward to her new role within the Department.

The Department will also welcome Dr Beth Shaw-Kahle as a lecturer in geophysics in 2014. Beth's position is supported by Tullow Oil, and she joins the Department from Mineral Services, where she has been working as an exploration geologist for the last two years. Beth is originally from Cambridge, and completed her PhD on neotectonics in the eastern Mediterranean.

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AWARDS

Lara Sciscio, PhD student of Emese Bordy, has won UCT's prestigious Research Associateship award. The purpose of UCT's Research Associateship is to reward excellent student researchers and to acknowledge the research undertaken by both students and their supervisors. Nomination for a research associateship award is followed by a rigorous review of each candidate's work, progress and contributions to the UCT's research endeavour. Lara's PhD is a multidisciplinary study aimed at constraining the Triassic-Jurassic boundary in southern Africa and is funded by the NRF's African Origins Platform programme.

Lara & VC of UCT Research Associateship award ceremony 2013

Johann Diener

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geoheritage in oudtshoorn

Preserving and communicating our Geoheritage as a global resource for the future of South Africa

The GSSA hosted a meeting to promote and debate the concept of Geoheritage within South Africa, an initiative that is gathering pace in time for the IGC, which is to be held in Cape Town in 2016. Surrounded by the strange, otherworldly Oervlakte, the subterranean caves of the Cango system, the Swartberg mountain range and the charismatic fossils of the Klein Karoo, there was no shortage of inspiration for attendees at the forum, held in Outdshoorn from 9 to 11 September.

Geoheritage is an important initiative of the GSSA, intended to catalogue, assess, protect, conserve and, perhaps most importantly, to educate about South Africa's sites of national and international geological importance. These sites may be important for one, or a combination of, scientific, cultural and aesthetic reasons.

The conference boasted an impressive array of attendees from academia, industry, government and scientific communication; the range of presentations soon persuaded the delegates that the problem would not be finding suitable sites, but rather selecting which of South Africa's multitudinous geological offerings should be recognised first. South Africa is truly blessed with an incredible diversity of potential Geoheritage sites.

Current international Geoheritage sites, recognised by UNESCO, in China, the UK, Greece and Ireland were presented as possible models, along with prosepctive sites in South Africa. We travelled from meteorite impact craters, in the footsteps of ancient reptiles, over mountains, rivers and earthquake faults and journeyed back to the beginning of the Earth, examining diamondiferous rocks from the deep mantle!

Suggestions for Geoheritage sites ranged from the scale of individual outcrops to 4x4 trails through landscapes dominated by the underlying geology and geological processes; they were as diverse as a museum display model of the mantle (with real mantle nodules, see below), to a journey from catchment to aquifer in order to display the path that our precious resource of clean drinking water must take.

We also heard about the challenges and variable success of geology teaching in South African schools. An inspirational teacher from Glenwood House underlined the importance of educational aids, such as Geoparks and museum displays, for communicating science to as wide a range of South Africans as possible.

Lively discussions accompanied the evening sessions, underlining the passion that practicing and retired geologists within the country feel about the preservation and communication of our geological heritage. The challenge of raising the profile of Geoheritage sites, and inspiring South Africans of all backgrounds to love and appreciate our natural environment is not trivial, but given the evident dedication of the conference delegates, it seems certain that great things will be achieved in time for the South African hosting of the IGC to leave a lasting and positive legacy.

Geology has played a fundamental role in the heritage of all South Africans, from the cradle of humankind, through cave paintings and shelters to modern day art, literature, farming, mining and outdoor pursuits. By engaging with the general public, especially today's scholars, we can build a deep understanding of our collective origin and a shared, unifying resource for the future.

the mantle room

The Mantle Room, based at the University of Cape Town, contains a unique collection of over 10,000 mantle xenoliths, collected over the last 50 years from 150 localities spread across 14 countries.

The collection boasts an irreplaceable selection of large (up to metre-scale) pieces of the Earth's mantle. The old mine dumps from which these specimens were collected are being reprocessed by grinding everything down to millimetre scale. Future finds of such large mantle xenoliths are extremely unlikely!

The Mantle Room is currently seeking funding to create a striking interactive and educational exhibit based around these mantle rocks for display at the 35th International Geological Congress, to be held in Cape Town in 2016; the IGC will provide an excellent platform for showcasing this impressive aspect of geological heritage.

Ultimately, the collection will be housed permanently in Cape Town as a valuable tool for research, education and outreach, with a mobile component that can be hosted in international museums.

Further information regarding funding and partnership options can be obtained from:

Professor John Gurney
The Mantle Room
john.gurney@msgroup.net

Beth Kahle

A Roberts Victor eclogite xenolith from the Mantle Room collection. It is interpreted to be a fragment of a sheeted dyke complex in subducted ocean floor. The dyke remnant is the Kyanite bearing zone in the centre of the rock. This is also the area of white (decomposed) clinopyroxene, high in jadeite component.

geophysics for elephant country

Geophysics for Elephant Country – the 13th SAGA Biennial Conference and Exhibition

I took a bus conductor's holiday from the 5-12 October 2013 when I attended the South African Geophysical Association's (SAGA) two-yearly conference held at Skukuza Camp in the Kruger National Park. Being a geologist, I feel that I do not qualify to be a busman! SAGA is renowned for holding its gatherings in exotic locations, and this year's one was really superlative. One supposes that this was the main reason that about 300 delegates signed up, half of whom came from outside South Africa, making the event truly international. The other was the coupling of the 2-day 6th International AEM (Airborne Electromagnetics) Conference and Exhibition to the 3-day main SAGA event. A host of specialised pre-, syn- and post-conference workshops were also held, but I opted to "play" a round of golf on the Sunday prior to the start of the conference. Eight of us teed off in sweltering heat on the Sunday and enjoyed a pleasant round, with at least one noisy hippo distracting us in Lake Panic (well-named!), the main water hazard. Dan DiFrancesco from America played a solid round, but shot of the day came from Jean Legault from Canada who hit his tee shot over water within a metre of the pin on the final hole. The day rounded off with a welcoming cocktail party where the drinks flowed freely, and oysters (!?!) were served amongst other delicacies.

Business started in earnest at 8:30 am on the Monday, with Johan de Beer (retired from the Council for Scientific and Industrial Research (CSIR)) delivering the plenary address after the opening remarks. He spoke on the trail-blazers of the geophysical sciences in southern Africa, focusing on Basil Schonland, Rudolf Krahmann and Oscar Weiss. These three luminaries had a significant impact on scientific research and the mining industry in South Africa. Schonland was the first head of the CSIR, while Krahmann and Weiss were mainly responsible for finding extensions to the Witwatersrand gold reefs in the Far West Rand and Free State, respectively, by geophysical means. Dr de Beer is busy finalising a book on the topic. Dr George Smith of the University of Cape Town then presented his Society of Economic Geophysicists (SEG) Keynote address, him being the SEG Honorary Lecturer for 2013. His topic on "AVO in Exploration and Development" flew way over (or under?) my head, but I'm sure my more gifted geophysical colleagues thoroughly enjoyed it!

Then it was breakaway into three venues, of which I attended the Open and Remote Sensing sessions. Colin Reeves gave a fascinating account on how Gondwana fits together and how it came apart. His final animation, not to be missed, is freely available on his web site (www.reeves.nl/gondwana). Sharad Master then presented some armchair geology (with the assistance of Google Earth and Gordon Cooper) with regard to the Bateke Plateau structure in Gabon, which they interpret as a possible impact site. Now

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all they need to do is to mount a jungle expedition to prove it. It's not going to be easy – I've explored for gold there! The Minerals Exploration sessions the rest of Monday and whole of Tuesday attracted my interest, and I found myself edified about the use of hi-tech geophysical methods used to hunt for a variety of goodies from copper-nickel to iron oxide-copper-gold deposits and even kimberlites in India. It was time well spent.

The evening's activities included a short night game drive and a dinner in the bush. Our game truck reported scrub hares, a Verreaux's eagle-owl and an elephant. Others reported elephants and hippos as well. It was flabbergasting to arrive at an open area in the dark, with tables and chairs all set up for dinner to be served – braaied steak and chicken with side dishes. That the area, a few kilometres south of Skukuza Camp, was unfenced was evidenced by a couple of discreet rifle-carrying game rangers, just in case some daring animal decided to share dinner with us (or on us)!

Ray Durrheim, my CSIR colleague, and I went on early morning game drives, and at 6:54 am we (and six other vehicles) saw a leopard in a tree, faffing with its kill (possible an impala). We were chuffed, but were still envious of the 20 delegates who went on the Sunday geology excursion led by Morris Viljoen. Besides looking at static, ancient rocks, they also managed to see the Big Five along the way, including a pride of 14 or so lions. Truly amazing!

Fatheela Brovko and her welcoming committee at the SAGA Gala Dinner.

After a long day listening to talks with GENESIS, DIGHEM, TEM and DCIP in the titles, one looked forward to the GALA Dinner which was held at the Skukuza Golf Club. The theme was Latino Fiesta, with Fatheela and Oleg Brovko and three colleagues issuing nifty straw hats and cigarillos to attendees on arrival. Quite a few accompanying ladies were dressed in flowing skirts to set the right mood. Three fetching senoritas gave fast-paced displays of Latino dancing, which was followed by general dancing by the more brave and spritely delegates. Paella with prawns and salad, grilled chicken and beef were enjoyed by all.

I confess to missing the Wednesday morning sessions that were too specialised for me, and instead went to the Lake Panic Bird Hide and relaxed with the birds and a dozen or so hippos that were on the far bank. After lunch, I to-and-froed between the Reflection Seismics and Seismology sessions. Especially enjoyable was Musa Manzi's lively account of the work he did on state-of-the-art 3D orebody modelling at KDC East Gold Mine, which was published in "Geophysics" in 2012 and was accorded the Best Paper of the year by that prestigious journal. Well done! Then all too soon the closing ceremony was upon us. All the sponsors, especially CGG, were heartily thanked for their generosity in difficult times which made the event a great success. The exhibitors came out in full force and displayed their wares and handed out useful widgets as well. Fatheela and her tireless committee members ensured that things ran smoothly, and the conference organisers "Going Africa Conferencing" under Ethne Cameron and Susie Prangley really put on an unforgettable event, which we were all fortunate to attend. Oh, about the elephants….see photo!

P.S. I thoroughly recommend that geologists, especially those in mineral exploration, attend this SAGA event, as a significant amount of talks touch on the topic. Besides, the networking is great, and there is always that elusive drive straight down the fairway to savour!

George Henry

Darren Burrows, Terry Odgers and Reece van Buren in the main exhibition hall at lunchtime.

125th anniversary

125th Anniversary Conference of the Geological Society of America

The 125th conference of the Geological Society of America (GSA) was held at the Convention Centre in Denver, Colorado, between the 27-30 October 2013. As this was a special anniversary edition of the conference with many interesting and exciting elements arranged.

Attendance by GSSA and LOC members of 35th IGC was deemed to be necessary both as a marketing opportunity for 35 IGC and to learn more about organizational aspects of a large geoscientific conference. Aspects such as marketing, funding, sponsorship, legacy, fieldtrips and scientific program could all be covered in one form or another. Since GSSA is an associated society of the GSA an opportunity to represent the GSSA at an organizational level was also possible.

The following members represented the 35 IGC local organizing committee: Danie Barnardo, Elna Van Niekerk, Lesley Ferreira, JuanitaVan Wyk, and Richard Viljoen, while Jeannette McGill represented CGS, GSSA and 35th IGC LOC.

The scale of the geoscience community support is unquestionable: 8061 registered delegates attended the event and 1800 of these were students. In total 4900 abstracts were submitted and there were 407 technical sessions together with 3000 posters (500 new posters appeared every day). The core focus of the event remains the technical sessions and the exhibit.

Also of interest were the associated initiatives that were undertaken to celebrate this auspicious event by the GSA: The "Left-hand Brewing Company" brewed a limited edition "Field Assistant Ale" that was provided each evening. Related merchandise was also sold. "Formations" was co-commissioned by the Geological Society of America and the Boulder Philharmonic Orchestra in celebration of the 125th Anniversary of the Geological Society of America. This symphony in four parts was played for the first time at the black tie/ period dress Gala dinner held in the Colorado History Museum.

35th IGC Secretary General, President and team members: Danie Barnardo (Secretary-General); Juanita van Wyk; Richard Viljoen (Co-President); Jeannette McGill

Richard was able to reconnect with many people to ensure some high-level input for technical sessions and assistance with field trips. Also state-side promoters of the 35th IGC were also engaged.

Jeannette represented the GSSA at the Associated Societies meeting. This was well represented and allowed all the various scientific and geographically diverse affiliated societies to interact. The majority attending societies were from various affiliated interest groups. In addition to South Africa, the Geological Societies of Belgium and China were also represented. Interesting presentations and discussions regarding geoscience in the media took place and a thought provoking presentation on IP retention in the geosciences.

A special Pardee Symposium session during the GSA 125th Conference was convened to provide background and context for the Resourcing Future Generations initiative. IUGS is driving the Resourcing Future

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Members attending the International Geological Conference Committee (IGCC) meeting in Denver on 26 October 2013 Sitting: Ian Lambert (Australian IGC and Secretary-General of the IUGS); Roland Oberhaensli (IGCC Co-Chair and IUGS President); Dong Shuwen (IUGS Secretariat). Standing: A K Shingvi (Indian IGC); Danie Barnardo (Secretary-General South African IGC); Neil Williams (IGCC CO-Chair and Australian IGC President); Richard Viljoen (South African IGC Co-President); D S Mishra (Indian IGC); S K Wadhawan (Indian IGC)

Generations initiative. This initiative is underpinned by the "IUGS new activities strategic implementation committee" of which both Mxolisi Kota (CGS) and Ray Durrheim (Wits and CSIR) are members.

Four main actions will be pursued through this initiative:

1) quantification of 21st Century supply and demand,
2) better understanding of resource deposits under subsurface,
3) better understanding of where new types and/or deposits will be found, and
4) building and advancing skills capacity, particularly in developing economies.

The CGS provided a presentation on the African perspective to resourcing future generations. The speech was very well received with significant feedback and interest afterwards.

Overall - GSA was an invigorating environment with exposure to many aspects of the geosciences. The IGC 2016 booth was a success and many connections were made. The strength of societies affiliated to the GSA was interesting as was the overall culture of volunteerism and contribution inherent to the functioning of them.

The LOC team is thanked for the contributions they made to our marketing effort during the conference. The good natured enthusiasm shown by everyone throughout the event made our stay in Denver a very pleasant one. Various meetings lunches, dinners, and informal discussions were held with many individuals and groups. We were able to meet and interact with a large number of individuals who provided us with important information and advice relevant to 35 IGC. Attending the 125th GSA event undoubtedly achieved the expected value add. Thank-you also to the 35th IGC, UNISA, CSIR, GSSA and CGS for the support.

R.P. Viljoen & J.E. McGill

IMA 2014

For the first time in more than 50 years, the next meeting of the International Mineralogical Association (IMA) will take place in Africa. It will be held in Johannesburg, at the Sandton Convention Centre from 1st-5th September 2014, although there will be workshops, short courses and field trips prior to, and post the conference.

'We are proud to be hosting the next international meeting here in South Africa', says Dr Sabine Verryn, Chair of the Organising Committee for the event. 'South Africa is endowed with a heritage of mineral resources that one would be hard-pressed to find anywhere else in the world and also South African companies are key players in the global industry. In addition, we are credited with a high standard of technical and production expertise, as well as comprehensive research and development activities in the mineralogical, geological and geochemical arenas.'

The IMA, which is the world's largest organisation promoting mineralogy, was founded in 1958. It has members worldwide with 38 national mineralogical societies or groups as registered members. Since its inception, the IMA have organised meetings every four years, with previous meetings having taken place in Budapest, Kobe, Edinburgh, Montreal and Pisa. The last IMA meeting in Budapest attracted more than 1700 participants from all over the world, and a similar number is expected to congregate in Johannesburg for what promises to be a vibrant meeting full of variety, controversy and interest. There was certainly a great deal of interest from participants at the Budapest meeting in 2010, as many approached our South African stand to ask whether there would be field trips, and where they would visit. This enthusiasm is also confirmed by Prof. Walter Maresch, president of the IMA, who reports that South Africa is proving popular as an IMA meeting destination, not least because of the country's well-established tradition in the mineralogical sciences, particularly in applied and economic mineralogy.

The IMA 2014 meeting in Sandton is held under the auspices of the Geological Society of South Africa and the Mineralogical Association of South Africa. The overall theme of the meeting is "Delving Deeper – Minerals as Mines of Information." The theme and logo epitomises the country's progressive mining heritage which underpins the economy. Although with an emphasis on the theme of economic mineralogy, session topics are incredibly varied ranging from Cosmomineralogy to the Deep Earth, clay science, metallurgy and materials, methods and applications, to environmental mineralogy and education. Dr Desh Chetty of Mintek and Chair of the Scientific Committee, reports around 70 sessions have been approved, resulting in a comprehensive programme of oral and poster sessions, workshops and short courses. Dr. Chetty also reports that the Scientific Programme Committee is planning a series of 10 pre- and post-conference workshops, which can be booked separately from the conference. These also reflect the span of mineralogical applications from the large scale to the small. Planned workshops are on: adsoborphysical characteristics of precious metals; applied mineralogy of concrete and cement; coding of mineral and rock compositions using the RHA method; equations of state in fluid inclusion research; mineralogy and geochemistry of acid mine drainage; Quantitative X-ray diffraction; Raman and IR spectroscopy in mineralogy; SIMS; thin section preparation; and Gemmology.

The field trip schedule has been carefully compiled by Prof Judith Kinnaird to appeal to as many participants as possible. Around 30 trips will be led by specialist tour leaders and opportunities are on offer to visit some of the many world class mineral deposits affording overseas visitors the rare opportunity of visiting platinum, gold, chromium, vanadium, iron ore, manganese and diamond mines. Visits further afield include the Cape Peninsula, the northern Cape, Madagascar and southern and central Namibia to appreciate the mineral wealth of southern Africa. Field trips vary in length from ten days to one or two days for trips to Vredefort, Pilanesberg, northern and eastern Bushveld or the mining heritage in the Johannesburg area for example. In particular, it is anticipated that the 'Big Five' trip will be popular. This trip will include visits to a gold, platinum, diamond, iron ore and Palaborwa mine followed by a few days in the Kruger Park to appreciate the other 'Big Five'. Half-day outings for delegates will be integrated into the week of the conference programme and will include visits to

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mineralogical facilities, cement and ceramic factories. Accompanying persons have not been forgotten with an exciting planned programme that offers a Johannesburg City Tour, Lesedi Cultural visit, a Soweto Township tour and a game reserve experience. Delegates will also have the opportunity to join organised visits to Victoria Falls, a trip along the Garden Route or have a holiday to Cape Town to appreciate the Mother City. No doubt many other participants will add an extra holiday to their conference visit and enjoy more of the many special aspects of our country that are so popular with overseas visitors.

Arrangements have been made with a number of hotels and guest houses in the Sandton area to offer a wide variety of accommodation options to suit the needs and budgets of delegates to the conference. Special rates have been negotiated that will be very attractive to overseas participants who will be paying in dollars, pounds, and euros.

The local organising Committee has been fortunate to secure sponsorship from a number of South African companies, whilst others are signing up to secure display booths at the Sandton Convention Centre during the event next September. Stand size varies, and will also include smaller spaces for mineral dealers to sell mineral specimens to visitors, as this will surely be very popular. 'There are still opportunities open to become a sponsor and it is a fantastic opportunity to highlight your activities to a global audience' says Dr. Craig Smith, Chair of the Finance Committee.

Details of opportunities for sponsorship together with information on field trips and sessions may be found on the conference website at www.ima2014.co.za. Conference registration, field trip booking and abstract submission can now be made online.

Judith Kinnaird

ICDP workshop

"Drilling the Bushveld Complex - the world's largest layered intrusion"

Surprising new discoveries are still being made in layered mafic intrusions and major advances in analytical tools promise many more. We are still in the first-order characterization phase of understanding these objects and there is much to be learned on a wide range of topics. To focus international research in this field, we are pleased to announce an ICDP workshop to discuss plans for a drilling project in the Bushveld Complex, the world's largest and richest layered mafic intrusion.

With an estimated volume of 1 million km3 of magma, this one complex is a Large Igneous Province it its own right. The science objectives include, but are not limited to: (1) Magma chamber processes & melt evolution (2) Crust-mantle interactions & the origin of Bushveld granitoids (3) Metallogeny and ore-forming processes: what were the relative roles of gravity settling, magma mixing, immiscibility and hydrothermal fluid transport? We identified 3 potential drilling targets for discussion at the workshop. For target A, East-Central Bushveld Complex, we propose 3 overlapping, 3 km boreholes to provide the first-ever continuous roof-to-floor coverage of the Rustenburg Layered Suite. Target B in the SE Bushveld Complex is a single borehole of ~2 km depth, which will intersect the Roof Zone, Upper Zone, Main Zone and floor to resolve conflicting interpretations of the late differentiates. Target C, in the Northern Lobe, would involve 2 ca. 500 m boreholes sited to (a) fill critical gaps between existing cores and (b) study the nature of the transgressive Main Zone – Upper Zone boundary.

The workshop will be held from September 7-9, 2014 at the University of the Witwatersrand in Johannesburg, South Africa, immediately following the International Mineralogical Association meeting in that city. Workshop goals are to discuss scientific objectives, potential drill sites, operations, logistics and funding. Members of the international scientific community who wish to contribute are invited to submit an application with contact details and a 1-page summary of relevant expertise and intended contribution. The workshop will be limited to a maximum of 50 participants. Full or partial travel support will be available; preference will be given to scientists from ICDP member countries (or from those with interest in joining ICDP). Applications should be sent to Dr. Robert Trumbull (bobby@gfz-potsdam.de) before MARCH 1, 2014.

karoo research

Participants of the kick-off meeting of the Karoo Research Project at the Council for Geoscience, Pretoria. Front row (from left): Niall Kramer (Shell), Emese Bordy (University of Cape Town), Claire Geel (Nelson Mandela Metropolitan University), Hermann Läuferts (Shell), Monica Oghenekome (University of the Western Cape), Dawn Black (Nelson Mandela Metropolitan University), Billy Schutte (Geoserve), Stephanie Scheiber-Enslin (University of the Witwatersrand), Doug Cole (CGS), Annette E. Götz (Rhodes University). Back row (from left): Michiel de Kock , Bruce Cairncross, (University of Johannesburg), François Fourie (University of the Free State), Reinhard Meyer (GSSA), Wlady Altermann (University of Pretoria), John Hancox (CCIC), Nathan Sassman (NRF), Bruce Rubidge (University of the Witwatersrand), Björn Lindberg (Shell), Ernst Crous, Stephan Mogridge (Geoserve), not on photo: Johann Neveling (CGS).

Industry-funded Karoo research on the way

In September 2013, geoscientists focusing on Karoo research met at the Council for Geoscience for the kick-off meeting of the Karoo Research Project, an industry-funded, multi-disciplinary and inter-university research project. Based on the long tradition of Karoo research in South Africa and combining the expertise of Karoo researchers in the country, this project aims to analyse the basin evolution with respect to its important water, energy and mineral resources. The detailed knowledge of Karoo stratigraphy and the understanding of the complex basin-fill history are crucial to estimate the potential of these resources as part of the country's future energy mix. The funding for new research core material is made available through Shell, and university research teams are at present preparing proposals to identify the specific research interests and to plan the drilling logistics. The Council for Geoscience, the Geological Society of South Africa and the National Research Foundation support this research project and representatives of these institutions will participate in the project steering committee. For further information contact the scientific project manager Annette E. Götz, Rhodes University (a.gotz@ru.ac.za).

EXPRESSION OF INTEREST

35th International Geological Congress
27 August – 4 September 2016
Cape Town, South Africa

TITLE: .....

NAME: .....

SURNAME: .....

ORGANISATION: .....

.....

TEL.NO: .....

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Please indicate your interest / participation in (tick relevant box)

- ☐ Presenting
- ☐ Oral
- ☐ Poster
- ☐ Geohost programme
- ☐ Field trips
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Comments / recommendations / topics for the programme:

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Congress Delegate enquiries:

35IGC@allevents.co.za

barnardo@geoscience.org.za

Please complete this form and email to either of the above email addresses or fax to:

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book review:

The Kalahari Manganese Field.
The adventure continues....

The new Kalahari Manganese book reviewed by George Henry in the previous issue of Geobulletin can be obtained from:
ASSORE
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South Africa Tel: (+27)-(0)11-770-6901
Telefax: (+27)-(0)11-268-6457
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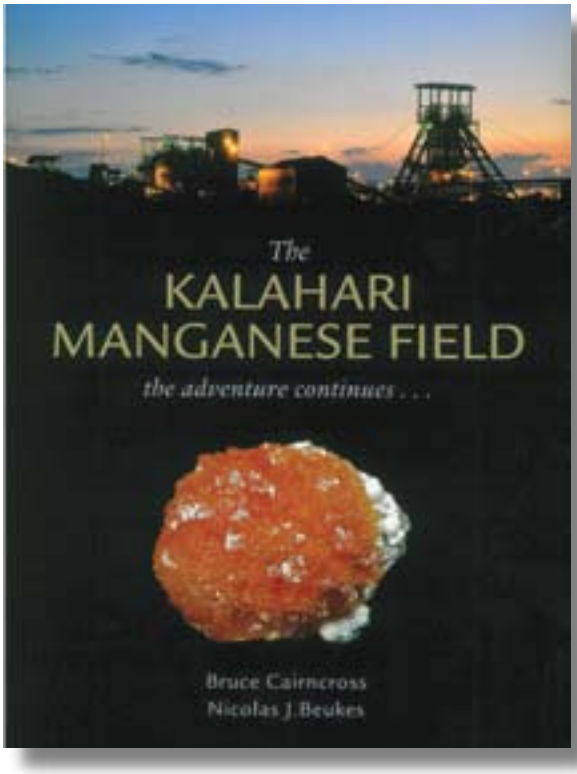
It costs R700.00 locally and US$85 for international orders. EFT payments, Master and Visa cards can be used.



obituaries

Andre Leeb - Du Toit – 1935 to 2013

Andre Leeb-Du Toit

Andre Leeb -Du Toit, former GSSA member, passed away in Cape Town on 7 October 2013. Born in Pretoria in 1935, Andre attended the University of Natal, where he graduated with a BSc Hons in Geology.

Andre joined Union Corporation in the late 50's and was initially based in Evander, where the company was rapidly expanding its gold mining activities with the opening of Bracken and Leslie Mines in 1959. He was one of the first geologists on Leslie Gold Mine.

In April 1967 Andre was transferred to Union Corporation Head Office in Marshalltown to serve his penance, as he put it, as "the Consulting Geologist's skivvy". Andre was intimately involved in collating and assessing the drill results coming in from the Rustenburg area and was summoned to a meeting between Ted Pavitt, Tom Stratten and Colin Anderson where the in principle decision was taken to proceed with the establishment of a fully integrated platinum mining and processing operation in Rustenburg. As he later put it "I was present when Impala was conceived".

In 1968 Andre was transferred to Rustenburg as the first Mine Geologist, replacing Bill Hill who had been intimately involved in most of the early exploration work. Ironically Bill was to replace Andre as Regional Chief Geologist for Impala some twelve years later. Initial mining operations were not that simple as the first Incline Shafts were located in a significantly potholed area. Bob Moubray, who headed up the

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Mines Geological Department in Springs, said Andre had 'potholes on the brain'.

Initial problems were soon overcome and over the next twelve years Andre presided over the most significant mining expansion in Union Corporation since the discovery and development of the Evander gold fields. Production grew from 100 000 oz Pt to close to 1million in this period.

Andre's first office was in the core shed on the mine and from there he oversaw all the exploration and mining expansion geology. He was well known for his brightly coloured, pull-apart wooden models, which he used to explain mining related geological features to young geologists and mining personnel alike. He developed a very plausible explanation for the formation of potholes, which certainly explained all the physical attributes of these features, even if it did not satisfy the academics! He authored the Impala Mine contribution to the 1986 Mineral Deposits of Southern Africa publication.

Andre's passion outside work was gliding. However, the mere flying side of the sport was insufficient to satisfy him so he decided to build his own glider. This took place in the newly constructed core shed on the mine and he was soon spending most of this leisure time, and much of the Company's time in the core shed. New geologists were encouraged to assist with the construction on thepromise of accompanying him on the maiden flight. All politely declined his kind offer!
In 1980 Andre was shocked out of his comfort zone by a major shakeup in the Geology Department. He was transferred to the Free State Office as Regional Chief Geologist. By all accounts his major problem was how to transport the half built glider and of course the added complication of where to house it whilst it was completed! The luxury of spare core storage facilities was not available as the exploration for Beisa and Beatrix mines was in full swing. His stay in Welkom was short lived and he was soon transferred to Evander where he remained until retirement in the early 90's.

Andre was a free spirit and non-conformist, a trait which often got him into hot water with the geological hierarchy in the Union Corporation/ Gencor Group. He always attempted to do things differently which did not go down too well in what was then a highly structured but well run department. His brushes with the Rustenburg Traffic Police were also legendary, not surprising since on more than one occasion he modified their speed measuring equipment.

Andre retired to Cape Town and remained actively involved in gliding circles. He contributed immeasurably to the publication of "Who the Hell Wants to be in Platinum" an illustrated history of Impala Platinum. I am personally indebted to him as he recruited me into the Union Corporation fold, initially as bursar and subsequently as an employee. I was privileged to work for him for two years as he gently guided me into the dark depths of mining geology.

Les Paton

With acknowledgement to Bert Brand, Karl Wulff, Peter Mellowship, Seef Vermaak and 'Who the Hell Wants to be in Platinum' by JK Bannon.

Bush's Route opening party at the summit - Keith Bush(left,) ND Harte (centre) and Andre Leeb-du Toit (right). Photo by Keith Bush.

media monitor

MINING AND EXPLORATION NEWS

Copper

Blackthorn Resources' Kitumba copper project in Zambia could support an 11-year operation producing an average of 39 000 t of copper metal per annum, according to the prefeasibility study. The development cost is estimated at US$358 million, and average cash costs at US$2.04 per pound copper. An underground mine targeting the high-grade core of the deposit was chosen as the preferred base case, as it has a lower capital cost and higher capital efficiency that a larger scale open pit mine. Blackthorn has begun work on project optimisation, and an updated study incorporating recent high-grade drilling results is expected in early 2014.

Australian company Regal Resources and Traxys Europe SA are acquiring a 60% interest in the Kalongwe high-grade copper-cobalt project in the DRC. The project area is some 15 km from Ivanhoe Mines' giant Kamoa copper deposit, and was previously held by Ivanhoe, who completed 12 000 m of drilling during 2006–2007. Significant historical intercepts include 90.2 m at 3.38% Cu and 0.93% Co, and 77.6 m at 4.14% Cu and 0.57% Co. Subject to a successful validation exercise, Regal and Traxys aim to conduct a resource delineation drilling programme over the next 12 months with the aim of establishing a JORC-compliant mineral resource.

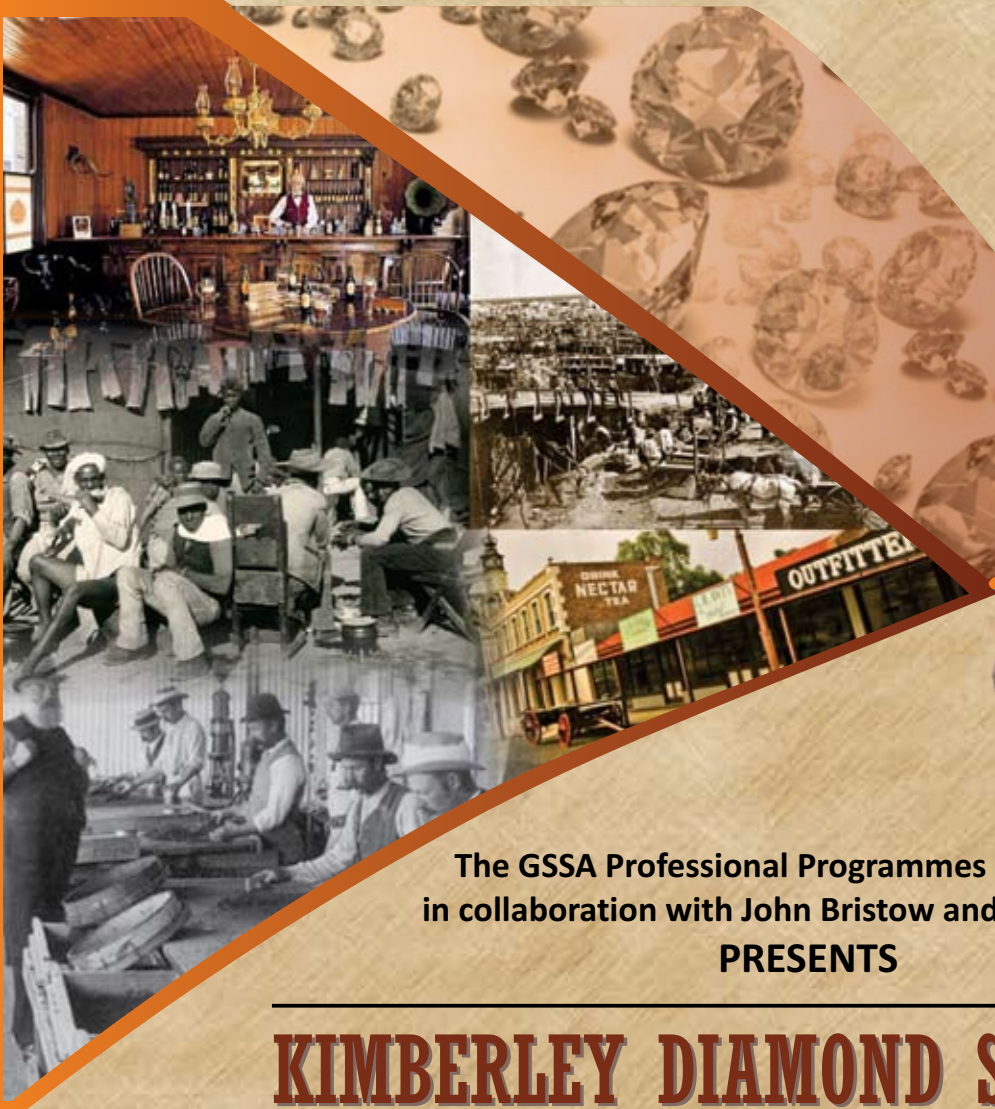
Diamonds

De Beers has begun construction of a new underground mine beneath its open pit Venetia mine in Limpopo Province, South Africa. The US$2 billion (R20 billion) investment will extend the life of Venetia beyond 2040 and replace the open pit as South Africa's largest diamond mine, treating approximately 130 Mt of ore containing an estimated 96 million carats. Underground production is expected to start in 2021.

Gold

Newmont Mining Corporation announced that its Akyem open-pit mine in Ghana has entered commercial operation. The US$950 million project is expected to produce an average of 350 000–450 000 ounces of gold per anum over the first five years of operation, at a total cost of $750 to $850 per ounce. Akyem has proven and probable gold reserves of 7.4 million ounces, and an estimated mine life of approximately sixteen years. Meanwhile, Iamgold and AngloGold Ashanti have suspended mining at the Yatela mine in Mali, although processing of the heap leach pads and ore already mined will continue until the end of 2016. The first gold was produced from Yatela in 2001, and the initial planned life of mine was six years. However, the discovery of additional resources within the permit area extended the life of the mine and led to the closure date being deferred several times.

Randgold Resources and AngloGold Ashanti have begun production at the Kibali project in the eastern DRC. Randgold is developing and operating the mine, which with a projected annual production of some 600 000 ounces of gold, reserves of 11 million ounces, and resources of 21 million ounces will rank as one of the largest of its kind in Africa. The mine is being developed in two concurrent phases at an estimated initial cost of US$1.7 billion, starting as an open pit operation, with the underground mine, already well advanced and scheduled to access ore in 2015. Kibali will also commission four hydropower facilities during the two phases to allow the mine to access low-cost energy from the abundant hydropower potential in the DRC.



GSSA
Geological Society **of South Africa**

The GSSA Professional Programmes Committee
in collaboration with John Bristow and Mike De Wit
PRESENTS

KIMBERLEY DIAMOND SYMPOSIUM
& Trade Show

Thursday 11th, Friday 12th, and Saturday 13th September 2014

Mittah Seperepere Convention Centre, The Big Hole, Kimberley, Northern Cape

ABOUT THE SYMPOSIUM

SECRETARIAT

www.gssa.org.za

Australian company Auroch Minerals added 18 km of prospective ground to of its Manica gold project in Mozambique's Odizi-Mutare-Manica greenstone belt through a joint venture agreement with Baobab Resources. The company can earn up to 80% interest in the area, which is thought to overlie the continuation of the shear zone hosting the mineralisation at Manica, by spending A$1.5 million over four years. Auroch recently completed a positive scoping sturdy for a 40 000 ounce per annum project at Manica, and is moving to a definitive feasibility study.

Sibanye Gold, which was formed early in 2013 through the unbundling of Gold Fields' South African operations, has agreed to acquire Gold One International's West Rand operations (Cooke operations). The transaction will add an average of 260 000 ounces of gold and 570 000 pounds of uranium per annum from the shallow Cooke operations to Sibanye's production profile, and also consolidate Sibanye and Gold One's existing and historical West Rand tailings deposits into a single low-risk reclamation project capable of producing 300 000 ounces of gold per annum with uranium as a co-product.

Iron ore

Tianjin Materials and Equipment Group plans to invest US$990 million for a 16.5% interest in African Minerals' flagship Tonkolili project in Sierra Leone. The transaction will be accompanied by a 20-year offtake agreement. Tianjin is the largest import and export enterprise in China, and is also the country's largest iron ore trader, with 33 Mt traded in 2011. Tonkolili has a current capacity of 20 Mt/a of direct shipping ore, and the next stage of the project expansion, due to come on stream in 2016, contemplates the production of up to 35 Mt/a of high-grade hematite concentrate.

Platinum group elements

Ivanhoe Mines (formerly Ivanplats) is sinking a bulk sample shaft to access the Flatreef discovery at its Platreef project on the northern limb of the Bushveld Complex. Site preparation will begin in the fourth quarter of 2013, with collection of the bulk sample in the second half of 2015. The 800 m deep, 7.25 m diameter vertical shaft is expected to cost US$80 million (R818 million). Separately, Ivanhoe announced an unprecedented intersection of 4.51 g/t 4E over 90 m – roughly the height of a 30-storey building – in a borehole collared about 360 m south of the location of the bulk-sample shaft. In comparison, the grade shells used to constrain mineralisation in the Flatreef indicated resource area have average true thicknesses of approximately 24 m, with an equivalent average resource grade of 4.1 g/t 4E.

Platinum Group Metals Ltd announced an updated independent Inferred resource estimate for the Waterberg Joint Venture, on the northern limb of the Bushveld Complex, of 167 Mt grading 3.26 g/t 3E (platinum, palladium, and gold) for a total of 17.5 million ounces. Initial drilling on a newly granted prospecting right immediately to the north of the known mineralisation has added 4.7 km to the confirmed 'F zone' mineralised layer, and a step-out hole 17 km to the north of the Waterberg deposit intersected Bushveld Complex geology at a depth of 285 m under sedimentary rock cover.

Rare Earths

Great Western Minerals Group has more than doubled the in-situ Indicated resources at its Steenkampskraal rare earth project in South Africa's Western Cape Province to 67 kt of total rare-earth oxides (474 kt at 14.12%). In addition, the company declared a maiden Measured resource of 16.6 kt TREO at a grade of 19.54%. The updated resources are based on 27 900 m of surface core drilling as well as underground channel sampling within the historic mine workings.

Uranium

Canadian company Karoo Exploration Corp. has agreed to acquire the Chirundu, Kariba Valley, and North Luangwa Valley projects in Zambia from African

Energy Resources for US$2.5 million in cash an shares. African Energy said that the sale would allow it to focus on the development of the Sese coal and power project in Botswana.

Deep Yellow Ltd has identified fifteen alaskite-type targets, six of which are high-priority, in a prospectivity analysis of its Namibian tenements. In the analysis, three layers – proximity to dome structures, proximity to marble, and occurrence in remnantly magnetized domains – were used to score and then rank prospectivity. This is the first time that these specific layers have been combined into one map to identify alaskite targets in Namibia. In a paper published in the African Journal of Earth Sciences (April 2013), the company presented evidence of a strong spatial relationship between uraniferous leucogranite and iron sulphide-rich schist, with significant mineralisation where the schist is thickest, such as in fold hinges and where it has been infiltrated by large accumulations of leucogranite against a thick marble barrier, which led to ponding and increased fluid–wallrock interaction. In this situation, the schist with high quantities of ferrous iron and reduced sulphides acted as a chemical trap for uranium transported in magmatic fluids. The partly stratabound yet highly irregular and pod-like nature of the orebodies is thought to result from the folded boudinage structure of the schist prior to leucogranite emplacement.

OTHER GEOSCIENCE NEWS

Rocks from the Mesoarchaean Pongola Supergroup in South Africa have provided evidence of appreciable levels of oxygen in the Earth's atmosphere more than 600 Ma before the Great Oxidation Event of around 2.3 Ga, raising new questions about the evolution of early life. The research is reported in the 26 September issue of Nature (doi:10.1038/nature12426). A group of Danish, South African, German, and Canadian geoscientists examined the distribution of chromium isotopes and redox-sensitive metals in the approximately 3-billion-year-old Nsuze palaeosol and in the near-contemporaneous Ijzermyn iron formation, and found extensive mobilization of redox-sensitive elements through oxidative weathering. Oxidation of Cr(III) to Cr(VI) enriches the resulting Cr(VI) in the heavy ^{53}Cr isotope, leaving soils depleted in ^{53}Cr when the soluble Cr(VI) removed by run-off. The heavy Cr(VI) is ultimately transported to the oceans, where it can be captured in chemical sediments, such as iron formations, if the supply of mobile ^{53}Cr-enriched Cr(VI) is large enough to alter the Cr isotope composition of seawater. The data was used to compute a best minimum estimate for atmospheric oxygen concentrations at that time of 3×10^{-4} times present levels, which requires oxidative weathering over broad areas of the continents and greatly exceeds the levels possible by photochemical means alone. The researchers suggest that oxygen production through oxygenic photosynthesis could be responsible for the geochemical signals observed, which would imply that cyanobacteria may have evolved by this time.

Anthony Cowey

International Conference coming to South Africa!

Experience mineralogy at its best in South Africa at IMA 2014

SOUTH AFRICA

ima 2014

DELVING DEEPER

MINERALS AS MINES OF INFORMATION

21st General Meeting of the International Mineralogical Association

1 - 5 September 2014

Sandton Convention Centre, Gauteng, South Africa

Hosted by:

MINSA Mineralogical Association of South Africa

GSSA Geological Society of South Africa

We are very pleased to invite you to attend the 21st General Meeting of the International Mineralogical Association, which will take place at the Sandton Convention Centre, Johannesburg, from 1 to 5 September 2014.

Following our first call, the IMA2014 scientific programme committee invites detailed proposals for sessions, workshops and short courses in putting together the scientific programme for the conference. The sessions/ workshops/short courses will be grouped into broader conference themes, a number of which are suggested here. Please note that the deadline for detailed proposal submissions is 30 June 2013, and submissions can be made on-line via the conference website www.ima2014.co.za.

Topics that will be covered include:

- Applied Mineralogy, materials science
- Clay science
- Cultural heritage
- Deep earth
- Economic geology/mineralogy
- Environmental mineralogy/geochemistry, biomineralogy, health
- General and specific mineralogy
- Geochemistry and Petrology
- Methods and applications
- Mineralogical crystallography
- Historical mineralogy and mineral museums
- Planetary mineralogy
- Thermodynamics, kinetics and mineral physics
- Education and open sessions
- Forensic mineralogy

For more information visit: www.ima2014.co.za

or contact Carolyn Ackermann, CMP - Email: info@ima2014.co.za • Tel: +27 11 463 5085

THE GEOTRAVELLER

By Dr Luke Longridge

Zwartkop - a classic Johannesburg geosite

The prominent hill known as Zwartkop, situated in Muldersdrift (northwest of Johannesburg) is a classic locality showing the stratigraphy of the lower Witwatersrand, Archaean greenstone remnants and evidence of intense folding and thrusting. This site has an auspicious history of over 100 years of geological work, and has been used in the past as a teaching site for many young geologists.

History of Geological Work

A review of the early work on Zwartkop brings up the names of a number of prominent South African geologists. Dr Draper, the founder of the GSSA, published the earliest reference to the rocks of Zwartkop, describing them as a 'hill of Witwatersrand Beds'. However, in 1906 the rocks of Zwartkop were described by Hall and Humphrey as part of the 'Swaziland Series', and they believed the granites of the Johannesburg Dome were intrusive into the sedimentary rocks at Zwartkop, and that they thus could not be correlated with the Witwatersrand Series. This controversy was settled in 1908 by Corstorphine and Jorissen, who described the rocks at Zwartkop systematically, and demonstrated their correlation with the lower Witwatersrand Supergroup. In the century since then, little work has been carried out for such a well-exposed and accessible area. A 1961 MSc thesis by L.P. Hendriks described the structural geology at Zwartkop, and the surrounding area. He noted the intense folding and thrusting of the Witwatersrand rocks, and interpreted the hill as a large syncline, and is shown as such on both the 1:50 000 and 1:250 000 maps of the area. The structural geology was reinvestigated again in 1983 by Chris Roering, who provided the most detailed description of the rocks at Zwartkop, as well as a 1:10 000 scale map of the hill (Figure 1). As far as I'm aware, nothing has been published on these rocks since then.

The Geology at Zwartkop

According to Roering (1983), the rocks at Zwartkop consist of sediments of the West Rand Group with stratigraphic thicknesses that are significantly less than is typical for these rocks. This thinning is accounted for by a system of thrust faults, with vergence towards the north (Figure 2). The hill at Zwartkop is thus interpreted by Roering as a nappe stack. Studies of the surrounding area show that this deformation does not appear to affect the Transvaal Supergroup, but has affected the Vendersdorp Supergroup. Recently a group of us decided to visit Zwartkop for a Sunday hike and an examination of into the geology of the southern portion of the hill (south of the Crocodile River). This area can easily be accessed from Glenburn Lodge where, armed with orthophotos and a copy of Roering's map, we explored the geology along a number of trails up and around the hill.

The view of the eastern face of the hill from the lodge is

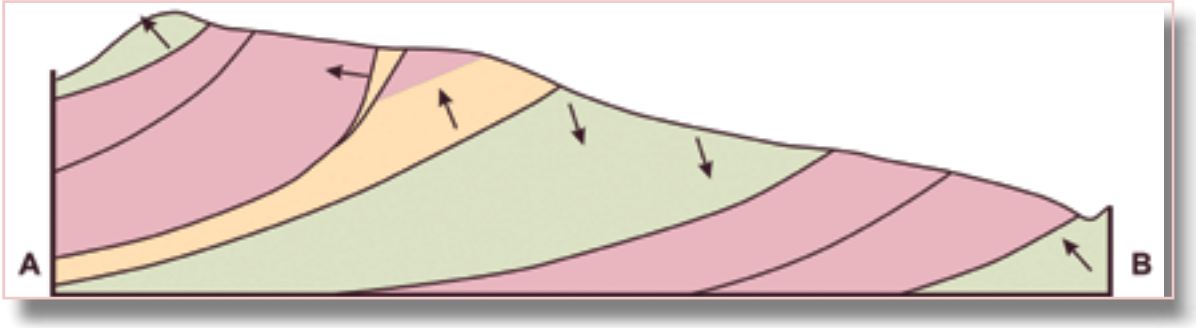


Figure 2 – Cross-section A-B (Figure 1), redrawn from Roering (1983).

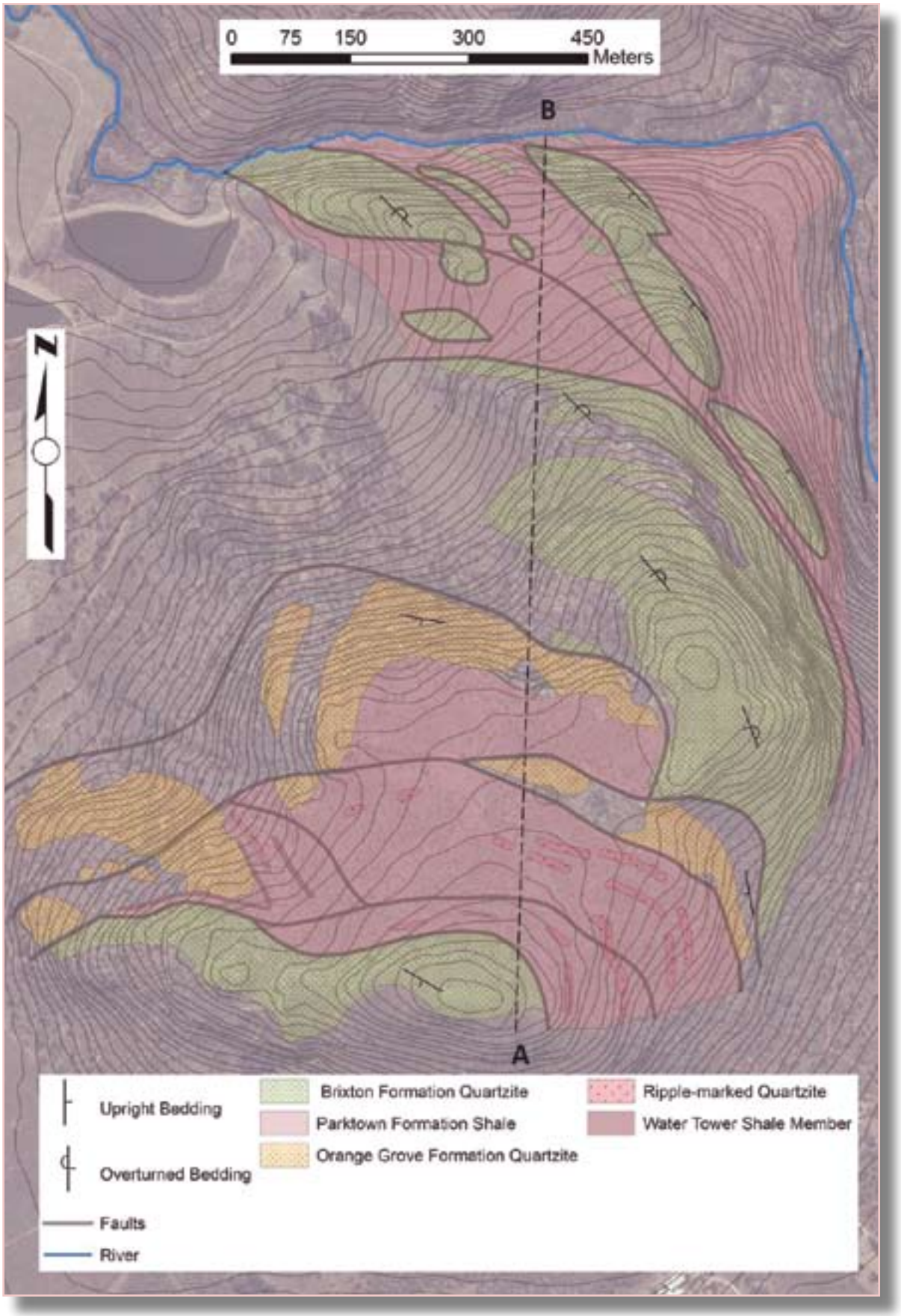


Figure 1 – Geological map of Zwarkop hill (after Roering, 1983). This map only shows the portion south of the Crocodile River. Section line A-B is shown is Figure 2.

Figure 3 – View looking west from the beginning of the trail, showing tectonic lenses of quartzite on the eastern face of the hill.

striking (Figure 3), and the lenses of quartzite exposed on this hill immediately give clues as to the intense deformation experienced by the rocks in this area. The trail starts adjacent to a weir on the Crocodile River, and follows the river upstream. At the start of the trail, one walks over Archaean greenstone terrain, where a vertical fabric is evident. There was some discussion amongst the group as to whether the fabric was tectonic versus original bedding (Figure 4). Shortly after this, the 'bedding' in the mafic rocks is obliterated by an obvious shear fabric. This fabric dips shallowly to the south-west, and any traces of bedding are obliterated – this zone of schist represents the basal thrust of the Zwartkop nappe. Mineral lineations are even visible on some of the shear-planes (Figure 5).

After a few hundred metres of walking, the trail swings to the west, up the hill and away from the river. The lower portions of the hill are underlain by the dark red-brown shales of the Parktown Formation, which are poorly

Figure 4 – Archaean greenstones with a vertical fabric along the Crocodile River.

Figure 5 – Schist in mafic rocks at the base of the Zwartkop nappe. Note the fine lineations on the shear plane

exposed. On the eastern side of the river, quartzite is visible – this is shown on Roering's map as the Orange Grove Formation.

As one moves further up the hill, another quartzite unit is found. This is recognisable by its distinct greenish hue as the Brixton Formation. This green colouring is the result of fuchsite (Cr-bearing mica) within the quartzite, and is one of the features used by Corstorphine and Jorissen (1908) to identify the rocks at Zwartkop as those of the lower Witwatersrand.

A zone of tectonic breccia is found within this quartzite unit, and some breccia clasts still show the original cross-bedding of the formation (Figure 6). Evidence of a shear fabric is also visible in this quartzite. As one moves up the hill, cross-bedding in the quartzites provides evidence for whether the units are upright or overturned. This entire section of Brixton Formation quartzite is shown by Roering to be overturned (Figure 2), and whilst we

Figure 6 – Tectonic breccia in Brixton Formation quartzite. Note the clast with cross-beds (indicated by arrow).

Figure 7 – Overturned cross-bedding in Brixton Formation quartzite.

did indeed find some spectacular examples of overturned bedding (Figure 7), we also found that there are places where the quartzites are clearly upright. This indicates that there may be intense folding of the rocks within some of the tectonic nappes, something not described by previous workers. Indeed, later on we found a tight fold in quartzites near the top of the hill (Figure 8). Whilst a morning walk is insufficient to remap and reinterpret the entire hill, there is definitely a case for some more detailed work on the geology of this area. The work of Roering (1983) suggested significant shortening in the rocks at Zwartkop, more than is often accepted for the Witwatersrand, which he suggested could be related to a major period of crustal shortening in pre-Transvaal times.

A Potential Geosite?

Apart from the fantastic structural geology, numerous other interesting geological features are apparent, including pseudotachylite (from faulting, not meteorite impact), herring-bone cross-bedding, en-echelon quartz veining, foliation boudinage and flattening of conglomerate pebbles. The ease of access and beautiful setting of the hill could make this an excellent site for promoting geoscience and highlighting the geology of the Johannesburg area. Some diggings in the iron formations of the Contorted Bed were also seen at the top of the hill, where some of this rock appears to have been smelted for iron. I'm not sure whether this hill is also an archaeological site, but if so this would add further to its appeal as a geosite.

Its position close to Johannesburg and ease of access could make this another great addition to the geo-tourism in the area, which includes sites like the Cradle of Humankind, Blaauwbank Gold Mine, and the Magaliesberg Cableway. Our day-trip only investigated the southern portion of the hill (on the property of Glenburn Lodge) but the northern extension across the Crocodile River is accessible on the property of Aloe Ridge Hotel and Game Reserve.

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Figure 8 – Anika Solanki indicating a fold in quartzites near the top of the hill.

Cappadocia

No. 2

THE GEOTRAVELLER

By Roger Scoon

THE CAPPADOCIA WORLD HERITAGE SITE, TURKEY: *Active Erosion of Volcanic Landscapes and Ancient Civilizations*

The Cappadocia area of central Turkey is a land of vast plains with rolling hills and rugged volcanic peaks, the highest of which is the snow-capped Mount Erciyes (3916 m). The area is covered by flat-lying volcaniclastics, lavas, and to a lesser extent lacustrine sediments. Erosion has scoured deep valleys and gorges in the plains producing areas of spectacular "badlands", mostly due to differential erosion of the hard lavas and relatively soft volcanic ash and pumice. Ancient communities took advantage of the ease by which the ash and pumice can be excavated to create the greatest number of rock dwellings known in the World. These include private dwellings, monasteries and churches, as well as dozens of underground towns.

The Cappadocia area occurs in the centre of the Anatolia microplate (map reproduced from Sorkhabi, 2011).

View of Mount Erciyes looking over the town of Göreme.

Cappadocia (pronounced Kapadokia), declared a UNESCO World Heritage site in 1985, is visited by some 2.5 million tourists every year, mostly during the summer months. The number of winter visitors is also steadily increasing as the appeal of this remarkable area (which includes skiing on volcanoes) increases. The average elevation of approximately 1200 m results in a semi-arid, continental-style climate with hot dry summers and cold snowy winters. The area is served by an international airport at the city of Kayseri and numerous high quality roads. The small town of Göreme, which is centrally situated and occurs in a National Park of the same name, is the main tourist centre and includes numerous hotels, many with rooms excavated from the volcanic ash and pumice. October is one of the best months to visit as days

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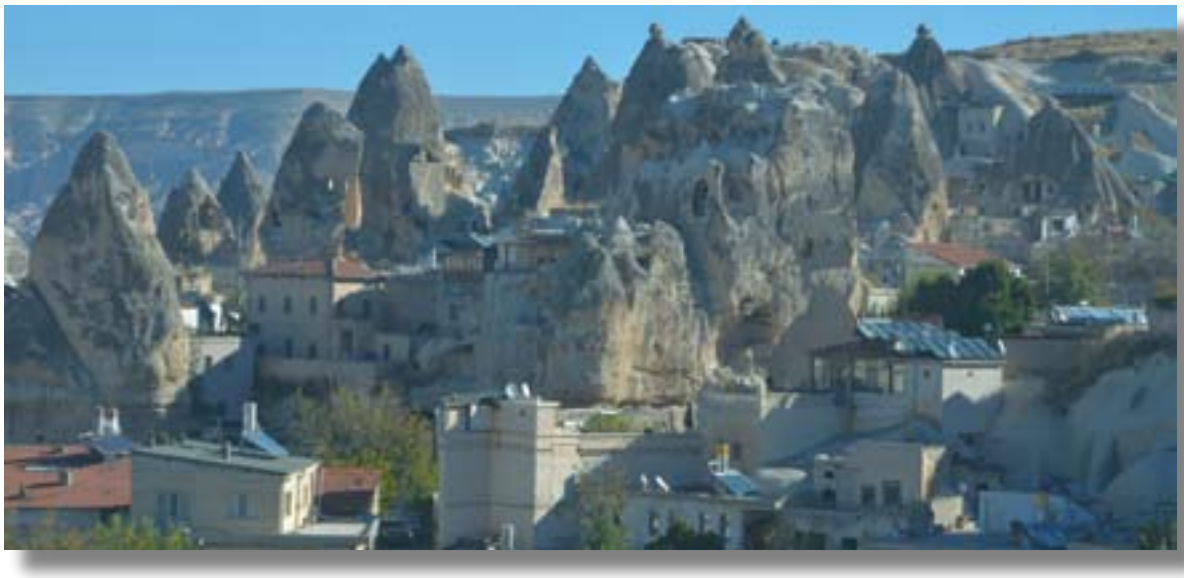

A mix of ancient and modern structures carved out of volcanic ash and pumice dominate the town of Göreme.

are typically sunny and chilly nights are reminiscent of a Highveld winter. The area covers some 32,500 square km and includes five modern towns, in addition to the archaeological sites.

The geological framework of Turkey is dominated by the Anatolian microplate which is enveloped by several active orogenic belts. Subduction of the Tethys Ocean during the Eocene was followed by continental collision - convergence of the Arabian, African, and Eurasian plates commenced during the Miocene - and formation of fold belts. The latter include the Alpine and Taurus Mountains. A regime of extensional tectonics, which is persistent today, dominates the central part of the block due to fault movements along sedimentary basins. Subduction of the African plate continues in the eastern Mediterranean. The complex tectonic setting of the Anatolian block is manifested by extensive volcanism and major earthquake activity, although the central part, including Cappadocia is far more stable than distal areas. The paucity of earthquakes has preserved the unstable features resulting from erosion, as well as the archaeological sites.

Typical view of the landscape of Cappadocia showing the flat-lying strata in elongate ridges and badlands erosion of the valleys. The differing colours of yellow and pink reflect changes in the iron oxide content of the ash and pumice.

A cluster of nine major stratovolcanoes of Miocene and Pliocene age occur in the Cappadocia area. The largest of these is Mount Erciyes which has been investigated by Şen and colleagues (2003). Erciyes erupted during Pliocene and Quaternary times. Two cycles have been recognized. These comprise basaltic and andesitic flows erupted from cinder cones as well as pyroclastics associated with catastrophic caldera collapse events. Plinian ash-fall deposits associated with the latter occur more than 50 km from the source area. The youngest Plinian events are dated at 2.8 Ma. Historical events were witnessed by Roman leaders and poets including Strabo (63BC-21AD) and Claudius Claudianus (370-410 AD). The volcano is considered to be dormant and the greatest threat to the city of Kayseri is probably heating of an ice mass which dates back to the Pleistocene glaciations.

Extrusion of huge volumes of magma and pumice from the stratovolcanoes has subsumed much of the Cappadocia landscape, producing extensive plateaus. Volcanism persisted intermittently from the Mid-Miocene through to the Quaternary. It was superimposed upon sedimentary basins of Cretaceous or early Cenozoic age. The origin and style of volcanism has been much debated. Şen and colleagues suggested it is calc-alkaline and related to melting of ocean floor subducted during collision of the macro-plates. The Cappadocia area reveals several major strike-slip and extensional faults. Two major fault systems have been identified, one bounds the volcanic province and a second group occurs parallel to the axis.

According to Sorkhabi (2010), nineteen eruptive centres (up to 40 km in diameter) can be recognized in the Cappadocia area. They are generally located close to fault systems. Most are stratovolcanoes composed of basaltic

The so-called "fairy chimneys" pictured here occur at Paşabağlari (Monks Valley), near Göreme. The poorly consolidated light grey rock is ash and pumice. The more resistant caps to the columns are basaltic lava. Some of the larger structures were carved out to form living chambers.

and andesitic lavas and ash layers. Many report large cinder cones, typically on the flanks. The most extensive lithologies are the lavas, volcaniclastic, and epiclastic members of the Ürgüp Formation. These are exposed in both the basin of the same name and the enclosing plateau. This formation developed during the Upper Miocene through Lower Pliocene. It has been researched in great detail by Viereck-Goette and colleagues (2010). The volcaniclastics include ignimbrites of rhyolitic composition and poorly consolidated air-fall ash and pumice layers. The latter are ascribed to Plinian-style eruptions. Epiclastics are dominated by lahars in the south of the region and carbonates in the north. These authors proposed some new field correlations and identified two previously unrecognized Plinian lapilli beds that constitute marker layers in areas where the ignimbrites did not reach. Correlation of the different volcanics with specific volcanic centres is still ongoing. Numerous Quaternary-age lakes have also been identified, as well as a number of maars within the largest volcanic centres.

Differential erosion of the lavas and volcaniclastics has produced spectacular features that include buttes, pinnacles (known as "fairy chimneys": they attain heights of up to 40 m), cones, and mushroom-shaped stacks. The so-called fairy chimneys are columns of relatively soft ash and pumice capped by more resistant layers of basalt or ignimbrite. Erosion is aided by a dry climate and poorly consolidated nature of the volcanic ash, but most of the larger valleys, and by inference areas where the spectacular landscapes occur, are probably related to catastrophic flood events triggered by seismic activity associated with major fault systems. In the main tourist areas a relatively simplistic sequence of rocks is preserved. The plateau is comprised of resistant basaltic lavas. These are underlain by thick sequences of volcanic ash and pumice. Some of these rocks are intercalated with basaltic or ignimbritic layers. The deeper valleys, including the gorge of the Ihlara River have cut down into a thick sequence of ignimbites. The ridges and hill slopes typically reveal intercalated sequences of basalt, volcanic ash-pumice, and ignimbrite, with the more resistant rocks forming caps, similar to the role of dolerite sills in the Karoo.

Human settlement in Cappadocia dates back to Neolithic times, possibly as long as 8,000 BC. This may in part be due to the occurrence of extensive deposits of obsidian (numerous obsidian tools have been collected). Obsidian is exploited today from underground workings where

A large outcrop of ignimbite known as the Üchisar castle is a prominent landmark and tourist attraction. The castle was probably first constructed by the Hittites but was subsequently used by the Romans and other civilizations.

THE GEOTRAVELLER

small pockets of metre-sized, or even larger, lumps are derived. Onyx is also extensively quarried and used to produce dimension stones, floor tiles, and other objects. The extensive kingdom of the Hittites ruled the area from 1800-1200 BC. Erciyes was one of their mountain gods and a 13th century BC Hittite rock carving depicting a storm god above three mountain gods is one of the most spectacular sites in the area. A man-made tunnel near the summit of Erciyes might have been used for worship. It has also been suggested that a link exists between the Greek legend of Typhon and Zeus and the volcanoes of Cappadocia. According to this legend, Typhon was an enormous monster with dragon heads, coiled serpents for legs and arms, and a mouth emitting flaming rocks. A Hittite bas-relief from Malatya dating from 1000 BC portrays the weather god (Zeus?) slaying a coiled serpent. Flames and volcanic bombs issue from the serpent's body, which might symbolize volcanoes.

The Kizilirmak River, the longest river in Turkey, cuts through the Cappadocia area. The name arises from the erosion of the red volcanic soil. This river had great historical importance, and was given different names by the various rulers. Subsequent invasions by empires including the Persians, the Greeks under Alexander the Great, and the Romans all left their mark. Most of the archaeological and historical sites are related to the more recent Byzantine Empire when the area became a refuge for early Christians, especially during from 4th through to the 11th centuries. Christianity flourished in Cappadocia

The characteristic pale grey ash and pumice may contain abundant lithic fragments, indicative of Plinian-style eruptions similar to those preserved on the island of Santorini.

where remnants of many churches in volcanic caves can be seen today. In the 12th century, the Muslim Turks invaded and took over Anatolia and again reshaped the history of the area. Cappadocia was also part of the ancient Silk Road from China to Europe and this is reflected in local cultural activities, including making of world-class ceramics and the use of silk in manufacture of some carpets.

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Steep cliffs of ignimbrite dominate the 14 km Ihlara Gorge. This nature walk includes natural scenes of a quiescent river in a wooded setting with numerous structures carved out of the rock cliffs.

Ignimbrite from the Ihlara Gorge.

The underground town of Yeralti Şehri, carved out from the volcanic ash and pumice, includes numerous rooms and tunnels that extend over 8 levels to a depth of 85 m.

Tepe ignimbrite (Central Anatolia, Turkey. ***Journal of volcanology and geothermal research 125, 225-246.***

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Photographs by the author from a visit in October 2013.

Early morning balloon flights are an exciting way of viewing the eroded landscapes of Cappadocia.

THE GEOTRAVELLER

Task Group on Global Geoscience Professionalism

26 November, 2013. For immediate release

INFORMATION RELEASE

International Union of Geological Science's Task Group on Global Geoscience Professionalism

BRUSSELS - The Member Organizations of th e International Union of Geological Science's new Task Group on Global Geoscience Professionalism (TG-GGP) are pleased to report on its recent progress and to announce the launch of its website at www.tg-ggp.org , as a service to geoscientists and the geoscience profession. The TG -GGP will continue to expand this website to add to its value to the profession , globally .

Geoscientists are relied upon to directly serve the public by providing expert services and opinions on which others rely for key decision -making. As a consequence geoscience is a now a recognized profession as well as the scientific discipline it has always been.

Formed by the IUGS at the 34th International Geological Congress in Brisbane, Australia, in Au gust 2012, the Task Group on Global Geoscience Professionalism ("TG -GGP") recogni ses this transformation and provides a single global forum for interchange on professional affairs in geoscience worldwide.

The Task Group has been set up by a group of national and international professional geoscience organisations from around the world , representatives of which have formed an executive committee.

- European Federation of Geologists
- Geoscientists Canada
- American Institute of Professional Geologists
- Australia n Institute of Geoscientists
- Colegio de Geólogos de Bolivia
- Geological Society of South Africa
- South African Council for the Natural Scientific Professions

The TG-GGP is keen to broaden its network to include other national and international professional geoscience organisations with an interest in participating, especially where new members would broaden its coverage beyond the countries and continents already represented . TG-GGP has already established collaborative links with a number of international organisations with interests relevant to the promotion, regulation and support of professionalism in geoscience (*e.g.* CRIRSCO, YES,[1]). The involvement of other such organisations would be welcomed .

[1] Currently: Committee for Mineral Reserves International Reporting Standards, CRIRSCO (www.crirsco.com); African Association of Women in Geosciences, AAWG (www.aawg.org); Young Earth Scientists Network, YES Network (www.networkyes.org); International Association for Promoting Geoethics, IAPG (www.iapg.geoethics.org); International Association for Geoethics, IAGETH (http://www.icog.es/iageth/)

As a Task Group of the IUGS, TG-GGP offers benefits to society and serves the global geoscience community by facilitating collaboration on professionalism in geoscience at local, national, and international levels by facilitating a more 'joined up' geoscience community through:

- Offering a venue for knowledge transfer;
- Providing information on work permitting, registration and/or licensure requirements for geoscientists in different countries to assist those wishing to work in other jurisdictions;
- Linking geoscientists in all areas of professional practice and at all stages of their careers with sources for practical guidance and support on professional matters;
- Sponsoring symposia and technical sessions to allow exchange and dialogue on professionalism in Earth Science; and
- Acting as a resource to members of the IUGS, and others, of material and speakers to present to geoscientist groups – in particular young Earth scientists – around the world on professional practice matters.

In speaking about the new Task Group and recent accomplishments including the launch of this website, Ruth Allington, Chair of TG-GGP and immediate Past President of The European Federation of Geologists, remarked: "The collaboration that this new Task Group is already achieving is very exciting and timely indeed for geoscience. We aim to develop an agenda for supporting the global geoscience community informed by addressing the following key questions:

1. Without understanding the skills and expertise needed by 'industry', how can educators in geoscience subjects prepare students for the workplace?
2. Without understanding societal needs, how can researchers design research which is truly relevant to those needs?
3. Without access to high quality graduates and excellent underpinning research, how can geoscientists in 'industry' deliver their expertise effectively? "

With 121 national members, the International Union of Geological Sciences(IUGS) (www.iugs.org) aims to promote development of the Earth sciences through the support of broad-based scientific studies relevant to the entire Earth system; to apply the results of these and other studies to preserving Earth's natural environment, using all natural resources wisely and improving the prosperity of nations and the quality of human life; and to strengthen public awareness of geology and advance geological education in the widest sense.

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