Geological Society of Zimbabwe

Newsletter

October 2009

Oblique Google image of debris flow scars on Pork Pie Hill behind Chimanimani Village. Colin Forbes of the Council for Geoscience in Pretoria brings awareness to the threat of geo-hazards in Zimbabwe

Contents

The Committee, on behalf of the Geological Society of Zimbabwe, would like to offer a sincere vote of thanks to Marion de Beer of *Cadline* for preparing and printing our Phaup and Bond Award certificates for 2008 -- free of charge. This is, as previously, a wonderful gesture of Marion's time and skills and we can only encourage all you geologists and mining houses to steer your Autocad mapping work in her direction and to take advantage of at least 30 years of hard-won cartographic experience. *Cadline* also offers monochrome printing and scanning services in formats up to A0. Their telephone contact is 04-2917261/60 Tel/Fax is 04-301855 and the address is 94B Pendennis Road, Mount Pleasant in Harare. marion.debeer@cadline.co.zw

Editorial

Our cover image for the October Newsletter resulted from an enquiry by Colin Forbes of the Engineering Geoscience Unit in the Council for Geoscience in Pretoria relating to information on the incidence of lansliding in Zimbabwe. This came about due to our recent liaison with the Geological Society of Africa through their Secretary for the Southern Region, Associate Professor Lopo Vasconcelos at the Eduado Mondlane University in Maputo. Lopo brought to Colin's attention the seriously damaging 1998 debris flow events on Mount Tumbine adjacent to Milange town in the Zambezia Province of Mozambique when 100 deaths were recorded. We had to inform Colin that to our knowledge there is no national data base on landslides in Zimbabwe and that there are no publications dealing with this geo-hazard. The editor's response to Colin giving him his knowledge of possible areas that may be prone to mass wasting and debris flow in Zimbabwe prompted his 'Google Earth' search. A disturbing and dramatic mining-related scar occurs on the hill slope above King Mine in Mashava and there are the dump slips on either flank of Buchwa Mountain, especially that above the Mashipisa Valley to the south of the iron ore mine. The editor remembers the nightly rumblings of boulder slips on the charnockite hills around Renco Mine during Cyclone Eline and he witnessed the scars from the air. He was able to relate the story of a 'falling mountain' in the Chimanimani District during the March 1951 earth tremors experienced there. Then Colin came up with our frontispiece, and to think that the Hon. Editor used to live on the slopes of that mountain during the 1960's. He was not thinking landslide then, but as a schoolboy on holiday he used to scramble up the bramble-infested 'gwasha' on the Pork Pie slope looking for the elusive Umkondo Quartzite outcrop and a magic waterfall, but all that was to be found was boulder scree. No wonder there was a perennial spring feeding our house and garden. The import of this pre-amble is to emphasize to the Geological Survey that information on landslide events must be recorded in their technical files and that such a survey could be a project for one of their new geologists to follow up on, perhaps by way of oral history hearings in vulnerable areas such as the Honde Valley, Nyanga North, Ngorima, Chikore, Mutema and Shurugwi. Or dare I suggest an Honours Degree Project – we wish!

Our Chairman has emphasized the positive projection for investment in our mining industry and the efforts that are being made to make this possible. I just hope that rogue politics does not destroy the very confidence in our country that is required for this investment to take place with any meaning at all. There are people, including members of your Committee, working on the timely redraft of the Mines and Minerals Bill, especially the practical means of ground tenure. We encourage this effort and look forward to a mature piece of legislation that will serve this country well and go a long way to addressing the confidence issues voiced by delegates to the 'Indaba' and from other quarters.

Thanks are again extended to our contributors, without whose support this Newsletter would be meaningless. We include an obituary to a well-known geologist who had made a significant contribution to the Zimbabwe mining industry, Chick Böhmke. In remembering a past Chairman of our Society, it is important that our Membership be aware of the important efforts of those who have gone before them to make mining what it is and can be in Zimbabwe.

Tim Broderick

Chairman's Chat

Forbes Mugumbate

This is the second issue of the Geological Society Newsletter under the current chairmanship. We wish to thank the editor and contributors for making production of the Newsletter possible.

The current committee continues to keep the business of the Society going, despite busy schedules triggered by improvements in the economy. Since my last report, the Society organised a well-attended talk on diamonds given by Martin Spence. A poorly attended trip was undertaken to Murowa diamond mine. We thank the three people who travelled to Murowa for an exciting glimpse into the goings on at a diamond mine, reported in this issue. These talks and field visits play a role as media for exchange of ideas on various subjects of interest to geoscientists, and above all for socialising. You are therefore encouraged to participate in these activities. Tim Broderick gave a talk on his 'dinosaur' activities in the Zambezi Valley to a well-attended meeting of the Pre-History Society on 16th September. Some delegates who had been at the Indaba Mining Conference the same day also attended Tim's talk.

Anthony Revitt is now the Society's representative in the southern part of the country and he is based in Bulawayo. We recognise the importance of this region and the distance separating Members from our activities. We wish Anthony the best in his efforts to organise these in that part of the country and if he has not found you, you can contact him on e-mail at anthonyrevitt@yahoo.co.uk

Of interest to the nation is the fact that one hundred days have lapsed since the formation of the Government of National Unity. Although there are disagreements here and there among the three political parties in the government, which might be expected in any marriage, there appears to be unity of purpose to promote development of the country. The Inclusive Government is implementing the Short Term Emergency Recovery Programme (STERP), a ten-month economic stabilization strategy that lays a foundation for comprehensive economic recovery. In reviewing the performance in the first 100 days, the government acknowledged poor performance in several sectors, but blamed this on shortages of financial resources and a lack of specificity for many targets. Government is now putting in place medium term strategies that are meant to see the turn around of the economy. We can only hope that these measures will indeed stabilize the economy to bring confidence to investors.

To take advantage of the new political climate and the general firming of metal prices, the government undertook a massive campaign to lure investors into the country's mining industry. Investment in mining was topical at the International Investment Conference held at the Celebration Centre. This was followed by the 5th Africa Mining Conference held in Johannesburg, which was dedicated to mining in Zimbabwe. The Minister of Mines and Mining Development from Zimbabwe was the guest speaker whilst several captains of the mining Industry in Zimbabwe made presentations at the conference. The first Zimbabwe Mining Indaba was held in Harare from 16th to 17th September 2009 to promote the mineral potential of Zimbabwe and answer various questions on the investment climate.

The Mining Indaba, officially opened and closed by the President and Prime Minister respectively, was most interesting. Over 700 delegates from all over the world attended. This

goes to show how many people are anxiously waiting to hear about Zimbabwe's mining investment climate. Highlights from the conference include the following:

- The delegates were assured of stability in the Inclusive Government. Efforts to stabilize the economy through STERP were outlined as well as efforts to bring lasting peace in the country through the National Healing Process.
- The delegates were guaranteed that the Government of Zimbabwe upholds the sanctity of the Rule of Law and of property rights to ensure the safety of their investment. The land reform programme is a separate issue that should not be mixed up with investment.
- The need to speed up amendments to the Mines and Minerals Act was highlighted. The Ministry of Mines and Mining Development is making frantic efforts to have the Bill considered within the current Parliament. The delegates were assured that the amendment was not a threat to industry, but they wanted the issue of indigenisation to be unambiguous.
- The issue of accessing ground for exploration was discussed in view of the fact that EPO applications made as far back as 2003 have not been granted. Investors wanted to know what is being done to decongest the ground that is currently covered by EPO applications. They were promised that something is being done to open up ground for serious players.

We wish the Ministry of Mines and Mining Development the best in its efforts to improve the investment climate in Zimbabwe.

The year 2010 is not only important because of the World Cup to be held in South Africa, but also because the Geological Survey Department will be celebrating 100 years of its existence, having been established in 1910. This is an important event. We are informed that the celebrations will be held sometime in September 2010. There is therefore not much time left to prepare. We appreciate that like any other government department, the Geological Survey lacks resources to organise such an important event. We, however, encourage them to leave no rock unturned to make this event a success. Any ideas about relating to the centenary event are welcome. The Geological Society has endeavoured to assist through organising an international conference with field trips to areas of geological interest. A committee on this has been put in place.

The date of the Summer Symposium, 27th November 2009, is fast approaching. We take this opportunity to remind you to diarise the date. Let us, like in previous years, make this symposium a memorable one.

Lastly we wish to thank all the Members of the Geological Society of Zimbabwe for their continued support. Membership now stands at over 80 individuals. Please remind colleagues to renew their membership. Our Institutional Membership is listed at the end of this Newsletter and we thank those companies for their support.

Articles and Reports

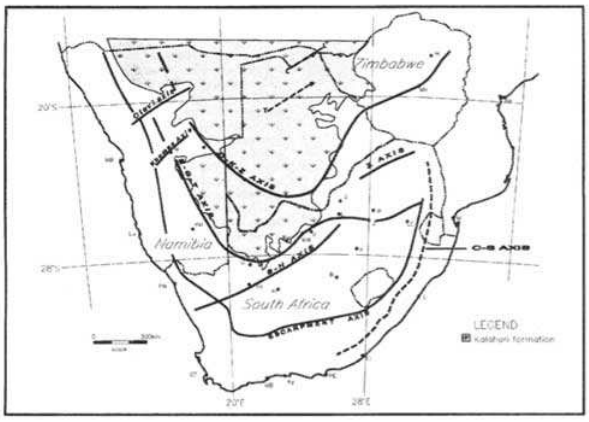
A reappraisal of epeirogenic flexure axes in southern Africa

A.E. Moore

Abstract

Major drainage divides in southern Africa are interpreted to reflect lines of epeirogenic flexuring of the sub-continent associated with the formation of co-related basins. The Great Escarpment, which separates coastal and inland drainage systems, marks the locus of the Escarpment axis. It was initiated by Early Cretaceous rift flank uplift associated with the break-up of Gondwana. Geophysical studies suggest that subsequent erosion, coupled with sedimentation on the continental shelf, would have resulted in progressive inland migration of this flexure. The divide between the Orange-Vaal River system and the Limpopo and Malopo-Nossib-Auob drainage basins is designated the Etosha-Griqualand-Transvaal (EGT) axis. Upper Cretaceous flexuring along this axis disrupted old drainage lines, and initiated deposition of the Kalahari formation. The end-Cretaceous Ovamboland-Kalahari-Zimbabwe (OKZ) axis forms the watershed between the Zambezi and Limpopo rivers in Zimbabwe, and separates the latter river system from fossil endoreic drainage lines in the Kalahari, which originally emptied into the Makgadigadi Pans system. In the south of Botswana, this axis is defined by the Kalahari Schwelle, which separates the fossil Kalahari drainages from the Malopo-Nossib river system. Processes responsible for initiating the EGT and OKZ flexures are poorly understood. However, the inferred ages of both these two axes and the Escarpment axis correspond with episodes of alkaline volcanism in southern Africa. This argues for a link between continental flexuring and volcanic activity. Major Pliocene uplift occurring along a line intermediate between the Great Escarpment and the present coastline in the east of the country (Ciskei-Swaziland axis). More subdued Plio-Pliocene flexuring along a southwest-northeast axis (designated the Bushmanland – Harts axis) traversing the interior of South Africa was responsible for the formation of major pans ('floors') in Bushmanland and the Orange Free State. There are a number of subordinate lines of uplift (the Khomas, Otavi, and Zoutpansberg axes), which are parallel to the Bushmanland – Harts axis. They are presumably related to the same stress field, and probably of similar age. These latter axes are all subparallel to active faults in northern Botswana, which are interpreted to reflect southwestwards migration of the east African rift system, following lines of structural weakness. Sequential uplift along the axes that have been identified provides a framework for interpreting the evolution of drainages and erosion surfaces on the sub-continent.

S. Afr. J. Geol., 1999, **102**, pp. 363-376.



Location of epeirogenic flexure axes in relation to the main Kalahari Basin

Drainage evolution in south-central Africa since the break-up of Gondwana

A.E. Moore and P.A. Larkin

Abstract

The drainage system in south-Central Africa has undergone major reorganisations since the disruption of Gondwana. Isopachs of the Kalahari sequence and a variety of geomorphological features can be used to pinpoint abandoned drainage lines. Continental fluvial sediments of Mesozoic-Cenezoic age reflect river systems, which existed prior to and immediately following continental break-up. The east coast sedimentary sequence documents changes in the location of major supplies of terrigenous sediments, and provides a framework for establishing the timing of changes in drainage configuration. The evidence indicates that during the upper Jurassic to Cretaceous, the Okavango, Cuando and Zambezi-Luangwa rivers formed the headwaters of the proto-Limpopo River. The lower Zambizi-Shiri formed a separate graben-bound river system with a discharge point into the Indian Ocean in the vicinity of the mouth of the present-day Zambezi. A third major drainage entered the Indian in the vicinity of the modern Save mouth. End Cretaceous uplift along the Okavango-Kalahari-Zimbabwe axis severed the links between the Limpopo, Okavango, Cuando and Zambezi-Luangwa. This resulted in a senile endoreic drainage system, which supplied sediment to the Kalahari basin. However, the uplift rejuvenated the lower Zambezi, initiating headward erosion and progressive capture of the Luangwa, upper Zambezi and Kafue. Predatory headward extension of the Zambezi is still active, and this river will eventually capture the Okavango. The model developed for drainage reorganisation provides a framework for interpreting kimberlitic heavy mineral dispersion patterns. It also forms the basis for explaining fish and plant dispersion patterns, and understanding recent water level fluctuations in the Magadigadi pans system in Botswana.

S. Afr. J. Geol., 2001, **104**, pp. 47-68

The role of mantle plumes in the development of continental-scale drainage patterns: The southern African example revisited

Andy Moore and Tom Blenkinsop

Mantle plumes that precede continental break-up have been postulated to exert a major influence on continental drainage patterns. In this model, a radial drainage develops away from the centre of the plumes, while failed arms of the associated rift system provide conduits for rivers from the continental interior towards the newly formed ocean. This paper summarises drainage evolution in southern Africa from the Permo-Carboniferous to the lower Cretaceous in order to test this model. A major reorganisation of the river system occurred at the time of eruption of the Karoo volcanics, or during subsequent fragmentation of Gondwana. The Karoo and Parana plumes imposed a first-order imprint on the drainage pattern. The superimposition of the Parana plume pattern on the earlier Karoo plume drainage is responsible for the dominant eastward drainage system from the Early Cretaceous to the present-day. The post-Gondwana river network has been modified by at least three other major factors: structural controls, exhumed ancient land surfaces, and post-Gondwana epeirogenic flexing of the sub-continent and resulting river capture. Understanding the factors responsible for initiation and evolution of continental-scale drainage patterns has important economic implications – for example, the identification of primary sources of diamond placers.

S. Afr. J. Geol., 2002, **105**, pp. 353 – 360.

Nyanga Archaeology: Re-examination of field evidence and interpretations

David Love [1,2] and Kevin Walsh [3]

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[3] *Oxford University Museum of Natural History, Parks Road, Oxford, OX1 3PW, UK*

The correlation of terraced areas with lithologies is not supportive of mining because: (a) terracing on dolerite can be explained by the agricultural interpretation; (b) extensive terracing on adamellites is not explained; and (c) the linking of granitic rocks and Umkondo sediments, as well as dolerite, with gold mineralisation means the argument offered is that all Nyanga lithologies are auriferous and all are terraced. It remains undemonstrated and conceptually implausible that the elaborate walling system of Nyanga terraces could have been built as part of bench mining. The similarity with modern and ancient agricultural terracing is clear and is not diminished by the agricultural "trials" carried out by Kritzinger, which involved neither the clearing of trees from the site nor fencing and protection of the crops from herbivores.

Field examination of the Gungustva site revealed that the gold is associated with pyrite and rare galena in quartz veins hosted in mafic rocks (tremolite-actinolite schist) and quartzo-feldspathic gneiss. These rocks contain bodies of talc-serpentinite and are intruded by simple pegmatites. This suite likely represents Archaean greenstone fragments in basement rocks, the classic setting for gold mineralization in the Zimbabwe Craton. This setting is very different to Proterozoic dolerites and Umkondo metasediments. Where these rocks outcrop, such as in the extensively terraced hills at Bende Gap, there is no evidence of gold mineralization, such as streambed panning or small-scale mining.

Kritzinger confuses three different models for ore genesis: (i) hydrothermal vein gold, (ii) lateritic deposits and (iii) placer / alluvial gold - and offers pieces of evidence in support of each. It is essential to be clear about what model is proposed and then test what evidence supports it. For example, gold and heavy mineral finds in rivers indicate alluvial gold but says nothing about the primary origins of that gold.

The assay data presented to date are problematic. Incomplete information is supplied, particularly in regard to the selection and representivity of samples. The response that she has not yet published full information is no rebuttal, as she must defend or withdraw what she has published. It is unclear whether or not the data presented in this newsletter and in *Cookeia* relate to samples from one hill or throughout the Nyanga area. Most suspicious are the repeat analyses: the samples of 12 g/t and 1.78 g/t gave results of 0.72 g/t and 0.09 g/t respectively. This is not a reproduceable result given the difference between the initial and repeat analyses. Such a result renders the assay data questionable. Even if these are repeat samples of the same site, as the dates imply, rather than repeat analyses of the same samples (not the same thing!) then the difference suggests that the sampling is not representative and unsuitable for scientific interpretation.

She further misreports geological information from the Muda River, in support of her argument. The CAMEC report states, "Bedrock lithotypes comprise mainly weathered, northward-inclined felsic and quartzo-feldspathic schists, with minor variable quartzo-feldspathic and quartzite veins, amphibolites and north trending dolerite dykes. Gold has been recovered from all the felsic rock types" – i.e. not dolerite.

The basic point is that the data reported by Kritzinger do not support the interpretations. This is partly due to poor understanding of the ore-formation process and of very different geological environments – and partly due to sampling and analytical work, which is poorly reported and appears not to be representative or reproduceable.

Report on the Geological Society Field Trip to Murowa Diamonds

18th September, 2009

Daniel Chatora

Only three members turned up at the rendezvous station by 09:00 hours in Zvishavane on the morning of 18th September. With fears of a "failed trip", the three who included Hillary Gumbo, Tariro Ndhlovu and Daniel Chatora, proceeded to Murowa Diamonds, a distance of approximately 56 km from Zvishavane in a south-easterly direction past Shabanie Asbestos Mine.

On arrival at Murowa shortly after 10:00 hours the members were taken through an induction process, which included:

- Health, Safety, Environment & Communication - by Lewis Kusikwenu (HSEC Manager)
- Security - by Mr Mkahlera (Chief Security Officer), and
- Production and related issues – by Roland Kuchocha (Mine Manager) and Lovemore Chimuka (Mining Superintendent). It is worth noting here that Lovemore Chimuka is the geologist who discovered the Murowa kimberlite pipes and now he is in charge of diamond exploitation.

After the induction Lovemore took the members around to see the open pit mining activities as well as the processing plant.

Background:

A Joint Venture between Rio Tinto Zimbabwe (22%) and Rio Tinto International (78%) Murowa Diamond Mine is part of a Product Group that includes Argyle Diamond Mine (Western Australia) and Diavik Diamond Mine (Canada). Exploration for diamonds in the Murowa area started in the 1990's resulting in the discovery of 3 diamondiferous kimberlite pipes followed by commencement of the current mining operations in 2004. A total of US$37 million has been spent here over the past 10 years. This includes US$5 million spent to relocate 142 families comprising 900 people and US$12 million spent on current plant infrastructure.

Geology:

The structure of the Murowa area is dominated by 2 conjugate fracture systems that generally trend north-north-east (NNE) and north-west (NW) with the NNE fractures displacing the NW fractures in a right-stepping sense. The thinking at Murowa is that the kimberlite pipes were channelled through weak zones created by this fracture system. With age dates of 500Ma $\pm$ 10, and arranged in a northerly direction, the kimberlite pipes are intrusive into granitic rocks of the Chivi Suite. The pipes have been named K1 to K3 based on chronology of their discovery.

Table 1. Characteristics of the Kimberlite Pipes:

Kimberlite Pipe	Shape	Arial extent (ha)	Average grade (carats per tonne)
K1	Guitar shaped	4	0.75
K2	Guitar shaped	3	
K3	Guitar shaped	1	

The resource has been confirmed to depths of plus 300 metres.

Production:

Murowa Diamonds employ between 300 and 400 full-time and 3-monthly contract employees, the latter being mostly from the surrounding communities. Production has been climbing steadily from 2004 to a peak of 380,000 tonnes of ore processed achieved in 2008 to recover 262,000 carats.

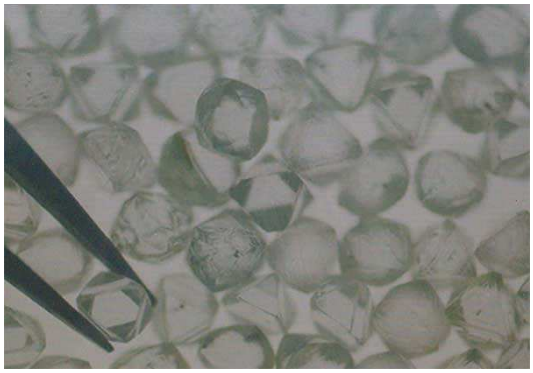
The current mining method is open pit down to a depth of 30 metres. However, the mine has what they call an ultimate pit design depth of 250 metres with a feed rate to the plant of 2 million tonnes per annum.

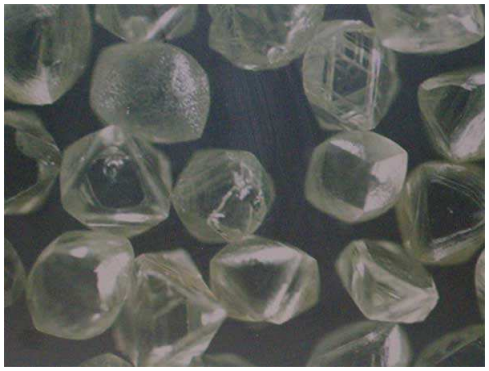
The security system is so strict that even at the pit no-one is allowed to pick up anything. The visiting geologists during this part of the tour developed what we termed the "itchy fingers syndrome" caused by the prohibition of examining specimens.

Employing a hands-off product philosophy with zero tolerance to security breaches, the processing plant is a "Dense Medium Separator".

Marketing:

The Minerals Marketing Corporation of Zimbabwe (MMCZ) controls the export process of packaging, listing and dispatching to Antwerp from where the diamonds are further cleaned sorted valued and sold. Ellah Muchemwa, a former Chairperson of our Society, has led Murowa's sales and valuation team for many years. However, the Global market collapse of 2008 also affected diamond sales with the effect that excess rough stock has accumulated due to Global liquidity constraints.





Future Plans:

Murowa Diamonds completed a detailed feasibility study in 2007 which would see a capital injection of ~US$300 million to enable a ramp-up in production to 2 million tonnes of ore per annum over an 11 year period with creation of an additional 300 jobs.

Conclusion:

The fact that we were a small group of 3 visitors came as an advantage as the hosts could afford to pay attention to all our enquiries and needs. All of us were agreed that had the crowd been bigger we would not have been granted the opportunity to see the processing plant from rock to the actual stone ready for the market. It was indeed a very informative and enjoyable trip and thanks are extended to Hillary Gumbo for organizing and to our hosts, the staff at Murowa Diamonds, for their kind hospitality. In addition to meals and refreshments we were given overnight accommodation on Friday night. We left Murowa on the morning of the 19th September. Special thanks go to Lovemore Chimuka and Roland Kuchocha for the preparations and successful hosting of this Geological Society of Zimbabwe field trip.

The Geological Society Representative's Report on the Zimbabwe School of Mines

Introduction

I was nominated to represent the Geological Society on the Zimbabwe School of Mines Board of Management as a replacement for Luckson Manda who was no longer available for that duty in January 2008. When I joined the BOM, the term of the sitting members was due to expire in December 2008. In January 2009 I was re-nominated and, by approval from the Minister of Mines and Mining Development, was appointed to another 3-year term. Although I have moved to Harare recently, I have committed myself to continuing with the duty until my term expires.

Meetings

The ZSM Board meets ordinarily four times a year. The meetings are arranged so as to alternate venues between Bulawayo (ZSM) and Harare (Chamber of Mines Boardroom). By design, the October meeting is always held at the School, a day before the School's graduation day.
Matters of interest that have come up during my period of participation include:

1. Shortages of teaching staff
2. Examination leakages
3. Infrastructure development.

It may interest members that the issue of shortages of teaching staff have been particularly acute up to the beginning of 2009 as the effects of hyperinflation took their toll. At that time six out of eleven lecturing positions and three out of five technicians' positions were vacant. Staff retention has remained a major challenge as the School competes with industry for the same labour pool. The net effect is that consistency of teaching standards has not been guaranteed and as a result, the products of the institution from the affected periods may not be of a quality that industry will be satisfied with.
Examination leakages were reported in 2008 in some disciplines but the School administration has been resolute in dealing with the culprits caught. As with the effect of staff shortages, one is left wondering if the graduate of the School has legitimately passed their examinations or has achieved success through fraudulent means. We all hope that as the economy stabilizes, staff will remain more buoyant and the above problems will fade away.

Commission of Inquiry into the ZSM

In June 2009, the Minister of Mines appointed a Commission of Inquiry into affairs at the ZSM, chaired by Mr Jack Murehwa, and I was appointed one of the commissioners. The commission was mandated to look into issues of high staff turnover as well as allegations of maladministration. Although the Minister had set a deadline of 26th July for submission of the report, the commission eventually submitted its report in the first week of September. I am unable to comment further on the findings of the commission as the Minister is still studying the report. However, a pre-emptive article in one of the weekly papers quoted Ministry officials as saying "heads to roll at ZSM".

Allan B. Mashingaidze (29/09/09)

New Geological Map of Mozambique

The Council for Geoscience (CGS) in Pretoria has recently published a new 1:1 000 000-scale geological map of Mozambique on behalf of the Direccao Nacional Geologia (DNG). The project was financed by the Nordic Development Fund and executed by a consortium consisting of the CGS, the DNG and a private consulting firm in Mozambique, Gondwana Empreendimentos e Consultorias Lda (GD). The compilation of the Million map, represents a coming together of new 1:25 000-scale reconnaissance maps and mapping reviews across the whole of Mozambique and in some respects was a new venture for the CGS as it was the first time that such a large geological map was compiled in an entirely digital manner from a GIS database. This method required close co-operation between the compilers Frik Hartzer (CGS), Vladimiro Manhica (DNG) and Joao Marques (GD) and the Spatial Data Management Unit of the CGS.

The published map is for sale at all offices of the CGS in South Africa, as well as the office of the DNG in Maputo, Mozambique.

Geoclips, CGS, Vol. 28 (June 2009), pp. 1-2.

USGS National Earthquake Information Centre

Earthquake data from the lower Save Valley area of Mozambique accumulated since our last update at the end of 2006 is listed. A total of 97 NEIC records were tabled in 2006 following the 22nd February magnitude-7 earthquake in the same area and including the magnitude-4.5 shock recorded from between Dorowa and Shawa on 19th May 2006.

Cat	Year	Mo	Da	Orig Time	Lat	Long	Depth	Mag
PDE	2007	04	20	093654.88	-21.31	33.48	10	3.8
PDE	2007	07	10	200955.48	-21.58	33.41	10	4.5
PDE	2007	09	02	124435.20	-21.03	33.12	10	
PDE	2007	09	02	134754.18	-20.85	33.54	10	
PDE	2007	09	14	173905.43	-21.05	33.22	10	4.6
PDE	2007	11	29	025910.44	-21.17	33.26	10	5.2
PDE	2008	02	03	111212.69	-21.32	33.09	10	5.1
PDE	2008	03	29	000940.25	-21.08	33.16	10	4.7
PDE	2008	03	31	032434.38	-21.01	33.01	10	4.4
PDE	2008	04	04	095232.68	-21.28	33.30	10	
PDE	2008	04	29	064352.80	-21.01	33.17	10	4.6
PDE	2008	11	25	150538.16	-21.92	33.40	10	4.9
PDE-W	2009	04	02	042424.98	-21.28	33.23	10	4.4

News

Geology Department, University of Zimbabwe

Maideyi Meck

The situation at the Geology Department has not changed significantly. However, the Department has recruited two assistant lecturers and we are now five teaching staff. The Department managed to hold its third year field trip and would like to convey its profound gratitude to the following people and organizations for the support rendered to make the field trip a reality. The Geological Society, Todal Mining, The Vice Chancellor, Mr Chinoda, Mr Mwatahwa, Mr Bean, Mr Sibanda, Mrs Sibanda, Mr Dube, Mr Muchekeni and Mr Mahaso. The excursion took place between the 9th and 18th June, but without their support this field trip would not have taken place.

The Department has only one stream left so will be recruiting another in 2010. Due to the long closure at the university there will be no undergraduates graduating this year. The Department, however, has one Masters student who has completed and passed the dissertation and should be graduating in October.

We have received a number of proposals for sponsorship of post-graduate students and expect to re-start the MSc programme in Exploration Geology in the near future. The Department is also looking at the feasibility of introducing a second masters degree programme. Prof. Manuel is currently working on the idea and anyone with input is welcome to contribute towards this initiative.

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Note: DG – Department of Geology; MRC – Mineral Resources Centre; GLF – Geology Lecture Fund

Geological Survey Department

M. Maisera and F.B. Mupaya

The professional staffing situation at the Geological Survey has improved greatly. Mr S. Lunga, a former field geologist with the Geological Survey, rejoined the Department after spending more than 12 years in the mining industry. He will be very helpful in co-ordinating the compilation of the 1: 1 000 000-scale geological map of the country. Already, he has updated himself with work done by Drs Ait Kaci and Bouamar. He is making following up with them in updating the geological explanation. The publication of this map is a key product for marking the centenary celebrations of the Geological Survey next year. The 5 new geologists recruited in May, though working hard in learning mining geology, are being frustrated by the lack of resources to place them in the field.

Still the country remains congested with Exclusive Prospecting Order (EPO) and Special Grant applications. However, the Department has started an exercise aimed at decongesting these EPOs by inviting companies to confirm their interest in applications and, if no longer interested, to withdraw. So far about 15 EPO requests have been withdrawn. Mining experts suggest that a excessive exploration time has been lost and that the granting of EPOs must be expedited now. This will instil confidence in the mining industry and investors and allow progress to take place. After the Mining Indaba, where the Ministry promised investors that the chaos surrounding the status of mining titles will be resolved soon, the Department saw several investors enquiring about mining opportunities. In pursuance of resolving the mining title issues, the Ministry's Mining Survey Section is auditing registered mining claims and is setting up a training programme for Approved Prospectors for them to be able to peg claims correctly.

The Director attended the Zimbabwe School of Mines graduation ceremony on 2nd October. A total of 32 students graduated as technicians in metallurgy, 2 in metallurgical assay, 14 in geology, 11 in mining and 6 in survey. Mr Mupaya, a board member of the PAN African Minerals Development Company (PAMDC), formerly ZIZA Ltd, attended their 3rd board meeting to map the way forward for the company since appointment of a CEO, Mr Davidson Mulela from Zambia, on 1st October. The PAMDC will manage those mining concessions jointly owned by South Africa, Zambia and Zimbabwe, which are located in the Northern Cape and NW Cape provinces of South Africa. Also, the board directors have mooted the idea that in future, the company may consider exploring in other countries besides South Africa.

With few resources for training, the Department is grateful to the Government of India for offering 1-month training courses to geologists of the Geological Survey in mineral exploration, remote sensing, digital data image processing and geographic information systems.

Mining Industry News

M. Maisera and F. B. Mupaya

Events over the past three months show that all are geared to see the mining industry back on its feet to help revive the National economy. Developments in the sector, gleaned from workshops and mineral production figures, are summarized below.

1. Mine Entra - July 2009

Mine Entra, which is an international exhibition covering mining, engineering and transport and their associated industries, was well attended by over 3000 people this year. With all hoping for a booming mining industry, exhibitors thronged the venue with modern mining consumables and accessories. At this venue, it was reiterated that the Government is making efforts to privatise its interests in the energy, mining and rail sectors and to relieve its foreign exchange rules.

2. The Banking Sector and Mining

The Commercial Bank of Zimbabwe (CBZ) helped the Zimbabwe Miner's Federation to buy 100kg of gold in less than two weeks during July. It offered the Federation a loan of US$500,000. In August, the Zimbabwe Miner's and Millers Association acquired US$25 million from a local bank to buy gold across the country. Other banks have also been encouraged to offer mining loans to small-scale miners. Mining experts, however, urge the banks to consult properly and intervene at all levels in the mining cycle, as gold buying is unlikely to be sustainable.

3. Diamond Mining in Zimbabwe

The Government has indicated that it will demilitarise the Chiadzwa diamond fields once a new investor to partner the Zimbabwe Mining Development Corporation (ZMDC) has been identified. This is in compliance with recommendations made by the Kimberley Process Certification Scheme (KPCS) in July. The KPCS is assisting Zimbabwe to comply with its standards. It is reported that the apparent problem of non-compliance has seen several investors being reluctant to partner ZMDC in the project.

Government, however, is committed to see that the Chiadzwa project bears fruit for the overall good of Zimbabwe. In August he Minister of Mines and Mining Development commented that the ZMDC has limited capacity to mine diamonds from the Chiadzwa fields. Therefore, they are intensifying efforts to increase production by engaging investors. The ZMDC has been mining diamonds at Chiadzwa since 2007 and has been realising between 50,000 and 60,000 carats per week, but this output is not up to expectation.

The wrangle over the Chiadzwa diamond fields between Government and African Consolidated Resources (ACR) Plc is probably a stumbling block for investment. In September, the High Court ruled in favour of the latter. It is possible that both parties may end up working together for the benefit of the country.

Depressed diamond production resulted in Murowa contributing an operating loss of US$1.4 million to the group by August.

4. Changes in the Gold Price

The gold price rose to trade above US$950 since the Federal Reserve said it would keep interest rates near zero from August, whilst a decline in the US Dollar provided an additional boost.

Slight fluctuations occurred during September and the price rose to US$1,000 per ounce in October. Such high prices should help boost Zimbabwe's gold industry.

5. Production from some Zimbabwe Mines

PLATINUM

Mimosa Mine

Mimosa Platinum achieved delivery of 526,682 tonnes of ore during the fourth quarter ended June 2009 compared to the 539,004 tonnes produced during the previous quarter.

Zimplats

Platinum output has started rising at Zimplat's Ngezi Mine after the July commissioning of their new concentrator under the mine's multimillion dollar phase-one expansion programme. This increase in production should enhance revenue income. Rising metal profits boosted Zimplats' operating profits for the second quarter by 25%. These profits rose to US$5m from US$1.1m the previous quarter. The total ore volume mined was 17% higher than the previous quarter as the increase in underground production continued. With these increases, Zimbabwe is expected to raise its pgm production enormously, and there are good prospects for further growth.

GOLD

Turk Mine

Turk Mine recorded a 32.9% increase in its gold production to 31.6 kg in July up from 29.15 kg the previous month. Since it's re-opening in February this year the mine has increased its production capacity by 8.4%.

Renco Mine

RioZim registered a growth in gold output during the first half of the year. According to its production update to shareholders issued in August, gold output has increased by 31% to 10,401 ounces compared to 7,931 ounces produced last year.

Blanket Mine

Gold production at Blanket Mine reached 77 kg in the second quarter ended June 30 further illustrating the positive response to the current monetary and political dispensation. The mine recommenced operations in April this year after being granted licences and approvals to export gold.

COAL

Tuli Coal Mine (Private) Limited has produced 15,000 tonnes of coal at its Beitbridge mine up to October this year. The mine is producing coking coal used principally for metallurgical purposes and in steel production.

In early October, Hwange Colliery Company Limited announced that it has repaired its key coal mining equipment, a problem that had stopped operations seven months ago.

6. The Re-opening of some Mines

Globe and Phoenix resuscitated its operations in early August under new management.

Mwana Africa has indicated that the re-opening of the Freda Rebecca gold mine before the end of September is on course. The milling and leaching circuits were commissioned early September. The mine's de-watering programme was effectively completed in July 2009.

Obituary

FREDRICK CHARLES (CHICK) BÖHMKE -- 1935/2007

It is with great sadness that we report the passing on of Chick Böhmke – one of the great characters of the southern African minerals industry

Chick will be remembered, by all who knew him, as an innovative and fearless leader who always led from the front with impeccable values and enormous valour.

His family were of German extraction and he was born in Cape Town on 25th August 1935. He went to Selborne College in East London before proceeding to Rhodes University in 1955, from where he graduated having studied geology, chemistry, mineralogy and petrology.

Rhodes University in the fifties was a small University of less than 1500 students. The massive enrolment of ex-servicemen who were demobbed after the war had by then receded. The only reminder of those times was the occasional AT-6 Harvard doing a low-level barrel roll over the College Tower. Despite frantic efforts by the police and the university authorities, the culprits were never traced. A large number of young men would appear in the local tea-room (Kaif) in the following days wearing fur-lined flying boots in an effort to impress the beautiful rag queen, Hilla Schroeder. Unfortunately she had already seen the potential of Wilbur Smith who at that time drove around in a 1929 Model T Ford.

Chick was an enthusiastic rugby player and enjoyed several years as captain of the University's third team. While this might not sound a great achievement, the first and second teams were playing in the City leagues of Port Elizabeth and East London and had various players who were later to enjoy national status including Neil Jardine and Bernie Myers, who both played for this country. Cricketers included Derek Varnels, Owen Emslie and Colin Bland.

Chick was the Chairman of the Geological Society at Rhodes for some years. In his Honours year there were only two others, David Bowen and Derek Kyle. Derek remained in South Africa and eventually became President of the Geological Society of South Africa. David recalls that Chick was always outstanding in the quality of his diagrams and illustrations that were full of accurate detail. This meticulous standard he maintained throughout his working life whether with borehole sections, field mapping or mine planning.

This background set him up for his first post-graduate job with the Frobisher organization as a field geologist.

In 1961 he joined Mineral Search of Africa, part of the Rio Tinto Group, as a geologist with a basic salary of £100, free accommodation and food up to the value of £15 per month. Chick remained with Rio Tinto for the following eventful 30 years during which time the Group prospered to the extent that it became one of the top three of the world's mining and resource companies.

In 1962 Chick married Sue (Budgie) Williams – a daughter of the Williams family from the Bulawayo district of Zimbabwe, who were well known for their outstanding mining, farming and sporting prowess and successes.

Chick and Sue had four children – Karen, Karl, Hayley and Andre, all of whom grew up within the mining environment in Zimbabwe.

An outstanding success in the early days of Chick's mining career was his contribution to the discovery and development of the Sandawana emerald operations. Having been instrumental in the discovery Chick was subsequently appointed manager of the mine, which flourished under his leadership. Initially the operation was set up to mine and sell emerald as rough stones to overseas buyers. However Chick and his colleagues, under the guidance of his well-known mentor, Craig Gibson, were not satisfied with this arrangement and went on to develop world class sorting, cutting and polishing facilities in Zimbabwe. The quality of the work was internationally recognised and Sandawana became the only fully integrated emerald producer in the world, setting the standard for others to follow.

Subsequently Chick progressed within the Rio Tinto Zimbabwe organization and held various posts culminating in his appointment in 1982 as Group Consulting Geologist and an Executive Director on the Board of Rio Tinto Zimbabwe Limited (now RioZim Limited). In the same year he became Chairman of the Geological Society of Zimbabwe, having served the Committee for several years and being part of the organizing committee for the Gold ’82 international conference.

Under Chick's geological guidance a number of new operations were developed by RioZim including the Empress Nickel Mine and in particular, the Renco gold mine where Chick's unique understanding and unravelling of the complex geology proved to be the key to the success of the operation which has now been in continuous and successful operation for more than 27 years.

In the eighties, Chick was one of a team from the Rio Tinto Group in southern Africa who was seconded to Rio Tinto Brazil to evaluate the potential of their prospects. This team was instrumental in setting up the world class Morro d’Orro gold mine, which was soon producing 5t of gold per annum from an ore grade of only 0,6 g/tonne.

In 1991 Chick decided to establish his own geological consulting business, which led to his involvement in various countries worldwide. He adopted “Mineral Search of Africa” as the name of his company in memory of his first employment in the Rio Tinto Group. In particular, Chick spent many years in Tanzania and Burundi where under the harshest of conditions he carried out projects for Rio Tinto, BHP and Barrick in the search for nickel deposits. During this period he was intimately involved in the assessment of the Kapalagula/Kabanga/Musangati nickel trend and deposits in western Tanzania and Burundi.

As mentioned, Chick was a fearless character and always showed great valour. This was clearly evidenced through his exploits during the troubled times in Rhodesia/Zimbabwe and endorsed by his determination to meet his contractual and moral commitments in Burundi throughout the sad

and very dangerous period in that country's history when homicide was rampant. When asked what he did in Burundi when trouble loomed, he inevitably responded in his usual understated, humble and humorous way: "I live and have my office in a heavy duty transportation container so that, when necessary, I just close the door".

When embarking on his gold exploration work in Tanzania, he bought a second World War Mercedes 2.5 truck and trailer/caravan from German army-surplus stocks for about $250. He was often heard to say, "I am the last surviving member of Rommel's Afrika Corps", highlighting his pride in his German origins and his unique sense of adventure and humour.

The geological and mining communities in Zimbabwe and at RioZim in particular have benefited immensely from the contributions that he made and from the consistently high standards of professionalism that he always followed and insisted upon. A number of the past and present Captains of this Mining Industry were guided and influenced by him and they all owe him a debt of gratitude.

Contributions from Don Bailey, David Bowen and Paul Markham

News about Zim Geoscientists

"**Peter Buchholz** joined the Federal Institute for Geosciences and Natural Resources (BGR) in Hannover, Germany, in 2005. He has been head of section in the Mineral Economics advisory group at BGR since 2009. In 2007 he worked for one year at the Mineral Resources and Geoscience Division of the German Ministry of Economics and Technology. His research now focuses on mineral exploration and global mineral economics."

Leo Passaportis, reporting from Windhoek, Namibia was introduced to a **Dr Ben Goscombe** from Adelaide, Australia (ben.goscombe@adelaide.edu.au www.terraneanalysis.com.au). Ben worked in the Chewore Inliers for a few years in the 90s on an Australian co-operative project. He was amazed and pleased to hear that the GSZ is operating and wishes to join again all these years later. His area of specialty is in the Pan-African metamorphic belts on the continent. As such he had been collecting specimens from the Damara Belt in Namibia. He is very keen to return to Zimbabwe to do further research and asks to be kept informed.

Leo also saw **Dr Ben Mapani** (bmapani@unam.na benmapani@yahoo.co.uk) at UNAM and **Cuthbert Banda** at the Namibia Ministry of Mines, both of whom were formerly of the Department of Geology at UZ. They send their regards. Ben currently heads the Namibian Geological Society and Cuthbert works as a technician doing XRF, AA and the like.

Vernon and Sue Stocklmayer report from Perth that they are co-authoring a Bulletin on the 'Gemstones and Ornamental Rocks of Western Australia' with a geologist from the Geological Survey and are aiming to complete this by December 2010. Vernon says that the exploration emphasis has firmly swung back to iron ore as he fields requests from the owners of small claims who propound the 'world-class' nature of their low-grade, high-phosphorus deposits.

David Love has returned to Zimbabwe as the Manager of WaterNet. WaterNet is a regional network and alliance of university departments and centres involved in capacity building on water resources management. **Faith Love** and Kathy will be returning to Zimbabwe in 2010.
E-mail: dlove@waternetonline.org Cell: 0913-420150

Please provide us with news about yourself or other geologists. We need to keep in touch with all of you out there. E-mail fmugumbate@gmail.com or makari@zol.co.zw

Research Funding Opportunities

GSZ Research and Development Fund

The objective of the Research and Development Fund is to give financial assistance for the development of earth science research and training in Zimbabwe. This financial assistance shall be in the form of annual Grants. Grants shall be made for activities over the course of up to one year. Those wishing to continue beyond one year must make subsequent and separate applications. The purpose of the Fund is to support:-

- Research projects on earth science topics of interest (Note that grants from the Fund will not be made to support projects which result in results that are not available to all members of the geological community in Zimbabwe);
- Scholarships for postgraduate study in earth sciences;
- Field trips and short courses for the training of Zimbabweans in earth sciences; and
- Travel to conferences to present earth science results.

In recommending the award of Grants, the following shall be considered:-

- The objective and purpose of the Fund;
- Potential benefits of the proposed activity to the geological and mining communities in Zimbabwe, in terms of development and/or the generation of new knowledge;
- The availability of matching funds, source or provided by the applicants; and
- The aim of awarding more than one Grant in a given year.

Grants made from the Fund shall be on condition that:-

- Results from the supported activity will be presented to the Society via a talk and an item or items in the Newsletter;
- Submission to the Fund Subcommittee of an annual report by 31 December of the year in which funding is granted; and
- Submission of a financial report to the Fund Subcommittee, with copies of receipts, by 31 December of the year in which funding is granted

All applicants for the award of Grants from the Fund shall be Members in good standing for the current membership year. Normally, the principal applicant should have been a member in good standing for at least twelve months.

Applicants for Grants should submit to the Research and Development Fund Subcommittee an application containing details of the applicants, summary of the activity, justification of the activity, proposed methodology, timeframe, budget for application and details of matching funds, if any. If you would like to apply for support, please contact the Research and Development Fund Subcommittee Secretary, Applications for this year should be made to the Chairman, Mr Forbes Mugumbate.

SEG Timothy Nutt Memorial Fund

Any enquiries relating to this fund can be directed through the Geological Society Committee to Judith Kinnaird, Professor of Economic Geology at the University of the Witwatersrand, who is the regional SEG representative.

Society Activities

Zimbabwe Geological Society

Summer Symposium 2009

Friday 27th November 2009

Call for Papers

We are looking for 15-minute presentations on a broad range of subjects of interest to geologists

We are planning an interesting set of presentations on:-

- Advances in Mineral Exploration Techniques
- GPS Application
- Database management and Quality Control
- Skills Situation and Challenges
- Environmental Management
- Topics of general interest to Geologists

If you would like to present, please let us know (andrew.dutoit@zimplats.co.zw)

Please put this date in your diary now

Conferences

The Groundwater Division - Western Cape, which is a division of The Geological Society of South Africa is holding their Biennial Groundwater Conference, Groundwater - Pushing the Limits from 16th-18th November 2009 at The Lord Charles Hotel, Somerset West.
Please view their website for all information needed: www.groundwaterconference.com
Or direct any queries to email kruger@kruger-associates.com

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Institutional Membership, 2009-10

African Consolidated Resources PLC

Platinum Exploration Ventures (Pvt) Limited

Casmyn Mining (Pvt) Ltd

Duration Gold Zimbabwe (pvt) Ltd

Samrec Vermiculite Zimbabwe (Pvt) Limited

Zimari Holdings

Zimbabwe Mining Investments

Zimbabwe Platinum Mines Limited