Geological Society of Zimbabwe

Newsletter

February 2023 No. 1 of 3 of 2023

Sharad Master concluding his delivery of the 12th A.M. Macgregor Memorial Lecture Harare, 21st October 2022. Photo: Lucy Broderick

www.geologicalsociety.org.zw

The Geological Society of Zimbabwe, P.O. Box CY 1719, Causeway, Harare

Contents

Editorial

As AGM-time is upon us, this is the last Newsletter to be circulated under the Chairmanship of Kennedy Mtetwa. To pre-empt the meeting we should thank Kennedy and his Committee for all they have put into our professional well-being over the past year, and we look forward to continuance under the leadership of Tenyears Gumede. So, please take cognizance of the AGM announcement for the 24th February at 5.00pm at our well known venue, Country Club. Looking forward to seeing you as we meet up with new and old friends and colleagues in a joint effort to advance our Society and its functions.

The last quarter of 2022 saw the successful and stimulating staging of the Summer Symposium at the University of Zimbabwe followed by Sharad Master's delivery of the 12th Alexander Meirs Macgregor Lecture to an appreciative audience. Sharad then led a field trip to the Lomagundi area around Chinhoyi on the Saturday, an event that is well reported in this Newsletter by Andrew du Toit and the attending geology students from Midlands State University. Andrew's organizational efforts, and those of the Committee, to make these key events the joy that they are, must be roundly acknowledged. Brent Barber has summarized the Symposium admirably whilst some of the abstracts are reproduced in this Newsletter. All presentations, including the two parts of Sharad's Macgregor Lecture and his field guide for the Lomagundi trip, can be downloaded off our website, the upkeep of which Andrew must also be thanked. The website has become a veritable archive for Society records.

Bornwell Mupaya and Shephard Mabhanga have kept the news flowing from the Geology Section at UZ whilst we welcome feedback from Maideyi Meck following her sabbatical in Belgium and Addis Ababa. It is a great pleasure to witness the launch of a student geological society at the Zvishavane Campus of MSU. They report back on their impressions gained during their inaugural trip to join the Lomagundi Excursion. It seems certain that they gained a lot, and we can only encourage and support them in their future efforts. We will hear more from the School of Mines in the next Newsletter whilst we are anticipating new correspondents from NUST and Manicaland, given the respective departure from those institutions of Dr Njila and Hazel Chibaya. Forbes Mugumbate had escaped to the Cape Town Mining Indaba, but news from the Geological Survey has been ably compiled by Ernest Mugandani, who is thanked for the continuance of this valuable record. Kennedy Mtetwa has again compiled snippets from the mining literature in an effort to keep us abreast of current happenings in our industry.

Note should be taken of the final publication of Professor Geoffrey Bond's autobiography, a script he was invited to write for the 'Men of our Times' series by Louis Bolze of Books of Zimbabwe. It is truly a most readable book, which expresses clearly the life and passion, particularly in the field of geological advancement in Zimbabwe, of this extraordinary person. We all owe a great deal to the heritage left by Geoffrey Bond to the well-being of geology.

Tim Broderick

Chairperson's Chat

Kennedy Mtetwa
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Greetings to you all, and Happy New Year!

As I conclude my Chairperson term of office this month, we continue to keep the geological community informed about points of geological interest in Zimbabwe. The incoming GSZ Committee will endeavour to organize more talks and field trips to interesting sites around the country. Members are most welcome to volunteer to give talks on any geological subject of their choice, either via zoom or in person. Those interested please do contact Steven Duma in this regard.

Our GSZ AGM will be held on the 24th February when a new Committee will be ushered into office by you, our members. Please look out for circulation of the nomination form, give careful thought and do the needful in order to keep your Society running smoothly.

During the period under review, the Society hosted the 12th A.M. Macgregor Memorial Lecture entitled *Geological Evolution and Metallogeny of the Palaeoproterozoic Magondi Belt, Zimbabwe and Botswana,* which was delivered by Dr Sharad Master in the Innovation Hub Auditorium, University of Zimbabwe in the afternoon of Friday 21st October 2022 and was attended by 120 members, guests and students.

On the same day in the morning the Society hosted the 2022 Summer Symposium. We were privileged to have eight presenters who delivered on very diverse topics. A summary of presentations was ably captured by Brent Barber.

The following day, Saturday, Dr Sharad Master led a trip to the Chinhoyi Area to see rocks within the Magondi Supergroup and adjacent sites. The trip was well attended, with about 40 members and a bus-load of MSU students participating.

The 12th A.M. Macgregor Memorial Lecture was also presented in Bulawayo at the Zimbabwe School of Mines on Monday 24th October 2022.

On Saturday 12th November, 18 members of the Society visited Eureka Mine, which has been reopened in the last few months and is producing 120kg Au from 100,000t of ore processed per month. Eureka Mine Geologist, Benefit Muoneka, gave our Society members a detailed presentation of the mine geology before he and his team took us around the site. It is fascinating to see the results of serious gold exploration at Eureka carried out in the 1990's, led by then Delta Gold Zimbabwe Exploration Manager, Terry

Lemmon, and his exploration team then headed by Paul Chimbodza. This reopening of a mine, which had been mothballed in 2000, shows what an improvement in the gold price and business climate can do for previously delineated resources that were deemed sub-economic two decades ago. We would like to thank Dallaglio Management for allowing our Society members to visit Eureka Mine. The Eureka Gold Mine is in the north-eastern part of the Chinhoyi-Guruve Greenstone Belt, which consists of two lithological successions in the volcanic-dominated Bulawayan (2.8Ga) Supergroup and sediments of the Shamvaian (2.7Ga) Supergroup. The greenstone belt is in contact with younger granitoids and sediments. Older granitoids (TTG) form part of the Archaean basement of the Zimbabwe Craton and Younger granitoids are associated with the Chilimanzi Suite. Evolution of the greenstone belt maybe described by five deformational events (D1-D5). The D1 event (diapirism of the Chilimanzi granitic intrusion) caused low grade metamorphism forming gold-bearing quartz veins at Eureka Gold Mine.

Renias Tirivabaya continues working on progressing the geologist's professional registration journey that your Committee has been working on. Your Committee is now awaiting a response from our letter submitted on 3rd August 2022 to the Permanent Secretary in the Ministry of Mines and Mining Development spelling out the need by GSZ to become a professional registered body. It was communicated that the Geological Society of Zimbabwe (GSZ) seeks to be the benchmark for geological excellence and, as such, it seeks to be able to regulate the practice of geology or geosciences in the country to protect the interests of exploration and mining investors.

I would like to encourage our members to be up to date with their annual subscription payments so that your Society's 'kitty' can be replenished. For those members who have not paid their 2022 fees, please do remember to pay before our AGM. On your side as Geological Society of Zimbabwe members, please encourage your colleagues to become Society Members. Recent geology graduates are encouraged to join the Society where they will be able to benefit from the soon to be launched mentorship programme. Application forms are available on the webpage: **www.geologicalsociety.org.zw**

I would like to thank you for your enthusiastic support during my 2022-2023 journey as your Chairperson. This is much appreciated! To the incoming Chairperson, Tenyears Gumede, I wish him all the best in taking our vibrant Society forward.

Notice is hereby given that the Annual General Meeting (AGM) of the Geological Society of Zimbabwe will be held as follows:

Date: 24th February 2024

Time: 1700 hours

Venue: **The Country Club, off Princess Drive, Highlands**

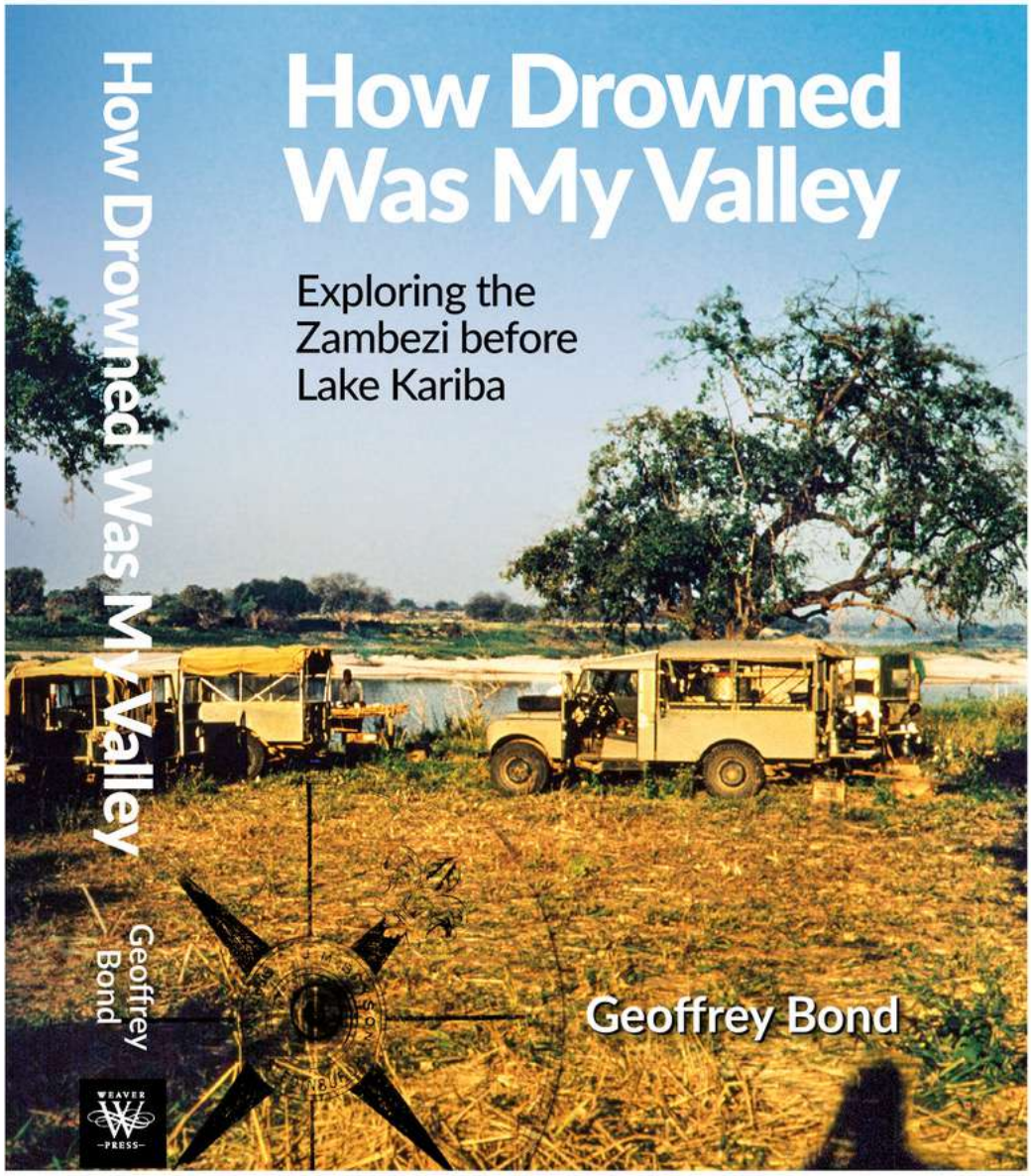
Cost: USD30.00 per person for dinner

K. Musiwa
Hon. Secretary

AGENDA

1. CONVENING OF THE MEETING
2. OBITUARIES
3. APOLOGIES
4. MINUTES OF THE PREVIOUS MEETING
   - 4.1 Consideration and approval of the minutes
   - 4.2 Matters arising not covered elsewhere in the agenda
5. CHAIRMAN'S STATEMENT
6. TREASURER'S REPORT
8. ANNOUNCEMENT OF THE NEXT COMMITTEE 2023 – 2024
9. PROFESSIONAL REGISTRATION
10. PRESENTATION BY PAUL CHIMBODZA
11. AWARDS
    - 11.1 A.E. Phaup Award
    - 11.2 Mike Vinyu Award
    - 11. 3 J.F. Wilson Award
    - 11.4 Keith Viewing Award
    - 11.5 Geoffrey Bond Award

K. Musiwa, Hon. Secretary



Geoffrey Bond, Keeper of Geology at the Bulawayo Museum, 1946–1960, and founding Professor of Geology, later Vice-Principal, at the University of Zimbabwe, 1960–1981, wrote his autobiography not long before he died in 1983.

Among his many other experiences, he tells of looking for water for the steam trains in Matabeleland, mapping the Sebungwe region, meeting the Tonga people, finding dinosaur fossils, airborne surveys from Victoria Falls for radioactive elements, and setting up the Lake Kariba Research Station.

The book also contains tributes to him from several of his colleagues and students, which bring to light other significant aspects of his life and work that he was too unassuming to recount himself.

It is available in Harare from Weaver Press and The Booklist, and in Bulawayo from the Orange Elephant.
It is on Amazon as a paperback and in Kindle format: <https://www.amazon.com/dp/1779224222>
Further information from Nina Bond Crowhurst: WhatsApp 0778 818302; e-mail <zimcrow@zol.co.zw>

Articles and Reports

Tectonic evolution of the south-eastern Mesoarchaean Mwanesi Greenstone Belt: implications for the construction of the Zimbabwe Craton

Brian Mapingere, Jérémie Lehmanna, Karel S. Viljoena, Marlina Elburga, Georgy Belyanina
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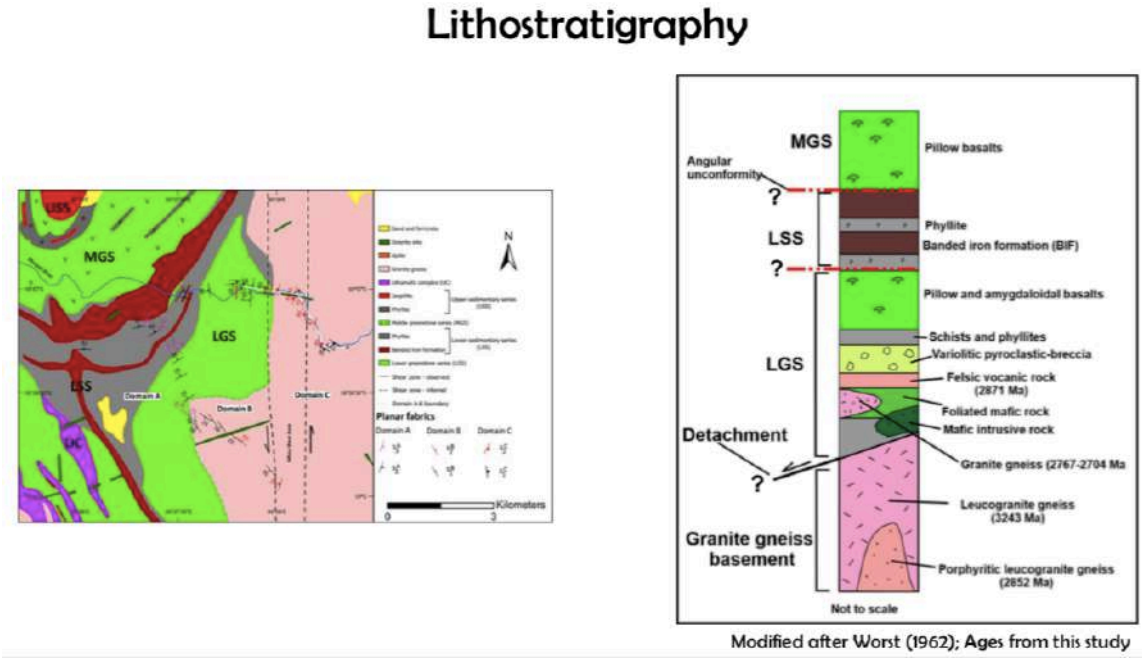
The Mwanesi Greenstone Belt (MGB), occupying the central part of the Zimbabwe Craton, remains one of the least studied greenstone belts in the craton. Many fundamental questions remain unresolved regarding the age, deformation record and tectonic evolution of the MGB. We present new structural, LA-(MC-Q)-ICP-MS zircon U-Pb, and biotite and white mica 40Ar/39Ar data from the south-eastern MGB and adjacent granite gneisses to investigate these unresolved aspects of the MGB. The folded volcano-sedimentary sequence of the MGB, characterised by basaltic rocks intercalated with metasedimentary rocks, is structurally underlain to the east by various granite gneisses, some in intrusive contact with the MGB. The granites are transected by the km-wide, N-S-striking sinistral Mhou Shear Zone (MSZ).



Zircon U-Pb dating shows that most dated zircons have been affected by hydrothermal alteration and they yielded discordant analyses. The measured trace elements were used to discriminate between altered and unaltered zircons, which are likely to yield reliable ages. The most concordant zircons are characterised by unaltered trace element signatures and very low average titanium content. The indicative age of the MGB is constrained at ~2871 Ma from the intraformational felsic volcanic rock of the Lower Greenstone Series (LGS), the oldest series of the MGB, which forms part of the Lower Bulawayan Supergroup as previously suggested by Worst (1962). Zircon U-Pb dating of

the underlying granite gneisses on the south-eastern margin of the MGB revealed three distinct magmatic events. The first magmatic event is represented by a ~3243 Ma leucogranite gneiss, interpreted as the basement of the MGB and forming part of the Sebakwe Proto-craton. This event was followed by the ~2852 Ma magmatic event that formed a porphyritic leucogranite gneiss coeval with the 2.8-2.9 Ga Chingezi Suite and interpreted to be the intrusive equivalent of the ~2871 Ma felsic volcanic rock of the LGS. The last magmatic event constrained at ~2767-2704 Ma is recorded in a granite gneiss and the granite protolith of the MSZ mylonite. This event was coeval with the formation of the Sesombi Suite of granites. The granite protolith of the mylonite is the only recognised granite younger than the MGB based on geochronology and field crosscutting relationships. All the other granite gneisses are older than the MGB.

Structural mapping corroborated with 40Ar/39Ar dating reveals three deformation events. The ~2688-2617 Ma lower to middle greenschist facies dextral strike-slip shearing D1 event formed shallow dipping fabrics in the supracrustal rocks and underlying granite gneisses in addition to F1 recumbent folds in the supracrustal rocks. The fabrics include gneissic foliation carrying shallow to moderately NW- to NNW-plunging mineral and stretching lineation in the granite gneisses, and fold axial planar cleavage to F1 recumbent folds associated with shallowly SW- to NW-plunging mineral lineation and fold axes in the supracrustal rocks. We interpret F1 folds as progressive folds formed by layer-parallel shortening with a significant component of shallowly inclined shearing. Regionally, D1 in the study area was broadly coeval with F1 folding and west-directed thrusting in the Bindura-Shamva Greenstone Belt constrained at ~2680-2643 Ma (Jelsma and Dirks, 2000). The ~2588-2541 Ma D2 event operated at upper greenschist to lower amphibolite facies and formed the mylonites of the MSZ. In addition, D2 formed steeply west-dipping fold axial planar gneissosity in the adjacent granite gneisses and mylonitic foliation carrying shallowly SSW- and NNE-plunging stretching lineation, and cm- to m-scale upright and intrafolial F2 folds. D2 structures show a gradual westward strain increase from the easternmost granite gneisses where D1 structures are preserved to the MSZ and where mylonitic foliation and cm-scale intrafolial F2 folds are pervasively preserved. D2 is interpreted as a wrench-dominated localised sinistral transpression in the granite gneisses, which formed under NW-SE (or NNW-SSE) contraction and is likely responsible for forming the MGB syncline. D2 in the MGB was coeval with the 2.58 Ga NNW-SSE contraction in the Limpopo orogeny (Berger *et al*., 1993; Mkweli *et al*., 1995; Treloar and Blenkinsop, 1995) and the emplacement of the Great Dyke at 2575 Ma (Oberthür *et al*., 2002). Lastly, the lower greenschist facies, brittle-ductile D3 event formed steeply NE-dipping fold axial planar cleavage in the supracrustal rocks and granite gneisses, and F3 box folds in the MSZ.

Our structural mapping shows that modern-type tectonics played a significant role in the evolution of the south-eastern MGB. This inference is evidenced by (1) shallow fabrics (S1) in the underlying granite gneisses and supracrustal rocks, (2) inferred detachment separating the underlying granite gneisses from the overlying supracrustal rocks, (3) wrench tectonics in the MSZ, and (4) steeply dipping fold axial planar cleavage S3 and F3 box folds which reflect the horizontal contraction of the crust. Our study gives some valuable insights into the deformation record of the MGB and the construction of the Zimbabwe Craton at large during the Archaean.

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Zoning in Archaean Li-Cs-Ta pegmatites from the Bikita field: Implications to rare-metals exploration

Godfrey S. Chagondah and Axel Hofmann
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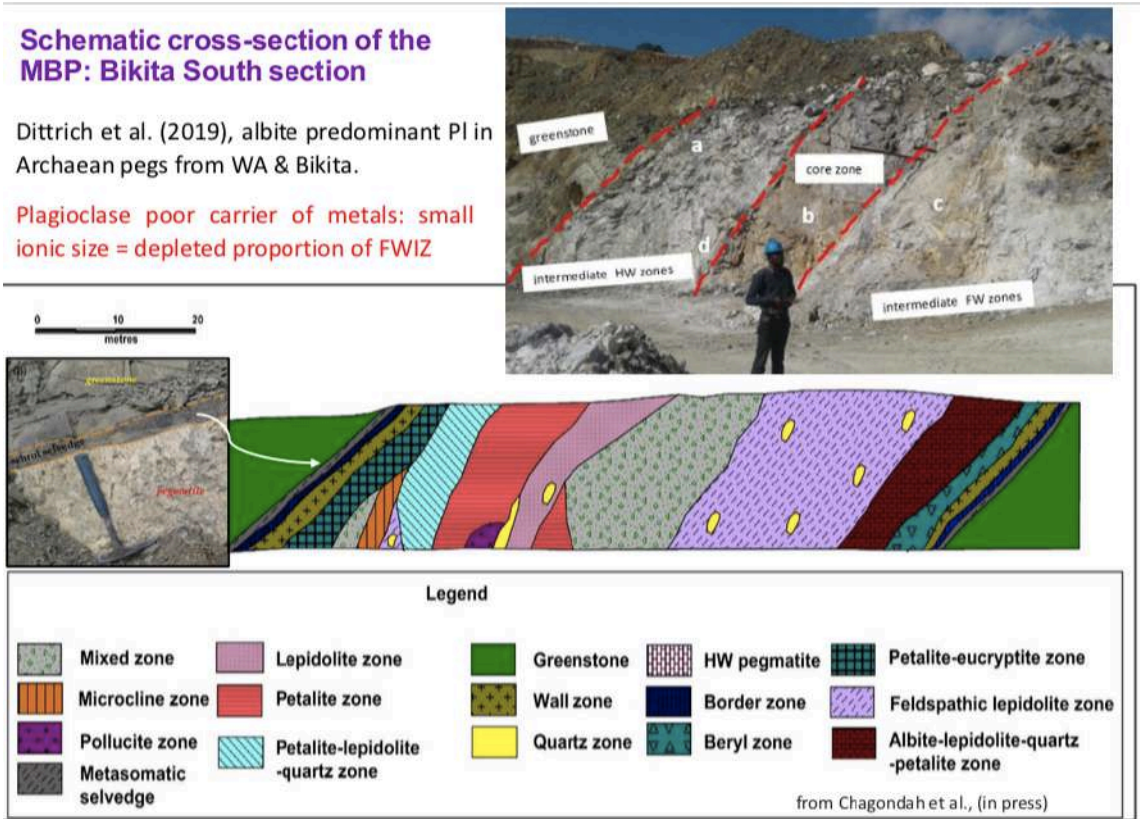
Complex-type pegmatites characterized by mineralogical, textural, and geochemical zonation patterns are recognized globally and span geological time from the Meso-Archaean to the Cenozoic. The pegmatites contain common granite mineralogy and are enriched in fluxing agents (e.g., Li, B, P, H_2O). The Bikita Pegmatite Field (BPF), situated along the southern margin of the Zimbabwe Craton, comprises Neo-Archaean complex-type pegmatites of the Li-Cs-Ta family that exhibit classic zonation profiles. The pegmatites are characterized by different degrees of vertical and lateral zonation patterns. Internally, the pegmatites reveal, from the margin inwards, successive zones with differing mineralogical and geochemical compositions, including border, wall, intermediate, and core zones. In individual pegmatite zones, K-feldspar and mica have contrasting concentrations of rare-metals, such as Li, Cs, Ta, Rb, Nb, Be, Ga, Th, U and Sn.



The paragenetic sequence in BPF pegmatites underscores the complementary roles of primary (magmatic) and metasomatic (sub-solidus) stage processes in the crystallization and rare-metals enrichment. After development of the border and wall zones, classic fractionation indicators in the BFP (e.g., K/Rb, Rb/Sr, Nb/Ta ratios) in K-feldspar, muscovite, lepidolite and beryl suggest that the pegmatites predominantly experienced a bottom-up crystallization sequence. The recognition of mineralogical zonation profiles and geochemical evolution vectors aids exploration of sought rare-metals, since they are laterally and vertically distributed in pegmatite units.

High temperature thermochronology from the Palaeo-Archaean eastern Pilbara Craton and relevance to the granite-greenstone terranes of the Zimbabwe Craton

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The Pilbara Craton represents one of the best-preserved records of Archaean crustal, magmatic and structural processes. Due to the difference in the geochemical and structural character of the eastern and western parts of the Pilbara Craton, this area is hypothesized to record the onset of “modern style” rigid plate tectonic interactions at ca. 3.2 Ga. The map pattern of the older eastern Pilbara Craton is dominated by large granitoid-gneiss domes with intervening meta-volcanic and siliciclastic rocks. This is often referred to as a dome and keel pattern. This map pattern is common in Archaean granite-greenstone terranes in cratonic areas around the world, including the Zimbabwe

Craton. The prevailing hypothesis for the origins of the dome and keel map pattern in the Palaeo-Archaean eastern Pilbara Craton is that it was governed by intra-crustal processes and that plate boundaries do not play a major role. In this model, low viscosity grantioids buoyantly rise from the middle-lower crust into the upper crust in large part due to the sinking of mafic-ultramafic volcanic rocks.

High temperature thermochronometers such as U-Pb in apatite or titanite are sensitive to mid-crustal temperatures and thus record exhumation of rocks into the upper crust. Here I present high temperature thermochronology on the granitoids that make up the dome and keel pattern of the eastern Pilbara Craton and compare the results with intra-crustal plate tectonic model predictions. In light of these results, I also make some comparisons between the geology of the Zimbabwe and Pilbara cratons.

SUMMER SYMPOSIUM 2022 - PRESENTATION SUMMARY

Brent Barber

The 2022 Summer Symposium, which as always was superbly organised by Andrew du Toit for the umpteenth consecutive year, saw a total of six talks being made prior to Sharad Master's presentation of the A.M. Macgregor Memorial Lecture – a paper that maintained the high standard set in previous years.

Scott Maclennan kicked off the Symposium with a presentation on high-temperature thermochronology from the Palaeo-Archaean Pilbara Craton pointing out its relevant application understanding the evolution of the Zimbabwe Craton.

After morning tea, **Brian Mapingere** gave a talk on the tectonic evolution of the south-eastern Meso-Archaean Mwanesi Greenstone Belt and its implications for the construction of the Zimbabwe Craton, which summarised the work completed together with Jérémie Lehmanna, Karel S. Viljoen, Marlina Elburga and Georgy Belyanina. The research undertaken shows that modern-type tectonics played a significant role in the evolution of the greenstone belt, providing further insight into the evolution of the Zimbabwe Craton during the Archaean.

This presentation was followed by one given on the study undertaken by **Godfrey Chagondah** and **Axel Hofmann** on the implications for mineral exploration of zoning in the Li-Cs-Ta pegmatites at Bikita.

Tim Broderick then gave an enthralling talk on "Dem Bones, Dem Bones" which included an outline of the distribution and tectonic relationship of Karoo and post-Karoo deposition and the distribution of known fossil vertebrate remains in Zimbabwe from the Permian upwards. This led into an overview of the work completed in the Cabora Bassa Basin in the Zambezi Valley which, based on the discovery of 'Africa's oldest dinosaur', *Mbiresaurus raathi*, places Zimbabwe at the centre of vertebrate palaeontological research into the evolution of early dinosaurs.

Digital Transformation in Mining was then discussed by **Patrick Weeden** who argued that, as the replenishment of mineral resources and reserves using traditional exploration methods is becoming increasingly less successful, a new approach using technological advances is required to find new deposits.

After lunch **Kingray Gowera**, in his presentation on "Cloud Mining", noted that one of the biggest challenges faced by mining is the capital required to enable reserves to be optimally exploited. This has been identified as one of the main reasons artisanal workings rarely develop into successful small mines. However, the overriding

conclusion reached is that adequate funding alone will not ensure mine development without meaningful change in organisational, technical and managerial capability.
The last presentation of the Summer School was made by **Tinotenda Chimbwanda** who discussed the use of Virtual Reality Technology (VRT) to promote effective student teaching in geological sciences education. Field trips, he pointed out, are an essential component in student development but, being relatively expensive, are beyond the budgets of many institutions in Zimbabwe and elsewhere. VRT has the capability to act as a partial substitute for fieldwork by enabling students to study geological exposures in the lecture room or on-line. This is an exciting development which merits further evaluation but one which, in my opinion, should never replace geological fieldwork.
Gratitude goes out to all those who contributed to make the 2022 Summer Symposium such an educational and enjoyable experience. Thank you!

Post-Summer Symposium Field Trip to the Magondi Belt and other exposures near Chinhoyi, NW Zimbabwe

Submitted by Andrew du Toit

On Saturday 22nd October following the 2022 Summer Symposium, Dr Sharad Master led a field trip to the Chinhoyi Area to examine rock exposures in the vicinity.

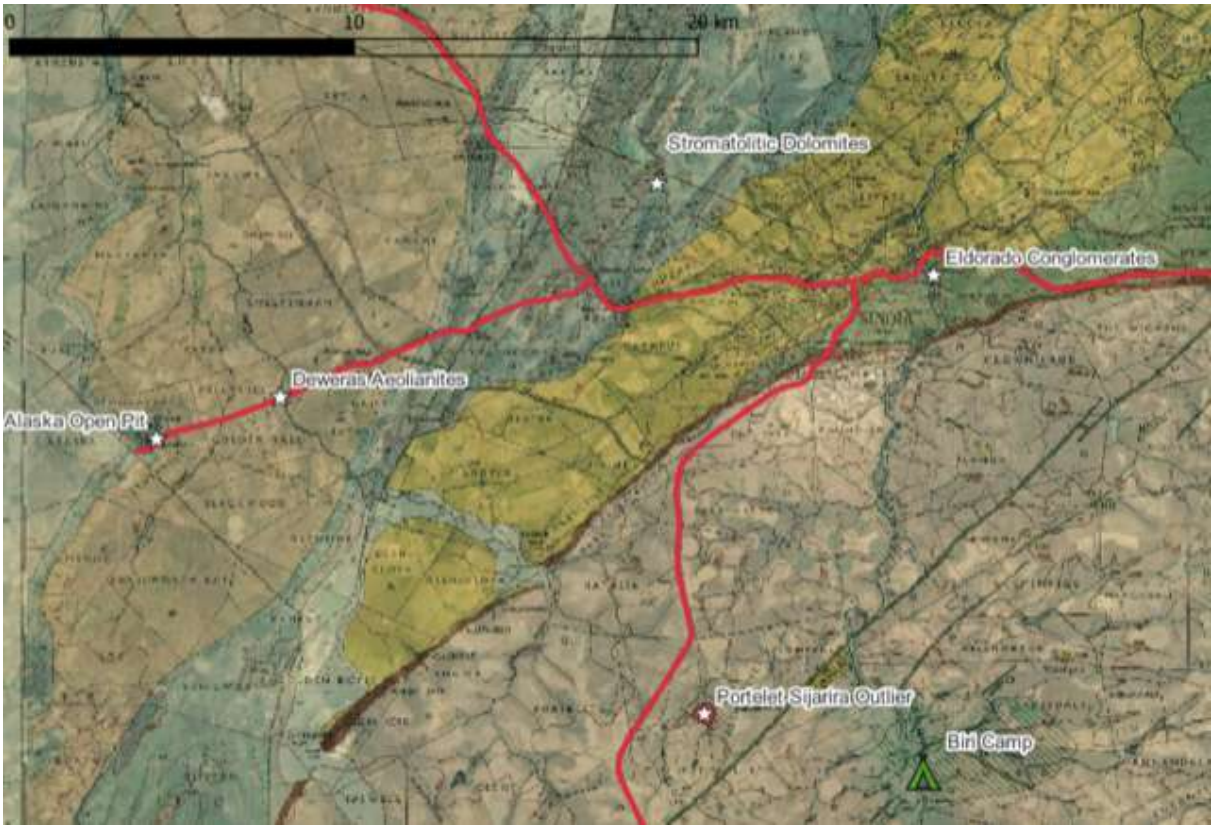

Figure 1: Location of Excursion Stops overlain on *JG* Stagman's Geological Map - ZGS Bulletin 49

The trip was well attended with about 40 members and a bus-load of MSU students present.

The aim of this excursion was to examine rocks of the Palaeo-Proterozoic Magondi Belt (Deweras and Lomagundi groups) exposed in the Chinhoyi area, as well as visiting some older and younger rocks in the region, such as the Neo-Archaean Eldorado Conglomerate of the Chinhoyi Greenstone Belt, and the outlier of Sijarira-type redbeds of possible Neo-Proterozoic age on Portelet Estate.

The first stop was a brief look at the P3 Pyroxenite exposed on the Great Dyke pass. We then proceeded to the bridge across the Manyame River near Chinhoyi to look at the late Archaean, Eldorado Conglomerates of the Chinhoyi Greenstone Belt. Excellent outcrop prompted discussion as to the origin and structural history of these conglomerates.

Figure 2: Sharad Master introducing the Eldorado Conglomerate near Chinhoyi.
Photo Andrew du Toit

The next stop was at a quarry near Lomagundi College where we examined excellent examples of columnar stromatolites in the Upper Dolomite of the Lomagundi Group. This presented an appropriate setting in which to discuss the *Lomagundi Carbon Isotope Excursion*, which is named following Shidlowski's work in this area.

Figure 3: Deformed columnar stromatolites, Upper Dolomite Member, Mcheka Formation, Lomagundi Group. *Photo Sharad Master*

We had lunch in the shade beside the Angwa River near the road to Alaska Mine where Sharad explained the significance of the dune-bedded Deweras Group aeolinites exposed there, suggesting the world's oldest known desert environment.

Figure 4: Sharad Master discussing the Deweras Group- aeolianites exposed in the Angwa River, a suggestion for the world's oldest desert? *Photo Andrew du Toit*

On the rock dumps overlooking the Alaska Copper Mine open pit, we examined pseudomorphs containing djurleite ($Cu_{31}S_{16}$) indicating the syntectonic replacement of pyrite.

Figure 5: The MSU group with Gayle Hansen, the Chairman and Sharad above the Alaska Open Pit. *Photo Farai Zihanzu*

After the Alaska stop, most people returned to Harare, but a small group continued to Portelet Estate south of Chinhoyi to look for a small outcrop of red indurated sandstone, which forms an outlier sitting on the Archaean granite of the Biri Dome as mapped by Gerard Stagman in 1961. With the help of the farmer, John Crawford, we found several boulders of the sandstone.

Figure 6: Sharad Master and Michele Dean examining some of the Sijarira-type red bed sandstone found on Portelet Estate near Chinhoyi. *Photo Andrew du Toit*

From Portelet we crossed the Manyame River and spent the night at a camp on the eastern shores of Biri Dam.

The full field guide can be found in and downloaded from the Geological Society Website. http://www.geologicalsociety.org.zw/news/trip-magondi-area

News

Geology Section: Department of Chemistry and Earth Science, University of Zimbabw

Fadzanai Bornwell Mupaya and Shephard Mabhanga

2022 ended well with the few available lecturers seen to be busy winding up exams for the last semester. The new semester will commence on 20th February 2023. Fortunately, two junior lecturers, **Ms Nancy Magaranhehwe** and **Ms Selina Sibanda**, joined the department and helped out in the teaching of geochemistry and geostatistics. **Dr Meck** has re-joined the department following her sabbatical leave in 2022. Her report follows.

The department arranged a training programme for 6 students as part of their one-year internship. This included laboratory techniques including the preparation of thin and polished sections over a period of 2 months, followed by stream sediment sampling with heavy media and magnetic separation of concentrates and grain picking over a further two months. In this regard, in order for them to complete their nine months industrial attachment, the University is requesting companies to consider placements for these students over the five months from April to August 2023.

Mennell Society students are arranging a fieldtrip planned for March this year to assist towards their fieldwork exposure and the need for them to conduct independent work.

The Mennell Geological Society

Fadzanayi Mupaya (Patron)

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Petrography and Geochemistry of Dorowa rocks - Zimbabwe: Implications for petrogenesis of the ring complex

Sabbatical Update

Dr Maideyi Meck

Chemistry and Earth sciences Department University of Zimbabwe

Introduction

The sabbatical was divided into two parts. Firstly, I attended KU Leuven University, Belgium under the Global Minds (GM) short stay research grants programme managed by KU Leuven Interfaculty Council for Global Development (IRMO). The GM philosophy is to "stimulate the exchange of knowledge and innovative research". The host was Professor Anouk Borst. The second part related to the African Union's 'African Minerals and Energy Resources Classification' (AMREC) activities.

During my stay in Belgium I reconsidered the Dorowa ring complex, a post-Karoo Mesozoic alkaline intrusion. This was prompted by the fact that my unpublished ICP–MS and XRD results from my PhD study on the Dorowa complex (Meck, 2011) showed a presence of REE-Zr-Nb-Ta-Ce in the various rock units, which include fenite, syenite, ijolite and carbonatite. Whilst phosphate is the major resource of interest, the complex contains metals and critical elements related to the occurrence of phosphate in igneous rock. Thus, in this postdoctoral project I tried to decipher the petrogenesis of the complex in order to understand the Rare Earth Element (REE) deportment in the rocks, concentrates and tailings with particular emphasis being placed on the presence of apatite. Emphasis in this study was put on the petrography and geochemical signatures of the major rock units making up the complex.

Schools of thought on the Petrogenesis of the Dorowa Carbonatite Complex

Mennell (1938) viewed the carbonatite as a result of the reaction between sedimentary limestone with surrounding gneiss. Macgregor (1947) viewed them as subsided blocks of Umkondo marble emplaced during post-Karoo times. These two authors related the carbonatite to a sedimentary origin. Tyndale Biscoe (1950), Swift (1952) and Lee (1973) regarded the carbonatite as being of magmatic origin whilst Barber (1991) viewed it as *in situ* fenitization of the Archaean leucocratic granitic Ziyambe Gneiss. Harmer and Gittins 1998 feel that the carbonatite was derived from primary, mantle-derived carbonate magmas, which ascend from mantle depths of 70–100km (2–3GPa) through conduits lined with orthopyroxene-free (wehrlitic) metasomatic assemblages. The different authors have features that they have used to conclude their views. This study will develop a view based on observations made from micro analytical observations.

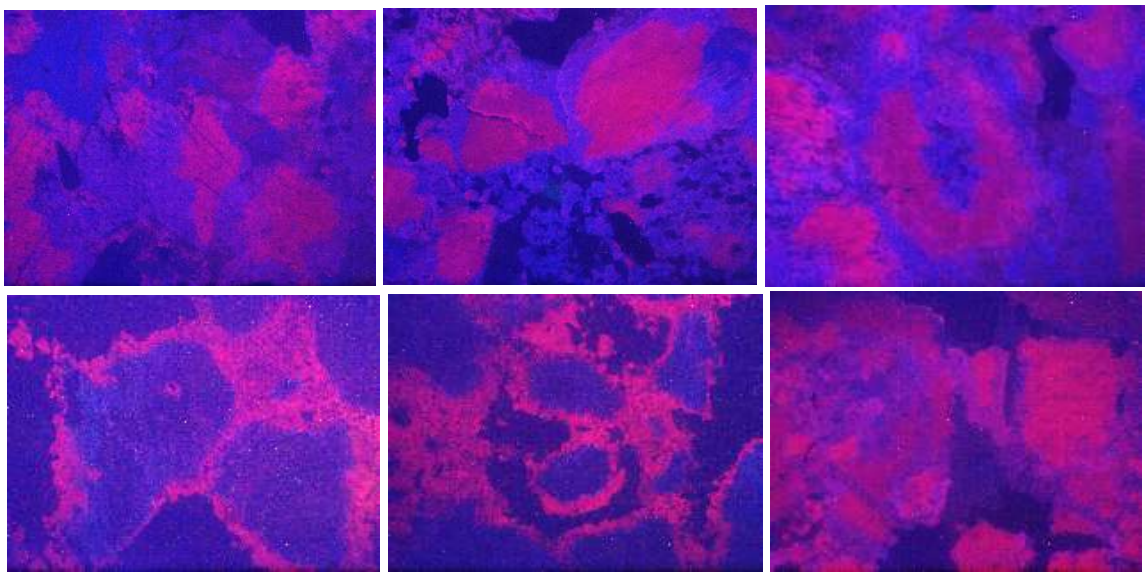
This Research

Access was made available to state-of-the-art thin section imaging equipment, Raman Microscopy (RM), Cathodoluminescence Microscopy (CL), Scanning Electron Microscopy (SEM) and thin section polishing for SEM.

Operating some of the KU Leuven micro-analytic equipment

Good CL response was noted in feldspars from the fenite (bright pink and blue) and from carbonates (oranges and red) in the beforsite. Dolomite and calcite in the beforsite shows variation in the intensity of cathodoluminescence within the grains. The phenocrysts also show contrasting intensity within the groundmass. Orange cathodoluminesce has been attributed to the presence of manganese and other trace elements by other writers. Thus the variations observed can be attributed to concentrations of manganese and trace elements. The fenite shows albitization of K-feldspar and possible plagioclase, including complete pseudomorphic K/Ca-feldspar replacement and replacement along margins and cleavage planes/micro-cracks within K/Ca-feldspars. The photomicrographs illustrate the luminescence observed in feldspar grains within fenite, and they clearly show different zoning expressions. Of particular interest is the zoning in the feldspars as a combination of normal, reverse and oscillatory zoning noted in the fenite as well as the non-luminescence of Dorowa apatite under CL.

From SEM scans it was seen that both ore and gangue minerals from Dorowa exhibit variable grain morphology and grain size. Though some ore minerals are liberated from the gangue, most apatite grains are closely associated with magnetite and feldspar. No intricate mineralogical textures were observed. Neither were unusual REE phases identified in the samples. REE's occur as ionic substitutions in the crystal structure of existing rock-forming minerals that were analysed. EDS Element mapping isolated the following elements in samples: Na, K, Fe, P, Ca, Si, Ti, V and Ce. Vanadium, cerium and titanium in the samples are associated with magnetite.



Normal, reverse and oscillatory zoning of feldspars within fenite

Textural features in the beforsite appears to arise from co-existence with magma. These include crystalline textures, porphyritic texture, carbonate spherules that cannot be explained by replacement textures and euhedral phenocrysts consistent with primary magma-related textures rather than being hydrothermal. The different morphological forms and textural diversity in Dorowa carbonates is probably an indicator of several generations of formation.

The fenite clearly shows normal, reverse and oscillatory zoning in the feldspars (orthoclase rimmed by albite, albite rimmed by orthoclase and alternating albite and orthoclase zones). Chemical zoning in igneous minerals represents a potential record of timing, process, and thermal evolution during the evolution of a given magma reservoir. Plagioclase and K-feldspar phenocrysts often exhibit zoning with a more calcic core of either anorthite ($CaAl_2Si_2O_8$) or orthoclase $KAlSi_3O_8$ rimmed by more sodic feldspar such as albite ($NaAlSi_3O_8$). This zoning reflects the change in magma composition as crystallization progresses. Normal zoning where the rim of a crystal shows a lower-temperature composition than the core is also present in the Dorowa samples. Reverse zoning describes the more unusual case where the rim shows a higher-temperature composition than the core. Reverse zoning (calcic plagioclase surrounding sodic plagioclase with a lower melting point) was also observed in these samples. Possible explanations for this phenomenon include:

a) Ascent of magma from a deeper to shallower chamber iso-entropically. Ustunisik, *et al* 2014
b) Convection of a magma in a large chamber polybaricaly. Ustunisik, *et al* 2014
c) Late reaction with foreign crystals within the magma
d) Metamorphism
e) Retrograde potassic alteration

The reverse zoning observed in the samples does not appear to be a reaction or alteration rim. Thus it may be explained by iso-entropical or polybarical activity within the magma chamber. Lack of luminescence for Dorowa apatite might imply that these crystals are trace element-poor or else carbonate-bearing. Fluorapatite that does not luminesce at all has been noted from Sokli by Broom-Fendley *et al* 2021. This has been interpreted as due to the fact that the mineral is carbonate-bearing. Beforsite from the complex is geochemically comparable with the fenite, implying the possibility that they may be from the same intrusive suite or else there was capture from the wall rock and interaction with the host melt.

Summary of petrogenesis from this study

a) The rocks have textural features that appear to arise from their co-existence with magma.
b) Textural diversity suggests several generations of formation.
c) Reverse zoning may indicate either ascent of magma from a deeper to a shallower chamber iso-entropically or convection of a magma in a large chamber polybaricaly.
d) The similar trends displayed by the geotenic plots of the rock suite suggest that the carbonate rock may have the same origin as the fenite.
e) Sodic alteration supports fenitization of the country rocks.

Observation from this work support a scenario that is consistent with a 'magmatic' origin for the carbonate rocks wherein the carbonate rocks and other lithologies have the same source as the surrounding fenite.

The Launch of the AMDC Phase II and the Second African Forum on Mining Addis Ababa, October 2022

Executive Summary

It has been thirteen years since the African Union Heads of State and Government adopted the Africa Mining Vision (AMV) to create a transparent, equitable and optimal exploitation of mineral resources in order to underpin broad-based sustainable growth and socio-economic development. In 2013, the African Minerals Development Centre (AMDC) was launched as a project under the United Nations Economic Commission for Africa (UNECA) to coordinate and oversee the implementation of the Africa Mining Vision and its Action Plan to enable the minerals resources sector to play its role in the social and economic transformation, inclusive growth and sustainable development of African economies. This would be in conjunction with AU Member States, Regional Economic Communities, the private sector, civil society organizations (including women and youth organizations), collaborating institutions and other key stakeholders. In 2019, the AMDC was officially handed over to the African Union by UNECA and in 2021 a Host Agreement was signed between the African Union and the Government of the Republic of Guinea. However, due to the COVID-19 pandemic and political changes in Guinea, the Centre was not able to relocate to Guinea. Since May 2022, an Interim AMDC Secretariat was established to oversee the Centre's establishment and operationalization (functionality?). AMDC is being supported through the ACP-EU

Development Minerals Programme (Phase II), initiated by the Secretariat of the Organization for African, Caribbean and Pacific States (OACPS).

Over the years, the AMDC has strived to establish the brand of the Centre of Excellence to become a facilitator of choice for a sustainable minerals' industry in Africa. It developed several knowledge products and AMV implementation tools, namely the AMDC Five Years Business Plan and its Theory of Change; the Country Mining Vision (CMV) guidebook; the Geological and Minerals Information System (GMIS); the AMV-Private Sector Compact; the Africa Minerals Governance Framework (AMGF); and the African Minerals and Energy Resources Classification Framework and Management System with the Pan-African Reporting Code (AMREC-PARC).

The launch of the African Minerals Development Centre (AMDC) Phase II and the second African Forum on Mining was held from 3rd to 4th October 2022, under the theme "***The Africa Mining Vision in the Time of the Green Energy Transition and Digitalization: Challenges and Opportunities".*** The objectives of the Forum and the re-launch of the AMDC were: to re-energize AMDC stakeholders towards a changing narrative with a view to creating a renewed momentum for the implementation of the AMV towards Africa's structural transformation through the dynamic use of minerals; to call upon African Union strategic partners and stakeholders to support operation of the Centre; to update and engage Member States and other stakeholders on the work of the AMDC and its operationalization plan, and to call for the signing and ratification of the AMDC Statute.

The Forum was attended by more than 150 participants, including representatives of the African Union Commission, the AMDC, and AU Member States represented by Ministers in charge of Minerals Development and Mines. These included the Minister of Industry from the Democratic Republic of Congo, the Ministers of Mines from the Republic of Senegal, the Republic of South Sudan, and the Republic of Zimbabwe, as well as the Deputy Minister of the United Republic of Tanzania, the State Minister of Mines and Petroleum from the Federal Democratic Republic of Ethiopia with a representative from the Ministry of Mines. Additionally, participants to the Forum included representatives from the European Union, OACPS, AfDB Regional Economic Communities (RECs), UNDP, UNECA, UNCTAD, and other African Union stakeholders and strategic partners including the private sector, academia, international organizations, think-tanks, research institutions and representatives of women in the minerals industry.

Conclusions of the launch of the AMDC Phase II and the second African Forum on Mining 2022 included: a strong recommendation for the development of the African Green Minerals Strategy (AGMS); the development of an African Green Minerals Observatory (AGMO) by the first quarter of 2023 to advance minerals development in Africa; for promoting local content policies to ensure job creation and employment, local ownership and the use of local suppliers, as well as to achieve high-value goods and link the mineral sector with other sectors of the economy. Furthermore, the AMDC Interim Secretariat was encouraged to continue working on the development of a roadmap for ratifications of the AMDC statute by African Union Member States, with a view to reaching the quorum of 15 AU Member States that would allow the AMDC to become a full-fledged Specialized Agency of the African Union.

Key recommendations that emerged from the 2nd African Forum on Mining and Launch of the AMDC Phase II:

- The AMDC to promote sustainable investments in strategic green minerals with a view to taking advantage of the global EV Battery value chain, which is estimated to reach about $8.8 trillion by 2025 through encouraging more African entrepreneurs and local-based exploration companies to invest in the upstream mineral value chain of these critical minerals;
- Promote the development of policies that would create the necessary supportive infrastructure to create incentive for local private exploration and project development in strategic green minerals.
- Promote participation of local entrepreneurs and exploration companies leading to the expansion of wealth being retained locally that can be reinvested into other sectors to diversify economies. For Africa to harness its significant potential in the era of the energy transition, battery revolution and technological minerals value chain, the continent needs to take control of its exploration and project development potential, which is underdeveloped and under-valued. This is an opportunity to build a greener and more prosperous world and Africa must not miss it.
- As mining exploration is at the front-end of the mining value chain, the active participation of local entrepreneurs and exploration companies would lead to the expansion of wealth retained locally, which can be reinvested into other sectors. AMDC would encourage African countries to take control of their exploration and project development potential, which is clearly underdeveloped and under-valued
- Build an African lithium-ion battery electric vehicle (BEV) value-chain with inputs of strategic green minerals from across the continent and through support of a special economic zone, centres of excellence as well as other vital building blocks for an industrial base that can fabricate cathodes and move into battery cell assembly and eventually electric vehicles.
- Ensure that the green minerals boom benefits Africa and spurs industrialization through proactive industrial policy that plans the allocation of resources and setting up of incentives that are a prerequisite to building new competitive advantages.
- Embrace collaboration between governments, businesses, labour groups, communities, development partners and financiers to outline a new approach to industrial policy for mineral value-addition. This is made possible by the establishment of an AMDC Futures expert group.
- Promote local content policies to achieve high-value goods and high-level employment, to ensure local ownership of suppliers and links with other sectors. This would be backed by support to local suppliers to develop skills and capacities.
- Leverage on the comparative advantages, expertise, and knowledge of its strategic partners to coordinate and oversee the implementation of the Africa Mining Vision, its Action Plan, AMV implementation instruments, and other existing developmental frameworks to enable the mineral resources sector to play its role in the social and economic transformation, inclusive growth and sustainable development of African economies.

- Develop a ratifications' roadmap for the African Union Member States to achieve the ratification of the AMDC Statute by the quorum of AU Member State's (15) founding members. This will ensure the establishment of the Centre's governing organs; the Conference of States Parties, Minerals Advisory Board; and the permanent Secretariat.
- Accelerate intra-African trade, skills building and research to unlock innovation along the battery electric vehicle (BEV) value-chain whilst leveraging the African Continental Free Trade Area (AfCFTA), and ensuring a socially, environmentally responsible and sustainable BEV value-chain, which in turn improves the lives of women and the youth; and encourages local and African champions to invest in the BEV value-chain and in the mineral sector in general.
- Develop the African Green Minerals Strategy (AGMS), and the African Green Minerals Observatory (AGMO) by the first quarter of 2023 to advance minerals development in Africa.
- Encourage African investors in mining, which is capital intensive, and improve policies on access to sustainable finance that would de-risk the sector for African mining industries. This will be further supported by organizing Mining Investment Forums to bring together the financial institutions and relevant stakeholders.
- Develop a platform or mechanism to map the activities of women in mining in collaboration with AWIMA, the Africa Business Council, and other private sectors.
- Establish regional steering committees to work on harmonizing policies in line with the Africa Mining Vision and regional value chains.
- Re-skill and upskill industry players to adapt to the energy transition and new technology "linking academic institutions to the priorities of the mining industries".

Join the Geological Society of Zimbabwe Facebook Group

MIDLANDS STATE UNIVERSITY
FACULTY OF ENGINEERING & GEOSCIENCES
ZVISHAVANE CAMPUS

Submitted by Dr Antony Mamuse, Executive Dean, and Farai Zihanzu
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Report back on the Magondi Belt Field Trip (21-22 October 2022)

Compiled by
Trisha Tanaka Paraziva (Chairperson of the MSU Geological Student's Society)

Introduction

On 21st October 2022 the MSU Geological Student's Society attended the Geological Society of Zimbabwe Summer Symposium that was taking place at the University of Zimbabwe in Harare. On 22nd October, we travelled to Chinhoyi to join the field trip led by Dr Sharad Master. The main aim of this excursion was to examine rocks of the Palaeo-Proterozoic Magondi Belt exposed in the Chinhoyi area, and to visit some older and younger rocks in the region.

The MSU Geological Student's Society was started by geology students under the instigation of Dr Mamuse. The aim is to engender inspiration and innovation in geology students at MSU by promoting the science of geology through the compilation of scholarly reports and publications, the holding of meetings as well as involving ourselves in research projects and other appropriate activity. The society is currently led by twelve committee members who are elected according to our constitution.

We left Zvishavane for Harare at 7:00 am on 21st October. Due to some delays on the way we arrived late for the Symposium, but we managed to listen to part of the Macgregor Lecture presented by Dr Sharad Master about the evolution and metallogeny of the Magondi Belt found across north-western Zimbabwe. He described the three sub-groups of the Magondi Supergroup, which are the Deweras, Lomagundi and Piriwiri, groups deposited between c.2.16 and 2.0 Ga ago (Master *et al*., 2010; Glynn *et al*., 2012). He also talked about the relationship of the Zimbabwean craton with the Kaapvaal craton.

On the following day, Saturday, we left for Chinhoyi at 7:00 am for our field trip, for which there were four scheduled stops, but we had a short unscheduled stop on the Great Dyke Pass near Mpinga where we managed to identify some exposed pyroxenite/bronzitite of the P3 horizon of the Ultramafic Sequence. This stop was important in that it demonstrated to us the tectonic setting and stratigraphy of the Great Dyke and allowed us to collect a representative sample (Figure 1).

Figure 1: Great Dyke pyroxenite

STOP 1: MANYAME RIVER, CHINHOYI. (30.21939E, 17.35695, WGS84)

Our first scheduled stop was at the Manyame River targeting exposures of the Eldorado conglomerate within the late Archaean (c.2.7Ga) Chinhoyi Greenstone Belt. We noticed a gold association with quartz veins in shear zones affecting the conglomerate and observation showed the rocks to be dipping downstream. Clasts of different size and shape are evident due to strain variation and include rounded and elongated inclusions of granite and banded iron-formation). With both rounded and angular clasts being present, a discussion on provenance led to the conclusion that the conglomerate is most likely to have a volcaniclastic origin (Figure 2).

Figure 2: The Eldorado Conglomerate

STOP 2: DOLOMITE QUARRY. STROMATOLITES IN THE UPPER DOLOMITE, LOMAGUNDI GROUP. (30.147E, 17.33309S, WGS84)

Our second stop was at the dolomite quarry on the road to Lomagundi College. According to Bekker *et al*., 2001, this excavation exposes the Upper Dolomite or Caves Dolomite of the Lomagundi Group, which has been sampled for C and O isotope analysis. As we climbed the side of the quarry towards the top, we observed good exposures of columnar stromatolites (Figure 3). Above the quarry face, near the top of the dolomite, some malachite straining was apparent. In road cuttings above the Chinhoyi Caves we observed fine-grained micaceous pyritic slaty shales and siltstones with a stripy appearance. This is the Striped Slate Formation.

Figure 3: Deformed stromatolites

STOP 3: DEWERAS GROUP. AEOLIANITES EXPOSED IN THE ANGWA RIVER (30.04888E, 17.38896S, WGS84)

The Deweras Group, which is the basal unit of the Magondi Supergroup, overlies the Neoarchaean granite-greenstone terrain of the Zimbabwe Craton with tectonically modified unconformity. The arkosic unit comprises a red bed sequence, up to 1.3km thick, comprising meta-arenite, rudite, pelites, minor dolostones and sulphate evaporites and is associated with sub-alkaline basaltic lavas, pyroclastic rocks and sills (Master *et al*., 2010). The Deweras Group was deposited in a rift-related continental alluvial fan, braided stream, playa flat and playa lake environment. An aeolian facies occurs within the Deweras Group arkosic arenites. We managed to identify the aeolianites based on the presence of medium-grained arkosic sandstones (with well sorted, well rounded grains), large-scale planar cross beds (with tangential bottom sets), inversely graded cm-scale wind ripple deposits (with local cross laminations), wedge shaped grain flows and pinstripe laminations.

STOP 4: VISIT TO THE ALASKA MINE QUARRY (30.01668E, 17.39984S, WGS84)

Our last Stop was at the Alaska Mine. At Alaska Mine, oxidised copper ore, mainly malachite, has been mined for centuries. The ore bodies are hosted in sheared dolomites of the Lomagundi Group, which are part of a thrust duplex. We identified malachite ore from the waste dump (Figure 4), together with some hypogene chalcocite which occurs as pseudomorphs after pyrite.

Figure 4: Alaska ore specimens

Around 5pm we returned to Harare from our field trip. It was an eye-opening experience for us, which enhanced our understanding of tectonic setting, stratigraphy and the Great Dyke, as well as giving us exposure to structural geology.

Our appreciation goes to the Geological Society of Zimbabwe for enabling us to attend this educative field trip through their financial support. We would like to express our thanks to the Midlands State University for affording us the opportunity to be part of the MSU Geological Students' Society and allowing us to attend the trip. Special thanks go to our Dean, Dr Mamuse, for his guidance and support and to Mr. Zihanzu who worked so hard to ensure the successful completion of this field trip.

ZIMBABWE SCHOOL OF MINES

Serving the SADC mining industry

Fyrence has little to report on ZSM activities for this quarter and will combine her report back for the next issue. We look forward to seeing her and her top student for 2022 at our AGM in Harare when the Mike Vinyu Award is announced.

Submitted by Fyrence Ndebele

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Department of Mining and Processing Engineering

Sadly, for us, Hazel Chibaya has left Manicaland State and we have no report. Consequently, we are looking for a willing correspondent to keep us informed on the progress and happenings as regards the earth sciences and their application in the province. Our thanks go out to Hazel for establishing our link with the department and for her input to this Newsletter.

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Research. *Innovation.* *Sustainable Development.*

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF APPLIED PHYSICS
EARTH SCIENCES

Similarly, Dr Njila is no longer with the department at NUST and we are seeking a correspondent in order to maintain news emanating from this important institution with respect to their positive applications in the earth sciences. Dr Njila, however, did indicate that the MSc course in Geophysics is presently running with 16 registered students. Our thanks are extended to Tendai for his contributions to this Newsletter.

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Geological Survey Department

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The Zimbabwe Geological Survey (ZGS) conveys congratulations to **Sicelo Makhaza** and **Esnath Mupomhori** for being re-graded from the post of Geological Technician to that of Geologist following their attainment of their BSc Honours degrees in Applied Geology from the Midlands State University. However, they were subsequently transferred from the ZGS to Matabeleland North and Mashonaland East provincial offices respectively. We wish them well in their new assignments.

The Department welcomes our new Geological Technicians, **Belinda Nobanda** and **Tatenda Tavarera**, who joined the department in January 2023.

Ernest T. Mugandani, Deputy Director, attended the 14th General Assembly of the Organization of African Geological Surveys (OAGS) held in N'djamena, Chad from 21st to 25th November 2022. The general assembly offered an opportunity for members to interact and exchange ideas in the field of Geoscience.

The Director, **Forbes Mugumbate** and **Mangwiro Sibanda**, Senior Geologist, attended the 2023 Mining Indaba conference in Cape Town, South Africa, from 6th to 10th February 2023. The theme this year was *"Unlocking African Mining Investment: Stability, Security and Supply*". While there, **Forbes** managed to interact and discuss possible areas of co-operation with several delegates from other geological surveys around the World such as the French Geological Survey (BRGM), the British Geological Survey (BGS), and the German Geological Survey (BGR), among others.

Forbes and **Ernest** also attended the Ministry of Mines and Mining Development Strategic Planning Workshop held from 24th to 27th January 2023 at the Great Zimbabwe Hotel near Masvingo. Key outputs from the ministry and departments were outlined and strategies to achieve them were discussed as the Ministry strives to achieve a USD12 billion mining industry by 2023. The allocated budgets were also unpacked during the Strategic Planning Workshop.

The Memorandum of Understanding (MOU) between the Zimbabwe Geological Survey and Japan Oil and Gas Metal Corporation (JOGMEC) continues to bear fruit. **Brian Muteta**, **Mangwiro Sibanda** and **Diana Mugadza** participated in the online JOGMEC

competition on Remote Sensing image processing and analysis held from 23rd to 27th January 2023. **Brian** and **Diana** subsequently attended the JOGMEC seminar held in Botswana on 10th February 2023.

Mines and Minerals Bill

The Mines and Minerals Bill has finally been gazetted, and we call upon members of the Geological Society to go through it meticulously in order to identify areas requiring attention by policy makers. There is not much time left before the current parliament is dissolved to pave way for the election.

Statutory Instrument (S.I) 5 of 2023

Statutory Instrument 5 of 2023 has also been gazetted. This is intended to guide and control the export of raw base mineral ores including lithium, which is currently the mineral of the moment. Lithium ores will only be exported subject to meeting the minimum beneficiation levels as defined by the Minister of Mines and Mining Development.

NB: *The Department erroneously reported that* ***Sicelo Makhaza*** *resigned in the previous newsletter. Instead, it is* ***Thembelani Ncube*** *who resigned for greener pastures after attaining a BSc Honours degree in Applied Geology from the Midlands State University.*

ZIMBABWE KEY MINING CONFERENCES FOR 2023

(Source: *The Sunday Mail 5 February 2023 Business 3)*

	Conference Name	Date	Venue
1.	Africa Mining Summit	21 March 2023	Victoria Falls
2.	Mineral Value Addition and Beneficiation Conference	22 May 2023	Victoria Falls
3.	Africa-Middle East-Asia (AFMEA) Conference	13-16 June 2023	Victoria Falls
4.	Zimbabwe International Conference	6 November 2023	Victoria Falls
RSVP: The Chief Director Mining Development Office Linda (0242) 750829			

MINING NEWS

gleaned from https://www.mining.com/

by Kennedy Mtetwa

Zimbabwe demands some mining royalties in refined metal

Reuters | October 9, 2022 | 11:25 am Intelligence Top Companies Africa Gold Platinum

Global miners operating in Zimbabwe will have to pay some of their royalties in refined metal rather than cash, the country's president wrote in a newspaper on Sunday, as the country struggles to benefit from demand for its resources. Zimbabwe has abundant reserves of minerals such as gold and platinum-group metals (PGM), but power supply problems, a lack of ancillary industries to support mining and currency fluctuations have prevented it from profiting from a resource boom.

"Starting this October, government now requires that part of these royalties come as actual refined mining product," Emmerson Mnangagwa wrote in a column in The Sunday Mail.

The policy will target four main minerals – gold, diamonds, PGMs and lithium – he said.

Mnangagwa said the aim was to build a national reserve of precious metals and critical resources for the benefit of the current population and future generations.

"We cannot, as the present government, and as the current generation, run and manage finite resources profligately, without any regard for generations yet and sure to come!" he wrote.

Leading South African companies such as Impala Platinum and Anglo American Platinum are among those that extract PGMs in Zimbabwe. Gold companies, including Johannesburg-listed Sibanye Stillwater and London-listed Caledonia Mining, also operate there. In addition, Chinese miners are involved in lithium mining in Zimbabwe with the potential to make it Africa's biggest lithium producer, analysts say.

(By Promit Mukherjee; Editing by Barbara Lewis)

Zimbabwe miners unfazed by new royalties proposal

Reuters | October 10, 2022 | 8:57 am Top Companies Africa Diamond Gold Lithium Palladium Platinum

Zimbabwe's miners do not expect any significant impact from the government's proposal to collect royalties in the form of refined minerals, the country's Chamber of Mines said on Monday. President Emmerson Mnangagwa announced on Sunday that Zimbabwe would require companies mining gold, diamonds, lithium and platinum group metals (PGMs) to pay part of their royalties in refined metal rather than cash.

The Chamber of Mines, which represents major mining companies, said it was not worried about the pronouncement because it would not increase existing royalty rates.

"We respect the government's position. It's their prerogative. All they are saying is they are changing payment modalities," Chamber of Mines Chief Executive Isaac Kwesu told *Reuters*.

Zimbabwe has significant reserves of gold, lithium and PGMs, but an uncertain policy environment, power shortages and currency volatility have hobbled the country's mining industry. Foreign companies with operations in Zimbabwe include Anglo American Platinum, Impala Platinum, Sibanye Stillwater, Alrosa and Caledonia Corporation.

Impala said it was working with the Chamber of Mines to understand and respond to the new policy.
"Paying royalties in US dollars and or partly paying in equivalent metal product, on face value, does not materially alter the cost burden in Zimbabwe," Impala spokesperson Johan Theron said in an emailed response to *Reuters*.

Caledonia, one of the largest gold producers in Zimbabwe, said it does not expect any significant impact from the change.
"We have not seen the detailed mechanisms whereby this proposal may be implemented, but I do not think it would have any financial or operational effect on our business," Caledonia Chief Executive Mark Learmonth said in an emailed response to *Reuters*.

Mineral royalties accounted for 2.8% of Zimbabwe's tax revenue in 2021, Zimbabwe Revenue Authority data shows.
(By Nelson Banya; Editing by David Goodman)

"Royalties remitted to the Zimbabwe Revenue Authority in respect of gold and those minerals specified shall be paid on the basis of 50% in kind," read the government notice dated Nov. The cash component of the royalties would be made up of 40% Zimbabwean dollars and 10% in foreign currency, according to the notice. Zimbabwe's royalty rates range between 5% for gold and platinum group metals and 10% for diamonds.

Tharisa begins $391 million Zimbabwe platinum mine build

Reuters | October 12, 2022 | 10:56 am Africa Platinum

South Africa's Tharisa Plc plans to spend $391 million on developing a 194,000 ounce per year platinum group metal (PGM) mine in Zimbabwe, chief executive Phoevos Pouroulis said on Wednesday. Tharisa, a co-producer of chrome concentrates and PGMs in South Africa, owns 70% of Karo Mining Holdings, developer of the Karo PGM project on Zimbabwe's Great Dyke, about 100 kilometres southwest of the capital Harare. Its site is close to Impala Platinum's Zimplats operations.

Pouroulis said the ground-breaking for the first phase of the Karo mine would take place in December 2022, with mine construction expected to be completed by July 2024. The Karo project is an open pit mine, which would deliver the first mineral ore to the mill in the next two years, Pouroulis said during a briefing on the project.
"We are fully licenced and permitted and we believe this is a low-risk approach to any mining opportunity…being large-scale, open pit, low cost and adopting a multi-phase development approach," he added. He said that the Karo mine production plan had been upgraded to 194,000 ounces of PGMs per year, from 150,000 ounces initially.

Karo Mining Holdings managing director Bernard Pryor said the company was in talks with renewable energy firm Total Eren for the development of a 300-megawatt solar plant to supply the mine with power. Zimbabwe has an electricity generation deficit that often impacts mining operations. Some 1000 jobs would be created at Karo during mine development, with a further 1000 created when the mine is operational, Pryor said. Pryor also said $260 million for the mine development would be raised through bank loans, while $50 million will be raised on Zimbabwe's United States dollar-denominated Victoria Falls Stock Exchange through a bond issuance. Tharisa would raise the balance through leveraging its existing assets, he said.
(By Nelson Banya)

Tharisa Plc has since issued a $50 million bond as it moves to raise $391 million to build a 194,000 ounce per year platinum group metal (PGM) mine in Zimbabwe. The bond, which is not rated, is the first issued on Zimbabwe's Victoria Falls Stock Exchange and will be guaranteed by the company. Tharisa said the bond is US$ denominated and will be issued by way of private placement, with the proceeds used to partly fund the Karo platinum project.

By December 12 Tharisa had received applications to subscribe for notes totalling $31.8 million – exceeding the minimum requirement of $25.0 million. However, it raised less than targeted, after failing to attract as much interest from pension funds as hoped.

Zimbabwe exports first coal to China for cement industry client

Bloomberg News | November 2, 2022 | 9:48 am Africa China Coal

Zimbabwe shipped its first coal to China, exporting 20,000 tons as part of a trial run to a customer in the cement industry. The coal was transported via the Mozambican port of Beira, Linos Masimura, chairman of the Zimbabwe Coal Producers Association, said in an interview.
"There are other orders which may come through," said Masimura, who declined to give further details of the coal contract.

While a property slump has weighed on growth, there is speculation that China may seek to reopen the economy despite its Covid-Zero policy. China is also building a vast array of new coal-fired power stations, amid concern over the global squeeze in energy supplies. Zimbabwe usually reserves the country's coal output for domestic electricity generation, but started shipping the fuel last year after demand dipped from the Hwange power plant. Masimura said there has also been interest from European firms, but no deals have been concluded.
"We have had some inquiries from Europe, but these for now are coming through third parties who are mostly based in South Africa," he said.
(By Godfrey Marawanyika)

Zimbabwe miners say costs, power shortages dampen 2023 growth prospects

Reuters | November 9, 2022 | 7:46 am Intelligence Africa Coal Gold

Zimbabwe's miners face rising costs and persistent electricity shortages, which will impact the sector's growth prospects next year, an industry body said on Wednesday. The southern African country has pinned hopes on the mining sector to drive its economic recovery after years of decline blamed on the government's forced seizure of white-owned farms in 2000 and excessive spending that fuelled hyperinflation. An industry report published by Zimbabwe's Chamber of Mines, which represents the country's major mining firms, says the sector will experience a slower 7% growth next year, from a projected 8% this year.
"Prospects for mineral output growth for 2023 are generally lower than those recorded in 2022. Key risks to the outlook for 2023 include fragile power supply, high costs, foreign currency shortages, an unstable tax framework and capital shortages," the report says.

Mining costs are projected to increase by 15% in 2023, with energy being the main driver, the report said. Zimbabwe's miners often suffer power outages due to the frequent breakdowns of the country's old generation plants. Zimbabwe's state-owned

power utility gets some electricity from neighbouring countries to plug the deficit and now bills miners in foreign currency to fund the power imports, a move which mining companies say has driven operating costs higher.
Zimbabwe has significant reserves of platinum group metals, gold, chrome, coal, diamonds and lithium and its mining sector contributes about 11% of the country's gross domestic product and over 60% of its export earnings.
Foreign companies with operations in Zimbabwe include Anglo American Platinum, Impala Platinum, Sibanye Stillwater, Alrosa, Zhejiang Huayou Cobalt and Caledonia Corporation.
(By Nyasha Chingono; Editing by Nelson Banya and Bernadette Baum)

Zimbabwe signs agreement with Tsingshan to set up lithium operations
Reuters | November 29, 2022 | 2:16 pm Battery Metals Intelligence Africa China Lithium

Zimbabwe has signed an agreement with Tsingshan Holdings Group, which plans to set up lithium mining and processing operations in the southern African country, President Emmerson Mnangagwa said on Tuesday. Tsingshan, one of the world's top nickel producers, is currently building a $1 billion stainless steel plant in Zimbabwe. The company also has a coking coal operation and a ferrochrome smelter in Zimbabwe, which has some of the world's largest hard-rock lithium reserves. Mnangagwa and Tsingshan's founder, Chinese tycoon Xiang Guangda, oversaw the signing of an outline agreement for Tsingshan's planned expansion projects in Harare on Tuesday.
"Tsingshan Holdings Group is set to expand its current operations. This will see the company embark on the production of cement and lithium concentrates, as well as scaling up coke and ferrochrome production among other mining and mineral processing projects in Zimbabwe," Mnangagwa said during the signing ceremony.

The agreement would also see Tsingshan increase its stainless steel and coke production to 5 million tonnes for each commodity annually. Mnangagwa said Tsingshan would also help Zimbabwe refurbish its railway system, which has suffered years of poor maintenance and under investment. Tsingshan's proposed investment in Zimbabwe's lithium sector follows the recent acquisition of lithium assets by Chinese giants Zhejiang Huayou Cobalt, Sinomine Resource Group and Chengxin Lithium Group in transactions worth a combined $678 million.
(By Nelson Banya; Editing by Chris Reese)

Raw lithium exports banned in Zimbabwe as demand and prices soar
Bloomberg News | December 20, 2022 | 8:22 am Battery Metals Africa Lithium

Zimbabwe has banned the export of unprocessed raw lithium with immediate effect as part of efforts to have the key raw material in electric-vehicle batteries processed locally.
"No lithium bearing ores, or unbeneficiated lithium whatsoever, shall be exported from Zimbabwe to another country" without written permission, an order issued by Mines Minister Winston Chitando states.

Mining companies that are building processing plants will be excluded from the directive, Deputy Mines Minister Polite Kambamura said by phone on Tuesday. Lithium has been on a tear, surging more than 1100% to a record in the past two years, as supply has struggled to keep up with rampant demand. Rio Tinto Group predicts half of all car sales

could be EVs by 2030, up from 9% last year, and mining companies have been scouring the world for opportunities to bring on new supplies.

Chengxin Lithium Group Co. and Sinomine Resource Group Co. are setting up a joint venture to explore for the metal in Zimbabwe, while Zhejiang Huayou Cobalt Ltd plans to invest $300 million to develop its Arcadia lithium mine.
"We have done this in good faith for the growth of industry," Kambamura said. "If we continue exporting raw lithium we will go nowhere. We want to see lithium batteries being developed in the country."
In July, the southern African country announced plans to introduce royalties on lithium producers from next month and banned the export of unpolished granite.
(By Godfrey Marawanyika and Ray Ndlovu)

Caledonia adds one of Zimbabwe's largest gold projects to portfolio

Cecilia Jamasmie | January 6, 2023 | 6:11 am Markets Africa Europe Gold

Caledonia Mining (LON: CMCL) has added to its portfolio one of Zimbabwe's biggest gold mining projects after completing the acquisition of Bilboes Gold, owner of the namesake asset. The shares plus royalty transaction, announced last year, will help the company achieve its goal of more than doubling annual output, potentially making it Zimbabwe's top gold miner.

The Bilboes gold project, a large, high-grade gold deposit located about 75km north of Bulawayo, also makes Caledonia Mining a multi-asset, mid-tier producer. According to the latest feasibility study, the asset has the potential for an open-pit gold mine producing an average of 168,000 ounces per year over a 10-year life of mine. Caledonia said it plans to conduct its own feasibility study to determine the "most judicious way" to commercialize the deposit. One approach that will be considered is a phased development, which would minimize the initial capital investment and reduce the need for third party funding, the company said.

Ore production from the Bilboes oxides will start in early February, chief executive officer, Mark Learmonth, said in the statement. Caledonia anticipates beginning to recover gold from the heap leach in March. Once full production rate is achieved, the net smelter royalty would generate around $2.6 million a year for the company at current gold prices, the miner said.

The total consideration payable for the Bilboes acquisition is, subject to adjustment, 5,123,044 shares representing approximately 28.5% of Caledonia's fully diluted share capital and a 1% net smelter royalty (NSR) on the project's revenues. Based on the last trading day's closing price for Caledonia shares on the NYSE of $12.82 per share, the value of the maximum number of new shares that could be issued as consideration if there is no adjustment is currently $65.7 million.

GSZ Research and Development Fund

Enquiries relating to the distribution of funds through this facility should be made with the standing Chairperson.

SEG Timothy Nutt Memorial Fund

This fund will be available to provide financial support for geology students and young economic geologists located in Zimbabwe or in southern Africa with ties to Zimbabwe. The fund may be used to support SEG student chapter activities, travel to meetings, field trips, for research or study grants, technical lectures or any other activities approved by the SEG Regional Vice President for Africa.

Strong preference will be given to those applicants who are SEG Student Members.

To become an SEG Student member visit www.segweb.org/join

Applicants must describe what the project is, why the research is important and how it is to be done.

An estimate of expenses for the project must be included with the application.

Grants are expected to be fully utilized by April 30 following the calendar year in which they are awarded / dispersed. .

Grant recipients are required to provide a year-end accounting of how the money was spent together with a suitable progress report or final abstract.

A 2018 Research Grant application form may be downloaded from www.segweb.org/StudentResearchGrants

Student Research Grants Committee c/o Assistant for Student Affairs, Society of Economic Geologists Foundation 7811 Shaffer Parkway, Littleton, CO 80127-3732 USA

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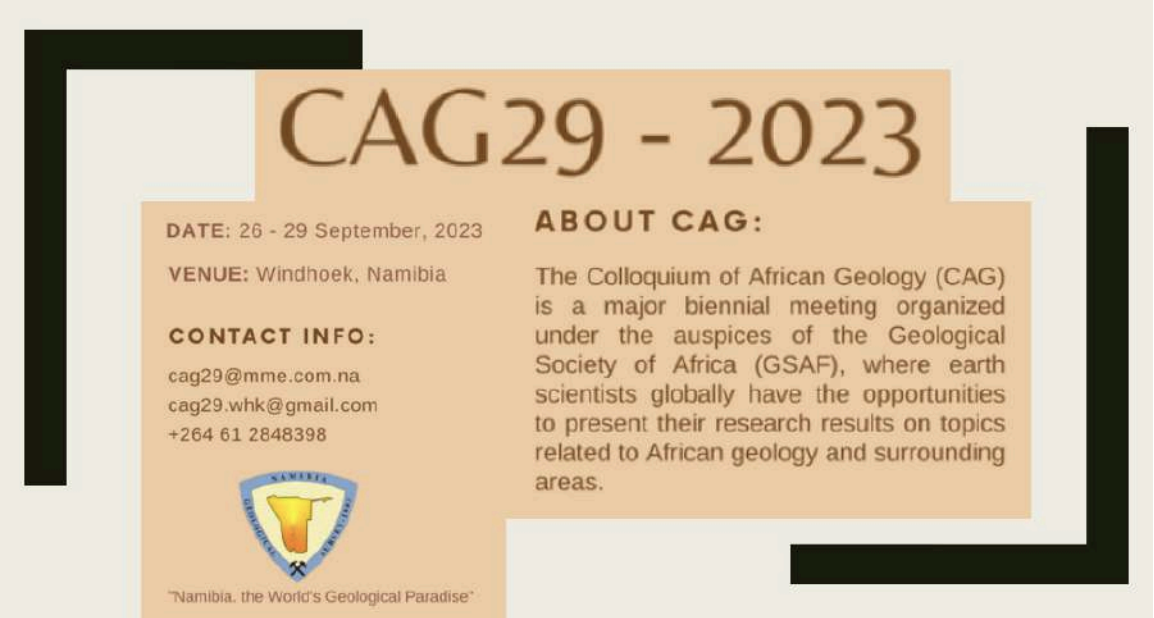

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EVENTS

GSSA events 2023

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

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

For further information on specific events see https://www.gssa.org.za/
or email info@gssa.org.za

GEOLOGICAL SOCIETY OF ZIMBABWE: CONTACT DETAILS OF MEMBERS OF THE EXECUTIVE COMMITTEE FOR 2022

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Mwatahwa, Collins	Hon. Treasurer	collinsm885@gmail.com
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Institutional Membership, 2022

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