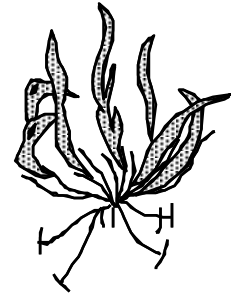


# *Geological Society of Zimbabwe*



## *Newsletter*



February 2014



*The Victoria Falls Summer Symposium, November 2013 – Our two field trip leaders – Dr Andy Moore and Prof. Sharad Master. Photo: Andrew du Toit, who Chaired the Organizing Committee.*

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

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Their telephone contact is 04-304839 & 304617 and the address is 7 Fairbairn Drive, Mount Pleasant in Harare.  
[marion.debeer@cadline.co.zw](mailto:marion.debeer@cadline.co.zw)

## Editorial

This Newsletter, the last under the current Chairmanship of Hillary Gumbo, emphasizes the success and stimulation of our Victoria Falls International Summer Symposium and its field trips held in November 2013. The reproduction of abstracts, talk summaries and field notes is intended to share the proceedings with a wider audience within our membership than those who attended. The calibre of our contributors and the variety of their presentations provide the first lasting impression as we welcomed new and old friends from South Africa, Botswana, Namibia, Germany and Zimbabwe (including a welcome student representation) to our attractive venue. Benjamin Mapani summed up the proceedings, whilst Andy Moore and Sharad Master led first class field trips that reflected their ongoing thinking into the geology and geomorphology of the Victoria Falls area and to our improved understanding of the metamorphic history of the Dete-Kamativi Inlier, with its relationships to the Choma-Kalomoti belt in southern Zambia and extension into Botswana. Special recognition should go to Andrew du Toit and his team for the organization and staging of the Vic Falls Symposium. Their efforts have served Zimbabwe well. This is an appropriate spot to wish Andrew, with his new Committee, well in his Chairmanship of our Society through 2014.

**In this regard, please diarise our AGM set for 5.00pm on Friday 21<sup>st</sup> March at our usual venue, the Highlands Country Club in Harare. For your stimulation our Guest Speaker is Dr Tony Martin - "Propaganda, Politics and Global Warming". We look forward to meeting and catching up with you. Dinner is at \$20 a head.**

Our grateful thanks must be further extended to our contributors to this newsletter, whose compilations are so important in helping us to keep abreast of current happenings within the mining industry and our institutions. Arising from the Symposium proceedings and from statements made in the press and in this Newsletter are concerns and challenges that must affect the Geological Society and its focus. There are challenges that we as a group are not vocal enough and should be engaging publicly with our views and advice in the hopes of redressing many of the negative impressions that beset our mining industry and therefore Zimbabwe as a whole. We need to take leads in the fields of professional conduct and accountability. Why have we not had an effective minerals exploration policy over the past decade? Why has the augmentation of new and enlightened mining legislation been so moribund over the same period? The gold industry of Tanzania was presented at our *Gold '82* Conference – production was zero. Liberalized and far-sighted mining legislation came in with a new Government soon after. There was an immediate response from the minerals exploration sector, who raised and channelled the necessary risk investment (*and I emphasize the word risk*) to facilitate the work necessary to locate and prove ore bodies in a systematic and responsible way over time. Tanzania is now the third producer of gold in Africa after South Africa and Ghana with a delivery of 43 tonnes last year. Tanzania and its people are the better for this vision.

There again delegates to the latest *Mining Indaba* in Cape Town in February report their embarrassment to have been representing Zimbabwe, whose mining industry and its policy received immediate and ongoing criticism as to why we should not be receiving investment. Why should we be receiving comment such as this?

*Alana Wilson, a senior economist at the Fraser Institute, said: "Zimbabwe's lowest scores on the Survey of Mining Companies 2013 were for uncertainty concerning*

*environmental regulations, the legal system, the taxation regime and disputed land claims, as well as infrastructure, trade barriers, and the quality of the geological survey. For each of these factors, no respondents rated that they encouraged investment."*

*He said mining was a "long-term and risky endeavour and mining companies must be confident in the stability and predictability of the regulatory regime" to invest.*

*"In order to enhance the country's attractiveness, Zimbabwe must provide stable, transparent, and predictable regulations and a legal system that is regarded as fair, transparent, non-corrupt, timely and efficient," Wilson said.*

We must take heed of the remarks and challenges issued by Alex Mhembere, President of the Chamber of Mines in his Opening Speech to our Symposium in November, and our considered professional views must be heard. To those listening – there is a message.

*Tim Broderick*



## Chairperson's Chat

Hillary Gumbo

Another year has come and gone. Compliments of the New Year to all our society members.

Although the Society had only a few activities in 2013, they were of high quality. The Summer Symposium held for the first time outside Harare since 2004, at the Victoria Falls, compensated for that in quality of presentations, venue and high attendance from across the SADC region. I met fellow practitioners I had not seen in decades. There were about 100 attendees at the symposium (some turned away due to the booked-out venue). I think I counted around 18 cars in convoy during the field trips. Well done to the organizing committee and many thanks to the members who took time off their busy schedule to be there. Enjoy the various articles on the symposium in this issue.

What came out of the symposium is that as geologists we need to help Zimbabwe know exactly what minerals we have, where they are, how much they are worth and how they could be exploited profitably. Therefore, we need to start a serious debate on this in order to educate our government and society in general what our mineral assets are, and what it takes to exploit them. As I leave office, this is a challenge I place upon the incoming 2014 Executive Committee and all our members.

To close my rather "short term in office", **I invite you all to our Annual General Meeting to be held at the Highlands Country Club on the 21<sup>st</sup> March 2014 starting 17.00hrs.** Sorry for the late date of the AGM. We could not find a suitable venue for this event as the Country Club was booked up on all Fridays from 28<sup>th</sup> February to 14<sup>th</sup> March. Planned for dinner-time is a fascinating talk on the "politics" of global warming by none other than our own Tony Martin, who will be our guest speaker. This is a continuation of the talk he gave at the Summer Symposium.

I wish you all, and the incoming committee a great year in 2014!

See you at the AGM.



*Delegates at the Vic Falls Symposium – including a great contingent from the Mennell Society, UZ*

## Articles and Reports

### Abstracts and Talk summaries - Victoria Falls Summer Symposium, Zimbabwe, November 2013

**Sharad Master: After Dinner - Journey to the hottest place on Earth - Geology of the Danakil depression, Ethiopia.** This presentation was on volcanoes, saline lakes, earthquakes and sedimentary deposits found in the Ethiopian Danakil depression. Overlying the Danakil depression, which is below sea level, with a 2km-thick salt layer underlain by basalts. The Danakil depression lies at 120m below sea level and Lake Afdera, which is one of the hypersaline (more saline than sea water) water bodies, lies in this depression. Foam forms when the lake has waves on it as a result of algae present within. The foam produces a layer of salt. Hypersaline lake water has a much higher density than ordinary water, and supports a small local artisanal salt production industry.

Within the depression is the Erta Ale volcano - with its permanent volcanic lake. You find lava tubes and pahoehoe and pelee's hair. Pelee's hair is lava that is blown by wind to form thin hair-like strands. The lava forming the lake is at 1200 degrees C. There are only four permanent lava lakes in the world. One is in the Congo, another in Hawaii and the other one is Etna. Lake Asale within the Dallal volcano is another salt lake, forming from the brines below. The Dallal volcano is surrounded by salt pans. Occasionally gas explosions occur and birds die. This may be due to CO<sub>2</sub>. The main minerals found in the lake are halite, sylvite and carnallite. Isotopic He<sub>3</sub> is found at the lake and is a signature of sourcing material from the mantle. *Summary by Ben Mapani*

#### **Alex Mhembe, President of the Chamber of Mines. Opening Speech – The Zimbabwe Mining Industry: State of the Mining Industry**

The Zimbabwean mining industry managed to pull through 2013 despite the difficult operating environment and the drop in most commodity prices. 2004 saw the peak production of Ni, while the highest price was in 2007. Coal production has been adversely affected by the hyperinflation period. After 2009, mining output has been the major driver for economic rebound in the country, increasing up to 35% by value in 2011. In 2012 the output

grew by 19% and in 2013 by 15%. These are good gains that are likely to continue. However, we need to look at the World outlook, and its focus on exploration. The Worldwide Exploration budget for 2009 was US\$8.4 billion. Of this Africa only got 15%, with Zimbabwe attracting very little of that 15%. West Africa, Tanzania, Malawi, Mozambique, Namibia and Zambia are among the regions and countries that benefited most.

Requirements for investment in the mining industry are: 1). Political and economic stability and predictability. 2). Favourable legislation - currently the minister is working on new legislation. We hope it will encourage investment.

*Questions and Challenges for the Geological Society of Zimbabwe.* How are we perceived as GSZ by the country's leadership? Why is there a lack of mineral exploration in the country? Can we use the answer to this question to give good advice to the politicians? Currently we have limited opportunities for career development for our young people, who tend to go outside for professional fulfillment. How can this be redressed? There are a limited number of professionals to draw from so as to energise the mining sector resulting in depressed development. The geological profession is non-vocal - this gives an impression that GSZ has a low-key presence in the minerals sector. This should be addressed. Proposals must be put in place that will advise the politicians on how to activate the minerals exploration sector. Viable and technical representation of GSZ is required on national platforms. GSZ must begin to contribute to skills development in one way or another. Development of standards for improvement of professional conduct in the field of geology will be an added advantage.

**Summary by Ben Mapani**

***Gordon Chunnnett: Update on the Geological Society of South Africa.***

This talk was more of an information session on upcoming events and activities of the GSSA.

- Alex du Toit lecture series for 2014
- IMA 2014. The 21st Meeting of the International Mineralogical Association: 1-5th September 2014. Sandton Convention Centre, Gauteng South Africa. The web site is: <http://www.ima2014.co.za/>
- Kimberley Diamond Symposium & Trade Show (following IMA 2014) 11 to 13 September 2014 in Kimberley South Africa. The web site is: [www.rca.co.za](http://www.rca.co.za) click on the diamond logo.
- IGC 2016 - The International Geological Congress will be held in Cape Town in September 2016. Go to [www.igc.org](http://www.igc.org)
- SACNASP is expanding its influence at a rapid pace as it is the law in South Africa that all scientists shall be registered. In our case all geoscientists, inclusive of academics shall be registered. Registration numbers are increasing at almost 20% per annum, mostly driven by young professionals coming on board. Many companies are now registering all their scientists, believing that it will give them an edge when competing for new clientele. Please take note of the Professional Indemnity Insurance offered for SACNASP registered persons. The rates are at almost a tenth of the alternatives currently on offer in the market. Visit the SACNASP website for detail ([www.sacnasp.org.za](http://www.sacnasp.org.za)) under the "scientist" tab. Also visit the website for information on the latest courses and conferences, or stay automatically informed through the SACNASP Facebook page.

***Tony Martin: Anthropogenic Global Warming and the History of the Earth's Climate. Abstract.***

There is currently considerable alarm about the impact of CO<sub>2</sub> on the earth's climate with claims that extreme weather events, retreating glaciers, loss of ice and a commensurate rise in sea levels can be attributed to a dramatic rise in global temperatures linked to increased levels

of atmospheric CO<sub>2</sub>. But what is the science behind these claims; how are global temperatures measured today; and what is the historical record in the recent past and further back in geological time? The earth's atmosphere in the Archaean and Palaeoproterozoic was dominated by CO<sub>2</sub> but oxygen was created, and the earth survived. Since then it has survived catastrophic super-volcanic and extra-terrestrial events, possible total freezing and extreme warm periods. Given the geological record, it would appear that the alarm is unwarranted. But what is the evidence to support this statement and why are politicians, "green" activists and a few "scientists" so confident in their support for the theory of anthropogenic global warming.

***Benjamin Mapani, Josefina Hamutoko, Rainer Ellmies, Arnold Bittner: A fingerprinting method for the identification of uranium sources in alluvial aquifers, Namibia. Abstract.***

Namibia is an arid country that depends on groundwater for almost 60% of its population. As such the identification of deleterious elements such as uranium and other radionuclides in aquifer systems is of prime importance. The Rossing uranium mine is located on the banks of the Khan River, and it was important to trace the source of uranium as either from tailings or of natural origin from the rocks. This study aimed at identifying the origin of elevated uranium (as a trace element as well as a radionuclide) and other radionuclides such as thorium and radium concentrations in the Swakop and Khan River alluvial aquifers. A fingerprinting method was used where the <sup>234</sup>U/<sup>238</sup>U and <sup>235</sup>U/<sup>238</sup>U ratios were used to distinguish natural from anthropogenic sources for the uranium sources. The <sup>234</sup>U/<sup>238</sup>U ratio is above unity (1.3 – 1.7) whereas the <sup>235</sup>U/<sup>238</sup>U ratio is 0.045 ± 0.015. All elevated uranium and other radionuclides concentrations in groundwater of the study area are as a result of natural dispersion from the mineralized rock formations rather than results of anthropogenic sources. Uranium increases in the lowest part of Swakop River; but there is no gradual change in uranium concentration thus indicating that concentration is related to local factors such as lithology, Eh and pH for each borehole. The secular disequilibrium between elements in <sup>238</sup>U decay series is natural due to different fractionation processes that include the decay of radioactive elements. The water in the area is not suitable for human consumption or agricultural usage, as most components such as TDS, which has values up to 11,123 mg/l and <sup>228</sup>Ra which has activities up to 278 mBq/kg exceeded the Namibian and WHO guideline values respectively.

***Sharad Master, S. Glynn, D. Frei, D. Davis and T. Oberthür: New U-Pb and Pb-Pb geochronology of rocks and minerals from the Proterozoic Dete-Kamativi inlier (Zimbabwe) and Choma-Kalomo block (Zambia) - regional implications.*** The Magondi Belt includes the Kamativi inlier. This unit is not very well understood and new U-Pb data for the area are presented.

Carbonate rocks in the Lomagundi Belt possess <sup>13</sup>C values of +10 per mil. The Lomagundi forms part of the global Lomagundi carbon isotope excursion at 2.22-2.06 Ga. The Archaean atmosphere was low in oxygen. At 2.45 and 2.32 Ga a great oxidation event characterized by oxygen increase in the atmosphere occurred. The Dewaras Group is younger than 2225 Ma and the Piriwiri Group is younger than 2022 Ma. The Kamativi rocks are higher grade than in the main Magondi Belt basin and must have been buried much deeper than those to the east.

*Stratigraphy of the Kamativi Inlier:* 8. Pegmatites. 7. Kamativi Fm – muscovite-biotite schists - Piriwiri Group. 6. Tshontanda Fm – garnet-mica schists, sillimanite schists - Piriwiri Group. 5. Inyantue Fm - schists - Lomagundi Group. 4. Malaputese Group -

gneisses, volcanics – 2254 - 2796 (detrital zircons) - Dewaras Group. 3. Granodiorite at 2031 $\pm$ 3 Ma 2. Biotite gneisses - 2.7 Ga (2698 $\pm$ 24 Ma) 1. Granitic Gneiss has older cores of 3.2 and 2.08 Ga.

The Choma-Kalomo batholith intrudes gneisses of an older age. Batholiths 1.34 Ga (1352 $\pm$ 14, 1198 $\pm$ 6, 1285 $\pm$ 64 Ma). Schists in the Choma-Kalomo batholith have detrital zircons of 1900 Ma. Columbite Pb-Pb 1037 $\pm$ 5 Ma for Kamativi tin. In Zambia Snelling *et al.*, dated muscovite from tin pegmatites at 1087 Ma. In conclusion the Zimbabwe Craton continues into Zambia and may underlie the C-K batholith. The Dete-Kamativi inlier has an Archaean basement at 2.7 Ga. Mineralization of copper is more VHS in nature than stratiform. **Summary by Ben Mapani**

***Lovemore Chimuka: Exploration Techniques: Discovery of Sese and Murowa Kimberlite Fields. Abstract.***

Murowa and Sese (538 Ma) kimberlites lie near the southern edge of the Zimbabwe Craton and intrude the 2.6 Ga Chibi granite batholith emplaced into the ~ 3.0 Ga Buhwa Greenstone Belt 10-20 km north of the boundary of the Northern Marginal Zone of the late Archaean Limpopo Mobile Belt. The greenstones are believed to rest on a non-outcropping ~3.5 Ga gneissose Tokwe Segment basement. The diamond prospective shield area forming the central Zimbabwe Craton was selected for a loam and stream sediment reconnaissance sampling programme. The initial target was the Tokwe Block, a 3.5 Ga Archaean tonalitic gneiss complex representing the oldest exposed core to the Zimbabwe Craton. The country rock is dominated by the 2.6 Ga Chibi Granite. The drainage pattern is trellis-type with NE-SW and NW-SE trending fractures suggesting a strong brittle environment for kimberlite emplacement. The well-developed drainage system was suitable for stream sediment rather than loam sampling, which was being applied in the flatter Lowveld EPOs held by RTZ. Exploration techniques employed in the discovery of the two kimberlite fields were conventional stream sediment sampling on predefined surface densities of 5-10 km<sup>2</sup> per 60 kg of concentrate. The method involved selecting the best trap sites along the river beds draining a catchment area. The trap sites play hosts to kimberlite indicator minerals (KIM), which were sort for in a sieve size of -2mm + 425 $\mu$ m. These indicator minerals are the mineralogical and chemical signature that identifies a kimberlite source rock. The KIM comprised pyrope garnets, spinel chromite, chrome diopside (pyroxene), ilmenite and micro diamonds. Ilmenite was not identified in any of the samples collected and processed in this area of study. KIM methodology is done on a regional and reconnaissance basis to identify the occurrence of kimberlitic bodies like pipes, dykes and sills. In alluvial diamond exploration techniques, KIM identification is avoided due to the destructive influence of fluvial regimes. KIM are vulnerable to attrition and breakdown during transportation. Chrome diopsides are lost after 500m; spinel and pyrope can travel beyond 2km whilst micro diamonds can be transported over a thousand kilometres. The granite greenstone terrains that host the two kimberlite fields produced relatively small volumes of heavy mineral concentrate approximating 500g, whilst samples within the Great Dyke vicinity produced concentrates of up to 1kg dominated by pyroxene and chromite mineral assemblages. In positive KIM-defined areas further techniques were employed: airborne and ground EMI (Max-Mini), gravity, magnetics and radiometrics. These techniques were used as follow up methods to close in on anomalous areas. Ground electromagnetic induction was used on grids of various dimension ranging from 4000 to 10 000 km<sup>2</sup>. Airborne remote sensing geophysics was applied on large grids of prospective ground to



identify large ore bodies. Geochemistry involved analysis of the fine soil ( $-75\mu$ ) fraction by XRF. In the granitic/gneissic terrain a suite of Mg, Cr, Ti, Nb and Ni was found to be sufficiently diagnostic. Orientation work at Sese showed that dispersion of the selected elements in the soil cover was minimal and typically limited to a few meters. The collection of samples is quick and analyses are relatively cheap so that close spacing was not a major concern. The XRF results were available within a few weeks from the diamond laboratory allowing a quick follow-up on the positive prospect. After successfully homing in on geochemical and geophysical anomalies, geological mapping of the grids was done to identify the outcropping lithological units, soil and vegetation anomalies. Trenching and pitting targets were generated from the mapping exercise.

### Acronyms

EPOs	Exclusive prospecting orders
KIM	Kimberlite indicator minerals
EMI	Electromagnetic Induction
Max-Mini	Horizontal loop electromagnetics
XRF	X-ray fluorescence

*Marange Diamonds.* The colour of diamonds tells us what element is present in the diamond. Yellow is indicative of nitrogen, blue implies boron, black is due to metamict damage from explosion of supernovae whilst red/green/purple are due to electromagnetic radiation. Marange diamonds from conglomerates have coatings that can be cleaned. The age of the diamonds are as follows: 500 Ma for Murowa, and 1.1 Ga for Marange.

### ***Thomas Oberthür: Platinum mineralization of the Great Dyke – from sulfide ore (pristine MSZ) via the weathering cycle (oxidized MSZ) into placers. Abstract.***

The world's prime sources of metallurgical chromite and platinum-group elements (PGE) are layered intrusions of Proterozoic and Archaean age (e.g. the Bushveld Complex, South Africa; the Great Dyke, Zimbabwe; and the Stillwater Complex, USA).

The Great Dyke of Zimbabwe hosts the World's second largest reserve of PGE after the Bushveld Complex. Economic PGE mineralization is restricted to sulfide disseminations in pyroxenites of the Main Sulfide Zone (MSZ), sited some metres below the transition of the Mafic to the Ultramafic Sequence of the Great Dyke.

In general, the MSZ is up to some meters thick and is composed of a basal PGE-rich sub-zone that slightly overlaps with a base metal sulfide-rich sub-zone above. Stratigraphically upwards, the MSZ displays metal profiles characterized by increasing Cu/Ni, Pt/Pd and PPGE/IPGE ratios, accompanied by a general element decoupling in the order: IPGE, Pd, Pt, Ni, Cu, Co, S (sulfides), Au, Te, Bi. The fine structure of the MSZ is regarded as reflecting primary magmatic features of consecutive batches of sulfide accumulation, concomitant scavenging of PGE, and fractionation.

Mineralogically, most of the Pd and Rh are hosted in pentlandite, whereas Pt is dominantly present in the form of discrete platinum-group minerals (PGM). Within the MSZ sequence, sperrylite is present throughout the PGE sub-zone of the MSZ, cooperite/braggite occurs mainly in its basal part, and the (Pt, Pd)-bismuthotellurides concentrate at the top. Furthermore, regional mineralogical differences of the PGM assemblages are present. These

findings indicate that a large proportion of the PGE, primarily concentrated in sulfide under magmatic conditions, was redistributed in the subsolidus stage and formed discrete PGM with available reaction partners. Chemical gradients and magmatic-hydrothermal fluids probably led to small-scale redistribution of PGE within the MSZ.

The behaviour of the PGE in the exogenic cycle was examined in a number of profiles of oxidized Main Sulfide Zone ores, in which the general metal distribution patterns of the pristine MSZ are grossly preserved. However, at similar Pt grades, significant proportions of Pd have been lost from the system. This indicates that Pd is more mobile than Pt and is dispersed in the supergene environment. Sperrylite and cooperite/braggite are stable in the oxidized MSZ. In contrast, the (Pt, Pd)-bismuthotellurides, common in pristine MSZ ores, have disintegrated, and ill-defined (Pt, Pd)-oxides or -hydroxides have formed. Furthermore, elevated contents of Pt and Pd are found in iron- and iron-manganese-oxides/hydroxides. The resource of ~250 Mt of oxidized MSZ calls for novel exploitation methods for these ores.

The assemblage of detrital PGM present in rivers draining the Great Dyke indicates further mineralogical changes. Sperrylite largely remains stable whereas most cooperite/braggite grains have been partly altered or completely destroyed. Grains of Pt-Fe alloy are ubiquitous in the alluvial sediments. Most likely these grains are neo-formations that either formed from pre-existing, unstable PGM, or via a solution stage under low-temperature conditions.

In a follow-up of the Great Dyke work, we have now entered into similar studies on the Bushveld Complex and will present first findings from these investigations.

***Judith Kinnaird: The northern limb of the Bushveld Complex - a decade of discovery. Abstract.***

Platinum mineralization in the northern limb of the Bushveld has been known since the time of Hans Merensky in 1925. Detailed mapping by van der Merwe in 1978 led to a better understanding of the lithological variability along the exposed 110km of the limb. Lower Zone rocks were identified as satellite bodies, the Platreef was mapped and regarded as the base of the Main Zone, whilst the Main Zone and Upper Zones were regarded as similar to, but thinner than their equivalents in the eastern and western limbs of the Bushveld Complex.

In the last decade, many new discoveries have furthered our understanding of the northern limb. The Lower Zone has been shown to be more extensive than originally thought, with thick packages of pyroxenite-harzburgite occurring locally beneath PGE-bearing Platreef. The Mg-rich composition of some olivines, sheds doubt on previous models of parental magma composition. The world-class PGE-bearing Platreef, which may be several hundreds of metres thick, has been shown to be a series of complex sills, often with interlayers of country rocks between the sills that have contaminated the Platreef magma to varying degrees and influenced the grade and stratigraphic position of the mineralization. Zircon age-dating has shown that the Platreef is the age-equivalent of the Merensky Reef. For the Main Zone, two reefs with economic grades of PGE-Cu-Ni mineralization have recently been traced along 17km of strike beyond the known exposed part of the northern limb, one of which is associated with troctolitic rocks, a feature that is unique to this part of the Bushveld Complex.

***Marina Yudovskaya & Judith Kinnaird: Origin of zonal PGM and PGE distribution in the platinum reefs of the layered intrusions. Abstract.***

An offset zonal distribution of platinum group elements (PGE), Au and base metals has been recognised through mineralized reefs in some layered intrusions (such as the Great Dyke,

Munni Munni etc). In contrast, Bushveld reef-style mineralization generally shows coeval variations in PGE, Au and base metals with the highest concentrations closely associated with chromitite seams or changes in rock types. This persistent pattern was explained by continued sulfide segregation as a result of multiple magma mixing events whereas the offset profiles require an involvement of a more complicated mechanism. Here we describe the zonal distribution of platinum group minerals (PGM) in a vertical section through the PGE reef at Turfspruit (the northern limb of the Bushveld Complex). The Turfspruit PGE reef is an 8m-thick mineralized zone hosted in olivine-bearing plagioclase orthopyroxenite within the Platreef sequence. The highest grade is confined to two top chromitite seams 0.8-1cm thick. The chromite-bearing interval contains predominantly Pt-Pd sulfides (up to 90 vol. % of total PGM); PGMs in the adjacent underlying interval are represented mostly by Pt-Fe alloy (up to 90 vol. %) that shows a transition to assemblages of predominant Pt-Pd bismuthtellurides and, finally, sperrylite. We suggest that this type of mineralogical zonation is related to evolution of a sulfide liquid starting with cotectic sulfide-silicate crystallization at sulfide saturation. An eutectic mix of Pt-Pd sulfides, Pt-Fe alloy and pyrrhotite crystallizes first from sulfide liquid with Bi, Te, As-enriched remains migrating downwards. Previously, a lateral variation of PGM mineralogy was reported for the Merensky Reef and Platreef; whereas we have now noted a vertical zonation in the Platreef on Turfspruit. This may occur where there is a significant reef thickness.

***Allan Wilson: Volcanic and Volcaniclastic rocks of the c3.0 Ga Pongola Supergroup: A view of the Earth's Earliest Stable Epicontinental Platform. Abstract.***

The Mesoarchaeon Pongola Supergroup is an exceptionally well-preserved succession of volcanic and sedimentary rocks that extends for 270km close to the eastern margin of the Kaapvaal Craton in South Africa and Swaziland. It is therefore one of the most extensive coherent Archaean terrains in the world and the oldest volcano-sedimentary continental deposit of this extent. Its characteristics are unique amongst supracrustal terrains of this age and unlike those of Archaean greenstone belts. The unique nature of the Pongola Supergroup is that it marks the transition in southern African crustal development from preceding early greenstone belts, such as Barberton, to late Archaean stable crustal basin formation. The sequence developed in a continental environment with extensive epicratonic volcanism and basin sedimentation.

The focus is on the occurrence, field relations and correlation of the volcanic rocks in both the Nsuze (lower) and Mozaan (upper) groups. The compositional range from basalt to rhyolite is remarkable, and this paper focuses on the distribution of different magma types and styles of eruption throughout the belt, including the first record of ultramafic compositions in the Pongola Supergroup, as well as the oldest occurrence of felsic ignimbrites. No single tectonic setting, on modern day analogues, can explain the Pongola volcano-sedimentary belt and the current evidence for the Nsuze Group is consistent with a continental arc, the oldest known to date, migrating into a continental rifted environment to the north, and overlain by the Mozaan Group formed in a cratonic basin following thermal relaxing after the preceding voluminous volcanism.

***Axel Hofmann, Robert Bolhar, Sandra Wind, Martin Whitehouse & Tony Kemp: A new search for ancient detrital zircons in Zimbabwean sediments. Abstract.***

Following the study of Dodson *et al.* (1988), we have initiated a new systematic search for ancient detrital zircons in Zimbabwe using samples from different Archaean sedimentary successions. The aim was to better define the crustal evolution of the Zimbabwe Craton, to provide age constraints of previously undated successions, and to pinpoint areas in Zimbabwe that may have preserved very ancient rocks. We have undertaken zircon dating by ion probe of six samples, four from the c.2.9 to 2.8 Ga old Belingwean/Bulawayan groups and two from the previously undated Sebakwian Group. Zircons were also subjected to O and Hf isotope analysis, results for which are beyond the scope of this presentation.

Two samples were investigated from the Wanderer Formation, Shurugwi Greenstone Belt. The sandy matrix from a conglomerate contains zircons with a  $^{207}\text{Pb}/^{206}\text{Pb}$  age range (<10% discordance) of 3.7 to 3.54 Ga, whereas zircons from a quartzite cobble from the same conglomerate have a more restricted age range of 3.35 to 3.32 Ga. A sample of quartzite from the Buchwa Greenstone Belt yielded zircons with an age of 3.59 to 3.11 Ga. These results are similar to those reported by Dodson *et al.* in 1988 from the same stratigraphic units, although we failed to observe any 3.8 Ga zircons in these rocks.

A sandstone from the Mafic Formation of the Midlands Greenstone Belt, resting unconformably on the 3.56 Ga Sebakwe River Gneiss, the oldest known preserved crust in Zimbabwe, was also investigated. Zircons range in age from 3.58 to 3.3 Ga, with a prominent population at 3.55 Ga reflecting the local provenance.

Furthermore, we dated two samples of fuchsitic quartzite from the Sebakwian Group from the Rhodesdale batholith complex. One sample yielded zircons with an age range of 3.64 to 3.39 Ga, while a second sample gave a much larger spread of ages between 3.82 to 3.13 Ga, containing a very prominent zircon population of 3.8 Ga.

While each analysis provides new geological constraints for each of the sampled stratigraphic units, the following main inferences can be made. (1) There appears to be a general dearth of zircons younger than 3.1 Ga, suggesting the absence of exposed felsic rocks 3.1 to 2.9 Ga old during times of deposition of the Bulawayan Group. (2) Sebakwian Group rocks dated in this study are younger than 3.12 Ga and thus may not necessarily be part of a separate, older stratigraphic unit at the group level. (3) The presence of large amounts of 3.8 Ga-old zircons in one Sebakwian Group quartzite sample presents a promising perspective for the presence of yet to be discovered Eoarchaean crust in Zimbabwe.

***Bagai, Z., Koitsiwe, K. & Kehelpannala, W.K.V.: Is the Moroka Granite on south-western margin of the Zimbabwe Craton in NE Botswana part of the Chilimanzi Granite? Abstract.***

The Moroka Granite, which is located within the Francistown Arc Complex in NE Botswana, extends into Zimbabwe up to the Matobo Hills near Bulawayo. The Matobo Hills are regarded as part of the suite of granites called the Chilimanzi. The emplacement of the Chilimanzi suite occurred over a large area of the Zimbabwe Craton about 2.6 Ga ago. The Chilimanzi intrusion is considered to be monzogranitic in composition. Detailed modal

analysis of the Moroka Granite indicates that the granitoid is quite heterogeneous in composition, which raises some doubts regarding its relation with the Chilimanzi suite granite. Our detailed field, petrographic and geochemical investigations on the Moroka Granite indicate that the granite formed through K-metasomatism of once a tonalite or trondhjemite and possible quartz monzodiorite. The main metasomatic transformation is characterized by formation of new microcline and myrmekite. Petrographic evidence shows that almost all microcline is of replacement origin. Sericitization and muscovitization of feldspars is common in the Moroka Granite. Geochemically, the Moroka Granite displays low Mg#, high-K, I-type and calc-alkaline affinities.

***Peter Nyabeze, Ben Mapani, Chiedza Dondo-Musekiwa, Anna Nguno, Ayanda Shabalala & Oswald Gwavava: Using GIS datasets to delineate groundwater bearing structures at hot springs in Southern Africa: Case Studies from South Africa and Namibia. Abstract.***

Groundwater-bearing structures at hot springs in South Africa and Namibia were investigated. The project was commissioned to generate information on hot spring occurrences at selected sites in Limpopo Province, South Africa and the Omaruru-Okahandja-Rehoboth districts of Namibia. Satellite imagery data was used to map out lineaments, wetlands, drainage patterns, soil moisture content and vegetation cover. Regional lineaments were inferred from the airborne magnetic data. Geological, geophysical survey and hydrogeological information was used to determine the geology of the groundwater aquifers. The integration of the GIS-based datasets resulted in the mapping of land use patterns and delineation of possible thermal groundwater-bearing structures.

***Herwig Marbler: The German Mineral Resources Agency and their activities in South Africa. Abstract.***

The availability of mineral raw materials as well as their sustainable supply is fundamental to German industry. The total value of German commodity imports in 2012 was about 140 billion €, of which over one third was spent on metals. The German Mineral Resources Agency (DERA), at the Federal Institute for Geosciences and Natural Resources (BGR), was founded in 2010 for consulting and advising decision makers of companies and in politics on specific issues, in particular the availability, current market trends and diversification of raw material sources. DERA analyzes and evaluates international raw material markets and the potential for mineral resources with the aim of enhancing market transparency and describing the potentials of raw materials.

International co-operation projects at both state and industry level enable us to establish networks with resource-rich countries. The aim of this co-operation and the establishment of partnerships is to assess raw material potential and investment options for German companies in the raw materials sector. DERA is active in several countries worldwide. Southern Africa is in particular focus in terms of their mineral resources. Currently DERA is working on an Investor's Guide for deposits of critical metals in South Africa, including special terms and conditions for investment in the mining sector. Platinum and other PGEs are of great importance for German Industry, in particular for the car industry. Due to the abundance of these elements in both South Africa and Zimbabwe, the two countries fall within the focus of DERA.

## Field Guide to the Geology of the Victoria Falls Area

*Andy Moore*

Our understanding of the geology of Victoria Falls and surroundings is underpinned by the meticulous studies and exceptional field observational skills of a remarkable group of geologists. Initial geological field investigations were carried out by AJC Molyneux and GW Lumplugh in the early 1900's. HB Maufe (in 1938) made exceptionally detailed descriptions and prescient interpretations of the Kalahari beds exposed in railway cuttings just south of Victoria Falls Station. Seventy-five years later, these are arguably still the best available records of these enigmatic sediments. In 1950 the archaeologist J Desmond Clark and geologist (Sir) Frank Dixey produced a remarkable monograph on the lithic artefacts associated with the gravels and alluvial sediments fringing the Zambezi channel. These pioneering studies, and the observations of Alex du Toit, John Wellington and Geoffrey Bond form the basis for our understanding of the evolution of the Victoria Falls and lower gorges.

### ***Summary Geology of the Victoria Falls area***

*Associated lithic artefacts given in brackets. (From Dixey, 1950)*

10. Aeolian sand and alluvium (LSA)
9. Redistributed Kalahari Sand (KS II) (Tshangulan – late MSA)
8. Younger Gravels I (Lupemban – MSA)
7. Kalahari Sand I (KS-I) (Lupemban – MSA)
6. Ferricrete 1

----- *Erosion*

*Sangoan (early MSA) entombed in ferricrete on Old Gravels*

5. Old Gravels II (OG-II) (Mid- to Late ESA and Sangoan - Early MSA).
4. Old Gravels I (OG-I) (Rolled Oldowan – earliest ESA and Acheulian – late ESA)

----- *Erosion and silicification*

3. Pipe Sandstone

----- *Erosion and silicification*

2. Silicified Limestone or chalcedony

### *Marked Unconformity*

1. Batoka (Karoo) Basalt (~180 Ma)

*LSA = Late Stone Age (<= ~20 - 30 ka*

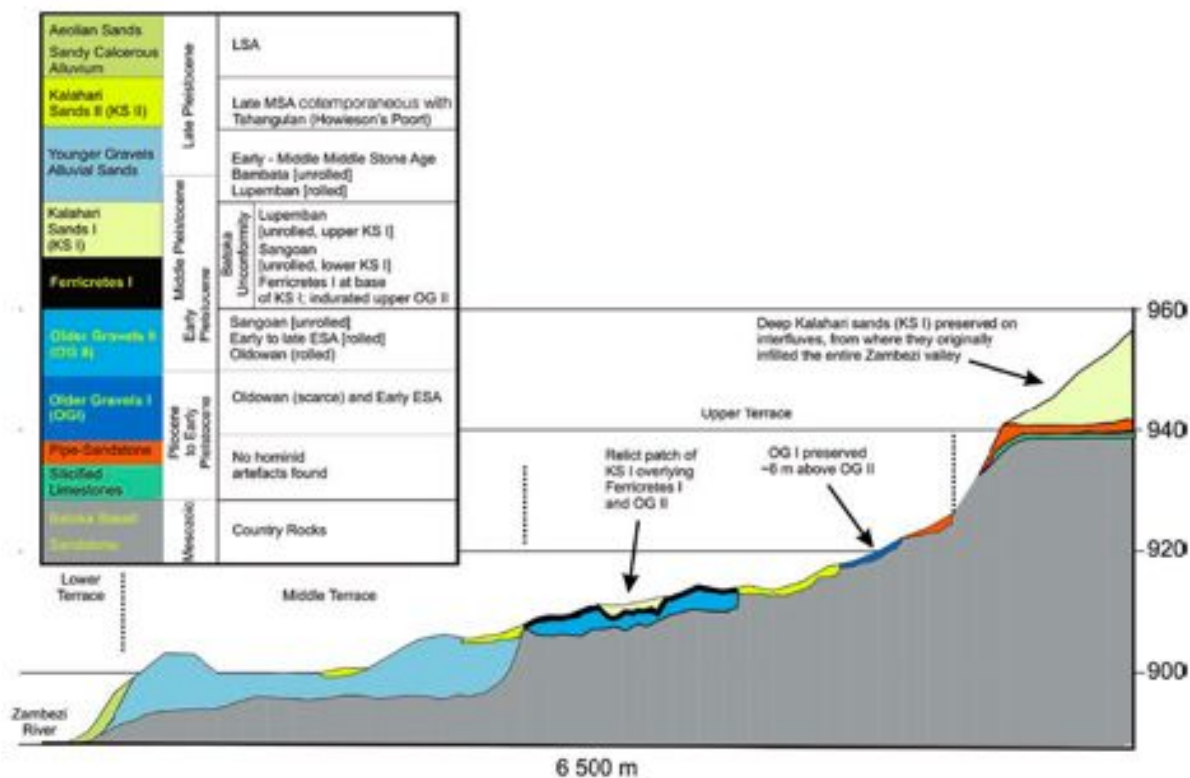
*MSA = Middle Stone Age. (Max Age >= 500 ka)*

*ESA = Early Stone Age.*

*ESA Mode 2 (Acheulian) (~ 1Ma - 500 ka)*

*ESA Mode 1 (Oldowan) (Lower Age possibly ~ up to 2.5 Ma)*

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*Schematic representation of the main geological units associated with the Zambezi River in the Victoria Falls region. [Modified from Wellington (1955) by Moore & Cotterill (2010)]*

## Geochronology – from the Field Excursion Guidebook to the Dete-Kamativi Inlier

*Dr Sharad Master, November 2013*

The only previous geochronological work in the Dete-Kamativi Inlier was done by Priem *et al.* (1972). They obtained Rb-Sr whole-rock ages on granodioritic gneisses and unfoliated intrusive granites of  $2158 \pm 100$  Ma and  $2000 \pm 80$  Ma, respectively (recalculated using a  $^{87}\text{Rb}$  decay constant from Steiger and Jäger, 1977). These poorly constrained ages reflect magmatic episodes on the western side of the Magondi basin pre- or syn-kinematic (granodioritic gneisses) as well as postkinematic (unfoliated granites), with respect to the Magondi Orogeny. The granodioritic gneisses probably represent a calc-alkaline magmatic arc, while the granites represent post-collisional crustal melts following granulite-facies metamorphism and migmatite formation.

The new geochronology of the Dete-Kamativi area reported by Master *et al.* (2013a,b) shows that the area is underlain by Archaean continental crust of the Zimbabwe Craton, which extends much further west under the Magondi Belt than was previously suspected. Superimposed on granitic Archaean migmatites (2.71 Ga) are the schist belts that comprise the Magondi Supergroup supracrustal sequences of the Malaputese, Kamativi, Tshontanda and Inyantue formations. These are in turn intruded by biotite granites and biotite granodiorites dated at between 2.07 and 2.03 Ga – representing an Andean-type magmatic arc on the western edge of the Archaean Zimbabwe Craton.

It appears that the Choma-Kalomo Block of southern Zambia was already in place at 1.2 Ga, since it contains deformed supracrustal rocks with detrital zircons clearly derived from the Archaean Zimbabwe Craton and the Magondi Mobile Belt (Master *et al.*, 2013b). The Choma-Kalomo Block contains granitoid plutons of 1.37-1.345 Ga and 1.20-1.18 Ga age (Hanson *et al.*, 1988; Bulambo *et al.*, 2004, 2008).

## News



### Geology Department, University of Zimbabwe

*Maideyi Meck*

The Department has survived into 2014, having completed 2013 on a high note. The term went successfully without a hitch. Of our 51 students 26 attended the summer symposium in Victoria Falls thanks to the Geological Society, mining industry and individual support.

Dr Nhamo continues as the chairperson of the Department. We lost the chance to employ two further PhD holders who had applied to join us due to the protracted time it took the University system to process their applications. Contracts for three of the teaching staff are coming to an end in March-April this year, and the Department is optimistic that these contracts will be renewed.

Students in the new honours degree programme are now entering their final semester before going on attachment. The Department is appealing to mining companies to absorb our students for a one-year attachment, which is a requirement for the new BSc Honours Degree. We have written requests to several companies and have asked many individuals for help, but up until now we have not even had one tentative offer for the placement of these students.

The Mennell Society is up and running and students are organizing events for themselves. The Mennell Society is indebted to the Geological Society of Zimbabwe for sponsoring their Victoria Falls Summer Symposium expenses.

As a Councillor of the GSAf for the southern African Region (2012-2016) term, Dr Meck will happily forward any news/discovery from Zimbabwe to the GSAf Newsletter as well as news that you want the world to learn about through GSAf.

#### Contact details:

Name	Position	Other	Email	Cell
Dr Nhamo	Chairperson	Chemistry, UZ		
Dr M.L. Meck			<a href="mailto:mabvira@science.uz.ac.zw">mabvira@science.uz.ac.zw</a>	0772-906612
Prof. I. Manuel			<a href="mailto:isrvn@yahoo.com">isrvn@yahoo.com</a>	0712-206767
Mr D. Maguze	Chief Technician		<a href="mailto:dmaguze@science.uz.ac.zw">dmaguze@science.uz.ac.zw</a>	0712-639792
Mrs G. Chipari	Secretary, DG		<a href="mailto:gchipari@science.uz.ac.zw">gchipari@science.uz.ac.zw</a>	0772-950681
Ms N. Musundire	Secretary, MRC		<a href="mailto:nmusundire@science.uz.ac.zw">nmusundire@science.uz.ac.zw</a>	0712-436649
Mr H. Gumbo	Chairperson, GSZ		<a href="mailto:hgumbo@mweb.co.zw">hgumbo@mweb.co.zw</a>	0772-366912
Mr. K. Musiwa		Mining, UZ	<a href="mailto:kudzic@eng.uz.ac.zw">kudzic@eng.uz.ac.zw</a>	0772-948915
DG Direct line/Fax:	263-4-303557			

**Note:** DG – Department of Geology; MRC – Mineral Resources Centre; GSZ – Geological Society of Zimbabwe





**ZIMBABWE**

## *Geological Survey Department*

*Forbes Mugumbate*

### **Staffing and other matters**

- In an effort to guarantee the future availability of geologists to the Department, four students from the University of Zimbabwe's Geology Department have been engaged as cadets. The Ministry will pay for their fees and allowances.
- The Civil Service Commission has approved the re-appointment into the Department of three former employees of the Ministry who had earlier left for greener pastures. It appears the pastures were not that green after all. The three are expected to resume duty once Treasury concurs.
- **Lloyd Magombedze**, geologist, left for India to attend a course relating to specialised application and development in the use of GIS and remote sensing.
- **Ernest Mugandani**, Acting Chief Economic Geologist, and **Frank Muzanhamo**, Acting Regional Geologist, attended a course on "exploration and environment conservation on mine sites" held in Cape Town that was organised and sponsored by the Japan Oil, Gas and Minerals National Corporation (JOGMEC).
- **Ms Sibonguhle Mpindiwa**, Principal Geologist, continued with her secondment to the Mining Affairs Board Secretariat at the Ministry.

### **Projects**

#### **African Development Bank (ADB) programme to capacitate the Department**

The ADB has extended a grant to capacitate the Geological Survey. The Department's capacity to generate geological information had almost collapsed due to aging and obsolete equipment, and shortages of skilled manpower. The grant amounting to \$1.2 million will be used to purchase equipment, computers, tools and software, and to train geologists and technicians in digital cartography.

As part of this project, the Department was involved in the following activities:

- Compilation of specifications for various equipment, software and tools to assist in the tendering process by the ADB.
- Preparation of Terms of Reference (ToR) for on-job training in digital cartography.
- Preparation of ToR for the editing of bulletins in preparation for printing and publishing.
- Preparation of ToR for the printing and publishing of the bulletins.

- Preparation of ToR for computerization of geological information. For this important item, the money made available by the ADB will not be sufficient.

### **Regional Geochemical Mapping Project**

The second part of the geochemical mapping of Zimbabwe project through a technical co-operative agreement with the China Geological Survey is progressing. This is the second phase of the programme, which commenced in 2008 with the successful survey of 12,000ha of the SE part of Zimbabwe and subsequent compilation of an invaluable data base for 39 elements.

In the current programme, two areas in the north and central parts of the country bounded by co-ordinates 17° 00' to 18° 00'S and 30° 30' to 32° 00'E and 19° 00' to 20° 00'S and 29° 00' to 30° 30'E are being surveyed.

Progress of the project is being seriously affected by some organizations and newly resettled farmers who are resisting the collection of stream sediment samples on their farms. As a result, the budget for the project in terms of time and money will be extended beyond anticipated levels, and this is making the Chinese counterparts uncomfortable.

The farmer resistance comes despite concerted efforts to explain the project through local authorities and leadership, the Ministry of Agriculture, and the ZRP. The farmers are failing to appreciate the importance of this national project and are suspicious of the intentions of the Project. The Department has had to second two geoscientists to the project to carry out liaison and public relations duties.

A total of 12,332 stream sediment samples are planned for collection in the Harare area where the surveying is currently taking place. So far 6692 samples have been collected.

## **MINING INDUSTRY NEWS**

*Sibongubuhle Mpindiwa, Mitchell Maisera and Forbes Mugumbate*

### **Introduction**

The beginning of the year has seen an overwhelming focus on the mining industry after it was pronounced by His Excellency the President to be the expected driver of a turn around of the national economy last year. The main issue under the spotlight is the value addition and beneficiation of mineral products. However, basic exploration, which is essential for development of the mining industry remains subdued. There are still no current Exclusive Prospecting Orders (EPOs) but progress in the processing of applications is being made, which brings hope for the initiation of some new exploration projects in the near future. Exploration for energy minerals (coal, coal bed methane gas and uranium) is in progress in over ten Special Grants, although progress on the ground is currently being stalled by the rainy season. Exploration for CBM in one SG has reached the stage of trial gas production.

### **Profiles of the Minister and Deputy Minister**

New Ministry heads; the Minister, Deputy Minister and the Permanent Secretary, were introduced to the Ministry during the month of September 2013. Brief profiles of the Minister and his deputy are as follows:

**Minister of Mines and Mining Development, Honorable Walter K. Chidakwa (M.P.)**

The Honorable Minister holds a Masters Degree in International Relations from the University of Zimbabwe and a Masters in Political Economy from Sofia University in Bulgaria. He has extensive knowledge of the investment promotion arena, with close to two decades of experience.

He joined the public service in 1991 and served the Ministry of Finance until 1993 when he left to join the Zimbabwe Investment Centre, forerunner to the Zimbabwe Investment Authority, as its Deputy Director. The Centre was responsible for advising on investment policy, planning and implementation of investment promotion strategies, as well as identifying sectors of the economy with the potential for attracting both local and foreign investors.

In 1996 he left the Centre to join the Export Processing Zone Authority as Chief Executive Officer where his brief was to administer, control, and regulate all export processing zones as well as to advise Government on all matters relating to investment in export processing zones.

In 2008 he was elected Member of Parliament for Zvimba South and served in the Government of National Unity as Deputy Minister for State Enterprises and Parastatals until the formation of the current government in 2013.

**Deputy Minister, Honorable Fred Moyo (M.P.)**

Honorable Moyo as a career-mining professional is one of Zimbabwe's pioneer black mining engineers, having graduated with a BSc. Hons degree in Mining Engineering from Leeds University in the United Kingdom in the early 1980's.

Fred Moyo started his career with the then Anglo American's Hwange Colliery Company Limited (HCCL) as a learner Engineer and rose through the ranks to the position of Mine Manager in 1988. In 2001, he left the HCCL to join Shabanie-Mashava Mines as the General Manager where he rose to the position of Operations Director within the company, which centered on asbestos and gold mining and processing operations.

In 2004 he joined Mwana Africa as Managing Director and served for three and a half years before re-joining Hwange Colliery Company as Managing Director in mid-2007. He left the Hwange Colliery Company in 2012.

Hon. Moyo is a past President of the Chamber of Mines.

**Exploration**

With no EPOs having been granted in the past decade, Zimbabwe has been hugely disadvantaged in failing to realize its potential for new mineral discoveries, in the generation of geological information, exploration dollars, and employment opportunities. Hundreds of geoscientists are in the diaspora as a result of lack of these exploration activities. Basic exploration has mainly been in respect of coal in the mid-Zambezi basin with China Africa Sunlight Energy reporting completion of the first phase of its exploration in the Gwayi area. The exploration results have already been audited and the next phase is to design a coal mine.

The fact that government is keen to see resumption of basic mineral exploration was shown by the resuscitation of the Mining Promotion Corporation (MPC) as a stand-alone exploration company. How the company is going to operate, and raise the necessary risk exploration capital remains to be seen. A board to manage the company is being assembled.

There have been some brown-field exploration activities around known mineral deposits. ACR reports its discovery of a world-class gold deposit at its Concession Hill prospect south of Chegutu. The company is now mobilizing funds to establish what could be the largest gold mine in this country.

Afrisino has conducted extensive diamond drilling at the Kanyemba uranium deposit firstly to confirm and validate previous exploration information and secondly to enhance the resources. These processes have since been accomplished, but the results are confidential.

Other brown-field exploration projects are aimed at re-valuating the Dodge barites deposit and the R.H.A. tungsten deposit.

### **Value Addition and Beneficiation**

The issue of value addition and beneficiation of mineral products is topical, with diamonds and platinum receiving focus.

The Chamber of Mines hosted a Beneficiation and Value Addition conference aimed at improving the understanding of mineral value addition and beneficiation concepts as perceived by Government and the Private Sector. The conference was held at Victoria Falls on 27-28<sup>th</sup> February 2014. Government insists that the establishment of a platinum refinery is not about whether or not it should be done, but about when. Platinum producers are not against the establishment of the refinery, but have cautioned about the cost and time needed. They have also advised government to consider beneficiation in the broader context of the whole mineral value chain; from exploration to manufacturing.

Government has imposed a 15% export levy on all platinum matte or concentrates with effect from the 1<sup>st</sup> January 2014 to discourage exportation of unrefined platinum.

With regard to diamonds, the Government has taken a policy position that it will establish a vibrant diamond industry that spans the whole value chain. The centerpiece of that industry will be the establishment of a Diamond Centre comprising clusters of industrial/economic units including cleaning, sorting, cutting and polishing, selling, banking etc. A site for building the centre has already been identified.

The need to clean diamonds, especially those from Marange that have a unique brown crust resulting from supergene processes in the sedimentary basin, was recently validated when cleaned diamonds fetched far higher prices per carat than raw stones at auctions held in Antwerp.

As for gold, Fidelity Printers and Refinery resumed operations in mid-December 2013 after a major facelift to its Harare plant. The company ceased operations in 2007 and the resumption of gold refining will pave way for Zimbabwe's re-admission to the London Bullion Marketing Association.

### **The Mines and Minerals Act [Chapter 21:05]**

We reported in the previous issue of the Geological Society Newsletter that the Ministry of Mines had resolved to repeal the whole Act and come up with a new version after years of futile attempts to amend the old Act. This decision was followed up by stakeholder consultation workshops throughout the country to gather information for crafting a Minerals Development Policy by the Ministry that would form the basis for the new Act. It has, however, turned out that the Ministry has again changed its approach to this legislative debate, preferring now to pursue the 'amendment route'. Minister Chidakwa announced that the amendments are expected to be complete by the end of March

this year. Crafting of the Minerals Development Policy will be concurrent with the drafting of amendments to the Act.

### **Ban on alluvial gold mining**

Government imposed a blanket ban on all alluvial gold mining activities along river beds in October 2013 after noticing rampant degradation especially of the Mazowe River and some of its tributaries, and the effect this was having on communities downstream. The ban has caused an outcry from several companies, some of them foreign owned, who are reported to have invested heavily in machinery. They do not understand why one government arm issues a license while a different one cancels the same license. It should be noted that mining may only start after a company is issued with an EIA certificate by the Environmental Management Authority. The question that arises then is why it took so long for authorities to realize that the companies were not following guidelines to their EIAs? This tends to show an unco-ordinated approach to the supervision of the mining industry by government organizations.

The biggest victim of this ban is the DTZ-OZGEO Limited operation. This company was previously commended for its environmentally friendly mining methods along Mutare River in Penhalonga. The company was producing between 20-30kg of gold per month and is said to be losing about US\$1 million in potential revenue. The company also employed over 500 workers.

### **Parastatal Boards**

The new Minister of Mines made his presence felt early on by 'reading the riot act' to companies in which government is involved. Diamond mines were instructed to invest in research and exploration so that they will not be found wanting when the easily mined alluvial diamond deposits run out. The Minister showed a lack of confidence in the performances of the MMCZ, ZMDC and Marange Resources boards by dissolving them. Corrupt activities were suspected at Marange Resources leading to the suspension of the ZMDC General Manager and senior managers at Marange.

Meanwhile new Boards of Management are being put in place for the three companies, and for the Mining Promotion Corporation. The new boards are expected to have at least 50% women in line with the requirements of the new Constitution of Zimbabwe.

## **News about Zim Geoscientists**

A W.A. newspaper cutting features **Phil and Viv Snowden** (Spec. Hons Geology, 1971), who owned and ran their successful mining consultancy under their own name, as having retired to their family-run Singlefile wine farm near Denmark, Western Australia. The report shows that the winery has been recognized by Western Australia wine editor Ray Jordan's wine guide as being the most improved. Cheers!

We hope your contributions may improve with the Facebook initiative. Talk to you on the Geological Society of Zimbabwe Group, an open link. Join us there for better communication.

**Please provide us with news about yourself or other geologists. We need to keep in touch with all of you out there. E-mail: [hgumbo@mweb.co.zw](mailto:hgumbo@mweb.co.zw) or [makari@zol.co.zw](mailto:makari@zol.co.zw)**

## 3D EARTH EXPLORATION (Pty) LIMITED

*Geophysical Contractors & Mineral Exploration Consultants*

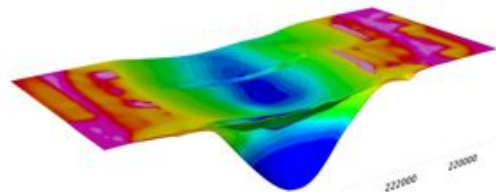
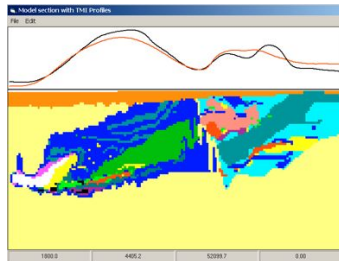
3D Earth Exploration is a Botswana-registered company operating in the Africa theatre and provides the following services:

- Ground geophysics surveys
- Physical rock properties measurements ...&... 3D Data processing and interpretation

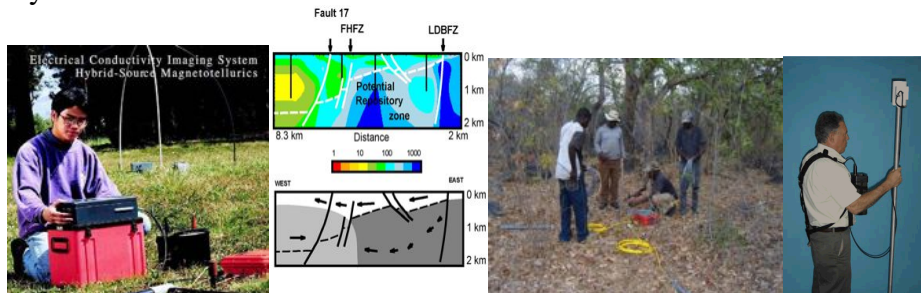


GDD MPP-EM2S+ Magnetic susceptibility and conductivity probe and axim .....Onsite data processing

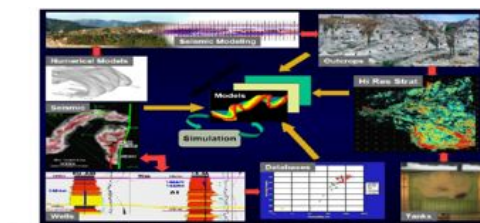
- 3D magnetic and gravity data modelling



- CSAMT, ground magnetic surveys, Induced Polarisation, gravity (CG3/5, La Coste), rock properties, EM, GPR, radiometrics and a wide range of other ground geophysics surveys.



- 3D Data integration and visualisation



**CONTACT:**

*For more information please contact Mr Hillary Gumbo +263-772-566912, email: [hgumbo@mweb.co.zw](mailto:hgumbo@mweb.co.zw)*

## Conferences

**Zimbabwe Energy Conference II.** Fossil Fuel Foundation. The Wanderer's Club, Illovo, Johannesburg. 11<sup>th</sup> April 2014. [events@rca.co.za](mailto:events@rca.co.za)

### **TANZANIA TO HOST THE THIRD YOUNG EARTH SCIENTISTS CONGRESS AUGUST 2014: Geology (CAG-25)**

The Congress will be organised in co-operation with government and other non-governmental organizations under the auspices of the Geological Society of Africa (GSAf) and other development partners. The congress is expected to bring together more than 300 early-career earth scientists, both practitioners and students, from different countries around the world. Young and prospective earth scientists are encouraged to join the network and register for free on the web site [www.networkyes.org](http://www.networkyes.org).

The congress will be held in Dar es Salaam from 18<sup>th</sup> -21<sup>st</sup>, August 2014. This event is scheduled as part of an on-going effort to enhance youth's participation in earth resources for sustainable development and economic integration. This will be the first time for such auspicious congress to be hosted in Africa said the National Representative of Young Earth Scientist Network in Tanzania Stephen Nyagonde.

**The Roy Miller Symposium - "A conference to recognise a lifetime of service to the geological sciences in Namibia"**, Windhoek, Namibia, 18th-20th August 2014. [roy\\_miller\\_symposium@geolsocnamibia.org](mailto:roy_miller_symposium@geolsocnamibia.org)

**IMA 2014 – Experiencing Mineralogy at its best. 21<sup>st</sup> General Meeting of the International Mineralogical Association.** 1 – 5 September, 2014, Sandton Convention Centre, Gauteng, South Africa. [www.ima2014.co.za](http://www.ima2014.co.za)

**Kimberley Diamond Symposium and Trade Show.** Thursday 11 – Saturday 13 September 2014. Mittah Seperepere Convention Centre, Kimberley, South Africa. [www.gssa.org.za](http://www.gssa.org.za)

**The 6<sup>th</sup> International Platinum Conference.** SAIMM, 20-22<sup>nd</sup> October, 2014. Sun City, South Africa. <http://www.saimm.co.za> [cameron@saimm.co.za](mailto:cameron@saimm.co.za)

**The 23<sup>rd</sup> International Geological Congress,** Cape Town, South Africa – 2016.



## **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 Scholarship 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.

# 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 year-end.

# 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.

See the Society of Economic Geologists website for further details and the next call for applications.

<b>GEOLOGICAL SOCIETY OF ZIMBABWE: CONTACT DETAILS OF MEMBERS OF THE EXECUTIVE COMMITTEE FOR 2012</b>		
NAME	PORTFOLIO	EMAIL
Gumbo, Hillary	Chairman	hgumbo@mweb.co.zw
du Toit, Andrew	Vice Chairman, Vic Falls Symposium	andrew.dutoit@zimplats.com
Musiwa, Kudzai	Hon. Secretary	kudzimusi@gmail.com
Mwatahwa, Collins	Hon. Treasurer	cmwatahwa@angloplat.co.zw
Hanssen, Gayle	Field Trips	dms@zol.co.zw
Chatora, Daniel	Membership Secretary	dchatora@gmail.com
Manuel, Isidro	Talks	isvrm@yahoo.com
Mupindiwa, Sibongubuhle	Newsletter	spoleldo@yahoo.co.uk
Mugumbate, Forbes	Geological Survey Representative	fmugumbate@gmail.com
Mangezi, Sofelani	Committee Member	sofelani@yahoo.com
Revitt, Anthony	Matabeleland Representative	anthonyrevitt@yahoo.co.uk



## **Institutional Membership, 2013**

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Metallon  
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Murowa Diamonds (Pvt) Limited  
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