

geobulletin

QUARTERLY NEWS BULLETIN ~ DECEMBER 2022

VOLUME 65 NO. 4

Equality in geological training
Geological Hot Pot
Layers of minerals
GSSA Sponsorship opportunities

news

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Front cover photo:

"A waterfall in Rustenburg" by Shaylan Chetty
Third place winner in the Geoheritage Photo Competition at the Geoheritage Conference 2022.



GSSA

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guest editorial

How can we ensure that everyone enjoys their geological field training?



Robyn Pickering



Rivoningo Khosa



Sinelethu Hashibi



Rosalie Tostevin

For many, field work is the highlight of their geological training. An opportunity to visit some of South Africa's most spectacular sites, enjoy nature, encounter some world-class geology, and finally put all that theory into practice. But the most memorable part for many is sitting around the braai in evenings. Field trips are where classes bond and become friends for life. However, some students have a very different experience, with field work being an uncomfortable, isolating and even dangerous place.

A myriad of problems

Field work has long been a problematic space for women in Geology. The combination of remote locations, uneven power dynamic between staff and students, socially acceptable drinking, often to excess, and a sense that 'what happens in the field, stays in the field' all combine into a toxic and often dangerous space. A space that is crucial to undergraduate geological training but is simultaneously off-putting and unpleasant for women, and indeed most participants from 'historically excluded groups' (basically everyone else other than white men).¹

A 2014 study by Clancy et al.,² based on a survey of 666 participants in human evolution field work worldwide, brought hard cold numbers to what had previously been anecdotal: 60% of their respondents had personally experienced sexual harassment at a field site. Over 20% of respondents reported they had been victims of sexual assault. Women trainees were the primary

targets, and their perpetrators were usually senior to them.

This is happening here in South Africa too. Perhaps you haven't heard about or witnessed any such behaviour yourself? There is a culture of silence around this topic, but when women are given a safe space to share their stories they are, sadly, widespread. We ran an annual sexual harassment workshop for women in Archaeology and Geology at UCT, and almost every student and staff member has a story to share about experiences of inappropriate behaviour, harassment, or assault during their time in academia. And what do our students have to look forward to after graduation? Often a career in the mining industry, where they face continued sexism and harassment.³ While these experiences are common, they are not acceptable, and radical and urgent change is needed if we are to retain talented women in geology.

A hostile obstacle course

The dominance of a single demographic (white men) in Geology, as well as the prevalence of sexism and racism in the geosciences, are a global issue.⁴ As *The New York Times* put it recently, 'Earth science has a whiteness problem'. Women are underrepresented in academic positions, especially senior ones, and black women are almost entirely absent. This is a problem.

South Africa is no different. A quick look at the home page of our various academic geology departments will show you how over-represented men, and particularly white men, are in South Africa. In stark contrast, our student bodies are diverse and mirror the demographics of South Africa. So, what is happening to the young black women who make up half, or even more, of most of our undergraduate classes?

This attrition has been described as a ‘leaky pipeline’ and the solution has long been to pour more water into the pipeline, i.e., recruit more black women, promote geology at school, etc. But in a recent *Nature Geoscience* piece, Berhe et al.¹ argue that the term ‘hostile obstacle course’ is a more accurate and compelling metaphor to explain the lack of diversity in academic geology worldwide. Women are already interested in geology, and they are good at it. But they are forced away by the additional hurdles they are forced to navigate compared to their male colleagues.

Imagine being forced to navigate field work with a lecturer you fear may sexually assault you. Travelling together to a remote region, staying in shared accommodation, being forced to socialise with them in the evening over dinner and while they drink. Imagine weighing your own safety against your education. Imagine the strength and energy it would take to report and challenge this person, knowing that institutions have a long history of protecting powerful men at the expense of women, people of colour and students. It is exhausting.

On top of this, women also must navigate field work while menstruating, while pregnant, or while nursing and pumping. There is often a macho culture in the field around avoiding regular bathroom stops if you are a “real geologist”, but these can be essential for women’s health. Raising these issues with all-male field trip leaders is daunting, particularly for students. In addition, respect in the field is often won with soft skills, such as changing tyres, starting braais, and fixing equipment, but women are rarely given an opportunity to develop, practice or demonstrate these skills.

But what can we, as a community, really do?

Towards solutions and change

In South Africa we are almost uniquely placed to tackle the lack of representation in geology, given our high-quality universities and diverse

classrooms. Doing this demands that those in power take the lead—it is unfair, and indeed unrealistic, to expect those with the least power to bring about change. Massive, discipline-wide change can feel overwhelming, but doing nothing and maintaining the *status quo*, means we stay as part of the problem. We offer three examples of what bringing change can look like.

First of all, we can reassure young women that we see the problem. For example, we invited [Dr Asanda Benya](#) to give a department seminar on her research into sexism in the mining industry. The stories she shared were difficult to hear but starting these conversations can help people feel comfortable sharing their own stories or concerns.

Secondly, those of us in leadership roles can make practical changes to student field trips. At UCT we run a three-day residential field training course for our first-year undergraduates. This trip has the potential to make or break future geologists—a good experience can influence their decision to major in geology.⁵ We introduced three major interventions:

1. We modified the field guide to include precise locations and timings for all coach journeys and stops, as students commonly report feeling a lack of control on field trips, which can be disorientating, particularly for students who are anxious or have little travel experience.
2. We included stops with toilet facilities at regular intervals and ensured students were aware of when the next rest break would be. This is important for female students who, worldwide, report finding the absence of facilities in the field distressing, sometimes forcing them to make unhealthy decisions, such as not changing menstrual products or intentionally becoming dehydrated.^{6,7} We also provided free emergency menstrual kits and informed students that they could help themselves as needed.
3. We made pedagogical changes to encourage student engagement and empowerment. Students were asked to research key topics in



advance, and then present them in the field. This improved student engagement and encouraged peer-to-peer learning. It also helped to empower the students and break down the model of field trip leaders (who are mostly white and male) being a fountain of knowledge and students being the “sponges”.

Thirdly, we can give women opportunities to develop field skills in a safe setting. The Human Evolution Research Institute (HERI) at UCT runs [all-women field camps](#)—a global first. We provide safe space for young women to learn field work techniques, gain exposure to hiking and camping, which may not have been part of their upbringing, and talk about taboo subjects associated with the field work, like menstruation and harassment.⁸

The initiatives and solutions we discuss here are offered as examples of how it's possible to do things differently, with some deliberate action and planning. It's up to us as a community to bring about the change we need to make our discipline safe and enjoyable for all.

Robyn Pickering^{a,b}, Rivoningo Khosa^{a,b,c}, Sinelethu Hashibi^a, Rosalie Tostevin^a

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executive manager's

This issue of *Geobulletin* wraps up 2022, a year of global uncertainty and extraordinary events despite the easing of the pandemic. We have seen extreme weather in many parts of the globe, such as the record floods in Pakistan. The Russian invasion of Ukraine has disrupted global energy and grain markets, and the inexplicable China COVID lockdown policies have severely impacted global supply chains. Let's not forget the events of January 6 in Washington DC, the conquest of the 'Twitterverse' by a South African-born business visionary, the prime minister 'revolving door' debacle in the UK, and rocketing global inflation. Several upsets characterise the World Cup so far (maybe the USA is in with a chance...). The crypto currency failure has been very costly for many investors. Locally, we have significant bouts of loadshedding with no end in sight, and sadly no real progress in kick-starting mineral exploration. The 'Year in Review' articles that always come out in December are liable to be lengthy this year.

But there are some bright spots. The pandemic seems to be fading in intensity, though the threat is not eliminated. The resource sector remains strong despite the headwinds, and this is liable to continue to improve because of the perceived long-term shortage of critical metals. Additionally, 2022 seems to be the year in which the effects of global warming have been accepted as real by the majority of scientists and politicians, as well as the general public. The greening of the global economy will drive radical change in resource geology, and in academia. The Earth Sciences are by no means an outdated specialist subject driven by the past; new horizons will take shape over the short- to medium-term future. Our young geologists should expect radical and rapid change over the next few years. The GSSA will play its part in the journey.



corner

Craig Smith

The main event keeping everyone awake at night is Geocongress, from January 11–13 (<https://allevents.eventsair.com/geocongress/>). There has been a tremendous response to this event, with 370 high-quality oral or poster abstracts received, and high interest in the excursions and the workshops. The conference will be accessible to those who may not be able to travel to Stellenbosch, through online participation. Check the website for details; on-line participation is a very cost-effective way to attend for those with limited time or budget. There is still time for sponsorship opportunities; you can contact craig.smith@gssa.org.za.

As in prior years, the GSSA will close on the afternoon of December 15, and re-open on the first working day of January. Email will be periodically checked throughout that period, and the Geocongress team will be active. Please enjoy the end-of-year festivities, and travel safely. All indications are that local and international tourist destinations—in particular Cape Town—are going to be very busy after the travails of the pandemic years. All the best for 2023 from the GSSA Council and staff!

Craig Smith



president's column



Tania
Marshall

The year 2022 is almost over. For many it has been a year of ups and downs—the relaxing of the COVID 19 restrictions (although it has never quite gone away) has meant that we can start thinking about in-person/hybrid events. To this end, the GSSA has planned a full programme of events for 2023 (pg 40). We have included some of the annual favourites as well as a bunch of new offerings, all designed to assist both the new and the

seasoned geoscientist. Not only do we bring you focused content with the assistance of dedicated industry professionals, but we also partner with acclaimed individuals and/or companies to bring you specialist courses at reduced rates.

We start the year off in Stellenbosch with Geocongress 2023. This is one of the most prestigious events on the GSSA Calendar and we are proud to partner with the Department of Earth Sciences at Stellenbosch University and the Igneous and Metamorphic Studies Group (IMSG) to bring you this event. It comprises oral and poster sessions (11–13 January 2023) as well as workshops preceding the conference and one- and two-day excursions in the region surrounding Stellenbosch. While primarily an in-person event, a hybrid (online) component has been added for those unable to travel to Cape Town. See <https://allevents.eventsair.com/geocongress/>.

Our specialised commodity event for 2023 focusses on base metals and includes a field trip to the Northern Cape (in conjunction with the NC Branch of the GSSA). Other planned in-person or potentially hybrid events are the Map-Making for Geologists Course (in conjunction with MINROM) to be held in Cape Town, the Brittle-Deformation Structural Field School to the north KZN coast with Prof Mike Watkeys, Data Analytics and Machine

Learning with Prof Glen Nwaila, and 3D Geological Modelling with Dr Ian Basson (TECT).

New offerings (potentially hybrid, where applicable) include courses on Remote Sensing for Explorationists, Mineral Economics, Sampling and Data Management, Advanced Excel Skills and Soft Skills—Report Writing and Science Communication. We, of course, continue with our ever-popular drilling courses in conjunction with Colin Rice, even though he will be delivering these courses from Australia. In addition, we will be continuing with our free online courses dealing with CPD, Professionalism/Ethics, feedback from the 2021 ESG Inquisition and the Introduction to Drilling that garnered over 600 registrations this year. And, as usual, we will finish off the year with our African Exploration Showcase, in conjunction with a number of our sister African geological societies.

One of the main strengths of the GSSA as a Voluntary Association, has been its ability to provide such quality scientific and professional events at reasonable prices (and free entry to a number of students). Never has this ability been more necessary than at this time when many of our members are still suffering the effects of the COVID-19 lockdown and the associated downturn in the global economy. The only thing that makes this possible are our sponsors.

During 2022, our annual sponsors have been acQuire, DMT Kai Batla, Geo-Explore Store, SACNASP and UCP Africa. We are grateful for your continuing support. Our event partners (Colin Rice Drilling, Minrom, TECT, ioGAS-Imdex, Prof Glen Nwaila, Prof H Thomas, and Prof M Watkeys) also come to the party by making high-quality courses available at significantly reduced rates. And then we have a long list of companies that support individual events—MSA, SRK, SRK Exploration, RES,

Sound Mining, Consulmet, De Beers, Botswana Diamonds, Petra Diamonds, Bluerock Diamonds, Helam Mining, CCIC, XMS, Overberg Geoscientist Group, SANBI, Bushveld Minerals, VM Investment Company, and The Umvoto Foundation. Many of you sponsor both the parent GSSA events as well as selected Branch/Division events. We thank you all for your interest and assistance this year.

At this time, we would like to ask allcomers to consider sponsorship for 2023, be it annual sponsorship or event sponsorship. During 2023 (pg 33), we are planning for in-contact/hybrid as well as online events. There are different levels of sponsorships available for these different kinds of events, including specified student sponsorships and sponsoring of dedicated networking events—a new innovation to be introduced in 2023.

Some of our annual sponsors have already renewed their commitment—thank you kindly. The more

annual and event sponsors we get, the better quality of events we can provide and the lower the cost per delegate; also, we can then afford to sponsor more students—something we have committed to do.

Just thinking about all the work that goes into organising these events by tireless volunteers in the Meetings Committee is enough to make me look forward to the short break that the end of the year brings. I would like to thank our many volunteers in the Meetings Committee as well as the office staff, Lully and Marliese, for their time, effort and endurance in organising these events.

For all of you who are travelling this December/January—be safe out there. And to those staying home—try not to spend too much. Hope to see you all at one or other of our events in 2023.

Tania Marshall

professional affairs



Professional Code of Ethics

- Professional norms and behaviours backed by a robust Complaints process



Branches & Divisions

- Support for wide-ranging interests

SA Journal of Geology

- Internationally recognised and accredited journal
- Journal archives back to 1895
- Relationship with Geoscience World



Continuing Professional Development

- Members can choose to record CPD credits on either GSSA or SACNASP website and be mutually recognised.

Recognised Professional Organisation

- Training & support for Competent Persons.
- Associated with CRIRSCO and IMVAL.
- Promotes international reciprocity



Geobulletin/Newsletter

- Know what is happening in the geoscience universe



Technical/Scientific Meetings

- Live and recorded events to learn at your convenience.
- Looking for new ways to present events (hybrid?).
- Networking events coming soon



REI Fund

- Access to funds for research activities

Mentorship Opportunities

- Opportunities for personal growth and also to give back

International/Regional/Local Alliances

- Founder member of Global Geoscience Professionalism Group.
- Numerous sister organisations and relationships with other regional and international geoscience organisations.

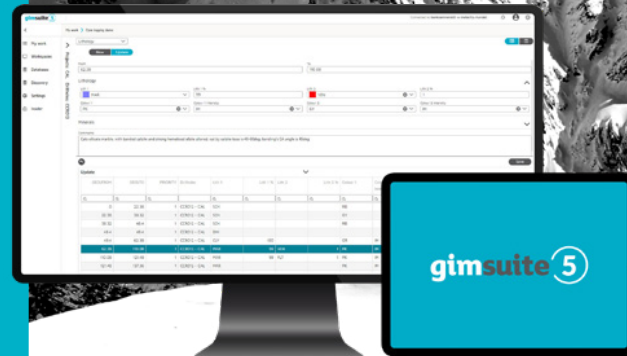
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Engineering
Performance



2008



2014



2022

all the news fit to print

UNIVERSITY OF THE WITWATERSRAND

News from the School of Geosciences in this issue is all about Science Communication!

In early September, as the University celebrated turning 100, the annual Yebo Gogga Science Fair opted for a very appropriate theme: *Coming of Age*. As in previous years, our mandate was to show

and tell the story of Earth's history and evolution. However, with the tragic passing of Matt Kitching and Ian Mackay, both of whom used to curate the Yebo Gogga exhibits, our team of staff and students at the School of Geosciences, Evolutionary Studies Institute and the Origins Centre, had to step in and work together to devise an appropriate new display. At its closure our exhibit was a resounding



The word 'age' is almost synonymous with geology, and consequently, "how do you date rocks?" was a common question fielded by volunteers at the exhibition.



Learners and their family members touring the various stations that showcase how Geoscience is so integrated with other science disciplines.



success, occupying the stylish My Café room adjacent to displays on the 'Little Five' and 'Secret Seven', free tastings of mopane worms, and regular loud bangs from the chemists. Geosciences was once again proud to show off our passion for the ancient to hundreds of schoolchildren, members of the public and fellow Witsies.

On 1 October, the top-performing matriculants had the opportunity to experience student life while exploring campus and were exposed to some of the impactful and progressive courses offered by the university. The would-be Witsies interested in science were welcomed by the School of Geosciences and then taken through an Integrated Faculty of Science Expo where they first circulated in small groups between five different stations before visiting other Schools within the Faculty of Science. At each station, the learners were introduced to a 'snap-shot' of integrated sciences, thanks to the assistance of School staff and students.

Station 1, set up outside on the Library lawns, demonstrated geophysical equipment in action together with data reduction and 3D computer modelling. Station 2 represented hydrogeology, where learners could determine the chemical composition of drinking water versus polluted water. Station 3 showed off the Petrology Lab,

where the learners looked at different rocks in hand specimen and in thin section. At station 4, the guests toured the new Earth Observatory, where they were shown the ultra-clean lab, mass spectrometry lab and other analytical instrumentation. Lastly, station 5 showcased palaeontology and the evolution of life.

Last but not least, Priyanka Davechand, a PhD candidate at the School of Geosciences, was recently the recipient of two awards at the Wits Annual Student Leadership Awards for her dedication to helping students. Priyanka currently serves as the Chairperson of the Wits Bridge the Gap (BTG) Geoscience Guidance Program (a student-led initiative that aims to



Priyanka pictured with her leadership awards.

SUPER SCIENTISTS

AFRICA

DINO CAL

PRIYANKA DAVECHAND

WITS UNIVERSITY

FROM : GP, SOUTH AFRICA

HARD WORK : 88

CREATIVITY : 80

CURIOSITY : 93

COMMUNICATION : 83

MY HEROES

MY FAMILY & PEOPLE WHO CHANGE THE WORLD

TOP TIP

ANYTHING IS POSSIBLE IF YOU PUT YOUR MIND TO IT. WHEN YOU FIND YOUR PASSION GO FOR IT WITH ALL YOUR HEART.

GEOCHEMIST

I CAN TELL WHAT DINOSAURS ATE BY ANALYSING THE CALCIUM IN THEIR FOSSILISED TEETH. WE USE THIS INFO TO UNDERSTAND ANCIENT ECOSYSTEMS.

Priyanka as her SuperScientist alter ego "Dinocal".

assist undergraduate and postgraduate students with an easier transition into university and the workplace); and was presented with the "Most Outstanding Postgraduate Leader" and the "Vice-Chancellor's Student Leader of the Year" awards for being an active leader in the expansion of the

BTG program to seven South African institutions offering Geoscience/Earth Science courses.

Priyanka is also an advocate for science communication and was recently featured as a *SuperScientist*, an initiative that aims to expose



younger generations to the science fields and the work being done by real superheroes i.e., real scientists. If you want to know more about what Priyanka is working on for her PhD, you can find out more in [this article](#) that featured in *Forbes* magazine.

Compiled by **Sarah Glynn** from various contributors within the School



STELLENBOSCH UNIVERSITY



It has been some time since the last instalment of a *Geobulletin* news item from Stellenbosch University. That is not to say that not much has been happening, rather that this latter part of the year has largely been dedicated towards final preparations for the forthcoming 2023 Geocongress. The event will run between 11–13 January 2023, and promises to bring together an eclectic mix of southern African and global geoscience students, industry professionals, academics and thought leaders. If you haven't already registered, be sure to get your registration so as not to miss out on the first local post-Covid national-level conference of this scale.

The Department of Earth Sciences is pleased to have successfully wrapped up the year, with a highlight being the successful completion of the Honours degree program in which we will be graduating 19 Honours students, making SU a crucial contributor to the talent pipeline of future southern African earth scientists. At the time of writing this piece,

the second opportunity exams are being finalised, and already, projected student numbers for 2023 are looking very healthy.

Environmental Geochemistry at SU

A team of SU Earth Scientists, led by **Dr Susanne Fietz**, joined the South African Winter Expedition #SCALE22 into the Southern Ocean in July–August 2022. In a collaborative effort between researchers from SU Earth Sciences, South African Weather Service Atmospheric Chemistry and University of Marseille (France), the team studied bioactive trace metals and mercury in the Antarctic seawater and in the sea ice. Trace metals can act as fertilizers (such as iron, for example), but some can be toxic in the environment (such as mercury). How these metals are distributed in Antarctica's atmosphere and ocean, and how they reach the Antarctic waters, is not entirely ascertained. Our team's efforts help towards understanding where the trace metals and mercury come from, how they are distributed and what their impact on the sensitive Antarctic ecosystem may be.

The Honours cohort of 2022 and SU Earth Science staff celebrate the finalisation of the Honours defences on 18 November 2022.





Group photo of all SCALE 2022 Expedition participants on board SA Agulhas II (credit: Kurtin Martin @kurt_artin)



Research Vessel SA Agulhas II sailing in the sea-ice zone as SCALE 2022 expedition focussed on understanding processes close in the area influenced by sea ice.

Follow some more stories and photos through Antarctic Legacy (@antarcticlegacy_sa), the project's [website](#), and via our team members Kayla, Lide, Sonja, Jared, Liam, Susanne and Casper (SAWS) on Instagram (@thisislide, @sonja.gin, @_jaredtanner, @quinlanlb, @stelliessf) or on Twitter (@susanne_fietz, @SGindorf), or contact Dr Susanne Fietz (sfietz@sun.ac.za) for more information.

Continuing on the theme of mercury, Stellenbosch PIs from Earth Sciences (**Dr Susanne Fietz**) and SAWS Atmospheric Chemistry (Dr Lynwill Martin) visited the Mercury Laboratory at University Marseille in France in October 2022 to discuss future mercury sampling in the waters around southern Africa and Antarctica. They were also

back on the lab benches to learn state-of-the-art analytical techniques to establish new mercury speciation units in South Africa.

As evidenced by the range of research activities currently being undertaken by **Dr Fietz**, it is with great pleasure that the Department announces her recent promotion to the Associate Professor level. This is a very well-deserved recognition for Susanne, whose exceptional performance is not limited to the research sphere, but spills over into her various outreach initiatives, and the leadership roles that she performs as Honours coordinator and on the SU Diversity committee. I look forward to writing future *Geobulletin* stubs in 2023 and onwards about a Prof Fietz.



Sedimentology at SU

Department of Earth Sciences sedimentologist **Dr Ryan Tucker** was out of office for much of September and on the run, taking part in a multidisciplinary internationally collaborative expedition to remote portions of the Eastern Gobi Desert, southeastern Mongolia. Dr Tucker has teamed up with collaborators from the United States and Japan to critically assess climate change during one of Earth's warmest periods, the transition from lower to upper Cretaceous. In the past, Dr Tucker has taken an active role within this collaboration to focus on contextualising climate change and landscape modification due to tectonics during the middle Cretaceous, along with assessing the effects of those changes to fossil assemblages preserved therein. These efforts are ongoing in Utah, New Mexico (USA; Zanno, 2019; Tucker et al., 2020, 2022, In Review; Ciliers et al., 2021), Thailand and Laos (Tucker et al., 2022), with meaningful linkages between these sites, but the team recognised a missing piece to the puzzle. Dr Tucker's work thus far in the Gobi



Chasing camels in the Gobi Desert.

has identified multiple sedimentary successions including fluvial (rivers), lacustrine (lakes), and aeolian (deserts), all exhibiting multiple phases of tectonic alterations. Furthermore, for the first time, Dr Tucker reports ash-fall and bentonites from key stratigraphic sections that will greatly help elucidate both local and regional stratigraphic relationships, which up to now have been tenuous at best. Along with learning fragments of the Mongolian language (*Ta Khuu* = "please"; *Ene Yu We* = "what is it"), and

Spotty outcrop in the eastern Gobi.





Dr Tucker assessing outcrop.

chasing camels for photos, this trip is successfully forming a foundation for ongoing work in the area. Dr Tucker also aims to continue his key role within this internationally collaborative team to address this knowledge gap by exploring remote areas of the eastern Gobi. Additional to this, Dr Tucker is formulating meaningful collaborative ties in Mongolia for Stellenbosch Honours and post-graduate students to take on active roles within this research team.

Hydrogeology at SU

South Africa is the leading pesticide user in Sub-Saharan Africa. Some of these pesticides can enter non-target environments, such as surface water or groundwater, where they can potentially harm aquatic biota or even human health. **Dr Reynold Chow** from the Department of Earth Sciences at Stellenbosch University has recently published an article (Chow et al., 2023) in *Science of the Total Environment* that evaluates a three-year dataset on aquatic pesticide pollution in the Western Cape, South Africa. He and his team sampled rivers (Berg, Krom, and Hex Rivers) from three agricultural

catchments in the Western Cape and found that all samples contained at least three pesticides and that a majority of samples contained five or more. They further investigated drivers of aquatic pesticide pollution with the hopes of identifying effective mitigation measures. For more information, please contact Dr Chow (rchow@sun.ac.za) or click [here](#).

Metamorphic petrology at SU

A recent collaboration between the Czech Geological Survey, Université Jean Monnet in France and **Dr Matthew Mayne** from the Department



Dr Matthew Mayne presenting the envisioned collaboration between the software tools of Rcrust and GCDkit to a public audience at the Czech Geological Survey in Prague.



of Earth Sciences at Stellenbosch University has resulted in a cross-software platform that allows the thermodynamic modelling program Rcrust (www.tinyurl.com/rcrust) to output data into the plotting and analysis program GeoChemical Data toolkit (<http://www.gcdkit.org/>). This new pipeline allows users to automate the data analysis and interrogation of phase equilibrium results with custom-built geochemical functions and plotting algorithms. The research exchange was generously supported by the Czech Geological Survey and was accompanied by a public presentation of the work in Prague in May 2022.

Economic Geology at SU

The Economic Geology study group at SU has experienced some notable successes during the latter part of 2022. These have mostly taken the form of student awards, where the following students have shone:

- **Yann Waku and Steve Chingwaru:** respectively 1st and 3rd best MSc posters at the Prospectors and Developers Association of Canada's (PDAC) conference in Canada. Yann's work looks at gold mineralisation in the Moto greenstone belt in the DRC, and Steve has conducted a detailed investigation of the mineralogical deportment of gold in the Witwatersrand tailings materials.

Yann Waku (left) and Steve Chingwaru (right) were recent winners of student science at the PDAC conference in Canada.



- **Ryan Rosenfels and Rutger la Cock:** respectively Geological Society of South Africa's John Handley Medal (best MSc thesis in South Africa) and Houghton Award (best Honours thesis in South Africa). Ryan's work characterised the cobalt

Ryan Rosenfels (left) and Rutger la Cock (far right, next to Bjorn von der Heyden) were recent award recipients from the Geological Society of South Africa's annual awards.



and copper mineralisation at the Fungurume 88 deposit in DRC, whereas Rutger's Honours thesis focussed on manganese mineralisation in the Western Cape.

- **Daniel Ferreira:** claimed third place for the best scientific poster in the entire Faculty of Science at SU. Daniel's work looks at the occurrence of sulphide minerals and platinum group elements in the Tantalite Valley Complex in Namibia.
- **Yamkela Mapetshana:** scooped first place in the Honours-level presentations given at the recent South African Geophysical Association's (SAGA) 17th Biennial Conference held at Sun City between 28 November and 1 December. Her BSc Hons thesis focussed on the Raman vibrational characteristics of Mn-bearing sphalerite.



Yamkela Mapetshana at the SAGA conference making SU Department of Earth Sciences proud with her winning Honours-level presentation.

In addition to these student successes, their study leader (**Dr Bjorn von der Heyden**) has recently been awarded a Research Chair position in the emerging field of Geometallurgy. The research chair is sponsored by **African Rainbow Minerals (ARM)** and is being shared with a close colleague from SU Process Engineering (**Dr Margreth Tadie**). The research chair will kick off formally from 2023 and hopes to make a meaningful contribution to this field of science within the local minerals sector.

Outreach at SU

In August 2022, alumnus **Andile Mkandla** invited **Dr Susanne Fietz** and **Dr Ryan Cloete** from Stellenbosch Earth Sciences to join a Career Day and high school debate that Andile and CLS South Africa held at CPUT. The Career Day focussed on opportunities in the maritime sector. The debate topic was "The exploration and production of oil and gas must not be allowed on any of the South African coasts". Two high schools attended the event, LEAP2 and Soneike High, and impressed the judges and audience with



Andile Mkandla (front of lecture hall) engages with high school students as part of an outreach program in August 2022.

interesting questions and very well prepared and rigorous arguments.

Dr Bjorn von der Heyden is also encouraging students to think about a career in the Earth Sciences. He is an invited lecturer at the 7th African School of Physics (ASP2022), planned for 28 November–9 December 2022, at Nelson Mandela University in Gqeberha, where he will engage with over 500 school learners from all over the African continent.



Dr Margreth Tadie (left) and Dr Bjorn von der Heyden (right) will lead up a new African Rainbow Minerals GeoMetallurgy Research Chair from 2023.

Bjorn von der Heyden



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"Special thank you to Anglo American for hosting us and to the speakers for their exciting talks – Deon Nel, Clement Rikhotso, Heino Hopps, Kevin Peyper, Vince Schaper, Reece Van Buren, Thabang Phakoe and Masibulele Zintwana – the connection of an exploration geologist's role to industry exploration and mining techniques were well incorporated. Including thanks to Charl Gouws and Anglo team for hosting the field trip.

To all who attended, thank you for sharing the event with us - what an amazing time with you all!

Thank you to our sponsors, your contribution was greatly appreciated." *Loni Gallant (NC Branch Chairperson)*



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the geological hot pot

The 27th United Nations Climate Change Conference or Conference of the Parties (COP27) recently ended in Egypt. Five key takeaways were reported [by the BBC](#). The main thrust, as usual, is to work towards a green economy by weaning the world off fossil fuels. Despite its “unpopularity”, nuclear power generation is a viable pathway to eventually achieving zero carbon dioxide emissions. It is interesting to note in this regard that natural nuclear reactions occurred at a uranium deposit at Oklo in Gabon around 1 700 million years ago. This unusual discovery was made by French scientists in 1972 when they reported that the ratio of the isotopes ^{235}U to ^{237}U was lower than that expected in natural samples. As ^{235}U is the isotope that undergoes fission in a nuclear reaction, they theorised that such reactions must have occurred naturally. This was confirmed by subsequent studies, and [in this good account](#), it is suggested that more such natural reactions have probably occurred elsewhere in the world where uranium reached very high concentrations.

More on climate change are the encouraging results reported [in SciTech Daily](#) regarding the Earth’s ability to regulate its own temperature. Life on Earth exists because our planet is conveniently (and luckily) situated in the “habitable zone” around the Sun. Temperatures are just right for water to exist in liquid form and also in a range that is neither too hot nor too cold (think Goldilocks and the Three Bears) for life to exist. But what keeps the Earth maintaining such equitable conditions? Researchers at the Massachusetts Institute of Technology suggest that a major control could be silicate weathering on continents, over millennial periods of time. The weathering would draw down carbon dioxide from the atmosphere and thus effect a stabilising control on the temperature in the long run. The researchers, however, do not discount the fact that an element of pure chance may also be responsible for keeping the Earth in the habitable zone.



Very high-grade uranium mineralisation in Karoo sandstone on cliffs along the Great Escarpment east of Sutherland. The hand-held scintillometer is off-scale! Similar high concentrations of uranium caused natural nuclear reactions to occur at the Oklo deposit.



Which brings us to a favourite topic of mine—the “Snowball Earth” hypothesis. I’ve mentioned previously that I did my doctoral studies on the Neoproterozoic Damara Sequence of rocks in central Namibia. One particular lithological unit in the Damara Sequence is the Chuos Formation that comprises mainly massive meta-diamictites with minor amounts of meta-turbidites and iron formation. The meta-diamictites were first described by Gevers in the Chuos Mountains, about 35 km SSW of Usakos, in 1931. Gevers called them tillites because they look similar to the more familiar, but much younger and undeformed and unmetamorphosed, Dwyka tillite in the Karoo sequence. Since its discovery, the glacial origin of the Chuos Formation has been debated. A 1985 paper by Henno Martin, the well-known German geologist who worked mainly in Namibia, and two co-authors, concluded that all the tillite-like rocks in Namibia were not glacial in origin at all.

Fast forward to August 1986 at the 12th International Sedimentological Congress in Canberra, Australia. I was fortunate to be able to present a talk about the sedimentological development of the Damara Sequence in my doctoral study area. One of the photographic slides I showed was of a lone stone

from the Chuos Formation that I interpreted as a dropstone, possibly from a floating glacier. When I concluded my talk and the chair of the session called for questions, an immediate hand shot up from a distinguished-looking gentleman in the audience who blurted out “That is not a dropstone!”. I do not remember replying to that remark and was probably saved from embarrassing myself by the chair. It turned out that the gentleman was a German professor who was one of Henno Martin’s two co-authors on the previous year’s paper. Any evidence for glacial activity would have, of course, negated their non-glacial hypothesis. I published a more detailed paper on the Chuos Formation in the *Communications of the Geological Survey of South-West Africa/Namibia* in 1986, and am happy to say that, gracious scientist that he was, Henno Martin verbally communicated to me that my interpretation was probably correct.

The recognition of similar-aged glacial deposits around the world, especially at palaeo-equatorial latitudes, led to the proposal of the “Snowball Earth” hypothesis, coined by Kirshvink in 1992, a period in the Neoproterozoic when our planet was totally frozen over. Since then, the hypothesis has

The dropstone picture that caused a bit of a stir in Canberra.





Spectacular pseudotachylite exposed in a disused ornamental stone quarry in the Vredefort Dome. The rock formed from the impact of a huge meteorite that streaked to the Earth about 2 023 million years ago. Visiting University of Fort Hare geology students for scale.

attracted much research (visit www.snowballearth.org for further information), but the cause or causes of such drastic glacial conditions are not known with any certainty. Which closes the loop of my meandering nicely because the same MIT scientists referred to above also proposed that a drop in the rate of incoming sunlight could trigger conditions that lead to a Snowball Earth event. This paper was published in 2020 and a short discussion is given [here](#).

The Vredefort World Heritage site should be one of our most prized and valued geoheritage locations. It is easily accessible and should thus attract a lot more geotourism than it currently does. The impact structure itself, nevertheless, continues to be studied by geoscientists, both local and international, with novel discoveries made regularly. A recent publication in *Journal of Geophysical Research* suggests that the meteorite that struck the Earth was much larger than the current estimated size. Instead of being about 15 km in diameter and travelling at 15 km/sec when it struck the Earth, computer modelling indicates that the meteorite was more likely to have been

20–25 km in diameter and travelling at 15–20 km/sec. The resultant impact would have resulted in devastating destruction on Earth, much more than that wrought by the Chixulub impact that is generally believed to have been the main cause of the demise of the dinosaurs (except birds). One of the results of the Chixulub meteorite impact was the generation of huge tsunamis around the world, as reported [here](#). The evidence for such destructive tsunamis at the Cretaceous–Tertiary boundary is still being discovered at various localities during ongoing research. We know that life on Earth survived after the Chixulub event, but we can only speculate if any higher forms of life other than microbes (if they existed then) would have survived the Vredefort impact. A possible topic for a science fiction story?

The town of Sutherland in the Northern Cape has a special place in my heart because it was the second town I lived in when I started my career as an exploration geologist in 1977. The first was Kenhardt, about 350 km further north in the same province. So when I see Sutherland mentioned in the media, my eyes light up, and curiosity sets in. It is thus not



An aerial view of Sutherland taken in 1978. The Nederduitse Gereformeerde Church is prominent. The Esso Minerals Africa office, where I worked, was in the hotel building diagonally across the road from church.



surprising that [this account in *The Conversation*](#) by Rosemary Prevec of the Albany Museum in Makhandla (Grahamstown) and her colleagues' palaeontological research in the Sutherland area caught my interest. The fascinating small invertebrate fossils they describe and illustrate make their Open Access Nature Communications Biology paper well worth reading. This article once again highlights South Africa's wonderful fossil heritage as well as how much research there still is to be done, and how many more fossils are left to be discovered. If my memory serves me correctly, I have driven along the road where the fossils were discovered, but was, of course, oblivious of the fossils, being intent on finding uranium!

Years later, with a PhD under my belt, I needed to find a job, and Dr Mark Bristow, now President and CEO of Barrick (second largest gold mining company), and then in charge of exploration at Rand Mines, offered me work at the Tsongoari lead–zinc deposit in Kaokoland in northwestern Namibia. The area is beautiful to work in, but harsh and remote. One of the fascinating natural phenomena we noticed were the so-called “fairy circles” that have become a really heated topic of study amongst scientists. They are circular

structures with a barren center and vegetated circumference, from a meter up to 10 or so in size. They are so prevalent in some areas that they are visible in Google Earth images. At the time I first saw them 30 years ago, their origin was simply ascribed to either poisoning of vegetation around a dead plant, or some type of termite activity. But, of course, the answer is never so simple, and a lot of time and effort have been put into understanding what's going on, with several competing hypotheses vying for acceptance. One of the latest that claims to have finally solved the mystery is reported [here](#). Nevertheless, I suspect that this hypothesis will be challenged, and further field work will be required... in a really scenic part of Namibia! The hardships of research—sigh.

To round off this December festive season column, here are some snippets to spice up the Hot Pot with a smile. If you are going stir crazy doing geochemistry in your laboratory, go out and enjoy watching our feathered friends. It is good for you. This is [scientifically proven](#)! And while we are enjoying a nice cool beer around the pool, we have to say thanks to our fellow scientists who have just announced an improvement to a good thing. Being a fan of the non-alcoholic variety, I will trust

the judgment of colleagues whether [this report](#) is great science or not!

And, finally, while recovering from a bit of overindulgence, [watching the Earth's tectonic plates moving around](#) is just what is needed! Much better and more calming than watching goldfish in a bowl.

Happy Holidays!

George Henry



Google Earth image of fairy circles on the gravel road from Sesfontein to Purros in Kaokoland. For fun, I suggest that readers should try and locate this area themselves. The structures are really amazing to see.

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research conference

Quaternary Research Conference held in St Lucia's Wetlands

UKZN hosted the 23rd [Southern African Society for Quaternary Research \(SASQUA\)](#) biennial conference in the heart of KwaZulu-Natal's iSimangaliso World Heritage Site.

About 60 delegates from China, Germany, France, Israel, Spain, the United States, Madagascar, Nigeria, Zimbabwe and South Africa attended the event at the St Lucia Ecolodge. A significant number of the participants were women and early career researchers.

SASQUA was formed in the 1960s to create a forum for Quaternary research, a field of study that examines the environmental conditions and prehistory during the Quaternary period of the last 2.6 million years to better understand global change problems and the processes that will influence the planet's future. The society encourages and advances southern African Quaternary research through meetings, publications, promotion of the field to young scientists, assisting research funding organisations, engaging with universities and museums, and supporting authorities on salvage and conservation operations.

UKZN's Dr Jemma Finch of the Discipline of Geography was the organising chair and co-host, assisting SASQUA president Dr Lynne Quick of the Nelson Mandela University in Gqeberha.

"It was a privilege for our lab to host the SASQUA community here in KwaZulu-Natal, and particularly in the St Lucia area, where we were shown geological evidence of Quaternary processes such as sea level fluctuation, dune formation, and discussed the evolution of the lake itself," said Finch.

The programme boasted a line-up of plenary speakers including Dr Tyler Faith of the University of Utah in the United States, the South African Research Chair in Stable Isotopes, Archaeology and Palaeoenvironmental Studies Professor Judith Sealy of the University of Cape Town, and the South African Council for Geoscience's Dr Hayley Cawthra.

Faith spoke about the Last Glacial Maximum at the Western Cape's Boomplaas Cave. The cave is an archaeological site that has enabled reconstruction of palaeoenvironments to enhance understanding of human adaptations and environmental changes in southern Africa's Cape Floristic Region.

Sealy spoke on stable isotopes and palaeoenvironments in South Africa and her research group's work measuring naturally occurring variations in the ratios of stable light isotopes to investigate past diets and environments, while Cawthra discussed the South African ecoregion of Mpondoland, focusing on the region's geological history and the role of seascape geology and giving insight into the [Mpondoland Paleoclimate, Palaeoenvironment, Palaeoecology and Paleoanthropology Project](#) a public participation initiative studying human adaptations to coastal environments.

In addition to informative presentations on global palaeoclimates, environments and vegetation, the programme included a hippo and croc boat cruise along the St Lucia Estuary, a conference dinner under the stars at the St Lucia Ski Boat Club, and a mid-conference tour of the eastern and western shores of Lake St Lucia in open game vehicles.

Delegates also visited geological formations at Cape Vidal and Mission Rocks, as well as the Makakatana



Delegates visiting Cape Vidal during the SASQUA mid-conference field excursion. (Photo: Brian Chase)

overview under the guidance of local geologist Dr Greg Botha of the Council for Geoscience, as well as enjoying several game sightings and breaching whales.

Awards for the best student oral and poster presentations went to Ms Gemma Poretti of the University of Cape Town and Ms Jean Baverstock of UKZN, respectively.

Dr Manu Chevalier of the University of Bonn hosted a one-day post-conference training workshop on quantitative climate reconstruction from proxy data using the [Climate REconstruction Software \(crestr\)](#) package.

The conference received sponsorship from DLD Scientific, Separations, the *South African Journal of Science*, and UKZN.

Twelve early career researchers were sponsored to attend by the GENUS Centre of Excellence for Palaeosciences and the International Union for Quaternary Research's Submerged Palaeolandscapes of the Southern Hemisphere project.

Organisers celebrated the participation of a dynamic and engaging student body, while

participants complimented the conference on being interactive, diverse in its research focus, and providing a positive opportunity to share ideas with an interdisciplinary and international group of scientists.

Christine Cuénod

University of KwaZulu Natal

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mineral scene

Layers of Minerals

This edition of 'Mineral Scene' digresses from previous versions in that a single species is not featured but rather a variety of minerals, but they have a common feature—all are layered, and all, in a sense, imitating art. One of the reasons for this theme stems from recent discussions and images on Mindat.org, the leading mineralogical website on the internet. There has been a trend that views some mineral images not just as presenting their morphological and/or crystallographic properties, but as abstract art forms (see for example "rocks imitating art", <https://www.mindat.org/mesg-608453.html>). The four specimens shown here are somewhat complex in their structure and layering and might be considered as artistic in their own right.

The relationship or symbiosis between science and art is not new (see <https://news.stanford.edu/2019/01/30/science-meets-art/> for examples

of graduates qualified in disparate scientific disciplines, yet excelling in multifaceted art forms). One need only go back centuries to the definitive scientist and artist, Leonardo da Vinci. So viewing geological specimens, albeit minerals or rocks, as natural artistic forms is not unique, nor even that current.¹

The relationship between science and art has been laconically described by Raymond Chandler:

*"There are two kinds of truth: the truth that lights the way and the truth that warms the heart. The first of these is science, and the second is art. Neither is independent of the other or more important than the other. Without art science would be as useless as a pair of high forceps in the hands of a plumber. Without science art would become a crude mess of folklore and emotional quackery. The truth of art keeps science from becoming inhuman, and the truth of science keeps art from becoming ridiculous."*²

This 'artistic' layered sample contains various shades of brown and yellow—the former is vanadinite, the latter descloizite. Kabwe mine, Zambia. Field of view is 4.2 cm.
(Photo: Bruce Cairncross ©)



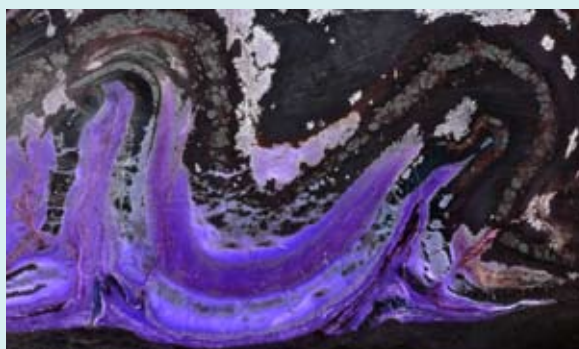
All of the specimens shown here have been sawn and polished to highlight their detailed layering and internal structure.

Bruce Cairncross

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Highly folded, finely layered purple sugilite with micro-brecciated grey haematite and associated grey-black manganese ores. Wessels mine, Kalahari manganese field, South Africa. Field of view is 4 cm. (Photo: Bruce Cairncross ©)



Vivid pink and red finely layered rhodochrosite with cream and brown siderite and manganocalcite above and below. Capillitas mining district, Argentina. Field of view is 6 cm. (Photo: Bruce Cairncross ©)



Originally layered, now brecciated, but with fragments retaining the fine laminations, this is 'pietersite', a variety of chalcedony with embedded fibres of various amphiboles, producing a chatoyancy similar to tiger's eye. Hopewell Farm, Kunene Region, Namibia. (Photo: Bruce Cairncross ©)

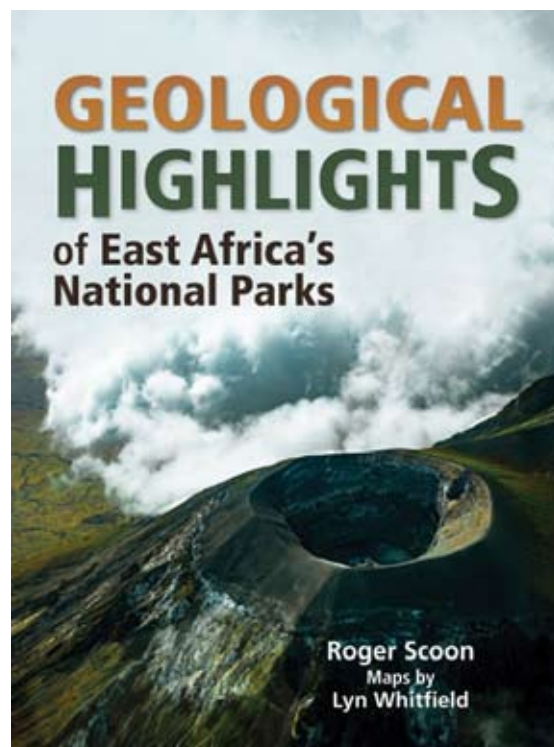
book review

'Geological Highlights of East Africa's National Parks' by Roger Scoon

*Published by Penguin Random House,
ISBN 978177584779 or ePUB 9781775847786*

Roger Scoon's passion for Geoheritage and Geotourism comes to light in this beautifully presented book on the remarkable national parks and reserves of East Africa. The region that is described in this, his latest book, encompasses the countries of Uganda, Kenya, Tanzania and Rwanda. It is unique in many respects in that the geologically recent East African Rift System bisects the area and is largely responsible for the varied and spectacular landforms. In sharp contrast, the regional plateau of East Africa that surrounds the rift system is underlain by some of the oldest rocks on the planet, with Lake Victoria, the largest lake in Africa, lying in a central portion of the plateau. The region is already a world-renowned tourist hotspot, containing one of the largest concentrations of wildlife on Earth, with vast herds of animals on the open plains of some the larger national parks.

The author describes, in a very readable and informative manner, the significance of the link between the geology, soils, landforms, flora and fauna and the renowned palaeo-anthropologic sites that have yielded significant fossil evidence of early Hominins. The book is well laid out with superb photographs, many taken by the author himself. The excellent diagrams, maps, annotated photographs and satellite images produced by Lyn Whitfield are a feature of the book and Lyn is to be congratulated for her outstanding contribution to this publication. There are also text boxes that contain more detailed aspects of particular topics without disrupting the flow of the text, as well as short descriptions of important geosites and trails. The book contains six chapters, the first two of which provide excellent overviews of both the



detailed and regional geology and landforms of East Africa, which is dominated by the two arms of the East African Rift System. The ancient Basement Complex and the overlying regional plateau that developed during the breakup of Gondwanaland complete the geological picture.

The mechanism of rift valley and graben formation and the difference between craters and calderas are explained with the aid of simple diagrams and the active and dormant volcanoes of East Africa are listed, with their positions shown on a regional geological map.

Chapter Three deals with the over 50 national parks, reserves and sanctuaries of Kenya. The parks that have similar geological frameworks and those that are adjoined are also grouped together. Many of the parks are well known tourist destinations and each has its own particular geological, landform, faunal, floral and archaeological highlights.

The importance of the soda-rich lakes of the Baringo and Bogorio National Parks north of Nairobi, where nutrients derived from volcanic activity give rise to algae, which in turn attract large flocks of flamingos, is discussed. The same Earth–life link is described for the soda lakes of the Lake Nakuru and Lake Elmenteita National Parks, both world heritage sites.

The geology of Mount Kenya National Park is discussed in some detail, as well as the volcanic ash that gave rise to the grassy savanna of the Maasai Mara National Park and the adjoining Serengeti National Park of northern Tanzania. Both these parks are major tourist attractions and wonders of the natural world, famous for the biannual migration of millions of ungulates.

The geology of other well-known national parks in Kenya include Mount Elgon, with its famous elephant caves, and Amboseli National Park, internationally known for its African elephants.

Chapter Four covers the 22 national parks together with the conservation areas and game reserves of Tanzania, which together constitute 15–20% of the total land area of the country. The most famous of these wildlife parks and reserves are in northern Tanzania and their geological highlights are presented in somewhat more detail than those in the more remote areas of the country.

The dominant feature of the Arusha National Park, the gateway to the northern cluster of parks, is Mount Meru, one of the largest volcanoes in the region, with the most recent eruption having been in 1910. Excellent geological descriptions are given, with features of note including the giant horseshoe-shaped caldera with a kilometre-high pyramid-like cone of unconsolidated ash. The breaching of the eastern wall of the caldera resulted in one of the largest volcanic-induced avalanches on Earth.

The nearby Kilimanjaro National Park is dominated by a volcanic massif that includes Africa's highest

peak. Details of the various geological features that are to be seen, including the summit ice field, are well presented.

The Lake Natron Wilderness Area lies in an arid area of the eastern or Gregory Rift and is a major breeding ground for flamingos. The lake is very alkaline in nature, due largely to the composition of lava from the Oldoinyo Lengai volcano lying to the south. The unusual nature and significance of the volcanic rocks are explained and illustrated by way of excellent photographs.

The principal feature of the Ngorongoro Conservation Area is the Ngorongoro caldera, a self-contained wildlife sanctuary that has been described as one of the natural wonders of Africa. The regional setting of the caldera, as well as the significance of its geology with regard to the presence and type of wildlife within it, is presented in an easy-to-read manner.

The world-famous palaeo-anthropological sites of the Olduvai Gorge and Laetoli are situated in the western part of the Ngorongoro Conservation Area and the significance of their geological setting is discussed.

Chapter Five documents and describes the geology of the 10 National Parks and 12 wildlife reserves of Uganda.

The geological setting and dense vegetation of Bwindi and Kibale National Parks on the shoulder of the western rift are described. These parks are well known for their gorilla and chimpanzee populations.

The Lake Victoria, Victoria Nile and Murchison Falls National Parks are discussed in terms of both their geology as well as their geomorphological settings. Geological highlights of the Mount Elgon National Park and of the mountain itself, the fifth highest in Africa, are presented, as is the geology of the Ruwenzori National Park. The spectacular Ruwenzori Mountains, unlike many of the other



mountains in East Africa, owe their formation to a large host block.

Chapter Six gives an overview of the geology of the Virunga Mountains, which straddle the boundaries of Uganda, Kenya and Tanzania. These mountains are all part of the Virunga Volcanic Province, which hosts eight volcanoes in the Virunga and Volcanoes National Park. Excellent overviews of the geology of the area, including the famous lava lake and vent of the Nyiragongo Volcano, are given.

Roger Scoon has produced an outstanding book on the geological highlights and other aspects of over 50 of East Africa's national parks and reserves, many of which are major tourist attractions and prime wildlife destinations.

The geological overview presented in this book has added a whole new sphere of interest, in the form of Geotourism, to the wildlife experience. The author has also incorporated aspects of flora and fauna as well as early Hominin sites, providing an exciting holistic view of East Africa, and emphasising the importance of the Earth–life link.

The book will be a valuable source of information for anyone planning a trip to East Africa, for local game rangers, tourists, and for all those with an interest in Geoheritage and Geotourism.

Reviewed by Richard Viljoen

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Dear Partners

It has been an interesting journey for the Geological Society of South Africa since its inception in 1895. As part of this journey we at the GSSA continually strive to stimulate the study of earth sciences and to look after the interests and professional development of earth scientists by providing technical forums, conferences, workshops and courses.

The GSSA Professional Meetings portfolio provides a significant impact to both the membership and the greater geological community in South Africa and Africa. The underpinning philosophy of the meetings portfolio is one that delivers quality technical offerings to the delegates. All GSSA offerings are eligible for professional development hours and continuing professional development points.

These events allow geologists and members from related disciplines to meet and share ideas on advances in the science, emerging technology, and new geological models and ideas.

Each event is considered independently from a financial standpoint ensuring each offering is priced for the specific target audience while adding maximum value. The GSSA does not endorse or support any commercial offerings as the quality of the product cannot be adjudicated or ensured. All delegate feedback is seriously deliberated after each event to ensure that both positive and negative feedback is incorporated in future offerings.

As one of the oldest scientific societies in South Africa, and a not-for-profit, public benefit association, the GSSA also endeavours to serve the wider public interest as well as the professional membership. Included in these public initiatives is a focus on geoheritage, geotourism and outreach education – issues clearly important to the public at large.

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- Acknowledgement in GSSA events calendar, mailers, holding slides, monthly newsletter and website
- Logo on all mailers related to the event
- Banners in event location (partner to provide)
- Opportunity to speak at the event.

Contact us for costing/event details.



GSSA events 2023

GSSA Events from January 2023 – November 2023 (Preliminary Programme)

Preliminary Date	Event
11-13 January	Geocongress (Stellenbosch university/hybrid)
14 March	CPD workshop (online)
18 April	Advanced Excel Skills for Geoscientists (online) with Marius Swart/Earthlab
2-3 May	Sampling & data management (hybrid)
6-7 May	KZN brittle deformation field trip (KZN north coast) with Prof M Watkeys
16 May	Soft skills for geoscientists (online). Report writing and science communication skills (with Seyens Visual Communications)
TBC (4 x ½ days) + self-study	Drilling methods and techniques in resource exploration (with Colin Rice) (online)
24-27 June	Base metals (hybrid & site visit)
July	Map making (with J van den Berg/Minrom) (contact in Cape Town)
11 July	ESG inquisition feedback (online)
1 August	Introduction to drilling (online)
August	Professionalism and ethics (online)
Sept (2 days?)	Data analytics / machine learning (with Prof G Nwaila/UWWR) (hybrid)
September (4 x ½ days) + self-study	Drilling methods and techniques in resource exploration (with Colin Rice) (online)
October	3D geological modelling (with Dr I Basson/TECT) (hybrid)
October	Mineral economics for geoscientists (hybrid)
15-16	November African Exploration Showcase (online?)



GEOCONGRESS 2023 11-13 JANUARY



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UPDATE

By the time the *Geobulletin* hits your desks, there will be less than a month until the start of the actual event and the registration numbers should be nearing the 400 delegates mark. The technical program has come together nicely and offers 280 speakers, including many internationally renowned keynote speakers. Our three plenary talks (Prof Neil Phillips, Dr Joré von Holdt and Mr Sifiso Siwela) offer an exciting range of topics encompassing the hard-rock/economic geology, environmental geochemistry and the southern African minerals sector.

In addition to the fantastic technical program, the conference offers a range of social and professional development opportunities. Over 280 delegates will attend the opening 'ice-breaker' function, ~95 delegates will attend the various workshops for further learning opportunity, and 41 delegates will enjoy some of the Cape's finest geology and terroir.

Although the speaker program is now finalised and early-bird rates have closed, there is still opportunity to get involved in the summertime earth science action. Standard registration rates apply up until the conference begins, and there will be a strong drive for increased online (and international) viewership. See <https://allevents.eventsair.com/geocongress/> for more registration details.

Of course, all of this would not be possible without the generous sponsorships from our sponsors. For this, the 2023 Geocongress delegacy is eternally grateful, and we look forward to mingling with our sponsors at the event.



applications

35IGC Legacy Fund Support: 2023 Call for Grant Applications

The generous support received from sponsors, donors and over 4,000 registered delegates resulted in a financial surplus after the 35th International Geological Congress that was held in Cape Town during 2016. These funds have been invested and are administered by the Board of the 35IGC Legacy Fund to ensure that the legacy of this successful event will benefit the South African geoscience community long into the future.

Annual grants are advertised to promote geoheritage projects or activities in support of deserving geoscience students and researchers. An annual thematic focus or dedicated conference support funding will be identified every year. The level of funding available annually for disbursement varies in relation to investment income and the need to maintain or grow capital from which sustainable support can be provided.

2023 call for grant applications

As the world emerges from the COVID-19 pandemic, many geoscientists are resuming their normal work, field-based activities and attending conferences.

Accordingly, the 2023 call for grant applications by the 35IGC Legacy Fund is aimed at a broad spectrum of activities across themes that support or promote:

- **Geoheritage, geotourism, geoscience education, geoconservation**
- **Student support for attending geoscience meetings**

- i) The thrust of proposals should be product-focused and applicants must outline how the grant will be utilised to establish a long-term presence that will promote activities associated with any of the themes listed above.
- ii) Proposals that include additional sources of funds will be favoured.
- iii) Where proposals aim to create products in support of facilities housed in a national- or provincial park, world heritage site or any other established heritage or tourism-focused facility, the written support of the controlling institution must accompany the application.

As available funds are currently limited, compliance with the above conditions does not guarantee acceptance of any applications submitted. All provisionally successful applications will be reviewed and evaluated by the Management Committee/Board of the 35IGC Legacy Fund and their decision is final.

Applications must be made on the prescribed form (available at <https://35igclegacyfund.org.za>) and submitted to Peter Stiff at pstiff@jpaudit.co.za before 15 January 2023. No late applications will be accepted. The applications will be adjudicated and the outcome announced early in 2023.



Request for applications to the Research, Education and Investment (REI) Fund of the GSSA

CLOSURE DATE FOR APPLICATIONS: 31 JANUARY 2023

The GSSA Research, Education and Investment Fund (REI Fund) is inviting applications from GSSA paid up-members (including current post-graduate student members) for grants from the Fund, to be received at the GSSA office not later than 31 January 2023. Applications can be made using the prescribed application form available under Publications/GSSA Documentation on the GSSA website (www.gssa.org.za) or see the link below for the online form. Supporting information required with each application includes a short description of the project, brief motivation for research and funding requested, a budget describing how funds will be used, and a letter of support from research supervisor (in cases where the applicants are post-graduate students at South African universities):

<https://www.cognitoforms.com/GeologicalSocietyOfSouthAfrica/researcheducationandinvestmentfund>

Grants are intended to support a variety of earth science research costs, including analytical and field costs, conference attendance, and publication costs. Projects that promote and support earth science awareness such as geoheritage, geotourism and geo-education may also be supported. Expenses related to (annual) registration and tuition fees, textbooks, accommodation, etc. required at higher education institutions are not covered. Members enrolled at non-South African universities are not eligible to apply for financial support.

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 R20 000 per application but well-motivated 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 during February/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 mid-March 2022 whether or not their applications are successful. Recommendations made by the Committee require Council approval, which may delay notifications.

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



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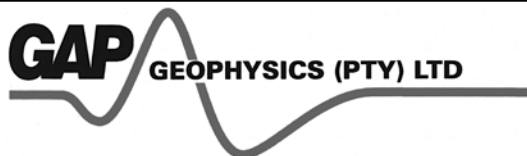
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4. DEADLINES FOR COPY AND ADVERTISING MATERIAL

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June issue:	15 May 2023
September issue:	15 August 2023
December issue:	15 November 2023

5. CANCELLATIONS

At least 4 weeks prior to deadline

6. CIRCULATION

Geobulletin is issued in digital format to all members of the GSSA and its local and overseas exchange partners. A printed option is also available for those who opt for it, and the electronic version is available as an open access download on the GSSA website.

7. ADVERTISING BOOKINGS AND SUBMISSION

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8. ADDITIONAL CONTACT INFORMATION

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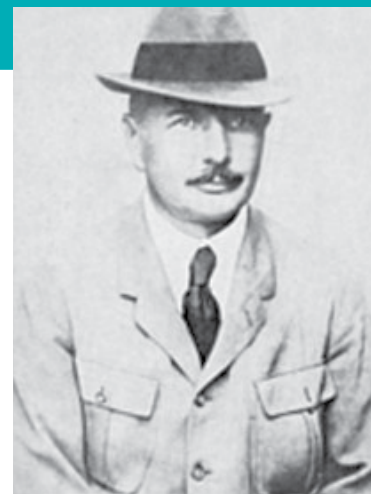
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- Cultural sites: Botshabelo Mission (Hans Merensky's place of birth, in 1871); Battle of Sekhukhune; Tsjate Cultural Centre

Contact Dr R N SCOON or the GSSA for details and an expression of interest. (rnscoon@iafrica.com)



Hans Merensky (1917)



Hans Merensky (3rd from right) and his team panning for platinum at Onverwacht (Photograph from Lehmann, 1955)



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