# Geological Society of Zimbabwe

# *Newsletter*

February 2022 No. 1 of 3 of 2022


The ‘Master’ enthrals about the basal orthoquartzite palisades. *Andrew du Toit.*

www.geologicalsociety.org.zw

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

# Contents

# Editorial

This, the third and final edition of the GSZ Newsletter under the Chairmanship of Renias Tirivabaya, allows us to capture some of the proceedings of our November Summer Symposium and to record the successful field trip to examine the Umkondo Group as it is exposed north of Nyanga. To this end the organizing input by Andrew du Toit and his back-up squad from the Committee for the Symposium and with Tony Martin on the Field trip must be acknowledged, as must the efforts from all presenters. We again were able to welcome back Sharad Master to our midst and thank him for his keynote presentation, which abstract is recorded in this Newsletter, as well as for his usual active participation in the field excursion, ably summarized by Tony. A number of other abstracts are included as are report-back summaries on the proposed mentorship programme and advances with respect to professional registration, ethics and the disciplinary code.

The other import of this edition is to promote the AGM at the Tayana Conference Centre in Mount Pleasant at 5.00pm on 25th February. Details and directions to the venue are presented. We look forward to your participation and to us catching up between friends and colleagues. We encourage Members to attend as there will be important issues under discussion that affect us all. The minutes of the 2021 virtual AGM are included for your prior perusal as is the agenda for the 2022 AGM.

Yet again we thank our news contributors who reflect the activities of both institutions and the mining world. A welcome to Tendai Njila, who brings NUST back into the fold, and a big welcome back to Forbes Mugumbate who keeps us updated as to the activity of the Geological Survey and the local mining environment. As a back-up to this is Antony Mamuse's regional roundup on mining and exploration activity and Kennedy Mutetwa's gleanings from the international mining press.

My thanks are certainly due to Shepard Mabhanga for co-ordinating Newsletter contributors and enhancing communication through the Committee. His efforts have made for good team work and are appreciated.

So, let us make an effort to come together on the 25th in order to participate in the affairs of our Society, to thank Renias and his Committee for their efforts on our behalf, to welcome in Kennedy and his new Committee, share in the achievements of our award winners and simply enjoy each-others company. See you there.

*Tim Broderick*

# Chairperson's Chat

*Renias Tirivabaya*

**Renias Tirivabaya, Chairman**

Dear geo-colleagues I hope I find you in good health as I welcome you to our February Newsletter. The Newsletter coincides with the Annual General Meeting scheduled for Friday 25th February 2022 at Tayana Conference Centre in Mount Pleasant. I cordially invite you to update your membership status and attend this years' AGM to participate in the governance of your Society. Our Society is membership-driven and your involvement is key.

Most of you will remember Julie as being our only "staffer" up until April 2021. Over the past few years she has played a big part in the administration of our Society. Please join me in thanking Julie for her service to us and for her very effective record keeping. Thank you Julie - you are an organiser par excellence.

Our quest for continued professional development for our membership has seen us connecting to or presenting some ten online talks reflecting various topics of interest to our geological community. It is worth mentioning that we are witnessing an increased involvement in the number of presenters from our own membership.

Thanks to the waning number of Covid cases in the country, we were able to hold our traditional annual Summer Symposium at the University of Zimbabwe. The symposium was well attended, and ended with a two day field trip to the Umkondo near Nyanga led by Tony Martin and our own "geological son" Sharad Master. Sharad continues to research and write on the geology of Zimbabwe. Please have a look at the abstracts on our website for those not presented in this Newsletter to gain an overview into the interesting topics covered. Those who attended the symposium and or the field trip and would want to claim CPD points, please contact our secretary, Kudzi Musiwa, for assistance.

It is also high time that we rotate the hosting of the symposium amongst our membership regions, a task I will leave to the incoming committee for consideration. This will improve our membership participation from all regions and institutions.

Our geoscience training institutions continue to plead with industry to accommodate their students, our "future for the Geosciences", for their compulsory industrial attachments. I implore you to assist and influence your organisation to consider taking in these upcoming geologists.

This Newsletter is my last as your Chairman and I would like to thank you for the support given as I led your Society over the past year. It has been a great development opportunity for me. I invite you to rally behind Kennedy Mthethwa and his Committee as they take us into and through the exciting times ahead. Lastly but not the least, please join me in thanking our contributors and editorial team, ably led by Tim, for always publishing this newsletter on time. Tim and your team, please consider upgrading this into a journal in the near future.

God bless you All.

## Proposed GSZ Geologist Mentorship Programme

Steve Duma
steven.duma@zimplats.com

An industry mentorship programme is proposed to operate under specific guidelines, which will be set and monitored by the GSZ and could be run by an inclusive subcommittee of the GSZ Committee. The programme will largely be in line with other existing professional mentorship platforms around the world that are aimed at availing an opportunity for scientists operating in the exploration and mining industry to impart knowledge and skills to young graduates and aspiring geoscientists.

The mentorship programme will be designed in such a way that Mentors and Mentees are identified and paired through a formalized system thus allowing a seasoned professional to offer coaching and to help a young scientist to navigate through the early stages of their career.

The industry programmes are voluntary and can be described as formalized professional relationships between an experienced person who voluntarily and deliberately decides to transfer knowledge and experience to a young mentee or protégé, to assist them to develop the skills that they shall need to achieve their career or life goals.

The GSZ is considering the benefits that could accrue to the profession and to the industry and is actively exploring methods in which this opportunity could be harnessed.

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## GSZ Professional Registration - Questionnaire Feedback

Kennedy Mtetwa
kcmtetwa@yahoo.co.uk

Professional registration requires that the GSZ is as representative as possible of the geologist population in the country and that the drive to encourage as many members as possible is strengthened.

Over the years there has been an on-going discussion on five separate but linked issues of whether to register the GSZ as a professional organization or not. Your Committee resolved

to pursue the issue of registering the GSZ as a professional organization, as discussed at the 2021 AGM.

Registering the GSZ is a legal process and some requirements need to be met:

- Registration – verification and validation of professional qualifications and experience;
- Guidelines for professional behaviour/norms –
  - Developing and adopting a Code of Ethics for the GSZ;
  - Disciplinary procedures
- Continued Professional Development (CPD), and
- Competence.

A professional registration sub-committee led by then Vice-Chairman Renias Tirivabaya was formed in 2020 to focus on this important issue. This sub-committee did a sterling job and came up with the GSZ code of ethics and disciplinary code documents, which were discussed and adopted at the 2021 AGM. From these documents the GSZ then sent out a Professional Registration questionnaire in July 2021, the results of which are detailed below:

**GSZ Professional Registration - Questionnaire Feedback**

A questionnaire was sent out via Survey Monkey and 40 responses are summarized below.

*Explanation - (8-20%) means 8 members and their % to the question.*

1. How many years post-graduate experience in the geological field do you have?
   Recent Graduate (0-0%) or 2 to 5 years (8 -20%), 5 to 10 years (6-15%), 10 to 20 years (10-25%), greater than 20 years (16-40%);

2. Have you read the proposed GSZ code of ethics document?
   Yes (39-97.5%) or No (1-2.5%);

3. Do you think that the proposed GSZ code of ethics document in its current form is adequate for what it is proposed to achieve?
   Yes (37-92.5%) or No (3-7.5%);

4. Have you read the proposed GSZ disciplinary code document?
   Yes (39-97.5%) or No (1-2.5%)

5. Do you think that the proposed GSZ disciplinary code document in its current form is adequate for what it is proposed to achieve?
   Yes (38-95%) or No (2-5%);

6. Do you think that geologists require professional regulation?
   Yes (38-95%) or No (2-5%);

7. Do you think that the GSZ should become a registered professional body under an act of parliament?
   Yes (34-85%) or No (6-15%)

8. Do you think that the GSZ Committee should continue with taking the code of ethics and disciplinary code documents for a legal opinion?
   Yes (34-85%) or No (4-15%)

9. Are you aware that taking these two documents for legal opinion might require you to pay extra fees?

Yes (33-82.5%) or No (7-17.5%)

10. Are you prepared to pay the extra fees to see the GSZ professional registration through?

Yes (32-80%) or No (8-20%)

Thank you for your contribution.

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# Geological Society of Zimbabwe

MINUTES OF THE ANNUAL GENERAL MEETING
HELD ON 26TH FEBRUARY 2021 AT
ONLINE ZOOM, HARARE

**PRESENT:**

**Honorary Members**

1001 Blenkinsop, Tom; 1038 Broderick, Tim; 1017 Jelsma, Hielke; 1045 Martin, Tony;
1020 Master, Sharad; 1148 Mugumbate, Forbes; 1179 Podmore, Francis.

**Members**

1056 Botes, Andre; 1057 Bouammar, Houda; 1343 Chadwick, Peter;
1326 Chikandiwa, Nevison; 1449 Chitsungo, Blessing; 1078 du Toit, Andrew;
1289 Duma, Steven; 1390 Gumbie, Solomon; 1100 Kuhn, Julie;
1338 Mapingire, Brian; 1277 Mamuse, Antony; 1330 Machiridza, Lovemore;
1125 Marazani, Tarisai;1452 Matsanga, Miriam; 1443 Mhuru, Tonderai;
1141 Mtetwa, Kennedy; 1143 Muchemwa, Ellah; 1160 Musiwa, Kudzai;
1166 Mwatahwa, Collins; 1448 Ncube, Sinikiwe; 1175 Nyirenda, Trish;
1041 Phiri, Maison; *1187 Simango, Sydney*; 1192 Tirivabaya, Renias.

## 1. CONVENING OF MEETING

The Secretary, Kudzai Musiwa, welcomed Members to the Society's first online AGM, declared a quorum present and opened the meeting at 17.04hrs.

## 2. OBITUARIES AND MINUTE OF SILENCE

A minute of silence was held in recognition of deceased members and colleagues.
Tim Broderick gave an obituary for **Maarten de Wit**, Kennedy Mtetwa gave an obituary for **Godfrey Gundani** and Forbes Mugumbate gave the obituary for **Frank Muzanenhamo**.

## 3. APOLOGIES

1431 Mabhanga, Shepherd; 1292 Manenji, Nhamo; 1241 Ndebele, Fyrence.

## 4. MINUTES OF THE 2020 AGM

**4.1** The minutes of the Annual General Meeting held on 28th February 2020 were approved. Proposed by Tim Broderick and seconded by Renias Tirivabaya.

**4.2** Matters Arising:
There were no matters arising.

## 5. CHAIRMAN'S STATEMENT

The Chairman, Ellah Muchemwa, reported that the committee membership had remained unchanged since the last AGM, and that they had been meeting remotely via the Zoom platform. The Society membership had gained 32 new members and she wished them a long and productive future with the GSZ.

The committee had forged closer working relationships all five institutions and universities teaching Geology to garner their involvement with the GSZ and there had also been a drive to encourage more institutional membership. The Chairman thanked the Administrator, Julie Kuhn, for maintaining the membership database.

Membership fees were unchanged for those set in 2019, with the Zimbabwe Dollar equivalent being applied at the ruling auction rate. There was a high value of membership arrears and the Chairman reminded the members that after arrears in subscriptions accumulated to over 3 years, the membership was cancelled.

A total of nine online talks had been held and there was a higher than usual attendance at these, including participants from other parts of the world.

There was one field trip in place of the Summer School. The Chairman thanked Houda Bouammar and Julie Kuhn for organising and co-ordinating the talks.

Although the Zimbabwe Mineral Resources Conference had been cancelled, there had been an opportunity to use some of the presentations and papers as online talks, and the Chairman said that the GSSA collaboration had also led to a wider range of talks and speakers being available to members.

There were 3 issues of the Newsletter and the Chairman thanked Tim Broderick, Kennedy Mtetwa, and the contributors, for their much appreciated efforts in producing these publications.

With regard to professional registration there were about 5 matters to be considered. A professional registration sub-committee had been formed, chaired by the vice-Chairman, Renias Tirivabaya.

The Chairman thanked the out-going committee members for their contributions and efforts, donating many hours of time, and offering their experience on both the committee and the sub-committees. She also thanked Julie Kuhn for organising the AGM.

## 6. TREASURER'S REPORT

The Treasurer, Collins Mwatahwa, presented the Financial Statements for the year to December 2021. The membership subscriptions were being received in both United States Dollars and Zimbabwean Dollars.

The total funds at 31.12.2020 equalled ZWL$231,568.31 in cash and bank resources, as well as stock.

The Financial Statements were approved unanimously and thanks were given to Constantine Ncube for verifying the accounts. Proposed by Francis Podmore and seconded by Sydney Simango.

The 2021 membership fees were set as follows:-

- Members and Foreign – US$30 or the equivalent in ZWL at the prevailing bank rate at the time of payment.

- Institutional – US$500
- Students - free if they are attached to a recognised Student Society.

## 7. PROFESSIONAL REGISTRATION

Tony Martin offered his help to the sub-Committee, which was gratefully received.

The chairman of the sub-committee, Renias Tirivabaya, reported that the self-regulation documents comprising the Code of Ethics and the Disciplinary Procedures had been finalised. Any resultant conflicts of the provisions in these documents with the Constitution had been identified and resolved.

Solomon Gumbie stated that a critical number of members would be required before the Society approaches the Ministry and that there was a need for this number to be realistic in relation to the proposals.

Tony Martin advised the meeting that before the Code of Ethics and the Disciplinary Code were adopted they need to be put as a referendum to the full membership. He also stated that if there was a poor response from the members, it brought into question as to why the project was being pursued.

Steven Duma requested that the proposals be made relevant to the members so that they do not view the matter as a 'side show'.

It was recorded that the meeting resolved to continue with this project. Tony Martin undertook to design a questionnaire and he also suggested a publicity campaign to push the project forward.

Tony Martin thanked the Chairman and his sub-committee for the work that they have done and for preparing a good path forward.

It was agreed that this will be taken up by the in-coming Committee.

It was agreed that the required changes to the Constitution would be held back until the Code of Ethics and the Disciplinary Procedures are approved and adopted.

## 8. ANY OTHER BUSINESS

There was no other business.

The Chairman, Ellah Muchemwa, thanked everyone for their attendance and participation, and for the very helpful discussion on Professional Registration.

She declared the AGM closed at 18.47hrs.

**AWARDS**

- **A.E. PHAUP AWARD**

The A. E. Phaup Award is given to the author or authors who made an important contribution to the geology of Zimbabwe by publication of a paper in a recognised scientific publication. The 2021 award was given as follows:-

Sciscio L. Viglietti PA. Barrett PM, Broderick TJ, Munyikwa D, Chapelle KEG, Dollman KN, Edwards SF, Zondo M, and Choiniere JN. 2020. Sedimentology and palaeontology of the Upper Karoo Group in the Mid-Zambezi Basin, Zimbabwe: new localities and their implications for interbasinal correlation. *Geological Magazine* https://doi.org/10.1017/S0016756820001089

- **GEOFFREY BOND AWARD**

The Geoffrey Bond Award is given for the best project produced by a Geology Honours student at the University of Zimbabwe, and this year it was presented to Kholwani Moyo for his paper on "Footwall Splay Faults: Implications to Gold Mineralization at How Mine, Bulawayo Greenstone Belt, Zimbabwe".

**COMMITTEE FOR THE YEAR 2021**

The incoming GSZ Chairman, Renias Tirivabaya, thanked the outgoing Chairman, Ellah Muchemwa, and her committee for their work and achievements during the past year. He announced the following members of the incoming committee:
Nevison Chikandiwa, Steven Duma, Andrew du Toit, Antony Mamuse, Forbes Mugumbate, Kudzai Musiwa, Kennedy Mtetwa, Collins Mwatahwa, Shephard Mabhanga, Miriam Matsanga.

Renias Tirivabaya appealed to senior members of the Society to work together to nurture the younger members and said that this calls for a strong public relations drive.

The meeting closed at 19.20pm.

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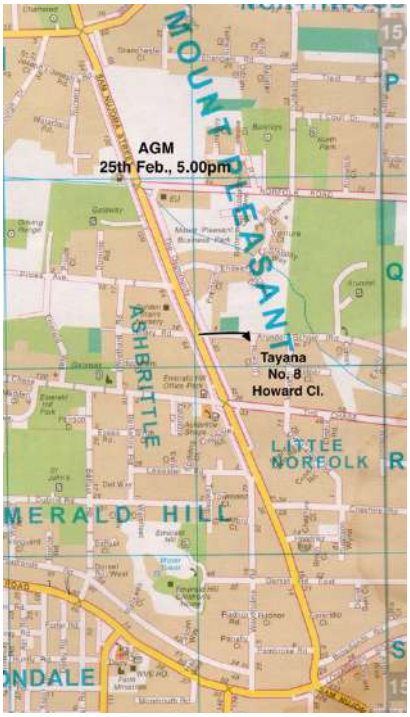
**Directions for the 2022 AGM**:



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

**Date:** 25th February 2022

**Time:** 17.00 hours

**Venue:** Tayana Conference Facility, Mount Pleasant

No. 8 Howard Close, 2nd right off Arundal School Road coming from Second Street Extension. Use second gate marked 'Tayana Conference Facility'.

**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 2022 – 2023
9. PROFESSIONAL REGISTRATION
10. AWARDS AND PRESENTATIONS
    - 10.1 A.E. Phaup Award
    - 10.2 Mike Vinyu Award
    - 10. 3 J.F. Wilson Award
    - 10.4 Keith Viewing Award
    - 10.5 Geoffrey Bond Award

# Articles and Reports

## Mesoproterozoic Umkondo-Ritscherflya foreland basin (Zimbabwe/Antarctica)

Sharad Master, Robert Bolhar, Dirk Frei, Johan Krynauw, Riafana Nemakonde, Tiffany Seema
sharad.master@wits.ac.za

The Umkondo Group is a late Mesoproterozoic sedimentary and volcanic succession that non-conformably overlies the Neoarchaean granite-greenstone terrain of the Zimbabwe Craton in eastern Zimbabwe, along the frontier with Mozambique. A basal conglomerate and grit sequence (which is diamondiferous in the Marange area), of fluvial origin, is transgressively overlain by a thin marginal marine carbonate platform succession, containing stromatolitic dolomites, followed by black shales, sandstones, and mafic volcanics with pyroclastics (Watson, 1969; Button, 1977; Stocklmayer, 1981; Master, 2016). The Umkondo Group is intruded by the 1108 Ma Umkondo sills, part of the Umkondo Large Igneous Province (LIP) (Hanson *et al*., 1998), which were emplaced into unconsolidated wet sediments (Master, 2006) (Figure 1).

Figure 1: Peperite consisting of xenoliths of hanging-wall semipelite incorporated into an Umkondo dolerite sill.

We have examined the basal Umkondo beds, and have dated detrital zircons (U-Pb, ICP-MS, only <±10% discordant grains considered) from diamondiferous conglomerate of Marange, non-diamondiferous conglomerate and granulestone from Birchenough Bridge (Seema, 2015), and a sandstone (MTS4) from Mutsago Hill, in eastern Zimbabwe (Watson, 1969). The two conglomerates have zircons with ages clustering close to 2.6 Ga, with, in both cases, single concordant zircons of c. 2 Ga. The granulestone has mainly discordant zircon grains, which define a Discordia line, due to Recent Pb-loss, with an upper intercept age of c. 2.62 Ga. The sandstone has three Archaean zircons with age ranges of 2.67-2.64 Ga, four Palaeoproterozoic zircons with ages between 2.02 and 2.0 Ga, and 14 zircons with Neoproterozoic ages of mainly 0.62-0.61 Ga. These data give us an absolute upper bound on the age of the Umkondo Group, of c. 2.6 Ga (which is the age of the Neoarchaean granites of the Chilimanzi Suite that form the immediate basement rocks underlying the Umkondo Group in the areas studied). The zircons of c. 2.0 Ga age in the conglomerates and sandstone indicate a younger maximum age of c. 2 Ga. They may possibly be derived from the same source as c. 2.0 Ga zircons recorded

in garnet-sillimanite gneisses of the Gairezi and Rushinga Groups, in Mozambique (Mänttäri, 2008). No younger ages (possibly deriving from the kimberlitic intrusion from which the contained diamonds would have been eroded) have been found in the diamondiferous conglomerate from Marange. The detrital zircon data from all four samples point unequivocally to the Neoarchaean Zimbabwe Craton as overwhelmingly the main source of the basal Umkondo sediments, with just a few zircon grains derived from a c. 2 Ga terrain. A Neoproterozoic (early "Pan-African") metamorphic overprint at c. 620-610 Ma is recorded from zircon rims in the sandstone. This is similar to a biotite K-Ar age of 615 ± 30 Ma recorded from gneiss at Nyapanani Hill, Nyanga (Snelling *et al*., 1964). It is also similar to the ages of the youngest detrital zircons in the Sijarira Group of western Zimbabwe (Master *et al*., 2020).

The Ritscherflya Supergroup is a supracrustal sequence of sedimentary and volcanic rocks exposed in numerous nunataks in West Dronning Maud Land, East Antarctica. It is composed of the mainly sedimentary Ahlmannryggen Group, overlain by the mainly volcanic and volcaniclastic Jutulstraumen and Straumsnutane Groups (Krynauw, 1986; Perrit, 2001). The Ritscherflya Supergroup is intruded by tholeiitic sills of the Borgmassivet suite (Krynauw *et al*., 1988, 1991), dated at 1107 Ma (Frimmel, 2004, in Grantham *et al.,* 2021). The sills were intruded into the Ritscherflya sediments while they were still unconsolidated, unlithified and wet (Krynauw *et al*., 1988, 1994) (Figure 2). The Ritscherflya Supergroup overlies Archaean basement rocks of the Grunehogna Craton, wherein the Annandagstoppane granite has been dated at 3067 ± 8 Ma (Marschall *et al*., 2010).


Figure 2: Contorted laminations in sedimentary xenolith from the Grunehogna Sill, 1285 nunatak, SE windscoop. West Dronning Maud Land, Antarctica. *Krynauw, 1986*.

Several samples of sandstones from the Högfonna Formation, Ahlmannryggen Group, originally collected and described by Krynauw (1986), were composited, and their detrital zircons were dated using the U-Pb method (Nemakonde, 2015). The detrital zircons give several groups of ages, ranging from Palaeoarchaean to Mesoproterozoic. The oldest group of 15 grains give ages between 3331 ± 33 to 2636 ± 35 Ma. There are two Palaeoproterozoic zircons dated at 1950 ± 42 and 1935 ± 39 Ma. The largest group of 44 zircons have ages between 1227 ± 45 to 1121 ± 51 Ma, while the three youngest zircons have ages of 1079 ± 54 to 1056 ± 76 Ma. The Archaean and Palaeoproterozoic zircons in the Högfonna Formation are derived from the Grunehogna Block (Marschall *et al*., 2010), while the Mesoproterozoic zircons are derived from arc rocks of the Maud Belt (Marschall *et al*., 2013). The youngest ages, with large errors, reflect metamorphic overprints. The detrital zircon record of the Högfonna Formation of the Ahlmannryggen Group indicates that the Ritscherflya Supergroup

was deposited in a foreland basin during the collision of the Maud Belt with the eastern edge of the Grunehogna block.

The Ritscherflya foreland basin, which derived detrital input from the Archaean Grunehogna block from the forebulge side, as well as from the Maud Belt adjacent to the orogenic foredeep, was continuous with the Umkondo Basin, which derived detritus from the Archaean Zimbabwe Craton from the forebulge (western) side, as well as (possibly, but not yet documented) from the southern Mozambique Belt (Barue Complex) to the east (Master, 2010, 2016) (Figure 3). The Southern Mozambique Belt is a continuation of the Maud Belt in Rodinia and Gondwana reconstructions (Jacobs *et al*., 1998). The rare Palaeoproterozoic detrital zircons from both the Umkondo and Ritscherflya basins may be derived from an old passive margin of the Zimbabwe-Limpopo-Kaapvaal-Grunehogna palaeocontinent ("Zilikag"), represented by the Gairezi schists and Chimanimani quartzites. The identical 1107 Ma ages, field evidence for intrusion into unconsolidated sediments, and similar compositions and palaeomagnetic poles of the Umkondo and Borgmassivet intrusions indicate that the Umkondo-Ritscherflya foreland basin was intruded by the Umkondo LIP shortly after deposition of the foreland basin sediments. Much later, during the Neoproterozoic, a Pan-African collision event recorded in Antarctica and the southern Mozambique Belt (Jacobs *et al*., 1998) resulted in the renewed deformation and overthrusting in the Chimanimani Mountains and southern Mozambique Belt, with ages ranging from about 620 Ma (this study) to c. 550 Ma (Snelling *et al*., 1964) and c. 500 Ma (Chaúque *et al*., 2018).

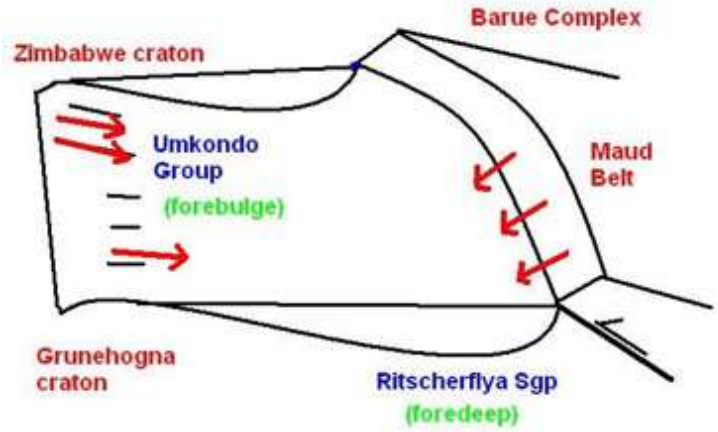



Figure 3: Schematic reconstruction of the Umkondo-Ritscherflya foreland basin, formed by the collision of the arc rocks of the Maud Belt and Barue Complex (southern Mozambique Belt) with Archaean rocks of the Grunhogna block and Zimbabwe Craton.

**Acknowledgments**

We thank Brian Mapingire and Lingululani Mukwevho for help with sampling and preparation of sample MTS4. We are grateful to the Geological Survey of Zimbabwe for supplying some of the samples. Andrew du Toit is thanked for his generous assistance during the 2012 GSZ Marange excursion when some of the samples were collected.

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# Structural constraints on the evolution of the south-eastern Mwanesi Greenstone Belt and adjacent granitoids, central Zimbabwe Craton: implications for gold mineralisation

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The Mwanesi Greenstone Belt (MGB) occupies the central part of the Zimbabwe Craton and trends in a NNE direction. The MGB consists of greenstones (intercalated with banded iron-formation [BIF]) of the Lower and Upper Bulawayan Supergroup. The MGB is described as a doubly plunging NNE-trending syncline, with BIF units defining fold closures at both the northern and southern ends of the belt. Gold mineralisation is hosted in quartz reefs in the supracrustal rocks and adjacent granitoids and gneisses. The MGB is one of the least studied greenstone belts of the Zimbabwe Craton. In particular, the deformation record of the belt is only known from Worst's (1962) mapping. We report new data from lithological and structural mapping of the south-eastern MGB (the focus of this study) and adjacent granitoids and gneisses.

The south-eastern MGB reveals that the lower structural units of the MGB are composed of mafic rocks (locally pillowed with pyroclastic breccia) and to a less extent felsic volcanic rocks, intercalated with thin-bedded and medium-laminated metasedimentary rocks, traditionally referred to as the Lower Greenstone Series (LGS). These are overlain by phyllite and BIF layers (i.e., the Lower Sedimentary Series, LSS). The LGS and LSS are intruded by mafic rocks and are overlain by locally pillowed basaltic volcanics of the Middle Greenstone Series. The MGB is underlain to the east by a variety of granites and gneisses, some in intrusive contact with the MGB. The granites and gneisses are transected by a km-wide N-S-striking sinistral shear zone (the Mhou Shear Zone [MSZ]). A new LA-(MC-Q)-ICP-MS U-Pb age at 2717 ± 21 Ma (MSWD = 2.1) from a MSZ mylonite is interpreted to date the crystallisation of the granitoid protolith of the MSZ.

Our structural mapping reveals three deformation domains based on the orientation and kinematic interpretation of tectonic fabrics, overprinting relations, and microstructural characteristics.

(1) The MGB is characterised by a shallow-dipping bedding parallel schistosity carrying a mineral, intersection lineation. This schistosity encloses dm-scale recumbent, intrafolial folds. The schistosity is overprinted by steeply NE-dipping axial planar cleavage to cm-scale folds, which carries a NNW-plunging crenulation lineation.

(2) Orthogneiss west of the MSZ and structurally below the MGB is characterised by a shallow SW-dipping gneissosity (carrying a shallowly NW-plunging mineral lineation), which is associated with a top-to-the NW shearing as evidenced by K-feldspar sigma porphyroclasts. The gneissosity is overprinted by steep NE-dipping axial planar cleavage to cm-scale open folds.

(3) Orthogneiss east of the MSZ reveals a shallow SW-dipping gneissosity overprinted by the steeply W-dipping gneissosity and mylonitic foliation of the MSZ. The MSZ carries a shallowly SSW-plunging stretching mineral lineation. Mylonitic foliation in the MSZ is associated with a sinistral sense of shear based on K-feldspar sigma and delta porphyroclasts. We suggest a wrench dominated transpression model to explain the deformation in the MSZ based on shallow-plunging stretching lineation carried by a steep mylonitic foliation.

Gold mineralisation hosted by broadly W-dipping quartz veins occurs in the MGB and MSZ. The crystallisation age of the granitoid protolith of the mylonite in the MSZ is contemporaneous with the intrusion of the Sesombi granitoid suite (2720-2640 Ma) in the Zimbabwe Craton. The lithostratigraphy and deformation record of the south-eastern MGB and adjacent granites and gneisses from our work have important implications for understanding the tectonic evolution of the MGB and the link between deformation and the gold mineralisation in the MGB.

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## A review of the regional aeromagnetic, gravity and electromagnetic data of Zimbabwe with special emphasis on the Lonely, Empress, and Hunters Road areas

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Aeromagnetic surveys have been of assistance to mineral and petroleum exploration identifying target areas and in geological mapping projects. Developed computer-assisted interpretation techniques have vastly increased the value of magnetic data for these purposes.

The first part of the Phase 1 CIDA-sponsored airborne magnetic survey was performed by Kenting Earth Sciences Ltd over most of the central part of the country covering the Great Dyke and most of the greenstone belts. These are the formations historically most favorable for mineral deposits. A total of 100,000 line-kilometers of digital magnetic data were acquired over an area of 90,000 km$^2$ at a flight line spacing of 1km and terrain clearance of 305 meters. The end products were contoured magnetic maps at a scale of 1:50,000 and 1:250,000. Coloured maps of the same area were provided of the total field and vertical gradient at a scale of 1:100,000 and 1:1,000,000.

The second part of Phase 1 was an airborne electromagnetic survey across selected greenstone belts performed by Geoterrex Ltd using a time-domain electromagnetic system known as INPUT (Induced Pulse Transient E.M.). This covered 20,000 line-kilometers at a line spacing of 250 meters and terrain clearance of 120 meters and was completed in 1983. This survey provided maps showing conductive zones which are indicators of possible base metal deposits in the Hunters Road area, Empress, Lonely, and Shangani areas.

The commonly used interpretation techniques rely on a qualitative review of data and these include anomaly shape, symmetry, strike extent, and variability within the conductive zone. Other factors are:

i) Shape and size of the INPUT anomaly
ii) Strike length and degree of isolation
iii) Associated geophysical anomaly e.g. aeromagnetics
iv) Geological environment and the relationship of anomalies to known mineralization.

The Phase 2 aeromagnetic survey was carried out in the eastern, southern, and southwestern parts of Zimbabwe by Sanders Geophysics Ltd. The total number of lines kilometers flown was 158,006 and the survey area covered 145,000 $km^2$. Sensitive areas left out during Phase 1 were covered, but the Mozambique border areas were omitted due to civil unrest.

Intera-Kenting Ltd was contracted to complete the aeromagnetic coverage of Zimbabwe as Phase 3 between May 1990 and April 1991. The survey covered the least mapped portion of Zimbabwe, the northwestern third of the country. The total number of line kilometers flown was 155,810.5.

On the other hand, gravity measurements that map the Greenstone Belts, the Great Dyke, and mobile belts are a composite derived from Geological Survey, private company and individual contributions. Mobil Oil, through its hydrocarbon exploration programme, generated data in the north. Anglo American and de Beers have made fair contributions whilst researchers, including Dr. F. Podmore, Dr. O. Gwavava, and Dr. R. Ranganai, have made a significant contribution through their road surveys and profiles crossing the Great Dyke.

## Update on the Petroleum Exploration Completed in the Cabora Bassa Basin in Zimbabwe during 2021

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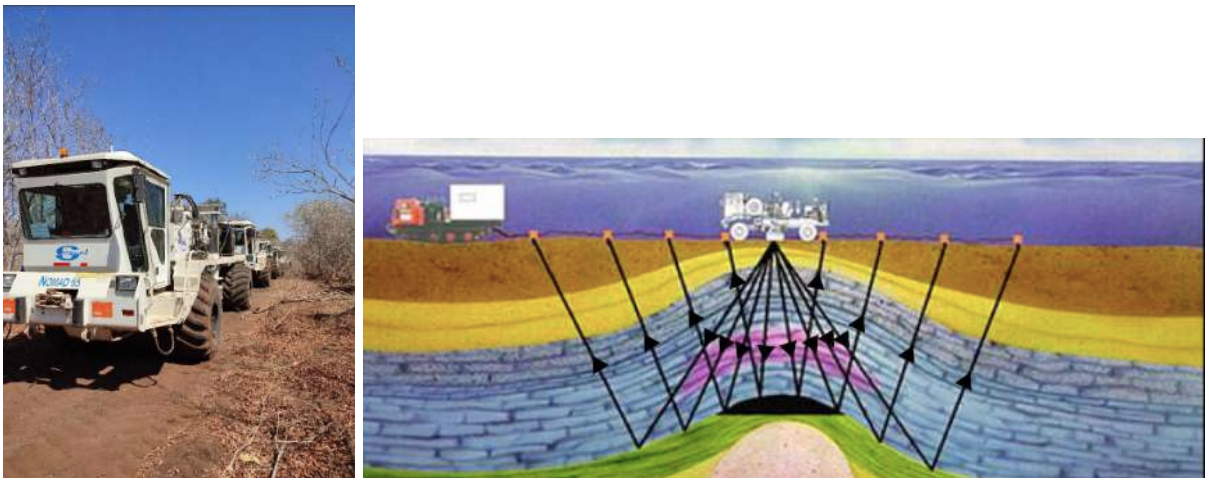
Following the signing of the Petroleum Exploration, Development and Production Agreement with the Government of Zimbabwe on 26th March 2021, Invictus Energy, through its subsidiary company, Geo Associates engaged Polaris to undertake a seismic acquisition programme in the Cabora Bassa Basin in Zimbabwe.

During this survey a total of 839.5 line kilometres of high resolution 2D seismic data was acquired. The final retrieval of the geophone spreads for data harvesting was completed at the beginning of November.

Preliminary evaluation of the seismic information acquired, which has been despatched to Earth Signal, a specialist company in Canada, for processing indicates that the data is of excellent quality. Once the processing of the in-fill seismic data has been completed an interpretation of the full dataset will be undertaken with the objective of identifying and maturing additional prospects and leads. The initial imaging of the better quality imaging obtained over the giant Muzarabani Anticline and other structures is encouraging and, once interpretation is completed, it is anticipated that the location of the Muzarabani – 1 Well, which is scheduled to be drilled in 2022, will be selected.



2D Seismic acquisition showing vibroseis truck and geophone receivers – black lines represent the path of sound waves from the truck to receivers. The sound waves travel through each layer of rock at different speeds to provide an image of the subsurface.

## Geophysics for Groundwater Search in Tsholotso

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The company 3D Earth Exploration recently carried out a survey for groundwater in the Tsholotsho area. The Stratagem EH4 Controlled Source Audio-frequency Magnetotelluric (CSAMT) unit was used to survey resistivity profiles at 25-m station spacing. The Nyamandlovu Epping Forest aquifer area was used as a test site to gauge how well the instrument is able to map various stratigraphic layers that control the aquifer in the area. The CSAMT unit was able to clearly map the various stratigraphic layers alternating as high and low resistivity zones as well as breaks in the layers attributed to faulting. Some drilling done subsequently confirmed the geological layers and abundant water was found in some drill holes.

## The use of mobile laser scanning to 2D & 3D map old underground workings

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We are a small company providing laser scanning and drone photogrammetric services. We have a hand-held mobile laser scanner capable of capturing up to 43,000 points a second with a maximum range of 15m. The scanner has a relative accuracy of 1-3cm and an absolute accuracy ranging from 3-30cm when a RTK GPS is used to set control points. To date we have primarily worked with small-scale gold mines. We are able to produce 3D point clouds, 3D solid meshes as well as 2D rasters and polygons, which accurately represent the reality of the structures being scanned.

Our laser scanning capabilities allow us to bring the reality of underground mines, and other structures to the office. We have proven that our laser scanning has enhanced benefits over traditional underground surveying as well as in architectural working. Laser scanning is able to capture detail that is easy to miss, as well as that of hard to reach or measurable objects.

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## The Umkondo Field Excursion, Nyanga

***Tony Martin***

The post-Symposium Society field trip to Nyanga on 28-29th November was attended by 32 members. The group started with an overview at Troutbeck and at a nearby outcrop, followed by visits to some 15 outcrops where some fantastic geology was seen.

The Nyanga area is underlain by Archaean granitoids with greenstone remnants overlain by the thick sedimentary Umkondo succession intruded immediately after deposition by the 1108 Ma Umkondo Dolerites. The sediments have been deformed and metamorphosed with the latest event attributed to the 750 – 550 Ma Mozambique Orogeny.

Tyndale Biscoe (1958) in describing the Nyanga area stated that here is “no explanation other than…a thrust zone…”. Stocklemayer (1977, 1979 and 1980) described the stratigraphy, lithologies and sedimentary facies but did not dwell on the structural aspects, although he mentions the widespread presence of schists. Payne (1984) described numerous thrust zones in the area in the sedimentary rocks, the basement granites and along dolerite contacts.

So the purpose of the 2021 field trip was to look at outcrops along the eastern border of Zimbabwe and to see if there was field evidence to support Tyndale-Biscoe’s statement.

The first roadcut just north of Troutbeck exposes an unconformity with fine-grained sediments overlying a planar granitic basement and showing no evidence of deformation.


Moving to the east and across the Gairezi River the next outcrop was of a probable calcrete regolith which underlies a thick arkosic sandstone, although the contact is not exposed.


The regolith is exposed on the edge of a plateau of arkosic sandstone, which contains some interesting features. The outcrops are typically columnar and bedding is visible in places but poorly defined. Of greater interest, Sharad Master introduced participants to a feature known as tafone.



The characteristics of the Nyanga tafone:

- Rounded to elliptical pits with resistant margins,
- Tend to follow bedding,
- Only found on vertical rock faces,

- Only on near-massive, weakly-bedded sandstones.

Characteristics elsewhere in the world:

- Occur mostly in granite and arkosic sandstone,
- Common in coastal areas but not restricted to them,
- Wide variety of climatic environments from Antarctica to deserts and the tropics,
- Found on every continent.

Mustoe (1981) has summarised previous work on tafone and through his own research he came to the following conclusions from a coastal environment:

- The margins and cavities of the tafone are chemically identical and show no evidence of depletion or cementation,
- The weathering is largely physical and not chemical,
- The evaporation of sea water splash may enhance the physical weathering of the cavities,
- The resistance of the tafone walls is caused by the presence of a microscopic layers of algae.

He admits that these conclusions will not apply to non-coastal areas. So the origins of the Nyanga tafone remain a mystery, but the possibility of a biogenic origin – perhaps lichen – cannot be ruled out.

The next (partly) unexplained feature was discovered by Brent Barber. This was a thin layer of a dark rock within the arkosic sandstones. It intermittently covered an area of several tens of square metres. Most participants had left for the beer at this stage, but in the evening gloom debate raged on as to its origin. Six theories were advanced and as more evidence accumulated, these reduced to two. Sharad favoured an algal mat and even found some stromatolites. Tony Martin suggested volcanic dust.
The final piece of evidence was seen at the lunch stop the next day on a boring outcrop of the Umkondo Dolerite.


The final piece of evidence was seen at the lunch stop the next day on a boring outcrop of the Umkondo Dolerite.


The combination of algae, sand and mud is very similar to what was seen the day before, so the conclusion must be that Sharad's hypothesis best fits the evidence – except for the stromatolites.

The dolerite, of course, is not at all boring.


Moving on to structure, every stop showed evidence of deformation and there can be little doubt that Tyndale Biscoe's conclusion is correct – thrusting is the predominant mode of deformation. Most of the rocks are schistose with zones of more intense deformation, and all of the structural elements dip at variable angles to the east.

Slickensurfaces all step down to the west and are consistent with the thrust direction. One interesting technique used to determine this direction for very small steps was provided by Evgeny Nikolenko – to run a finger up and down the surface, smooth in one direction and rough in the other – it works!


The final stop was on the calc-silicates where Sharad gave an excellent discourse on the metamorphic reactions between dolomite and silicates to produce talc.

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*Join the Geological Society of Zimbabwe Facebook Group*

# News

## Geology Division: Department of Chemistry and Earth Sciences, University of Zimbabwe

*Maideyi Meck*

The department continued to go forward in the face of the Covid-19 pandemic. Teaching took place by means of face-to-face and online lessons. The University of Zimbabwe held its graduation on 10th December 2021 when 23 students were conferred with Geology Honours degrees. This is the last group to graduate from the Geology Department. In future students will graduate under the Chemistry and Earth Science Department. The 2021/2022 academic year commenced in October. The university is now using a modular approach for all its teaching. A module runs for 3 weeks followed by an exam in the 4th week. This was done to allow those in industry to be able to attend a single module that they are interested in and to finish rather than having a module run for the whole semester. Those who also do not need the whole degree but would want to upgrade in certain aspects are free to join a particular module.

The modules currently running are as follows:

- *Introduction to Mineralogy and Crystallography*
- *Igneous Petrology*
- *Metamorphic Petrology*
- *Sedimentology*
- *Optical mineralogy*
- *Geochemistry*
- *Principles of Stratigraphy and Palaeontology*
- *Maps and Fieldwork*
- *Structural Geology*
- *Economic Geology*
- *Rock Deformation, Structures and Geotectonics*
- *Computer Applications in Geology*
- *Hydrogeology and Engineering Geology*
- *Exploration Geology and Mining Geology Applications*

- *Environmental Geology*
- *Geological Field Mapping*
- *Geochronology and Geostatistics*
- *Basin Analysis and Hydrocarbon Geology*
- *Ore Deposit Studies and Ore Petrography*
- *Geological Evolution of Southern Africa*

The rock cutting and thin section laboratory is now running with two technicians, thus industry can now access the facilities.

The department would like to thank industry for availing industrial placements to our students and mining houses for hosting our students during the field excursion undertaken by the department.

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# The Mennell Geological Society

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## GEOLOGICAL REPORT

**December 2021**

As I stand as the Mennell Geological Society Chairman, I am witnessing the stimulating proceeding of the Society. We have not faced any untoward impediment concerning our e-leaning presentations although I am still not satisfied with the number of participants in attendance. The only inconvenience beyond our control concerns our field trips, which had to be postponed due to Covid restrictions. However, we anticipate organizing more trips before the end of the year 2022. As the Society Chairperson, I shall continue putting effort into encourage most geology students to be members of the Society.

Major topics discussed in December related to the:

GEOLOGY AND METAMORPHISM OF THE ZIMBAWE CRATON WITH RESPECT TO ORE GENESIS, PAYING PARTICULAR ATTENTION TO GREENSTONE BELT FORMATION & THE EVOLUTION AND EMPLACEMENT OF MAJOR GRANITIC PLUTONS OF THE CHINGEZI, SESOMBI, WEDZA AND CHILIMANZI SUITES.

We dwelled extensively on these topics due their complexity and relevance to Zimbabwe geology

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Geological Society Summer Symposium

The Chairman and a few members attended the Geological Society Summer Symposium and were thrilled by the presentations. This stimulation will encourage our members to prepare and present the best BSc Honours Degree projects for 2021.

Proposed upcoming research

Mutare River placer deposit

The emplacement and nature of Mutare River gold placer deposit remains debateable, as work in published articles, including Bulletin No. 32 do not tackle this aspect. So as the Mennell Society, we are contemplating visiting Mutare in order to carry out some studies before the end of December.

# MIDLANDS STATE UNIVERSITY

FACULTY OF ENGINEERING & GEOSCIENCES
ZVISHAVANE CAMPUS

**Updates from the Faculty of Engineering & Geosciences**

MSU reopens, initially with online teaching and learning, on 1st February 2022. Face-to-face teaching and learning kick in two weeks later according to a prescribed schedule. In the face of the ongoing Covid-19 pandemic, this blended teaching and learning procedure is expected to be the mainstay for the better part of 2022. Following the introduction of two new programmes in the Department of Fuels & Energy Engineering (BEng Fuels & Energy Engineering and BEng Electrical & Electronic Engineering), the Faculty now has a total of eight running programmes. Updates on other items, including research and student activities, were not available in time for the current instalment.

*Submitted by Dr Antony Mamuse, Executive Dean*
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# ZIMBABWE SCHOOL OF MINES

*Serving the SADC mining industry*

The school opened its gates to first-year and returning students on 10th of January. A hot-sitting arrangement is being used to ensure that all students attend classes every day in an uncongested environment. The school is also offering a two-year ZSM Diploma to mine workers who have a minimum of two years working experience on a blended delivery.

Last year's first and third years will be sitting for examinations from 14th of March.

The school continues to appeal for attachment places for second-year students and for those who failed to get an attachment last year.

*Submitted by Fyrence Ndebele*

# MANICALAND STATE UNIVERSITY OF APPLIED SCIENCES

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## Department of Mining and Processing Engineering

Challenges associated with learning during the Covid-19 pandemic persist but our lecturers and students have been collaborating well as they adapt to online learning tools. The September and October 2021 examinations proceeded well, after which students came back in batches for a new semester. Lecturers then continued online classes after the Christmas holidays due to the national lockdown. The final-year students, however, managed to come back to continue with physical contact lectures and they wrote their final exams in January. Face-to-face lectures are yet to resume for the remaining students but should do in February at a date to be advised.

We appreciate all of our industrial stakeholders who have been taking students for industrial attachment. We encourage them to keep absorbing more of our students into the industry as attachés.

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*Contributed By: Hazel Chibaya*

*Research.* *Innovation.* *Sustainable Development.*

**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**
DEPARTMENT OF APPLIED PHYSICS
EARTH SCIENCES PROGRAMME
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# Inaugural NUST Earth Science class graduates

Students comprising the inaugural intake for the BSc Honours degree in Earth Sciences graduated in November 2021 having experienced a delay due to the Covid-19 pandemic. Of the 11 graduates, one student graduated with a First Class degree while the rest attained Upper Second class degree.

# All set for BSc and MSc in Geophysics

The Master of Science degree programme in Geophysics is expected to resume together with undergraduate studies in the 2022/23 Academic Year. We have doctoral students whose studies are ongoing and 2 staff members have also registered to undertake their doctoral programmes. Currently there are 60 students in both undergraduate and postgraduate programmes. Our research interests are listed in the following table.

| | DEPARTMENT OF APPLIED PHYSICS-APPLIED PHYSICS & EARTH SCIENCES RESEARCH ACTIVITIES<br>NUST, February 2022 |
|---|---|
| **Name** | **Title of Project on Applied Research/Innovation/Consultancy** |
| Baricholo Peter | Industrial applications of radiosiotpes. |
| Chuma Constant | 1. Groundwater Assessments for Bulawayo Aquifer. 2. Geothermal Characterisation of Binga Hotsprings. |
| Mahuvava Courage | Monte Carlo dose calculations for pre-clinical radiotherapy studies. |
| Mashingaidze Robin T. | Natural Radioactivity characterisation of the Bulawayo granite-greenstone terrane. |
| Ndlovu Thabisani | Groundwater Investigations. |
| Njila Tendai | Potential geothermal systems in Omay District and Eastern Highlands based on integrated geological-geophysical methods. |
| Olivia Chitake | Potential geothermal systems in Eastern Highlands based on combined geophysical methods. |
| Thwala Luba | Determining the Geothermal Potential of Binga Hot Springs from combined electrical resistivity tomography and magnetic methods. |
| Zulu Zenzo | Enhancing the efficiency of solar cells using low cost crystalline perovskite material. |

# Blended Learning

Learning has been blended between face-to-face teaching and online learning due to the impact of Covid-19. Practical laboratory sessions, fieldwork and examinations were conducted virtually in line with the recommended Covid-19 safety protocols.

# Industrial Attachment

Our industrial attachment was mostly carried out within the mineral resources exploration fields related to gold, base minerals and hydrocarbons, but included some placements in the hydrogeology, geohazards and engineering sectors over the past two years.

# Future Plans

We are in the process of fully equipping our laboratories. We appeal for assistance from all relevant sectors. The Earth Sciences programme at NUST will undergo periodic reviews to suit the requirements of national growth and industry, in line with current and future trends. Our aim is to ensure that programmes satisfy the requirements of various sectors that are aligned to earth sciences applications.

# Staffing

The programme recruited four (4) new lecturers, raising the staff compliment to 16. Of these there is a Co-ordinator, a Full Professor, an Associate Professor, three (3) Senior Lecturers, nine (9) Lecturers and a Research Fellow as shown in the Table below. Staff development programmes are underway while senior staff are undertaking research in various fields of earth and physics sciences.

**Staff compliment for the Applied Physics and Earth Sciences programmes**

| Name | Position | E-mail |
|---|---|---|
| Dr T.V. Chabata | Co-ordinator | tichakunda.chabata@nust.ac.zw |
| Prof G.G. Nyambuya | Professor | golden.nyambuya@nust.ac.zw |
| Prof D.J. Hlatywayo | Associate Professor | dumisani.john.hlatywayo@nust.ac.zw |
| Dr T. Njila | Senior Lecturer | tendai.njila@nust.ac.zw |
| Dr P. Baricholo | Senior Lecturer | peter.baricholo@nust.ac.zw |
| Dr M. Murape | Senior Lecturer | davison.murape@nust.ac.zw |
| Dr I.K. Muchingami | Lecturer | innocent.muchingami@nust.ac.zw |
| Dr C. Mahuvava | Lecturer | courage.mahuvava@nust.ac.zw |
| Mr C. Chuma | Lecturer | constant.chuma@nust.ac.zw |
| Mr R.T. Mashingaidze | Lecturer | robin.mashingaidze@nust.ac.zw |
| Mr T. Ndlovu | Lecturer | thabisani.ndlovu@nust.ac.zw |
| Mrs T. Thatha | Lecturer | tendai.thatha@nust.ac.zw |
| Ms L. Thwala | Lecturer | luba.thwala@nust.ac.zw |
| Ms O. Chitake | Lecturer | olivia.chitake@nust.ac.zw |
| Mr Z. Zulu | Lecturer | zenzo.zulu@nust.ac.zw |
| Mr M. Gumbo | Research fellow | mervyn.gumbo@nust.ac.zw |

Geological Survey Department

The Director of the Geological Survey, **Forbes Mugumbate**, resumed work at the beginning of January 2022 after having been on suspension since April 2021 over some trivial misunderstanding with a potential investor. The Public Service Commission took long to commence investigations. **Lloyd Shawarira** acted as Director during the period the substantive director was on suspension. Lloyd is now acting as Deputy Director.

The professional staffing situation at the Geological Survey is now bad. This, compounded by the erratic release by Treasury of funds for activities, means the department cannot undertake major projects. An unavoidable activity that the department is undertaking is the management of Exclusive Prospecting Orders (EPOs), and energy minerals Special Grants (SGs) on behalf of the Mining Affairs Board (MAB). This task is ably executed by Ms **Evelyn Marumisa** and Mr **Mangwiro Sibanda**, who have to meticulously go through all applications and progress reports, and prepare briefs for both the Ministry and the MAB, whilst maintaining the mineral exploration database.

The department recently lost two senior geoscientists to greener pastures. These are Ms **Vimbayi Gengezha**, senior geologist, and Mr **Abenezel Makuvaza**, senior geophysicist. Both were involved in a joint project between the department and the Japan Oil, Gas and Metal Corporation (JOGMEC). Other officers involved in the project have been transferred to other departments in the Ministry, which makes it difficult for them to continue participating in the project. We therefore have to formulate new strategies to continue with the project.

Not all is gloom however. Two new geologists joined the department. These are **Macpherson Gwindi** and Ms **Enersty Gotosa**, both recent graduates from the University of Zimbabwe. Three geological technicians have recently graduated with BSc Honours degrees in Applied Geology from the Midlands State University. We congratulate Ms **Esnath Mupomhori**, Mr **Tembelanenkosi Ncube**, and Mr **Sicelo Makhaza**. These graduates will now hopefully be upgraded to positions of geologists.

In our report for the next issue of the Newsletter we shall review progress in the implementation of the Mining Cadastre Project headed by Mrs **Portia Mungate**, who is one of the two deputy directors at the Geological Survey.

***Submitted by:*** *Forbes Mugumbate (Director)*
fmugumbate@gmail.com

# MINING INDUSTRY NEWS

*Forbes Mugumbate*

**Grassroots mineral exploration picking up**

Zimbabwe was last subjected to systematic grassroots mineral exploration more than a decade ago. The country has therefore lagged behind regional and international competitors in utilizing modern mineral exploration techniques. However, going by the number of current EPOs that stands 28 as at 31st January 2022, mineral exploration can be said to be picking up, although the time taken from application to the granting of EPOs could be reduced. The EPOs are all in their early stages of exploration as they were issued in 2020/2021. Over 40 EPO applications are currently being processed by the Mining Affairs Board.

**Chinese company buys Arcadia lithium deposit**

The biggest news in the Zimbabwe mining circles is the buying of Arcadia lithium deposit towards end of 2021 by Zhejiang Huayou Cobalt of China. The Chinese company that is into battery manufacturing for electric vehicles forked out US$422 million for the lithium deposit. Huayou is the world's biggest producer of cobalt, another battery metal. This transaction that was witnessed by President Emmerson Mnangagwa, is expected to put Zimbabwe on the world map of important lithium-rich countries. Zimbabwe is proving to be robustly endowed with lithium-bearing pegmatites. We expect heightened activities in the lithium sector as a result of the Arcadia deal. Paul Chimbodza, a fellow geologist who held some stake in Arcadia, is acknowledged for facilitating development of the prospect. We hope colleague geologists will learn one or two lessons from Paul's shrewdness as an entrepreneurial geologist.

**Chinese investors taking short-cuts?**

News about Chinese mining companies clashing with villagers and authorities over alleged transgressions has been reported in local and international newspapers. The Guardian of the UK extensively covered the stories. A recent example of this tension is the Mutoko incident where villagers complained that a Chinese mining company had told them that they will have to leave their ancestral land to make way for a black granite quarry. The company denies this arguing that they had followed all the requirements of the Act to acquire the claims, and would follow the recommendations of an Environmental Impact Assessment study carried out by consultants. The black granite site is also an isolated hill lying some distance away from the village. This case follows a similar incident in Domboshawa where a Chinese company intending to quarry granite for aggregate was accused by some villagers that the company intended to push for resettlement of the villagers in Gokwe. Again the company denies this. In both cases, government resolved the impasse by ordering the Ministry of Mines to cancel the mining licences. This reminds us of the Hwange National Park case where a Chinese company drilling for coal had activities halted following an outcry from environmentalists. These incidences suggest some ambiguities in our mining legislation. For instance, these companies had legal documentation to enable them to conduct their business, yet ended up having their licences being cancelled. These clashes between miners and villagers ought to be handled with jurisprudence so that the process is not seen as threats to the security of tenure.

The clashes between Chinese mining companies and villagers are also interpreted by Chinese authorities as having been deliberately stirred up by Western companies who fear competition from Chinese companies. Chinese authorities believe there is a malicious campaign against Chinese investment in Zimbabwe.

**Use-it-or-or-lose-it policy**

As Government moves to ensure maximum utilization of ground held for mining, several miners, including some large ones, have been issued with letters for them to show cause why their claims should not be expropriated, in terms of the Act, for idleness. The expropriation processes is, however, ponderous. So far no claims have been successfully expropriated. The policy is being used to exert pressure on platinum miner Todal Mining Limited to come up with a roadmap on the development of the Bokai Mine south of Unki in Shurugwi District. There are claims that some politicians in the Midlands Province are questioning why the company should not lose its concession as it has not done much to show seriousness in developing the deposit. Information, Publicity and Broadcasting Services Minister Monica Mutsvangwa told a post-Cabinet briefing that government would

want the platinum deposit to be developed so that it starts contributing to the US$12 billion mining industry milestone. Other platinum projects that have made a very slow start are Karo Resources and Global Resources.

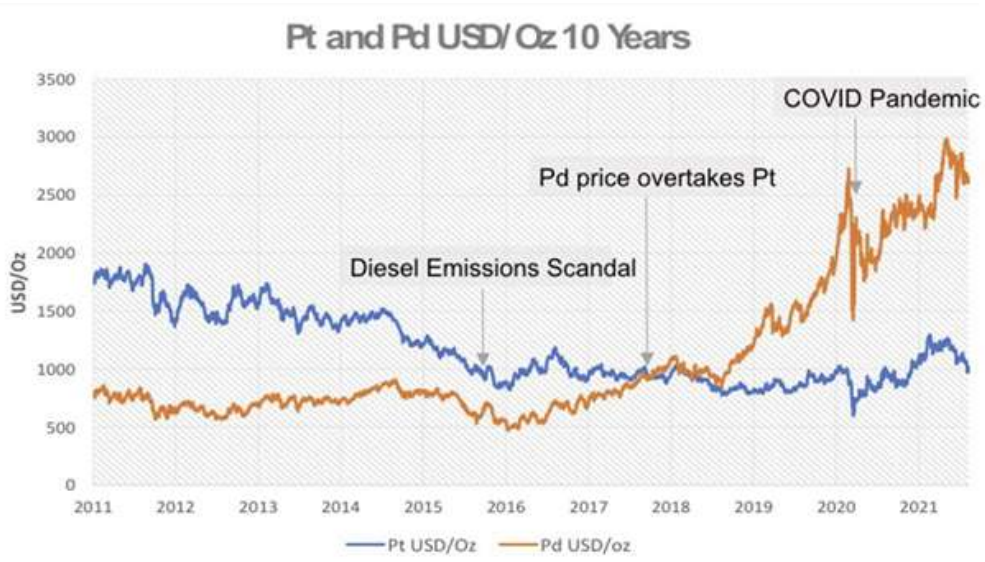
**Watershed Supreme Court ruling on forfeitures**

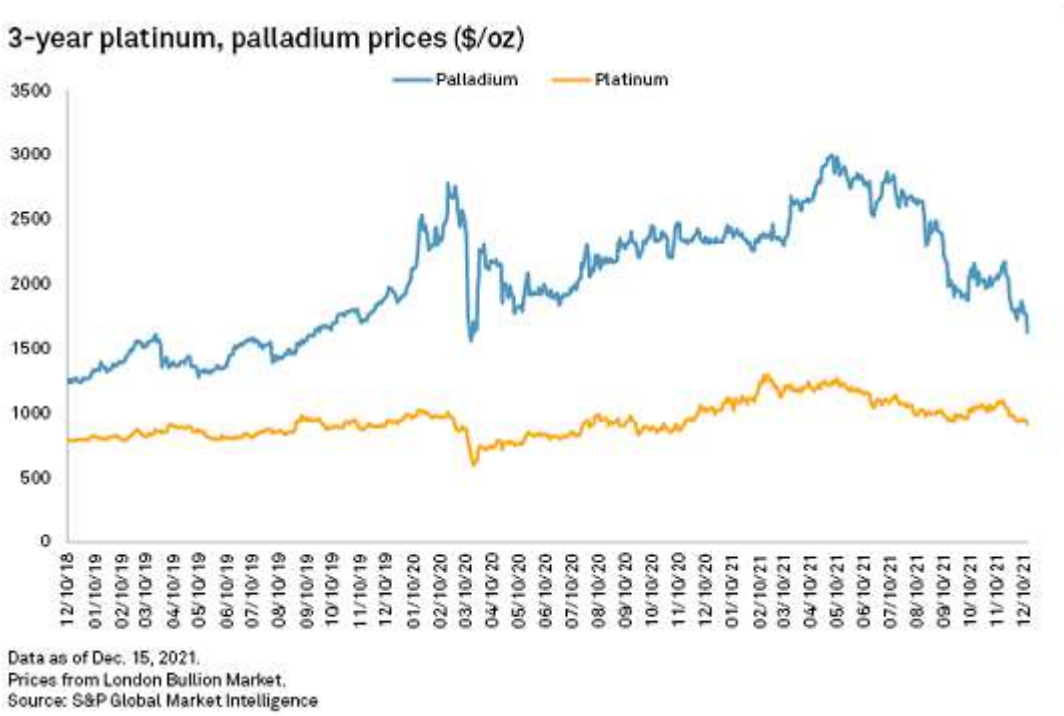
A Supreme Court ruling made recently in favour of Fidelity Printers and Refiners (FPR), which had its gold claims forfeited for failure to renew them has far reaching consequences on the administration of mining titles by the Ministry of Mines and Mining Development. The FPR had approached the Supreme Court challenging the forfeiture of its gold claim in Kwekwe by the Ministry without affording them a chance to be heard. The High Court had earlier refused FPR the right to repossess its claim that had been forfeited fdue to their failure to pay the laid down annual fees for more than six years. Justice Chiweshe of the Supreme Court set aside the ruling by the lower court arguing that FPR should have been notified of the intended forfeiture. Traditionally the notification of intention to forfeit claims is done through a notice that is posted at a conspicuous notice board at the Ministry's Provincial Offices. Now, following this Supreme Court judgement, the question is, what happens to so many forfeitures that were done through the traditional notification method? How feasible is it to inform hundreds of individual claim holders about their impending forfeiture?

**Invictus Muzarabani project on course**

Invictus Energy, which is searching for oil and gas in Muzarabani, has registered significant milestones in the exploration for and development of the Muzarabani oil and gas project. The company, which expects the recently concluded seismic data gathering exercise to help locate a site for planned drilling sometime mid-2022, has concluded a drilling agreement with a British company, and secured the necessary casings and wellheads. The company also indicated that it had completed a tendering exercise for the integrated well services contract including cementing, directional drilling, and logging. Invictus recently announced plans to raise A$5.5 million to finance further development through issuance of at least 55,000 new shares. We are all holding our breath in anticipation of game-changing results resulting from the drilling.

**PGM opportunities for Zimbabwe**






Platinum and palladium prices are set to recover, as motor vehicle production rebounds. The prices of both metals, key materials in exhaust-cleaning catalytic converters, plummeted in 2021 as global car and truck output slowed amid global supply chain bottlenecks. Auto production started to climb towards end of 2021 bringing with it an increase in demand for platinum group metals. However, rising electric vehicle sales pose a challenge for both metals. Full battery electric vehicles do not require catalytic converters. Zimbabwean PGM miners should therefore take note of these global developments and maximise production while the metals are in their peak demand. In this regard, we note the efforts of Zimplats, Zimbabwe's largest platinum miner, which has set aside US$521 million for the construction of a 38 MW furnace and an acid leach plant as it seeks to double the smelting capacity

**History of Mining in Zimbabwe**

The Geological Society of Zimbabwe's Phaup award winning book, *Mining in Zimbabwe – From the 6th to the 21st Centuries*, that had been plunged into controversy as a result of some misunderstanding over a few comments in the book, has now been reprinted under the auspices of the Chamber of Mines of Zimbabwe. The second edition is the same as the first except for the controversial Postscript, which is now entirely removed. The main chapters remain unchanged. The book that has received numerous positive comments from book reviewers can be obtained from the Chamber of Mines.

**Efforts to halt the currency slide**

Finance Minister Mthuli Ncube has requested mining companies to help to promote use of local currency by paying up to half of their royalties in local currency. This measure, it is believed, will help to to stem inflation. The order reverses a 2020 decision requiring mining companies to pay the tax in foreign currency only. A similar rule has been imposed on taxes and duties levied on imported vehicles, while taxes due from exporters are now payable in both foreign and local currencies in proportion to approved retention levels. These measures are all meant to promote the wider use of the Zimbabwean dollar.

# A Regional Report on Mining Activity Submitted to the Geological Society of Zimbabwe

*by*

*Antony Mamuse*

**December 2021-January 2022**

| Province | Mining Title | Exploration | Mining and Mineral Processing | Contributor |
|---|---|---|---|---|
| **Bulawayo** | | | | Edward Mushaninga |
| **Mashonaland Central** | | | | No report |
| **Mashonaland East** | • Approximately 40 new registrations or titles were issued to small-scale gold miners whilst about 80 new gold applications were received in the period December 2021 to January 2022.<br>• New gold mining interests are mainly in the Beatrice and Murehwa-Mutawatawa areas.<br>• 17 new base mineral mining titles were issued in the same period whereas approximately 30 new applications for base minerals were received.<br>• Key base minerals | • Very little exploration work is being done currently. Some diamond drilling is being done in Makaha by ZMCN. | • ZMCN finishing up construction of the biggest heap leach, and crushing plant in the country located in Makaha (Mudzi District).<br>• Massive production in terms of gold mining by ZMCN following delivery of a new batch of heavy-duty equipment, which was commissioned at the mine in December 2021.<br>• Afrochine Smelting (Pvt) Ltd is completing a smelting plant for Iron ore near Chivhu. Mining to commence in 2023.<br>• A total of 7 (seven) new gold custom | Ngwereva Bonface |

| | | | | |
|---|---|---|---|---|
| | applied for were dolomite and manganese in the far North of the province close to the border near Nyamapanda. Others are for black granite, tantalite and lepidolite.<br>• Key transfers of title include that of the famous Joyce Mine at Beatrice to a Chinese investor, as well as other mining claims registered formally as K and I covering about 240ha, which the same investor obtained. | | milling plants where commissioned in 2021 alone.<br>• In December there was a massive gold rush along the contact between the Harare Greenstone Belt and the Chinamhora Batholith. | |
| **Mashonaland West** | • 5 EPO's are current.<br>• There are 13 current EPO applications.<br>• 7 reserved areas.<br>• Mining cadastral data capturing is ongoing. | • The Bravura Company is completing its phase 2 drilling on their PGM Special Grant in the Selous area.<br>• Riozim's One-Step Mine shows ongoing exploration and some production. | • Resuscitation of Empress Nickel Refinery is underway. | Trust Ndebele |
| **Manicaland** | | | | No report |
| **Masvingo** | • There are 9 current EPO's.<br>• 14 current special grants.<br>• 4 reserved areas, excluding | • Domus: Copper exploration in Malipati .<br>• Mutoko Resources: Gold | • Resuscitation of Empress mine heap leach pads.<br>• A lot of ASM activity within the Masvingo | Clifford Mlilo |

| | | | | |
|---|---|---|---|---|
| | those held by Parks & Wildlife, Rural District Councils, ZINWA and municipalities.<br>• Cadastral Progress: Larger operators have submitted co-ordinates of all titles to the MMMD (including mining leases, special grants & mining blocks). | exploration in Ngundu.<br>• RioZim: Copper exploration in Devure range, and ongoing exploration around Renco Mine.<br>• Diamond exploration around Sese. | Greenstone Belt. | |
| **Mat North** | | | | |
| **Matabeleland South** | • All greenstone belts are covered by EPO's. ASM sub-sector are not amused.<br>• There are several special grants across the province. | • Main targeted commodities are for gold, nickel, lithium, limestone, coal and diamond.<br>• ZCDC has several special grants in the province.<br>• Ongoing coal exploration at the Tuli and Diti deposits.<br>• Ongoing nickel exploration at Fort Rixon.<br>• Ongoing lithium exploration at the Zulu deposit near Fort Rixon.<br>• No significant | • Ongoing limestone mining at Colleen Bawn (PPC) in Gwanda.<br>• Small-scale mining of corundum, garnet and aventurine within the Limpopo Belt. | Alfred Tafirenyika |

| | | | | |
|---|---|---|---|---|
| | | exploration in EPOs granted earlier in the year. | | |
| **Midlands** | | | | Alec Kudubva |

# MINING NEWS

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

by Kennedy Mtetwa

**Zimbabwe miners losing 20% of export proceeds to exchange rate distortions**

Reuters | October 27, 2021 | 7:26 am Africa Gold Platinum

Zimbabwe's miners are losing 20% of their export proceeds due to a widening gap between the official and black market currency exchange rate, an industry report showed on Wednesday. The Zimbabwe dollar is [was] trading at 93 to the United States dollar on the official market, but is quoted as low as 180 against the greenback on a thriving black market. A survey commissioned by Zimbabwe's mining chamber found that mining companies were losing money due to the exchange rate mismatch. Exporters from Zimbabwe are required to surrender 40% of their foreign currency earnings to the central bank, in exchange for local currency at the official rate.

"Almost all respondents indicated that the value of the surrender portion that is liquidated into local currency at the official auction rate has been significantly eroded on the back of the parallel market rate which is used for pricing goods and services by local suppliers," the report said.

"Respondents highlighted that the exchange rate disparities have resulted in mining companies losing 20% of gross export proceeds."

The mining companies said they were also battling electricity shortages, low levels of investment and the high cost of capital, but despite the challenges, the survey found that miners were more confident about their prospects for 2022 compared to this year. The report showed an improvement in the confidence index to 17 for 2022 from 9.8 in 2021. The scale ranges from minus 100 for the least confidence, to 100 for the highest.

"Notable among the positive sentiments include optimism about the commodity price outlook, improvement in capacity utilisation and anticipated mineral output growth," the report said.

Central bank governor John Mangudya, who addressed miners at the launch of the report, projected record high mineral exports this year.

"At $4.4 billion, that's what we are expecting from mineral exports for this year, that's the highest we have ever recorded in this country," Mangudya said.

Zimbabwe earned $3.65 billion from mineral exports last year, with platinum group metals and gold accounting for 82% of the earnings.

Mangudya also promised to let miners retain 80% of their export earnings if they increased production. He did not specify what increase he would like to see.

*(By Nelson Banya; Editing by Emelia Sithole-Matarise)*

**B2Gold weighs acquisition of gold assets in Zimbabwe**

Bloomberg News | November 25, 2021 | 11:32 am Top Companies Africa Gold

B2Gold Corp., the Canadian company that owns mines in Africa and the Philippines, is interested in acquiring gold assets in Zimbabwe. The mid-tier gold producer which has mines in Mali, Namibia and the Philippines, has held talks with the government and other officials in the southern African nation "to see if they are ready for us to come in," said Clive Johnson, chief executive officer at the Vancouver-based company.

"There is really a strong case and we are making that case in Zimbabwe," Johnson said in a Nov. 24 interview. "We are looking at it as intriguing potential with some advanced projects as well as exploration potential."

B2Gold weighed buying an idled Zimbabwean gold mine two years ago but wanted authorities to exempt it from a law that forces miners to sell all the metal to a unit of the country's central bank, Bloomberg reported, citing people familiar with the details. Zimbabwe desperately needs fresh investment in its key mining sector to reboot a struggling economy. Still, forcing gold miners to sell the bulk of their bullion to the central bank unit, Fidelity Printers and Refiners Ltd., which then pays them back partly in dollars and partly in rapidly depreciating local currency, is unnerving to new investors.

Winston Chitando, the Mines Minister, said that B2Gold has shown interest in investing and is holding talks with privately-owned gold mining firms.

B2Gold would consider buying operating assets in Zimbabwe and also enter into joint ventures and the company could also explore the potential for establishing a milling plant, the CEO said. The miner is also searching for gold in Finland, Uzbekistan and is seeking to build a new mine at the Gramalote project in Colombia with AngloGold Ashanti Ltd.

"It's an interesting area for us geologically and that's what we are looking for in the world," Johnson, who has led the company since it was founded in 2007, said. "We will probably enter the first part of next year a bit more confident to talk more about what we see there as the potential."

*(By Felix Njini and Katarina Hoije, with assistance from Godfrey Marawanyika)*

**Zimbabwe makes U-turn on mining royalties to halt currency slide**

Bloomberg News | February 4, 2022 | 8:04 am Africa Diamond Platinum

Zimbabwe's finance minister requested mining companies to pay up to half of their royalties in local currency, as part of measures to stem a decline in the unit that has been fanning inflation. The order reverses a 2020 decision requiring mining companies to pay the tax only in foreign currency. A similar rule has been imposed on taxes and duties levied on imported vehicles, while taxes due from exporters are now payable in both foreign and local currencies in proportion to approved retention levels, Finance Minister Mthuli Ncube said in a statement posted on his Twitter account Friday.

"These measures reflect government's commitment to promote the wider use of the Zimbabwean dollar and to continuously strengthen the economy so as to build lasting macro-economic stability," he said.

The Zimbabwean dollar has weakened 6.8% this year to 116.65 per dollar, after losing almost a quarter of its value last year, and changes hands at more than twice that rate on the streets of the capital, Harare. The decline has fueled inflation which quickened to more than 60% in January, from 54% in October. The policy change comes days after the central bank agreed with business leaders that it would "continue fighting inflation through

restrictive monetary policy and building foreign exchange reserves as a way of augmenting the defence of the value of the local currency."
*(By Godfrey Marawanyika)*

**Zimbabwe platinum miners ask government to defer 5% export tax**
Bloomberg News | **February 7, 2022 | 8:55 am** Top Companies Africa Platinum

Platinum miners in Zimbabwe asked the government to push back a tax on exports of semi-processed metals, requesting more time to invest in processing plants at home. The Treasury announced the tax in 2020, giving miners two years to prepare before its planned introduction early this year. The levy of as much as 5% is aimed at spurring the companies to develop their own processing facilities, allowing Zimbabwe to increase the value of its mineral resources.
The miners want the government to "reconsider the policy and further defer" the tax, Alex Mhembere, chairman of the Platinum Producers Association of Zimbabwe, said in a letter to Finance Minister Mthuli Ncube. "This will allow the producers more time to invest in the beneficiation facilities while building sufficient feedstock." Ncube confirmed receiving the letter, which was dated Jan. 24 and seen by Bloomberg News, and said the government is considering the miners' request.
"The Treasury is analyzing the matter and its implications," the minister said by phone from the capital, Harare. "We will get back to them once we have concluded our analysis and reached a decision."
Mhembere is also chief executive officer of Impala Platinum Ltd.'s Zimplats unit, the country's biggest producer of the metal. Companies have made "significant progress" toward processing platinum-group metals locally, Mhembere said. Zimplats itself plans to spend $1.8 billion to expand mining and processing, including rehabilitating an old base-metals refinery built by the BHP Group.
The southern African nation generates more than half of its earnings from exports of minerals including gold, chrome and diamonds. Zimbabwe holds the world's third-largest known reserves of platinum, which occurs with base metals including nickel and copper.
*(By Godfrey Marawanyika)*

**Dubai can't shake off the stain of smuggled African gold**
Bloomberg News | December 27, 2021 | 10:13 **pm** Intelligence Africa Asia Gold

In the moon-like landscape of northern Sudan, informal gold miners toil with spades and pickaxes to extract their prize from shallow pits that pockmark the terrain. Mining ore in the sweltering heat of the Nubian desert is the first stage of an illicit network that has exploded in the past 18 months following a pandemic-induced spike in the gold price. African governments desperate to recoup lost revenue are looking to Dubai to help stop the trade. Interviews with government officials across Africa reveal smuggling operations that span at least nine countries and involve tons of gold spirited over borders. That's a cause for international concern because the funds from contraband minerals dealing in Africa fuel conflict, finance criminal and terrorist networks, undermine democracy and facilitate money laundering, according to the Organisation for Economic Cooperation and Development.
While it's impossible to say precisely how much is lost to smugglers each year, United Nations trade data for 2020 show a discrepancy of at least $4 billion between the United

Arab Emirates' declared gold imports from Africa and what African countries say they exported to the UAE.
The UN and NGOs have long questioned the apparent role of one of the Emirates — Dubai — in facilitating the trade by closing its eyes to imports from dubious sources. The UAE strenuously denies any involvement in illegal practices. But as global scrutiny over corporate governance intensifies, the extent of the smuggling now under way poses increasingly uncomfortable questions for Dubai and its reputation as a gold trading hub. Allegations that it's not doing enough to stamp out questionable flows of the precious metal have led to public slanging matches with London, home to the world's largest gold market, and with Switzerland, the top refiner. Deputy U.S. Treasury Secretary Wally Adeyemo discussed concerns about gold smuggling with Emirati officials during a visit to Dubai and Abu Dhabi in mid-November, according to two people with direct knowledge of the matter who asked not to be identified because they're not permitted to speak publicly about it. That same week, the head of Dubai's commodities exchange, Ahmed bin Sulayem, answered the accusations head on.
"I want to address the elephant in the room: namely, the consistent and unsubstantiated attacks launched on Dubai by other trading centres and institutions," he said at a conference in the Emirates. They are, he said, "lies."
*(By Simon Marks, Michael Kavanagh and Verity Ratcliffe, with assistance from Ben Bartenstein, William Clowes, Eddie Spence, Leanne de Bassompierre, Yinka Ibukun, Prinesha Naidoo, Daniel Flatley and Saul Butera)*

# On-Line Talks and Upcoming Events

As reported by *Nevison Chikandiwa*

The Society continues with our online talks programme, details for which can be downloaded from our web site. The Society will continue to host these zoom-based online talks and we would like to thank the membership for participating. We continue with our collaborative link with the Geological Society of South Africa to participate in their series of online talks and other events, notification for which is circulated through our Secretariat. A link has also been established with the Geological Society of Namibia in order to share online events.

Vaughan Duke delivered his talk on *"Professional Integrity"* on 11th November, 2021.

Lesley Jeffrey of SRK Consulting presented on *"Some African Coal Deposits"* on 18th November 2021.

Hielke Jelsma spoke on *"Basement Architecture of the Central African Shield"* on 27th January 2022.

# 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

Phone: +1.720.981.7882/Fax: +1.720.981.7874

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# Conferences

**GSSA Geocongress 2020**
Stellenbosch, Western Cape
The next 125 years of Earth Sciences
Postponed to January 2023

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**Geological Society of South Africa**
***GEOHERITAGE CONFERENCE***
**3 – 7 April 2022**
Registration for the Conference sessions is free and OPEN.
Click here to register for the conference sessions
https://zoom.us/meeting/register/tJMtcuygpjsrHNLafEJBr6G03elSK7mh3L6z

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**12th International Kimberlite Conference**
30 years of diamonds in Canada
**Postponed - 15 to 19 August 2022**
Yellowknife, Canada
secretariat@12ikc.ca

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**A GREAT OPPORTUNITY EXISTS TO CREATE ADDITIONAL AWARENESS**

Advertising on the GSZ website is only $50 per display for a 6-month period.

Visit http://www.geologicalsociety.org.zw/ to see where the adverts can be placed, and choose your spot.

Please contact Andrew du Toit at andrewdutoitzim@gmail.com, or the Administrator at geol.soc.zimbabwe@gmail.com, for more information.

Don't forget - you can also advertise in this Newsletter through these contacts.

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# GEOLOGICAL SOCIETY OF ZIMBABWE: CONTACT DETAILS OF MEMBERS OF THE EXECUTIVE COMMITTEE FOR 2021

| NAME | PORTFOLIO | EMAIL |
|---|---|---|
| Tirivabaya, Renias | Chairperson | rennyt80@gmail.com |
| Mtetwa, Kennedy | Vice Chairman | kcmtetwa@yahoo.co.uk |
| Musiwa, Kudzai | Hon. Secretary | kudzimusi@gmail.com |
| Mwatahwa, Collins | Hon. Treasurer | collinsm885@gmail.com |
| Mabhanga, Shephard | Newsletter | smabhanga@gmail.com |
| Chikandiwa, Nevison | Talks & Field Events. | wchikandiwa@yahoo.co.uk |
| du Toit, Andrew | Summer Symposium. Phaup Award | andrewdutoitzim@gmail.com |
| Mugumbate, Forbes | ZGS Representative. Phaup Award | fmugumbate@gmail.com |
| Duma, Steve | Student mentorship | duma.steven@gmail.com |
| Mamuse, Antony | Co-ordinator–Regional Representatives | antony.mamuse@graduate.curtin.edu.au |
| Matsanga, Miriam | Without Portfolio | mmatsanga22@gmail.com |

# Institutional Membership, 2022

Bruker RSA

Chamber of Mines of Zimbabwe

Freda Rebecca Mine

Invictus Energy

MaxGeo

Metallon Gold

Mimosa Mining Company (Pvt) Ltd

New Dawn Mining

Optimum Drilling

Prospect Resources

RioZim Limited

RZM Murowa (Pvt) Limited

Samrec Vermiculite Zimbabwe (Pvt) Limited

Sandvik

SMC Drilling

Trojan Nickel Mine

University of Zimbabwe Geology Department

Unki Mines (Pvt) Limited

Vast Resources

Zimbabwe Geological Survey

Zimbabwe Platinum Mines Limited