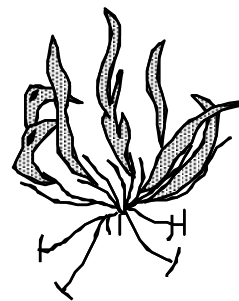
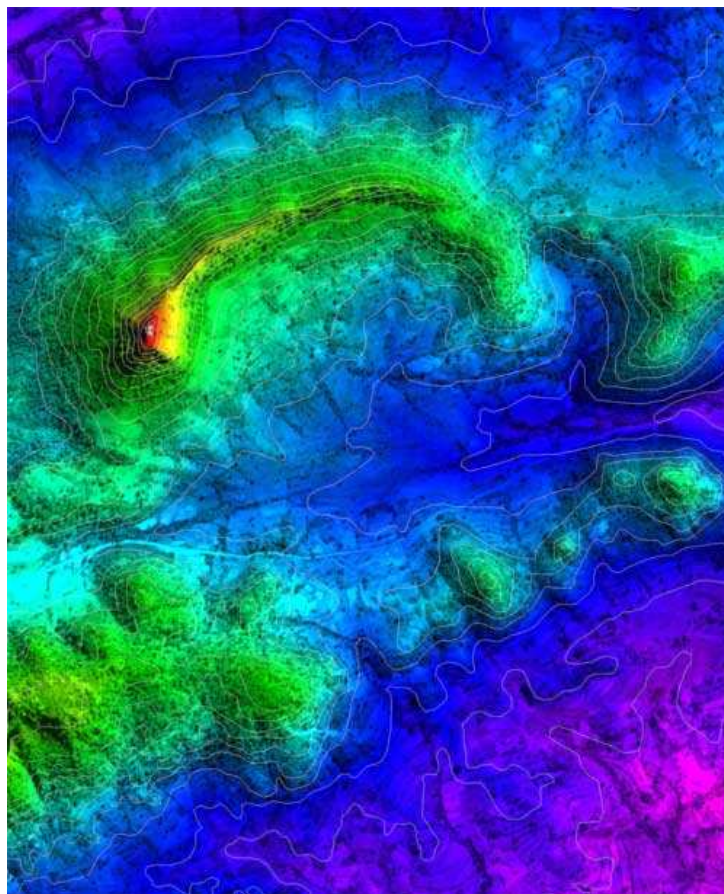

Geological Society of Zimbabwe



Newsletter

December 2008



Fumure 'Impact Structure', Ndanga C.L., Zaka. Adapted by A. du Toit from Google Earth

THE GEOLOGICAL SOCIETY OF ZIMBABWE, P.O. BOX CY 1719, CAUSEWAY, HARARE

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Editorial

The year 2008 must have been the most distracting, disrupting and confusing ever, yet we have survived in our own ways, numbed no doubt by the unrelenting passage of events beyond our control. Wherever you may be, it is time to share those compliments for the season and to look forward to 2009 as a time of hope when we all play our part in the reconstruction of our Nation. It is events such as the Summer Symposium, the Macgregor Memorial Lecture and field trip and the AGM that draw us as a profession together and it is times like these that help us to focus as to the way forward.

Grateful thanks are extended to all our contributors without whose efforts this communication would not be. I am particularly interested in attracting news snippets from members and non-members alike as I feel this is a way of retaining our identity and of keeping in touch with friends and colleagues who find themselves in the far reaches of this planet. A short account of your experiences can enrich us at home, where circumstances may have made us somewhat parochial. We look forward to that communication.

Tim Broderick



Chairman's Chat

Collins Mwatahwa

This is our second newsletter of the year. We now have more than 40% of our members working in various parts of the world, mainly Australasia, West Africa, North America, southern, central and West Africa. As enshrined in our constitution, we wish our members to continue to provide professional services to industry wherever they may be. Those providing geological service in the diaspora should continue to raise the Zimbabwe flag high. Those members who have remained behind in these difficult times should also be given a pat on the back for their part in holding the fort and providing service to our short-skilled mining industry.

We have had three successful field trips organised by the Society - to Mountain View Mine, the DTZ-OZGEO mine in Mutare and to the assumed Fumure meteorite impact site. The Society is indebted to the Management of these operations for making the trips possible. The trip to the Mutare alluvial workings was well attended by 13 geologists. Dr Sharad Master, from Wits University joined the Fumure trip with his family, adding more flare and fanfare to this trip, in which the local community braves also participated.

The Summer Symposium was held on 28 November 2008 at the University of Zimbabwe, Geology Department and was attended by more than 40 of our members, including some of those working in the diaspora. It was especially good to see them home.

The year is ending with a bleak outlook for the mining industry. The industry is facing serious viability challenges against a backdrop of recession in metal prices and a poor operating fiscal regime. The gold industry has been the hardest hit, with many mines facing closure or being put on care and maintenance. The base metals sector has not been spared either with BNC, our major nickel producer, announcing that they are on care and maintenance from late November 2008.

We note that Mining is the backbone of economic development in Zimbabwe and hope that this sector gets favourable fiscal dispensations that will promote growth and reverse the severe declining production trends in gold and base metals production in these difficult times. Once mines are closed, it will be extremely difficult to resuscitate them. We note positively that, significant strides have been made in the area of PGM production and that further growth is expected from expansions at Zimplats, Mimosa and new mines coming on stream through Anglo Platinum and ZMDC with its Joint Partners. This group of mines will also be affected if the metal prices continue to decline. The fact that EPOs have not been granted for some years now has had a negative impact on base metal and precious metal exploration activities. We hope that the government of the day will address the issuance of the Prospecting Licences and also conclude the amendments to the Mines and Minerals Act timeously.

We have now lost a lot of mining related professionals and academics to the rest of the world. We may attract some back, but in the short-term we need to seriously address the problems associated with mining-related disciplines at the University of Zimbabwe and at other institutions that train mining professionals. As noted mining represents the backbone of Zimbabwe's turnaround strategy requiring that serious investment in training is made to meet current and future human resources needs and to reverse the effects of the brain drain. We note and thank the Mining Industry that we have engaged through the Chamber of Mines for providing financial and material support to avoid near collapse of some of the critical departments at our institutions of higher learning.

It is sad to announce that Dr Keith Viewing emigrated on retirement to Italy in October 2008. Keith has been an active member of the Society since its inception in 1962 and we will miss his contributions in person. We should all wish him the best in his retirement plans. Keith, before he left donated a silver jug to the Society, and we have found it befitting to present this jug each year as a token of appreciation for the best presentation at the Summer Symposium.

It is intended that the Macgregor Memorial Lecture be held in Harare and in Bulawayo in mid-February 2009, and plans are underway to host a field trip on the Great Dyke during the same period.

I hope to see most of you at one of the Macgregor Memorial lectures and also at the AGM to be held towards the end of February 2009.

Lastly, I wish you all a very happy Christmas and New Year.

Articles and Reports

Nyanga Archaeology—Mining Perspective Gaining Ground

Ann Kritzinger

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Geology is key to an understanding of the archaeology of Nyanga. This continues to be the finding in the research conducted by Ann Kritzinger under a permit issued by the Research Council of Zimbabwe in May 2005. Evidence of the existence of gold is unmistakable in assay values from quartz veins in terraces, in 'pit-structure' soils, and in slag. The research is self-funded with limited resources for field

surveys and lab analysis but to date 38 samples taken in the Sanyatwe area average 5.4 g/t Au, with only three zero results.

A professional programme of geophysical and geochemical surveying and analysis on a wider scale is the next step. In particular it is necessary to prove placer exploitation in TERRACES and 'MIHOMBA' in different geological formations, to establish the role of numerous QUARTZ HEAPS associated with 'pit structures' and terraces, to identify the origin of 'EROSION GULLIES' no longer active, and to trace the extent of 'TAILINGS DAM' features. The hydraulic function of FURROWS and hilltop RUN-OFF is a related study.

A. TERRACES

In October 2006 primary-source vein quartz mined in terraces built in dolerite terrain at an elevation of 1560m near Sanyatwe was found to carry values of 14.2-19.3 g/t Au. Dolerite is the formation most favoured by the terrace builders. Until recent decades, dolerite was not a known host for precious metals. But in the 1990s the Golden Mile Dolerite in Western Australia was found to have peak values for gold, as did the Fourkoura discovery in a similar dolerite formation in West Africa in 2007. In Zimbabwe in 1968-71, in a bid to find "a north-easterly extension" to the Inyati copper mineralization, EPO reports noted "In all cases, high values for copper and nickel were related to dolerite sills and dykes" (SA Manganese Ltd 1968). In 2003 the supergene mineralization of Zimbabwe's Chimanmani gold rush was found to occur in mantles of laterite always overlying dolerite (Mupaya and Mangezi 2004). Can the Nyanga terrace builders have stolen a march on science by bench-mining eluvial gold deposits migrated downhill from primary sources in dolerite bedrock?

Comparison of 1: 50 000 topographic maps with geological surveys identifies a secondary choice for the building of terraces over adamellites, gneisses, granodiorites and tonalites (Stocklmayer 1978, 1980). All these granitoids in Zimbabwe are prospective (Kalbskopf and Nutt 2003). Sedimentary rocks of the Umkondo Group known for auriferous potential were also terraced.

Soper (2002) has found that terraces were invariably built on hillslopes between altitudes of 900 to 1700m. The higher of these altitudes fall into the lower levels of the African erosion surface. Grubb "noted that within and to the south-west of the Stapelford area, positions above 1500 metres altitude, principally the African Landsurface, carry bauxite deposits" (Lister 1987: 40). Is it feasible that bedrock sources in the African level have weathered and migrated downhill as eluvial deposits in the higher levels of the Post African erosion surface?

Soil analysis by Katherine Verbeek in Soper's research shows an unexpectedly high coarse sand fraction in the terraces (particularly anomalous in dolerite zones). Together with the further anomaly of soil layers "in most terraces [having] been transported and deposited" from a different parent origin, these are geomorphological issues that "a mineralogical study would clarify" according to UZ Dept of Soil Science and Agricultural Engineering (Soper 2002: 18). This essential study is still pending.



Terracing off an erosion bevel in the Nyanga District

B. MIHOMBA

“Very extensive systems” (Soper 2002: 24) of ridging and trenching several hundred metres-long and 7 to 10 metre-wide that run across contours in stream valleys and vleis show geomorphological inconsistencies similar to those of the terraces. These landscape features are known in archaeological research as ‘mihomba cultivation ridges’ attributed to the growing of the root crop *tsenza*. Today *tsenza* is grown on narrower, much shorter ridges that are 20-30 metres across and are easily distinguished from the older more massive land modifications seen on aerial photographs (Soper 2002: 28). Are the latter features waste dumps? Or a system of ground sluicing? They need auguring, sampling and analysis.

C. QUARTZ HEAPS

“The whole of the ruins area is dotted with cairns of stones ... sometimes in open veld, sometimes nearer enclosures (where they are very large indeed) and sometimes standing on the top of pillars of soil in gullies. There is no doubt in our minds that nearly all these heaps are contemporary with the terraces and ruins” (Summers 1958: 22).

Archaeologists seldom identify lithic finds (except in relation to napped tools). These ‘stone’ heaps are dumps of sorted quartz, frequently associated with ‘pit structures’ and terraces. The German explorer Carl Peters opened two north of Nyanga town and discovered the “quartz at the bottom had been subjected to great heat ... a kind of stove ... to prepare the quartz for crushing” (Peters 1899: 161).

Basic crushing and panning of a group of quartz heaps has revealed magnetite—a typical black sands’ clue for prospecting placer deposits. More sophisticated sampling is needed to reveal any residual values of gold. Supplementary results are of interest, for instance two samples assayed from a dump of ferricrete seen below the Gungutsva Mine on the Nyanga Field Trip of 1-2 Sept 2007 carried values of 0.10 and 0.88 g/t. On the hill above the dump a granitoid boulder has been subjected to firesetting. Samples need to be taken from the quartz vein for assay (inset).



Firesetting against a quartz vein, Nyanga District

D. RAVINES or GULLIES

“In the [Nyanga] National Park and surrounding areas there are numerous very large erosional ravines cutting the slopes, most of them with little active erosion at the present day” (Soper 2002: 76). Summers (1958: 259) is in agreement that active erosion “has now ceased”. Soper and Clark (1991: 10) identify human agency, Soper suggesting “disturbance of the vegetation cover and soil by the activities of the pit-structure inhabitants.” Summers dates the period of “intense erosion [to] ... During and after occupation of the Ruins”. Climate is a complex question generating many suppositions but Summers does not find climatic change the catalyst: “The amount of erosion during the intervening wetter period is problematical, since Brooks [1949] suggests that there are but minor fluctuations from A.D. 800 onwards” (1958: 263).



Concave slump structures, Nyanga National Park

Referenced in Clark (1991: 10) Basset (1963) observes that Nyanga erosion occurs “particularly in contact zones between dolerite and granite”. Dolerite-granite contacts are prospective for gold (the Gungutsva Mine is an example) and this feature has been found to be true of gullies observed in the field, with evidence of quartz visible in gully walls. In August 2008 a grab sample assayed by BioMetallurgical Kwekwe gave the grade 0.27g/t Au. More resistant to weathering than granite or dolerite, is this a clue that vein quartz has been manually removed, thus creating the gullies? Geochemical analysis can provide the answer.

Summers gives details of gullies in Table 11 (1958: 260) as follows:

Ziwa ‘Site of Offerings’: Gullied to depth of 8 ft. Stone heaps eroded; gully sides nearby lined with stones; weirs nearby; protective walls round head of nearby gullies. Erosion not now active, some gullies grassed over.

Nyabombgwe River: Gullied to depth of 6 ft. Little erosion now.
Ditto 1 ft. and refilled with hillwash. Little recent erosion.

In the field protective stone walls can be traced round the heads and tails of gullies as Summers indicates. Gullies do not appear to have started from channels characteristic of formation by erosion. The head is commonly elliptical like that of an open cut or stoep.

E. TAILINGS DAMS

In the ‘pit structures’ (academically interpreted as pens for dwarf cattle) small catchment points termed ‘dammed basins’ present at drain exits and also around 6-10 metres downhill exhibit the features of tailings ponds for the collection of waste from concentrates. Eight samples of soil taken from drain exits gave the following values Au: 0.01, 0.01, 0.10, 0.02, 0.08, 0.72, 1.78, 12 g/t. The 1.78 g/t result was assayed at ZimLab Harare and comes from the ‘pit structure’ seen on the last day of the 2007 Geological Society Field Trip (Hillary Gumbo’s ‘Harare Villa’).

To date no “remains of dung deposits have been found in pits” to back the widely held theory that liquid manure was flushed through the drains and impounded as slurry in the “dammed basins” (Soper 2002: 126-8). The gold values from ‘pit-structure’ drain exits are significant. Comparable to grab-sample grades of 0.4-1 g/t taken from Central Rand goldfield dumps targeted for reclamation by the Gauteng Mining Pollution Forum in 2002, the results quoted above indicate that the ‘pit structures’ were purpose-built for the recovery of gold.

F. FURROWS and RUN-OFF

Furrows carried water from sources sometimes over 1000 metres distant. Shorter furrows are frequently found to be feeding groups of 'pit structures'. Hilltop run-off was also employed. In a run-off experiment in January 2008, 2.15 litres water was collected from a 'pit-structure' tunnel after 5 days rainfall totalling 33mm—further evidence of a dedicated management of water essential to gold recovery plants.

Soper (2002: 72-3) records as an example of his 'Class 4' furrow the feature shown on the topographical map as a prospecting trench where the group photograph was taken on the September 2007 Field Trip (UTM 459143E/7976506N) and thought by members to be a modern drain. According to Soper it is a 'massive earthen bank' running for 1520m (VQ 505754-7).

CONCLUSION

A survey and sampling programme is required on a wide axis to affirm links between terrain and mineralization. Data regarding technological solutions should produce a standardised mining model for the 'pit structures'. Nyanga National Park is a suitable location for studying water management and tailings technology design, building on existing surveys (Soper 2002: 65-75, Soper 2005: 38-40) recorded in an attempt to explain the system in terms of a pre-colonial sewage farm (Sutton 1988: 23).

Academically a professional expansion of this subject could provide the basis for a MPhil dissertation. Geologically it is of national importance to Zimbabwe and the mining industry. *

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* A team comprising members of the Geological Survey and the Geological Society has subsequently visited the Sanyatwe area in order to advise the author on the way forward in conducting an orientated geochemical soil survey. From the photograph presented in this article it appears that the gully forms and processes shown are classically active for a high rainfall, deeply weathered terrain. The author may need to appreciate the process of subsurface erosion and headward slumping in the formation of such gullies in the environment under discussion. Ed.

Oldest Known Rock on Earth Discovered

NSF PRESS RELEASE Friday, September 26, 2008

Canadian bedrock more than 4 billion years old may be the oldest known section of the Earth's early crust. Scientists at the Carnegie Institution of Washington and McGill University in Montreal used geochemical methods to obtain an age of 4.28 billion years for samples of the rock, making it 250 million years more ancient than any previously discovered rocks. The findings, which offer scientists clues to earliest stages of our planet's evolution, are published in this week's issue of the journal *Science*. "This research highlights the ways in which new instrumentation [a thermal ionization mass spectrometer, or TIMS] enables the collection of new data--data which lead to major scientific discoveries," says David Lambert, program director in the National Science Foundation (NSF)'s Division of Earth Sciences, which funded the research. The Nuvvuagittuq greenstone belt is an expanse of bedrock exposed on the eastern shore of Hudson Bay in northern Quebec and was first recognized in 2001 as a potential site of very old

rocks. Samples of the Nuvvuagittuq rocks were analyzed by geologists Jonathan O'Neil of McGill University and Richard Carlson of the Carnegie Institution of Washington. By measuring minute variations in the isotopic composition of the rare earth elements neodymium and samarium in the rocks, O'Neil and Carlson determined that the rock samples range from 3.8 to 4.28 billion years old. The oldest dates came from rocks termed "faux amphibolite," which the researchers interpret to be ancient volcanic deposits. "There have been older dates from Western Australia for isolated resistant mineral grains called zircons," says Carlson, "but these are the oldest whole rock dates yet." The oldest zircon dates are 4.36 billion years. Before this study, the oldest dated rocks were from a body of rock known as the Acasta Gneiss in the Northwest Territories, which are 4.03 billion years old. Earth is 4.6 billion years old, and remnants of its early crust are extremely rare--most of it has been mashed and recycled into Earth's interior several times over by plate tectonics since the planet formed. The rocks are significant not only for their great age but also for their chemical composition, which resembles that of volcanic rocks in geologic settings where tectonic plates are crashing together. "This gives us an unprecedented glimpse of the processes that formed the early crust," says Carlson. The research was also supported by the National Science and Engineering Research Council of Canada, and the Carnegie Institution of Washington.

Discovery of an active methane gas system beneath Arctic seabed

Press Release 24 September 2008 Submitted by Euan Nisbet

Researchers have discovered a methane gas system beneath the seabed off the west coast of Svalbard in the Arctic that has probably been active since the end of the last ice age, about 15000 years ago. Methane, much of which is stored in the sediment beneath the seabed as methane hydrate, flows upwards to the seabed surface where it enters the water as plumes of bubbles. Led by Professor Graham Westbrook from the University of Birmingham, the research team from Britain and Germany found a field of more than 250 plumes of gas bubbles escaping from seeps in the seabed, in water shallower than 400 metres. This is the first discovery of such plumes in this part of the Arctic. Working from research ship the *RRS James Clark Ross*, the team took cores of sediment from beneath the seabed. In deeper water they found gas hydrate in cores close to where bubble plumes rise from depressions (known as pockmarks) in the seabed. Methane hydrate is an ice-like crystalline solid in which methane gas is trapped in 'cages' of bonded water molecules. This stores methane at high concentrations. Increasing temperature or reducing pressure melts the hydrate and releases the methane. Using seismic profiling equipment the team obtained data to show the presence of methane and hydrate beneath the seabed, and imaged rock structures through which the gas naturally flows to the seabed. Sonar systems provided high-resolution maps and images of the seabed that identify the seeps and vents where methane can escape. Professor Westbrook said, "The discovery of this system is important as its presence provides evidence that methane, which is a greenhouse gas, has been released in this climatically sensitive region since the last ice age. With an analysis of the numbers and types of fossils found in the sediments and their isotopic chemistry to show how the climate changed in the past, this will help us establish when, how rapidly and how much methane was released in response to changes in water temperature and depth as the climate changed." The scientists, who are from the National Oceanography Centre Southampton, the Universities of Birmingham and Royal Holloway London and IFM-Geomar in Germany, have also taken samples of the atmosphere and the water itself to measure the concentration of methane present. Professor Westbrook added, "Our results may also provide the means to assess the potential effect that future climate warming will have on these gas hydrate systems beneath the Arctic seabed." The expedition was funded by the Natural Environment Research Council as part of an International Polar Year project investigating the dynamics of gas hydrates in polar marine environments.

Visit to the Mountain View Gold Claims Bindura

A Geological Society of Zimbabwe visit was made to the Mountain View Gold Claims on 13th of September 2008. A total of nine geologists participated in the visit. This small-scale mine is owned by Goldsearch Technical Services and is situated approximately 7 km east of Bindura town on Mountain View Farm beyond the Mazowe River bridge along the road to Mount Darwin.

On arrival we were welcomed to the mine by Mr Madyira and Mr Makaza, who are both miners. Unfortunately there was no geologist to give us a full geological explanation of the area on arrival, but the miners took us for a tour of the whole claim. We learnt that gold production started in 2002. Gold is being recovered using mercury once the ore, currently in the form of rubble derived from weathered quartz veins, is crushed and milled. The small crusher is able to process about 5 to 6 tonnes of ore per hour. However, the grade of the ore being processed is not known as the sampling technique is visual.

The gold reefs are in the form of quartz veins that are hosted within granites. The reefs generally dip to the east and strike north with dips inclined at 30 degrees increasing to 46 degrees in some instances. The granite is highly weathered as a result of hydrothermal processes as may be evidenced by the presence of secondary minerals that include sericite, epidote and clay minerals. Some granite stock works are apparent by the development of micro fracturing, conjugate joints and slickensides. Some of the conjugate joint sets are filled with quartz.



Quartz vein and sheared granite-greenstone contact at the Mountain View Claims

The two Goldsearch geologists later joined us and led us to see the greenstone-granite contact exposure. It is a sharp contact, striking north contrary to the expected regional easterly orientation. It was concluded that this is a third-order structure and that all our observations are indicative of an intrusive sheared contact.

We concluded our visit by having a lunch at the Bindura Wimpy and then drove back to our various locations.

Benson Bhunu and Adolph Chikasha, October, 2008

Mutare River Alluvial Gold Project

A total of 13 members of the Geological Society of Zimbabwe set out to visit the Mutare River alluvial gold project on Saturday 4th of October 2008.



DTZ-OZGEO (Pvt) Ltd was incorporated in 1994 in a joint venture between the Development Trust of Zimbabwe (DTZ) and the Russian State Association “Zarubezhgeologia”, referred to briefly as “OZGEO”. This joint venture project was spearheaded by the late Dr Joshua Nkomo. In 1999 “Zarubezhgeologia”, being a purely geological exploration organization, transferred the mining operations to a Russian mining company “Econedra Ltd.”. Between 1994 and 2000 the DTZ-OZGEO Joint Venture conducted exploration and assessment work for alluvial gold, a pilot mining scheme for this alluvial gold and related development of an opencast mine in the Mutare river valley.

Results of alluvial gold exploration and assessment all over the country.

As a result of the exploration work carried out by “Zarubezhgeologia” in 1995-1999 in the central, south-western, western, north-western, eastern and, partially, the south-eastern parts of Zimbabwe, nineteen promising areas were contoured for the detailed exploration of gold placers with potential reserves ranging from several hundreds up to several tons of *in situ* gold. The exploration and assessment work carried out in the north-eastern part of Zimbabwe resulted in the discovery of two gold placers in river valleys located not far from the Mutare deposit contain reserves of about 500 kg each.

Results of the Mutare river valley exploration

The Mutare River section is about 32 km long. Gold placer reserves, about 6 km in length, were discovered in the central parts of the Mutare valley following the exploration and assessment operations and these were estimated to equal about 2000 kg of chemically pure gold with a total mine life of 2.5 – 3.5 years. The gold occurs in the bottom pebbly horizon as nuggets, some as large as a finger-nail with an average grade of 1g/m³. Further exploration work has been planned further upstream and downstream and it is envisaged that a total of 3-4 tonnes of gold will be exploited in these areas. The thickness of the gold-bearing sands averages 2m.

Mining of the alluvial gold in the Mutare river valley

Pilot mining started in April 1998. 340 kg of chemically pure gold were extracted by October 2000 with a peak production of 20 kg in one month. In October 2000 all operations were temporarily suspended due to the shortage of diesel fuel and erratic power supplies. Exploration resumed in May, 2007 and mining started in November last year with an average production of 3kg/month. The project was officially re-launched by the V.P. Joseph Msika on 25 July 2008. Opencast mining commenced in blocks C1-15. Powerful bulldozers, excavators and dump-trucks were used to remove separately the top soil, then overburden and at last the gold-containing sands. These sands are transported to a stockpile where they are washed using washing units GRU-880/40 and GGM-5.

From November 2007 to September 2008 inclusive, 650 000 m³ of topsoil and overburden were excavated to reveal 200 000 m³ of gold-bearing sands. Preparatory and other earthmoving operations accounted for a further 325 000 m³ of material. Within the same period 110 000 m³ of sands were washed and 40 000 m³ of earth were put back and rehabilitated on an area over 70 000 m² in extent. About 100 kg of chemically pure gold was delivered to Fidelity Printers. The average content of gold is about 1.0 g/m³ of sands. 8-10% loss is encountered during recovery and no chemicals are used during the processing.

Current Operations

Production is now on full throttle and the Russian in the joint venture have invested more than US\$20 million. The company is presently developing its C1 - 28-30 blocks and about 50 kg of gold is being sent to Fidelity Printers every month. To date, about 120kg of gold have been delivered to Fidelity Printers. The operation now employs a total of 240 employees. Uncovering of the gold-bearing sand horizon and subsequent gold extraction is controlled by continuous sampling. The depth of sampling is 0.2m with a sample volume 0.01m³, set at a sampling grid of 20 x 20 metres. Analysis is mainly done by panning. The walls of the opencast workings are also sampled at every 20m interval. The length of the sampling section is 0.5m with a total sample volume of 0.01m³. Results of sampling indicate the limits of the gold-bearing horizon and where the opencast mining of sands should be stopped. DTZ-OZGEO (Pvt) Ltd has a large fleet of powerful earthmoving equipment (12 dozers, 10 dump trucks, 2 wheel loaders, 2 excavators), modern washing units, drilling rigs, diesel generators, and manpower resources, including highly skilled personnel in the field of alluvial gold and other minerals exploration and mining.

As the structure of the alluvial gold deposit is complicated and discontinuous due to there being narrow sections without gold accumulation, the presence of basement uplifts and so on, the detailed exploration of further plots for opencast mining is necessary to evaluate reserves under category C1 (proven resources) to guarantee further successful mining.

Detailed exploration is carried out using a percussion drilling rig BU-20 (borehole grid of 10 x 20m and 0.5m sampling interval). Two drilling units are involved in the exploration, one upstream and another downstream in the Mutare river valley.

The total quantity of balance (evaluated) reserves of category C1 (proven) within the plots where detailed exploration is completed is about 1000 kg of chemically pure gold. Potential resources of the Mutare valley are evaluated at about 3000 kg of placer gold.



Mining the Mutare River palaeochannel, rehabilitation and a potato crop

The Project has a classical environmental rehabilitation policy. Mined out areas are now thriving with crops under irrigation. In some places where gold occurs below the present river channel, the river is temporarily diverted. In such a situation, a careful study of the present channel is undertaken. This involves taking pictures and surveying the river before the mining commences. Once mining is completed, rehabilitation involves restoring the river channel to its original position and state.

The project is highly self sufficient, boasting a highly mechanised workshop and the production of food sufficient to feed over 200 employees and the surrounding communities as well. The company has also demonstrated a high degree of social responsibility by providing tillage facilities to local farmers.

Melusi T. Hlambelo

Fumure – A new meteorite Impact Structure for Zimbabwe?

Tim Broderick, Andrew du Toit, Adolph Chikasha

The anomalous 2 km-diameter circular topographic feature dominated by Fumure Hill in Ndanga Communal Land north-east of Bangala Dam and east of Renco Mine is imposed across the distinct north-north-easterly structural trends that characterize the North Marginal Zone of the Limpopo Mobile Belt. The feature was discovered during an aerial photograph interpretation for ground water potential in the Mshawasha Small-Scale Farming area north of the Mutirikwe River in 1999. Announced in the Geological Society Newsletter, a field trip to verify the possibility of a new impact structure was mooted. This eventually took place at the close of October 2008 when a small group of Society Members were able to coincide with a visit by Dr Sharad Master, now a specialist in meteorite impact structures, who kindly drove up from Wits University to be with us. The enthusiasm and hospitality shown by the Renco geologists is much appreciated.



Only the 15-20 km-diameter Highbury structure in the Umboe Valley and the small Sinamwenda crater have been associated with meteorite impacts in Zimbabwe. Such features are now realized to have had a distinct influence on geological expression and process at the surface of all celestial bodies. However, the recognition of impact features on Earth is frustrated by the dynamics of surface processes that modify and obscure their original expression. Criteria needed for the confirmation of an impact origin include crater morphology, geophysical expression, evidence (usually petrographic) for shock metamorphism and the presence of meteorite fragments. Simple craters are usually less than 4 km in diameter and are bowl-shaped whereas wider-diameter craters usually display a central structural uplift. The bedrock on impact is fractured and brecciated and the rim may be overturned and enhanced by the accumulation of allogenic breccia derived from ejecta from the crater. The degree of erosion around the crater may result in the loss of this ejected material and the down-grading of *in situ* fractured and brecciated rock towards more competent bedrock. This seems to be the case at Fumure where only discontinuous suggestions of *in situ* brecciation were found, especially in the more brittle quartzitic rocks that often have a mylonitic texture relating to shearing within the Limpopo domain. The northern rim of the Fumure structure corresponds to a well-foliated, blocky magnetite quartzite that has remained resistant to weathering and erosion. It appears to have been warped and to have been displaced by radial, post-impact fractures. Gneiss and mafic granulite that occupy the floor of the basin trend without disruption across the enclosing topographic rim and are also brecciated in places. No evidence for the presence of allogenic breccia was found, suggesting that if Fumure is of impact origin, it has been deeply eroded and is therefore of considerable age. A number of rock specimens were collected for petrographic study, notably relating to the nature of the breccias, the possibility of there being planar deformation features (PDF's) present and the assessment of the character of quartz and other minerals. A combination of criteria may result in Fumure being added to the growing list of African impact structures. A nickel anomaly associated with soils and mafic granulite has been geochemically defined and drilled by both percussion and diamond methods.

News



Geology Department, University of Zimbabwe

Maideyi Meck

The situation in the Department has not changed for the better or worse. No intake for first-year students was made in September when registration began. The third-year field trip to Mberengwa went off well, courtesy of Mr Chinoda. The second-year field trip is still to be carried out. Both the second and third-year field trips have been sponsored by Zimplats and Canister Resources, to whom our grateful thanks are extended.

The five fourth-year Honours students who finished in February will be graduating. The third-year class had an 80% pass rate.

The Department is still appealing for part time lecturers to pick up courses in Geology.

Contact details:

Name	Position	Other	Email	Cell
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Mr D. Maguze	Chief Technician		dmaguze@science.uz.ac.zw	011 639792
Mrs G. Chipari	Secretary, DG		gchipari@science.uz.ac.zw	091 2950681
Ms N. Musundire	Secretary, MRC		nmusundire@science.uz.ac.zw	011 436649
Mr. C. Mwatahwa	Chairman, GSZ	Anglo-American	cmwatahwa@unki.co.zw	091 239567
Mr. H. Gumbo	GLF subcommittee		hgumbo@mweb.co.zw	091 2566912
Mr. K. Musiwa	GLF subcommittee	Mining, UZ	kudzic@eng.uz.ac.zw	091 2948915
DG Direct line/Fax:	263-4-303557			

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

Mennell Society Notes

No news received due to the failure of the University to reopen this semester ☹

Geological Survey Department



ZIMBABWE

F.B. Mupaya

Like similar government organizations, the Geological Survey is almost on care and maintenance. Professional staff left include Temba Hawadi, Director; Forbes Mugumbate, Deputy Director; Bornwell Mupaya, Regional Geologist; Munyaradzi Mukandi, Chief Geologist (Data Management); Ernest Mugandani, Geologist; Sibongubuhle Mpindiwa, Geologist; Frank Muzanenhano, Geologist. Several geoscientists and technicians recently absconded their posts. The Geophysics Section is virtually closed as a result. The Cartographic Section remains with four technicians including the Chief Cartographer and his deputy.

Members of staff are mainly involved in responding to numerous requests for information on various minerals and attending to many visitors that come to enquire about the mineral potential of the country. Anticipation of a political settlement has attracted many potential investors mainly from China, Russia, India, and South Africa.

Following an agreement between the Governments of Zimbabwe and the People's Republic of China, a comprehensive geochemical soil sampling survey of the south-eastern part of the country encompassing the Umkondo System, the Archaean basement and the Limpopo Mobile Belt has commenced. The work will be conducted in four phases over a period of 30 months. About 10 000 samples are expected to be collected from an area 12 000 km² in extent.

Mining Industry News

Fadzanayi Bornwell Mupaya

There is an unprecedented upsurge in investment enquiries by companies mostly from China, Russia, India and South Africa. Coal, uranium and base metals are the main commodities sought. Besides gathering information on the mineral potential of the country, the investors are concerned about policy issues, chief among them being conditions for foreign investment and the indigenization policy. There are veiled concerns over the security of investments. Despite the obvious mineral potential that the country boasts, potential investors are frustrated by the management system of the country's mining titles. Currently the whole country is covered by applications for exclusive prospecting licences of which none have been granted since 2004. There is therefore no room for new comers while those that lodged applications have to wait indefinitely for the resolution of their applications.

Gold production continues to deteriorate. Production up to end of August was only 3.5t. Traditional contributors to the national gold output are finding it difficult to operate normally owing to the late disbursements of their foreign currency by the Reserve Bank of Zimbabwe. Most mines are, as a result, operating at very low capacities, almost on care and maintenance levels. However despite the problems, the Industry welcomes a new mine into the family of important gold producers. This is DTZ-Ozgeo's alluvial gold project along the Mutare River near Penhalonga. The project was re-launched by the Vice President Joseph Musika in August 2008. Already production is averaging 50 kg of gold per month.

The Marange placer diamond project is the largest diamond producer in the country, averaging 2000 carats per day of both industrial and gem quality stones. This is in spite of the fact that the project is still at exploration and evaluation stage. The deposit has potential to contribute immensely to the country's mineral production. However, it is discouraging that illicit dealings in the Marange area continue despite efforts to control the scourge.

The government has given licences to three companies to cut and polish diamonds. However, the companies are finding it difficult to secure those diamonds locally. This is despite a government directive that all producers make available 10% of their production to local beneficiaries. The producers are reluctant to comply with this policy.

News about Zim Geoscientists

Vernon and Sue Stockmayer, ex Geological Survey, are living in Perth, Australia. After nearly twenty years with BHP Vernon parted ways in 2000 and joined a small group as a geological consultant specializing in iron ore and nickel laterites (both of which are very much in favour at the present). He now works on a permanent basis for two Australian Juniors, doing 1 day a week for each plus any field work that needs to be done. The rest of the time he picks up on whatever comes his way with other Juniors or large consultancy groups such as Hatch. In Western Australia there is no shortage of work at the moment (but that was before the global financial woes that have affected metal prices. Ed.) He still travels a bit, mostly to Indonesia and the Philippines but recently he scored work in Poland, the DRC and Madagascar. At the time of his message, Vernon had just returned to Perth from a short trip to the Hamersley Ranges. Sue still interests herself in aspects of gemmology and mineralogy.

Neil Harrison has taken to retirement like a fish to water and does no geological work at all. He is presently on one of his trans-Australia campervan tours. He had left the Geological Survey to join BHP on their gold side, working out of Perth for many years.

Pat Stidolph has semi-retired from his job with Gympie Gold in Queensland and now does a couple of days a week with them.

Ian Robertson has also semi-retired from the CSIRO in Perth but continues to work part time for them.

Ian Kirkpatrick, Eric Sutton and Dave Edwards are in the UK whilst **Malcolm Light** retired to Spain after many years working on oil for Soekor in South Africa and as an academic at the University of Texas in Austin.

Phil and Viv Snowden established an extremely successful consultancy business.

They have been bought out and, last heard of, they had retired to their vineyard in the south of WA.

Nick Lockett, also ex Geological Survey, writes. "Much of my work last year and this has been on iron ore projects in South Africa and Australia. Diamonds, which used to be my bread and butter, are now on the nose and no-one is looking for them, or if they are they're not using photogeology. With all the iron-ore, coal, gold and copper work going on I don't miss diamonds. I have also been doing a lot of work in the DRC over the last few years. **Paddy Belstead** does my GIS work. **Rod Fripp** has listed Impact Resources and is busy in Australia and in Botswana. Lucky for me I still enjoy image interpretation (and the satellite imagery is becoming progressively higher resolution and much is available in stereo) and I can't see my way to retirement yet."

John Lauderdale says "I have been asked to go back to do some work in the DRC but that is not possible right now as I am busy in Cameroon - different working conditions and geology to what I have been exposed to previously, and quite a challenge."

Peter Fey reports that things are hectic in his life! He spent a month in Zambia over April-May, exploring for uranium, but is mostly involved in iron-ore work in Western Australia.

Sharad Master is still at Wits. He writes: "I am intrigued by this (the Fumure structure). I am still very much involved with impact structures, and have just proven a new structure in Botswana whilst working on new structures in India, Senegal, Iraq, DR Congo and a few other places. My research interests have moved away from Zimbabwe to other parts of Africa, but still with a focus on Stratabound Copper Deposits, and the Central African Copperbelt; in addition to impact structures."

Nick Baglow is now in charge of the Council for Geoscience office in Polokwane. He has been based there since he left our Survey. Much of his work is now administrative, but he is still expected to get out into the field and map within the Limpopo Province. This is over and above training young geologists in the finer points of field mapping on a Field School Programme he runs. He had previously joined the BGS on a training session in Scotland, where he certainly dressed for the weather and learnt to make notes on drip-resistant paper. In April he was part of a CGS team making a diagnostic assessment of the Algerian Geological Survey, where money is no object – they just need a plan. Ali, Houda, where are you? Nick says that **Steffen Kalbskopf** is working on contract at the Kamoto Mine in Kolwezi.

Congratulations to **Martin Prendergast**, who has been elected a Fellow of the Zimbabwe Academy of Sciences.

Please provide us with news about yourself or other geologists. We need to keep in touch with all of you out there. cmwatahwa@unki.co.zw 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 Collins Mwatahwa.



SEG Timothy Nutt Memorial Fund

A message from Judith Kinnaird, Professor of Economic Geology at the University of the Witwatersrand, shows that the SEG has decided this year to award grants from the Tim Nutt fund to allow students to attend the international SEG-GSSA conference on Economic Geology in Johannesburg in July. Consequently no more funds are available for this year but will be available again in 2009.

Society Activities

The Summer Symposium, 2009

A successful Summer Symposium was held at the Department of Geology, University of Zimbabwe on 28th November 2008. A message from our secretary, Gayle Hanssen is to the effect that she is in possession of the talks presented in Power Point form. If you are interested in getting copies, please contact her (details below) and, with a CD, she can copy them for you. However, to make life easier - we are investigating putting the presentations on an FTP site where you will be able to download them. Once this is done Gayle will give you the website address. The abstracts will be reproduced in the February newsletter.

The Macgregor Memorial Lecture

The Macgregor Lecture is being planned for February 2009 in both Harare and Bulawayo. It is hoped to combine this with a three-day field trip to the platinum mines of the Great Dyke. Final arrangements will be forthcoming in the New Year.

GEOLOGICAL SOCIETY OF ZIMBABWE: CONTACT DETAILS OF MEMBERS OF THE EXECUTIVE COMMITTEE		
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Institutional Membership, 2008

Anglo American Corporation Platinum Exploration Ventures

Canupe Investments

Mineral Resources Centre, University of Zimbabwe

Musiwa Environmental Services (Pvt) Limited

Samrec Vermiculite Zimbabwe (Pvt) Limited

SRK Consulting Zimbabwe