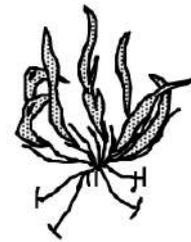


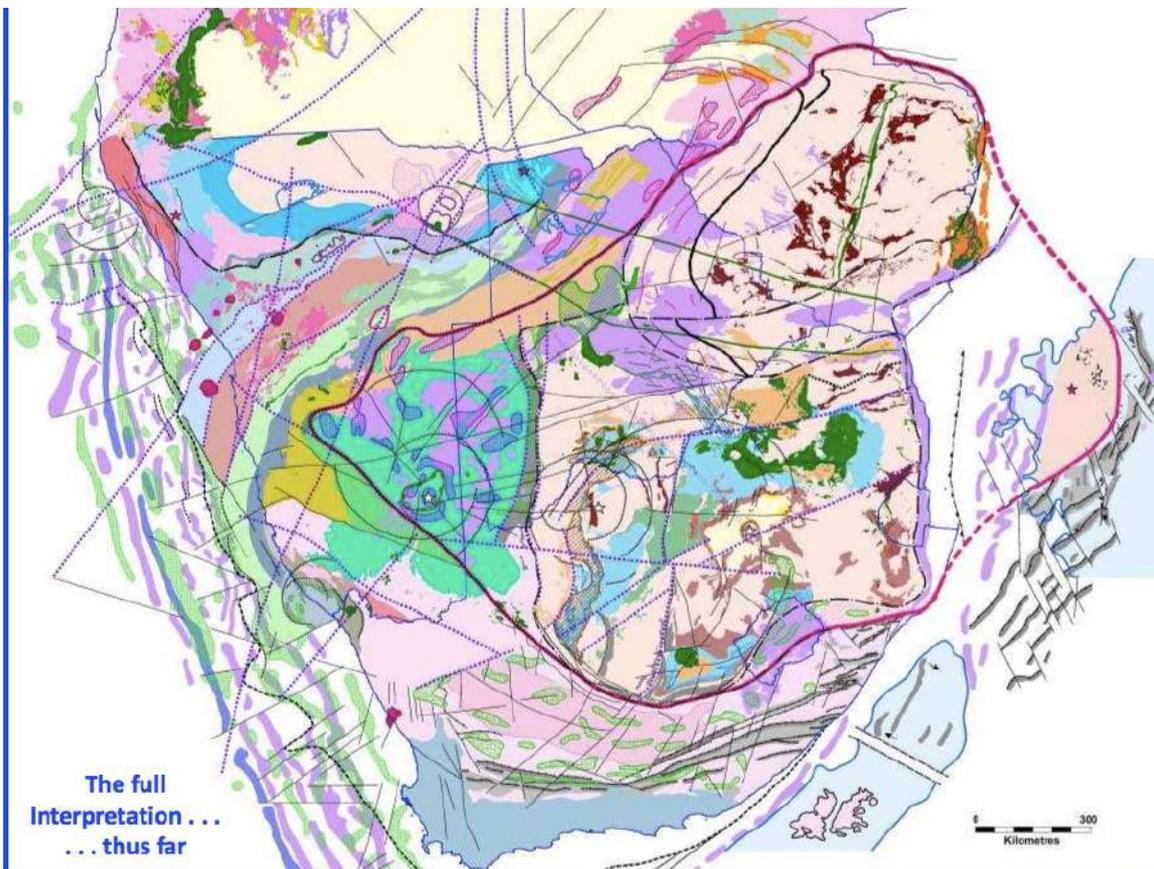
Geological Society of Zimbabwe



Newsletter

February 2018

No. 1 of 3 of 2018



An integrated geophysical and geological interpretation of southern Africa. Keynote Address to the Geological Society of Zimbabwe 2017 Summer Symposium by Branko Corner

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

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Geological Society of Zimbabwe

AGM

9th March 2018

At 17.00hrs

**The Country Club (CFX), Brompton Road
Highlands, Harare**

Gayle Hanssen is our Guest Speaker during dinner and following
the award presentations

Cost for dinner is @ \$20.00 per person

Editorial

Another year has passed and a new Committee under the Chairmanship of Steve Duma awaits us. Please take note of the AGM on 9th March at what has become our usual venue, the CFX Country Club in Highlands. We will be there to thank Maideyi and her Committee for all that they have done this past year and to welcome Steve and his Committee into the challenges that they will face this coming year. As we are all aware the dynamic changes that took place in Zimbabwe towards the close of 2017 will pose hope, opportunity and challenges to us all as geologists. With a new and understanding Minister in the mining field and the general drive towards investment in Zimbabwe our respective lives could change from the hum-drum of existence we have been going through. With promises of policy change, the revival of our basic exploration drive, and encouragement for investment to stimulate our economy, all indications provide a positive air. Forbes Mugumbate has spent a lot of effort in summarising much of these positive forces within the mining industry. Upbeat glimpses of this renewed energy came out in our stimulating and successful Symposium on 1st December, and some of the abstracts are reproduced here along with Tony Martin's summary of proceedings. Other presentations can be read or downloaded off our web site.

The positive mood that arose was continued in the Society field trip to the expanding Cam and Motor megapit at Eiffel Flats. Lovemore Machiridza has recorded the enthusiasm of this event and Tony Martin supplied the group photo below.



Our thanks as always must be extended to our regular news contributors to whom I am always grateful as their efforts allow us to keep abreast of happenings in various fields of geological interest and endeavour.

Although obituaries will be observed at the AGM, I would like to record here my personal notice of the passing of Jeremy Prince who died in Brisbane on 22nd September 2017 aged 79. Jeremy played a very significant role in groundwater development across Zimbabwe and in the region apart from his earlier role as a topographic and mine surveyor.

Tim Broderick



Chairperson's Chat

Maideyi Meck

It gives me great pleasure to extend to you all compliments for 2018 on behalf of Geological Society of Zimbabwe. Your Society continues to work hard to bring in value for members. On the programme for 2018 we have talks and field trips lined up, and preparations for an international conference earmarked for 2019 are in hand. Your ideas for additional events are welcome.

The 2017 symposium, a focal point of our Society's calendar, was well attended followed by a field trip to the Cam and Motor Mine, Kadoma. It is my sincere hope that members had an opportune time to renew contacts and discuss problems of mutual interest within the geological family. It is gratifying to note that the symposium programme covered a wide range of very interesting topics relating not only to geology but earth science in general. Our distinguished colleagues reported on their research, developments and experiences and most of us learned a lot and were encouraged. The Society, through the administrator, has a register for those who need to use their attendance for CDP.

The Society website is functioning well but requires your input as members to log interesting exposures with the addition of photographs and locations, and to participate in discussion. You can also advertise on the website for only \$50 per year. The list of paid-up members is on our website so that anyone can check who the genuine members of our society are.

We as a Society are looking at establishing regional chapters in order to co-ordinate activities such as talks and field trips locally. If you need assistance from the committee to help in establishing your local group and in co-ordinating events please contact our administrator.

The Society's AGM will be held on 9th March at our usual venue, the CFX club. We look forward to seeing all of you at the AGM, details of which are advertised in this Newsletter.

Thank you!

Articles and Reports

Summary of the Summer Symposium Presentations - December 2017

Tony Martin

Of the 14 papers presented three were related to mining tenure issues, two on geophysical topics, six on mining and exploration projects and two on more academic aspects of geology.

Farai Mutondoro of Transparency International Zimbabwe (TIZ) outlined the levels of corruption in the mining sector and the weaknesses or vulnerabilities in the regulatory systems that control the industry. TIZ has used a Mining Awards Corruption Risk Assessment (MACRA) tool to identify these and rank them in terms of likelihood and impact. Phase I of this programme, completed in 2017, has identified and ranked the vulnerabilities and Phase II will involve implementation of changes required to address the Phase I issues. The targets will include land tenure and mineral rights, statutory approvals, environmental compliance and community relations. Other concerns include the functioning of the Ministry of Mines and State-owned Enterprises, the use-it-or-lose-it policy and the lack of a whistle-blower mechanism.

Of direct relevance to the first presentation was the talk by **Princess Mahari** on the implementation of a Mining Cadastre Information Management System in Zimbabwe. Flexicadastre software has been widely used for maintaining exploration and mining records throughout the world and, following its acquisition by Trimble, it has been rebranded as Landfolio. The implementation of this programme has been trialled at the Mutare Mining Commissioner's office and will be rolled out to the other provinces once funds are available to acquire survey equipment, hardware and software for all of the offices.

A presentation on small-scale chrome miners by **Nevison Chikandiwa** highlighted the many challenges facing operators producing chromite that range from lack of geological and mining knowledge to poor understanding of safety and environmental issues, and insufficient funding to address these.

Branko Corner's presentation, *Southern Africa Under Cover – An Integrated Geophysical and Geological Interpretation* detailed the accumulation of a lifetime's work of interpreting the hidden geology of southern Africa. This work has added enormously to our understanding of the tectonic evolution of the sub-continent. The cratonic blocks that comprise the sub-continent and their marginal metamorphic belts are largely under cover ranging in age from the Archaean to present. Branko presented a series of interpretations based on all available data from outcrop mapping and drilling to aeromagnetic, gravity and magnetotelluric surveys, showed how powerful these tools are in defining near-surface through the deep basement geology. Of particular interest is how the WSW Limpopo Belt structures wrap around the SW corner of the Zimbabwe Craton into the northeasterly Magondi Belt. The ~2Ga age of the Magondi and the synchronous

late tectonothermal event of the Limpopo are intriguing – what bearing do they have on the interior structure of the Zimbabwe Craton and the interpretations provided by Mark Tsomondo?

Mark's presentation focused on two components of the Zimbabwe Craton in his talk on *Transtensional Tectonics for the 2575Ma Great Dyke and diachronous Razi-Chilimanzi suite plutonism*. Using indenter analogues from a number of orogenic belts around the world Mark illustrated the transtensional effects of collision and how this relates to the fanned intrusion of the two satellites of the Great Dyke that splay from a 15-km separation in the north to 55km in the south where the two dykes meet the North Marginal Zone of the Limpopo Belt. The Chilimanzi Suite granites that cover a large part of the Craton are close to Great Dyke in age, but show diachronous intrusion with shapes that indicate short- and far-field tectonic controls also related to indenter impact and rotation of the craton.

The Xade Complex in Botswana is hidden under 200 to 1000m of Karoo and Kalahari sediment and was discovered during an aeromagnetic survey of Botswana in the late 1970's. **Peter Hildebrand** outlined its geology and presented a detailed interpretation of the Complex based on the magnetic anomalies and seven drill holes. These indicate that there are three lobes to the Complex, some of which are volcanic and others feeder conduits. Age determinations on core show that it is part of the ~1.1Ga Umkondo Large Igneous Province and of similar age to the Duluth Complex in North America and others in Australia. It has the potential to host Ni/Cu/PGE mineralization but its depth is a challenge. However, it does suggest that rocks of similar age elsewhere in the subcontinent warrant investigation.

The other exploration project presented was the *Development of Arcadia Lithium Project* by **Roger Tyler**. This deposit lies 35km ENE of Harare and comprises a series of 14 near-horizontal, stacked pegmatites with a known strike length of over 4km, but with minimal surface exposure. The pegmatites contain significant concentrations of petalite and spodumene with subsidiary tantalite. Exploration started in 2016 and to date 90 core and 188 RC boreholes have been drilled (25,000m) and over 5000 samples were analysed. In addition over 8 tonnes of drill-core sample have been subjected to metallurgical tests. The total JORC-compliant resource is 57 Mt at 1.1% Li₂O, within which there is a high-grade core of 35 Mt (1.4% Li₂O). This is presently Africa's largest and the World's 5th largest lithium resource. A pit has been planned to mine the 24 Mt reserve (1.34% Li₂O) at 1.2 Mt/a and work on a feasibility study to produce lithium carbonate is in progress.

While still on exploration, **Brent Barber** reminded us that there is still the possibility of viable hydrocarbons in the Zambezi Valley. Mobil completed extensive exploration in the early 1990's and although the seismic surveys suggested that the area held potential, the play was considered to be gas-prone and not oil-prone. However, the geology of the area indicates that the maturity of the source rocks, suitable migration routes under impervious seals, and structural traps are all present in the Zambezi Valley. These have similar characteristics to producing basins elsewhere in the world and suggest a potential of 3.1 TCF of gas with 241 mmbbl of condensate. This will be investigated under Special Grant 5741 gazetted in August 2017.

Tenyears Gumede's presentation was on the comparison between Airborne Full Tensor Gravity Gradiometry (FTGG) and Ground Gravity in the Search for Mineral Deposits and

it's all very complicated. Ground gravity involves dumping a gravity meter on the ground and measuring the gravitational pull at that point. Airborne surveys are faster, allow uniform coverage and cost less, but aircraft movement limits the accuracy of measurements because early devices could not distinguish between a shift in the position of the device and the earth's gravity. However, this can be addressed using gravity gradiometry, which does give sufficient spatial resolution for mineral exploration. The way in which this is done is complex and even digs into Einstein's general theory of relativity concerning the equivalence principle and differences between gravitational and inertial mass. While gravity is measured as an acceleration unit in m/s^2 , a gravity gradient is the spatial rate of change of gravitational acceleration determined from the difference between two gravity measurements separated by a small distance. This distance can simply be vertical but a full tensor gradiometer takes into account three orthogonal components. And if you find that a little outside of your comprehension, then join the club. Essentially two matched and accurately aligned accelerometers (devices that measure proper acceleration or the acceleration relative to free fall, popularly known as a g-force) are used. Reduction of the data from these instruments involves filtering with some loss of short wavelength information, but minimal filtering results in higher errors. Despite the technical problems, airborne full tensor gravity gradiometry has advanced to a stage where it can detect a variety of orebody types. There are a number of companies that offer FTGG, each with slightly different instruments and methods and the results of some of these surveys were presented and compared to ground surveys. At the current state of technology (and much research is being done) FTGG can detect large bodies of potential mineralization but for smaller deposits, follow-up ground surveys are recommended.

Tony Martin talked about the link between *durchbewegung* textures and mineralization in the Katanga Copperbelt. The term *durchbewegung* has been applied to textures formed by ductile movement of near-solid sulphides, which entrain and abrade more brittle material to form rounded clasts within a sulphide groundmass. It was argued that the term be extended to any breccia resulting from abrasion of clasts within a high-viscosity medium and in particular the diapirism of salt. Satellite images of salt domes indicate that they contain entrained wall-rock material and Internet photographs appear to confirm this, but a site visit to one of these beasts is required. The copper deposits of the Katanga commonly occur within fragments or *écailles* of coherent Roan stratigraphy surrounded by huge volumes of breccia, parts of which contain well-rounded clasts from higher up in the stratigraphy. It was suggested that the breccia initially formed from movement of salt to create "durchbewegung" textures and subsequent dissolution of the salt created the conditions for large-scale movement of the *écailles* using the low viscosity medium of the slush breccia as a lubricant.

Onto a very different topic and that of palaeontology, **Tim Broderick** reported back on a trip to the shores of Kariba and other localities, which proved to be two very successful fossil-hunting expeditions. First visited were the Kariba islands off Bumi – the objective being to find *Volcanodon karibaensis*. Detailed work indicated continuity of the Upper Forest Sandstone between islands but only fragments of bone were found and it appears that fossils are not preserved between lava flows. At the Tashinga site, an Archosuarian *Phytosaur* was discovered, the first in Sub-Saharan Africa. Its association with numerous *Ceratodus* tooth plates and coprolites suggest the locality was the site of a feeding frenzy during the deposition of the Pebbly Arkose of the Upper Tashinga Formation. For the uninitiated (like me), from the *Phytosaur* clade (evolutionary branch) came crocodiles on

one branch and dinosaurs and ultimately birds, on the other – so this discovery is an important link in the evolutionary tree. The second expedition relied on a National Geographic grant to investigate *rhynchosauurs* in the Dande area with associated early dinosaur remains and then *therapsids* in the Madumabisa Mudstone south of Kariba. At both of these locations important discoveries were made including an almost complete skeleton of a prosauropod dinosaur and numerous skulls from a new *Dicynodont* location. So, well done to Tim and the teams from the Evolutionary Studies Institute at Wits, the Natural History Museum in London, Virginia Tech and our own National Museum.

Two mining projects were described: Rio Tinto's Richards Bay Minerals (RBM) mine in South Africa and Rio Zim's Cam and Motor project at Eiffel Flats.

Ellah Muchemwa described the extraction of heavy minerals from sand dunes that extend for over 20km along the KwaZulu-Natal coast some 180km north of Durban. The operation is huge and RBM recovers around 2 Mt/a of concentrate. Mining starts with top soil removal and the creation of freshwater ponds of sufficient size to float a dredge and the concentration plant – and there are four such pits. The dredge advances into the face and the slurry created by pit wall collapse is pumped to the gravity concentrator. Tailings are discarded behind the plant and the concentrate is stockpiled prior to transport to the mineral separation and refining plants. The tailings are shaped to mimic the original dune topography, covered with topsoil stockpiled at the start of the operation and planted with a mixture of coastal dune vegetation and cash-crop trees harvested by the local communities. The concentrate is trucked to a single plant that separates the minerals – mainly ilmenite with 100 kt/a of rutile, 250 kt/a of zircon, high purity magnetite and minor accessory products, which are further processed before marketing.

The re-opening of Zimbabwe's largest gold producer was the subject of the presentation by **Jonathan Nyagumbo**. The Cam and Motor started production over 100 years ago and was developed down to 2063m from surface. It closed in 1968 having extracted 11.76 Mt of ore at 12.53 g/t for 147t of gold. Re-examination of the old plans and drilling from 2009 resulted in the estimation of a significant near-surface resource. A 200 metre-deep open pit is planned and mining started in 2015. Initially the ore was treated at Dalny Mine with an on-site plant commissioned in 2016. The ore will be treated using three technologies: the cap oxides (to 30m) goes to a CIL facility, transitional ores (30 to 70m) will be treated by CIL and flotation, and finally sulphide ore will incorporate roasting or bioleach of a flotation concentrate.

Last but not least, **Anthony Mamuse** gave an overview of the development of the Mining and Mineral Processing Department at the Midlands State University, which was established in 2015. The faculty currently offers undergraduate programmes in mining, metallurgy and materials, and plans to add geology and geophysics in 2018 – followed by courses in mechanical engineering, spatial sciences, and fuels and energy at a later date. It has acquired equipment for teaching and research and is establishing partnerships with other research institutions in Zimbabwe and internationally to ensure that training and research are relevant to the country and of the highest standard.

The Proterozoic Choma-Kalomo Block, SE Zambia: Exotic terrane or a reworked segment of the Zimbabwe Craton?

Sarah M. Glynn, Sharad Master, Michael Wiedenbeck, Donald W. Davis, Jan D. Kramers, George A. Belyanin, Dirk Frei, and Thomas Oberthür

Abstract

The Choma-Kalomo Block in south-eastern Zambia was hitherto considered as solely Mesoproterozoic in age based on granitoids which were previously dated at 1.37 and 1.18 Ga respectively. The Choma-Kalomo Block was therefore thought to constitute an exotic terrane with respect to the neighbouring Palaeoproterozoic Magondi Belt and Archaean Zimbabwe Craton. This study of the Choma-Kalomo Block presents new U-Pb SIMS age data for zircons collected from previously undated metasedimentary rocks, revealing an abundant Palaeoproterozoic component (2040–1861Ma). Palaeoproterozoic (2040 ± 5 Ma) xenocrystic zircons in a Mesoproterozoic (1370 ± 3 Ma) leuconorite point to reworking of older crustal material, and suggest that the Choma-Kalomo Block is not a juvenile Mesoproterozoic terrane. Our U-Pb age data on columbite-tantalite fragments from tin-bearing pegmatites in both the Choma-Kalomo Block and the Dete-Kamativi Inlier (which is part of the Magondi Belt) indicates that Sn-(Ta-Nb-W-Li-Be) mineralisation within the two terranes occurred c. 1030 to 920 Ma. New ^{40}Ar - ^{39}Ar dating, confirms previous data, and indicates that a thermal event affected the region between 1020 and 980 Ma. The similarities between the Choma-Kalomo Block and the Dete-Kamativi Inlier imply that these two terranes have a common history, at least as far back as the Palaeoproterozoic, but were certainly juxtaposed by the late Mesoproterozoic era. A large difference in lithospheric thickness between the Choma-Kalomo Block and the adjacent Zimbabwe Craton could explain the different rheological behaviour of the Choma-Kalomo and Dete-Kamativi areas, with the former being strongly deformed during the Neoproterozoic (Pan-African) orogeny. Our data indicate that the Choma-Kalomo Block is not an exotic terrane, rather it may represent a reworked portion of the Zimbabwe Craton. However, what is unclear is whether the subcontinental lithosphere has been thinned, or the Choma-Kalomo Block represents a terrane with an originally thinner lithosphere.

Precambrian Research, **298**, pp. 421-438

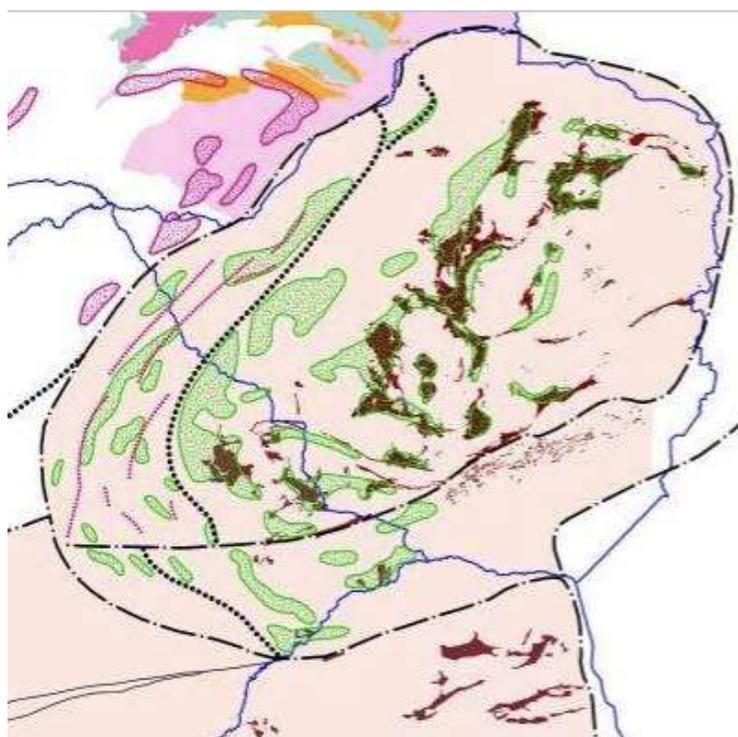
Southern Africa under cover – an integrated geophysical and geological interpretation

Branko Corner

Manica Minerals Ltd
branko@iafrica.com.na

Southern Africa, here taken as the region that comprises the Kalahari and southern Congo cratons, and the important orogenic belts that surrounded or separated them during the assembly of Gondwana, was situated in the heart of the supercontinent. A plethora of

data sets, both geological and geophysical, are available in the public domain, including outcrop mapping, drilling results, aeromagnetic, gravity and magnetotelluric surveys, allowing mapping of extensive regions under cover. Deeper penetrating seismic reflection, refraction and teleseismic data, as also the magnetotelluric data, have allowed the lithospheric interpretation to be extended to the middle and lower crust, and to the upper mantle. Interpretation has included *inter alia*, mapping, or refinement of existing mapping, of: the craton boundaries and associated terranes; major faults, structural lineaments and ring structures; specific features which have a geophysical expression such as the Witwatersrand Basin, the Xade Complex and the tectonostratigraphic zones of the Damara-Ghanzi-Chobe Orogenic Belt; the Namaqua-Natal Belt and extensions thereof as the Maud Belt in Antarctica, as well as associated features such as the Beattie Magnetic Anomaly and the Southern Cape Conductivity Belt. Interpretations of the large-scale seismic, electrical resistivity, geomagnetic induction and magnetotelluric data by many workers have yielded important insights into the deep structure and evolution of the subcontinent, showing that the Archaean Kaapvaal, and Zimbabwe cratons have deep roots that are relatively cold. As best possible, the interpreted features honour all geological and geophysical data sets within the resolution of the data. Integration of these results in the unified interpretation map presented here brings new insights into both the disposition of selected geological features under cover, and the evolution of the Precambrian geology of southern Africa, extending into Antarctica within a Gondwana framework.



Coincident residual Bouguer Gravity anomalies relating to the Zimbabwe Craton as expressed in Zimbabwe and Botswana

Transtensional tectonics for the 2575Ma Great Dyke and diachronous Razi-Chilimanzi suite plutonism: the end of Macgregor's vertical tectonics

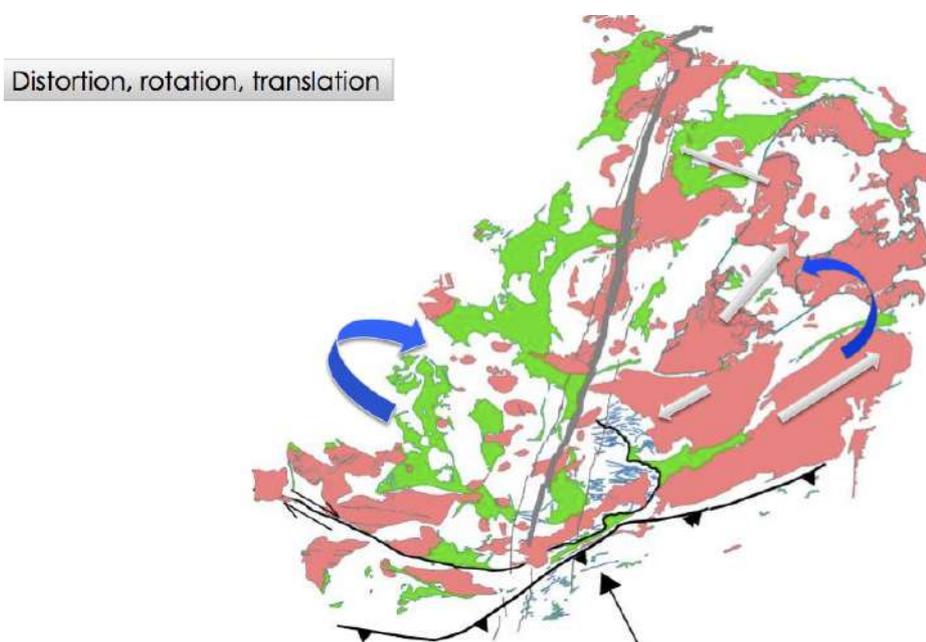
Mark Tsomondo

tsomondom@gmail.com

Is the Great Dyke fracture pattern evidence for vertical tectonics under an active mantle plume or indentation-linked global tectonics? If we accept that the 2575Ma Great 'Dyke' (lopolith) formed under an extensional tectonic regime, could the same apply to the diachronic 2634-2517Ma Chilimanzi suite plutons east of the Great Dyke? The Razi-Chilimanzi suite is synconvergent under late Archaean Limpopo orogenesis that recorded peak metamorphism at 2.58Ga, an age that is indistinguishable from a 2575.4±0.7Ma Great Dyke or the 2575.0±1.5Ma Umvimeela satellite dyke. What tectonic setting (coupling and decoupling between upper, lower and middle crust) permits the Great Dyke and its satellites to intrude the Limpopo Belt during a period of along-strike North Limpopo thrusting and intrusion of the Razi-Chilimanzi, north-eastwards, which also happens to be the younging direction of these Chilimanzi plutons? The transcratonic Great Dyke and pan-cratonic Chilimanzi suite plutons are excellent geological markers for resolving these geodynamic problems that are at the heart of poorly understood Neoproterozoic tectonic evolution of the Kalahari Craton and its amalgamation. Are the Great Dyke and its satellite dykes the stitching plutons for the amalgamation? What evidence is there to demonstrate that the Belingwe Greenstone Belt occupies the frontal face of a buoyant Tokwe protocraton indenter?

Here we draw attention to a rather obvious yet neglected observation about the Great Dyke and its satellite pattern that has been previously termed simply 'subparallel' by nearly all researchers. The Great Dyke and its satellite dykes are clearly *south-fanned* or represent fanned σ_1 trajectories characteristic of indenters; its localization along the contact between a stiff Tokwe protocraton and weak (western) magmatic arc lithosphere has been successfully analogue-modeled under indentation. The horizontal separation between the East and Umvimeela dykes is about 15km in the north (Snakeshead) but about 55km in the south adjacent the Northern Marginal Zone (NMZ). The wider (4-11km) Great Dyke terminates south within the Chibi pluton in the structural footwall of the North Limpopo Thrust Zone (NLTZ), and only a width-attenuated and offset extension intrudes the NMZ. In a comparable manner, the high aspect ratio (8:1) Chibi pluton extends 150km ENE and passes into a wedge-shaped (2547Ma) Zimbabwe monzogranite. Strains within the southern Belingwe Greenstone Belt and its Mapiravana pluton (streaky mineral lineation) are predominantly constrictional and tentative estimates of kilometric pure shear displacement parallel to the orogen (OPE) are available. The transition from constrictional to transtensional wedge-shaped granitic plutons (fanned-NE) is termed *lateral constrictional flow* (LCF) of a hot orogen (Chardon *et al.*, 2009) - an essential but missing concept for the entire NMZ and Limpopo Belt. East of the Great Dyke there are essentially three wedge-shaped Chilimanzi plutons - *in gregarious NE-tectonic escape* (not Macgregor's vertical tectonics). We revisit the western margin of the 2601Ma Murehwa batholith to show dextral extensional shear bands in the structural footwall of host gneisses. Some 20km into the interior of the Murehwa batholith, we examine horizontal extension in exhumed lower-crustal amphibolite gneiss in the presence of a Chilimanzi-style melt. We show horizontal and

vertical extensional shearing structures (3D strain), including sheath folds from the margins of Chilimanzi plutons from east of Mvuma. Finally we draw exciting inferences of extensional tectonics during oblique convergence that operated across the Limpopo orogen since 2.74Ga, our preferred start to a Himalayan-style Limpopo orogeny (s.s.). To explain diachronic age relationships in magmatism, metamorphism and tectonism in the absence of oblique convergence has been impossible, a similar drawback to explaining how space was created for the large Chilimanzi plutons found east of the Great Dyke. Small including *en cornue*-shaped Chilimanzi plutons with their tails merging into the Shashe-Gwanda-Antelope system of transpressive dextral shears are seen west of the Great Dyke. Thus the shape of Chilimanzi-suite plutons can be shown to reflect short- and far-field tectonic controls. The ballooning and diapirism described for the Chinamora batholith must be seen in this light in order to make sense of detailed thesis research (Bekker, 2000) implying that its late-stage laccolith was emplaced westwards under a N-S far field stress regime.



Inferred tectonic framework during the Late Archaean evolution of the Zimbabwe Craton

Development of Arcadia Lithium Project

Roger Tyler

Prospect Resources

roger.tyler99@gmail.com

The Arcadia Project lies some 35km ENE of the capital, within the Harare Greenstone Belt. It is a series of 14 flat-lying, stacked pegmatites of the L-C-T (lithium-caesium-tantalum) class. The known strike length is over 4km, but surface exposure is minimal. The pegmatites are mineralogically quartz-feldspar rich, with significant concentrations of petalite and spodumene, with subsidiary amounts of tantalite.

Historically one of the bodies; the so-called Main Pegmatite was mined sporadically in the 1960s and '70s for lithium and beryl. A limited drilling programme was undertaken by Rand Mines in the early 1990s, but no detailed information is available.

Prospect Resources hold around 14 km² of claims over the project area. Chip sampling of the old pit was started in May 2016 followed by the Phase 1 DD programme in June. At various times two to five drill rigs have been operating. Five phases of drilling have now been completed comprising 90 DD holes (10,000m) and 188 RC holes (15,000m). Over 5000 assay samples have been analysed for multi-elements, with 2000 XRDs done to define the detailed mineralogy.

25 dedicated metallurgical test core holes have been drilled, and over 8 tonnes of bulk sample was sent for test work.

The current mineral resource estimate has defined 57 Mt @ 1.1% Li₂O, with a high grade core (0.8% cut off) of 35 Mt @ 1.4% Li₂O.

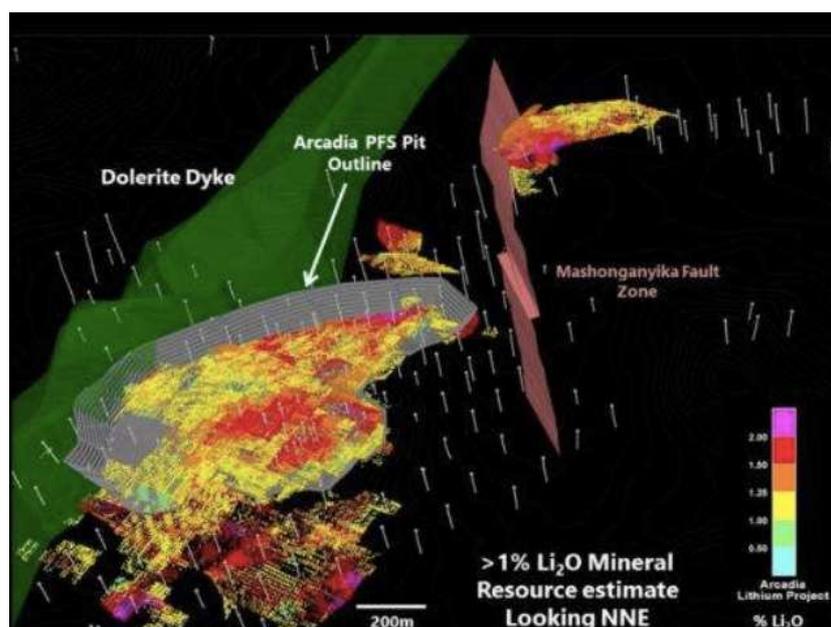
A main pit some 1.5km long to a maximum depth of about 140m is planned, based on reserves of 24 Mt @ 1.34% Li₂O.

A pre-feasibility study has been released detailing the profitable extraction of 1.2 Mtpa and production of varying grades of spodumene and petalite for a CAPEX of \$55m.

Work is now concentrating on producing a feasibility study for a dedicated lithium carbonate plant production facility.

Regional exploration by means of mapping and soil sampling continues to identify satellite and associated bodies.

Arcadia is Africa's largest and the World's 5th largest JORC-compliant hard rock lithium resource.



Arcadia Lithium Mine – block model

Visit to Cam and Motor Mine - 2 December 2017

Lovemore Machiridza

A 30-strong group of keen geoscientists visited the Cam and Motor Mine on 2nd December 2017. This was part of the very successful 2017 Geological Society of Zimbabwe Summer Symposium that was held at the Geology Department, University of Zimbabwe on 1st December. The visitors met at the Cam Club, Eiffel Flats at 9am and were treated to welcoming refreshments before a talk by Jonathan Nyagumbo's technical services team of geologists and support staff.



Following catch-ups and refreshment, visitors settled down for a presentation by Joshua

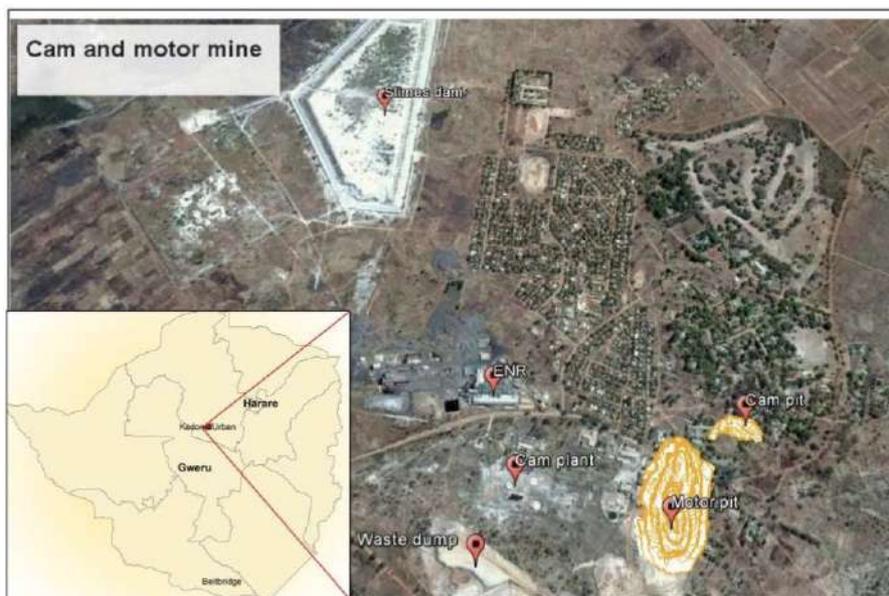
Senior Geologist, Joshua Nyemba ably presented on the geology and operations at Cam and Motor Mine. He then fielded questions from the interested visitors, which he batted with skill and with support from his team.

After an hour of presentation the visitors were taken on a tour of operations where an exploration drill rig was seen in action probing the link between the E-W Cam trend and the N-S Motor trend. Lots of arm waving and pointing intervened as the visitors and their hosts shared ideas ranging in topic from drill core to logging criteria, styles of mineralization, bench heights, new and old workings and pit management, as the group stood on the northern edge of the Motor Pit.



Probing the Cam and Motor trends and viewing the Motor Pit from its northern edge

Visitors were taken into the Motor pit, past stockpiles and viewing stations. Diligent efforts were made by hosts to enlighten guests of the mine geology as the party descended into the pit, wandered about at the bottom and then made their way out.



The Party descends into the Motor pit. Deep discussions ensued.

Tony Martin, Mark Tsomondo and several others were visibly stimulated by what they saw. Mark, in particular, could be seen wandering like a lost but engaged hermit way out in the hanging wall. He came back very excited with his observations of fining sequences in the metasediments. Tony was equally over the moon with the metasomatic alteration of basalts while Joshua was at pains to show us kinematic indicators. There was more arm waving here as relative block movements were vividly conjured up. Quite a few of the younger professionals nodded or shook their heads in geological belief or disbelief.

The heat in the pit was hardly noticed as brecciated, altered, sheared and mineralized specimens were passed around. They were licked to taste stibnite and to enhance the visibility of other sulphides and silicates and hand lenses were dusted off and used. The party was well entertained in a geological way before making their way out of the pit in small groups. The last group of three had to include Mark.

Two groups missed the tour of the processing plant, out of either disinterest or fatigue or both before they teamed up with the others at the offices at about 2pm before heading for a well-deserved and much awaited buffet lunch at the Cam Club. Following a vote of thanks and the exchange of contacts the visitors dispersed at 3pm for their various destinations.

News



Geology Department, University of Zimbabwe

Maideyi Meck

The Department of Geology now comes under the School of Earth and Mineral Sciences. The School was approved by the University of Zimbabwe Academic Committee on 12th December 2017 when it was also agreed that the operation of the School should start with immediate effect. The School has started with four departments namely Mining Engineering, Metallurgical Engineering, Geology and the Institute of Mining Research.

The Department continues to do well and is expecting Mr Surrender Ncube to join us on a part time basis. The first semester ended on 2nd December and the second semester is expected to commence on 26th February. We sincerely thank the mining industry for accommodating our students for the crucial industrial attachment experience. However, the department is appealing to the geological fraternity to help in the attachment for 11 remaining students, some of whom have been unable to find a place since June. The current curriculum does not permit a student to proceed before they have gone through with an appropriate attachment.

Contact details as of February 2018:

Name	Position	Email	Cell	Office Number	Office Phone 04-303211 (Extension)
Prof M Ityokumbul	Professorial Chairman				15032 Secretary
Dr. M.L. Meck	Dept. Chairperson	mabvira@science.uz.ac.zw	0772906612	25	15027
Dr. T. Njila	Senior Lecturer	drtnjila@gmail.com	0783696888	21A/5A	15029
Dr. M. Tewelde	Senior Lecturer	mulugheta1@yahoo.com	0775471789	6A	15030
Dr. A. Martin	Lecturer	anthony.martin2107@gmail.com	0772211224	2A	15036
Mr. P. Mangingaaisa	Lecturer		0783042494		
Mr. F.B. Mupaya	Lecturer	fbmupaya@gmail.com	0773599433	26	
Ms. S.Ncube	Lecturer	sinikiwencube26@gmail.com	0776746145	19	
Mr. O. Maponga	Lecturer	mapongaoliver1954@gmail.com			
Mr. G. Kwenda	Lecturer	gkwenda@gmail.com	0772935936		
Mr. T. Harawa	Lecturer	tonderayiharawa@yahoo.co.uk	0775207293		
Mr. G. Chinoda	Teaching Assistant	grecie.chinoda@gmail.com	0773000324	15	15025
Mr. D. Maguze	Chief Technician	dmaguze@science.uz.ac.zw	0712639792	24	15033
Mrs G. Chipari	Secretary	gchipari@science.uz.ac.zw	0772950681	21A	15032
Mr. F. Zihanzu	Technician	fzihanzu@science.uz.ac.zw	0772218208	1	15024
Mrs E. Hamah	Technician	emhamah@gmail.com	0773924053		
Mr. D. Mupambo	Technician	DIDYMUS@science.uz.ac.zw	0772916652	16	15024
Mr. P. Sena	Technical Assistant	psena@science.uz.ac.zw	0772390026		15193
Ms. S. Gorogodo	Messenger/Cleaner		0772390026		15029

We regret to announce the deaths of two students, Mr Raymond Dube and Mr Blessing Gondore. Mr Dube was involved in a road accident whilst Mr Gondore succumbed to aplastic anemia.



The Mennell Geological Society

Audious Kashesha (Chairperson) Bernatrix Makenah (Secretary)
audieekm@gmail.com panashebpm@gmail.com

Dr T. Njila (Patron)

The Professor Tom Blenkinsop UZ Geology Field Trip Fund

Following the successful presentation of the 2013 A.M. Macregor Memorial Lecture in Harare and Bulawayo, and his lead of the field trip in the Renco Mine area, Professor Tom Blenkinsop made a generous donation of \$200 to the Geological Society of Zimbabwe (GSZ). This was in support of University of Zimbabwe (UZ) geology student field trips. Over the years the UZ Geology Department has been under funded, resulting in their failure to raise sufficient money to conduct the mandatory field trips for its students. The GSZ responded by donating funds and materials from its own resources as well as from members. This assistance went towards the welfare of the geology students, especially in meeting costs for field trips.

Using the donation from Prof. Blenkinsop as seed money, the GSZ has now established the “*Professor Tom Blenkinsop UZ Geology Field Trip Fund*” to be administered by its Executive Committee. Tom has indicated an interest in supporting the Geology Department on a long term basis, not only to help in mobilizing funds for various activities, but by also providing moral and material support. Annually the students go on their main field trip, which lasts around 2 weeks with direct costs being in the range of \$6000 per class. Therefore we are appealing to all our members to donate generously to this worthy cause both in cash or in kind. Materials such as fuel and food are most welcome.

The direct benefits that accrue to the geological profession are that it ensures a properly trained graduate. Referring to the adage that the best geologist is the one who has seen the most rocks, our students need quality field trips. From these field excursions we also want to develop the Zimbabwe Geology Atlas.

Your donations, either in cash or in kind, should be forwarded to our Treasurer, Collins Mwatahwa – E-mail: cmwatahwa@Angloplat.com or to our Administrator, Julie Kuhn - E-mail: geol.soc.zimbabwe@gmail.com

THANK YOU FOR YOUR GENEROSITY

H. N. Gumbo



MIDLANDS STATE UNIVERSITY
FACULTY OF MINING AND MINERAL PROCESSING ENGINEERING
ZVISHAVANE CAMPUS

1. Introduction

Our returning Visiting Students, who are mining industry employees, commenced their studies in mid-January 2018 and our returning and new Conventional Students, and new Visiting Students commenced their studies mid-February 2018. We expect a semester and year of rewarding research, learning, teaching and networking.

2. Key issues in First Quarter of 2018

- a) Interviews for posts advertised in late 2017 will be held soon as preparations to launch Geology and Geophysics programmes advance.
- b) Short courses
 - (i) Two short courses in Geostatistics and Mining Law, which were well received by Industry participants in October 2017, are being offered again in the first quarter of 2018, at dates to be advertised.
 - (ii) Consultations are underway to offer a short course in Rock Mechanics, potentially also in the first quarter 2018.
 - (iii) All the short courses will be delivered by acclaimed experts, and those in the industry are invited to participate in scouting for the best talent to deliver these and any other desired short courses.
- c) The Faculty's Mining Industry Advisory Committee held its first meeting of 2018 at the Zvishavane Campus on 19th January 2018. The meeting was very successful and the Faculty will be guided by resolutions of that meeting to pursue projects that are mutually beneficial to MSU, the mining industry and to Zimbabwe.

3. Conclusions

The Faculty continues to complement efforts of sister training institutions, the mining industry and government in fully and sustainably developing Zimbabwe's minerals value chain for the country's maximum socio-economic benefit through excellence in research, training and community engagement. To this end, the Faculty values partnerships with these local players, as well as with relevant regional and international institutions.

Submitted by Dr Antony Mamuse, Executive Dean
antony.mamuse@graduate.curtin.edu.au



Geological Survey Department

Ernest T. Mugandani
etmugandani@gmail.com

Staffing

- **Dr Mabasa Temba Hawadi** retired from the department early in November 2017. He has been the Director of the Zimbabwe Geological Survey since 2002. His wealth of knowledge and experience in the mining sector will always be remembered. However, Temba is still working on a number of projects for the department that are being concluded. The writer has been appointed Acting Director effective from November 2017.
- **Ms Evelyn Marumisa** and **Robert Mashambanhaka**, who were geological cadets, joined the department in November and December respectively as geologists following completion of their studies at the University of Zimbabwe where they each graduated in August 2017 with a Bachelor of Science (Hons) degree in Geology.
- **Lloyd Shwarira**, Principal Geophysicist, and **Tendai Kashiri**, Senior Geologist, have been appointed acting Deputy Provincial Mining Directors for Manicaland and Mashonaland East mining districts respectively effective from January 2018. **Mitshel Maisera**, who was senior geologist in the Midlands, is now acting Deputy Provincial Mining Director for Mashonaland West effective from January 2018.
- **Sokesimbone Lunga**, **Frank Muzanenhamo** and **Ms Sibongubuhle Mpindiwa**, all Principal Geologists, continue to act respectively as Provincial Mining Directors for Matabeleland South, Mashonaland West and Masvingo mining districts while **Brian Muteta**, geologist, continues with his Masters degree studies in Japan whilst on Manpower Development Leave (MDL).

- **Mathias Ndoro**, I.T Geophysicist, was involved in a car accident on 16th December 2017 while on family business. He was discharged from Parirenyatwa Hospital in January and is currently recuperating at home. We wish him a quick recovery.

SPONSORED SKILLS DEVELOPMENT TRAINING

1. Organization of African Geological Surveys (OAGS)

The department is participating in various training programmes offered under the Pan African Geoscience Project (PanAfGeo). The training is aimed at restoring skill gaps that exist in African Geological Survey departments.

Admire Charumbira, Geophysicist, attended the training course on Remote Sensing for Geological Mapping that was held in Addis Ababa, Ethiopia from 20th to 30th November 2017. The scope of this training is to co-ordinate geological, geographic information system (GIS) and organizational techniques from an initial preparation phase to the final production of a geological map and to provide an explanatory text within the guidelines of the OAGS.

Mathias Ndoro, IT Geophysicist, attended a training course on Geoscientific Information Management, Database Management, the handling of spatial data and GIS interface, in Accra, Ghana from 20th to 30th November 2017. The aim of this training is to strengthen the geoscience information management skills of professionals at operational level in various African Geological Surveys. These skills combine spatial data infrastructure, data modelling, the application of interoperability standards and data dissemination to evolve multilayer 3D geological models using dedicated geoscience software. Database management skills are enhanced in geographic information systems to provide added value data in user orientated products.

Lloyd Magombedze and **Ms Vimbai Takawira**, geologists, participated in a training course on geohazards held in Pretoria, South Africa from 20th to 26th November 2017. The scope of this course included a review of the technical properties of rocks and soils, the application of remote sensing methods, modern geoscience mapping techniques and geo-structural field surveys in the definition of potential hazards; the quality of rock masses, slope stability analysis for rocks and soils, direct investigation techniques and the application of geophysical investigation methods.

2. Japan Oil and Gas National Co-operation (JOGMEC)

The Ministry of Mines and Mining Development has a Memorandum of Understanding (MOU) with JOGMEC. The Zimbabwe Geological Survey is the executing agency. It is under this framework that the department is receiving support

for Remote Sensing Techniques through training and workshops. Hopefully, the MOU will be renewed upon its expiry in March 2018.

Ms Portia Mungate, Tendai Kashiri and Abenezel Makuvaza attended the Remote Sensing Competition and Seminar held in Lobatse, Botswana from 27th to 30th November 2017. This is an annual event by JOGMEC, the intention of which is to strengthen remote sensing skills for geoscientists in the Southern African Development Community (SADC) region. Tendai and Abenezel together with **Ms Vimbai Gengezha** also attended the course on Advanced Remote Sensing in Geological Mapping using satellite images and Principal Component Analysis (PCA) in Gaborone, Botswana from 14th to 20th January 2018.

Ms Rumbidzai Shereni and Timothy Dinga from Matebeleland North and Mashonaland West districts attended the Remote Sensing Seminar and Workshop held from 30th November to 8th December 2017 in Gaborone, Botswana.

3. Governance Institutional Strengthening Project (GISP)

Mrs Alice Mudzi, Mrs Nyasha Chimuka, Ms Marita Matsatswa and Ms Laiza Chibove, all cartographers, attended further training in Digital Cartography from 4th to 8th December 2017 at the Council for Geoscience (CGS) in South Africa courtesy of African Development Bank (AfDB) funding under GISP. The training was a follow up to the study tour done in June 2017 to CGS and will go a long way in restoring digital cartography skills at the department.

The department received a major boost towards modernization under this project following the delivery of 10 large monitor screen computers in January 2018.

The project has since been extended to end on 30th April 2018 to enable finalization of outstanding key activities such as the publication of bulletins and maps, training and the commissioning of equipment.

4. China – Zimbabwe Collaboration

The Ministry of Mines and Mining Development (Republic of Zimbabwe) and the Ministry of Land and Resources (Republic of China) has a Memorandum of Understanding (MOU) dating back to November 2012.

It is under this framework that training in Mineral Resources Development Technology with special emphasis on ‘Green Mining’ was held at the Zimbabwe Institute of Public Administration and Management (ZIPAM) from 6th to 17th November 2017 for the first time in Zimbabwe. The training was hosted by the Ministry of Commerce of the People’s Republic of China, co-organized by the Academy for International Business Officials (AIBO) and Guangdong Province Nuclear Industry Geological Survey Bureau. **Amicable Hove**, geologist, and

geological technicians **Sicelo Makhaza** and **Edwin Muzanenhamo** from the department participated in the training together with a further 28 professionals from district mining offices and parastatals.

NEWS from the MINING INDUSTRY

Forbes Mugumbate
fmugumbate@gmail.com

The new political dispensation

Doubtlessly the most significant news has to do with the resignation of former president Robert Mugabe from power in November 2017. The regime that replaced him is promising exciting times for the country's mining industry. With the slogan "*Zimbabwe is open for business*" complemented by some positive policy pronouncements, the new head of state, President Emmerson Mnangagwa, has brought hope for the revival of the economy. Indications so far are that 2018 might be the turn around year for the mining industry that has been struggling in past years under unfriendly policies of the previous government.

Encouraging reviews on the new political order have seen a rise in investor confidence, which is culminating in several enquiries on the country's mineral potential, especially with regards to gold, diamonds, lithium and rare metals. Many potential investors in the mining and other sectors are flocking into the country to seek opportunities on the back of President Emmerson Mnangagwa's recent regional tours and his attendance of the World Economic Forum in Davos, Switzerland, and also Minister Chitanda's recent attendance at the Mining Indaba in Cape Town. Some of the large companies that have expressed immediate interest include De Beers who is considering taking up ground for exploration, Pan African Resources who are looking at nickel and gold mining assets in Zimbabwe, and Tharisa, a chrome and platinum group metals miner in South Africa.

The new government 'hit the ground running', with Minister Patrick Chinamasa immediately announcing that the much hated and greatly misunderstood policy on indigenization was instantly scrapped except for diamonds and platinum, the two strategic resources that still require the 51-49% compliance threshold. The statement did not explain whether this would apply to both new and existing mines. However, indications are that the policy regarding these will be clarified soon, as insinuated from President Mnangagwa's speech when he said, "I only excluded diamonds and platinum for now. We do not have a real or deep-rooted or well-interrogated policy on diamonds or platinum. Down the line when we are satisfied that this can also go into the open basket we will do so."

The positive intent of the new government came at the time a study by the Chamber of Mines revealed that the mining industry, which has been stagnant for over a decade, is estimated to require about \$400 million in working capital to sustain operations in 2018. The high cost of capital, as well as scarcity of hard currency, are the top factors undermining viability of the sector.

To sustain the thrust of promoting investment in the minerals industry, the government will host the Zimbabwe Mining Investment Conference on 27th and 28th February 2018. President Emmerson Mnangagwa will officially open the conference where various issues including ease of doing business, investment opportunities and mineral value addition and beneficiation will be discussed. Ministers Winston Chitando and Patrick Chinamasa will also address the conference. Over 20 countries have already expressed interest in attending.

Exit Chidakwa, enter Chitando

The Zimbabwe Defence Forces-led *Operation Restore Legacy* that saw President Mugabe resigning from office, resulted in formation of a new government under President Mnangagwa. A leaner cabinet comprising both new and old faces was assembled. Winston Chitando replaced Walter Chidakwa as Minister of Mines and Mining Development. The post of deputy minister was scrapped, which saw Fred Moyo losing his job.

Winston Chitando, B.Acc., is a seasoned executive whose experience in the mining sector spans close to three decades. He completed a Bachelor of Accountancy degree from the University of Zimbabwe in 1984 and joined the Anglo American Corporation as a graduate trainee based at the Hwange Colliery, where he rose through the ranks and later held various positions within the Anglo American Group. He also served as Divisional Commercial Manager in the Mining and Industrial Division at both Zimasco and Mimosa where he has been Executive Chairman from 2013 until his present appointment. He served as President of the Chamber of Mines of Zimbabwe from 2011 to 2013 and has been Chairman of Hwange Colliery Company Limited since 2016. He serves as Chairman of the Platinum Producers Association. Mr. Chitando sits on various other boards including the Zimbabwe School of Mines.

Of interest to the mining industry is the announcement by Mr Chitando, immediately on appointment, that his vision is to make Zimbabwe a destination for mining investments, to ensure a timely implementation of policies including a promise of policy consistency and clarity, and that he would promote mineral exploration.

With such promises, the mining industry is poised to grow. We can only hope that Mr Chitando will implement what he used to advocate for when he was steering the Chamber of Mines.

Chitando's hour at the Mining Indaba, Cape Town

Chitando took the "*Zimbabwe is open for business*" motto to South Africa where he held a breakfast meeting on the sidelines of the Mining Indaba in Cape Town. Judging from reports from various sources, the Minister is said to have performed very well such that some commentators believe he is one of President Emmerson Mnangagwa's finest appointments. The business breakfast meeting was co-hosted with the Moti Group, a 70% shareholder in African Chrome Fields having interests on the Great Dyke.

Minister Winston Chitando impressively addressed major areas of concern to investors. The audience was excited about the proposed amendments to the indigenization laws and his endeavour to ensure that there is policy clarity. Regarding the protection of ownership rights with specific reference to a case of

Anglo American and Zimplats being forced to give up some of their assets, the Minister stressed that unless in the case of mining rights expiring, Government would not arbitrarily impound assets.



A new dawn for Zimbabwe's greatest asset - Platinum

Zimbabwe is considered to have the world's second largest platinum reserves, yet in terms of production, the contribution to the world output is insignificant. While the world's two biggest platinum companies, South Africa's Anglo American Platinum Ltd and Impala Platinum Holdings Ltd, operate mines in Zimbabwe, they have slowed investment plans because of concerns over ownership laws and beneficiation policies. Both companies have also been forced to cede part of their concessions to the government. On the other hand Russian and Chinese investors on the Great Dyke have suspiciously slowed down developing their concessions.

These developmental hiccups may, however, be a thing of the past following recent changes in the country's political arena. As indicated, although the indigenization requirements for platinum and diamonds were not affected when indigenization requirements were lifted in other areas of the minerals economy, President Munangagwa has hinted that this statement will be reviewed soon.

An immediate response to the new political developments is the announcement that the Russian Foreign Minister, Sergey Lavrov will visit Zimbabwe in March 2018. Mr Lavrov last visited Zimbabwe in 2014 and took part in the commissioning of the US\$4 billion platinum project south of Darwendale, which is expected to start operations soon.

Exploration and geological work in the area situated in the Darwendale Chamber of the Great Dyke have already been completed. Mr Lavrov's anticipated visit is expected to mark a major step in the development of the platinum deposit owned by Great Dyke Investments, a joint venture between Russia and Zimbabwe.

Meanwhile, Zimplats reports that development of their Bimha Mine on Portal 4 remains on schedule and that full production will be reached in April 2018. Bimha Mine, which partly collapsed in 2014, affected Zimplats' output, resulting in a 50% drop in ore delivery, but this was mitigated by the opening of the South Pit Temporary Mine as a stop-gap measure. Zimplats is also on schedule for the development of Mupani Mine on Portal 6, the replacement for the Ngwarati and Rukodzi mines. That Zimplats is doing well was demonstrated in a recent report, which showed a 69% rise in profit to \$41-million for the quarter ended December 2017. This was helped by the sale of platinum group metal stockpiles from the previous quarter and higher prices.

The company reported that it was still in talks with the government, which last year filed a court application to enforce a previous notice to seize more than half of Zimplats' mining land. Going by the new Minister's responses to various questions at the Mining Indaba in South Africa, an amicable solution to this apparent problem is likely to be found, which will further help to bolster investor confidence.

Lithium: the mineral of the future

Lithium has been described as "white petroleum". This is a resource that could help the world move away from its dependence on fossil fuels and into a new era of battery-powered energy. Global climate agreements, tightening fuel economy standards and China's attempts to tackle its pollution crisis all point towards a future in which batteries and their component parts will play an increasingly important role. Lithium-based batteries are lighter, charge faster and are able to store more energy than traditional ones, making them a strong contender to fossil fuel as the primary source of transportation energy. Although the market is still relatively small, worth about \$1bn a year, the speed at which lithium battery technology is growing points to an increase in demand into the future.

Although Zimbabwe boasts several deposits of lithium, to date only Bikita Minerals has been producing lithium concentrates. With several known pegmatite-based lithium deposits, the country could benefit tremendously from an increased world lithium demand. Significant exploration is already taking place. For instance the Perth-based Prospect Resources, a focused lithium and gold mining and exploration company, has raised \$10-million for exploration. The ASX-listed company is using the funds to accelerate the development of its flagship Arcadia lithium mine near Harare, while focusing on progressing exploration at the Good Days lithium project, also in Zimbabwe. The company intends to investigate and possibly acquire additional lithium projects in the country.

The Office of the President and Cabinet has identified the Arcadia lithium deposit as a priority for development. Conferment of priority status on the Arcadia lithium project follows the new government's directive that the Ministry of Mines and Mining Development identify certain projects under the rapid results initiative's first 100-days programme. The government hopes that this will encourage the miners to fast-track development of the Arcadia deposit.

A 2017 prefeasibility study confirmed the project's technical and financial viability to become a significant producer of spodumene, petalite and tantalite concentrates. The study showed a 15-year life-of-mine based on an ore reserve of 15.8 million tonnes

grading 1.34% lithium oxide and 124 parts per million tantalum pentoxide. The company is expected to commission plant and to start production in the third quarter of 2018.

Meanwhile Premier African Minerals has drilled one of best holes to date at its Zulu lithium project near Shangani. The updated drilling results have shown an intersection of 1.74m at 1.69% lithium oxide (Li_2O), with 40.58m containing an average grade of 1.56% Li_2O in multiple intersections. The close proximity of the mineralized sections is considered to support a cost efficient and bulk mining scenario.

In another development Chimata Gold Corporation announced it had entered into a binding letter of intent with the Zimbabwe Lithium Company Limited (ZLM), a privately held company incorporated under the laws of Mauritius. ZLM is focusing on developing lithium assets in Zimbabwe. The company recently signed a joint venture agreement with the Zimbabwe Mining Development Corporation (ZMDC) to process Kamativi Mine lithium tailings. The tailings stockpile is estimated to contain 23,168,000 metric tonnes of material on surface. This is probably the deal Minister Chitando was referring to when he indicated that government would soon announce a significant deal it had struck, through the ZMDC with a foreign investor to exploit lithium deposits worth \$1.4 billion in Matabeleland North. The investor is expected to begin work on the site in March 2018.

Forever Diamonds?

De Beers considering a come back

De Beers has indicated that it is considering diamond exploration opportunities in Zimbabwe. Phillip Barton, CEO of De Beers South Africa said at the Mining Indaba in South Africa, "I'm excited about what I'm seeing in Zimbabwe. If we get licences, we would have a further look." Such a statement could be significant considering the role De Beers played previously in exploration for diamonds in this country. The Marange diamond field was discovered by De Beers. The company holds a huge data base on previous exploration efforts in Zimbabwe. They are also looking for deposits in South Africa after getting 16 exploration licences in the Northern Cape, and are extending searches into the Free State, the North West and Limpopo provinces. It is natural to look northwards to Zimbabwe.

Meanwhile the Zimbabwe Consolidated Diamond Company is working on a structure to lure private investors back into the diamond mining industry after government ordered companies that have been operating in Marange to vacate in 2016. Zimbabwe is this year expected to produce three million carats of diamonds up from 1.8 million carats last year, according to Mines and Mining Development Minister Winston Chitando. In 2016, ZCDC produced 961,000 carats which increased to 1.8 million carats in 2017. At peak in 2012, Zimbabwe's diamond sector produced 12 million carats.

In an effort to assist in the reduction of the cost of producing diamonds, government has significantly reduced ground rental annual fees for diamonds to \$225 per hectare from \$3000. The reduction is in line with government's ease of doing business reforms to facilitate investment in the diamond sector.

Zimbabwe diamonds for Botswana

After realizing that Zimbabwean diamonds were fetching far lower prices than those from neighbouring countries, and that buyers were beginning to believe that local diamonds are cheap, Zimbabwe has decided to use the experience of Botswana to rebrand the local stones. Pursuant to this, Zimbabwe was reported to be negotiating with the Botswana government to explore the possibility of sending local gems to the neighbouring country for cutting and polishing. This was revealed during President Emmerson Mnangagwa's tour of the Diamond Trading Company of Botswana at the conclusion of his two-day state visit to Botswana. The rebranding of Zimbabwe diamonds will also help the neighbours in that they were beginning to feel the effects of cheaper diamond sales from Zimbabwe.

Not all diamonds will end up going to Botswana, as the Zimbabwe Consolidation Diamond Company (ZCDC) will soon set up a 'Gemmology Park' in Mutare to cater for locals who are interested in the business of cutting and polishing diamonds. The establishment of such a park is part of the company's corporate social responsibility to ensure locals benefit from the mining of gems in their community. ZCDC has set aside 10% of its production for the local market in line with statutory provisions regarding the sale of diamonds

Diamond auctioning to resume

The country is planning to resume diamond auctions before the end of February 2018, having suspended sales in February 2017 after the government in 2016 merged the operations of seven companies that were mining gems in Marange.

Diamonds may not be forever!

While many Zimbabweans were participating in a revolution that brought into power the current government, this writer was in Brussels for the African Diamond Conference where some information shared showed that the diamond industry is under tremendous threat. Several countries in Asia, Europe and America are now manufacturing diamonds in laboratories. The following are some of the areas of concern regarding laboratory manufactured diamonds:

- i. There is an exponential increase in the production of synthetic diamonds as innovative technology makes it cheaper to manufacture them. Currently about 3% of stones in the diamond value chain are synthetic, and this figure is poised to increase.
- ii. Synthetic diamond producers are vigorously campaigning for the acceptance of their products, especially by the environmentally conscious new generation of jewellery users who are being attracted by the environmentally friendly nature of the production process. Synthetic diamonds do not cause wars (they cannot be blood diamonds), do not cause damages to the environment as they are not mined, no child labour is used to manufacture them, and the synthetic diamond industry is sustainable as they are not finite. Already there are significant changes in consumer demands. For instance 15-20% of jewellery users in the USA are against using natural diamonds.
- iii. Some dishonest people contaminate natural diamond packages with synthetic stones, the intention being to progressively replace natural stones with artificial ones thereby gradually killing the natural diamond industry.

The above will have devastating effects on countries that rely on diamonds for economic sustenance if the threat is not checked. There is some considerable debate on how to counteract the offensive by synthetic diamond manufacturers. The following are some of the proposals:

- i. The term diamond should only be used to refer to natural diamonds. Synthetic diamonds should therefore be called something else. Stakeholders should be able to detect synthetic diamonds.
- ii. There is need to maintain transparency and integrity in the whole diamond value chain to avoid negative attention from those intending to kill the industry. Although blood diamonds have been largely eradicated, the Kimberley Process remains relevant, and should now be reformed to preside over the whole diamond value chain.
- iii. The positive impacts diamonds have had on poor African countries should be highlighted to emphasize that buying natural diamonds contributes to the welfare of poor countries from where the diamonds are mined.
- iv. Consumers of diamonds should be constantly reminded about the uniqueness of natural diamonds; that they crystallised in a very exotic environment tens of kilometres in the earth's mantle; that every diamond is special, formed over 3 billion years ago and brought to surface by unique geological processes. The Diamond Producers Association is vigorously campaigning for natural diamonds in the USA, Europe, India and China under the slogan "Real is Rare Real is a Diamond".
- v. Countries that produce natural diamonds should come up with policies to fight the threat caused by the introduction of synthetic diamonds.

Gold

Gold remains the country's top mineral. Annual gold production rose to 24.8t in 2017 from 22.7t the previous year. The Chamber of Mines projects that production will rise to a record 30t this year. Government is considering building reserves of gold and diamonds to back the eventual relaunch of the country's own currency. Zimbabwe abandoned its currency in 2009 after an economic collapse saw inflation surge to about 500 billion percent.

To ensure sustained gold production, the government has set up teams, dubbed 'Gold Mobilization Teams', to monitor gold production processes at custom milling centres. Most small-scale gold production comes from these centres. It is believed that enforcement of compliances at mills will contribute to an increase in small-scale gold production. These monitoring and surveillance excursions that are done quarterly, have occasionally unearthed some irregularities that are suspected to have resulted in loss of significant gold to parallel markets.

The other strategy being pursued to ensure increased production is to empower small-scale miners. The Gold Development Fund (GDF) that was introduced by the Reserve Bank of Zimbabwe to capacitate qualifying small-scale gold miners, has been oversubscribed resulting in \$80 million being disbursed to miners in 2017. Gold deliveries in 2018 are expected to increase on the back of this financial assistance to add capacity to artisanal and small-scale miners.

The year 2017 also saw the provision of funding to gold-buying agents to enhance their mobilisation capacity.

Meanwhile Sabi Gold Mine south of Zvishavane plans to ramp up its gold output to 70kg per month. The mine, which has been under judicial management since 2011 is currently producing between 25 and 30kg. However, an investor has been found - Chandiwana Mining Corporation. Chandiwana is made up of 5000 Zimbabwean mining experts within and outside the country. Chandiwana becomes the majority shareholder with 51 percent while ZMDC holds 49 percent. The investor started by investing US\$5 million into underground mining.

The ZMDC is frantically making efforts to revive its other mines. The company invited, through advertisements in local newspapers, interested investors to file bids for Jena and Elvington gold mines, Lynx Graphite Mine in Karoi and Sandawana Mines in Mberengwa.

The awakening giants

Efforts to revive the giant asbestos mines of Shabanie and Mashava gained momentum with announcements that an initial 50 workers had been engaged to re-process dumps at the mines in an effort to raise part of the funding required for re-opening the mines. The number of workers to be engaged to process the dump is expected to rise to 800. The plan is to use the funds, which will be raised from the re-processing of that dump, to re-open Mashava Mine. This is expected to have been de-watered by December 2018 following Mines and Mining Development Minister Winston Chitando's Parliamentary announcement that a de-watering process of flooded shafts was being carried out. The government is, however, yet to secure an investor for these mines. The Zimbabwe Mining Development Corporation estimates that \$140 million is required to re-open the two mines. The Mashava Asbestos Mine is reported to have already mobilised \$14 million for its recapitalisation.

The two mines, which used to be the biggest employers with over 3000 workers, were closed in 2004, after experiencing severe operational challenges.

Mining Legislation

The Speaker of Parliament Jacob Mudenda has issued a two months ultimatum for the National Assembly to finalise the Exploration and Mines and Mineral Amendment bills, which he says will provide clarity on mining activities in the country. He ordered that the Bills must be enacted into law by 31st March 2018. The legislation has been in the making for the past 17 years, becoming an impediment towards investment in the mining sector. The Minerals amendment bill is before Parliament waiting for a second reading, but indications are that fresh consultations might be necessary.

The government has also announced plans to come up with a new Diamond Policy in light of the changes that have occurred in the diamond industry in recent years. Assistance in this regard is being sought from neighbouring diamond producing countries: Botswana, Namibia, South Africa and Angola.

Hot and cold at Hwange

Hwange Colliery Company Limited is resuming underground mining at one of its key mines to push monthly coal export volumes beyond 3000 tonnes. The company recently secured a US\$32 million loan as a retooling facility, and has embarked on an ambitious drive to replace obsolete equipment with plans afoot to boost monthly coal and coke

output to 400,000 tonnes. The resumption of underground mining at the '3-Main Mine' is meant to produce high quality coking coal to satisfy export demand. The company is exporting around 3000 tonnes per month to the Democratic Republic of Congo (DRC), Zambia, Malawi, Botswana and Mozambique. The resumption of operations at the 3-Main Underground Mine will be a major boost to the export drive given the high quality of Hwange Colliery's coking coal.

Meanwhile hundreds of spouses of Hwange Colliery Company Limited (HCCL) employees have been staging a sit-in at the coal mining company premises for over a week demanding payment of their husband's outstanding salaries. The women were calling for the removal of managing director Thomas Makore and human resources manager Raymond Munangwa, whom they accuse of mismanaging resources and a failure to pay workers since 2014.



GSZ Research and Development Fund

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



SEG Timothy Nutt Memorial Fund (Up to US\$1500.00 available for 2018)

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

Conferences

The 13th International Platinum Symposium will take place at the Ranch Hotel near Polokwane, South Africa from 30th June to 6th July 2018. There will also be a two day layered igneous rocks symposium immediately before organized by Steve Barnes and Rais Latypov. Field trips will be integrated with the event and post-conference. Contact Prof. Judith Kinnaird, Director EGRI, University of the Witwatersrand, 2050 WITS, South Africa. Tel: +27 (0)11 7176583

**27th Colloquium of African Geology cag27
incorporating the 17th Conference of the Geological Society of Africa**

Aveiro, Portugal 21st to 28th July 2018

On behalf of the 27th Colloquium of African Geology (27 CAG) and 17th Conference of the Geological Society of Africa (GSAf17), we would like to extend a warm welcome and invite you to join us at the University of Aveiro, Aveiro, Portugal, for the CAG27. The Colloquium of African Geology (CAG) is a major biennial meeting organized under the auspices of the Geological Society of Africa (GSAf).

Website: <http://cag27.web.ua.pt/>

The **20th International Sedimentological Congress** will take place in **Quebec City** (Canada) on **13-17 August 2018**. Check the conference website: <http://www.isc2018.org/>

Geological Society of Zimbabwe

Summer Symposium 2018

Thursday 6th September 2018

Department of Geology, UZ

Call for Papers

We are looking for presentations on broad range of subjects of general interest to Geologists.

If you would like to present, please let us know (andrewdutoitzim@gmail.com)

Please put this date in you diary now

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NAME	PORTFOLIO	EMAIL
Meck, Maideyi	Chairperson	maideyimeck@yahoo.com
Duma, Steven	Vice-Chairman & UZ Representative	steven.duma@zimplats.com
Musiwa, Kudzai	Hon. Secretary	kudzimusi@gmail.com
Kuhn, Julie	Administrator	geol.soc.zimbabwe@gmail.com
Mwatahwa, Collins	Hon. Treasurer	collins.mwatawa@angloamerican.com
du Toit, Andrew	Summer Symposium	andrewdutoitzim@gmail.com
Mugandani, Ernest	ZGS Representative	emghans@yahoo.co.uk
Bouammar, Houda	Talks & Meetings	houda.bouammar@gmail.com
Chikandiwa, Nevison	Talks & Meetings	wchikandiwa@yahoo.co.uk
Ait Kaci Ahmed, Ali	Newsletteer	ali_aitkaci@yahoo.fr
Mugumbate, Forbes	Regional Representative	fmugumbate@gmail.com
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