



iRock Geology

Nairobi University Geology Students Association (NUGSA) Magazine

WISE-UP TO CLIMATE

CLIMATE CHANGE
EFFECTS ON THE
RIFT

PAGE12



HOW OIL WILL AFFECT
THE ECONOMY

PAGE25



NEW COURSES OFFERED

PAGE25

ROCKS IN KENYA

Kenya has a wide range of
rocks. many of which are
economically viable.

PAGE02



University of Nairobi

GEOLOGY DEPARTMENT

COURSES OFFERED:-

113 Bachelor of Science in Geology 4 years

127 Bsc. Environmental Geoscience 4 years

*156_14 Master of Science in Geology 2
years*

180_SPS3 Phd (GEOLOGY) 3 years

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MESSAGE FROM THE EDITOR

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Geographical Information Systems (GIS) for instance, is a programme that is being embraced by geologists and other disciplines and its being offered here in our department.



It has been said that in a span of a few years, our country will have the ultimate solution: GEOLOGY. That's is why we, the editorial committee are dedicated to publish magazines related to all aspects of geology. In this, the magazine brings together and provides information and learning to geologists and to the related professionals like engineers, prospectors, planners and to the general public.

Now that we have it, it is our hope that this years publication will circulate more widely than it was the case back then. With the improved quality and increased publication we hope that our goals will be met.

In this issue, we aim to introduce to you the recent developments in the department. Geographical Information Systems (GIS) for instance, is a programme that is being embraced by geologists and other disciplines and its being offered here in our department. We have full details about it in this issue so get to learn about it.

For those of us who want to know some companies that are associated with geologists or even would want to be involved with the companies, we have details for you from Base Titanium Company and Geothermal Development Company.

Some don't know what as-

sociations directly link geologists to the numerous opportunities. Not to worry, we are giving you details here on AAPG, SEG and GSK. This is going to be a wonderful experience. Lots of learning has been taking place and we are going to see this from the pictorial pages of the magazine.

It has been a road with many challenges but we thank God for what He has enabled us to do. We attribute our success to the dedicated editorial team and of course to the dedicated departmental staff and students who have worked to make sure that this issue is a success. We also thank Scott Carruthers of Base Titanium Company and Geothermal

Development Company for their cooperation.

With all that has been said, I leave it to you to learn and enjoy the other pages of our NUGSA magazine. We would also be delighted to hear from you. Please drop a note to the editor.

On behalf of my editorial board and those who have made this issue a reality,

WELCOME TO THE SIXTH EDITION OF THE NUGSA MAGAZINE.

CHEERS!
GRACE MWENDE.

magazine contact

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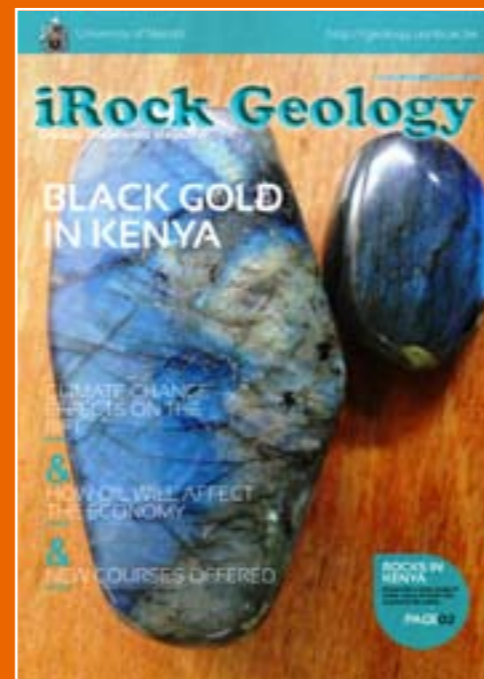
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WHO WE ARE NUGSA



NUGSA Chairman - George Mwaura

Nairobi Geology Students Association (NUGSA) is a student's body formed with the main objective of bringing students in the department of geology together to develop a common agenda before them and be able to address common issues that they face. It is an old association, seeing that it has alumni who are current professors in the same department. One is referred to previous publications to prove this. However, in the past few years, NUGSA has been rather quiet and has only been existent as a dormant volcano. For past two years, efforts have been made to bring it back to life and are bearing fruits as more and more students are becoming sensitized on the need to be a team under such an association. Challenges facing students in the

department have brought a realization to a good number that they can be addressed under the unitary representation of NUGSA. This way, missed opportunities to learn and develop career interest will be a thing of the past. Lack of a link between them and the department's administration crops out as the major cause of most of the challenges, and reckoning that they can communicate better through NUGSA with a loud and audible voice brings back the long lost aurora of hope of reviving NUGSA.

It is now upon the students to resolve involvement and support the leadership of NUGSA in rebuilding it again. Registering for membership is the first step. The current leadership has the mandate to reach out to the previous leadership and available alumni for guidance. They should also endeavor to make sure that they leave a prepared lot ready to take over the leadership and push the agenda forward, and that a step is never taken in the reverse direction.

For those of us who will be leaving soon and those of us who left recently, let us look back and offer a helping hand. Only the diamond understands the PT conditions of the depths from which it comes from, and the same way we understand why such an association is important for the department of Geology.

To the department's administration, it is only fair to understand that the current leadership has little knowledge in running NUGSA and that real handholding is needed for direction. It is humble prayers that office of the chairperson takes a forefront role in helping students reform their association. The students are the future of this department, and I am convinced that this is the ultimate concern of this office..

"amazing facts"

A lump of pure gold the size of a match box can be flattened into a sheet the size of a tennis court.

Mercury is the only metal liquid at room temperature.

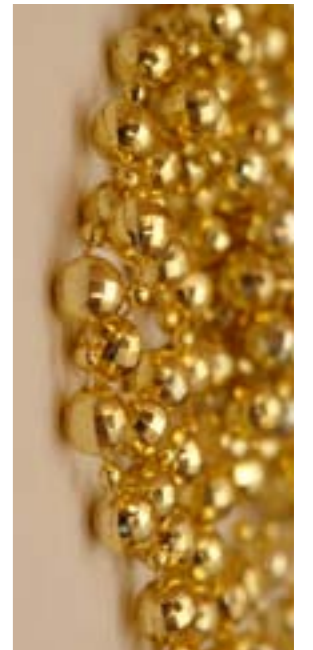
Natural gas has no odour.

The smell is added artificially to help in detecting leaks.

The only rock that floats in water is pumice.

Magnetite naturally occurs as a biogenic magnetite in animals brain especially birds, has been the reason why birds are able to navigate and migrate in the air.

by Francis Njuki Mwangi



CHAIRMAN'S BRIEF



Department Chairman - Dr. Christopher Nyamai

Since its inception in 1956 when the University of Nairobi was still the Royal Technical College of East Africa, the Department of Geology has trained the bulk of professional geologists within Kenya (over 90%) and a significant number within the Eastern African Region and beyond.

The Department of Geology has one of its Strategic Objective of tailoring its academic programs to retain a strong responsiveness to basic training in Geological Sciences and Geotechnology. The Department trains in B.Sc., B.Ed. Science (Geology option), B.Sc. & B.Ed. (Science) by Open and Distance Learning, B.Sc. in Environmental Geosciences, M.Sc., PhD and Post Graduate Diploma in Environmental & Disaster Management Courses. The core areas of specialisation include Mineralogy and Petrology, Economic Geology and Mineral Resources, Environmental Geology and Management, Engineering Geology, Hydrogeology and Groundwater Resources Management, Petroleum Geology, Marine Geology and Resources, Applied Geochemistry, Applied Geophysics, Seismology, Palynology and Micropalaentology, and Mineral Exploration.

Foremost the Department has continued to offer unique services in the areas of national interest in earthquake monitoring, landslide studies, monitoring volcanic activities as well as in mineral resource studies and research. Currently the Department is in the process of establishing a state-of the art GIS & Remote Sensing Laboratory

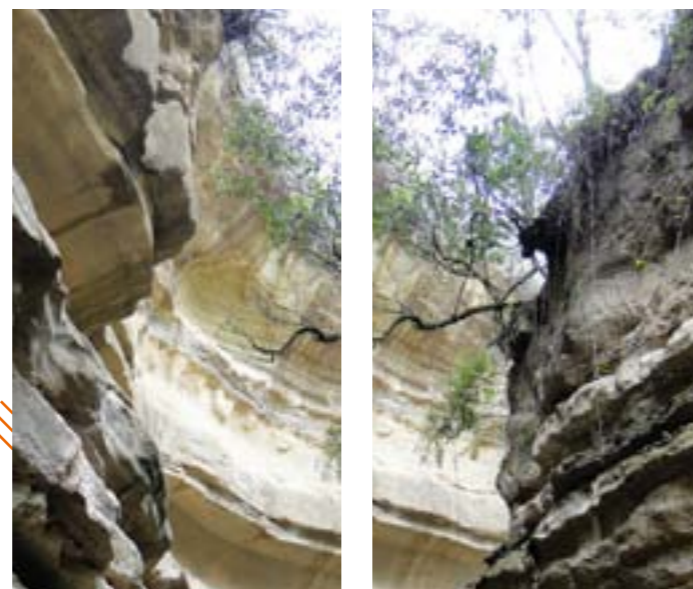
that will enhance further research in the aforementioned disciplines.

The Department has continued to grow in student and staff numbers, in physical facilities, as well as in broadening and advancing academic programmes. It has continued to offer valuable service courses to many other key departments at the University of Nairobi in the following Colleges; Architecture and Engineering, Agriculture and Veterinary Sciences, Humanities and Social Sciences and Education and External Studies. Hence, the Department of Geology heartedly embraces the new University vision and mission. About 1200 students at the University of Nairobi do some aspects of geological studies.

There have been novel advances in the field of geological sciences particularly during the past three decades that have significantly advanced our knowledge. In tandem with this development there has been great improvements in the approach, methodology and techniques used to study the geological environment. Such methodological advances include the use of Geographic Information Systems (GIS); satellite remote sensing of surface and subsurface earth structures and features; minerals, petroleum and energy exploration involving the integrated and cross-disciplinary use of sophisticated tools and instruments such as gravimeters, terrameters, magnetometers (field based) and X-ray fluorescence, X-ray diffractometer, scanning and ion electron microprobe analysers (laboratory based) and others. Despite lack of some of these equipment in the Department, the academic staff have remained on the cutting edge of research, employing such tools through intensive collaboration with other universities, the industry, and research institutions nationally and internationally. Hence, there is the need to expand and enhance the geological sciences programmes and facilities to meet these emerging developments.

The Department is strong in seismic studies and hosts a National Seismological Network which monitors earthquakes in the region. Data from two seismic stations (KMBO PS24 and USGS) is internationally telemetered to Comprehensive Nuclear Test Ban Organization in Vienna, Austria and to the American Geological Society at Washington DC in U.S.A.

The Department of Geology is one of the four Departments of the School of Physical Sciences in Chiromo Campus within the College of Biological and Physical Sciences situated about 3 kilometres from the City Centre in a cool conducive environment for learning. The Department is therefore open and welcomes you all who are keen to advance your knowledge in Geological Sciences through studies (including Distance Learning), through research and development for a better planet Earth.



"wise geological quote"

"The geologist takes up the history of the earth at the point where the archaeologist leaves it, and carries it further back into remote antiquity."

Bal Gangadhar Tilak, The Arctic Home in the Vedas

LECTURER'S BRIEF



PROF. ODADA ERIC ONYANGO
PhD Applied Geochemistry (London University-U.K), MSc. Mineral Exploration Leoben Mining Institute - Austria, MSc Mining Geology-Gorny Institute, St.

Eric Onyango Odada, born in Nyanza is a full Professor of Geology at the University of Nairobi. He obtained his PhD in Marine Geochemistry from Imperial College, London University (1986) and has been with the University of Nairobi as a Lecturer since 1989. Before joining the University, he served as Chief Research Officer, Kenya Marine and Freshwater Research Institute (KMFRI) and Principal Geologist with the Mines and Geology Department, Ministry of Environment and Natural Resources, Kenya.



PROF. AKECH NOBERT OPIYO
Ph.D - Geochemistry (University of Leicester, UK). MSc. - Field Geology (University of Nairobi). Courses taken at Colorado School of Mines, USA as part of the MSc. Programme. BSc. - Geology (University of Nairobi)

Prof. N. Opiyo has been the Dean, Faculty of Science and Dean, School of Physical Sciences, University of Nairobi from 2003 to 2007. He has since 2007 represented Africa in the technical working group (WGB) of the International Monitoring Stations for the Comprehensive Nuclear Test-Ban Treaty Organization (CTBTO). In this capacity he is the Task leader for National Data Centers (NDCs) worldwide.



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LECTURER'S CORNER



“What is SEG and the benefits of being a member of SEG??”

SEG stands for Society of Exploration Geophysicists and the SEG slogan is “Together, we transform our passion into advancing geophysics today and inspiring geoscientists for tomorrow”. SEG is a professional, nonprofit organization dedicated to promoting the science of geophysics and the education of exploration geophysicists. It was founded in 1930 and the headquarters are currently located in Tulsa, Oklahoma, USA. The Society fosters the expert and ethical practice of geophysics in the exploration and development of natural resources, in characterizing the near-surface, and in mitigating earth hazards. The Society publishes “The Leading Edge” which is a monthly professional magazine, and the peer reviewed Geophysics Journal.

SEG membership is open to students and professionals with a passion for geophysics and includes several membership types to fit different needs. To foster the science of geophysics, the so-

IT Geology

GEOLOGY SOFTWARES

With the recent revolution of technology in earth sciences, working for geologists have been made easy by the ever increasing number of geology software available for data processing and interpretation. There are different softwares for different fields in geology.

The softwares are available for free (e.g. trial versions) and commercial versions, some companies offer student versions of their softwares at a subsidised price. Softwares are designed to suit specific needs in geology and are categorized according to their uses and functionality. Some of the mentioned softwares are being used in our department.

Geostatistics

These are softwares responsible for numerical data handling i.e. they store and interpret spatial or spatio-temporal datasets and can be used in calculating probability, mode, mean of mineral ores, its also in handling petroleum geology, hydrogeology, and geochemistry data. The softwares available are; Matlab® (available in the schools computer labs), Gstat (open source).

ciety particularly welcomes membership of SEG students' chapters from Universities, technical training institutions and other academia involved in geophysics. Students may apply for sponsorship of membership whereby membership dues are paid by one of the many SEG sponsors until the students complete their studies.

SEG members get full access to the SEG Digital Library, which includes Geophysics Journal, The Leading Edge, SEG Technical Program Expanded Abstracts, and Robert E. Sheriff's Encyclopedic Dictionary of Applied Geophysics, fourth edition. All members also receive the SEG Yearbook on a CD that also includes the previous year's articles from Geophysics and TLE. Most members receive TLE in print, and Geophysics in print is available to members at a modest subscription rate. It is important to note that the full access to these articles is by authorized user name and password which are only granted to the SEG members. In addition, members get lower pricing for reference publications at the SEG Book Mart, Annual Meeting registration, and professional development. SEG Online offers members a suite of services including an online messaging and collaboration tool, a career center, and group health and life insurance in cooperation with its partner society American Association of Petroleum Geologists (AAPG).

In conclusion, I quote Daron Girard (Geophysicist at WesternGeco, Houston, Texas) that “SEG is not simply a professional organization, but a worldwide group of people working together to promote geophysical research and programs in industry and academia”.

Dr Josphat K. Mulwa PhD in Applied Geophysics

SEG Graduate Member (2008 - October 2011)
SEG Associate Member (November 2011 - Present)
Member ID: 177080

Geographic information system (GIS).

This is a system for analyzing, presenting and managing spatial geographical data. It digitizes hard copy maps and survey plans through georeferencing capabilities enabling them to be stored in softcopy. Softwares available are Quantum GIS and ArcGIS.

Visualization, interpretation and analysis.

These softwares interpret structural data obtained from the field to 3D graphic models for analysis.

They involve;

- Well log software for hydrology and stratigraphic correlation for subsurface interpretation of rock sequence.
- Structural data softwares for analysis of structural geology, geophysics and engineering geology. They model structural data like lineation, foliation and dip and present rose diagrams. The common software used is Fabric8®
- Oil models for petroleum reservoir for estimate on the extent of the reserves

By, Gevera Patrick

NEWS 3RD QUARTER NOVEMBER



GEOLOGY STUDENTS RECOGNIZED AND AWARDED BY ESRI

Some fourth year Geology Students emerged victorious after coming up with the Best Map during the Esri Eastern Africa Education User Conference held in Kenyatta University from 17 - 18 September, 2013. The map titled “Geological Field Mapping of Kitui, Ikanga Area” was declared the best map by the organizers.

Given the commendable work they did, each one of them will be awarded the following:

{ An Esri Press Book called “Designing Better Maps: A Guide for GIS Users by Cynthia A. Brewer” }

A one year license of ArcGIS Desktop software to be installed in their laptops

Instructor-led training in the following 3 courses:

- ArcGIS 1: Introduction to GIS (3 days)
- ArcGIS 2: Essential Workflows (4 days)
- Designing Maps with ArcGIS (3 days)



Some of our Graduates and undergraduates have been engaged by AFRICA BARRICK GOLD (ABG) Exploration Kenya Ltd this year. These positions will offer so many of our students a chance of gaining some experi-

ence with ABG, and we are happy to report that ABG are pleased with their output so far. At the end of this year (assuming their (ABG) exploration programme remains on track given the current turbulence in the country's mineral sector), when they have a good feel for each individual's performance both technically and in terms of personal character, going in to 2014 ABG will be reducing the numbers and selecting the cream of the crop to join them as staff members in the role of junior geologist.

The hiring and internship program of our graduating geologists is part of our fruitful collaboration with Africa Barrick Gold company.



EDUCATIONAL COLLABORATION VISIT BY AKITA UNIVERSITY (JAPAN) STUDENTS

A team of eight (8) students from Akita University, Japan led by their two Professors, namely Prof. Miyamoto Ritsuko and Prof. Fujii were granted their request to make an educational visit to SPS including the Department of Geology. They were received cordially by the Chairman, Geology Department Dr. Christopher Nyamai and hosted to a warm cup of tea as they went on to get to know each other. They toured some of our research facilities and were given a brief of your teaching curriculum and programs.

CHINA EARTHQUAKE ADMINISTRATION (CEA) DELEGATION VISIT

Late last year, the CEA, was able to donate equipment to the Department worth USD 20,000 in the form of 2 - workstations,

6 - desktop computers and 2 - Laptops.

The major purpose of this delegation's visit was to discuss necessary and preparative work for the two sides on joint seismic network in Kenya, including the standing official governmental procedures of collaboration, site selection, scale, and type of stations. Also the discussion included UON's view on personnel exchange and academic lecturing of Chinese experts as captured in the signed MOU.

The Chinese delegation requested UoN (Department of Geology) to pursue the possibility of anchoring the proposed seismic project collaboration on a bilateral government to government basis of which it was agreed that they would also aid the process through floating the idea to their embassy in Kenya to hasten the process.



NATIONAL OIL, UNIVERSITY OF NAIROBI PACT TO BOOST STUDIES

National Oil and University of Nairobi signed a petroleum capacity building, research and development agreement.

The accord will see the entities collaborate in institutional capacity building through short-term courses and staff exchanges, information swap and sharing of equipment and technical expertise.

National Oil Chief Executive Officer Sumayya Athmani says the agreement comes at a time when Kenya and East Africa are facing a shortage of qualified personnel to work in the emerging petroleum sector which has

seen a rise in activity following recent oil and gas discoveries. Athmani said the agreement is part of a wider strategy by National Oil to develop adequate technical and human capacity as Kenya prepares for success in the upstream sector. As part of the agreement between the two institutions, National Oil will provide industrial attachment to University of Nairobi students enrolled in petroleum related courses as well as train students on the use of various analytical instruments.

“The partnership with National Oil will therefore enhance the university's capacity to deliver industry-ready graduates for the upstream sector,” she said.

Athmani revealed that recently, National Oil recruited a total of 34 management trainees who are currently being taught various aspects of the upstream petroleum exploration and production including geology, geochemistry, geophysics, petroleum economics and law.

“The trainees will undergo two years of intensive training locally and internationally before being deployed to various petroleum exploration and production activities in the country,” she said.

To enhance public participation in the emerging oil and gas sector in Kenya, National Oil is leading a national dialogue process where it brings together stakeholders bi-monthly to discuss opportunities for investment in the upstream petroleum sector.

“The outcomes of these meetings will also be used in enriching Kenya's petroleum policies,” she said.

She said that National Oil will continue engaging stakeholders in the petroleum sector with a long term view of opening up the industry for local participation.

STUDENT'S ARTICLES

COVER STORY GRAVITY & ANTI-GRAVITY

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AMAZING FACTS ON GRAVITY AND ITS COUNTERPART: ANTIGRAVITY

We all know gravity is the force from the centre of the earth that pulls all objects to its core. (I am assuming you are well informed). You could think of it like an orange with its centre pulling everything towards itself, both within and without.

'Ever wonder why....' or 'Did you know....'

Ordinarily, I would start with the phrase 'Ever wonder why....' or 'Did you know....' But I do not think gravity is a topic every one of my readers would have a problem attesting to. Our academic syllabi are heavily endowed with facts and significances of gravity and its role in our daily lives. I even recall being warned not to let go of my milk bottle at two years of age since for some reason, everything had a tendency to want to go down

(No wonder the artiste in the song 'Rise Up' starts with the words 'My dream' because it really is a dream to fly over the rainbow, well, unless we are talking spaceships and planes). Anyway, my point is that gravity does take a huge role in our lives, both positively and negatively, in our sitting, standing, walking, talking (I want to believe those who are gifted in heavy speech tendencies- as in those who talk a lot not those who can't speak, get the difference- have very strong temporomandibular muscles to counter gravity), in our eating (I thought 'throwing-up' was an act of countered gravity until my biology high school teacher proved me wrong) and many other important activities we embark on as humans.

We all know gravity is the force from the centre of the earth that pulls all objects to its core. (I am assuming you are well informed). You could think of it like an orange with its centre pulling everything towards itself, both within and without. (A super super strong orange, I would say). Here are some interesting facts about gravity you wouldn't want to miss on:

1. For weight loss, try Pluto! – A 68kg person would not weigh

more than 4.5kg on the dwarf 'planet'

2. Gravity is lumpy – Because the globe isn't a perfect sphere, its mass is distributed unevenly.

3. Without gravity, some bugs get tougher – salmonella, the bacteria that causes food poisoning becomes three times more virulent in microgravity.

4. Black holes at the centre of galaxies – not even light can escape their gravitational clutches.

When you jump, you fill a drag pulling you to the ground. When you climb a table and jump, you will feel the same effect. When you climb the roof and jump, the same same thing will happen. When you are on your hiking trips and you happen to go down a hill, you will not walk as easily as spider man would, but a certain force will make you slide on the slope of the hill. All these are real life situations of the experience of gravity as most of us know it. Now to some interesting stuff- if you happen to drill through the earth's crust on your way to the core (just a hypothetical situation don't imagine it real), you will, of course, start off on your way down, or rather, in a downward/vertical orientation. However, after a while, as you continue drilling, you will notice yourself moving in a horizontal manner and not too long from that, in a vertical manner upwards. The interesting part is that you will not fall off! Wow! So you could actually do the spider man thing! (I am not too sure if you would be needing a drilling team and a couple of geophysicists and firemen to help you enact spider man in the earth's core – pretty hot down there!). And by the way, do not forget that at some point in your drilling activities or spider man moves, (I have no idea which of the two you would prefer at this point), you will float and perhaps find it quite hard to reach the core, owing to the simple fact that gravity below the surface is proportional to distance and therefore at the core, gravity would be zero.

Now, back to our orange. According to the discoveries made in physics so far, it is believed that gravity exists in three "faces" as you move from the centre of the earth to its surface and beyond. Below the earth's surface, gravity is directly proportional to the distance. This defines the possible floating effect one would experience in their journey to the earth's core. On the earth's surface, the behavior of gravity changes greatly. Objects at this point "feel" the more gravitational pull near the surface compared to high heights away from the surface. This is evidently seen during the launching of satellites into the earth's orbit, since more power is needed at the start of the journey to initiate the strength needed for the satellite to attain a safe distance from the earth. AMAZING!!!! (continued)

AMAZING FACTS ON GRAVITY AND ITS COUNTERPART: ANTIGRAVITY

We all know gravity is the force from the centre of the earth that pulls all objects to its core. (I am assuming you are well informed). You could think of it like an orange with its centre pulling everything towards itself, both within and without.

..... (continuation)

Just as 'big guys' have 'big enemies', so does gravity. The advancements made in improving the ideas that support, the existence of the phenomenal existence of gravity's twin and opposite, ANTIGRAVITY are unsatisfactory. From the prefix anti-, you can tell we are dealing with an opposite, almost like Anti-Terrorist Task Force or Anti-social (For the case in which a human being would not have the 'heavy speech tendencies' I mentioned earlier). But please note I used the phrase 'almost like' in my sentence to mean that it is not exactly gravity's opposite but more like gravity's rebel.

Antigravity is defined by the Free Online Dictionary to be the hypothetical effect of reducing or cancelling a gravitational field. To make it much clearer to you, imagine a river flowing down a hill. Okay, this little exercise may not be necessary since most of you must have seen rivers flowing on a slope. Now, imagine the same same river flowing up the slope. It sounds ridiculous, but to someone who may have visited the Mississippi River in the USA, they need not imagine this particular scenario for it truly exists. The latter is the clear description of antigravity.

There are a few ideologies that try and lay out possible explanations to the occurrences that spell antigravity. I have, therefore, listed them, not because I have proved them to be true but because I feel obliged to stir up your curiosity and enjoin you to my search of the truth. Here are a few of the hypotheses:

1. Gravity may truly be a force contained in bodies of matter, whose magnitude differs with different masses -This would mean that the pull of gravity is exerted on smaller bodies by bigger bodies whose position occurs naturally deeper into the earth surface in most parts of the world. Antigravity would therefore be the effect of these large bodies switching positions (the large gravity rocks occurring above the small gravity rocks) during certain geological occurrences such as folding, causing its unusual pull upwards or upslope.

2. Gravity may be a field placed at strategic places in the globe,

whose grid is not defined as yet – considering the huge number of places with a testimony of the occurrence and existence of antigravity, there maybe an invisible grid of gravity, whose position has been manipulated by weathering effects. Taking, for instance, an area like Machakos in Kenya, at a place called Kya Mwilu, the area has plain evidence of heavy ongoing weathering occurrences.

The second point suggests that the earth is surrounded by an intricate electronic grid network offering free energy. I wouldn't be surprised if this has something to do with what has been named 'earth energy'-some strong magnetic field that only manifests itself at strategic points in the world. To give you an idea of the magnitude of attention antigravity has called, here are just but a few places around the globe that have felt the hand of antigravity:

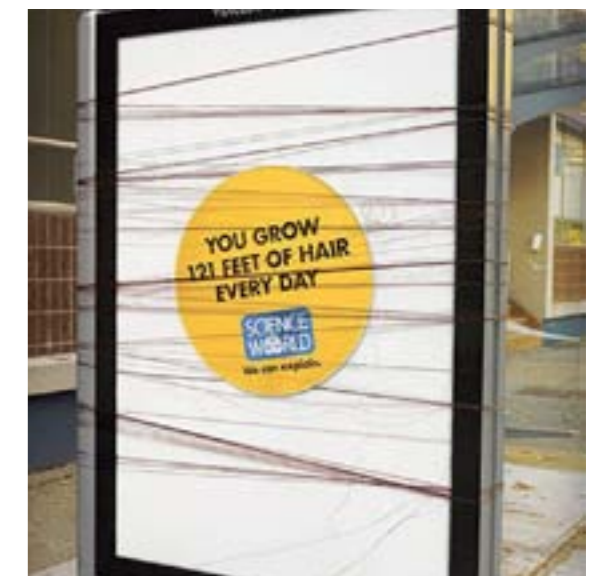
1. Electric Brae in the British Isles.
2. Magnetic Hill in Northern Ireland.
3. Cheju Do Island in South Korea.
4. Near Jerusalem in Israel.
5. Near Hanging Rock in Australia.
6. Between Rocca di Papa and Albano in Rome.
7. Near Porti in Portugal.
8. Opawica Road in Southern Poland.
9. Pinarhisar-Demirkoy highway in Turkey.
10. Coastal Road between Simotata and Platie on Greek Island of Cephalonia.
11. Mystery spot in Santa Cruz California.

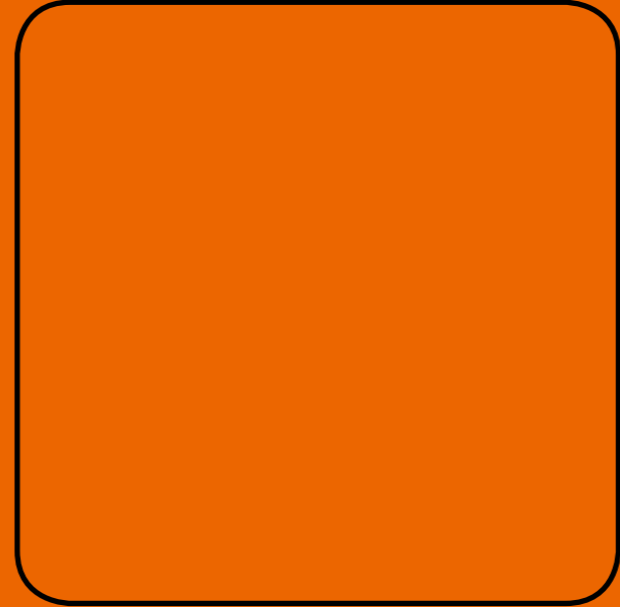
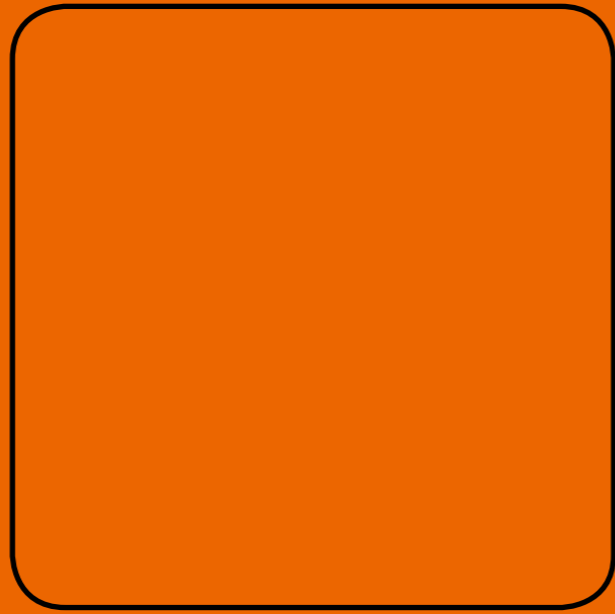
NB: This list is only about 20% of the total areas with gravity anomalies.

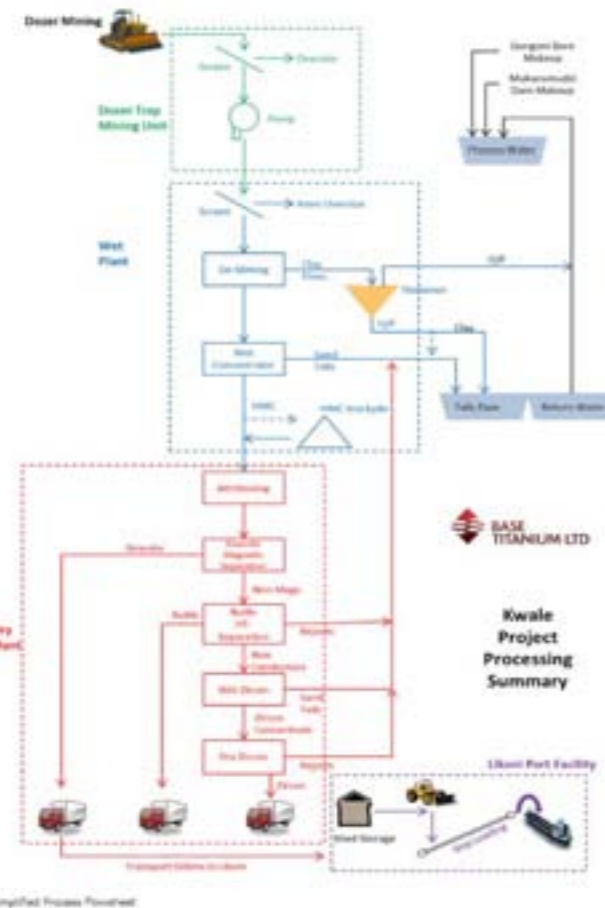
The laws governing antigravity are not clear at the moment. Many who've tried to give it a little thought, have only reached to the point of amazement and easily backed out of the search for answers concerning this strange phenomena. A number of people contemplated the idea of antigravity such as Thomas Townsend Brown and before him Nikola Tesla and before him John Worell Keely as early as in the 1880's. In 1948, people thought flying saucers were antigravity vehicles carrying beings from other worlds and of course, today, in this present day and age, there are still lots of us who believe this to be true. In as much as I would have a tint of possible acceptance of this myth, I blame the absence of an improvement to this claim upon our lack of curiosity and hunger for the truth.

I do, of course, commend those who've actually spent their time trying to come up with explanations to these occurrences, but I believe much more can be done in this area of research. You never know, maybe these answers will shake the foundations of all science and force the reevaluation of our laws and theories to a great and unfathomable extent...just saying!

"ads promoting science"







BASE TITANIUM

Base titanium is a fledgling mining company developing the Kwale mineral sand mine (the company's first) south of Mombasa.

The project's construction phase is about 70% complete with mining scheduled to start in late August 2013. Mine life is expected to be 13 years and is projected to generate royalty and tax revenues for the Kenyan Government between USD 260 and 300 million over that time. The mine's products will be the titanium dioxide minerals rutile (~95% TiO₂) and ilmenite (~50% TiO₂), and zircon. During the peak of the construction phase, about 1200 people will be employed. Once in operation, that number will reduce to about 350.

Titanium minerals are primarily consumed in the manufacture of pigments (>90%), with some used in welding rod flux and titanium metal production. The pigment is white, highly reflective, and biologically inert. It is used in paints, plastic, paper, foodstuffs, sunscreens and other applications. The Kwale mine will produce about 3.5% of annual world consumption of TiO₂ minerals.

Zircon has use as an opacifier in the ceramics industry

material for furnace linings (15%), as foundry sand and partly for zirconia and zirconium chemical production (9%). Annual production from the Kwale mine will be about 3% of world production.

The dozer trap mining method has been chosen, feeding a traditional mineral sand spiral concentrator and slime (clay tailings) thickener. Concentrate will be processed on site to separate the various minerals into the saleable products and tailings. The only chemicals used in the process are flocculants in the slime thickening sub process. The bulk of the tailings will be disposed of in a tailing storage facility (basically a large dam) and the rest used to facilitate the rehabilitation process. The production process is summarised in the diagram above.

Base Titanium's most pressing issues usually revolve around resolving social and regulatory issues. It is a fact that the project cannot provide all the social benefits and employment that everyone asks for and still provide a return on investment. Bureaucratic processes are especially time consuming in Kenya, which creates some headaches.

Base Titanium currently employs two Kenyan geologists. That is expected to increase to five by the end of the year. Internationally, probably over 100 geolo-

gists find permanent employment in the mineral sand field, so it is a small industry compared to gold, base metals and other commodities.

Sedimentary and mineralogy units would be the foundation for mineral sand geology.

Mineral sand geologists have a relatively favourable field environment to work in, since most deposits are near the coast, which is normally less remote than, the locations of most other minerals. The challenges facing a mineral sand field geologist include optimising the sampling programmes to minimise waste of money whilst achieving the sampling objectives, supervising field and drilling crews, dealing with social issues and field logistics. Personally, I would advise geology students and recent graduates to seek employment farther afield than Kenya (come home later if you want), to gain experience with a mine planning and/or GIS software package and to further your education after gaining some experience and you know where your interests lie. At the least, a basic understanding of economic feasibility analysis will add to your marketability as geologists.

base TITANIUM

tax revenues have bypassed USD 260 and 300 million



project location



GEOGRAPHIC INFORMATION SYSTEM (GIS).

WHAT IS GIS?

A geographic information system (GIS) integrates hardware, software, and data for capturing, managing, analyzing, and displaying all forms of geographically referenced information. GIS allows us to view, understand, question, interpret, and visualize data in many ways that reveal relationships, patterns, and trends in the form of maps, globes, reports, and charts. A GIS helps you answer questions and solve problems by looking at your data in a way that is quickly understood and easily shared. GIS technology can be integrated into any enterprise information system framework

What are the Benefits of GIS?

GIS benefits organizations of all sizes and in almost every industry. There is a growing awareness of the economic and strategic value of GIS. The benefits of GIS generally fall into five basic categories:

- Cost Savings and Increased Efficiency

GIS is widely used to optimize maintenance schedules and daily fleet movements. Typical implementations can result in a savings of 10 to 30 percent in operational expenses through reduction in fuel use and staff time, improved customer service, and more efficient scheduling.

- Better Decision Making

GIS is the go-to technology for making better decisions about location. Common examples include real estate site selection, route/corridor selection, evacuation planning, conservation, natural resource extraction, etc. Making correct decisions about location is critical to the success of an organization

- Improved Communication

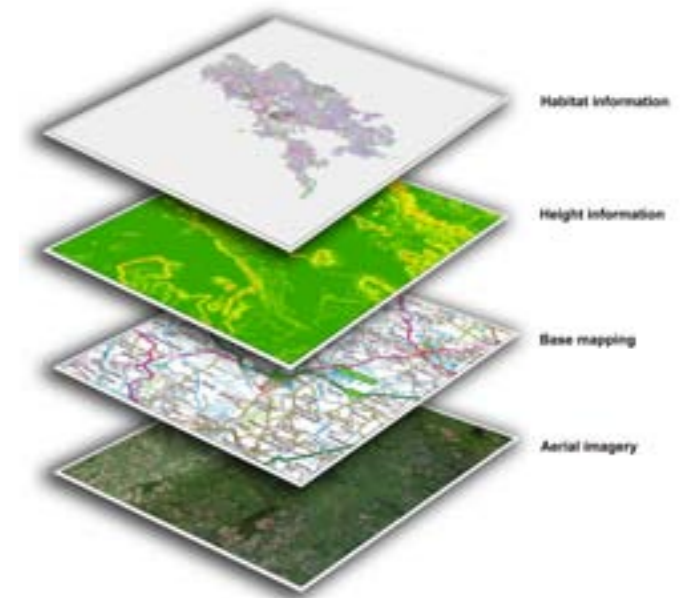
GIS-based maps and visualizations greatly assist in understanding situations and in storytelling. They are a type of language that improves communication between different teams, departments, disciplines, professional fields, organizations, and the public.

- Better Recordkeeping

Many organizations have a primary responsibility of maintaining authoritative records about the status and change of geography. GIS provides a strong framework for managing these types of records with full transaction support and reporting tools.

- Managing Geographically

GIS is becoming essential to understanding what is happening—and what



will happen—in geographic space. Once we understand, we can prescribe action. This new approach to management—managing geographically—is transforming the way that organizations operate.

What Can You Do with GIS?

GIS gives us a new way to look at the world around us. With GIS you can:

- Map Where Things Are

Mapping where things are lets you find places that have the features you're looking for and to see patterns.

- Map Quantities

People map quantities to find places that meet their criteria and take action. A children's clothing company might want to find ZIP Codes with many young families with relatively high income. Public health officials might want to map the numbers of physicians per 1,000 people in each census tract to identify which areas are adequately served, and which are not.

- Map Densities

A density map lets you measure the number of features using a uniform areal unit so you can clearly see the distribution. This is especially useful when mapping areas, such as census tracts or counties, which vary greatly in size. On maps showing the number of people per census tract, the larger tracts might have more people than smaller ones. But some smaller tracts might have more people per square mile—a higher density.

- Find What's Inside

Use GIS to monitor what's happening and to take specific action by mapping what's inside a specific area. For example, a district attorney would monitor drug-related arrests to find out if an arrest is within 1,000 feet of a school—if so, stiffer penalties apply.

- Find What's Nearby

GIS can help you find out what's occurring within a set distance of a feature by mapping what's nearby.

- Map Change

Map the change in an area to anticipate future conditions, decide on a course of action, or to evaluate the results of an action or policy. By mapping where and how things move over a period of time, you can gain insight into how they behave. For example, a meteorologist might study the paths of hurricanes to predict where and when they might occur in the future.

The Geographic Approach

Geography is the science of our world. Coupled with GIS, geography is helping us to better understand the earth and apply geographic knowledge to a host of human activities. The outcome is the emergence of The Geographic Approach—a new way of thinking and problem solving that integrates geographic information into how we understand and manage our planet. This approach allows us to create geographic knowledge by measuring the earth, organizing this data, and analyzing and modeling various processes and their relationships. The Geographic Approach also allows us to apply this knowledge to the way we design, plan, and change our world.

DIAMOND

shine right with that



One of my female friends asked if I could tell if on her engagement she could come to me and see if the ring she gets is a real diamond or not. So the first question I asked is "how sure are you'll get engaged or get a diamond ring?"..... Let's just say I had to buy her lunch as an excuse of an apology.

But anyway, away from my daftness, how would an ordinary Kenyan Republic citizenry, without the know-how, get to differentiate a genuine diamond from a fake? Well, fake or real, firstly you will need to get an actual/real Kenyan man who is willing to buy you a diamond ring, no matter how many carats it holds, which as I am told the number of carats increases with love, so I will have to explain carats later in another blog. I doubt women care anyway as long as its shiny and shaped just right. So back to the point.

Diamonds- yes- The most popular diamond fake is a Cube Zirconia (C.Z for the purposes of this article). The ways listed here are not scientifically proven or fully effective but they could be of great help and are simple... somewhat.

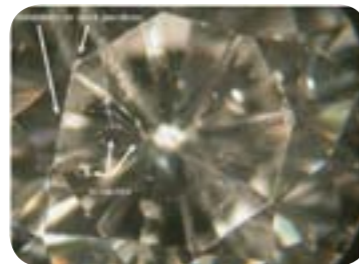
The oldest trick in the book is "all diamond scratches glass". True. But so do every other fake in the black (ok I sometimes find this racist) market. C.Z scratches easily. This picture

POEM

A lifetime of mixed feelings and uncertainties,
Storms arise from humble journey initiations,
Rainbows come into picture at the start of the omega,
Fear not the dreads the worlds bring forth,
But put them into place and make them an ally,
The human creatures are complex of all systems,
Destructive, constructive and manipulative,
Fogs arise from the mist,
Just the same way life hatches from an egg.
Groom whatever comes along,
And use it as an aiding implement,
For all the right reasons.
Be bold young one and face what the world offers,
The same way every cloud has a silver lining,
Make use of your God given fabric of talent,
In this world you, I must warn you,
Of the capabilities of man, his ever changing heart,
The work his hands can instigate, the trait behind the tongue,
A tug of war to be exact, among the human race.

JOSHUA MALIDZO. C.

below shows abrasions at the facet junctions and scratches when looked at closely under a magnifying glass. Fakes are also cut in a very sloppy manner most of the time. My advice then is use this with extreme care (meaning never) My favorite has to be the fog test. Take the diamond place it in front of your mouth and just breathe on it. If the fog lasts for, lets say 2-4 seconds, congratulations your man is cheap! Diamond, releases heat instantaneously so the fog will have cleared up before you get to see it. (A downfall to this is that oil and dirt on the rock could affect its reliability)



For you who like having those kinky U.V lights in your bedrooms, you can use that light to do other things other than set the mood. When "doing your thing"- because I know you probably have the ring on, and before it gets too exciting to notice, look at the diamond under the ultraviolet light, it should have a blue fluorescence. Most of the fakes usually don't have it. Good for you if its real, but there is a twist too, it's less valuable. I avoided to say cheap on this on this one. Lack of the blue fluorescence could mean its either a fake or of better quality. Two extremes in one.

The weight test. If you have a butcher husband, you would he would probably have a trophy cabinet of some of his prized measuring scales or whatever his fetish is. C.V will weigh 55% more than the real thing of the same shape and size. The fake diamond will then definitely tilt downwards towards itself in all its attention seeking.

The next one if the most effective to some extent. The transparency test:-



Step one
Take a blank piece of paper and draw a dot on it with a pen



Step two
Take your "ice" turn it upside down on the paper and center it on the dot.



Step three
After its set and centered observe. The C.Z will have a circular reflection of the dot. The diamond will break up the reflection to a point where it becomes impossible to recognize

This is to me the lame-man test that anyone can use to great effect.....and the real diamond in the picture is to the right by the way

"I never worry about diets. The only carrots that interest me are the number of carats in a diamond."
-Mae West



MINERAL OF THE MONTH

So, what is a mineral?

A mineral is a naturally occurring inorganic solid formed by geological processes, with physical properties, chemical classifications and a crystal structure that are either fixed or vary within a definite range. There are over 4000 different type of minerals. Out all of these, only 30 are found are found on the earth's crust.

Gem quality opal is one of the most spectacular gemstones. Most of the opals are 'common opals' or 'potch' which is characterized by a milky luster known as opalescence.

Opals are commonly white but they contain a rainbow like iridescence which changes their colour when the mineral is viewed from different angles. This comes about because the stone has microscopic spheres of silica arranged in an organized manner. As light passes through, it is diffracted into the colours of the spectrum. This property is known as the play of colour. Those opals that exhibit this property are known as 'precious opals'.

The play of colour is observed when:

1. The stone is moved,
2. The source of light is moved or when,

3. The angle of viewing is changed.

There are many varieties of opal except the common and precious like Fire opal, Solid opal, Boulder opal and Matrix opal naming just but a few.

Opal is hydrated silica. It has the formula of SiO2.nH2O and is amorphous in terms of crystal system.

Properties of Opal:

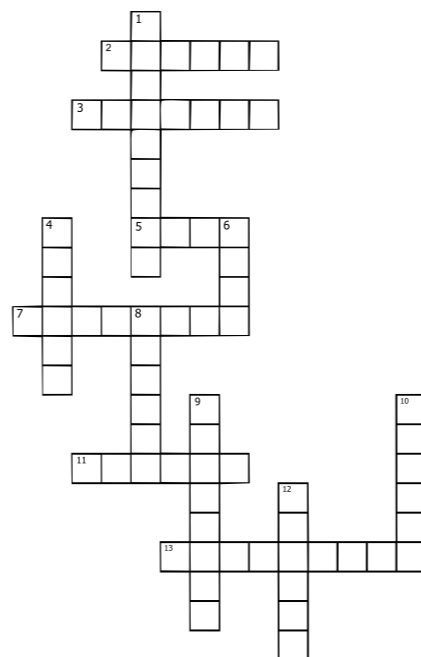
- It lacks cleavage, pleochroism and birefringence.
- Harness is 5.5-6
- White streak
- Sub-vitreous to waxy luster.
- Density of 2.09.
- Conchoidal to uneven fracture.
- Colour ranges from colourless – red – blue.

Did you know...?

1. Australia is the home to 97% of the opals found in the world? The common mining centers are such as Andamooka, Yowah and Lightning Ridge.
2. Opal lacks a definite chemical composition and for this case, it is sometimes termed as a mineraloid as opposed to a mineral.

References www.geology.com

CROSSWORD PUZZLE



Across

2. This was used in Greek construction
3. A crystallized rock
5. A soft mineral, sometimes used for baby powder
7. You use this in your pencils
11. Used to be granite, now is this
13. Some people use this for their garden

Down

1. A fine white clay used in making porcelain
4. An igneous rock
6. This is in the middle of the Earth
8. A reddish colored rock
9. A rock sometimes used for spearheads
10. Looks like obsidian
12. This rock is very common

13: ΓΙΩΜΕΣΤΟΥΣ
15: ΒΡΑΖΙΛ
11: ΛΥΣΙΣΣ
10: ΟΥΡΑΝΟΣ
8: ΗΛΕΘΑΡΤΕ
5: ΛΥΣΙΣΣ
9: ΚΟΙΛ
2: ΤΡΑΧ
4: ΒΡΩΜΙΤΕΣ
3: ΚΑΡΤΕΣ
5: ΜΑΡΤΙΕ
1: ΚΑΘΙΠΙΣΣ
20: ΑΡΤΟΥ

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GEOLOGY DEPARTMENT