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Geological Society of South Africa

contents

Front cover photo:
Erongo Mountains, viewed towards the northeast. The smooth granite surface belies a myriad of miarolitic cavities that have yielded a variety of minerals including topaz, aquamarine, fluorite and schorl. For more about topaz from Namibia and elsewhere in southern Africa, see Mineral Scene on pg. 34. (Photo: Bruce Cairncross)

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guest editorial

Bjorn
von der Heyden

In 2023 the editor-in-chief of the *Geobulletin* (Trishya) approached me asking me to write an 1800-word editorial. I made up a bunch of excuses and politely declined. In 2024, the same thing happened, but by now I was starting to run out of good excuses. I gave them anyways and politely declined again. In 2025, I'd formally run out of excuses due to my lack of creativity. So here I am. Bjorn, nice to meet you.

The problem with being not particularly creative is that you are forced to become an academic writer instead of, e.g., a novelist. If I was creative, I would have made millions by writing a sensational book about some young wizard called Harry Potter. Oh wait, that's already been done. Perhaps then a sensational book about a young university student instead. I'd call it Hairy Pothead. Eish, looks like that title has also been used before. See, this is why I have a distinct dearth of those millions, and why I instead spend all my time writing academic grant proposals. Which is basically the same as playing Russian Roulette with one's time.

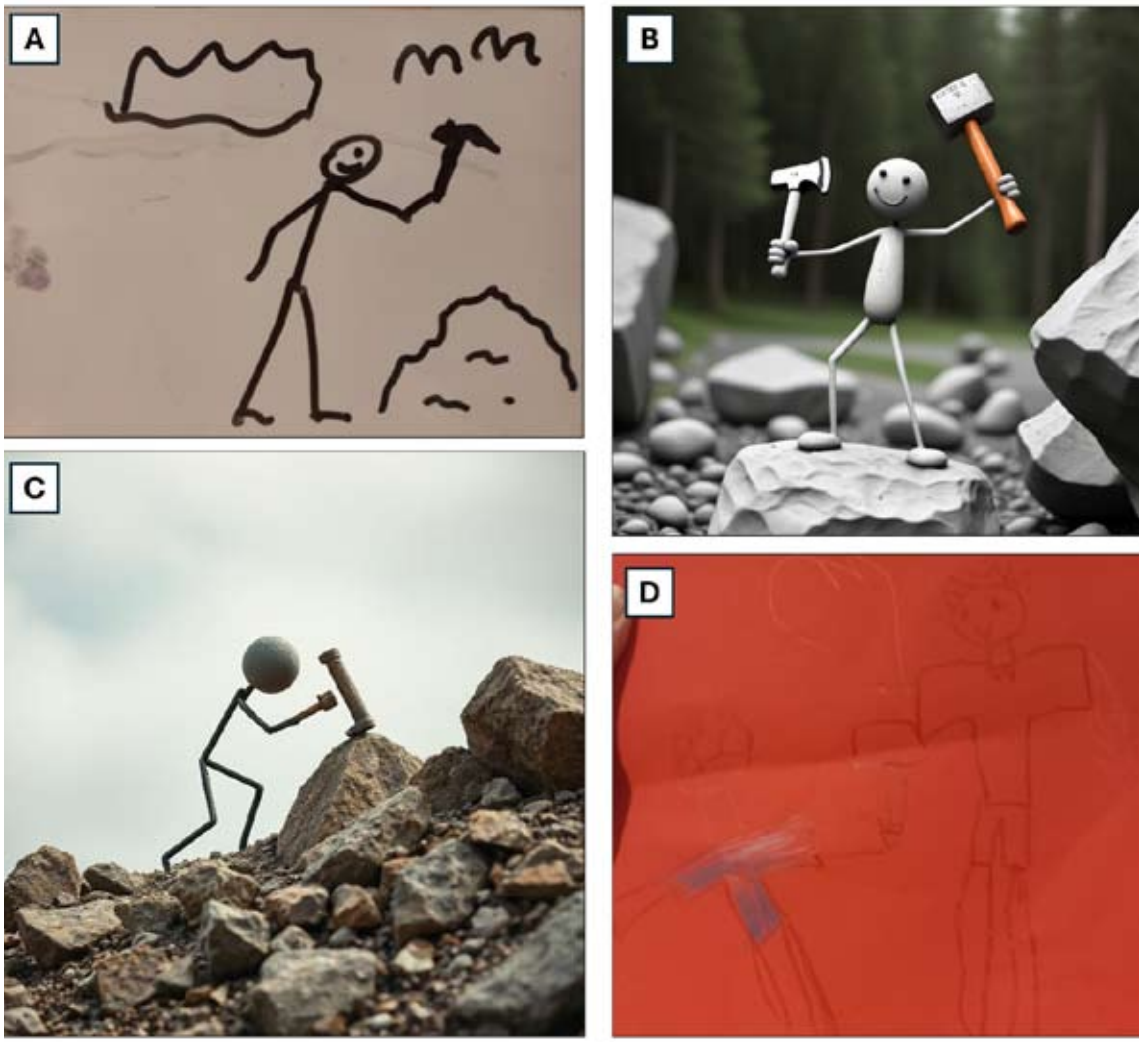
The other problem with being not particularly creative is that when you agree to write an editorial, you have no idea of what to write about. Eish again. So you do what any good student from the pre-Covid era would do. You do some research. I trawled through the past issues of the esteemed *Geobulletin* and found editorials on Geosports (Naude and van Hinsbergen[1]), on Environmental, Social and Governance (ESG; Soulsby[2]) and on rock nomenclature (Neveling[3]). Good, but now what?

The editorial deadline is tomorrow; in fact I've been told the editorial is the last thing outstanding in the issue. Deadlines are terrible things, they follow me around incessantly, nagging and whining for attention. Just like my four-year-old. Fortunately, I realised that we're now in the post-Covid era, where student research prowess is rampantly being replaced by use of Artificial Intelligence tools. With that in mind, I decided to adopt a mantra that is not commonly applied to eggs. If you can't beat them, join them.

So I opened ChatGPT, and typed in: *"Please write a 500 word humorous story that blends aspects of geo sports, rock naming conventions, and ESG"*. The result is given in Box 1. It manages this 496-word essay in less than a minute. It's littered with cliches and geological puns that should be reserved for around the campfire in Aggeneys at 2 am after the Honours tour final evening. That way, I wouldn't have to hear the jokes, because these days I'm in bed by 9.30 pm. Incessant whining, nagging kids will do that to you.

Great, so with ChatGPT's 496 words, and my feeble 440 words to this point, I'm still about 864 words short of my target. I got Google to help me with that math. Its my other weak point. Math, personality and creativity. If you still don't believe me on that last one, check out Figure A.

So to burn through a few more words, I re-ran the ChatGPT request, this time excluding the word 'Please'. It gave me a story along the same basic plot, perhaps with a few additional cliches that I pretended I hadn't heard before. So basic manners, like saying your pleases and thank you's, are clearly no longer important in this post-Covid AI world. But I think I already knew that. The number of emails that I receive these days that start simply as "Bjorn, …", instead of a nice erudite "Dear Bjorn, …", or simply the standard and more colloquial "Hi Bjorn, …". When I receive those "Bjorn, …" emails, the voice inside my head (who is also possibly one of my only friends) reads it out to me in my barking voice. That's the same voice that I typically reserve



A: *My best rendition of a geologist smashing a rock. I should probably have put some clothes on him. But you know how geologists like to hang out. What happens in the field stays in the field.* ***B, C:*** *Images generated by two different free AI image-generator software packages. Each generated in less than ten seconds with the prompt "Stickman hitting a rock with a hammer".* ***D:*** *For reference, I asked my six-year-old daughter to draw me a picture of a geologist hitting a rock with a hammer. She drew herself hitting me with a hammer instead (I was surprised by how much my arm swelled up). I think the take-home message here is that if you want your six-year-old to like you, I guess you shouldn't have barked at them so much when they were four.*

for my four-year-old after too much nagging and whinging (Fig. D).

Great, I'm up to 1149 words now. I hope Trish will count the figure captions as well. Its time to get serious, although I've probably already destroyed the entire *Geobulletin* issue with my staccato gibberish. Though I guess the editorial could still be rejected. Like all my academic papers last year.

I think what I try to demonstrate in Figure C, D and Box 1 is the power of AI in your day-to-day last-minute editorial writing. It is fast, it is powerful, and it delivers workable results. Indeed, in the tertiary education space, lecturers are currently grappling with how best to manage the use of AI in teaching, learning and assessment. For example, is it a tool that we should prohibit our students from using so that we can continue to teach them fundamental skills like scientific writing using traditional editorial approaches? Or is it something that we should be encouraging, through teaching our students to use it ethically in order to strengthen their writing?

These are the types of questions that we are actively discussing in our staff rooms at universities across the country. And I'm certain that colleagues in industry are having similar conversations. I overheard one about a year ago, in which a CEO of a small firm in the mining sector stated that his staff were instructed to use ChatGPT for their email writing. His position was that, firstly, the AI served to increase staff efficiency, and secondly, that it ensured that no unprofessional or poorly written emails were sent from company email accounts. The use of AI is projected to extend beyond these administrative tasks and will pervade tasks that we as Earth scientists regard as our bread-and-butter. For example, in their synthesis of AI in the geosciences, Zhao *et al.*[4] suggest that there is a lot

of scope for improved understanding of the Earth system by combining data-driven machine learning (ML) approaches with our conventional physics-based models. Given this backdrop, another conversation that we are having in our staffrooms revolves around increasing the exposure of our students to ML-approaches as part of the curriculum. Is this an important pre-requisite for our students to be 'industry-ready' or is it just another tool that we are trying to jam into an already packed three-year Earth sciences curriculum?

These are important and evolving conversations that we are and should be having. At this point, I don't have all the answers. Of course, I tried asking ChatGPT whether AI is good for student training in the Earth sciences, but it just told me how great AI is. No surprises there, not only does it not value manners, but it is also an egotist. Phew, 1781 words. If I'm not rejected again, hopefully that'll suffice. Coming back around to my egg mantra, hopefully with this editorial I've beaten them eggs. If not, then I've probably joined them. Or rather, they joined me. Upon my face.

Box 1: ChatGPT's 496-word editorial contribution

The Great Geosports Showdown: Basalt vs. Schist

The annual **Geosports Championship** had arrived, and the atmosphere in the Lithodome Arena was electric. This year's competition was the most anticipated yet, featuring the ultimate showdown: **Team Basalt vs. Team Schist**. Geologists, miners, and eco-conscious investors from around the world had gathered to witness the legendary battle between two of Earth's finest rock formations.

As the teams took the field, commentators provided the rundown.
"Welcome, folks, to the **GeoGames!** I'm Dr Sandy Grains, and with me is none other than the legendary Petra Fide!"
"Thanks, Sandy! We've got an **igneous vs. metamorphic** matchup today. Team Basalt—strong, steady, and fine-grained—is known for rapid cooling under pressure, much like the ESG compliance departments of major corporations. On the other hand, Team Schist—layered, complex, and prone to splitting—is the embodiment of the modern investment strategy: flaky but valuable!"

First Event: The Erosion Endurance Test

The teams lined up for the Erosion Endurance Test, where they had to withstand a high-pressure water jet while maintaining structural integrity. Team Basalt, known for their resilience, took the onslaught head-on, barely losing a grain.

Meanwhile, Team Schist started *shedding layers* at an alarming rate. "Oh, looks like Schist is falling apart already!" Petra exclaimed. "Much like companies who 'greenwash' their ESG reports!" Basalt easily took the round, leaving Team Schist scrambling to put their pieces back together.

Second Event: Sustainable Rock Climbing

The next event, **Sustainable Rock Climbing**, was a nod to ESG initiatives—using only eco-friendly methods to ascend a cliff face. Participants were only allowed to use responsibly sourced pitons and could not disturb local wildlife.

Team Basalt, ever the practical type, leveraged their steady formations to create a natural staircase. "Classic basalt behaviour—low maintenance and universally applicable, much like responsibly sourced timber credits," Sandy noted.

Schist, however, faced problems. Their climbers couldn't get a good grip because of their tendency to break apart under stress. "Schist is really having an identity crisis here," Petra quipped. "Just like an oil company pledging to go carbon neutral… by 2050!"

Team Basalt won again, and Team Schist looked… well, like a pile of rubble.

Final Event: The Ethical Extraction Relay

The final event was the **Ethical Extraction Relay**, where teams had to mine a rare mineral without harming the environment. Any sign of pollution, destruction, or excessive energy consumption led to instant disqualification.

Team Basalt, ever the efficient rock, strategically extracted the mineral with minimal impact. "It's as if they *understand* sustainability!" Sandy marvelled.

Team Schist, however, struggled. Halfway through, they used an unapproved chemical to speed up the process, setting off alarms. ESG auditors in the audience gasped in horror.

"That's a major violation!" Petra shouted. "Schist has been **delisted from the Sustainability Index!**"

With that, **Team Basalt claimed victory**, proving once and for all that resilience, integrity, and a fine-grained ESG strategy always come out on top.

As Team Schist sulked away, their captain muttered, "Well, schist happens."

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executive manager's corner

Craig Smith

Since the last issue of *Geobulletin*, I am greatly saddened to have to report the deaths of several eminent geologists, all of whom were influential and highly respected in their fields. Many of you will have been affected in one way or another by their work. Dr Chris Jennings, Dr Luc Chevallier, Dr Jochen Schweitzer, Mr Jaco Vermeulen, Dr Assie van der Westhuizen and Prof Anton Le Roex were Members or Fellows of the GSSA; they will be missed.

2025 looks to be anything but boring. As I pen this, Donald Trump has been in office for just over two weeks, and the number and breadth of executive orders are stunning the world. Some of his cabinet picks are clearly incompetent for the roles they are supposed to fill (for example the Secretary of Defence), and there are several billionaires in the lot (hello American Oligarchs!) who are almost certainly conflicted between their business and political roles. He has threatened Denmark with a takeover of Greenland, wants to take back the Panama Canal, has called Canada the 51st state, and has managed to find time to threaten South Africa. His love of tariffs threatens to push the world into deep recession or even depression. But don't expect the revolving door for cabinet appointees as happened in his first term of office because he has picked his cabinet appointees based on loyalty only. He has been able to get them confirmed because the Republican Party is in the majority in both houses of Congress.

Trump himself is not necessarily a climate change denialist, but the audience he is playing to certainly is. He has once again pulled out of the Paris Accord, expanded the lands available for oil and gas drilling, and pulled out of the World Health Organisation—all of which are disastrous actions in the efforts to keep carbon emissions to something approaching the climate objectives. To date, he has not set his sights on Africa, but I think it is only a matter of time before the AGOA agreement is consigned to history (bad for South Africa). The world's stock exchanges are reacting positively to all the chaos (a Trump bump), but will all this eventually fade to a Trump slump? Apparently, gold ETFs (Exchange Traded Funds) are attracting a great deal of money now (good for South Africa). The territorial ambition of the President is worrying because he wants Greenland for "strategic" defence reasons, but he may also want minerals, or at least to block China from accessing the resources.

Whichever side of the political spectrum you may fall, the next four years and possibly more will herald much change. South African companies, academic institutions and government agencies will have to factor in uncertainty and volatility in the world. He has made threatening remarks about South Africa (because of the land expropriation bill). He has paused the operation of USAID. It will not be business as usual.

Returning to climate change, a recommended read is the last chapter in the book "The Earth Transformed—An Untold History" by Peter Frankopan. The possibility of a Dystopian future

due to many factors is not something that is too remote, and our modern way of life combined with the disdain of the White House increases the risk. (Trump has issued at least eleven executive orders that will dilute or kill mitigation efforts.) It might keep you awake at night.

Welcome to 2025! Watch for a number of meetings and events in our Monday Mailer, the Monthly Newsletter, the website, and follow the GSSA on social media.

Craig Smith

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The GSSA is looking forward to seeing you at Geocongress 2025 in Bloemfontein 23-27 June this year! On our website, you will be able to register for the conference, submit an abstract, and view the exciting list of keynote speakers, fieldtrips and workshops available. Importantly, the call for abstracts is currently open and has a closing date of 31 March, which is rapidly approaching. We encourage you all to get your abstracts in as early as possible to prevent a rush in late March. We anticipate an exciting and diverse scientific programme and look forward to hearing from you soon.

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president's column

Steve McCourt

When researchers of Early Earth Tectonics use the term 'microcontinent', they are invariably referring to pieces of continental crust that, over time, grew through accretion and/or collisional tectonics into continental blocks capable of accommodating the development of regional sedimentary basins or the intrusion of major igneous complexes. In this sense microcontinents are the forerunners of cratons. By contrast, in discussions of Phanerozoic tectonics, the term microcontinent is related to extensional tectonics, and is defined as an isolated fragment of rifted continental crust displaced from its original continent and surrounded by oceanic crust.[1] A related term, proto-microcontinent, is used to describe pieces of continental crust that haven't fully broken away (calved or cleaved) from a larger continent, but are separated from them by a zone of thinned continental lithosphere.

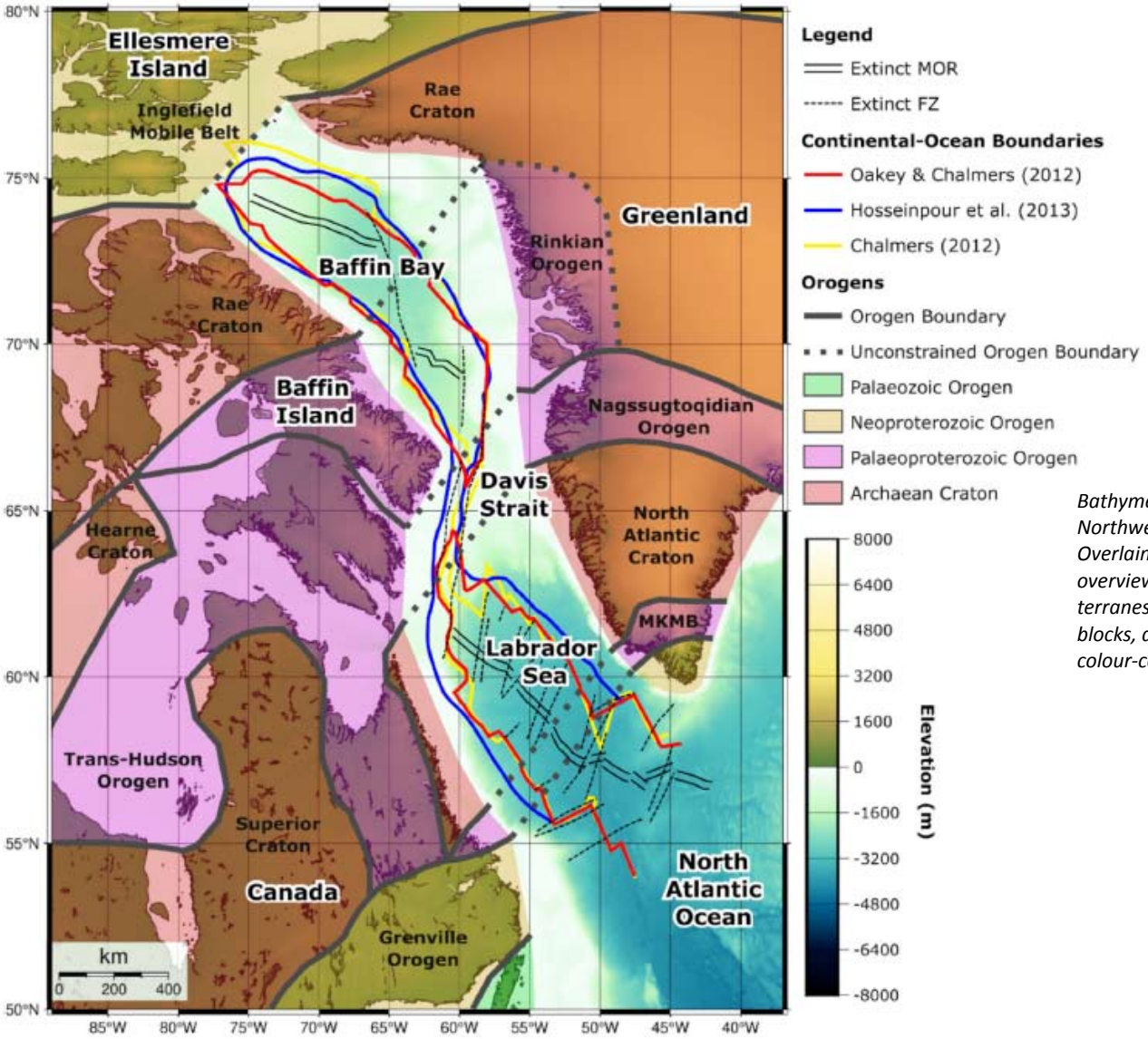
A recent study into continental breakup and subsequent seafloor spreading in the Labrador Sea and Baffin Bay oceanic basins of the NW Atlantic, published by Longley *et al.*[1], deals with the Davis Strait proto-microcontinent (DSPM) and provides some interesting insight into possible mechanisms associated with the formation of these features.

The authors used gravity data to compile maps of oceanic fracture zones (FZs) and extinct Mid-Ocean Ridges and from these produced a new plate-tectonic reconstruction model for the Labrador Sea, Baffin Bay and Davis Strait during the separation of Greenland from North America. In addition, using crustal thickness inversions and seismic reflection data from the Davis Strait and offshore of West Greenland, the study provided information on the composition and thickness of the crust within the Davis Strait and in so doing, identified the Davis Strait proto-microcontinent.

The salient features of the study as they relate to the DSPM are summarised below and depicted in the accompanying figures.

The northern Labrador Sea basin is 900 km wide and the Baffin Bay basin 500 km wide; they are linked through the Davis Strait seaway. Based on the new study, rifting propagated from the North Atlantic into the region of the current Labrador Sea Basin at around 120 Ma and, based on the oldest undisputed seafloor spreading magnetic anomaly (chron 27 equating to 62.2 Ma[1]), NE–SW-orientated seafloor spreading, and thus continental breakup, started at around 61 Ma. Seafloor spreading later propagated into Baffin Bay during chron 26 (58.9 Ma).[2] Due to the significant offset between the axes of the Labrador Sea and Baffin Bay, NE–SW seafloor spreading in the basins required a NE–SW sinistral transform fault. This transfer zone formed in the developing Davis Strait and is identified as 'Pre-UTM' in the figure. At 56 Ma, an anticlockwise rotation of the spreading orientation began, and by 48 Ma the spreading azimuth had rotated 55° to become approximately N–S orientated, a change that would have important consequences for microcontinent development.[1]

The Davis Strait is a submerged bathymetric high. Early seismic reflection studies[3] suggested it was composed of overthickened oceanic crust, possibly the result of plume-related magmatism, probably mixed with fragments of continental crust.[4] More recent work based on seabed sampling and seismic refraction studies[5–7] suggests the region is predominantly composed of stretched and thinned continental crust overlain by thick sedimentary deposits and interbedded basalt layers.

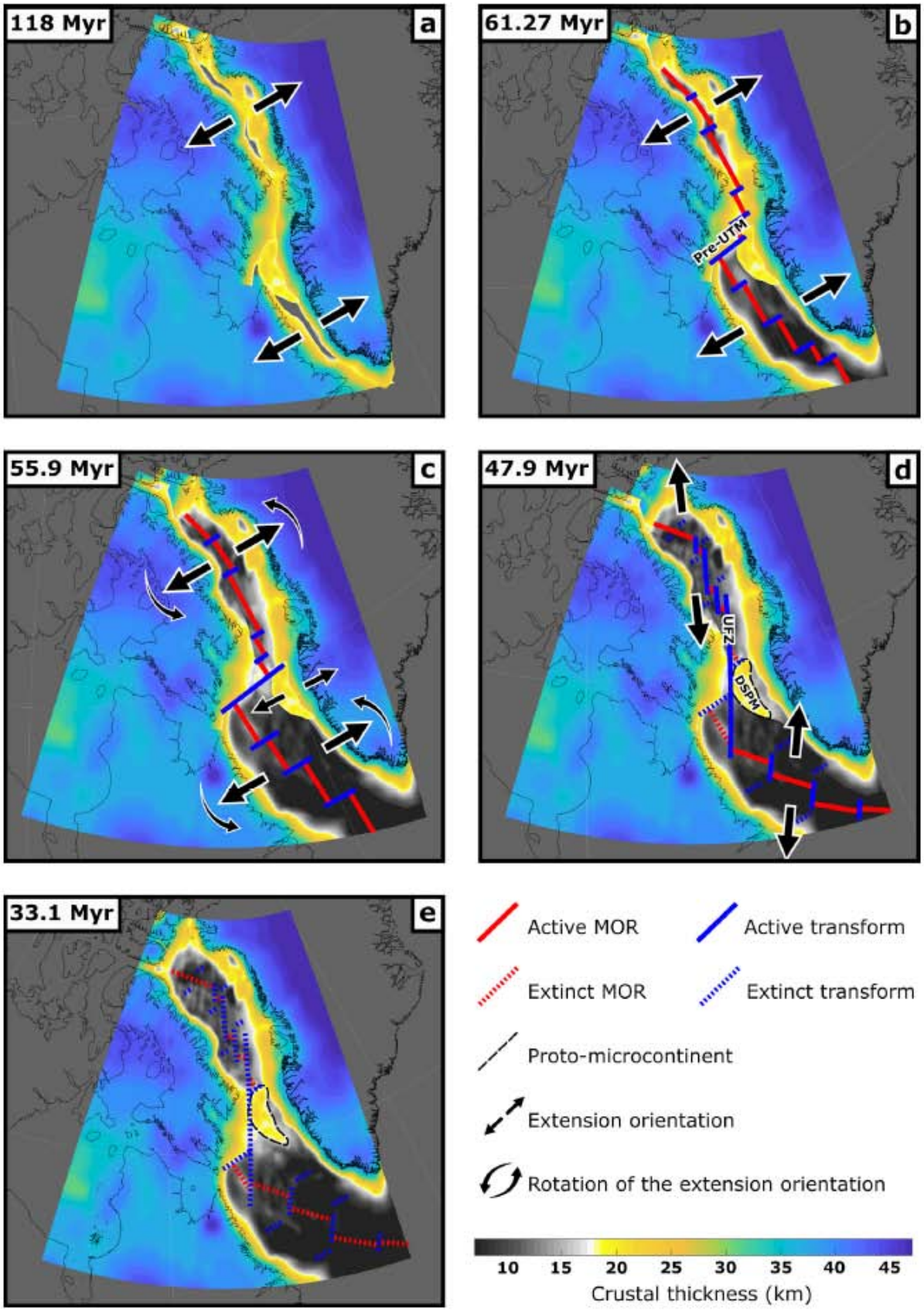


Bathymetry map of the Northwest Atlantic.[1] Overlain is a tectonic overview of the major terranes, continental blocks, and cratons colour-coded by age.[8]

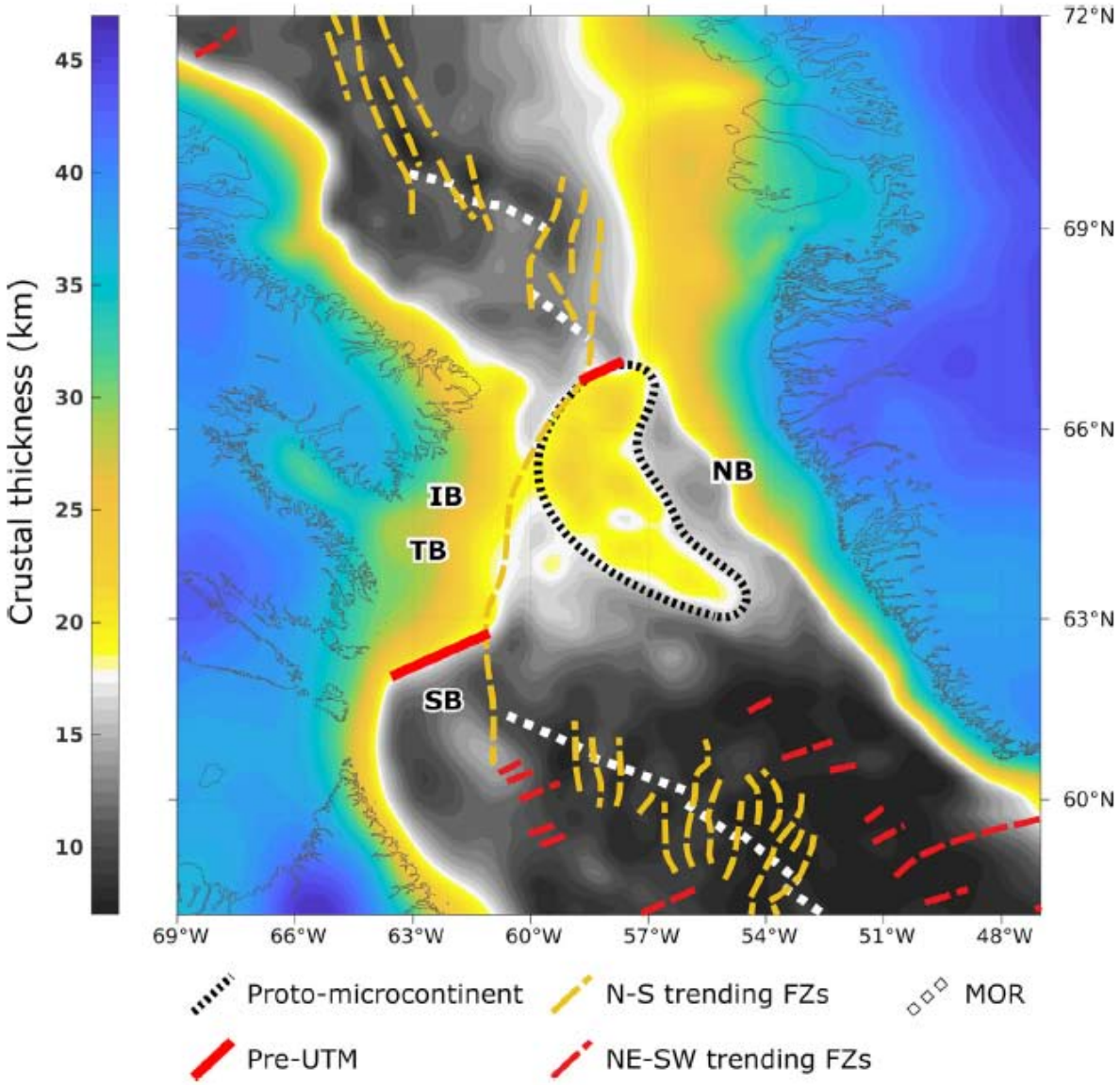
To better understand the crustal signature of the Davis Strait, Longley *et al.*[1] used results from receiver function inversions[8] to produce an updated region-wide crustal thickness model to identify isolated regions of thick continental crust. The crustal thickness model helped constrain the presence and geometry of continental crust within the Davis Strait and allowed the authors to identify a distinct block of continental crust in the centre of the seaway. This block of continental crust contains the Davis Strait High, a region of relatively thick (>20 km) continental crust. Importantly, this region of thick continental crust is separated from Baffin Island to the west by thinner crust (15–17 km) near the Tariut and Imaqpik Basins, and from the continental margin of Greenland to the east by the Nuuk Basin. Longley *et al.*[1] interpret this continental block as an incompletely rifted microcontinent, which they term the Davis Strait proto-microcontinent.

The plate tectonic reconstruction model of the authors suggests release (calving) of the proto-microcontinent coincided with the change in the spreading orientation from NE–SW to N–S between 58 and 49 Ma during the alignment of Canada and Greenland's rifted margins, indicating a fundamental control of lithospheric structure on plate motions.

Previous interpretations of the Davis Strait High have suggested that it formed because of over-thrusting of crustal material along the UFZ[9] (a younger feature that developed as a N–S-orientated



The proposed plate tectonic model.[1] (a) Initial pre-rift fit of Greenland, Canada and Baffin Island, with the Davis Strait proto-microcontinent (DSPM) located between them. (b) NE–SW seafloor spreading begins in the Labrador Sea and the Pre-UTM begins to develop. (c) Following NE–SW seafloor spreading in the Labrador Sea and Baffin Bay, the spreading axis begins to rotate anticlockwise. Simultaneously, the DSPM begins extending away from the West Greenland margin (smaller arrows). (d) Greenland stops rotating and extension is N–S orientated, forming the UFZ through the Davis Strait. The DSPM lies adjacent to West Greenland. (e) Spreading ceases, with Greenland now attached to the North American plate.



Crustal thickness inversion overlain with the proposed extent of the Davis Strait proto-microcontinent. IB – Imaqpik Basin; NB – Nuuk Basin; SB – Saglek Basin; TB – Tariut Basin.

transform fault cross-cutting and replacing the Pre-UTM as the active plate boundary between Greenland and North America). However, this model does not explain the anomalously thin crust across the eastern Davis Strait. Based on the new data, the authors propose that the Davis Strait High and the surrounding region of thick continental crust represents a proto-microcontinent (the DSPM), with the thinner crust to the east signifying a failed spreading ridge. The extensional tectonics (rifting) related to this failed spreading can be recognised by faulting within the Nuuk Basin off Western Greenland.

The main findings of this study can be summarised as follows[1]:

- The new crustal thickness model of the Northwest Atlantic region shows a relatively thick (19–24 km) terrane in the Davis Strait surrounded by two corridors of generally thinner crust (15–17 km), separating it from mainland Greenland to the east and Baffin Island to the west. Although it has previously been inferred that this thickened crust may be a result of excess magmatism, it is now interpreted as thinned continental crust.

- The Davis Strait High and the surrounding region of thick continental crust represents a proto-microcontinent, the DSPM, with the thinner crust to the east, offshore of West Greenland, signifying a failed spreading ridge. The E–W extensional tectonics related to this can be recognised by normal faulting within the Nuuk Basin.

- This extension can be related geometrically and temporally to plate reorganisation (spreading reorientation) during the period 58–49 Ma that resulted in the anticlockwise movement of Greenland.

This research has applicability to other microcontinents globally for understand their calving from continental crust, including the Jan Mayen microcontinent northeast of Iceland, East Tasman Rise southeast of Tasmania, and the Gulden Draak Knoll, offshore western Australia.

Steve McCourt

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CPD for SACNASP

CPD for SACNASP Candidates

All SACNASP Candidates should take note of the updated regulations for CPD (Continuing Professional Development). The latest policy document (May 2024) indicates that the policy is *applicable to all persons who are registered as Candidate Natural Scientist. Candidates will need to meet their annual CPD targets as part of the registrations process to upgrade to higher categories.*

Before Candidates will be allowed to upgrade following the completion of their Candidate Natural Scientist (Cand.Sci.Nat.) phase, they will need to have met the minimum points for the years that have elapsed, i.e., 3 points per year (since their registration). These regulations are applicable to all Candidates wishing to upgrade from 1 April 2025.

GSSA Candidates will be allowed to submit their GSSA CPD Credits at 3/5 of the standard requirements (i.e. 36 GSSA credits per year).

To find out more about what you can claim for CPD and how to log your credits, watch the recording of the CPD workshop on the GSSA YouTube channel.

Noleen Pauls

SAMCODES

SAMCODES Quarterly Snaps

25th Anniversary of the SAMREC Code

March 2025 marks the 25th anniversary of the initial SAMREC Code. A series of celebratory events are planned throughout the year and will be announced in due course.

LinkedIn

A SAMCODES profile has been established on LinkedIn, pay a visit to get up to speed with current developments: https://www.linkedin.com/company/samcodessa/.

SAMCODES App

- The App is alive and updated and offers a useful platform to access current SAMCODES information.
- The new quiz has been uploaded. Test your proficiency and know-how on the SAMCODES by doing the effective and informative quiz. It will take only a few minutes to complete. Check out the SAMCODES App User Guide for step-by-step instructions: https://lnkd.in/emT8976z.

Training programmes

The Young Professionals course is planned to be offered as part of the of the celebrations of the 25th anniversary of the SAMREC Code.

Additional training and awareness campaigns will be announced in due course. In the meantime, look out for the launch of the Industrial Minerals Guideline in March 2025.

SAMCODES ESG Working Group Activities

Draft documents from the SAMCODES ESG Working Group have been released for comments. The documents provide reviews of the disclosure requirements for incorporation into the SAMCODES. Andy McDonald, Chairperson of the SAMCODES ESG Working Group, presented at the ESGS conference. The recording and presentation is available here.

International Liaison

The JORC Code update is in progress and consultation with stakeholders has been completed. The JORC Committee will advise of the anticipated adoption of the updated Code in due course.

Sifiso Siwela

Committee updates

SAMREC	Continuation of incorporation of ESG Factors into SAMCODES and recommendations for additions into SAMREC Table 1 and SAMVAL is in progress.
SAMVAL	The Committee has plans to host a Valuation Conference in South Africa in October 2025.
SAMOG	SAMOG Code updates were sent for public comments and feedback is expected by 15 January 2025.
SAMESG	Draft updates to the SAMESG Guidelines 2.0 and ESG definitions are out for comment and feedback is expected by 15 January 2025.
INDUSTRIAL	Progress is being made on the update of the Industrial Minerals Guidelines and a draft working document has been circulated for comment and feedback is expected by 15 January 2025.

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the geological hot pot

In my column last June, I reflected on the start of my geological career with Esso Minerals Africa and uranium exploration. As a short break from too heavy academic topics and discussions, I hope to share some of the more interesting photographs that I took over the years. I have always been a keen photographer and had my trusty Olympus OM1 single-lens reflex camera with me on my trips, until it was phased out with the advent of digital cameras. I mostly used colour slide film as opposed to colour negative film (from which you made colour prints) because the slides could be used in presentations. After I retired, I managed to scan over 5000 slides that are now stored digitally. This took some time, but well worthwhile, as the slides are easily accessible and shared. The advantages of modern technology!

Hope you enjoy the photographs, and please give us a thumbs up, like they do on LinkedIn!

George Henry

During a reconnaissance trip to investigate the uranium potential of the Kuboos Pluton (~ 500 million years old) for Esso, my field assistant Ron Horscroft and I drove over to the Richtersveld from Kenhardt in the Northern Cape. There we came across the iconic "halfmens" tree Pachypodium namaquanum that is endemic to the region. The mountain in the background comprises meta-arenites of the Stinkfontein Subgroup of the Upper Proterozoic Port Nolloth Group.

Me for scale in 1977, straight out of Wits. Note the long hair and especially the bell bottoms. Those were truly the good old days….

I can't recall whether Ron managed to fill up with diesel here, but I somehow doubt it!

After I left Esso, I enrolled in the MSc programme in Exploration Geology at Rhodes University in Grahamstown, and then onto my doctoral studies back at Wits. My study area was between Usakos and Swakopmund in central Namibia and focused on the tectonostratigraphic development of part of the Damara Sequence. I was supported by the Geological Survey of South-West Africa (now Namibia), which provided transport and camping equipment. My assigned Chevrolet K20 truck is parked at a most scenic spot on the edge of the Namib Desert where I spent the night.

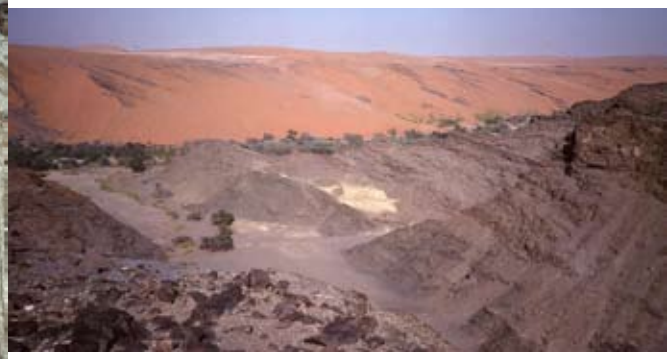
The evenings tended to be on the cold side, and I ensured that I had my camp set up and had my evening meal before the sun set.

Gold Fields were conducting exploration in the country at the time and had this house/office in Usakos where I stayed a few times when I came out of the bush to get supplies and water. A hearty thanks to them!

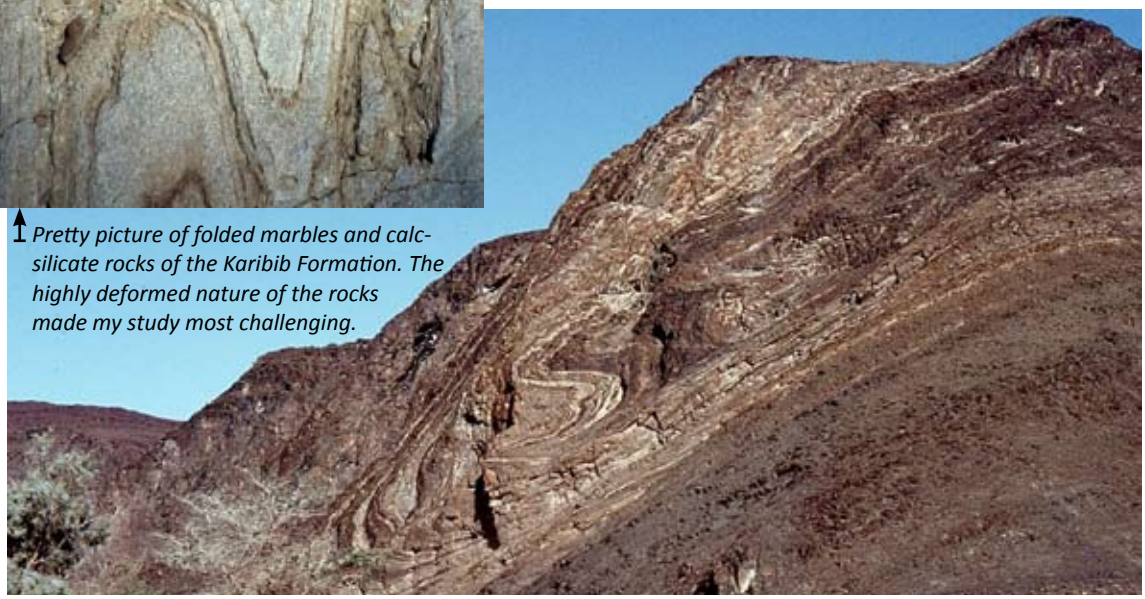
To say that my field area is very scenic would be the understatement of the year! This view was taken on the track along a stream leading to the abandoned Khan Mine. The highly folded rocks belong to the Damara Sequence and were the basis of my dissertation.

View to the southeast from the top of the Chuos Mountains. These comprise resistant meta-arenites of the Etusis Formation, the basal unit of the Damara Sequence. The glaciogenic Chuos Formation type area lies along the south-eastern side of the mountains.

Pretty picture of folded marbles and calc-silicate rocks of the Karibib Formation. The highly deformed nature of the rocks made my study most challenging.



During my time in Namibia, I was fortunate enough to visit other geological sites of interest in the country. This is taken near the Gobabeb Desert Research Station along the Kuiseb River, not too far from my field area. The sand dunes of the Namib Desert appear to be dramatically stopped by the Kuiseb River from crossing over to the northern bank. It is worth having a look at the Google Earth image of the area



Gold Fields hosted the Wits Geology Honours class of 1984 at their exploration camp near the Ugab River about 200 km northwest of my field area. I showed the class some of the outcrops that I studied and tagged along for part of their other geological stops. The drive down the Ugab River was spectacular, and I managed to capture only one photograph of the folding in the meta-turbidites of the Swakop Group of the Damara Sequence. The limitations of having only 36 shots in a reel of film, when you had to think hard about what to click, in contrast to what one can do nowadays with cell phone cameras.

a diamond diver

Up close with a Diamond Diver (and a bit of self-introspection)

It was hard not to notice the naturally polished pebbles of variable size placed all around and within the house that we were Airbnb-ing in Lamberts Bay. The house with thatched roof stands apart from the monotonous housing landscape that is so typical of what sits on the Western Cape geology. Turns out the house belonged to a retired diamond diver, part of the legendary fraternity of guys with long hair, surfing as a passion and hippie attitude who were well known in the 80s along the coastal line that drains the tributaries of the Orange River.

All it needed was a casual remark about the pebbles to Amy, an interior designer making stuff out of stone and shell, and her reserved life-partner Doug, to open up a Pandora's Box on diamond diving along the harsh and barren West Coast. Doug passed on a spiral-bound one-of-a-kind book titled 'Diamond Diving' by George Moyses*, the guru on the subject at hand. I can't remember the last time I read a book of this many pages in less than an hour. It was a captivating read about the journey of a bunch of similar-minded guys, their families, the communities, pains, hardships, short-lived glories in between, and the much-needed funny stories on how the shining stones were 'taken out' amidst the heavy-handed security screening.

Doug in his dwelling with one of the heavy rock samples from the sea-bed.

The account spanned from the 1920s, when the first diamonds were picked up in Port Nolloth, to the big timers, including the Texan oil tycoon who dredged diamonds using airlifts suspended directly down to the seabed, Hans Merensky's venture to buy out the entire 'oyster line' around the shores where the shining stones were invariably found associated with gravel beds mixed with fossilised shells of *Striostrea prismatica*, and Ernest Oppenheimer's intervention to curb the stampede by buying out diamonds following the demand-and-supply model, to the 'Namaqualand rebellion' against the control of the 'big sharks', finally bringing into picture the 'small timer' private boat owners diving for diamonds on a partnership basis for the big companies who owned the rights.

I crossed the yard in the pretext of returning the book, and Doug started off a passionate chat on his life as a diamond diver around the large dinner table adorned by the polished lower jaw bones of a year-old whale that had beached a while back. George's book became a reference point to much of what Doug talked about. In between, he went out to the side yard and carried in rock samples of variable size, including the jars full of 'indicator minerals' that he had collected over the years.

In memory of the jackpot of their lives in 1988 in their lucky boat Jacob V. J (Johan Retief), D (Dougie Leech), C (Carl Barvir) is written with the diamonds.

After being a diver with the SA Navy, Doug (Dougie Leech) was introduced to diamond diving by J (Johan Retief) of JDC, then C (Carl Barvir) joined them later. The trio in their lucky boat named *Jacob V* had a fleet of good diamond recoveries, 1988 being the best of the lot. The rosy days did not last, as has been the fate of most who went after the shining stone along the West Coast. In this respect, Doug has been lucky (as rightly pointed out by Amy).

Diamond diving is about taking diamonds out of the sea-bed. It involves descent into the depths of the ocean on a clear calm day (few come by in a year) close to cliffs along the shore in mostly shallow water, looking for signs, including green (olivine), shiny black (ilmenite), red (garnet) and brown (koffee klippen) concentrates, and oyster shell-rich rocks (indicative of less-disturbed gravel), etc., and pumping diamond-bearing (hopefully) gravel from the sea-bed using the long vacuum hoses that are so diagnostic for spotting diamond diving at a distance. The risks far outweigh the effort. As the gravel gets moved aside and/or pumped up from underneath large boulders, vision starts to get

A collection of indicator minerals

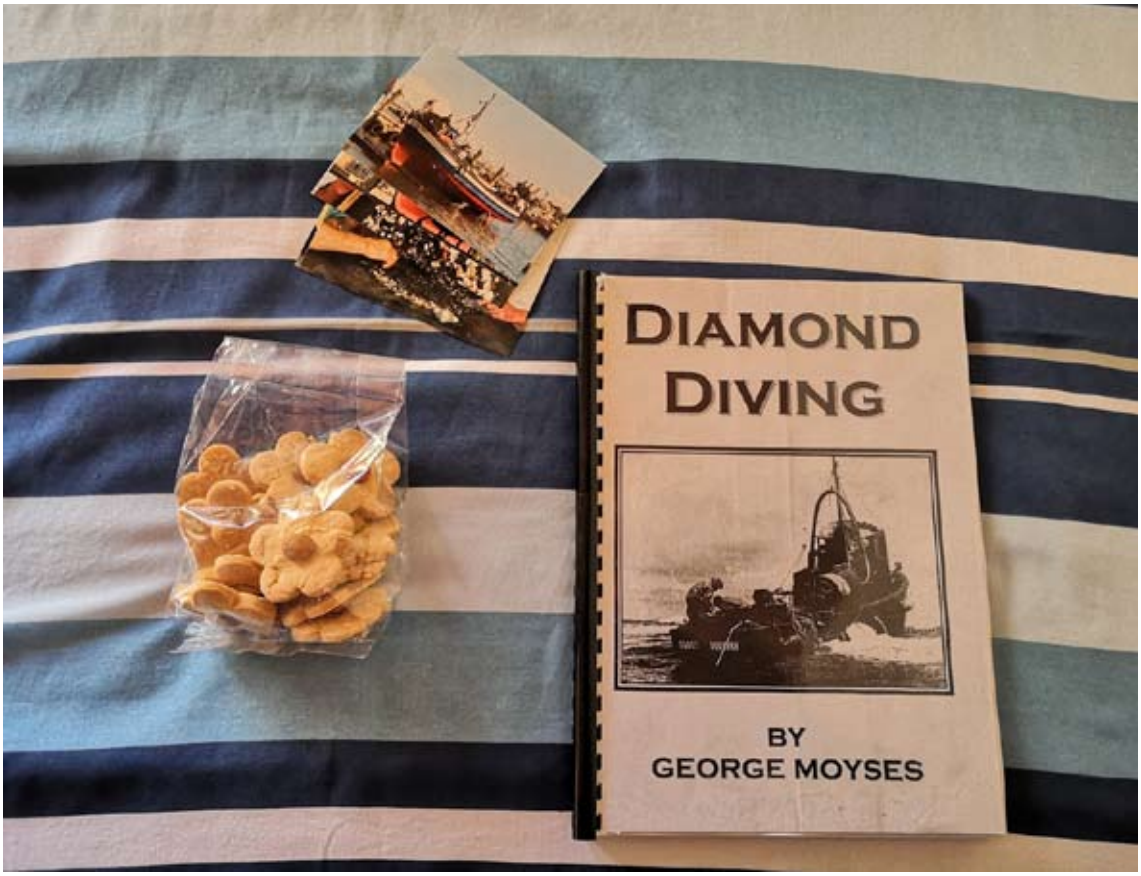
Close-up of the rock sample (hand lens for scale).

blurred and it is a matter of time before the diver gets caught underneath one of the 'rootless giants'. George's book pays tribute to the many who could not get timely help from 'above'.

It was hard to imagine how the four crew members went about their 'routine' up to three days or more in the small boat, adding to the load they had already started off with. Amy remarked on how small the kitchen is in the boat. Accompanied mostly by guys with no swimming experience, in addition to the distance from the shore, the onus is on the diamond diver to respond to emergency situations in case one of the crew falls off.

Doug retired from diamond diving in 2021, relatively earlier than the norm. As rightly pointed out by him (and stressed by Amy), one should be aware of the

Example of a shell-rich rock.



The book by George Moyses together with cookies baked by Amy and Doug's lovely daughter.

evolving situation with respect to work, assess the situation realistically and, importantly, realise when to call it quits. As I was walking back to my part of the dwelling, a thought arose—'this guy is a good candidate to invite for a talk/chat with students'. People like this can stimulate students to pursue what is important in life.

Later on I realised, much to my surprise, that I was able to control my 'monkey' mind (there were no thoughts, the silence of mind brought in order!) while Doug was narrating his ordeal as a diamond diver. Maybe the retirement from academic life helped—no expectations, no need to worry about 'never-ending meetings', the ridiculous need to 'rate oneself' (as part of annual reports), the predicament to justify 'why students fail relatively more in your module?' or 'why lately all students score high marks in your module?', etc. My mind intervened—isn't retiring early from academia escapism? Or should I have followed the crowd, retired by 60, 65 or 70 years and then waited for the 'ground to clear' only to eventually realise 'you are just a piece of Earth'?

While penning this down, I am reminded of Guruji asking followers, 'Have you seen the ocean?'. 'What sort of question is that, Guruji, we have all seen the ocean'. Guruji clarified—'Haven't you seen only the waves? Beneath the waves lies the ocean, which is peaceful, calm and, importantly, silent'. Natsumi was passing by and in her subtle voice remarked, 'When are you going to stop bullshitting, and help me in cooking?'.

Rajesh

**George Moyses, an avid storyteller, retired diamond diver and curator of the Port Nolloth Museum passed away in 2022 (*https://karoospace.co.za/farewell-to-a-port-nolloth-legend/*).*

For a short introduction, including a video, on diamond diving, as it stands today:
https://oceandiamonds.com/our-story/*;*
https://oceandiamonds.com/in-conversation-with-a-diamond-diver/*.*

variation within a species

The need to quantify the "amount" of variation within a species (Darwin, 1859, *The Origin of Species*): An attempt to define a biological species probabilistically when boundaries between taxa do not always exist

I am a palaeoanthropologist with a particular interest in vertebrate taxonomy, notably the classification of species on the basis of measurements of skulls as well as teeth, which are often well preserved in the sparse fossil record. Three centuries ago, Carl Linnaeus had adopted "alpha taxonomy", whereby it is assumed that there are clear boundaries between species that can be pigeon-holed into boxes A, B and C, etc. But there are *not* always distinct boundaries between species, especially in the context of hybridisation. Hence my appeal for a probabilistic approach in relation to what I call "sigma taxonomy", where sigma is", the Greek letter S that stands for a Spectrum of variation. I have applied this morphometric approach to Darwin's finches from the Galápagos Archipelago,[1] as well as to hominoids,[2] which include modern humans, chimpanzees, gorillas and Plio-Pleistocene fossil hominins (distant human relatives) represented for example by *Australopithecus* (such as "Mrs Ples" and "Little Foot" from Sterkfontein in Gauteng, the "Taung Child" from the North West Province, and "Lucy" from Ethiopia), as well as *Paranthropus* (from East Africa, as well as from caves such as Kromdraai and Swartkrans adjacent to Sterkfontein), and extinct species of *Homo* from sites in Ethiopia, Kenya, Tanzania, Malawi, Zambia and South Africa—all more than a million years old.

I have attempted to establish a probabilistic (morphometric) definition of vertebrate species, applicable in modern and palaeontological contexts, using what I call a "log sem" statistic.[1–3] From pairwise regression equations of the form $y = mx + c$, the statistic is based on measurements of skulls or teeth, comparing in each case two specimens that may or may not be the same species. The term "sem" is the standard error of the *m*-coefficient in the equation.

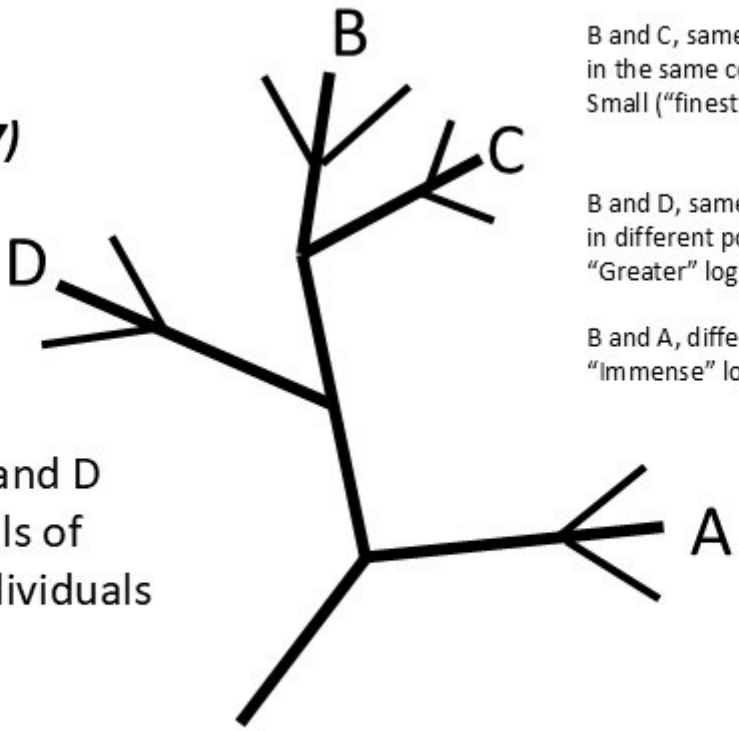
In the figure that I have prepared for this note, I present a scenario related to "log sem" statistics based on pairwise comparisons between measurements of four skulls, A, B, C and D. Theoretically, we can assess them in relation to Charles Darwin's iconic generalised phylogenetic tree that he sketched in a notebook in 1837, in which he compared a specimen B against A, C and D. From his graph he noted that there was the smallest ("finest") difference between individuals B and C (probably conspecific), but a "greater" difference was found between specimens B and D (which might still be the same species). However, when B was compared to A, an "immense" difference occurred, reflecting different taxa.

In his sketch in the top left-hand corner of his notebook Darwin wrote the words "I THINK". Well, I like to think that "I CAN THINK TOO" in the context of analogous theoretical concepts based on morphometric observations—in my case, about 10,000 pairwise linear regressions of conspecific hominoids, with a mean "log sem" value of −1.61 and a standard deviation of 0.1, reflecting what I consider to be a *typical amount of variation* in hominoid species (including Plio-Pleistocene hominins), based on cranial measurements.[2]

Note the following scenario:

1. When cranial measurements of two conspecific specimens B and C from the *same community* are compared, there is little scatter ("*the finest*", to use Darwin's words) around the regression

I THINK TOO (After Darwin, Notebook 1837)

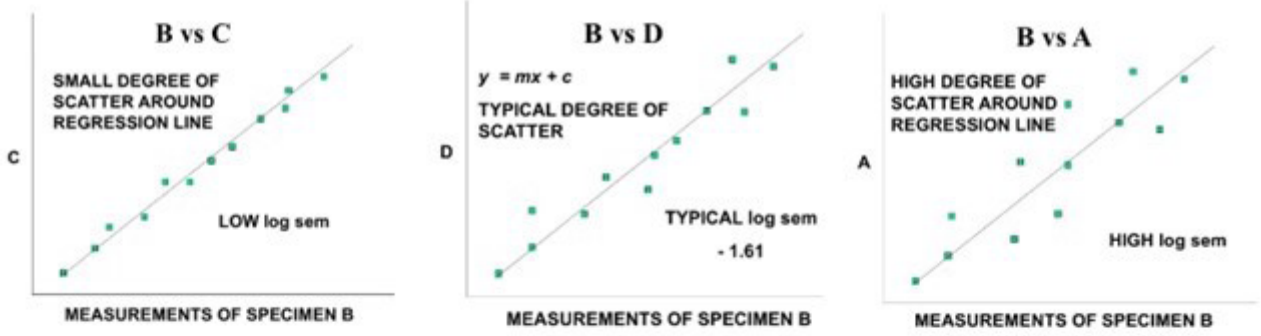


B and C, same species
in the same community.
Small ("finest") log sem difference.

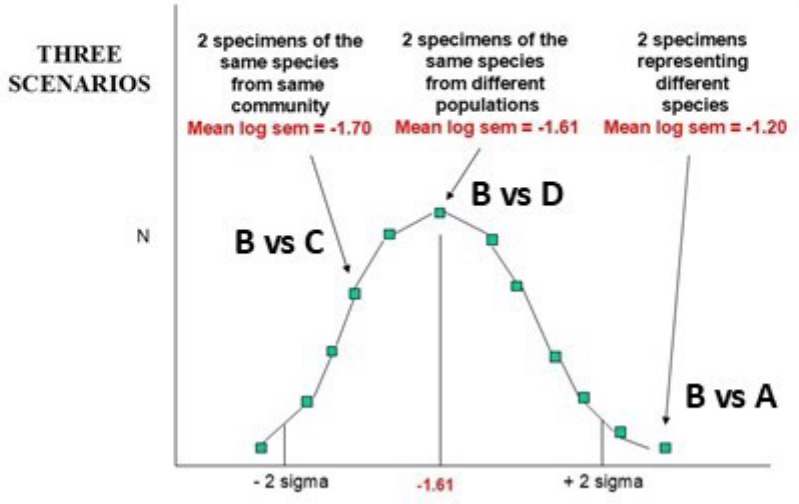
B and D, same species
in different populations.
"Greater" log sem difference.

B and A, different species.
"Immense" log sem difference.

A, B, C and D
are skulls of
four individuals



THREE SCENARIOS FOR COMPARISONS BETWEEN A, B, C and D



line (associated with $y = mx + c$), and the "log sem" statistic is very low (<< −1.61).

2. When cranial measurements of two conspecific specimens B and D from the *same populations* are compared, the "log sem" is generally "*greater*", typically −1.61 ± 0.1, reflecting a high probability of representing the same species.
3. When cranial measurements of two specimens B and A representing different species are compared, the "log sem" is "*immensely*" different, typically outside the upper 95% confidence limit of −1.61 ± 0.1.

The above relates closely to a statement in the last chapter of *The Origin of Species*, in which Darwin recognised the need to quantify the "*amount*" of variation in a species. In the case of hominoids, −1.61 ± 0.1 is my statistical probabilistic definition of a species based on "log sem" statistics. See the accompanying table.

There is something remarkable about the absolute value of −1.61, which I questioned[3] as a possible "approximation of a biological species constant", designated *T*, applicable to many vertebrate species. In my recent article,[2] based on a study of extant and extinct conspecific hominoids (see table), I confirm that 1.618 is the absolute value of an apparent "constant" based on about 10,000 pairwise linear regressions. Perhaps not coincidentally, 1.618 is the value of Phi (Φ), the "Golden Ratio", which is expressed in many ways in nature, associated with the Fibonacci sequence.

Francis Thackeray
Evolutionary Studies Institute, University of the Witwatersrand

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2. Thackeray, J.F. 2024b. Quantification of morphological variability expressed by a "log sem" statistic in the context of human evolution *(Australopithecus*, *Paranthropus* and early *Homo*). In Djindjian, F. (ed)., *Les sociétés humaines face aux changements climatiques 3.* Proceedings of the International Academy of Prehistory and Protohistory (AIPP), Archaeopress, Oxford, 1–14. https://www.archaeopress.com/Archaeopress/download/9781803278919 (This link is for the entire book. Thackeray's chapter is the first in the volume).
3. Thackeray, J.F. 2007. Approximation of a biological species constant? *South African Journal of Science* 103, 489.

Table: *Summary of results obtained from morphometric analyses of extant and extinct hominoids, based on measurements of skulls and teeth. For comparisons of conspecific pairs, the mean of the mean log sem values in this table is −1.618 ± 0.1 for both modern and fossil sets of data (9,788 regressions).*[2]

Mean log sem	Number of regressions
Extant hominoids **-1.61** ± 0.13 (crania)	8072
Extant hominoids **-1.62** ± 0.12 (dentition)	1520
Plio-Pleistocene **-1.64** ± 0.06 hominoid crania	6
Plio-Pleistocene **-1.61** ± 0.10 hominoid dentition	176
Paranthropus robustus dentition **-1.61** ± 0.06	14

SAMREC code

Celebrating 25 Years of the SAMREC Code: A Milestone in the Global Minerals Industry

March 2025 marks the 25th anniversary of the South African Code for the Reporting of Exploration Results, Mineral Resources and Mineral Reserves, commonly known as the SAMREC Code. This milestone is a testament to the enduring significance of the SAMREC Code in the global minerals industry, reflecting its pivotal role in standardising and enhancing the transparency of mineral reporting.

The SAMREC Code was launched on 24 March 2000, following extensive collaboration among industry stakeholders, including the Geological Society of South Africa (GSSA) and the Southern African Institute of Mining and Metallurgy (SAIMM). The Code was developed in response to the need for a standardised framework for reporting mineral resources and reserves, ensuring consistency and reliability in public disclosures. Over the years, the SAMREC Code has undergone several revisions to keep pace with the evolving needs of the industry. The most recent edition, released in 2016, incorporated significant updates to align with international standards and address emerging challenges in mineral reporting.

The SAMREC Code's impact extends far beyond South Africa, influencing mineral reporting practices worldwide. Some of the key reasons why the SAMREC Code is crucial to the global minerals industry include:

1. **Standardisation and Transparency**: The SAMREC Code sets out minimum standards for reporting exploration results, mineral resources, and mineral reserves. This standardisation ensures that reports are consistent, transparent, and comparable across different jurisdictions, fostering trust among investors and stakeholders.
2. **Credibility and Confidence**: By adhering to the SAMREC Code, companies can enhance the credibility of their public reports. This credibility is vital for attracting investment and securing financing for mining projects, as investors rely on accurate and reliable information to make informed decisions.
3. **Guidance for Professionals**: The SAMREC Code provides comprehensive guidelines for professionals involved in mineral reporting. It assists Competent Persons in demonstrating the legitimacy of their declarations, thereby upholding high standards of professionalism and accountability in the industry.
4. **Adaptability to Changing Needs**: The SAMREC Code has evolved to address the changing landscape of the minerals industry. It incorporates updates to reflect advancements in technology, shifts in economic and political conditions, and the growing emphasis on environmental, social, and governance (ESG) factors.
5. **Global Influence**: The principles and definitions established by the SAMREC Code have been adopted and adapted by other international reporting standards, such as the JORC Code in Australia and the CIM Definition Standards in Canada. This global influence underscores the SAMREC Code's role in shaping best practices in mineral reporting worldwide.

As the SAMREC Code celebrates its 25th anniversary, the industry continues to recognise its importance in promoting transparency, credibility, and

professionalism in mineral reporting. The ongoing efforts to update and refine the Code reflect a commitment to maintaining its relevance and effectiveness in a dynamic and ever-changing industry. The SAMREC Code's legacy is one of collaboration, innovation, and dedication to excellence. As the global minerals industry faces new challenges and opportunities, the SAMREC Code will undoubtedly remain a cornerstone of best practices, guiding the way forward for the next 25 years and beyond.

Join us in celebrating this milestone on 2–3 September 2025. The GSSA and the SAIMM will be hosting an *Introduction to SAMREC/SAMVAL and JSE Listing Rules* workshop at the Johannesburg Country Club (Auckland Park). Included in the programme will be a celebration of 25 years of the SAMREC Code—listen to professionals who were on the original committee and hear how things have changed (or not) over time. There will also be a cocktail networking event on the evening of the 2nd of September.

Click here to register for the workshop and/or the cocktail event.

2-day Workshop
GSSA (and associated organisations) members: R3,000 (R1,750/day)
Non-members: R3,500 (R2,000/day)
Students/academics/retired: R750
Sponsored students/mentees with sponsorship code: FREE

25th Anniversary Roundtable & Cocktail Function (cash bar)
GSSA (and associated organisations) members: R200
Non-members: R250
Students/academics/retired: R100
Sponsored students/mentees with sponsorship code: FREE

Tania Marshall

science communication

South Africans advance science communication at the European Geosciences Union General Assembly 2024

Dr Robyn Pickering and PhD candidate Sinelethu Hashibi, both from the Department of Geological Sciences, UCT, attended the European Geosciences Union General Assembly, held in Vienna, Austria, from 14–19 April 2024. This was a huge conference, with 20,979 registered attendees, of which 18,388 made their way to Vienna from 116 countries and 2,591 joined online from 109 countries. It was a great success, with 18,896 presentations given in a staggering 1,044 sessions over 5 very busy days. The GSSA generously supported Robyn and Sinelethu with a travel grant to offset the expense of attending the meeting.

Sinelethu Hashibi was awarded the 2024 Katia and Maurice Krafft Award for pioneering work developing accessible geoscience educational resources that fill a vital need, translating complex concepts into more understandable language for under-served audiences. The award was received during an event held on the 17th of April in Vienna. As is customary for awardees, Ms Hashibi gave an Award Lecture titled, '*Translating the South African geological record into isiXhosa*', which was well attended and received. It was really good to address the problem of language in communicating science, which became apparent was not just an African problem, but a worldwide problem that affects everyone whose mother tongue is not English. Sinelethu also presented a scientific poster focused on her current PhD project, titled *'Using kimberlite indicator mineral geochemistry to better constrain the thermal and chemical structure of the lithospheric mantle beneath the Kaapvaal craton: correlations with S-to-P receiver functions'.* The session was a really good time to interact with both peers and "seasoned" researchers, with incredibly valuable feedback.

Robyn Pickering gave an oral presentation in the 'Geoscience and public outreach' session titled *'Decolonising geoscience communication: a case study of a new human evolution exhibition at the Iziko South African Museum*'.

Robyn also co-facilitated a short course on '*Building meeting grounds between the Global South and North: how do we move away from neo-colonial geoscience research structures',* which was very well attended and saw some interesting debate. After discussing with a colleague over a beer last year about how few African geologists know each other, and how geologists on the continent and in the diaspora end up being drawn into existing European and American networks, at the expense of building pan-African networks, Robyn helped organise and co-hosted a networking event for 'Geographically Under-Represented Geoscientists'. This event was a big success and it was great to see familiar faces, finally meet some online colleagues in person and make new connections.

Sinelethu Hashibi receiving the 2024 Katia and Maurice Krafft Award.

Robyn Pickering delivering her talk on 'Decolonising geoscience communication' at EGU2024.

Back in 2022, Robyn was invited by the senior leadership team of the European Geosciences Union (EGU) to co-convene a Union Symposium titled "*Scientific neo-colonialism: what is it and why should you care*?". She gave a 10-minute presentation on what scientific neo-colonialism is and how this manifests in our field of Earth sciences. To illustrate this presentation, and mindful that almost no one in the audience had English as a first language and that this is a sensitive and hard topic to talk about, she worked with the art and design team at the Iziko South African Museum, Nkosingiphile 'Mazi' Mazibuko and Amy Sephton and co-created a series of illustrations of concepts like 'helicopter science'. In late 2023, the three of us were invited to bid for Mazi and Amy to be the EGU2024 Equity Diversity Inclusivity (EDI) Artists in Residence, which was successfully approved by the EGU Council. They ran a booth in the expo space at the conference for 5 days, based on the idea of calling people in, rather than calling them out, and building understanding in the EGU community about what neo-colonialism is and how

Iziko Museums designers Nkosingiphile Mazibuko and Amy Sephton collecting stories of neo-colonialism & illustrating them at the EGU booth.

to bring about change. We also collected delegates' stories and experiences of neo-colonialism, which Mazi illustrated live in the booth. We are working on a paper for the EGU Geoscience Communication to publish these illustrations and stories.

EGU24 was a great experience for us both and we are grateful to the GSSA for getting us there!

Robyn Pickering *and* ***Sinelethu Hashibi***

Geoscience Symposium

Group photo in front of UJ Business School.

Meeting report: International Geoscience Symposium "Precambrian World"

The International Geoscience Symposium "Precambrian World" held at University of Johannesburg in December 2024 was the 7th meeting of its kind since its inception in 2009. Supported by several Japanese and South African institutions, the purpose of this symposium was to bring together Japanese, South African and international scientists and students to discuss recent progress related to Precambrian surface processes. Specific focus areas were Precambrian hydrothermal systems, microbial activity, banded iron formations and the Great Oxidation Event. The main organisers of the conference were Prof. Shoichi Kiyokawa, Kyushu University and Visiting Professor at University of Johannesburg (UJ), and myself.

The event consisted of two parts, a 2-day scientific symposium held in Johannesburg and a 5-day field trip to investigate some of the Archaean and Proterozoic geology of the Kaapvaal craton around Johannesburg.

The scientific symposium was held at UJ Business School and was attended by 35 people. Twenty-five oral presentations and three posters were presented over the two days, with the majority coming from Japanese and South African contributors. However, the event also attracted visitors from Botswana, Brazil, Egypt, Germany, Ghana, Moldova, Sweden, and the USA. The focus of the talks was on the evolution of Archaean and Palaeoproterozoic volcano-sedimentary successions and their traces of life and mineral deposits. The symposium, which also included poster presentations by postgraduate students, was a lively event that signified a strong, ongoing interest in Precambrian geology, life and mineral deposits.

Lunch break at Piza e Vino next to UJ business school.

Discussion inside the symposium venue.

David Russo explaining Witwatersrand geology next to the Contorted Bed in downtown Johannesburg.

Landowner Gina Forster and field trip participants at the Lanseria palaeosol site (cliffs in the background).

The field component of the event was limited to 20 participants and started off with a 2-day investigation of the geology in and around Johannesburg, led by Axel Hofmann and David Russo (Wits). Sites visited included granitoid-greenstone basement of the Johannesburg Dome and outcrops of the Witwatersrand and Ventersdorp supergroups. The 3rd day was dedicated to the geology of the Transvaal Supergroup. Led by Andrey Bekker (UC Riverside) and Axel Hofmann, participants investigated the

Roger Gibson explaining the formation of pseudotachylitic breccia at Salvamento quarry.

Group photo at Doornkop Mine.

recently discovered Lanseria palaeosol situated on granodiorite below the Black Reef Formation, stromatolitic carbonates of the Malmani Subgroup and siliciclastic sediments and ironstones of the Pretoria Group. Roger Gibson (Wits) shared his knowledge of impact cratering processes during a trip to the Vredefort Dome on the 4th day. The 5th day was dedicated to an underground visit to Harmony's Doornkop Mine.

Funding from the Japan Society for the Promotion of Science covered the expenses of a number of Japanese and international participants. Funding for the participation of South African academics and students was possible via grants from the GSSA Research, Education and Investment (REI) Fund and the DSI-NRF Centre of Excellence in Palaeosciences (Grant 86073). We also thank Brendan McNally, Mzokhona Mchunu, Hilton Chirambadare and Cornell van der Merwe of Doornkop Mine for the opportunity to visit their operation, for excellent hospitality and for leading the trip. More information on the event, especially photos, are available at https://wheelaa.jp/. Field trip guides and the abstract volume are available on request.

Axel Hofmann

mineral scene

The Klein Spitzkoppe at sunset. The granite, and the weathered alluvium surrounding the mountain, have been a source of topaz crystals for over 120 years.

Southern African Topaz

Topaz, $Al_2(SiO_4)(F,OH)_2$, is a popular gemstone and occurs in different colours, from blue to yellow to colourless, the latter often referred to as 'silver topaz'. The blue variety of topaz is probably the most popular and the gemstone's intense blue colour is often obtained via irradiation or heat treatment, or both.[1] The geological setting of topaz is varied, and while certain silicic pegmatites are one of the most well-known, others include vein-type, greisen-type, skarn, and placer.[2,3]

Southern Africa has some famous topaz occurrences, particularly in Namibia and Zimbabwe, and in more recent times, Zambia.[4] The Namibian localities are Klein Spitzkoppe[5], Erongo Mountain[6] and the Brandberg[7]. The Klein Spitzkoppe crystals are volumetrically the most abundant and thousands of crystals have been collected from the miarolitic cavities in the granite. In fact, the first specimens were collected by Hintze[8] and used to determine, and confirm, that the morphology and crystal structure was similar to the more ancient topaz from Russia. Most of the Klein Spitzkoppe topaz are colourless, but can be treated to yield an attractive blue colour. The nearby Erongo massif[6] has also yielded attractive topaz crystals, although not as plentiful as those from Klein Spitzkoppe. These tend to be colourless and fluoresce yellow under long-wave ultraviolet light. Further north, the Brandberg Mountain contains rare pegmatitic veins that have yielded large (several kilograms) topaz crystals that are characteristically pale green.[7]

A selection of five typical Klein Spitzkoppe 'silver topaz'. Extreme left crystal is 4.6 cm.

A faceted 27.93 carat Klein Spitzkoppe topaz alongside a natural crystal.

Erongo Mountains, viewed towards the northeast. The smooth granite surface belies a myriad of miarolitic cavities that have yielded a variety of minerals including topaz, aquamarine, fluorite and schorl.

A 3.5 cm cluster of topaz crystals from Erongo Mountains. ***Left:*** *Viewed under natural light.* ***Right:*** *Fluorescing yellow while viewed under 365 nm long-wave ultraviolet light.*

A semi-tabular topaz crystal with 'booklets' of silver-white muscovite at the base, 3.6 cm. Erongo Mountains.

Pale green topaz with brown clay inclusions, 5.4 cm. Erongo Mountains.

The road leading up to the Brandberg in Namibia.

Pale green topaz crystal, 9 cm. Brandberg Mountain.

An 'Imperial-coloured' prismatic 5.4 cm topaz crystal from Zambia.

Zimbabwe has a world-famous topaz deposit, the St Anne's mine in northwestern Zimbabwe.[9] The naturally blue crystals can be seen in many local and overseas collections. In the past, the mine was operated specifically for topaz crystals, and in more recent times, artisanal workers still search for these.

To the north of Zimbabwe, a relatively small deposit close to Karengerenge village in Kalumbila District in northwest Zambia yielded exceptional amber-champagne topaz crystals that rival some of those from Ouro Preto, Brazil and Russia.

Finally, the Alto Lighona pegmatite province[10], famous for its gemstones, has sporadically produced exceptional topaz crystals, some up to a meter in length.[11]

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All photos © Bruce Cairncross

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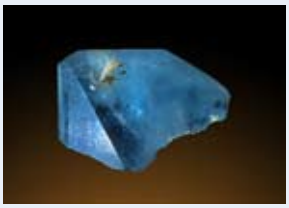
Four pale blue St Anne's Mine topaz crystals. Left-hand-side crystal is 3.2 cm.



A natural blue (non-irradiated) topaz from St Anne's Mine, Zimbabwe, 8 cm.

A 3 cm Zambian topaz crystal. These crystals caused a sensation when they first appeared on the international market several years ago.

A large topaz crystal weighing 9.75 kg (20×19×16.5 cm). This specimen was collected at the Namirrapa Mine, Alto Ligonha pegmatite field, Mozambique, in the late 1950s.

Council for Geoscience

The Council for Geoscience (CGS) is the national custodian responsible for the collection, compilation and curation of all onshore and offshore geoscience data and information. The CGS aims to use this information and knowledge to develop geoscience solutions to real world challenges in South Africa.

The CGS implements its geoscience technical programme (GTP) model through the five (5) core themes which are summarised below.

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Council for Geoscience

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Image credit: Bushveld Complex UG1 chromitite seams at the famous Dwars River outcrop. George Henry.

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obituaries

Asriel van der Westhuizen †

Asriel (Assie) van der Westhuizen
3 September 1942 to 27 November 2024

Born on September 3, 1942, in the picturesque town of Graaff-Reinet, Asriel (Assie) Van der Westhuizen passed away on 27 November 2024, at the age of 82.

Shortly after his 11th birthday, his family relocated to Namibia, where he completed his education, matriculating from Windhoek High School at the end of 1960.

After a brief two-year stint as a furniture salesman, Assie discovered his passion for geology, inspired by the allure of beautiful mineral specimens. He completed a BSc Geology degree at Stellenbosch (1968), his 4th year Honours at Potchefstroom (1988), an MSc Geology at University of the Free State (1992) and PhD at Stellenbosch (2012).

Loni Gallant introducing Oom Assie at the West Coast Diamonds event in 2023.

In March 1967, he embarked on his professional journey as a Junior Geologist. It was during this time that he met the love of his life, Joey, and they were married on 18 April 1970.

To lay the groundwork for his long and illustrious geological career, Assie initially worked and gathered experience in various geological commodities and disciplines, including petroleum exploration, base metals and minerals in and around Pofadder in the mid-1970s, and industrial minerals. Significant projects included Northern Cape Sishen-type iron and manganese, the Kalahari Manganese Field, Barberton and Witwatersrand gold, and Peruvian gold in the Andes.

In April 1982, he found his niche in kimberlite and alluvial diamonds, a field in which he would make substantial contributions. Most notably, Assie spent 22 years (from 16 April 1982 to 31 March 2004) with the Trans Hex Group (THG), initially providing detailed geological delineation, interpretation and evaluation of the fascinating deposits of the lower Orange River (including Baken Mine). Subsequently, he spent some 15 years in the THG middle management level, involved with alluvial and kimberlitic diamond deposits in RSA, Namibia, Botswana, Zimbabwe, Zambia, DRC, Swaziland and Brazil, from time to time also reviewing gold and industrial minerals projects in RSA, Namibia and Swaziland.

In April 2004, he moved on from Trans Hex to establish his own consulting business working in a range of commodities, though diamonds remained his key focus.

His dedication to alluvial diamond geology culminated in a PhD from Stellenbosch University in 2012, four years after his retirement. His thesis on

the *'Provenance of alluvial diamonds in southern Africa: A morphological, and mineral chemistry study of diamonds and related heavy minerals from the Vaal-Orange system and the West Coast'* is a magisterial and comprehensive study of an ever-fascinating and challenging subject. This dissertation provides a wealth of knowledge, offering important insight into the sources, weathering, planation, transport, and formation of the extensive alluvial diamond deposits of southern Africa, particularly those of the West Coast and Orange River.

Assie at the braai—Baken Mine, lower Orange River, 1997.

An important aspect of this PhD work was his reinforcement of the role played by the Dwyka glaciers that transformed the landscape of southern Africa (and Gondwanaland) in the Carboniferous–Permian period and the role these giant rock-crushers and transporters played in rock-mass disaggregation (including pre-Permian diamondiferous kimberlites) and transport of diamonds from the Gondwana hinterland (southern Africa) to the West coast of southern Africa, and into what is today South America.

Assie Submitting his PhD thesis.

Assie busy processing his samples for this PhD thesis.

After retiring, Assie continued to share his expertise as an independent consulting geologist, focusing on the development of new prospects in heavy mineral sands in South Africa and Lesotho.

In mid-2013 he ended up at Alexkor on the West Coast where he provided geological part-time services to Alexkor and other groups pursuing land and marine diamonds. Unfortunately, a hip problem saw his mobility restricted, but though confined to a wheelchair in recent years, he continued to advise and share his wealth of knowledge with geologists young and old.

Those that knew, interacted with and worked alongside Assie benefited immensely from his commitment to the alluvial diamond discipline, attention to detail, his quiet demeanour, professionalism, politeness, openness and sharing of ideas and skills.

To *John Bristow*, who first met Assie on an eye-opening trip to the exceptional alluvial diamond deposits of Baken Mine and the lower Orange River in 1997, he became a long-standing friend and sounding board. He was always willing to share knowledge, comment about concepts and ideas put forward, and very politely pour cold water on untenable models! He was a regular visitor to the Bristow home in Pretoria and made a big impact on their two high-school then university learners, given his politeness, immaculate dress-code, engagement and sharing of his life-long experiences.

For *Baxter Brown*, he was a dear friend of remarkable mind and recall. Assie's deep sense of humanity and gentle humour was a pleasure to encounter on the privileged occasions he enjoyed when visiting both Assie and Joey at Alexander Bay. Baxter cherishes Assie's insights into alluvial diamond geology in general and benefitted greatly from discussions in the quiet of his home.

To *Peter Walker*, who first met Assie and Joey in Pofadder where they worked together for a Canadian junior exploring for base metals in the mountains near Pella and later worked together for Trans Hex, Assie was everything that a gentleman should be—unassuming but knowledgeable, with a gentle sense of humour. Assie was deeply religious and lived as a committed Christian in his daily life and interactions with everybody he met. Peter will greatly miss his friendship and counsel.

Kabelo Mongalo first met Oom Assie in 2016 as a young geologist, and he generously shared a wealth of knowledge with Kabelo and his colleagues at

Assie with locals in the DRC, during his field work.

Alexkor. His kindness and willingness to share his experiences created a valuable knowledge base for them. Both he and Aunty Joey always offered a warm welcome whenever we visited. He made a significant impact on the alluvial diamonds industry, and he will always be remembered fondly.

A passionate advocate for the geological community and young geologists, Assie was a great supporter of the establishment of the Northern Cape Geological Society of South Africa (NC GSSA) and played a pivotal role in organising the Annual West Coast Diamonds event. His remarkable contributions to the research and development of the alluvial diamond industry in South Africa have left a lasting impact.

Assie is survived by his beloved wife Joey, children and grandchildren. He will be remembered not only for his professional achievements but also for his kindness, generosity, and unwavering support for his colleagues and friends.

Rest in peace, Assie. Your legacy in the field of geology and the hearts of those who knew you will endure forever.

Kabelo Mongalo
*(with contributions from **John Bristow**, **Baxter Brown** and **Peter Walker**)*

obituaries

Luc Chevallier †

Luc Chevallier
1954–2024

It is with profound sadness and heartfelt gratitude that we honour the life of Dr Luc Chevallier, an extraordinary geologist, mentor, and global citizen. Luc passed away peacefully, leaving behind his legacy in geology, scientific research, and mentorship.

Luc's journey through the Earth sciences began with a passion that led him to achieve a PhD from the University of Grenoble in 1980 and a DSc in the Tectonophysics of Volcanoes in 1987. His research on volcanic structures, particularly on the Piton des Neiges and other iconic formations around Reunion Island, cemented his place as a leading researcher in the volcanic islands of the Indian Ocean.

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11 FACILITATES LIFELONG LEARNING THAT IS CRUCIAL TO A PROFESSIONAL'S CAREER PATH – CANDIDATE MENTOR PROGRAMME

12 CONTINUING PROFESSIONAL DEVELOPMENT – ONLINE LEARNING

Over a career spanning more than four decades, Luc contributed profoundly to the fields of geological mapping, structural analysis, and the advancement of hydrogeology. He worked extensively across the globe—from the volcanic islands of the Indian Ocean to numerous countries in Africa. As geologist at the Council for Geoscience and later as a consultant, Luc supervised and participated in numerous high-profile international projects in countries including Cameroon, Madagascar, Burkina Faso, Gabon, Mauritania, Morocco and Saudi Arabia. His expertise and dedication yielded more than 15 geological maps, over 33 scientific publications, as well as practical advancements in groundwater sustainability.

A decade of work for the Water Research Commission in the Karoo Basin exemplified Luc's ability to blend rigorous science with practical applications, addressing critical water challenges in semi-arid regions of South Africa. His novel insights into the influence of dolerite sills and ring complexes on aquifers remain pivotal in understanding hydrological systems.

Beyond his technical achievements, Luc was celebrated for his compassionate leadership and deep commitment to education. As Manager of the Western Cape Branch of the Council for Geoscience between 2002–2013, he left an indelible mark on the development of young geoscientists, nurturing their careers with patience, insight, and unwavering encouragement. His guidance and mentorship have inspired a generation of professionals who continue to carry forward his values of excellence and curiosity.

Known for his kindness, humility, and love for the natural world, Luc's legacy transcends the scientific community. He leaves behind an enduring body of work and a network of grateful colleagues, mentees, and friends who were touched by his brilliance and humanity. While he will be deeply missed, his memory will forever inspire those who were fortunate to work with him.

Rest in peace, Luc. The Earth's story is richer for having had you among us.

Chris Lambert *and* ***Paul Macey***

obituaries

Christopher Mark Hubert (Chris) Jennings
15 February 1934 to 11 December 2024

A very young Chris, in—appropriately—the early days of geophysics in Africa.

Chris died quietly in his bed, surrounded by Jeanne and their four children, on the morning of Wednesday 11 December 2024, aged 90. Having been diagnosed a few years earlier with amyotrophic lateral sclerosis, in the end it got the better of him, like nothing else in 90 years had been able to. Like the patriarch Abraham, Chris died full of years. Let's take a brief trip through them.

The first published tribute to Chris appeared in the Canadian *Globe and Mail* shortly after his death. It was written by a family friend, Canadian journalist and author, Matthew Hart. The dates and details in the following lines are to a large extent indebted to Hart's biography, *From the Kalahari to the Arctic: a family journey and an epic diamond chase*, published in 2016. Note that it is not Chris's journey that Hart follows but the 'family journey'. Chris was nothing if not a family man, starting, first and foremost, with his wife Jeanne (called 'Jenny' by one and all.)

It is a measure of Chris's single-mindedness and dedication—that were his hallmark professionally—that he built an exemplary marriage over the better part of seven decades with someone he had first known at primary school. As a working geologist, Chris's natural instinct was to have Jeanne on board—they dreamt things together, dared things together and did things together.

His schoolteacher father, Hubert, immigrated from England, taught at DHS in Durban before moving on to head schools in Greytown—where Chris met Jeanne—and then Dundee. Chris finished his schooling at DHS before moving on to Natal University, where a geologist friend of Hubert's introduced him to the charismatic Professor Lester King. Chris, a lover of nature and the outdoors, needed no persuasion to study geology, majoring with a BSc in geology and physics and BSc Hons in geology. He divided his university time carefully, courting the love of his life and playing the rugby he loved, finishing as captain of the university team and playing for Natal.

At the end of their fourth year of studies—Jeanne 21 and Chris 22—they married in Greytown and, after a short honeymoon, were off to Lobatse, where Chris would start his job with the Geological Survey of Bechuanaland. One of the reasons for the choice of that job was that it was the only post offered that allowed wives to travel in the field with their husbands. Mining companies like Rio Tinto, De Beers and Anglo American in the late 1950s expected their geologists to be in the remote areas they were exploring, alone, for the winter months, while they did their prospecting. That was not for Chris and Jeanne.

When Chris signed on with the Bechuanaland Geological Survey in January 1957—nine years before independence—it was a poor, sparsely populated country with an almost entirely agricultural economy. It is largely covered by sand of the Kalahari (semi-)desert, with no perennial rivers other than the Okavango in the far northwest, which flows into the Okavango Delta and not far beyond that disappears into the sand. Water was a priority, and Chris was first tasked to use his geological expertise, backed by geophysics, to find sources

of groundwater for the cattle-based communities along the eastern rim of the country.

With three mineral-rich countries to the west (South-West Africa/Namibia), south (South Africa) and east (Southern Rhodesia/Zimbabwe), mineral exploration was in its early stages and Chris's second main portfolio was liaison with the companies engaged in this.

The dual roles Chris filled led to two main outcomes: a PhD for the thesis he wrote on the results of his research into the country's groundwater, and an abiding interest in how geophysics might be applied to the discovery of kimberlite pipes, which De Beers suspected lay below the Kalahari sand. In the late 1950s and early 60s, geophysics was in its infancy, but elsewhere in the world was being used as a powerful tool in mineral exploration.

In mid-1966, kimberlite indicator minerals (KIMs; pyrope garnet, ilmenite and chrome diopside) were recovered by De Beers geologists from samples collected in east-central Botswana. Decades before this, diamonds had been recovered from samples collected in the Motloutse River in the far east of the country, but extensive follow-up by various companies over the years had failed to locate the source. Now, it appeared, De Beers was at last zeroing in on that long-sought holy grail. Chris, in his capacity as the Geological Survey's exploration monitor, was completely au fait with developments, so knew of the discovery of a large kimberlite pipe (later to be called Orapa) on Friday, 21 April 1967. There was a full sharing of exploration know-how between De Beers and the Survey because of the success of De Beers KIM sampling and Chris's pioneering success in various new geophysical methods. These had been mainly applied to his search for groundwater, but no one doubted that there would be applicability to mineral prospecting.

De Beers' Lobatse-based veteran diamond exploration manager, Gavin Lamont, and Chris liaised frequently and exhaustively to discuss

Connecting one of the prototype ground geophysical instruments in Botswana.

Chris checks the sludge samples from another prototype—a 'stampboor', which preceded modern air-flush drills—near Tsabong in southern Botswana.

wChris (in the middle) and two colleagues check the location of a geophysical anomaly in Northwest Territory. Note the Southern Era kit proudly worn.

aspects of Botswana's geology that might relate to diamonds and their discovery, including geomorphology and geophysics.

On the domestic front life went on in the Jennings household; between spending time in the field with Chris, Jeanne was able to raise four children, two girls, Jeannine and Zizi, born in 1957 and 1959, and two boys, Marc in 1963 and John born three years later. The idyll that was pre-independence Lobatse could not last forever, though, and sooner or later Johannesburg, with its good schools, was bound to call.

In 1971 Chris joined Falconbridge (Canadian-based multinational Falconbridge Nickel Mines Limited) as Exploration Manager: Africa, based in Johannesburg. They were halcyon days for exploration globally, and particularly in southern Africa. Apart from the discovery of the Orapa and surrounding kimberlite pipes, Anglovaal SWA had discovered promising indications of sedimentary copper ore south of Lake Ngami, and its parent company based in Johannesburg had discovered a major copper ore body south of Prieska in the Northern Cape Province. A major zinc mine was in development in southernmost South-West Africa, and in neighbouring Bushmanland in South Africa rumours abounded of new showings of base metals. (Several major copper and zinc mines would be opened there in ensuing decades.) Multinationalism in mining and exploration had come of age, particularly in underexplored 'elephant country' like southern Africa. Falconbridge was not going to be left out.

As a company built on metal mining, exploration for base metals was where Falconbridge was most comfortable. Their new African exploration manager, though, could see more clearly than anyone that with geophysics coming into its own in kimberlite exploration, diamonds were where the most immediate opportunities lay. He also knew that with companies increasingly aware of the multifaceted potency of geophysics, the window wouldn't stay open for long. He waited four years after leaving Botswana 'for ethical reasons' (Chris's words), during which time he applied himself to exploring southern Africa's exciting base metal and gold potential, not without considerable success. The years he waited—with growing impatience—gave him time to perfect his strategy of how he would apply his geological and geophysical skills to finding diamonds in the vastly undervalued and

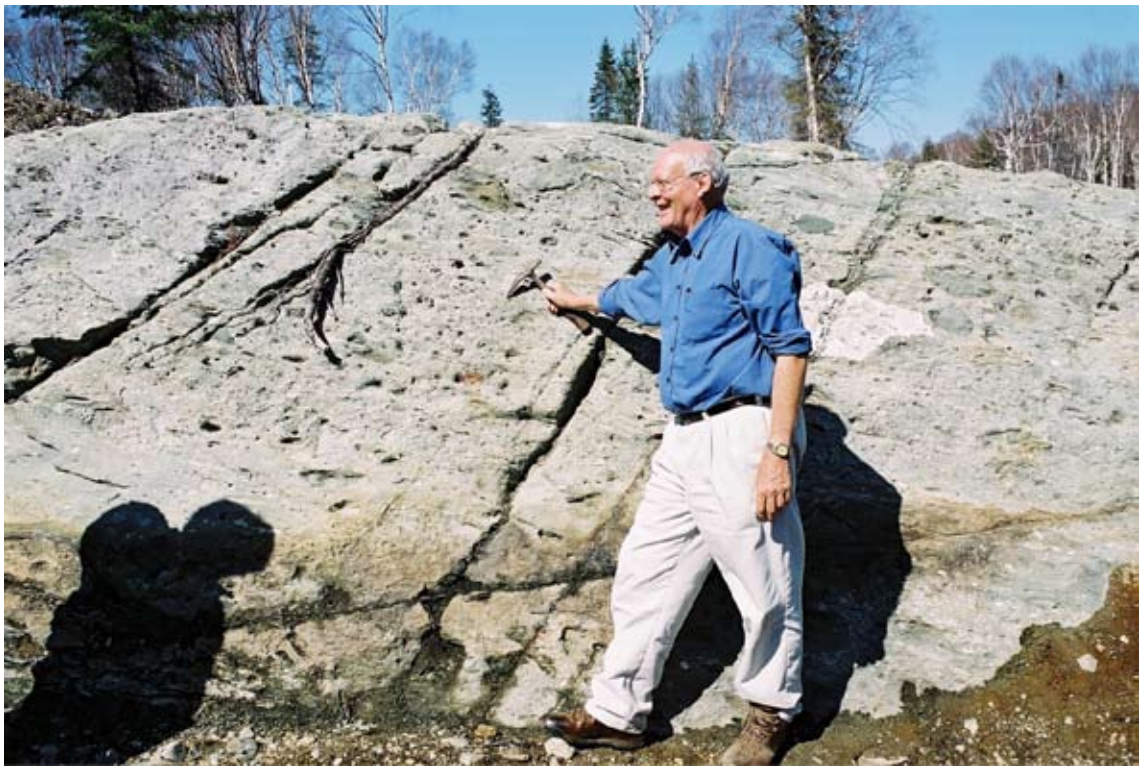
challenging Kalahari sand-covered savannah of southern Botswana.

By late 1974 Chris felt his ethical obligation had expired, and he persuaded Falconbridge and its majority shareholder, Superior Oil from Texas, to jointly fund a diamond reconnaissance search over a large tract of southern Botswana. They would use a strategy well-known to the Canadians—airborne geophysics—in which Chris had developed an unequalled skill set for identifying kimberlite pipes. Until then, megalithic De Beers had had unfettered access to diamond exploration rights in the Kalahari and a year and a half earlier had found another super-deposit at Jwaneng, 120 kilometres northwest of his old base in Lobatse, which they were preparing for mining. Chris knew there were more mines waiting to be discovered.

They didn't have to wait long. Within two and a half years, the joint venture had discovered 66 pipes. Far more challenging than finding the pipes, though, Chris soon realised, was evaluating them. Until then the only reliable way of testing whether a kimberlite pipe could be profitably mined was by taking bulk samples of many tonnes and processing them in the same way any commercial mine extracted diamonds from the ore. It was slow and costly. Chris, however, knew that a drastically more immediate and cost-effective technique was very probably on the way.

In the late 1970s, UCT-based academic geochemist and consultant John Gurney appeared to be close to making a breakthrough in the field of kimberlite indicator mineral geochemistry. The signs were that a distinguishing feature of pyrope garnet of high chromium and low calcium correlated closely with diamond-bearing kimberlite, at least in some pipes.

Near the Arctic Circle. Was Chris dreaming of a Kalahari summer day?



Chris would look happy at a kimberlite outcrop on a beautiful winter day in Canada.

Chris needed to know whether this relationship held for the Botswana kimberlites, for example the recently discovered Jwaneng pipe. He tested some samples of the ore that he had acquired and held his breath as he awaited the results. Bingo: the garnets were almost without fail high in chrome and subcalcic. It was an epiphany. This member of the pyrope garnet family became known, simply, as G10.

The Falconbridge–Superior Oil joint venture set about sampling the pipes they had discovered and analysing the garnets from the samples. Following the well-known rule that only a minute minority of pipes in any kimberlite field are of commercial grade, most that they tested were not. One, though, yielded a wealth of the—to diamond prospectors—beautiful pale purple garnets that show G10 chemistry. It was called Gope, changed to Ghaghoo in its early days.

However, Falconbridge–Superior lacked the stomach for mining in such an extraordinary field in a commodity so dominated by one player, and with no deference to their African manager, ceded half of their ownership and management of the project to De Beers. While managing to conceal his frustration at this turn of events, a short time later—1981—Chris accepted the position of Assistant Vice-President (Exploration) in the Falconbridge head office in Toronto.

Chris was to discover over the ensuing years that few if any major mining companies had the stamina to pursue diamond exploration if opportunities in metal prospects were available. From his rugby-playing days as a youngster and more recently as an explorationist in Botswana, stamina was one thing Chris was not short of. Following his arrival in Canada, he outlasted Falconbridge, BP Minerals (Canada) and Corona Resources in his relentless pursuit of the pipes that he knew must have been the source of the diamonds spread far and wide by glacial ice sheets across the Canadian tundra and south into the northern United States. He acted as Vice-President of Exploration for all the companies mentioned but none of them could match his passion or recognise his skill at identifying and testing targets. Disillusioned, but ever more determined, he left each one of them in turn, resolved to ‘go it alone’.

One that was up for the chase was mega-multinational BHP. They had been spurred by Chris's former Falconbridge–Superior Oil colleague, Hugo Dummett, who was fortunate enough to have been joined by the real bloodhound of the Canadian search, Chuck Fipke. In 1991, in Northwest Territory, close to the Arctic Circle, they closed in on a kimberlite just north of Lac de Gras. Chris had just left Corona, unwilling to take the transfer they proposed for him and Jeanne to Vancouver: he was a free agent. Free to engage in the most epic staking rush of the twentieth century.

While in London with Jeanne founding a company within which to run his own diamond exploration outfit, Chris was summoned urgently by two junior mining company executives who had heard of the BHP strike at Lac de Gras and knew there might be an opportunity ripe for the plucking. Chris and one of the executives, Gren Thomas, flew to Yellowknife in NW Territory prepared to mount a highly clandestine staking operation. Chris had already had a scout in the area, who had found KIMs. That was where they headed when they had settled themselves in the 'hot zone'. They found De Beers had got there before them.

In the most gruelling Arctic Circle weather, they staked huge areas adjacent to those already staked and put out notices inviting investment in Gren's company, Aber Resources, in which Chris had acquired a substantial shareholding. There was no interest. Had the whole exercise been a waste of time—and large amounts of money? They wondered. Then Chris had a call from Rio Tinto head of global exploration, John Collier. Collier had a decade earlier masterminded Rio Tinto's fabulously successful foray into diamonds in Australia and had heard of the staking rush at Lac de Gras. He wanted in. With two of the world's biggest mining companies committed to the area, now the rush started in earnest. Yellowknife went crazy.

Chris bought a shell company quoted on the Toronto stock exchange called Southern Era Resources and transferred all the land he had staked into it and

Chris, in April 2016, just south of Lac de Gras, N.W.T.—still exploring at the age of 82.

took their stock at 1 cent a share. In a few months the shares were trading at $1.90. Alongside this, Aber's claims covered a million acres and Gren Thomas's daughter, Eira, recently graduated in geology, joined the fray.

Unless one has been to The Barrens, as the area is called, it's impossible for South Africans to visualise the harshness of conditions in which the Aber and Southern Era teams worked. Morale sagged as news of multiple finds of new pipes by BHP circulated, and geophysics and sampling provided no encouragement. With days—and investors' belief—shortening, in October 1992 Aber drilled eight targets. Seven were kimberlite pipes.

In late May 1994, after years of wildly fluctuating fortunes, Eira Thomas chose to drill a borehole Chris had sited—famously remembered as the 'discovery hole'—into what would become the Diavik orebody. With Aber Resources and Southern Era both shareholders in the Rio Tinto-dominated owning company, Chris and Jeanne's future had been well and truly secured, even if the certainty of this would have to wait six years, while the development of the very challenging mine was completed. In describing the diamond chase that was a big part of Hart's book *From the Kalahari to the Arctic* as 'epic', he had, if anything, understated what it was. Nonetheless, after Gope/Ghaghoo in the Kalahari, the 'Arctic' success dramatically underlined Chris's status as the diamond discoverer of all time.

While they waited, and still homesick for the bushveld of Africa, in the mid-1990s Chris introduced Southern Era to South Africa. It zeroed in on a system of narrow kimberlite dykes—better known as fissures—east of Potgietersrus (now Mokopane) and started mapping and evaluating them. In February 1997, within this extensive system of fissures the Southern Era geologists found a small pipe on a farm called Marsfontein. Southern Era had secured a large area including the fissures and Marsfontein pipe with a block of mineral rights of unprecedented scale in South Africa.

Recovery of diamonds from the so-called Klipspringer Mine proceeded apace and within months had produced 5 000 carats, selling in Antwerp for a total of $630 000. There were problems at Marsfontein, however. Although bulk sampling was suggesting phenomenal grades, when it came to transferring the mineral rights to Southern Era so that mining of this treasure trove could go ahead, heirs to the estate of the deceased original owner suddenly and mysteriously appeared and proceeded to claim ownership of the rights, which they had just sold to De Beers. A bloody legal battle ensued, at the end of which Southern Era settled for a 40% share of the Marsfontein production—from the richest diamond mine in the world, even if it was one of the smallest. So rich it was that the total investment in the mine was recovered within the first 3.4 days of production. Over its short life, and notwithstanding the loss of a part of the income stream, it still fed a robustly healthy income to Southern Era's coffers.

The 2007 Lifetime Achievement Award, made by the international *Mining Journal,* is an apt symbol of a life dedicated to thoughtful and resolute pursuit of the goal of finding new deposits of diamonds. And yet, at the time and speaking from London, Chris described it as a huge surprise, and above all, a humbling experience, considering the pre-eminence in the industry of previous award-winners. That's Chris Jennings for you.

And besides his humility there was remarkable generosity, always backed by Jeanne. Perhaps, as Chris looked back on a long and extraordinarily fruitful career, what brought the widest smile to his lips was how he had enriched people's lives by finding water they and their cattle could drink or employment on the mines he discovered.

Chris Jennings's life showed qualities of fearless determination and endurance at an extraordinary level, which, built on an exploration skill set second to none, delivered glittering success in three countries. His is a legacy that will be remembered as long as diamonds are mined. In the dark days when mining company executives could not match his courage or others tried to claim what was rightfully his, Jeanne was always at his side, believing in him as surely as he believed in himself. Rest in peace, dear Chris, role model extraordinaire.

These lines were written by his friend, loyally and generously supported for 55 years, ***Nick Norman****, ably and willingly assisted by friends and professional associates of Chris's: Andy Moore, Norman Lock, John Blaine and Mike de Wit; and, of course, Jeanne.*

GSSA Events 2025

DATE	EVENT	LOCATION
On Demand	Drilling Methods & Techniques in Exploration (Drilling Skills for Geologists Certificate Programme)	Online
4 March	CPD Workshop	Online
11–20 March	Namaqualand Diamond Centenary (NDC) Conference & Field Trip	Vanrhynsdorp & Port Nolloth
27 March	Advanced Excel for Geologists	Online
5–6 April	Structural Geology Course & Field trip	Southbroom KZN Coast
11 April	3D Geological Modelling	Online
24–27 June	Geocongress 2025	UFS Bloemfontein
17 July	• Soft Skills for Geoscientists / Mentorship Group • GSSA AGM	JHB Country Club (Hybrid)
5 August	Introduction to Drilling Workshop	Online
2–3 September	SAMREC/SAMVAL Compliance and JSE Reporting / 25th Anniversary of SAMREC	JHB Country Club (Hybrid)
9 September	Professionalism & Code of Ethics Workshop	Online
TBD September	Data Analytics & Machine Learning	Online
21–22 October	Mineral Resources Mastery: Tools, Trends and Industry Insights	Online
12–13 November	African Exploration Showcase	JHB Country Club (Hybrid)
TBD	ESG Update	Hybrid
	New Cadastre System (with Minerals Council)	Online
	Updated SACNASP Bill (with SACNASP)	Online
	Marine Geoscience	Online & Site Visit
	Mapmaking (MINROM)	Online

Alex Du Toit

Alex Du Toit Lecture 2026:
Associate Professor Robyn Pickering

It gives me great pleasure to announce that Associate Professor Robyn Pickering has been selected as the Alex Du Toit Memorial Lecturer for 2026. The Memorial Lecture takes place biennially and is awarded to an individual to recognise world-class research in the Earth sciences. She will be the first female Alex Du Toit lecturer since Edna Plumstead in 1969.

Pickering is currently an Associate Professor at the Department of Geological Sciences, as well as the Co-Director of the Human Evolution Research Institute (HERI), at the University of Cape Town. Her undergraduate degree was focused on both geology and archaeology at the University of the Witwatersrand, with completion of her PhD at the University of Bern, in Switzerland in 2009, in isotope geochemistry.

Following her PhD completion, Assoc. Prof. Pickering was employed as a Post-Doctoral Research Fellow at the University of Melbourne, Australia, from 2009 until 2015. Thereafter, she returned to South Africa as a Lecturer in 2016 at the University of Cape Town, advancing to the position of Associate Professor.

Assoc. Prof. Pickering leads a productive research group at UCT, focused on the age and development of Quaternary landscapes, as recorded by rivers, lakes and caves. She was key in establishing the first carbonate U-series dating laboratory in South Africa, as well as pioneering the U-series technique to include time and cost saving *in situ* analysis. She directs field programmes in the Cradle of Humankind, at the Kalkkop meteorite impact crater palaeolake and in the southern Kalahari. Further, she is the co-director of the Human Evolution Research Institute, which aims to disrupt, deconstruct and transform patriarchal narratives of human evolution. She is focused on the transformation and decolonisation of the geosciences in improving field experiences for women and underprivileged students, and raising awareness around neo-colonialism in geoscience research practices. Pickering has no less than 59 peer-reviewed publications, has hosted six post-doctoral fellows, supervised 3 PhD, 3 MSc and 11 BSc Honours students and is actively involved within the European Geosciences Union.

For the 2026 Alex Du Toit Memorial Lecture, Assoc. Prof. Pickering will speak on the geology, dating and palaeoenvironments of human evolution in South Africa, how the uranium-lead technique has provided the first direct chronology for the early hominin fossils in the Cradle of Humankind, and how her research group are actively building a detailed palaeoclimate record for this region from 1–3 million years ago. She will also talk about research into how early modern humans survived and even thrived in the now arid southern Kalahari around a previously unrecognised palaeolake deposit. Finally, she will speak to how the pioneering approach of Alex du Toit has inspired her approach to research, innovation and capacity building within South African geosciences.

Dr Louise Coney
Fellows Chair

NAMAQUALAND DIAMOND CENTENARY CONFERENCE

11 – 20 March 2025
Vanrhynsdorp – South Africa

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diamond conference

Namaqualand Diamond Centenary Conference (Vanrhynsdorp (11-20 March 2025)

Programme

Topic	Speaker	Company
DAY 1		
Formal Welcome Address	Tania Marshall	GSSA
Keynote Address: Towards a framework for the formation of the Namaqualand Diamond Mega-Placer, South Africa	**John Ward & Mike de Wit**	**Private and University of Stellenbosch**
Discoverers and Discoveries on State Land, West Coast 1924 -1929	Nic Dinham	Private
The first diamond finds in Namaqualand: towards uncovering a myth	Anthony de la Harpe	University of Cape Town
Bredasdorp Group south coast analogy to West Coast deposits and sea levels	Jean Malan	Overberg GeoConsulting (Pty) Ltd
History, current trends, and future of diamond mining in Namaqualand	Ashok Damarupurshad	SADPMR
Dwyka contribution towards the dispersion of alluvial adiamonds in southern Africa - a tribute to Assie van der Westhuizen -	Mike de Wit	University of Stellenbosch
The eruption age of the Namaqualand diamonds'	Jeff Harris & Dave Phillips & Mike de Wit	U Glasgow & U Melbourne & University of Stellenbosch
What was the Discovery of the Namaqualand Diamond Deposits Worth?	Andre van der Merwe & Norman Lock	ABAGlobal & Private
Keynote Address: The Namibian Megaplacer –117 Years on and Still Going Strong: Mining for Good	**JJ Jacob**	**NAMDEB**
Late Cretaceous and Early Tertiary marine high stands along the west coast of southern Africa: their signatures and implications for Namaqualand diamond placers	Roger Swart & John Ward	Blackgold Geoscience
The gift that keeps on giving – diamondiferous beach deposits – Namaqualand, southwestern Africa	Jana Jacob, Lynette Kirkpatrick and Deone Strauss	Namdeb
Panel Discussion (then open to the floor): On the future of alluvial/marine diamond mining in Southern Africa	Lyndon de Meillon	JJ Jacob, KabeloM, Gert vN
Poster Session and finger dinner		
Diamond growth and destruction constrained using diamond morphology and surface etch features, Roberts Victor Kaapvaal lamproite, and comparison with kimberlitic diamonds	*Michelle Brits*	*UCT*
Probing the northern Kaapvaal craton root with mantle-derived xenocrysts from the Marsfontein orangeite diatreme, South Africa	*Ntando Ngwenya*	*UJ*
Namaqualand-Bushmanland melilitite and breccia pipes	*Phil Janney*	*UCT*

Testing the use of olivine as a diamond indicator mineral	*Merrily Tau*	*UCT*
The use of pyrope garnet in inferring diamond potential from a kimberlite source in Butha-Buthe, Lesotho	*Nkopane Tohlang*	*UOFS*
Sedimentary provenance of the Orange River Basin: Preliminary integration of learnings from diamond and hydrocarbon exploration in South Africa and Namibia	*Tim Goodwin*	*TJGX*
The Orange Basin - stepping past the Namaqualand diamonds	*Jean Malan*	*Overberg Geo-Consulting (Pty) Ltd*
DAY 2		
Welcome	Craig Smith	GSSA
Keynote Address: The Buffels River Complex	**Deon Bowers**	**Private**
The diamond-bearing Quaggas Kop gravels along the Sout River, Knersvlakte region, Vanrhynsdorp.	Mike de Wit	University of Stellenbosch
Not the last bend in the river – Namibian Orange River Deposits – Daberas case study	Lizel Jordan & Gottfried Grobbelaar	Namdeb
Shelf architecture and stratigraphy offshore of the Chameis Bay area, southern Namibia	Heike Fourie, Bjorn von der Heyden, Kegan Strydom	University of Stellenbosch
The Classification of the Middle Orange River Rooikoppie Gravels: A Comparison Between the Wouterspan and Remhoogte Diamond Projects	Richard Horn, Tania Marshall and Glenn Norton	Various
The use of heavy minerals to map diamond transport pathways on the Namaqualand Coast	Urban Burger	De Beers Marine
A reinterpretation of the courses of both the Molopo and Lower Orange Rivers and the conveyance of diamond 'styles' to the West Coast of South Africa	Robin Baxter-Brown	Private
Valuation of Angolan early stage alluvial diamond deposits	Nair Ganda	Endiama
Keynote Address: Treasure Hunting on the West Coast – Where Science & Grit Meet	**Brett van Coller**	**RES**
Moving along and staying behind – Diamondiferous aeolian and deflation deposits - southwestern Namibia	Cindy Andrews & Jana Jacob	Namdeb
Developments in west coast geophysics for diamond exploration	Lynette Kirkpatrick	Namdeb
The use of geophysical data coupled with 1:50 000 mapping in delineating alluvial diamonds trap sites highlights the potential of South Africa's diamondiferous gravel deposits in the Northwest and Northern Cape provinces.	Simon Sebothoma; Emmanuel Chirenje; Neo Moabi; Debbie Kilian; Adrian Williams	Council for Geoscience
Photo Competition winners & CLOSING (Fieldtrip arrangements)	Baxter-Brown &Tania Marshall	GSSA

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