

# ANNUAL REPORT 2016

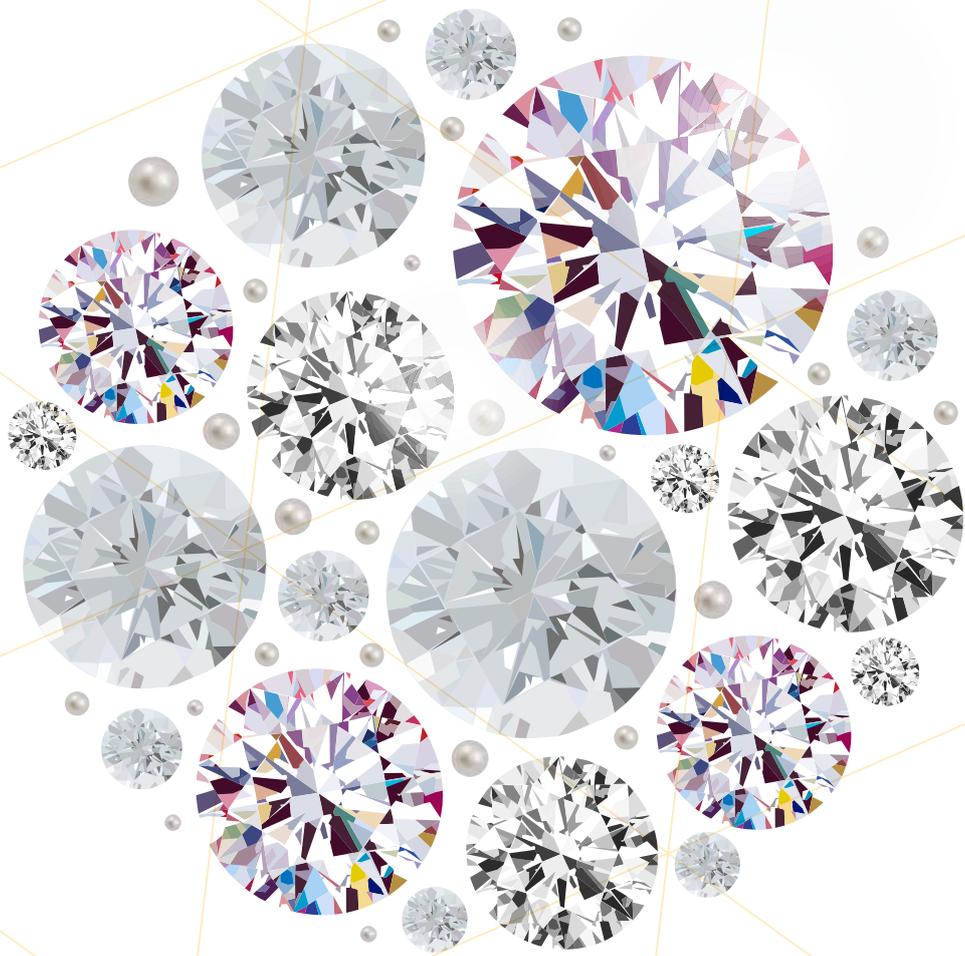
of the **COUNCIL FOR GEOSCIENCE**



**Council for Geoscience**  
Applied Geoscience Solutions

# ANNUAL REPORT 2016

of the **COUNCIL FOR GEOSCIENCE**



**Council for Geoscience**  
**Applied Geoscience Solutions**



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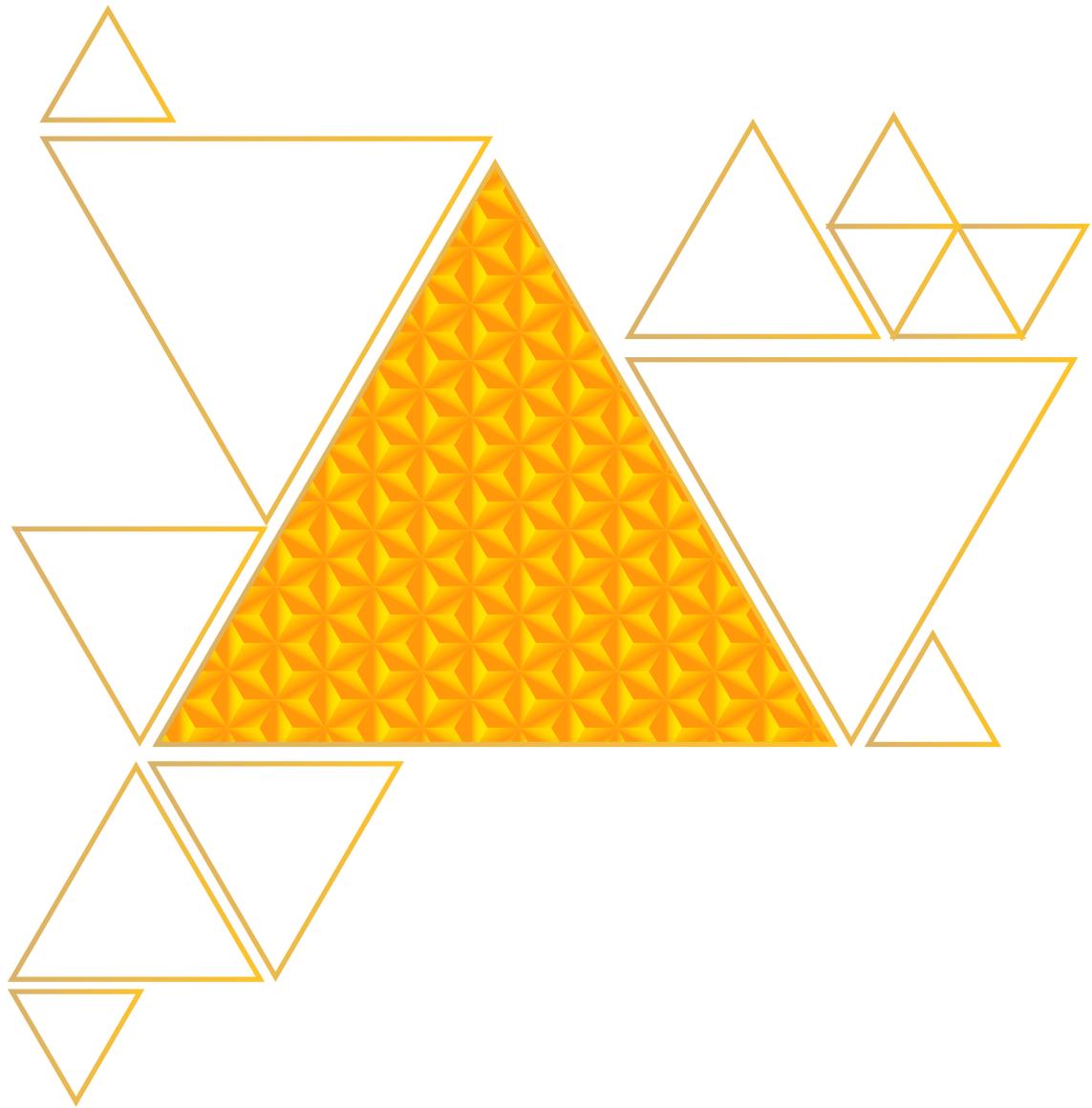


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**A**

**GENERAL  
INFORMATION**







## 1. GENERAL INFORMATION OF THE COUNCIL FOR GEOSCIENCE

<b>REGISTERED NAME:</b>	Council for Geoscience
<b>PHYSICAL ADDRESS:</b>	280 Pretoria Street Silverton, Pretoria South Africa
<b>POSTAL ADDRESS:</b>	Private Bag X112 Pretoria, South Africa 0001
<b>TELEPHONE NUMBER:</b>	+27 (0)12 841 1911
<b>FAX NUMBER:</b>	+27 (0)12 841 1203
<b>E-MAIL ADDRESS:</b>	info@geoscience.org.za
<b>WEBSITE ADDRESS:</b>	www.geoscience.org.za
<b>EXTERNAL AUDITORS:</b>	Auditor-General of South Africa
<b>BANKERS:</b>	Nedbank and ABSA in Silverton, Pretoria
<b>BOARD ADMINISTRATOR:</b>	Nomkhosi Cele

## MANDATE OF THE COUNCIL FOR GEOSCIENCE

The mandate of the Council for Geoscience is stipulated in the Geoscience Act (Act No. 100 of 1993, as amended by Act No. 16 of 2010), section 3: Objects of Council:

“The objects of the Council are to (a) promote the search for and exploitation of, any mineral in the Republic; (b) undertake research in the field of geoscience; (c) act as a national advisory authority in respect of (i) geohazards related to infrastructure and development; and (ii) geo-environmental pollution brought about by mineral exploitation and by other activities; and (d) provide specialized geoscientific services.”

The organisation is listed as a schedule 3A Public Entity in terms of the Public Finance Management Act (Act No. 1 of 1999, as amended by Act No. 29 of 1999).



## 2. ACRONYMS

<b>AFTAC</b>	Air Force Technical Application Centre
<b>AMD</b>	Acid Mine Drainage
<b>ANN</b>	Artificial Neural Network
<b>BBBEE</b>	Broad-Based Black Economic Empowerment
<b>BSC</b>	Balanced Scorecard
<b>CCS</b>	Carbon Capture and Storage
<b>CEO</b>	Chief Executive Officer
<b>CFO</b>	Chief Financial Officer
<b>CGS</b>	Council for Geoscience
<b>CIMERA</b>	Centre of Excellence for Integrated Mineral and Energy Resource Analysis
<b>CoJ</b>	City of Johannesburg
<b>COO</b>	Chief Operations Officer
<b>CSI</b>	Corporate Social Investment
<b>CSIR</b>	Council for Scientific and Industrial Research
<b>CSR</b>	Corporate Social Responsibility
<b>CSSE</b>	Corporate Shared Services Executive
<b>CTBTO</b>	Comprehensive Nuclear Test Ban Treaty Organisation
<b>D&amp;O</b>	Derelict and Ownerless
<b>DAS</b>	Dispersed Alkaline Substrates
<b>DMR</b>	Department of Mineral Resources
<b>DST</b>	Department of Science and Technology
<b>DWS</b>	Department of Water and Sanitation
<b>EIA</b>	Environmental Impact Assessment
<b>ERT</b>	Electrical Resistivity Tomography
<b>FMPPI</b>	Framework for Managing Programme Performance Information
<b>GIS</b>	Geographic Information System
<b>GRAP</b>	Generally Recognised Accounting Practice
<b>GSN</b>	Geological Survey of Namibia
<b>HDI</b>	Historically Disadvantaged Individual
<b>HDPE</b>	High Density Polyethylene
<b>HR</b>	Human Resources
<b>HSE</b>	Health, Safety and Environment
<b>HVAC</b>	Heating, Ventilation and Air Conditioning
<b>IAS</b>	International Association of Sedimentologists
<b>ICT</b>	Information and Communications Technology
<b>IDA</b>	International Development Association
<b>IGC</b>	International Geological Congress
<b>IMS</b>	International Monitoring System
<b>INQUA</b>	International Union for Quaternary Research
<b>IS</b>	Infrasound
<b>IUGS</b>	International Union of Geological Sciences
<b>KIMS</b>	Knowledge and Information Management Services
<b>KOSH</b>	Klerksdorp–Orkney–Stilfontein–Hartebeestfontein
<b>LIMS</b>	Laboratory Information Management System
<b>MASW</b>	Multichannel Analysis of Surface Waves

<b>MQA</b>	Mining Qualifications Authority
<b>MT</b>	Magnetotelluric
<b>MTEF</b>	Medium Term Expenditure Framework
<b>NDP</b>	National Development Plan
<b>NEMA</b>	National Environmental Management Act
<b>OAGS</b>	Organisation of African Geological Surveys
<b>PAA</b>	Public Audit Act
<b>PASA</b>	Petroleum Agency of South Africa
<b>PDAC</b>	Prospectors and Developers Association of Canada
<b>PFMA</b>	Public Finance Management Act
<b>PGE</b>	Platinum Group Element
<b>PIXE</b>	Proton-induced X-ray Emission
<b>PPM</b>	Palaeoproterozoic Mineralisation
<b>PS</b>	Primary Seismic
<b>RAPS</b>	Reducing Alkalinity Producing System
<b>REE</b>	Rare Earth Element
<b>SACCCS</b>	South African Centre for Carbon Capture and Storage
<b>SACS</b>	South African Committee for Stratigraphy
<b>SADPMR</b>	South African Diamond and Precious Metals Regulator
<b>SAGA</b>	South African Geophysical Association
<b>SAMRAD</b>	South African Mineral Resources Administration System
<b>SANEDI</b>	South African National Energy Development Institute
<b>SASQUA</b>	Southern African Society for Quaternary Research
<b>SCCS</b>	Scottish Carbon Capture and Storage
<b>SEM</b>	Scanning Electron Microscope
<b>SGA</b>	Society for Geology Applied to Mineral Deposits
<b>SHEQ</b>	Safety, Health, Environment and Quality
<b>SLA</b>	Service Level Agreement
<b>tcf</b>	Trillion Cubic Feet
<b>UNESCO</b>	United Nations Educational, Scientific and Cultural Organisation
<b>USA</b>	United States of America
<b>WIP</b>	Work in Progress
<b>WOCA</b>	World of Coal Ash
<b>WP</b>	Work Package

### 3. STRATEGIC OVERVIEW

#### 3.1 Mission

Provide geoscience solutions in South Africa and beyond

#### 3.2 Vision

A prosperous society enabled by geoscience solutions

#### 3.3 Brand Promise

Applied Geoscience Solutions

#### 3.4 Values

<b>Innovation</b>	Working together as teams across functions to solve problems, develop novel ideas that create new value for our stakeholders, and improve the organisational performance of the CGS
<b>Diversity</b>	Striving for a diverse workplace by incorporating the contributions of people from a wide variety of backgrounds, promoting an inclusive culture and demonstrating respect for the individual
<b>Excellence</b>	Excellence and continuous improvement in everything we do
<b>Accountability</b>	Consistently setting challenging yet realistic targets, taking ownership of personal actions and work commitments, and holding ourselves personally accountable for achieving results
<b>Learning</b>	Ensuring professional and personal development of our staff in a learning organisation
<b>Service</b>	Consistently providing prompt and courteous service to both our external and internal stakeholders

### 3.5 Strategic Outcome Oriented Goals

The following ideal outcomes were formalised by the Board of the Council for Geoscience:

- The Council for Geoscience is a financially viable and structurally robust organisation catering for all stakeholders and utilising multiple revenue streams.
- The Council for Geoscience is responsive to the developmental needs of the country and is recognised among global leaders in the geological field because of its commitment to excellence.
- Employees view the Council for Geoscience as an organisation offering attractive career opportunities.

#### *Strategic outcomes of the Council for Geoscience*

The Council for Geoscience is confident that it has identified all the key challenges for the organisation and that the strategic objectives, measures and actions that have been put in place will lead to the achievement of its mission and vision.

The Council for Geoscience has listed the following outcomes:

#### *Market (stakeholder/customer) perspective*

- Increased customer/client/stakeholder satisfaction
- New products/services/technologies.

#### *Economic/financial growth perspective*

- Increased revenue
- Increased funding for statutory work
- Improved budget management.

#### *Effective systems (organisational) perspective*

- Improved planning and institutional reporting
- Improved business risk management and security

- Improved compliance and corporate governance
- Improved information and knowledge management
- Improved contract and project management
- Improved business processes efficiency.

#### *World-class people perspective*

- Increased access to critical/scarc skills (technical as well as managerial)
- Increased retention of critical/scarc skills
- A conducive work environment (positive culture, diversity, leadership)
- An improved employee performance culture
- A transformed Council for Geoscience.

## 4. LEGISLATIVE AND OTHER MANDATES

#### *Constitutional mandate*

The constitutional mandate of the Council for Geoscience is found in sections 24 and 26 of the National Constitution of the Republic of South Africa.

#### *Legislative mandate*

The Council for Geoscience was established under the Geoscience Act (Act No. 100 of 1993) and the Geoscience Amendment Act (Act No. 16 of 2010) from which it derives its principal mandate. The organisation is listed as a schedule 3A Public Entity in terms of the Public Finance Management Act (Act No. 1 of 1999). The objectives underlying the establishment of the Council for Geoscience are to develop and publish world-class geoscience knowledge products and to render geoscience-related services to the South African public and industry.

The Geoscience Amendment Act (Act No. 16 of 2010) that was signed into law by the President of South Africa in December 2010 came into operation on 1 July 2012,



with the exception of sections 4(c), (eA) and (f), section 5(b) and section (8). The sections that are still exempted deal with the custody of geoscientific information, the

review and evaluation of geotechnical reports, the maintenance of certain national geoscientific facilities and the appointment of a Geotechnical Appeal Committee.

## 5. ORGANISATIONAL STRUCTURE

### 5.1 Board of Directors of the Council for Geoscience



**Prof. P E Ngoepe**

Chairperson of the Board  
University of Limpopo



**Mr S M Sikhosana**

Acting Chief Executive Officer  
Council for Geoscience



**Mr B A Gerrys**

Department of Science and  
Technology



**Prof. M A Hermanus**

Council for Scientific and  
Industrial Research



**Mr M Mabuza**

Department of Mineral  
Resources



**Dr H Mathe**

Tranter Resources (Pty) Limited



**Dr M Mayekiso**

Department of Environmental  
Affairs



**Dr J E McGill**

Anglo Platinum Limited



**Ms D Mochotlhi**

Department of Water and  
Sanitation



**Ms K R Mthimunye**

Bluewaves Consulting Services



**Mr M Riba**

Department of Rural Development  
and Land Reform

## Alternate Members



Ms D Fischer

(Alternate to Dr M Mayekiso)

*Department of Environmental Affairs*



Ms R Mdubeki

(Alternate to Mr M Riba)

*Department of Rural Development and Land Reform*



Ms S Mohale

(Alternate to Mr M Mabuza)

*Department of Mineral Resources*



Mr P Nel

(Alternate to Ms D Mochotlhi)

*Department of Water and Sanitation*

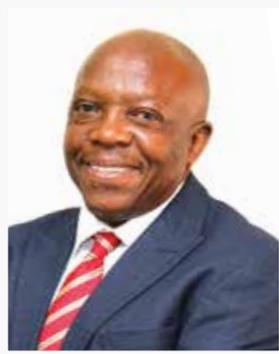


Mr D Sibiyi

(Alternate to Dr J E McGill)

*Tronox*

## 5.2 Executive Team



Acting Chief Executive Officer (CEO)

Mr Simon Sikhosana



Chief Operations Officer (COO)

Dr Mosidi Makgae



Chief Financial Officer (CFO)

Mr Leonard Matsepe



Corporate Shared Services Executive (CSSE)

Mr Fhatuwani Ramagwede



# FOREWORD BY THE CHAIRPERSON OF THE BOARD

The Council for Geoscience is a sound and adaptable organisation in the face of ever-changing environmental factors.

It is my honour to report on the Board oversight of the Council for Geoscience. It has been a challenging year during which the Board and Management have had to make some difficult decisions in changing the strategy of the Council for Geoscience to the Business Unusual model to ensure that the organisation re-focusses on service delivery to its stakeholders.

The Council for Geoscience is a sound and adaptable organisation in the face of ever-changing environmental factors. The Board of Directors and Management are happy to see improvement in the performance of the organisation as a result of the re-focus in terms of service delivery to its stakeholders.

Amidst all these changes, the Council for Geoscience has strived to accomplish the key objectives set out in the revised 2015/16 annual performance plan. Over and above the corporate and financial objectives, the first CGS scientific conference was held in February 2016 under the theme "In pursuit of Excellence in the Geosciences". The conference proved to be a success and attracted considerable media attention to the work of the Council for Geoscience.

South Africa will host the 35th International Geological Congress (IGC) in Cape Town, scheduled to take place from 28 August to 2 September 2016. The Local Organising Committee is making excellent progress in regard to preparations for the event. It is expected that 4 000 delegates will attend the congress. The 35th IGC scientific programme is based on three core topics: Geoscience for Society, Fundamental Geoscience and Geoscience in the Economy. Fifty-eight themes

have attracted over 220 symposium proposals. Field trips have been proposed across South Africa and our neighbouring countries such as Namibia, Zambia, Zimbabwe, Botswana and Tanzania, as well as further afield, in Ghana and Mali. The congress is set to promote geological research, mining investment and tourism, thereby making a noticeable contribution in boosting the economy of South Africa and the continent.

Challenges, without doubt, will continue in the year ahead, but I am confident that our organisation is well positioned for the immediate and long-term future. We will continue to build a strong foundation that will ensure the prosperity of the organisation in the years to come.

We owe our improved performance to the dedicated employees of the Council for Geoscience and our indomitable team spirit.

As an organisation, we will continue to strengthen the structures that will assure robust governance and promote transformation.

To this end, the Board would like to thank the Department of Mineral Resources, the Management team and the staff for their continued commitment to the organisation.



Prof. P E Ngoepe  
*Chairperson: Board of the Council for Geoscience*

# OVERVIEW BY THE CHIEF EXECUTIVE OFFICER

The Council for Geoscience, as the mandated geoscience research body of South Africa, continues to service the mining industry and the public at large by acquiring, interpreting and releasing appropriate datasets in order to provide detailed information in view of attracting investment into the exploration and development sectors.

The Council for Geoscience embarked on a Business Unusual strategy in the financial year 2015/16. The purpose of this strategy was to unlock deferred income that had been accumulating over the previous two years. The main focus was placed on the Medium Term Expenditure Framework (MTEF) projects as these are projects of national importance funded by government to address social, economic and environmental problems in the mining industry and the community. The MTEF projects include the following:

- The Stimulation of Investment in the Minerals and Energy Sectors project aims to unlock the mineral wealth of the country and to stimulate investment in the minerals sector.
- The Shale Gas project was introduced for the first time during the present financial year. The main purpose of this project is to allow the Council for Geoscience to build sufficient capacity to advise authorities and regulators in the future processing of applications for onshore gas exploration. Shale gas exploration is new to South Africa and, thus, the Council for Geoscience needs to conduct research into petroleum exploration in support

of the development of regulations around the production of onshore gas.

- The Mine Water Management Programme and the Derelict and Ownerless Mines project have been running for some time now. Their main purpose is to address issues concerning the legacy of mining in the country.

The implementation of the Business Unusual strategy has led to a reallocation of scientific resources in order to ensure optimum delivery on these key projects. In addition, this business strategy was developed and adopted into the balanced scorecard system for measuring performance and compliance against set objectives. The initial 2015/16 targets had to be adjusted in order to prioritise MTEF projects. This exercise resulted in the reduction or cancellation of some of the statutory research projects.

The introduction of the Business Unusual strategy has borne fruit, leading to a significant improvement in the financial position of the Council for Geoscience. The total assets amounted to R572,7m and current assets and liabilities to R343.7m and R174.4m, respectively.



The organisation will be able to meet its current financial obligation. The financial performance has resulted in a surplus to the amount of R54.2m.

The Council for Geoscience is a very old research institution and, as such, its infrastructure has been deteriorating over the past few years. In order to improve our research capacity, funds have been allocated to upgrade the laboratories to increase the throughput and accuracy of analyses. The main building at the CGS head office in Pretoria has also been renovated in certain areas to improve the working environment of staff.

However, the current economic climate has had an impact on the commercial revenue stream of the organisation.

Despite the prevailing negative economic climate, the Council for Geoscience continues to pursue national and international projects in order to improve its financial position. In this regard, it has been successful in creating International joint venture research and commercial programmes, with work being conducted in a number of African countries in collaboration with a variety of science stakeholders.

The technical audit of the organisation has improved from 76% in the 2014/15 financial year to 81% this year in regard to the performance index on the Annual Technical Programme. Although this achievement is below the target of 85% set for the financial year, it is

nevertheless encouraging to see such an improvement despite the challenges that the Council for Geoscience is currently experiencing.

This past financial year has been very eventful and, in many respects, challenging for the Council for Geoscience in terms of service delivery to our stakeholders and clients. Nevertheless, remarkable results have been achieved despite the difficult challenges within the organisation.

We would like to acknowledge our stakeholders and clients for your unwavering support in making the continued success of the organisation possible.

A special word of thanks is extended to the staff and the Management of the Council for Geoscience for their hard work and to the Board members for their strategic guidance of the organisation. We would also like to thank the Minister, Deputy Minister, the Director-General and staff of the Department of Mineral Resources and the Department of Science and Technology for their continued support.

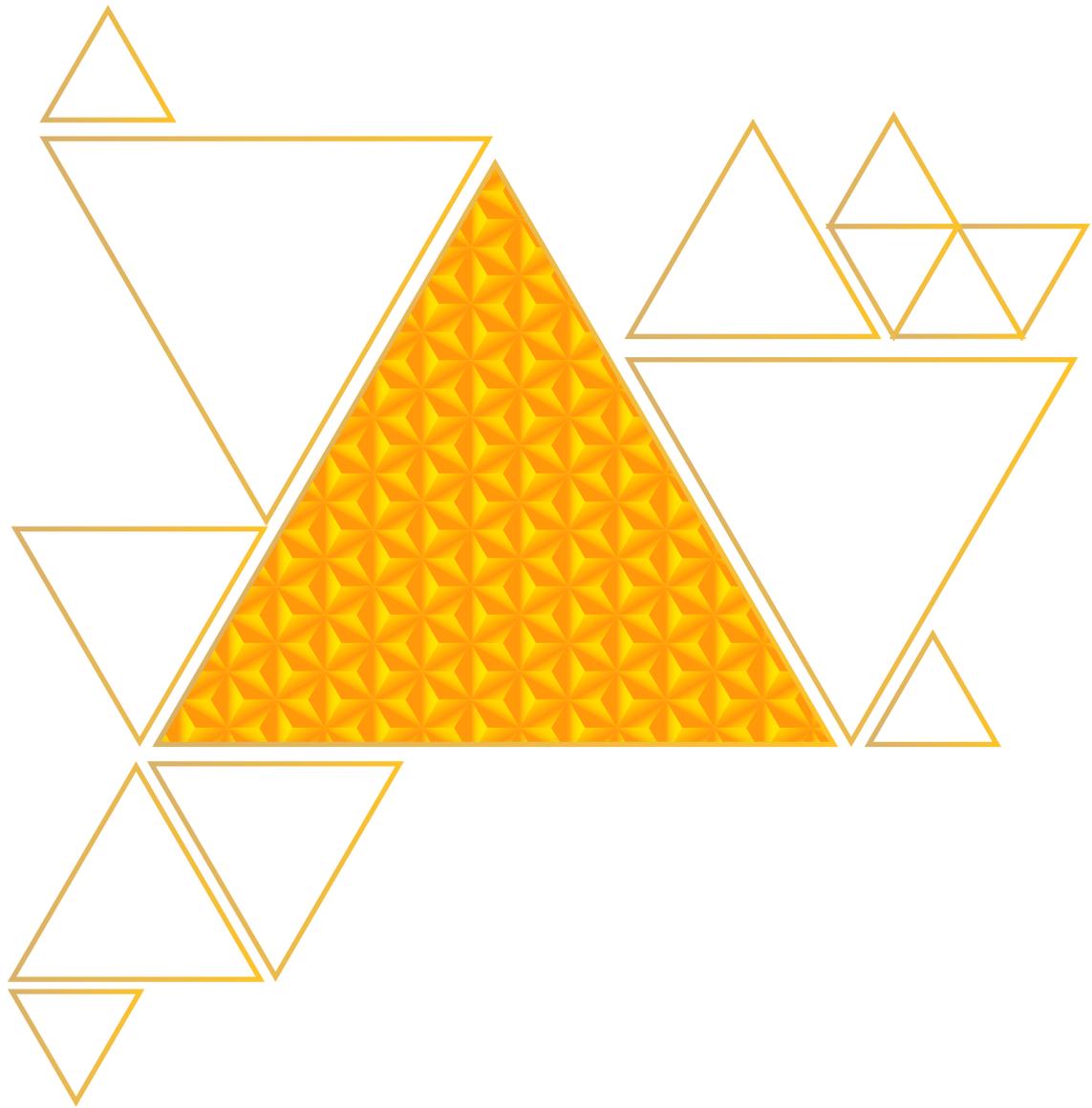


Mr S M Sikhosana  
*Acting Chief Executive Officer*  
*Council for Geoscience*

**B**

**PERFORMANCE  
INFORMATION**





## 1. STATEMENT OF RESPONSIBILITY FOR PERFORMANCE INFORMATION

### Statement of Responsibility for Performance Information for the Year ended 31 March 2016

The Chief Executive Officer is responsible for the preparation of the performance information of the Council for Geoscience and for the judgements made in this information.

It is the responsibility of the Chief Executive Officer to establish and implement a system of internal controls designed to provide reasonable assurance as to the integrity and reliability of performance information.

In my opinion, the performance information fairly reflects the actual achievements against planned objectives, indicators and targets as per the Strategic and Annual Performance Plans of the Council for Geoscience for the financial year ended 31 March 2016.

The performance information of the Council for Geoscience for the year ended 31 March 2016 has been examined by the external auditors and their report is presented on page 121 to page 124. The performance information was also approved by the Board of the Council for Geoscience.



Mr S M Sikhosana  
Acting Chief Executive Officer  
Council for Geoscience  
28 July 2016



Prof. P E Ngoepe  
Chairperson  
Board of the Council for Geoscience  
28 July 2016

## 2. AUDITOR'S REPORT: PREDETERMINED OBJECTIVES

The Auditor-General performed the necessary audit procedures on the performance information to provide reasonable assurance in the form of an audit conclusion. The audit conclusion on the performance against predetermined objectives is included in the report to Management, with material findings being reported under the Predetermined Objectives heading in the Report on Other Legal and Regulatory Requirements section of the Auditor-General's report.

The Report of the Auditor-General, published as Part E: Financial Information, is contained on pages 121 to 124.

## 3. OVERVIEW OF THE PERFORMANCE OF THE COUNCIL FOR GEOSCIENCE

### 3.1 Service Delivery Environment

The Council for Geoscience is mandated to gather, compile, interpret and disseminate geoscience knowledge for South Africa, as provided for by the Geoscience Act (Act No. 100 of 1993) and its Amendment Act (Act No. 16 of 2010). With this mandate, the Council for Geoscience follows a business model which allows for both statutory activities and activities with financial gain. The ratio between commercial and statutory revenue has varied between 30 and 50 per cent over the years and the Council for Geoscience has become increasingly reliant on commercial income to fund the statutory activities. However, this arrangement has proven to be unsustainable, especially as some of the statutory activities were suspended since 2009 owing to the global economic downturn. Thus, it is envisaged that, in order for the Council for Geoscience to fund national projects in the future, a dedicated investment from government is required, such as ring-fenced funding for projects.

The statutory technical programme addresses many of the developmental needs of South Africa,

as captured in the government's NDP 2030, the Stakeholders' Declaration on Strategy for the Sustainable Growth and Meaningful Transformation of South Africa's Mining Industry of the Department of Mineral Resources, the Grand Challenges of the Department of Science and Technology, and the government's National System of Innovation.

The Council for Geoscience delivered on these developmental needs by releasing scientific publications and articles in the popular press in the following fields:

- **Geoscience mapping:**  
the Council for Geoscience systematically gathered and documented geoscience information into in-house maintained databases which are, in turn, used by the other fields for their deliverables.
- **Minerals and energy development:**  
the Council for Geoscience performed research and systematically gathered information on minerals and energy resources in the country in order to stimulate investment in the mining sector and to contribute towards the energy security of South Africa.
- **Environment and water:**  
the Council for Geoscience advised on the identification, prevention and mitigation of the effects of geohazards on people and the environment, as well as assisted in the delivery of water to communities, industry and to agriculture.
- **Engineering geoscience and physical geohazards:**  
the Council for Geoscience provided advice in order to reduce the risk to lives and property from the effects of geohazards.

The Council for Geoscience delivered on projects with a financial benefit within the same fields as mentioned above, but from the following sources:

- **Agency projects:**  
these projects were solicited from other government departments and public entities.
- **International projects:**  
these projects were solicited through international tenders.

- **Private sector:**  
these projects were solicited mainly from local South African companies.
- **Multinational research funding:**  
these projects were solicited through joint tenders with other international research institutes.

The Council for Geoscience successfully managed a number of national facilities on behalf of the country, which include:

- the national seismograph network and infrasound observatory, which monitor the earthquakes and other sonic disturbances within the country
- the national borehole core repository, which provides a comprehensive national collection of valuable geoscientific material
- the national geoscientific databases, of which the Council for Geoscience is the custodian
- the national geoscience museum, which provides information to the public
- the national geoscience library and bookshop, which provide both international and local geoscientific publications and maps to the public
- the national geoscience analytical facility, which is available for the analysis of geoscientific material.

### 3.2 Organisational Environment

During the 2015/16 financial year, the Management team of the Council for Geoscience requested the Board to approve a Business Unusual strategy. The need to move to the Business Unusual strategy was necessitated by the financial loss that the organisation incurred in 2014/15. The primary aim of this strategy was to direct all the resources to the MTEF projects to unlock the continuous deferred income that the organisation had accumulated over the years.

The re-focus of the organisation on this strategy has indeed yielded positive fruits. The performance of the Council for Geoscience has improved substantially in terms of revenue generation and the audit result of the Annual Technical Programme has increased from 76% to 81%. The organisation is striving to formulate a

strong base for structured research programmes that will sustain the organisation in the immediate and long term. The Council for Geoscience is a research organisation that is aiming to make a meaningful contribution to the developmental needs of South Africa.

In 2013, the Board and Executive Management of the Council for Geoscience approved changes to the business model and functions of the organisation to reposition the organisation in the context of a changing political, economic, social, environmental, legislative and technological landscape. The ultimate objective of the five-year repositioning strategy, which started in April 2014, was to achieve a sustainable organisation and to optimise the capabilities of the organisation to make a meaningful contribution to the developmental needs of South Africa.

The first year progressed well with the migration of all staff to support the new target operating model. Further consolidation of operating processes will continue over the next financial year. Decreasing income revenues had posed a threat to the ongoing transformation agenda.

In addition to the repositioning process, ageing infrastructure was also identified as a challenge to service delivery and thus the Council for Geoscience has embarked on a recapitalisation programme in order to effect the necessary changes.

### 3.3 Key Policy Developments and Legislative Changes

No key policy developments have occurred since the Geoscience Amendment Act (Act No. 16 of 2010), which was signed into law by the President in December 2010, took effect on 1 July 2012. The Amendment Act includes a more comprehensive description of the services rendered by the Council for Geoscience, expands the mandate of the organisation and reflects the interaction with the Minerals and Petroleum Resources Development Act (Act No. 28 of 2002), the amendment of which is still pending.

## 4. PERFORMANCE INFORMATION

### 4.1 Performance Management Criteria and Performance Targets of the Council for Geoscience

In accordance with the strategy developed by Management, the organisation has adopted a Balanced Scorecard (BSC) approach to its performance measurement.

The balanced scorecard system, which measures the performance of the organisation at corporate, business unit and individual level, was approved by the Board of the Council for Geoscience. The corporate balanced scorecard incorporates the current performance measures into the following evaluation perspectives:

- Stakeholder and customer satisfaction; to drive stakeholder and customer satisfaction by the development of world-class products and services
- Economic growth; to achieve sustainable revenue and profit growth
- Organisational systems; to develop and maintain effective and streamlined processes, using appropriate tools and methodologies
- Scientific excellence and human capital development; to develop a world-class geoscience organisation where our people can grow and perform.

Ten strategic objectives were identified in agreement with the balanced scorecard framework, and, as such, cover the customer, internal business process, financial and learning and growth perspectives. The objectives are aligned with the targeted strategic outcomes of the organisation and include:

#### *A. Market (Stakeholder/Customer) Perspective Objectives*

- To address stakeholder needs

- To effectively promote the Council for Geoscience and disseminate strategic information to the public.

#### *B. Economic and Financial Growth Perspective Objectives*

- To generate revenue
- To manage overhead efficiency.

#### *C. Effective Systems Perspective Objectives*

- To develop and implement effective policies and procedures
- To drive preferential procurement.

#### *D. World-Class People Perspective Objectives*

- To attract and retain a skilled workforce
- To enhance present levels of excellence
- To build a positive organisational culture
- To reflect and embrace the diversity of South Africa.

### **4.2 Corporate Performance Targets of the Council for Geoscience**

In order to evaluate the corporate performance of the Council for Geoscience (CGS), the organisation has developed a range of performance indicators which cover the entire spectrum of activities within the organisation. The range of performance indicators, together with the performance targets for the period 2015/16, is summarised in the table on pages 32 to 36.

#### 4.3 Corporate Scorecard for 2015/16

Market (Stakeholder/ Customer) Perspective	TO DRIVE STAKEHOLDER AND CUSTOMER SATISFACTION BY THE DEVELOPMENT OF WORLD-CLASS PRODUCTS AND SERVICES				
Strategic Objective:	To Address Stakeholder Needs				
Performance Indicator	Actual Achievement 2014/2015	Planned Target 2015/2016	Actual Achievement 2015/2016	Deviation from Planned Target to Actual Achievement for 2015/2016	Comment on deviations
Number of Geoscience Maps and Publications Published In-house	18	4	7	3	Target achieved.
Customer Satisfaction Level	85%	85%	57.81%	-27.19%	The decline in this measure is attributed to the focus on MTEF projects. Most of the statutory projects have been put on hold resulting in a reduced service to the public.
Number of Rural Development Project Reports Completed	14	13	8	-5	The decline in this measure is due to the prioritisation of MTEF projects leading to many of the statutory projects being put on hold.
Number of Regional and African Development Project Reports Completed	27	7	3	-4	The decline in World Bank projects in Africa is a major contributing factor to this lower than anticipated result.
Number of Environment Project Reports Completed	8	8	7	-1	The CGS remains committed to addressing environmental-related problems as a result of past mining activities.
Number of Innovation Reports Completed	2	2	1	-1	This target was not met due to research priorities conflicting with Business Unusual; this is an area that the CGS plans to grow by initiating new innovative research and applied projects.
Annual Technical Programme Performance Index	76%	85%	81%	-4%	Although this target was not met, this measure has improved from last year's 76% to 81%. The CGS has initiated more focussed and structured programmes with integrated deliverables rather than engaging in disparate projects.

<b>Strategic Objective:</b>	<b>To Effectively Promote the Council for Geoscience and Disseminate Strategic Information to the Public</b>				
<b>Performance Indicator</b>	<b>Actual Achievement 2014/2015</b>	<b>Planned Target 2015/2016</b>	<b>Actual Achievement 2015/2016</b>	<b>Deviation from Planned Target to Actual Achievement for 2015/2016</b>	<b>Comment on deviations</b>
Articles published in the Popular Press	2	2	2	0	Target achieved.
Articles published in Industry Publications	4	2	6	+4	The overachievement of this target is attributable to the first CGS conference held in February 2016. Indeed, the industry press appreciated the relevance of the work that the CGS has embarked on in terms of government priority areas.

<b>Economic/ Financial Growth Perspective</b>	<b>TO ACHIEVE SUSTAINABLE REVENUE AND PROFIT GROWTH</b>				
<b>Strategic Objective:</b>	<b>To Generate Revenue</b>				
Total Revenue	R378,8m	R492,5m	R413m	-R79.5m	The MTEF plans were not fully implemented resulting in deferred income.
Contract Revenue	R87,9m	R40m	R52m	R12m	The target was achieved.
Ratio of External Revenue to Total Revenue	24%	24.4%	19.4%	-5%	The global economic recession is still negatively affecting the availability of commercially funded geoscience projects and this has led to the CGS not achieving this target.
Number of Large Tenders and Proposals Submitted (>R1m)	24	20	16	-4	The global economic recession is still negatively affecting the availability of commercially funded geoscience projects. Little funding was made available by the World Bank and other institutions for new geoscience-related projects, thus limiting the opportunity to submit tenders.
Tender Success Rate	10%	24%	25%	1%	The target was achieved.



<b>Strategic Objective:</b>	<b>To Manage Overhead Efficiency</b>				
<b>Performance Indicator</b>	<b>Actual Achievement 2014/2015</b>	<b>Planned Target 2015/2016</b>	<b>Actual Achievement 2015/2016</b>	<b>Deviation from Planned Target to Actual Achievement for 2015/2016</b>	<b>Comment on deviations</b>
Ratio of Overheads to Total Cost	60%	60%	51.4%	-8.6%	Target exceeded due to Business Unusual cost-saving measures.
Ratio of Personnel Cost to Total Cost	59%	60%	52.4%	-7.6%	Target exceeded due to the difficult economic climate.

<b>Effective Systems (Organisational) Perspective</b>	<b>TO DEVELOP AND MAINTAIN EFFECTIVE AND STREAMLINED PROCESSES, USING APPROPRIATE TOOLS AND METHODOLOGIES</b>				
<b>Strategic Objective:</b>	<b>To Develop and Implement Effective Policies and Procedures</b>				
Number of Audit Qualifications	0	0	0	0	An unqualified audit report was obtained.
Number of Policies Written and/or Reviewed	7	8	9	+1	Target achieved.
<b>Strategic Objective:</b>	<b>To Drive Preferential Procurement</b>				
Preferential Procurement as a Percentage of Total Procurement	40%	40%	69.73%	+29.73%	Target achieved. The industry is transforming, therefore a higher target will be set going forward.

<b>World-Class People Perspective</b>					
<b>TO DEVELOP A WORLD-CLASS GEOSCIENCE ORGANISATION WHERE OUR PEOPLE CAN GROW AND PERFORM</b>					
<b>Strategic Objective:</b>					
<b>To Attract and Retain a Skilled Workforce</b>					
<b>Performance Indicator</b>	<b>Actual Achievement 2014/2015</b>	<b>Planned Target 2015/2016</b>	<b>Actual Achievement 2015/2016</b>	<b>Deviation from Planned Target to Actual Achievement for 2015/2016</b>	<b>Comment on deviations</b>
Staff Turnover	0%	<10%	9.7%	-0.3%	Target achieved.
Number of Staff Sponsored for MSc and PhD Degrees	35	40	36	-4	Target not achieved because not all students that were awarded bursaries have registered.
Proportion of Scientists to Total Staff	50%	40%	36.94%	-3.06%	The CGS did not meet this target because of the scarcity of high-calibre geoscientists.
Proportion of Scientific Staff with MSc and PhD Degrees	60%	40%	43.09%	+3.09%	Target achieved.
<b>Strategic Objective:</b>					
<b>To Enhance Present Levels of Excellence</b>					
Number of Papers and Articles Published	70	50	133	+83	The CGS has overachieved on this measure. This is attributed to the calibre of scientists within the organisation and is a true reflection that publishing scientific outputs is critical within a research organisation such as the CGS.
Number of Projects with External Collaborators	55	19	6	-13	This underperformance is due to the focus on MTEF projects.
Number of Strategic Science Partnerships	22	19	7	-12	This underperformance is the result of the Business Unusual strategy which has focussed mainly on MTEF projects.

<b>Strategic Objective: To reflect and embrace RSA diversity</b>					
<b>Performance Indicator</b>	<b>Actual Achievement 2014/2015</b>	<b>Planned Target 2015/2016</b>	<b>Actual Achievement 2015/2016</b>	<b>Deviation from Planned Target to Actual Achievement for 2015/2016</b>	<b>Comment on deviations</b>
Percentage Overall Employment Equity Targets in the Organisation (White-Black)	32:68	30:70	26:74	+5.7%	Few white employees were appointed in proportion to the target.
Percentage Overall Employment Equity Targets in the Organisation (Male-Female)	54:46	53:47	55:45	-4.25%	The CGS is still struggling to attract women in the organisation. This measure will be prioritised in the 2016/17 financial year.
<b>Strategic Objective: To Build a Positive Organisational Culture</b>					
Staff satisfaction level	65%	65%	55.7%	-9.3%	There have been many changes within the CGS and this has brought about uncertainty amongst staff.

## 5. OPERATIONAL HIGHLIGHTS

The CGS Management held a strategy session at the beginning of the financial year and concluded that there was a need to focus on MTEF projects to unlock the deferred income of the organisation.

The financial year 2015/16 showed several underlying trends:

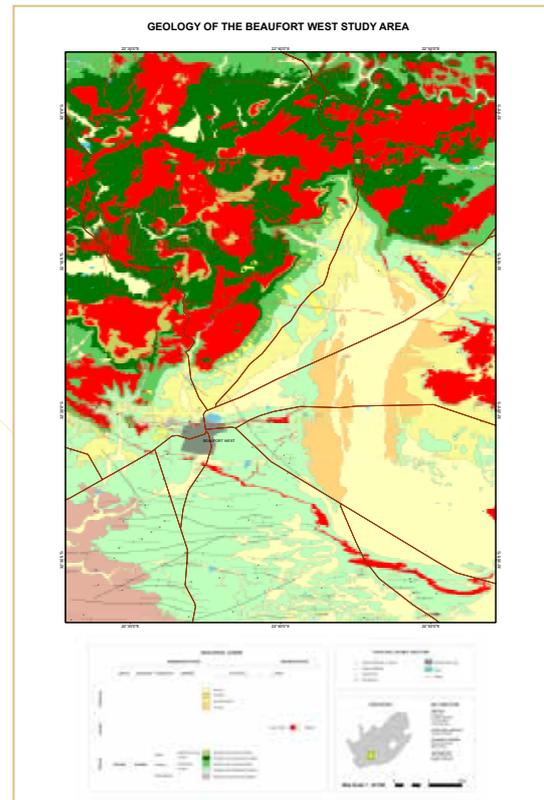
- An improved focus on projects funded by the Medium Term Expenditure Framework (MTEF), prioritised to deliver key outputs of national importance
- Re-allocation of scientific resources to ensure optimum delivery on key projects
- In-depth planning for the upgrade of the CGS laboratories to increase throughput and accuracy of analyses
- Successes of the Council for Geoscience in creating international joint venture research and commercial programmes, with work being conducted in a number of African countries in collaboration with a variety of science stakeholders
- Projects including specific investigations into minerals and energy, water, climate and geohazards
- Ongoing training and mentorship provided in most projects.

The main projects that are funded by the Department of Mineral Resources under the Medium Term Expenditure Framework are the Shale Gas Research project, the Management of Derelict and Ownerless Mines, Mine Water Management, the Promotion of Investment in Exploration and Mining and the Seismic Microzonation of Johannesburg.

### 5.1 NATIONAL PROJECTS

#### 5.1.1 Shale gas project (ST-2016-1250)

Natural gas derived from hydrocarbon-rich shale formations has the potential to be an efficient, clean and affordable energy source, if produced responsibly. The gas is held in fractures, pore spaces and adsorbed

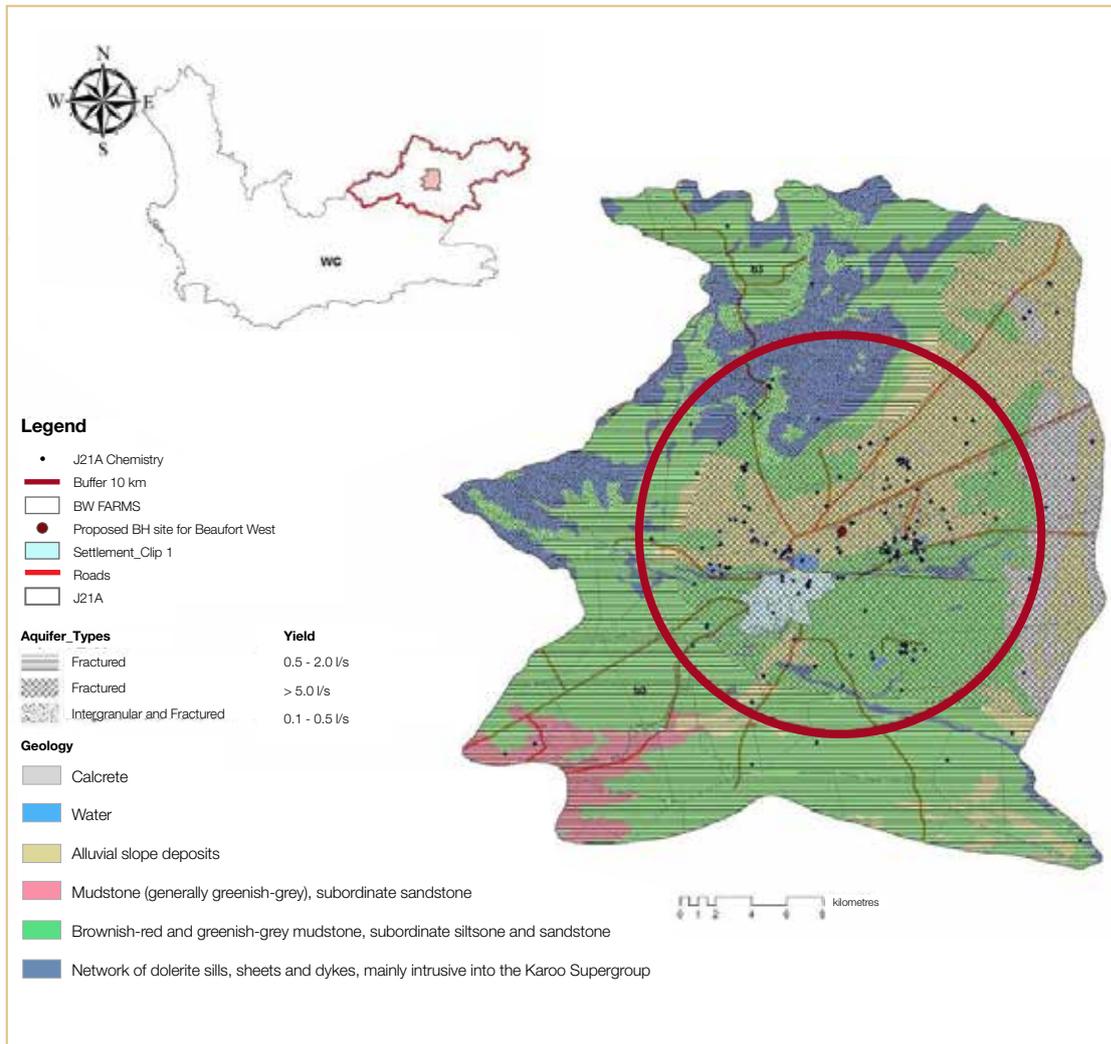


Visual representation of the geology of the Beaufort West area digitised from 1:50 000-scale field sheets.

onto organic material within the shale. Published data show various potential sites for unconventional natural gas discoveries in the southern African region, specifically in the Karoo Basin. The southern portion of the Karoo Basin is potentially favourable for shale gas accumulation. An estimate of 485 trillion cubic feet (tcf) of technically recoverable reserves were documented by an environmental impact assessment (EIA) in 2011, but later estimates by PASA and the Council for Geoscience showed considerably lower volumes of 23 and 13 tcf. Despite these reductions in the estimates, shale gas may still become a game changer in the energy production regime of the country.

The shale gas activities proposed in the MTEF project will assist the Council for Geoscience in making the recommendations required for the newly released Regulations for Petroleum Exploration and Production, in particular pertaining to the following sections:

1. Assessment of conditions below the ground (Section 87)



Location of hydrocensus points investigated in the J21A catchment area.

2. Water resource monitoring (Section 88)
3. Assessment of related seismicity (Section 89).

The shale gas project will contain activities in alignment with the current regulations. The current regulations (NEMA and Petroleum Exploration and Production) will be utilised as a framework for the identification of shortfalls. The project will allow the Council for Geoscience to build sufficient capacity to advise the DMR in the future processing of applications for onshore gas exploration licencing rights. The current project will also act as the baseline study for future shale gas and deep drilling exploration projects undertaken in the country.

*Overall objectives*

- **Geology task:** Study the stratigraphy and lithology in a 3 500 m deep cored borehole through the Beaufort, Eccca (including the Whitehill Formation) and Dwyka Groups at a site near Beaufort West. Compile 1:50 000-scale maps of the geology in the area around the borehole.
- **Airborne and ground geophysics task:** Map subsurface geological structures in the Karoo shale gas project area.
- **Environmental and hydrogeology task:** Collect site data for the J21A catchment to create baseline

information of the surface and groundwater for monitoring before and after drilling. Drill three percussion boreholes for water flow monitoring.

- **Geochemical and gas quantification analyses task:** Analyses of the shale samples after deep drilling and gas quantification and quality analyses to determine the type and purity of gas to be found in the shale samples.
- **Socio-economic task:** To determine the impact to be caused by the shale gas developments in the Karoo both socially and economically.

#### Progress

A CGS shale gas workshop was conducted on 1 and 2 February 2016 and two international shale gas experts were invited to present and guide the project. Three oral and two poster presentations from the project tasks were presented at the workshop.

The geology task group reviewed existing historical geological data and unpublished reports, such as geological maps, regional cross-sections and structural interpretations of the Beaufort West area. A site visit for the validation of the geology and the structural geology was conducted. A 1:65 000-scale geological map covering the study area was produced. Finally, all data collected during this phase were collated to create a 3D model of the subsurface geology. The creation of the 3D model was complemented by boreholes of the National Groundwater Database to highlight the groundwater dynamics and previous SOEKOR exploration data from five deep boreholes. This model will assist in making important predictions prior to and during the deep drilling

programme and is expected to evolve continually as the project progresses.

The geophysics task interpreted the SOEKOR seismic lines in view of confirming the depth of and the subsurface layers to the Whitehill Formation and below. The data extracted assisted with the validation of the character of and seismic attributes associated with the Whitehill Formation. The task also conducted a literature survey of the airborne geophysics flown in some parts of the Karoo. Within the Inkaba yeAfrica project, magnetotelluric (MT) data were acquired along three profiles across the Karoo Basin in South Africa. The MT data revealed a continuous, conductive layer, probably associated with the Whitehill and Prince Albert Formations as well as deeper formations. This conductive horizon can be traced throughout the entire Karoo Basin in a north to south direction and possibly for another 350 km towards the east.

The surface and groundwater baseline investigations for the hydrogeology task will be conducted on the J21A catchment. Boreholes within a 10 km radius around the proposed borehole site will be evaluated continually and assessed for surface and groundwater quality analysis.

The hydrogeology task reviewed groundwater quality data using historical data from the Department of Water and Sanitation (DWS). In addition, a hydrocensus (borehole audit) was conducted to confirm both the surface and groundwater quality of the area and to generate a water quality database of the area to be drilled. The hydrocensus was followed by two field visits during which water samples were collected for laboratory analysis. As part of a developing environmental plan, a field visit was conducted focussing on the fauna and flora of the area.



Dark-grey shale containing abundant lighter coloured tuff beds of the Collingham Formation overlying black carbonaceous shale of the Whitehill Formation at 420.46 m depth in the upper right of the core box. A sample of core has been removed for desorbed and residual gas analysis.

### 5.1.2 Management of D&O mines in South Africa (ST-2013-1165)

During the reporting period, good progress was made in the various task areas of the management of D&O mines project. In particular, field investigations were conducted in various provinces, the database was developed and data capture was improved. Work also included the closure of unsafe mine openings, specialist studies and postclosure rehabilitation monitoring and maintenance.

The field investigation report shows that 100% of the D&O mines have been visited since the 2012/13 financial year and that 95% of the investigated D&O mines have been captured in the database. All the visited D&O mines have been ranked and prioritised for rehabilitation per province. A total of 1 199 no-access sites have been checked on the South African Mineral Resources Administration System (SAMRAD) to verify whether there are mining rights linked to these sites. It appears that the largest number of prospecting rights have been issued in the

Limpopo Province, mainly as a result of the prospecting of minerals such as gold, corundum, tin and copper, whereas Mpumalanga has the most mining rights owing to the demand for coal, gold and silver and the availability of commodities in that province.

Three major projects related to the closure of mine openings were initiated early in the year, one each in Limpopo (19 openings), Gauteng (20 openings) and Mpumalanga (21 openings). The initial plan had been to close ten mine openings in Limpopo; however, nine more shafts were added to arrive at a total of 19 in Limpopo. This addition was made as a result of an anticipated delay in the Gauteng project resulting from alleged collusion, an issue which still needs to be resolved pending internal investigations. The Limpopo project was subdivided into four components, namely the Blaauwberg Lead Mine subproject (with four shafts, waste rock dumps and a tailings dam with a footprint evidenced by a lack of vegetation), the Ka-Xikukwani Village subproject comprising five openings (two shafts and three inclined openings) with small dumps around the mine area,



Abandoned Marsfontein diamond mine pit in the Limpopo Province.



A handheld XRF spectrometer is used for in situ geochemical analyses.



An unrehabilitated abandoned gold mine dump at the Osprey gold mine.



CGS scientists investigating a dangerous open shaft at the Louis Moore gold mine in the Limpopo Province.

the Ennis subproject with five shafts and the Ellerton subproject comprising five shafts. The Gauteng and Mpumalanga projects were also divided into subprojects.

Although the Council for Geoscience had planned to close 34 mine openings in Limpopo during the 2015/16 financial

year, only 19 mine openings were closed. The Ennis (5 shafts), Blaauwberg (4 shafts) and Ellerton (5 shafts) subprojects were completed during the year. The initial plan was to close 20 mine openings in Gauteng, but only six shafts were closed owing to delays caused by illegal miners and collusion in one of the tenders. Closure of the

remaining 14 shafts in Gauteng will be undertaken in the 2016/17 financial year. A total of 46 mine openings (19 in Limpopo, 21 in Mpumalanga and 6 in Gauteng) were closed in the 2015/16 financial year.

The project is also investigating passive treatment technologies for the mitigation of the effects of acid mine drainage (AMD) at coal and gold mine sites where high metal concentrations have been detected. Dispersed alkaline substrates (DAS) technology is being considered as a treatment option for the eMalahleni coalfield. The seasonal efficiency of the technology will also be monitored to assess its effectiveness.

Specialist studies are ongoing and progressing on schedule. These studies are aimed at assisting decision making during the prioritisation of rehabilitation programmes. A technical progress report on the specialist studies employed was completed during the year.

### 5.1.3 Mine water management programme (ST-2016-1251)

The mine water management programme is being undertaken by the Department of Mineral Resources and the Council for Geoscience, with the following high-level objectives:

- Technical support to the DMR, specifically the Directorate: Mining Environmental Research and

Sustainable Development, on matters related to mine water.

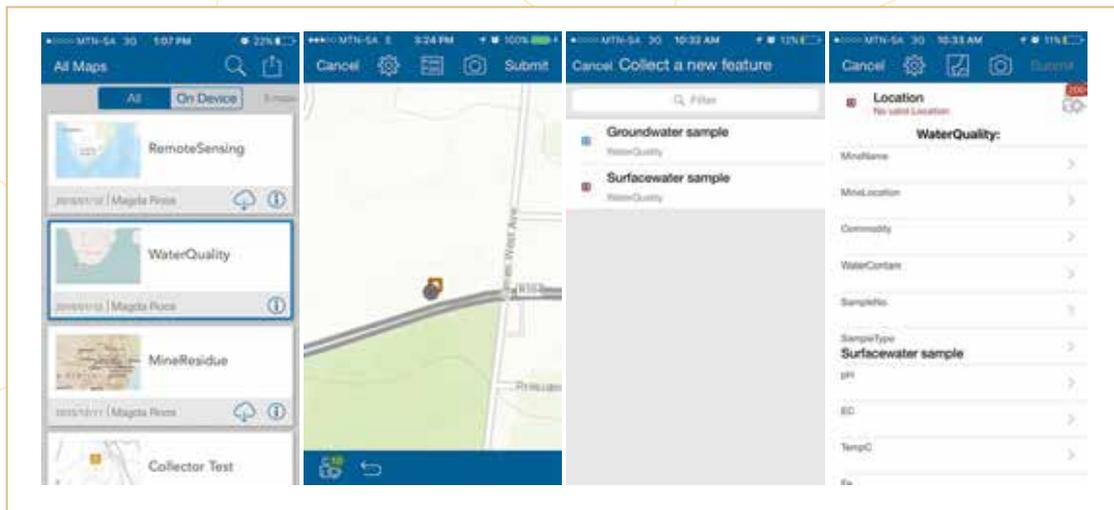
- Development of a mine water database.
- Solution-oriented mine water management.
- Mine residue pollution solutions.
- Assessment of potential water and other environment-related constraints on mineral development.

A number of tasks were undertaken to support these objectives, which can be broadly summarised as follows:

1. All project data and related mine water information are being compiled into a single, secure, web-accessible database, with the goals of:
  - Preservation of institutional memory
  - Project continuity
  - Rapid access to information and improved response time to queries.

Systems have been established for secure access to project data via a web interface as well as the uploading of field data directly to the project database using a mobile application.

2. Passive treatment of mine water is the treatment of water using locally available materials and natural



Visual representation of mobile phone interfaces for spatially referenced data capture in the field.



Repairs to the Florida Lake canal.



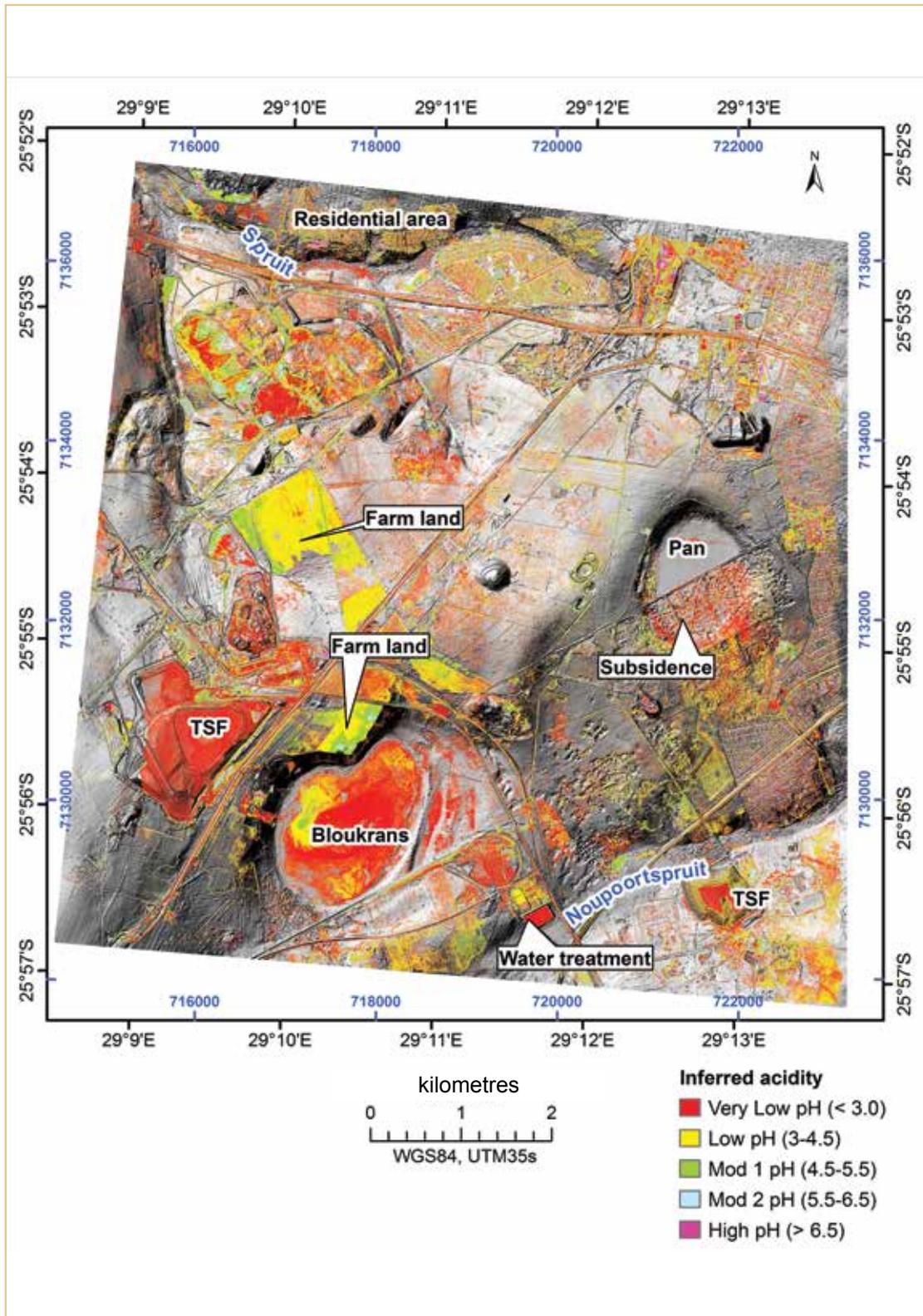
Deep gully erosion along the berms of an old tailings dam wall, Fairview mine, Barberton, Mpumalanga Province.

processes, with minimal external energy input. Where applicable, passive treatment offers a sustainable option to the often expensive methods used in mine water treatment. Two pilot plants for the passive treatment of acid mine drainage from non-operational coal mines in Mpumalanga were operated during the past financial year:

- A Reducing Alkalinity Producing System (RAPS) plant, combined with an open limestone drain, constructed during the previous financial year, was operated for the full year at an acid mine drainage discharge near Carolina. This demonstrated the effectiveness of the system, producing neutral water and removing most metals for more than 12 months.
  - A hybrid plant, combining a RAPS and a Dispersed Alkali Substrate (DAS) system, was installed at the discharge from an abandoned mine at eMalahleni. This system showed great promise, removing all metals and adding alkalinity to the water. Unfortunately, the site was vandalised after a few weeks of operation.
3. The Florida Lake canal, constructed to reduce the ingress of water into the underground workings in the Central Rand, had been vandalised and damaged due to the actions of illegal miners operating in the area. Repairs were undertaken and, where possible, more robust construction methods were used.
  4. A number of studies of mine residues were undertaken with the aim of reducing their environmental impact:
    - The geotechnical and geochemical properties of a number of materials were tested to determine

their suitability as backfill materials. Backfilling mines with residue materials has the potential to reduce water pollution by preventing water ingress, improve the stability of the ground above abandoned underground mines and, in the case of coal mines, to prevent and mitigate spontaneous combustion.

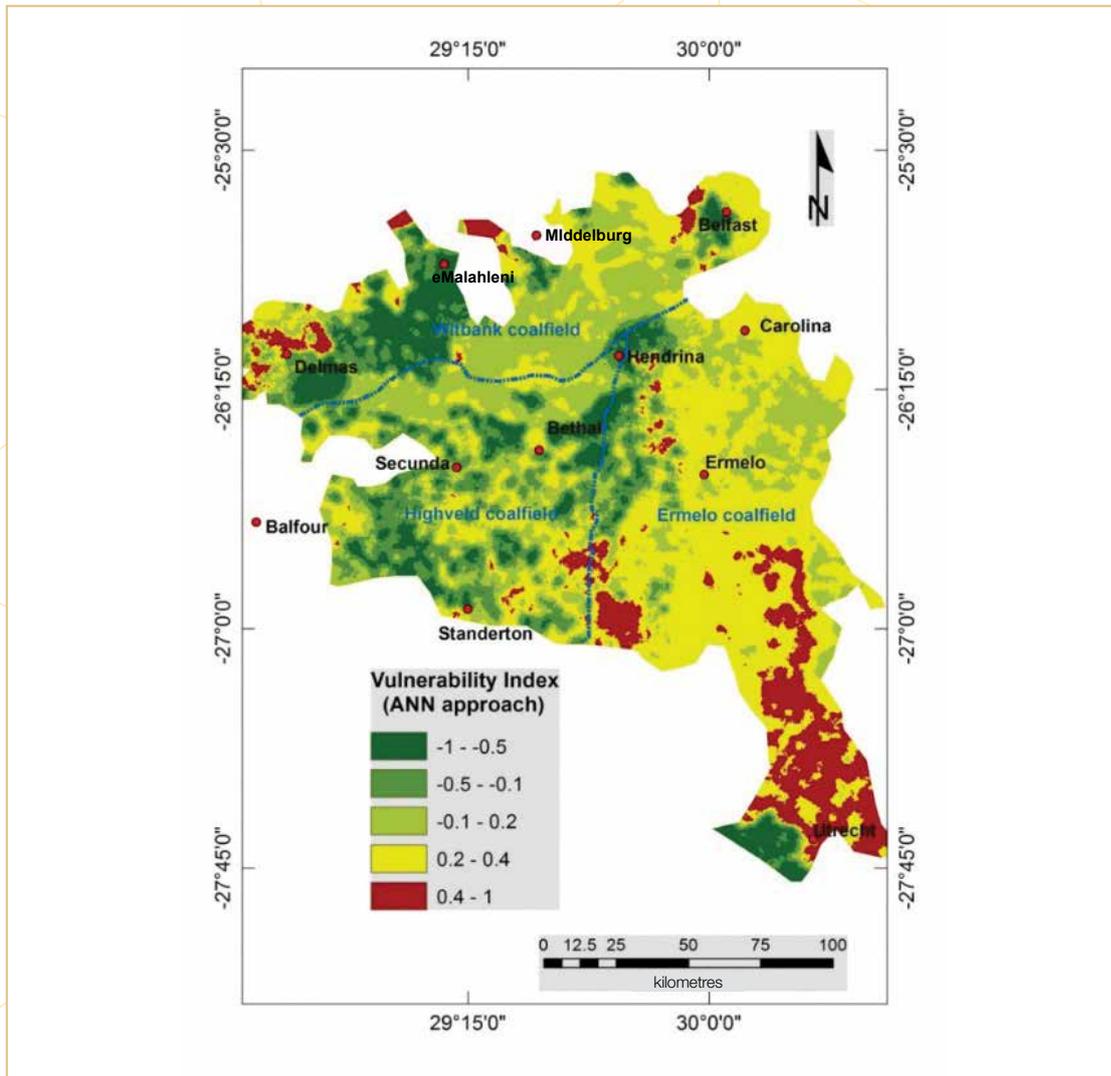
- The potential for the recycling of mine residues was investigated, focussing on residues from derelict and ownerless mines.
  - Research was undertaken on the valorisation of mine waste materials, looking at novel technologies for the transformation of wastes into useful products such as nanoparticles, which could be applied in water treatment, and geopolymers, which could be used as construction materials.
  - A geotechnical study of mine residues was undertaken with the aim of assisting the DMR in the regulation of mine residue deposits. A number of geotechnical issues were identified and a checklist for the inspection of mine residues was proposed.
5. A detailed hydrogeological study of the Free State Gold Field was undertaken. Pollution impacts relating to both poorly managed wastewater treatment plants and mines in the area were identified. These pollution streams were found to have distinct chemical signatures, allowing the identification of pollution sources. A number of recommendations were made to improve mine water management in the area.
  6. Remote sensing studies were undertaken covering the Free State Gold Field, KOSH (Klerksdorp–Orkney–Stilfontein–Hartebeestfontein) Gold Field and portions of the Mpumalanga coalfields. A



Inferred acidity in a portion of the Mpumalanga coalfield, derived from hyperspectral data overlain on a digital terrain model.

number of products were presented. Combining different remotely sensed and spatial methods, it was possible to directly detect pollution and to predict the dispersal of pollution in the environment.

7. Studies looking at the environmental and water-related constraints on current and future mining were undertaken. These included:
  - An assessment of the vulnerability of groundwater to mining developments using a number of statistical and artificial intelligence tools. A better understanding of groundwater vulnerability will allow better regulation of existing mines and the development of more appropriate licencing conditions for future mining activities.
  - An assessment of the availability of groundwater to support potential mining activities and the establishment of groundwater quality baseline information in the Tugela mineral province, an area under investigation as part of the target generation activities of the Council for Geoscience.
  - An approach to the environmental screening of new mining areas was presented and illustrated with a case study looking at the Giyani Greenstone Belt. This provides decision support tools that can be applied in a variety of mining settings.
  - An assessment of the water quality and the availability of water quality data was undertaken for the coalfields of South Africa. Poor water quality was identified in historical and existing areas of extensive coal mining, particularly in Mpumalanga. A particular concern was the lack of baseline information, necessary for determining licencing requirements in new and potential mining areas.
8. Measures to reduce the cost of mine water management in the Witwatersrand were identified:
  - Reduction of the ingress of surface water into underground mine workings to reduce the volume of water requiring pumping and treatment. The implementation of physical measures is a high priority and future research should support implementation.
  - Determination of more precise environmental critical levels to allow the water to rise to shallower depths than currently proposed. This will reduce the cost of pumping and could create opportunities which would allow alternatives to pumping, such as discharge tunnels, to be implemented. Furthermore, flooding to shallower levels will exclude oxygen from a larger portion of the mine void, reducing the amount of acid mine drainage generated.
9. Information on appropriate liners for mine residue deposits was compiled:
  - Identification of the sources of water entering the mine voids, especially where these sources may be controlled to decrease the volume of water. Possible water sources include mine residue deposits and leaking municipal potable water, as well as sewage and storm water infrastructure.
  - Investigation of the feasibility of using backfill to reduce the volume of water entering the underground mine workings.
  - More focussed monitoring of mine voids and surrounding water resources needs to be undertaken to reduce uncertainty in the solutions proposed and to provide a benchmark against which the success of the measures implemented can be measured.
9. Information on appropriate liners for mine residue deposits was compiled:
  - Three main categories of barrier systems are used:
    - Engineered clay layers, which take advantage of the extremely low permeability of clays to prevent seepage from the tailings pile into the underlying groundwater.
    - Artificial liners, for example high density polyethylene (HDPE) sheets, which form an impermeable barrier at the base of the tailings pile.
    - Fine tailings may compact under the weight of the overlying tailings to form an impermeable barrier at the base of a tailings pile. Increasing the height of the tailings pile will cause this compaction, but may also increase the hydrostatic head at the base of the pile, allowing flow through this type of barrier.
  - The choice of an appropriate liner system should be site specific, taking the local environmental conditions as well as the nature of the tailings to be deposited into account.
  - The importance of drainage systems at the top and base of operational tailings dams was highlighted,



ANN groundwater vulnerability results of the Witbank–Highveld–Ermelo coalfields.

looking at both environmental and geotechnical considerations.

- Care must be taken in the assessment of proposals to ensure that:
  - All feasible options have been considered and fairly assessed.
  - Models used have been properly calibrated to reflect site-specific conditions.
  - Appropriate monitoring systems (piezometers, lysimeters, regular geophysical surveys, etc.) are put

in place to validate the models used and to monitor the performance of the systems.

- In the case of existing facilities where it is not feasible to retrofit liners, in particular some derelict facilities, appropriate engineering measures, including covers which prevent infiltration and provide adequate groundwater protection, need to be considered.
10. Answers were drafted for parliamentary questions related to the impact of mine water on the Cradle of Humankind World Heritage Site and the impact of mine residues on communities in Gauteng.

**5.1.4 Promotion of exploration and mining investment (ST-2013-1163)**

New discoveries of mineral deposits in mature mineral belts in general and in South Africa in particular require a new approach to maximise the use of advancements in technology and to form an understanding of ore-forming processes. This endeavour requires a conceptual understanding of mineral systems and the integration of multiple geoscience datasets including mineral deposits, geophysical, geochemical, geological, structural and remote sensing data and other relevant information in order to investigate the subsurface and to generate mineral potential targets in greater detail.

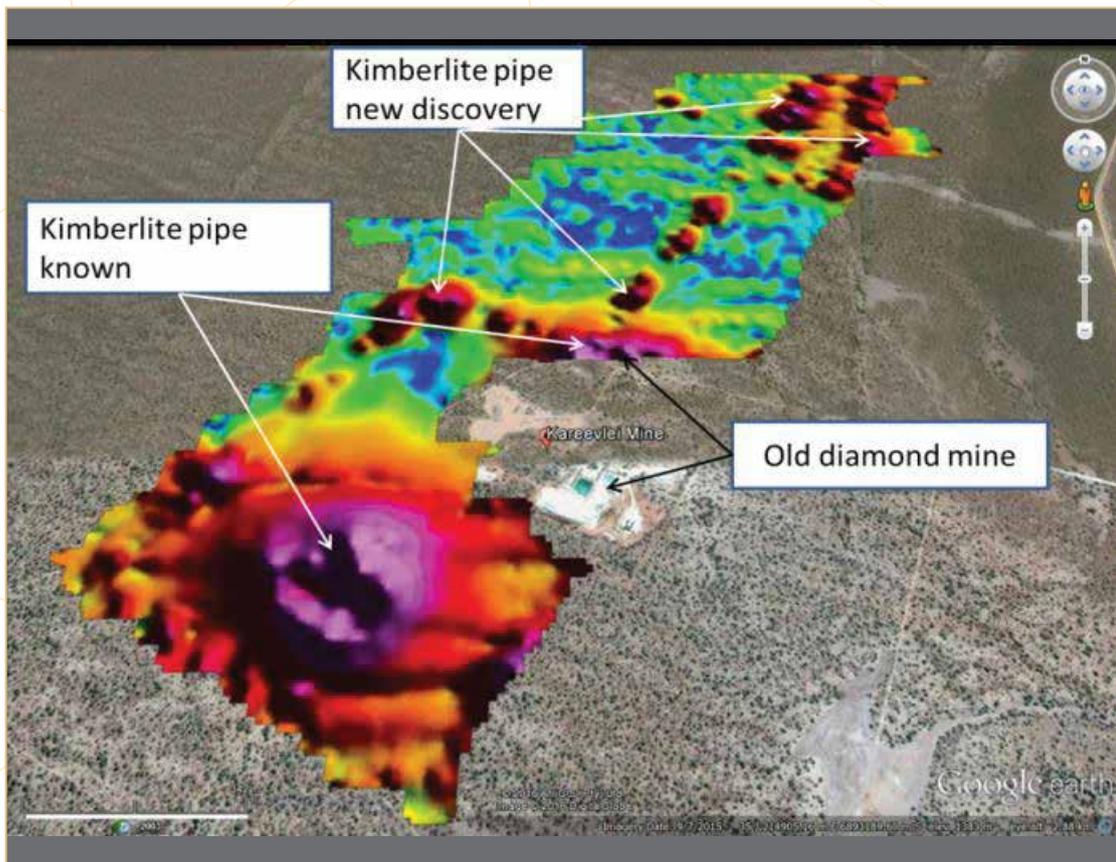
This MTEF project has the objective of stimulating investment in exploration/mining in South Africa by providing new high-quality geoscience data and mineral prospectivity maps. This is the third year of the MTEF programme which started in 2012/13. The project has now been extended to 2017/18.

The project involves:

- Desk studies for area selection as well as more focussed literature reviews on selected project areas in order to understand all aspects of mineralisation, which will aid data synthesis and interpretation.
- Acquisition of high-resolution airborne geophysical surveys (200 m line spacing) and regional and semiregional soil sampling (four samples/km<sup>2</sup> and eight samples/km<sup>2</sup>, respectively).
- Data processing, interpretation, integration and production of mineral prospectivity maps accompanied by reports.

*Project areas investigated during the financial year*

**Tugela Terrane in KwaZulu-Natal** — An airborne geophysical survey of magnetic and radiometric surveys and soil sampling on a grid of 500 x 500 metres, as well



Magnetic map of the Kareevlei mine in the North West Province.



(a) Gravity survey across suspected Rietputs-type gravel channels near Windsorton, Northern Cape Province. (b) Electrical resistivity tomography survey for alluvial diamond exploration near Schweizer-Reneke, North West Province.

as an airborne electromagnetic survey on a smaller part of the same area have been completed. A report has been compiled and the project is now closed. The major finding of this project is the identification of gold potential targets of which the economic potential needs further investigation.

**Pofadder–Upington in the Northern Cape** — Airborne magnetic and radiometric surveys and soil sampling

on a grid of 1 x 1 kilometres have been completed. A geophysical report has been completed. Soil analysis is ongoing and is expected to be completed in mid-2016. A report of the exploration work will be completed in 2016/17.

**Alluvial diamond fields in the North West Province** — Multidisciplinary investigation of airborne geophysical survey, alluvial mapping and remote sensing data



Setting up the hand-held acquisition computer for a time domain electromagnetic survey over a kimberlite target south of Reivilo, North West Province.

interpretation have been carried out. Remote sensing data interpretation is complete, but the other two investigations are still ongoing. Based on preliminary results of the alluvial field mapping, a ground geophysical investigation has been conducted on selected small areas. This investigation identified kimberlite pipes that were not previously known. The investigation will be extended to 2016/17.

**Sabie-Pilgrim's Rest Gold Fields in the Barberton area** — Airborne geophysical surveys and a report have been completed. Structural mapping that started in 2015/16 is still ongoing. Soil sampling will be undertaken in the 2016/17 financial year.

**Bushveld region** — Follow-up soil sampling on targets identified from regional soil data has been carried out. A total of 8 700 samples have been collected and sample preparation and analysis is ongoing. The main mineral targets are the granite-related Rare Earth Elements (REE)

and Lead-Zinc-Silver. A report on one target has been completed.

**Aggregate quality assessment in the Eastern Cape**

— Field sampling of selected areas has been completed, however, the geotechnical investigation is continuing. This project will support the infrastructure plan of government.

*Project deliverables as per the contract*

- Raw airborne geophysical data (200 m line spacing) intended to be used in future geoscience research.
- Raw soil analytical data (collected on 1 x 1 km grid, 500 x 500 m grid, follow-up 250 x 100 m grid).
- Maps, mainly mineral prospectivity maps showing mineral potential target areas (synthesised and integrated product of various geoscience maps) and various types of intermediate maps accompanied by explanatory reports.



Airborne soil sampling in the Tugela area.

**5.1.5 Seismic microzonation of Johannesburg (ST-2015-1226)**

The Council for Geoscience is developing a seismic microzonation model for Johannesburg, including those



Public awareness campaign in the KOSH area.

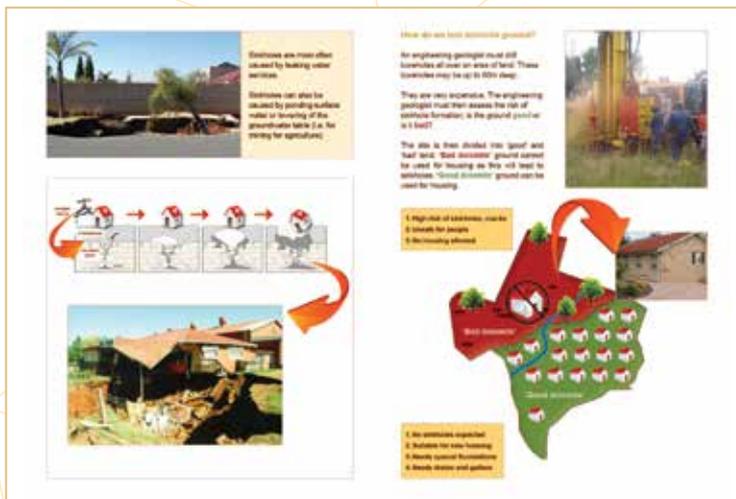
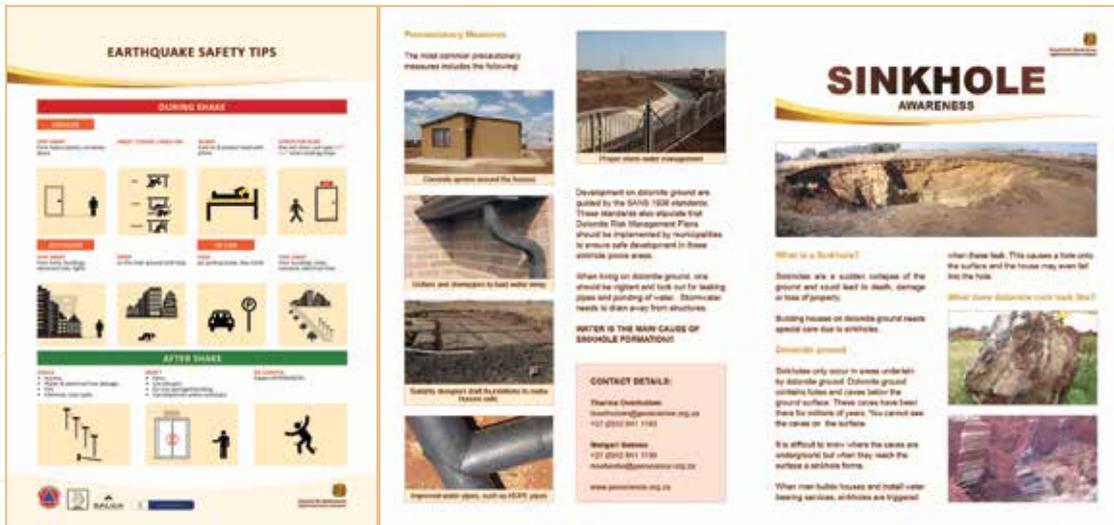
areas underlain by abandoned and flooded mines, which can assist in the mitigation of possible earthquake damage in the area.

Seismic microzonation is a process used to identify seismic hazards at different locations within an area and is essential in identifying potential seismic “hot spots”, which may affect critical structures, for example subways, bridges, elevated highways, sky trains and dam sites (including tailings dams from the mines).

Multichannel analysis of surface waves (MASW) surveys have been completed and site-specific, shallow shear-wave velocity profiles are being produced. These shear-wave velocity profiles will be used to model the effect of the near-surface structure in anticipation of ground motion amplification. Both study areas, the City of Johannesburg

(CoJ) and KOSH (Klerksdorp–Orkney–Stilfontein–Hartebeestfontein), were divided into grids of 2 and 1 degree spacing, respectively. The MASW method was employed within each grid block, ensuring full coverage of the target areas.

Geophysical surveys were conducted using the multi-electrode resistivity technique to investigate depth to bedrock around the City of Johannesburg and KOSH as part of developing the microzonation model. The sites were selected based on the availability of borehole information and guided by the microzonation grid map. The electrical resistivity tomography (ERT) results provided greater resolution of geological units highlighting variations in depth to bedrock at a localised scale as opposed to the more regional scale for which the microzonation information is required.



A campaign was launched to create awareness amongst the public of geohazards such as sinkholes and earthquakes. Educational tours and road shows were undertaken to schools, shopping malls and public areas.

The public awareness campaign in the KOSH area has been very successful. The Council for Geoscience designed and printed a number of flyers and posters for the public and presented talks to the stakeholders. This is considered a pilot project, which, if successful, may be extended nationwide.

### 5.1.6 Laboratory services recapitalisation (BL-2013)

The main objective of the Council for Geoscience is to improve the services and quality of analytical and research work offered by the CGS Laboratory. The project will focus on the following issues:

- Capacity expansion
- Service scope expansion

- Replacement of old, obsolete or uneconomic-to-maintain instruments and equipment
- Quality improvements
- Complete implementation of the Laboratory Information Management System (LIMS)
- Recruitment of key technical staff
- Development of a geotechnical laboratory section
- Safety improvements.

The expected benefits of the project are:



The Council for Geoscience is expanding the capacity and service scope of its laboratories by replacing old and uneconomic equipment.

- Improved reporting turn-around times on analyses and projects
- Expanded service scope offered by the CGS Laboratory to internal and external customers
- Quality output using state-of-the-art modern instrumentation
- Good data and information management using LIMS
- Technically competent staff and a centre of excellence
- Laboratory services will remain relevant
- Geotechnical laboratory facility
- Safe working environment.

#### **5.1.7 New 1:1 000 000-scale geological map of South Africa (ST-2013-1179)**

The last version of the 1:1 million-scale geological map of South Africa was released in 1997. It has become customary for the Council for Geoscience to release new editions after substantial changes to the 1:250 000-scale map database have occurred. This project therefore aims to collate the latest seamless 1:250 000-scale map data into a new version that will be released at the 35<sup>th</sup> IGC in August 2016.

The project comprises the revision, recompilation and assembly of a new version of the 1:1 000 000-scale geological map of South Africa, Lesotho and Swaziland. The project started as a consultation to incorporate the most recent thinking on lithostratigraphic subdivisions in southern Africa. This was followed by data acquisition and auditing involving the various 1:250 000-scale maps, an exercise which evolved into the compilation of the new map edition, and which has now largely become a GIS exercise, with related quality control by the project manager and other specialists.

#### **Activities during 2015/16**

a) Collation of the 1:250 000 data from the regions

Some of the attribute tables received from the regions were comprehensive, but others lacked age data and an

updated classification of the geochronology according to the newest units of the IUGS. Manual compilation of all polygon boundaries and major faults onto the chronars was completed by the end of August 2015, after which the chronars were sent to the KIMS (Knowledge and Information Management Services) division for vectorising, line cleaning, polygon building and coding. Data for Lesotho and Swaziland were sourced from information held at KIMS.

b) Vectorising, line cleaning and coding

This task essentially entails the conversion of the line data on the two polyester overlays into polygon shapefiles. This is achieved by first applying an automated process to the scanned overlay, followed by a very tedious process of "line cleaning" to ensure that all polygons are properly closed and seamless across the 1:250 000-scale dataset.

c) Review

The task entails the checking of data for the western and eastern chronars on A3 paper copies of every 1:250 000-scale map area. These copies are also used to code the faults.

d) Legend

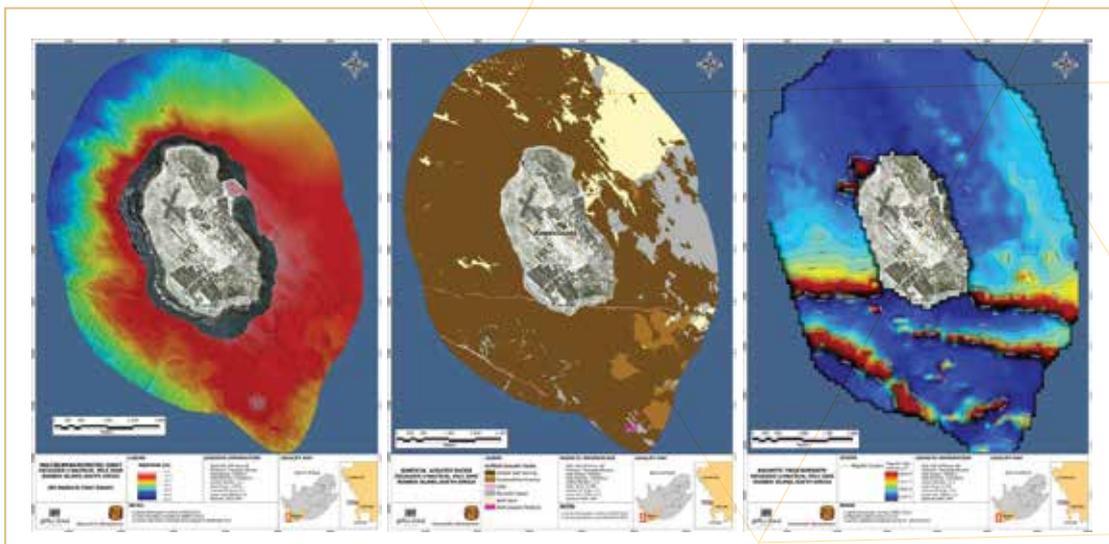
The legend is compiled from the attribute data of the vast number of different lithostratigraphic units on the map. Legend compilation includes the compilation of one final attribute table for the geodatabase, showing information such as the age, colour choice, hatching choice, updated labels and generalised lithology for each lithostratigraphic unit, and the assembly of a style sheet.

The map to be released at the 35<sup>th</sup> IGC will be the first version of the 1:1 000 000-scale map that will be compiled from start to finish in a modern, digital GIS environment. Although the map is the main deliverable of this project, other by-products will include a largely seamless 1:250 000-scale database with revised and extended attribute tables which, when properly audited, will facilitate the compilation of other map legends.

#### **5.1.8 Marine geological mapping (ST-2016-1261)**

The Council for Geoscience has developed two large-scale projects aimed at addressing some of the major offshore issues of the South African coast:

- Sediment dynamics as a means of understanding the availability of sediment as a mineable commodity for aggregates and building sand.
- Offshore geophysical datasets were acquired along the Atlantic seaboard of the Cape Peninsula from Hout Bay to Mouille Point and from the tombola between Robben Island and Big Bay.
- At all the localities, multibeam bathymetric data were acquired at a resolution of 1 m, producing digital elevation models of the seafloor from as close inshore as was safe to navigate to approximately 60 m water depth. From Hout Bay to Mouille Point, seafloor textural data were acquired using a sidescan sonar to delineate the surficial seafloor geology. Marine magnetic data were acquired for the same region charting the offshore dolerite dyke swarm at previously unparalleled resolution. Medium and deep penetration subbottom profiling data were collected to help delineate the geological evolution of the region and to calculate sediment thicknesses in the areas where relative accumulations have occurred.
- For the Atlantic Seaboard area, over 100 surficial sediment samples were acquired and analysed using an in-house developed sediment settling tube to compute the sedimentary statistics and physical properties. The data were gridded and presented spatially showing the various sedimentological trends for the area.
- To date, one MSc dissertation has been completed on the data acquired within Hout Bay with another dissertation in progress for the area from Hout Bay to Mouille Point.
- Supplementary to the offshore geophysical datasets collected, onshore beach elevation data for beaches along the northern rim of False Bay were acquired using a mobile laser scanner. These beaches are postulated to be the source of the offshore sediment conveyor around the Cape Peninsula and understanding their dynamics is pivotal to understanding the offshore sediment dynamics.
- Geophysical mapping of the exclusive one nautical mile zone around Robben Island
- In 1996, Robben Island was declared a national monument in terms of the National Monuments Act of South Africa. The island and its buffer zone of one nautical mile are legally protected as a National Heritage Site through the National Heritage Resources Act (Act No. 25 of 1999), the World Heritage Convention Act (Act No. 49 of 1999), the Cultural Institutions Act (Act No. 119 of



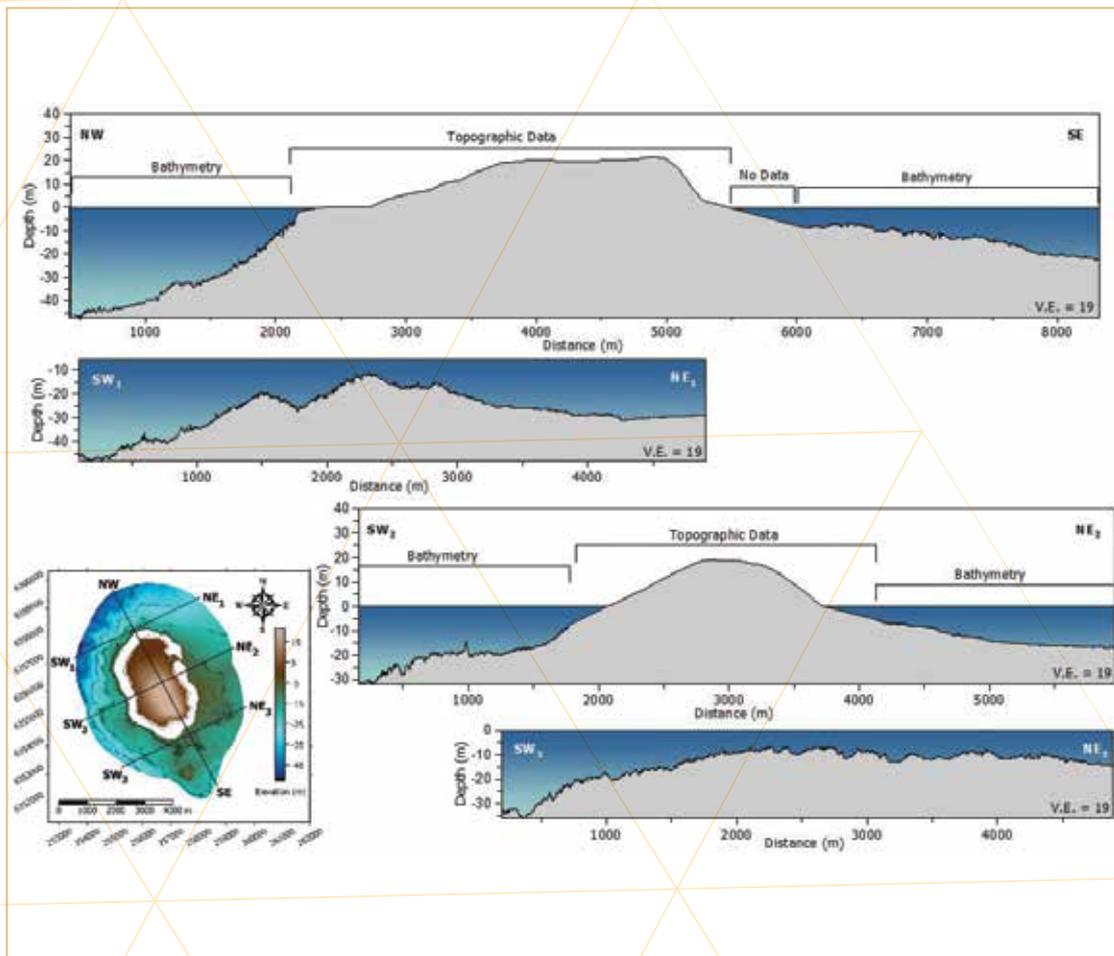
Multiyear bathymetry, surficial acoustic facies (seafloor geology) and magnetic field intensity of the one nautical mile zone of Robben Island.

1998), the National Environmental Management Act (Act No. 107 of 1998), the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) and the National Environmental Management: Protected Areas Act (Act No. 57 of 2003).

- The stewards of the UNESCO world heritage site (Robben Island Museum) have requested the Council for Geoscience to map this sensitive zone to enable them to better manage its resources and to educate and enrich the visitors' experience to the island.
- The surficial geology within this zone represents the largest and best-preserved exposure of the Malmesbury terrain ever mapped and should shed light on the tectonic and structural setting of this poorly understood zone of the Neoproterozoic–

Early Cambrian Saldania orogenic belt.

- To date, the following geophysical datasets have been acquired, processed and interpreted:
  - Multibeam bathymetric data
  - Marine magnetometer data
  - Surficial seafloor facies (geology) data
  - Sediment isopach (thickness) data
  - Sediment composition/grain size analysis.
- After all the datasets have been interpreted, scientific papers and a CGS bulletin will be compiled for the area.



Selected elevation profiles across the nautical mile zone and Robben Island.

**5.1.9 Carbon capture and storage (CCS) technologies in South Africa (ST-2013-1183)**

The Council for Geoscience and the South African Centre for Carbon Capture and Storage (SACCCS), represented by the South African National Energy Development Institute (SANEDI), signed an service level agreement (SLA) during the reporting period. The SLA determines that a number of work packages (WPs) as defined by the SACCCS can be added as required in future.

**WP1 – Bongwana natural CO<sub>2</sub> release monitoring programme**

A delegation from the Scottish CCS, the British Geological Survey and the Universities of Edinburgh and Strathclyde

undertook a field excursion to the Bongwana natural CO<sub>2</sub> release site in September 2015 in view of increasing South African scientific capacity and knowledge on CO<sub>2</sub> monitoring in the subsurface. A report outlining the initial findings was compiled and submitted to SANEDI in March 2016. These results are being utilised to formulate a proposal for continued onsite monitoring.

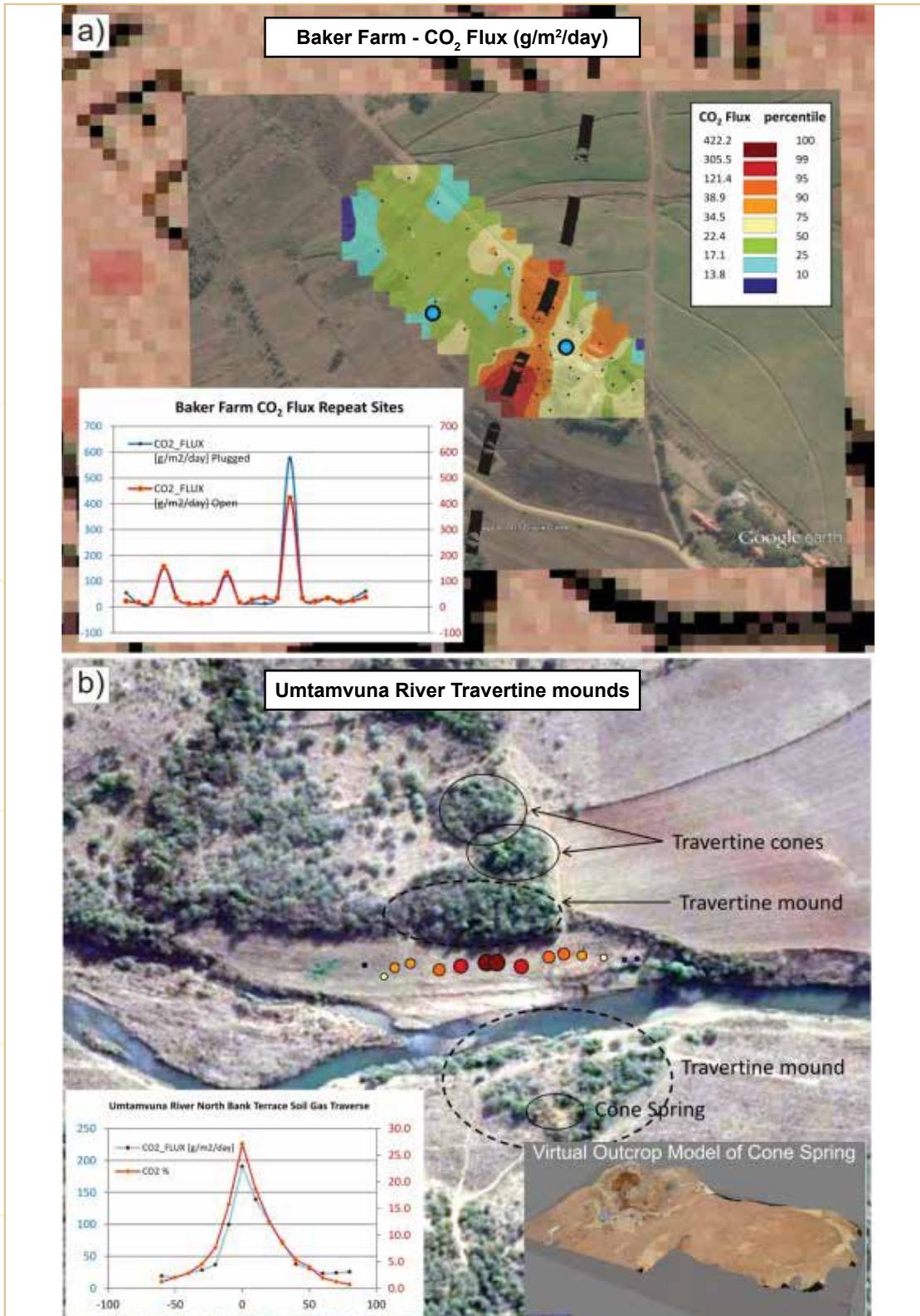
**WP2 – Data inventory**

In December 2015, SANEDI and the Council for Geoscience signed a proposal and budget for an inventory of all available and known data relating to CCS in the onshore Zululand and Algoa Basins in South Africa. This contract makes provision for the mentoring of HDI staff in South Africa by creating a comprehensive



Sampling and analyses being undertaken at various sites around Bongwana in KwaZulu-Natal. (a) Delegates discussing the geology of the area, (b) water sampling, (c) soil gas sampling and (d) soil flux measuring at Baker farm, (e) CO<sub>2</sub> gas sampling at Umtamvuna.





Soil gas and soil flux results for Baker farm and travertine cone exposures along the Bongwana fault.

database of all literature and information housed at the Council for Geoscience, PASA and other relevant institutions. An inventory of all available data at the Council for Geoscience and PASA was undertaken and the information amalgamated into a searchable database. The database and a final report have been submitted to SANEDI for comments.

**Assessment of the CO<sub>2</sub> storage capacity of the Mesozoic succession, Durban Basin, off the KwaZulu-Natal coast**

The project is co-funded by a bursary grant supplied by the SACCCS as part of SANEDI. A PhD study related to this project has been registered at the University of KwaZulu-Natal. The project is ongoing with seismic analysis of the offshore Durban Basin being undertaken at the University of KwaZulu-Natal using academic licence software. CCS is one of the fundamental approaches to mitigating global climate change by capturing and injecting CO<sub>2</sub> into suitable geological reservoirs. The *Atlas on geological storage of CO<sub>2</sub> in South Africa* contains a number of possible onshore and offshore repositories within South Africa, specifically the Durban Basin, that conform to the prerequisites of carbon capture and storage.

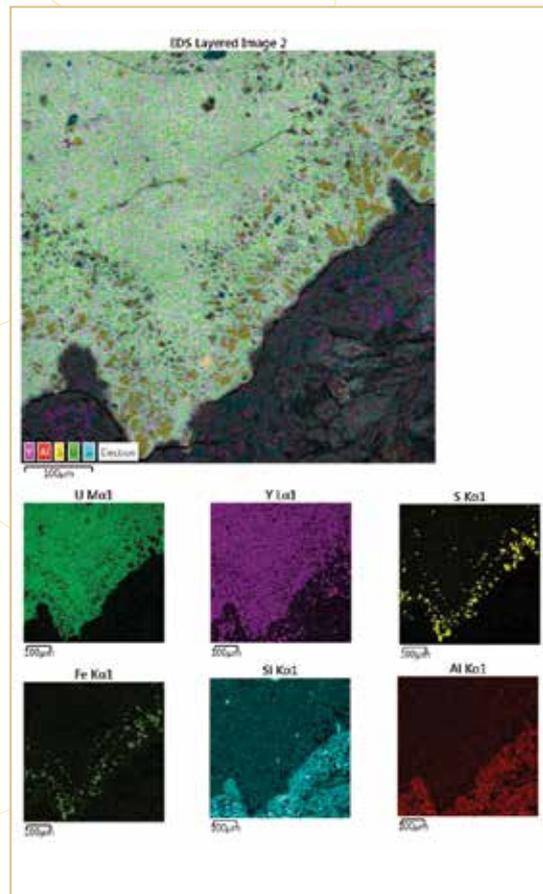
A 4D (3D time-lapse) static model has been produced for the basin, which identifies numerous basin floor fans and shallow-marine sandstones within the basin. The objective of the study is to define the sedimentary history of the offshore basin fill and to quantify the CO<sub>2</sub> storage potential of prospective reservoir sandstones.

**5.1.10 Uranium research studies in the Springbok Flats Basin, South Africa (ST-2013-1182)**

This is a collaborative research project between the Council for Geoscience, University of Johannesburg, the Centre of Excellence for Integrated Mineral and Energy Resource Analysis (CIMERA) and iThemba Laboratories in Somerset West, Cape Town. The project involves a detailed investigation of uranium mineralisation in the Springbok Flats Basin, South Africa. Uranium is currently being used as a nuclear fuel to generate electricity in nuclear power stations. In contrast to energy produced by coal-fired power stations, nuclear energy from uranium is relatively cheap and does not contribute to climate change. Uranium resources in the Springbok Flats Basin have never been exploited and information regarding these resources is not currently available to



Uranium-rich veins within the mudstones of the Volksrust Formation.



Elemental maps of uranium-rich veins of the mudstones of the Volksrust Formation.

the public. This research project was therefore initiated to better understand the relationship between coal and uranium in the Springbok Flats Basin together with information regarding type, content and feasibility for extraction, which will be invaluable in contributing to achieving the objectives of the 2011 South African Government Beneficiation Strategy.

Detailed analysis of coal samples were conducted at the iThemba Laboratories using proton-induced X-ray emission (PIXE) in conjunction with a nuclear microprobe technique to understand the distribution of uranium in the coal samples of the Springbok Flats. Characterisation of Springbok Flats coals in terms of maceral content and rank was conducted at the University of Johannesburg. Preliminary results were presented at the SGA 2015 Conference in Nancy, France, the PPM Colloquium at the University of Johannesburg and the Council for Geoscience Conference 2016. Two papers on coal quality and uranium mineralisation are currently being written for publication in international journals.

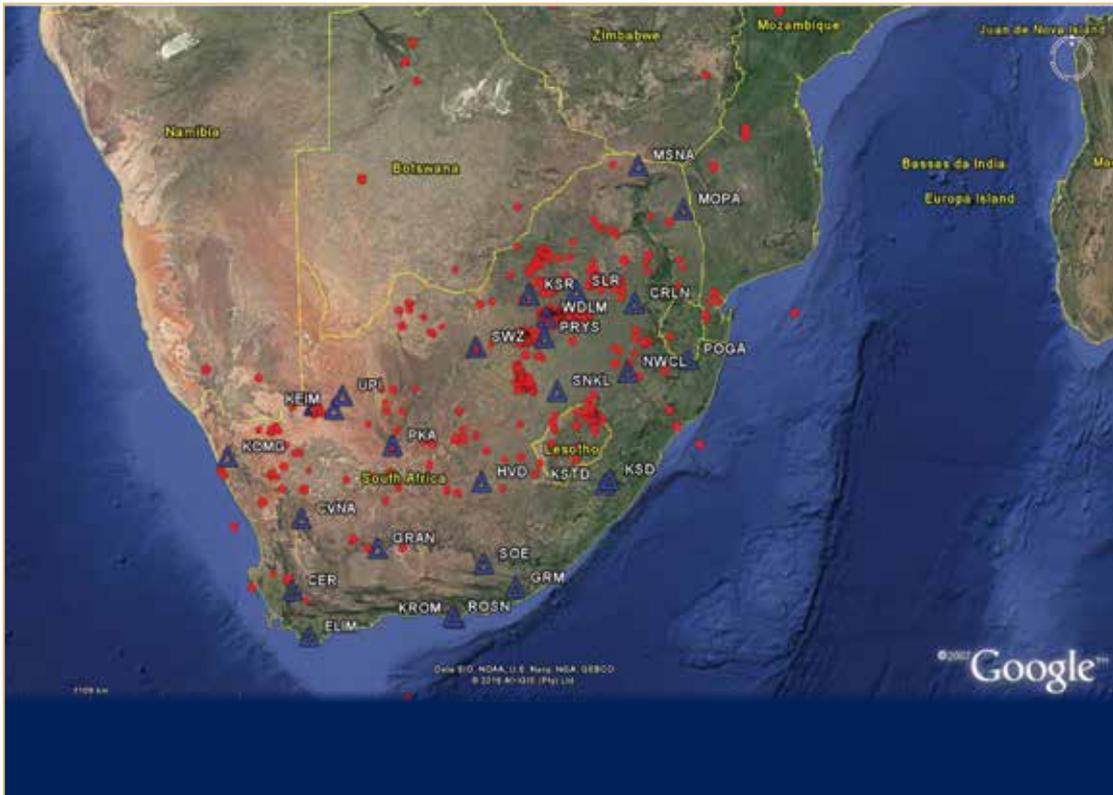
#### 5.1.11 Seismic activity in southern Africa (ST-2000-0184)

Two tectonic earthquakes measuring  $M_L \geq 4.0$  were recorded in southern Africa during 2015. Both earthquakes were located in the Zambezia Province of Mozambique. The first earthquake measured a magnitude of 4.5 on the local magnitude scale and occurred on 25 August 2015. The second earthquake occurred on 14 October 2015, measuring 4.1 on the local magnitude scale.

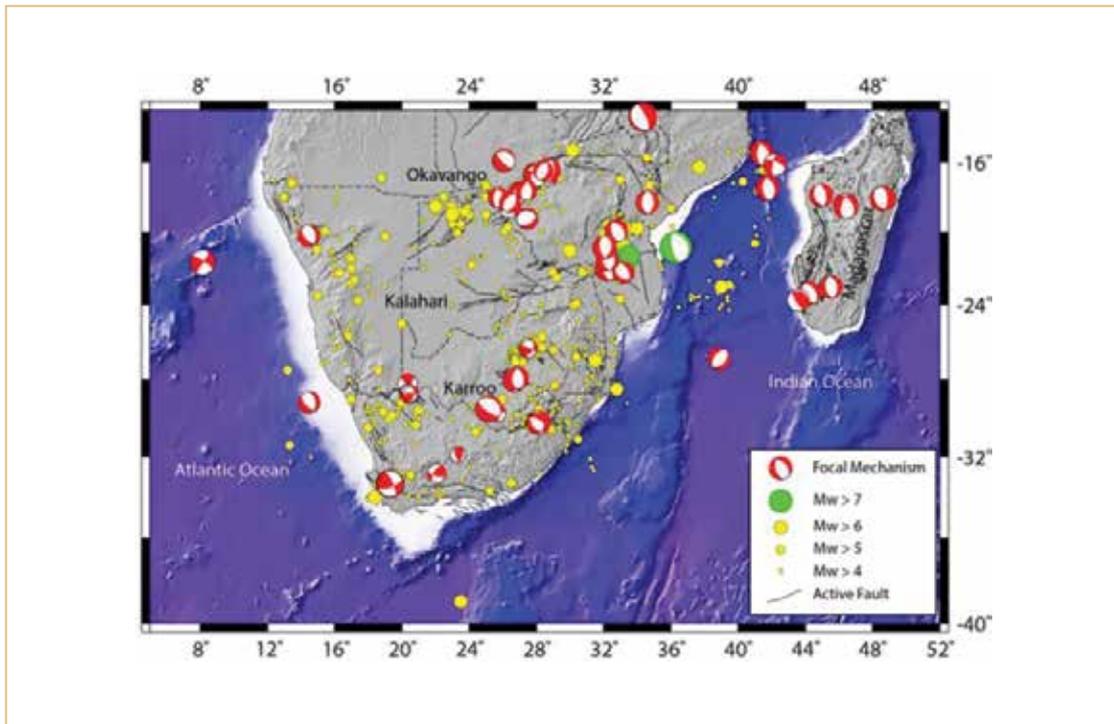
The most significant earthquake in South Africa measuring  $M_L \sim 3.8$  occurred in the Far West Rand gold mining area on 1 September 2015. The earthquake did not cause significant damage.

A total of 38 earthquakes were recorded and located in Lesotho within the magnitude range  $1.4 \leq M_L \leq 2.9$ .

Swaziland experienced one earthquake with a small magnitude of  $M_L < 2.0$ .



The seismicity recorded in southern Africa during 2015/16 is shown as red circles. The stations of the South African National Seismograph Network are shown as blue triangles.



Seismotectonic map of southern Africa combining available tectonic information used in the identification of seismic sources.

Seismic activity in the Northern Cape Province totaled 62 earthquakes with magnitudes ranging from 0.9 to 3.4 on the local magnitude scale. The largest event measured 3.4 and occurred in Namaqualand on 1 October 2015. The Au-grabies area experienced 19 earthquakes during the period under review. This area had been of interest since becoming seismically active in August 2006. Clustering of earthquakes was also noted at Aggeneys (six earthquakes) and Fraserburg (three earthquakes).

Five earthquakes were located in the Western Cape Province during the year. Two earthquakes occurred off the coast. One earthquake measured 2.5 on the local magnitude scale ~60 km off-coast from Strandfontein while another earthquake with an identical magnitude occurred in the vicinity of Saldanha Bay. A magnitude  $M_L \sim 3.7$  earthquake on 2 December 2015 in the Ceres area was investigated since it had been felt in a wide area and was located close to the place where an earthquake of  $M_L \sim 6.3$  had occurred on 29 September 1969. The study revealed that the hypocentre of the earthquake was deep (~14 km) and was attributed to stress release in the Namaqua Metamorphic Province. No reports of injury or serious damage were received after this earthquake.

The Eastern Cape Province experienced two earthquakes of a small magnitude ( $M_L \leq 3.0$ ).

Seismicity in the Free State Province was dominated by earthquakes related to gold mining activity in the region, while 22 earthquakes could be identified as being of a tectonic nature. The largest earthquake measuring  $M_L \sim 3.7$  occurred in the Koffiefontein region on 1 October 2015.

Fourteen earthquakes in the Gauteng Province could not be related to mining activity and were thus considered tectonic in origin.

Twenty-two earthquakes were recorded in the North West Province with magnitudes ranging from 1.2 to 2.8.

The Limpopo Province experienced 14 earthquakes of a tectonic origin. The largest event in this province occurred on 10 May 2015 and measured 3.3 on the local magnitude scale.

Mpumalanga Province experienced 54 earthquakes during 2015. A possible connection between the tragic collapse at Lily Mine and seismic activity was investigated but no link could be established.

KwaZulu-Natal Province experienced seven earthquakes. One of the earthquakes measured  $M_L \sim 2.4$  and occurred 73 km to the east of KwaDukuza. The largest earthquake during this period was located 38 km north-northeast of KwaDukuza and measured 3.1 on the local magnitude scale.

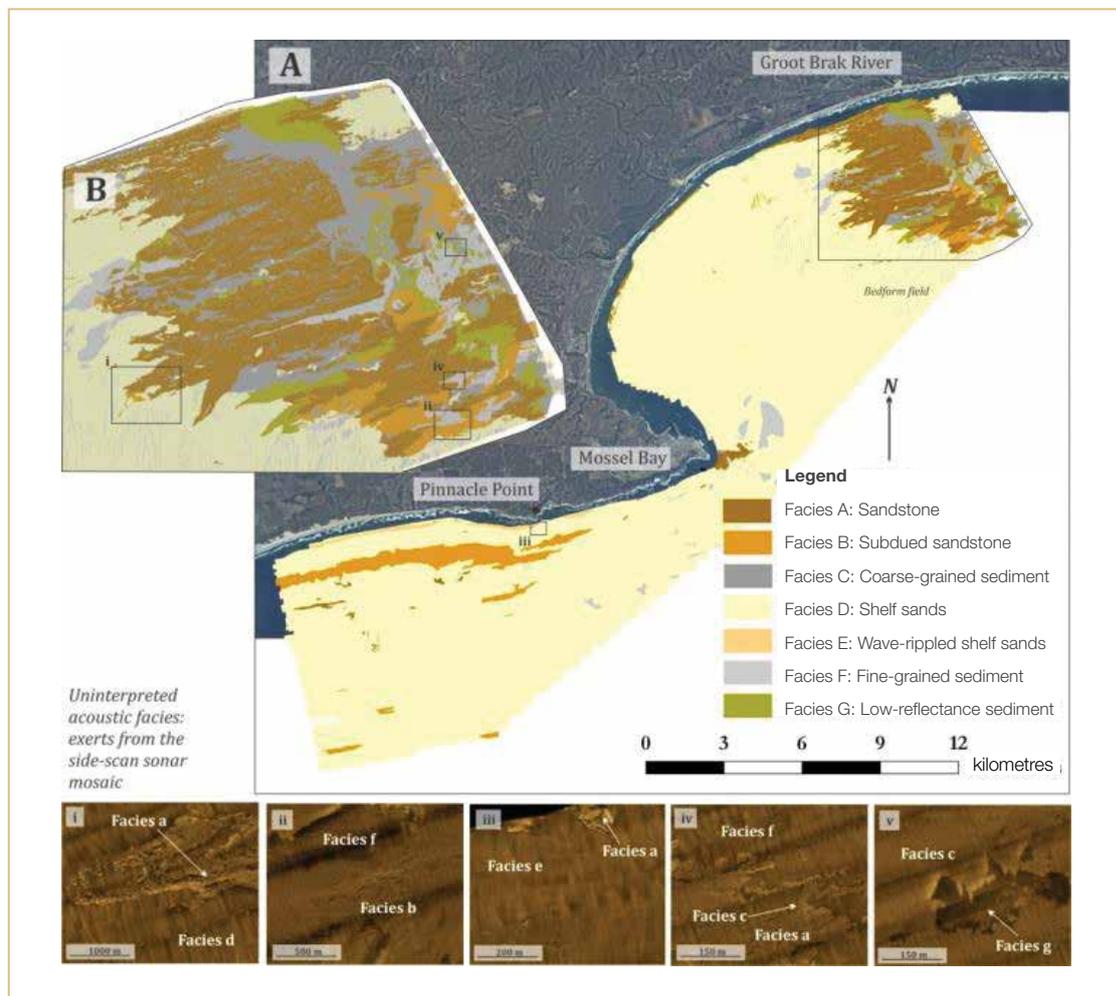
## 5.2 INTERNATIONAL COLLABORATION

### 5.2.1 Comprehensive Test Ban Treaty (CO-2006-5606; 2006-5620)

The Council for Geoscience operates and maintains the South African primary seismic (PS) and infrasound (IS) stations that form part of the international monitoring

system (IMS). In addition, the Council for Geoscience is involved in the operation and maintenance of one of the auxiliary seismic stations at the South African Antarctic base and assists with another auxiliary station at Sutherland.

The infrasound IS 47 and primary seismic PS 39 stations performed at an uptime of more than 98%. The PS 39 station is co-monitored by the American Air Force Technical Application Centre (AFTAC) and the South African station operator was commended for achieving 98.8% performance for 2015. Moreover, this station has continued to perform according to the requirements of the Preparatory Technical Secretariat of the Comprehensive Nuclear Test Ban Treaty Organisation (CTBTO).



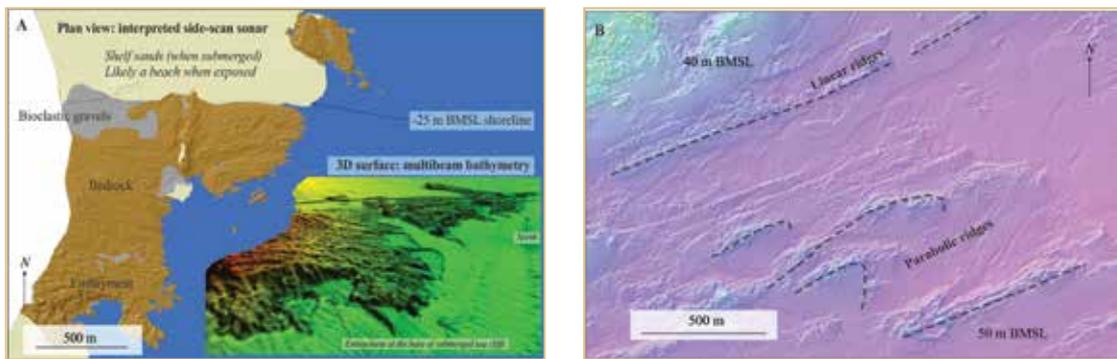
Interpreted side-scan sonar dataset, showing the acoustic facies present in the Mossel Bay area. Inset: uninterpreted side-scan sonar mosaiced data showing the textures of each acoustic facies.

### 5.2.2 Southern Cape Quaternary palaeoenvironments (ST-2016-1257)

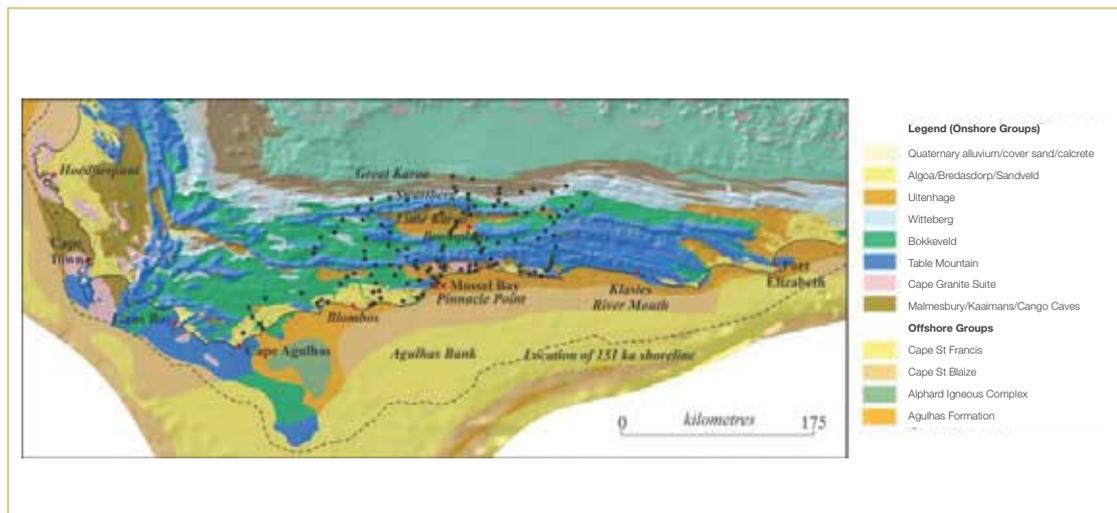
The primary focus of this study was to map and understand the submerged palaeoenvironment in which early humans lived during past lowered sea levels. The Council for Geoscience collected marine geophysical data off the continental shelf of Mossel Bay in view of clarifying the geological evolution of the region and to map the ancient landscape which has been drowned by high sea levels. This project presented a unique opportunity to complement the large onshore body of knowledge about human origins and to link these findings with fluctuations within past ecosystems through geological and sea level modelling. This study has been the first of its kind in southern Africa.

The greater “palaeoscape” study, led by scientists from Arizona State University, is funded by the National Science Foundation of the USA. The National Geographic Society awarded a grant for the offshore component of the project. The last part of the programme consisted of seismic interpretation and geochronological work. A PhD based on this study was completed at the University of Cape Town in 2014.

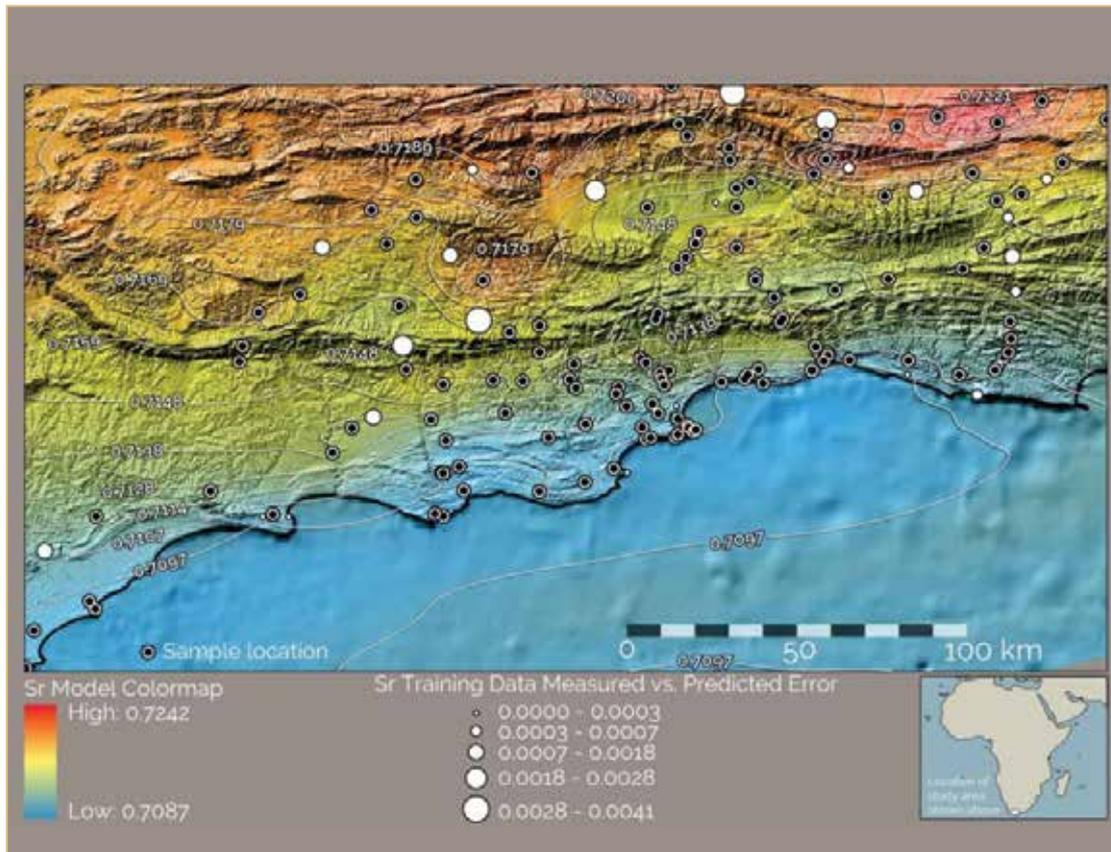
Four marine sediment cores were obtained during 2013 in this area as part of a German–South African collaboration project. The cores confirmed the seismic stratigraphy of the shelf and the potential for palaeoclimate archives is still being investigated through ongoing analyses.



(a) Submerged sea cliffs offshore of Cape St Blaize, (b) Shoals located in a water depth ranging from 35–50 m below mean sea level.



Map of the South African coast showing the bedrock geology, modern coastline (solid black line) and the extent of the 151 ka shoreline (the time of PP30 fossil accumulation, dashed black line). Black dots show sampling localities at which plants were collected for biologically available  $^{87}\text{Sr}/^{86}\text{Sr}$  determinations. Red dots indicate modern cities and archaeological sites.



Bioavailable strontium isoscape ( $^{87}\text{Sr}/^{86}\text{Sr}$ ) predictive geospatial model. Circles with black dots in the centre represent bioavailable  $^{87}\text{Sr}/^{86}\text{Sr}$  sampling localities used to create the model. White dots represent the 26 randomly selected sampling locations that were extracted prior to model development and that were used later to test the model predictions. The size of the white dots shows the amount by which measured  $^{87}\text{Sr}/^{86}\text{Sr}$  differed from the model's predictions. Contour lines show the predicted bioavailable  $^{87}\text{Sr}/^{86}\text{Sr}$  based on the model. Colours indicate areas of lowest bioavailable  $^{87}\text{Sr}/^{86}\text{Sr}$  (blue) to highest bioavailable  $^{87}\text{Sr}/^{86}\text{Sr}$  (red).

The outcomes of this project include a CGS memoir, a paper published in a special publication of the Geological Society of London detailing terrestrial geomorphic features on this continental shelf, a manuscript focussed on a strontium isoscape across the Southern Cape published in the journal *Quaternary Science Reviews*, a paper in the journal *Palaeoanthropology* detailing the proof of the concept and a seismic stratigraphic model in the journal *Quaternary Science Reviews*, detailing the land-sea connection through time.

### 5.2.3 Testing the terrestrial Guadalupian extinction in the Karoo Basin of South Africa (ST-2011-1127)

This is an international collaborative research project that investigates environmental and ecosystem change at the

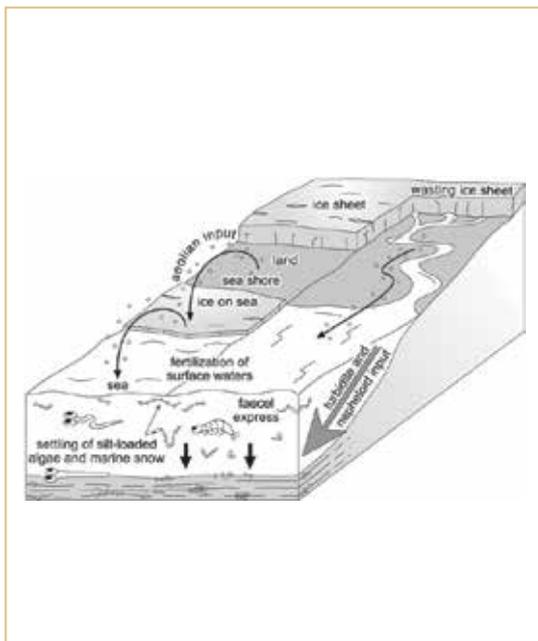
end of the Permian Period, as recorded in the sedimentary rocks of the Karoo Basin. This interval has been used as a model to understand the modern ecosystem response to climate change. The project team consists of specialists in a number of different disciplines and includes scientists from the Council for Geoscience, the University of the Witwatersrand (Johannesburg), Colby College (Waterville, USA), the Jack Satterly Geochronology Laboratory (Toronto, Canada), the University of Texas (Dallas) and the University of California (Berkeley). During the financial year, the team undertook two data collection field trips to the southern Free State and Eastern Cape Provinces. A manuscript on an ash layer sampled close to the reported Permian–Triassic boundary was published in the journal *Geology* in October 2015. One oral presentation and four posters were presented at the annual meeting of the Geological Society of America in October 2015

and two oral papers were presented, one at the meeting on the Origin and Evolution of the Cape Mountains and Karoo Basin, hosted by the Nelson Mandela Metropolitan University, and one at the Council for Geoscience Conference 2016. A draft manuscript was submitted and accepted for publication as conference proceedings in a book to be published by Springer by the organisers of the meeting of the Geological Society of America.

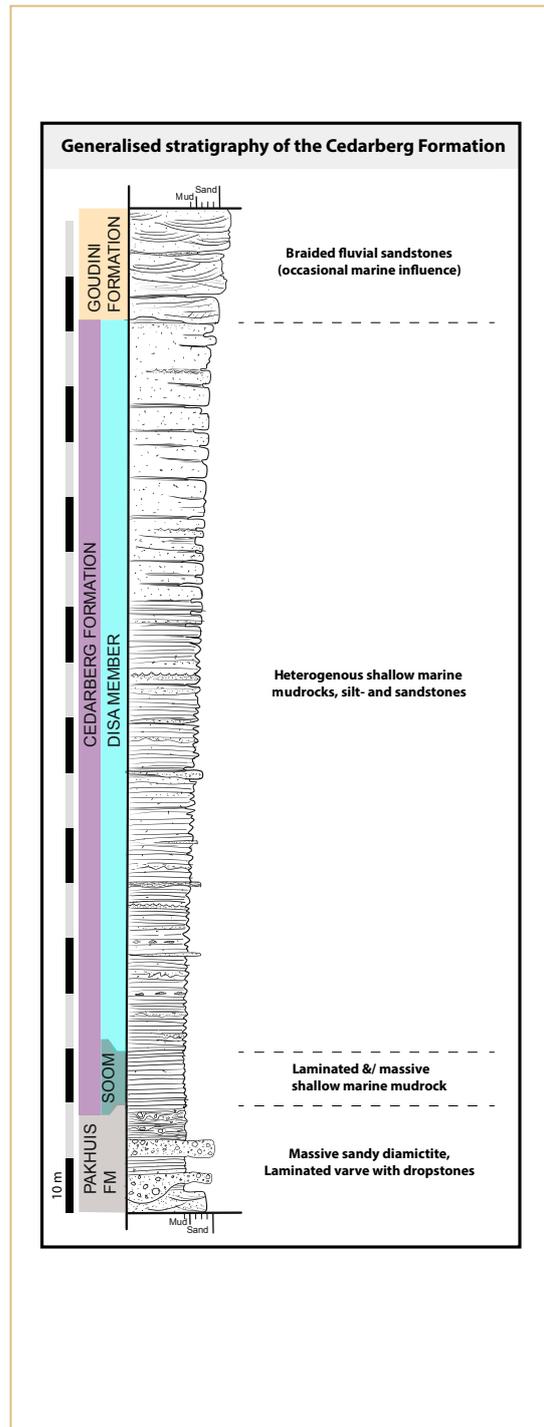
**5.2.4 Palaeoclimate: Ordovician glaciation (ST-2014-1242)**

The Council for Geoscience has embarked on a collaborative project with Leicester University, partly funded by the National Geographic Society. The main aim of the project is to gain a better understanding of the Soom Shale, which, if read correctly, could be a unique barcode-like archive of climate change dynamics during the Early Palaeozoic ice age.

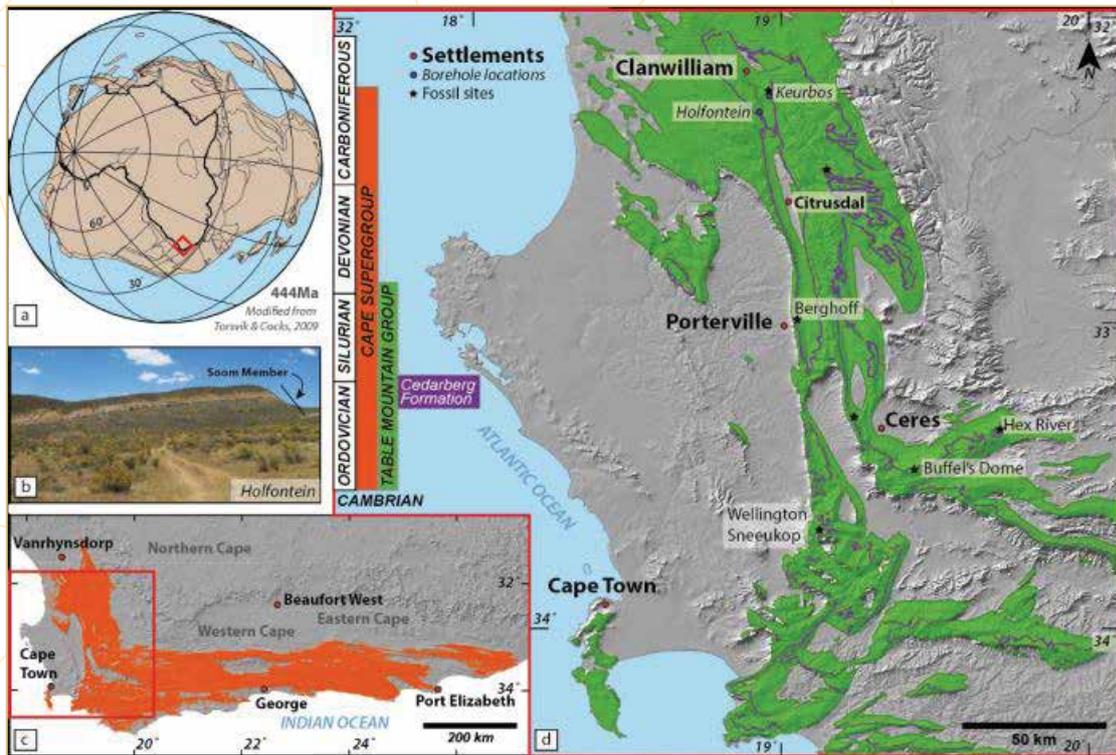
A 40 m deep borehole was drilled at Holfontein Farm near Clanwilliam in April 2014. Core recovery was excellent despite concerns about a major fault in the



Block diagram depicting depositional processes that were possibly responsible for the laminated and homogeneous mudstone facies. The left portion of the drawing shows silt grains blown over seasonal sea ice before being deposited, whereas the right side shows silt grains blown directly out to sea and deposited.



Schematic stratigraphic log of the Cedarberg Formation showing the lower and upper contacts with the glacial Pakhuis and braided fluvial Goudini Formations respectively. The upward-coarsening Cedarberg Formation is subdivided into the lower Soom and upper Disa Members deposited in a shallow-marine environment.



Approximately 444 million years ago, the palaeolatitude of the southernmost portion of Africa was roughly 30–45°S (a). The Ordovician Cedarberg Formation is divided into the upper Disa Member and the lower Soom Member, shown here at the Holfontein borehole site (b). It forms part of the Cape Supergroup (c), which is further subdivided into the Table Mountain Group (d). The Soom Member Konservat-Lagerstätten has yielded exceptionally preserved fossil biota from various localities, mostly in the vicinity of Ceres and Clanwilliam in the Western Cape (d).

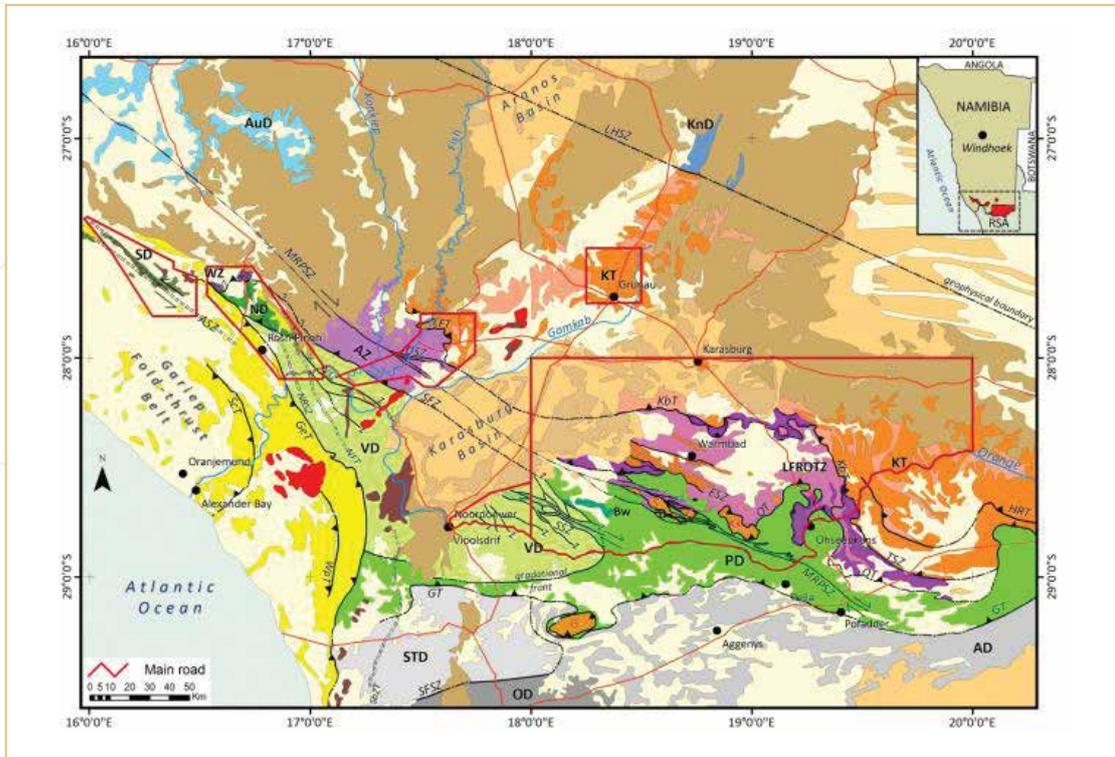
area. Detailed petrographic and scanning electron microscope (SEM) analyses revealed some interesting, but complex, results, which are currently being analysed statistically. The detail revealed during this part of the study has necessitated the relogging of core at an even finer scale. The borehole database continues to be updated as more data are acquired from commercial and parastatal sources. Results from the SEM analyses, core logging and petrographic thin sections are currently being analysed.

### 5.2.5 The transfrontier geology project: South Africa and Namibia (FR-2016-5788)

The lower Orange River region of South Africa and Namibia is characterised by complex geology and mineral wealth (several mineral occurrences and operating mines, particularly Cu, Pb, Zn, U, Ta, Nb, REE, Li, W and diamonds) and is well suited to modern geological study. The Council for Geoscience is currently engaged



View of the Fish River Canyon south of Ai-Ais. Mapping of the canyon was done on foot and by fly-camping.



Location of recently completed geological mapping (red-hatched polygons) overlain on the new tectonostratigraphic map for the Namaqua Metamorphic Province in the lower Orange River region. The mapping area included the regions around Warmbad, the Haib Cu deposit, lower Fish River Canyon and Ai-Ais, Rosh Pinah and the previously unmapped Aurus Mountains of the Sperrgebiet.

in a transfrontier geological mapping initiative in the region, co-funded by the Geological Survey of Namibia (GSN) and involving collaborators from the Universities of Stellenbosch, Cape Town and McGill (Canada). The team, consisting of eight members each from South Africa and Namibia, have already produced 18 maps at a scale of 1:50 000 in the past two years and are currently completing the mapping of 15 more areas across the high-grade rocks of the Namaqua Metamorphic Province. The programme includes extensive fieldwork, map compilation and research. The research results will be presented together with the digital maps in a report. The new maps and research data have been used to unify the cross-border stratigraphy and to determine the geological history of the area in the context of modern-day plate tectonics. The main application of the maps and report is to provide base geological information to economic geologists to identify areas of mineral prospectivity. The data may be used to search for water and to provide base information for infrastructure developments such as solar-powered farms, pipelines, roads and bridges. Capacity building forms an important component of

the programme and includes basic to advanced in-field and in-office training and postgraduate training of junior geologists of the Council for Geoscience and the Geological Survey of Namibia. The fieldwork in the Fish River, Ai-Ais, Haib, Warmbad, Namaskluft and Sperrgebiet has been completed, hand-drawn maps have been compiled and the geochemistry and petrography work has been completed. The team is currently busy with digital cartography and report writing. The main component that is still outstanding is the geochronology.

#### 5.2.6 National hydrogeological and water quality mapping in Malawi (FR-2015-5776)

The Government of Malawi, through the Ministry of Water Development and Irrigation, received credit and a grant from the International Development Association (IDA) towards the cost of services. This contract was awarded to the Council for Geoscience.

The overall objective of this consultancy, as stated in the

terms of reference, is to map out groundwater aquifers, including yields and water quality parameters, to improve the understanding of groundwater occurrences and quality in the country in view of informed water resource planning, management and development. Specifically, the aim of the work is to:

- assess groundwater resources including aquifer characteristics, aquifer types and distribution, and water quality parameters.
- improve the existing hydrogeological and water quality database.
- produce hydrogeological and water quality maps.
- build capacity in regard to groundwater and water quality monitoring, analysis and the production of hydrogeological and water quality products.



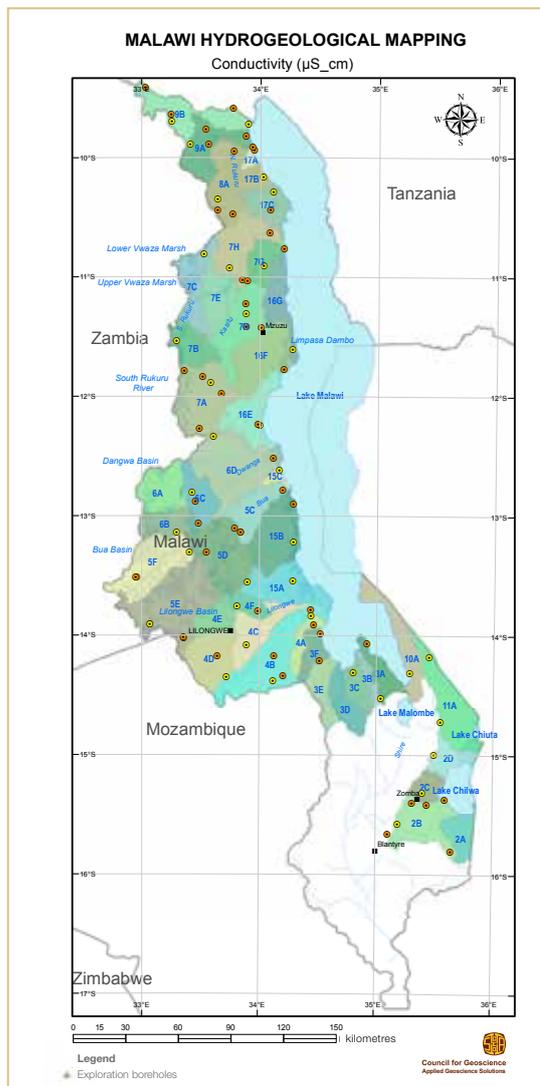
Civil work in Malawi includes borehole protection.



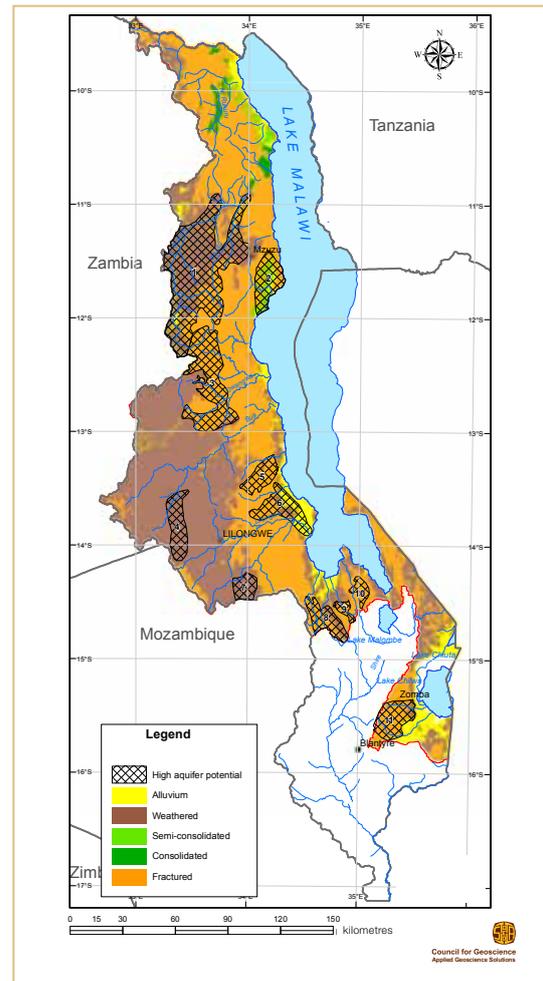
An example of lithological logging in Malawi.

The milestones achieved in the period under review are:

- Inception report to review the availability of information and presentation of a detailed work plan.
- Drilling of 40 exploratory boreholes.
- Water sampling and laboratory analyses.
- Production of a groundwater recharge map of the country.
- Production of a hydrogeological and water quality map and atlas.



Location of the drilled exploratory boreholes.



Aquifer map showing areas of higher groundwater prospects.

- Provision of four training courses on Hydstra and WISH software, a hydrogeological map and recharge estimations in addition to on-the-job training.

All deliverables were submitted and accepted by the client and, hence, the project has been completed.

### Other projects of interest

#### Refurbishment of the CGS helicopter

The Council for Geoscience purchased a Eurocopter AS350 B2 helicopter in 2005 with the aim to use it in various scientific research projects. The helicopter is capable of carrying up to six people and is predominantly used for geoscience operations such as geochemical and geophysical surveys.

With geochemical surveys, roughly 200 samples are collected per day over a predefined area. Owing to the higher efficiency rates of the helicopter compared to foot sampling, helicopter sampling is the preferred mode for collecting geochemical samples, both from a cost and sampling accuracy perspective. In this case, the crew normally consists of a pilot, a navigator

(geologist), a sampler and a labeller. This crew is supported by a ground crew who collect the samples from the helicopter crew at regular intervals.

Geophysical surveys are logistically less complicated than geochemical surveys as they involve the helicopter flying at low altitudes to collect radiometric, gravimetric



Handover of the refurbished helicopter to the Council for Geoscience.



Refurbished helicopter.



Soil sampling staff in Namaqualand.

and lidar (topographical) data. To collect the data, the helicopter is fitted with special geophysical equipment.

The helicopter incurred main rotor gearbox damage in 2012 and as a result lost its airworthiness. A ceiling cost to refurbish the helicopter back to its airworthy state was negotiated with a leading aircraft manufacturer. After many months of meticulous engine dismantling and rebuilding, spray painting and refurbishment, the major parts on the helicopter were repaired. After final ground runs and flight tests, the helicopter was handed back to the Council for Geoscience early in 2016. The helicopter made its first public appearance in the Botanical Gardens of Pretoria.

***The CGS Field School celebrates 10 years***

The Council for Geoscience Field School was designed as a two-year programme linked to the Annual Technical Programme for mostly permanently employed

geoscientists entering the organisation. These scientists would spend their time at the Limpopo regional office benefitting educationally from the vast economic mineral deposits of the province and the highly complex, high-grade tectono-metamorphic terrane, the Limpopo Belt. During this time, the field school participants would work on map compilations and the writing of complementary map explanations. This was in addition to courses on microscopy, GIS and 4x4 driving. Together, these would provide the participants with the vital knowledge and skills needed to ensure a successful start to their careers.

In recent years, the field school has transformed into a compact one-month programme. This shorter version retains many of the objectives of the earlier programme and also includes a geological road trip across the South African stratigraphy. The 2015 field school, the tenth field school, was a highly ambitious programme that covered a wide range of geoscientific topics and included an



Field school participants are gathered on an excellent contact of the basal Dwyka Group tillites on the Pongola basement.



Field school activities included the measuring of bedding planes in the quartzites of the Lekkersing Formation, Richtersveld.

even wider range of participants, largely interns, from all the CGS offices. The field school commenced with a stratigraphic trip from Pretoria to Cape Town, where ad hoc stops were made at a number of geological exposures over a period of five days. These included aspects of the Barberton greenstone belt, coal-bearing deltaic deposits of the Eccca Group, Glacial Dwyka tillites, Pongola Supergroup and the requisite Cape Fold Belt.

The mapping region for the 2015 field school was near the small town of Eksteenfontein in the Gariiep Belt, south of the Ais-Ais/Richtersveld Transfrontier Park. Three mapping areas were defined and encompassed much of the Port Nolloth zone, which forms part of the Gariiep Supergroup. A wide variety of lithological units and structural fabrics made this a tough, but ideal, learning environment.

An important facet of the mapping work in the Richtersveld was the field school driven Richtersveld Science Week. During this week, some of the geoscientists participating in the field school spent time with learners from the surrounding schools. Topics for these school visits included an interactive lecture series on Earth Sciences, life as a geoscientist and information on becoming an earth scientist. A wide range of in-house designed scientific posters were given to the schools and a series of experiments was demonstrated to highlight how volcanoes and sedimentary processes function. Nine refurbished computers and several stationery packs were donated to the schools.

### ***The Council for Geoscience hosts its first annual conference***

The Council for Geoscience hosted its first annual conference on 4 and 5 February 2016 at the CSIR International Convention Centre in Pretoria. The theme of the conference was "In pursuit of Excellence in the Geosciences" and the focus of the conference was to showcase the work that is being undertaken by the Council for Geoscience paying particular attention to the five projects that are funded by the Department of Mineral Resources under the Medium Term Expenditure Framework. These projects include shale gas research, the management of derelict and ownerless mines, mine water management, the promotion of investment in exploration and mining and the seismic microzonation of Johannesburg.

In his welcoming note, the Acting Chief Executive Officer, Mr Simon Sikhosana, highlighted that the conference aims to serve as a platform for discussion around various scientific issues of national importance as well as to provide greater insight into the scientific work of the organisation.

The conference featured presentations from CGS scientists and researchers that highlighted the progress made on various projects. The conference also featured presentations from international and local experts, particularly on shale gas and the challenges of mine water drainage and mining.



Dr Mathe and Prof. Ngoepe at the CGS Conference.



CGS Conference 2016 featured presentations by four keynote speakers. Professor Brandon Nuttall from the University of Kentucky presented a talk on the successes and challenges in the development of shale resources and Ms Marianne Stuart from the British Geological Survey discussed the risk of groundwater contamination from shale gas wells and the pressures on freshwater resources. Professor Chris Wolkersdorfer from the Tshwane University of Technology highlighted the challenges of mine water drainage with his presentation titled "Mine water in South Africa — present and future" and Dr Declan Vogt from the University of the Witwatersrand outlined advances in mining practices in his presentation "Surviving the change — South African mining in the future".

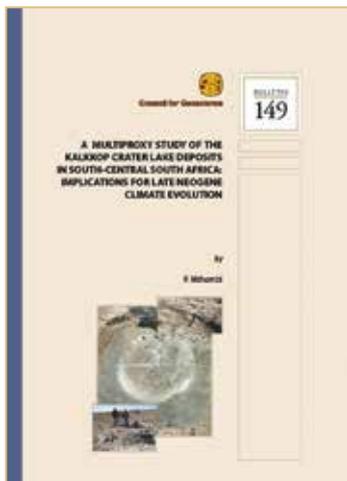
CGS Conference 2016

## 7. DISSEMINATION OF INFORMATION

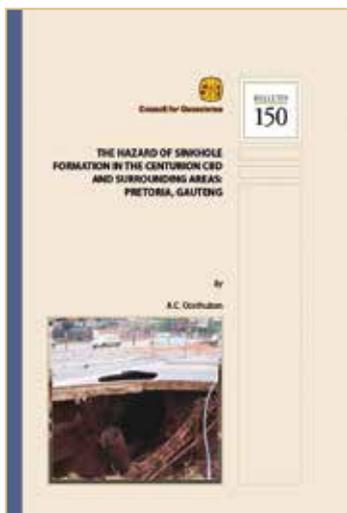
### 7.1 Publications

#### Bulletins

**Bulletin 149:** A multiproxy study of the Kalkkop Crater Lake deposits in south-central South Africa: Implications for Late Neogene climate evolution by P. Mthembu.

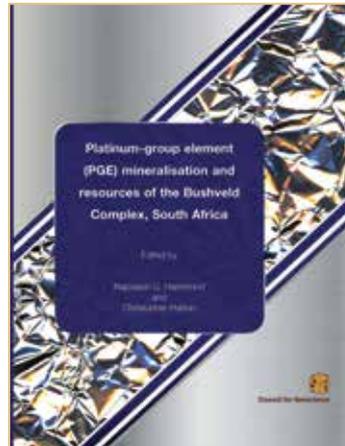


**Bulletin 150:** The hazard of sinkhole formation in the Centurion CBD and surrounding areas: Pretoria, Gauteng by A.C. Oosthuizen.



#### Popular Geoscience Series

**Mineral Resources Series No. 2:** Platinum-group element (PGE) mineralisation and resources of the Bushveld Complex, South Africa, edited by Napoleon Q. Hammond and Christopher Hatton.

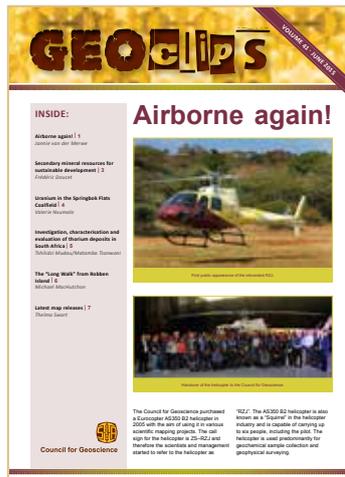


#### Annual Reports

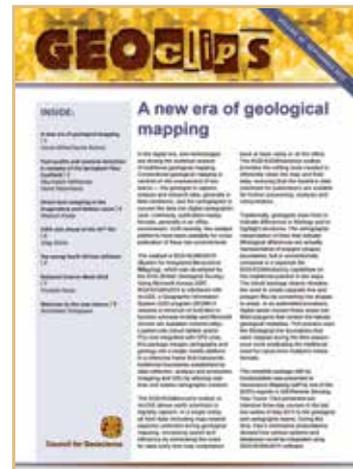
Annual Report of the Council for Geoscience 2015.

#### Newsletters

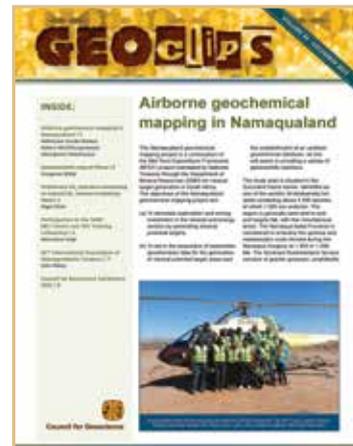
GEOclips Newsletter, Volume 41, June 2015, 8pp.



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## 7.2 Articles published in academic journals and books

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## 7.3 Conference abstracts and posters

## A

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## B

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Battifarano, O.K., Churchill, A.N., Gastaldo, R.A., Neveling, J. and Geissman, J.W., 2015. Lithostratigraphy and lateral variation in vertebrate biostratigraphy near the Permian–Triassic boundary at Bethulie, South Africa. *2015 GSA Annual Meeting*, Baltimore, USA, 47(7), 1–4 November 2015.

Bensid, M., Strauss, S. and Billay, A., 2016. Mineral prospectivity mapping of the Tugela Terrane, KwaZulu-Natal — semiregional soil survey. *Council for Geoscience Conference 2016*, In pursuit of

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Billay, A., 2016. The role of the Council for Geoscience in promoting mining and exploration investment in South Africa — current exploration projects. *Council for Geoscience Conference 2016*, In pursuit of Excellence in the Geosciences, Pretoria, 4–5 February 2016.

Black, D.E., Booth, P. and De Wit, M., 2016. Petrographic, geochemical and petrophysical analysis of the Collingham Formation near Jansenville, Eastern Cape, South Africa — potential caprocks to shale gas in the Karoo Basin. *Council for Geoscience Conference 2016*, In pursuit of Excellence in the Geosciences, Pretoria, 4–5 February 2016.

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## C

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Cawthra, H.C., Compton, J.S., Fisher, E.C. and Marean, C., 2015. Former land surfaces and palaeoshorelines on the Mossel Bay continental shelf, South Africa. *80th Meeting of the Society for American Archaeologists*, San Francisco, USA, 18 April 2015.

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of Excellence in the Geosciences, Pretoria, 4–5 February 2016.

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Doucet, F.J., Mohamed, S., Van der Merwe, E. and Neyt, N., 2016. Extraction of aluminium from coal fly ash using a novel process and low-cost recoverable extracting agent. Council for Geoscience Conference 2016, In pursuit of Excellence in the Geosciences, Pretoria, 4–5 February 2016.

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J., 2015. 300,000 years of coastal occupation in Pondoland: recent findings of the P5 project and future directions. Palaeoanthropology Society Meeting, San Francisco, USA, 14–15 April 2015.

## G

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the Geosciences, Pretoria, 4–5 February 2016.

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#### J

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- Maré, L.P. and Shingange, P., 2015. The usefulness of petrophysical analyses in geological and geophysical exploration. 5th Combined Science and Technology Train and Matjiesfontein Space Geodesy Observatory Workshop, Matjiesfontein, 4–10 October 2015.
- Maré, L.P., Shingange, P. and Mokoena, N., 2015. Petrophysical characterization of the Namaqua Metamorphic Province. 14th SAGA Biennial International Geophysical Conference and Exhibition, Drakensberg, South Africa, 6–9 September 2015.
- Matshusa, K., 2016. Overview of the Derelict and Ownerless Mines Programme — a South African perspective. Council for Geoscience Conference 2016, In pursuit of Excellence in the Geosciences, Pretoria, 4–5 February 2016.
- Midzi, V., Zulu, B., Manzunzu, B., Mulabisana, T., Pule, T., Myendeki, S. and Gubela, W., 2015. Macroseismic survey of the ML5.5, 2014 Orkney earthquake. International Union of Geodesy and Geophysics General Assembly 2015, Prague, Czech Republic, 22 June–2 July 2015.
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- Mitha, V., Roberts, M. and Reddering, K., 2016. Geomorphological evidence for gap dykes along the Wild Coast of the Eastern Cape, South Africa — contributions to locating large feeder conduits of the Karoo continental flood basalt province. Council for Geoscience Conference 2016, In pursuit of Excellence in the Geosciences, Pretoria, 4–5 February 2016.
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- Mohamed, S., Doucet, F.J., Van der Merwe, E.M. and Altermann, W., 2015. Thermochemical treatment of PGE mine tailings using ammonium sulphate as chemical agent. ThermSA — Applications in Thermal Analysis, Stellenbosch, 17–18 August 2015.
- Mohamed, S., Doucet, F.J., Van der Merwe, E.M. and Neyt, N., 2015. Extraction of aluminium from coal fly ash using a novel process and low-cost recoverable reagent. Coal Science and Technology Conference, Potchefstroom, 24–25 November 2015.
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- Mosavel, H., Cole, D. and Chevallier, L., 2016. The Karoo deep drilling project at Beaufort West — geological baseline and challenges. Council for Geoscience Conference 2016, In pursuit of Excellence in the Geosciences, Pretoria, 4–5 February 2016.
- Musetsho, M., Kgari, T., Robey, K., Hanise, B., Madikizela, K. and Malumbazo, N., 2016. Overview of the shallow and deep hydrogeological investigations associated with the drilling of a deep borehole in the Karoo Basin. Council for Geoscience Conference 2016, In pursuit of Excellence in the Geosciences, Pretoria, 4–5 February 2016.
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- Neveling, J., Gastaldo, R.A., Kamo, S.L., Geissman, J.W., Looy, C.V. and Bamford, M.K., 2015. Reviewing correlations between the terrestrial and marine records of the end-Permian extinction. Cape-Karoo Imbizo, Origin and Evolution of the Cape Mountains and Karoo Basin, Port Elizabeth, 25–27 November 2015.
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## P

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## R

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## S

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## T

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## Z

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### 7.4 Popular magazines and books

Baglow, N., 2016. The CGS Field School celebrates 10 years with a bang. GEOclips Newsletter, 44, March 2016, 4–5.

Bosch, P.J.A., 2015. Book Review: 50 must-see geological sites in South Africa by Gavin Whitfield. Geobulletin, Geological Society of South Africa, 58(4), December 2015.

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Cawthra, H.C., 2015. Annual Newsletter. Southern African Society for Quaternary Research (SASQUA), 36 pp.

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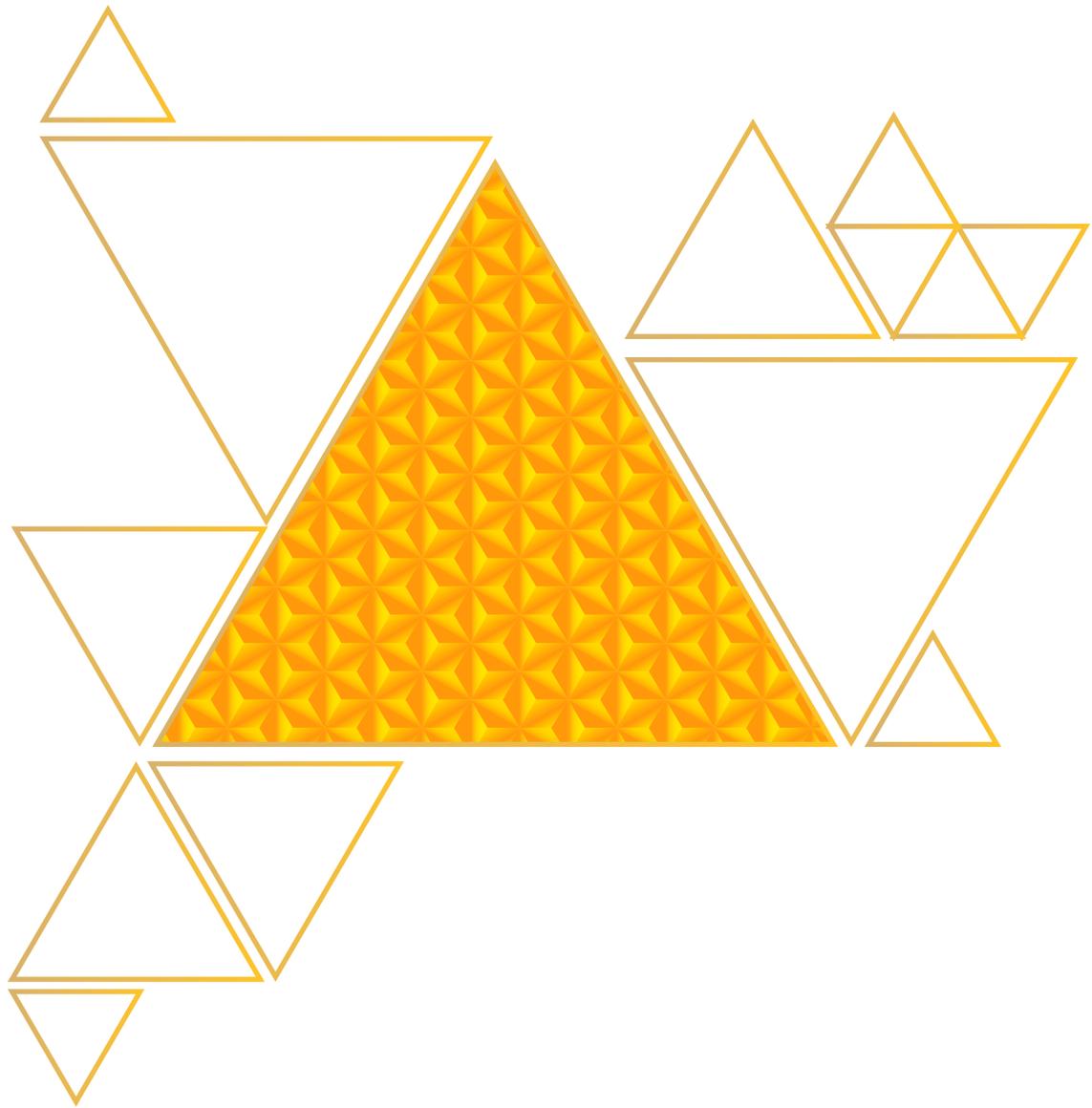
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**C**

**GOVERNANCE**





## 1. INTRODUCTION

The Council for Geoscience is fully committed to applying the fundamental principles of good governance, transparency, integrity, accountability and responsibility. It embraces the principles of good governance as set out in the Public Finance Management Act (Act No. 1 of 1999, as amended) and the Protocol on Corporate Governance in the Public Sector.

## 2. EXECUTIVE AUTHORITY

The Council for Geoscience submits quarterly reports in terms of National Treasury regulations (26.1) to the Executive Authority on 31 January, 30 April, 31 July and 31 October. The Annual Performance Plan and the Council for Geoscience Strategic Plan are submitted to the Department of Mineral Resources on 30 September.

No issues were raised during the 2015/16 financial year.

## 3. BOARD OF THE COUNCIL FOR GEOSCIENCE

The Board of the Council for Geoscience approves the mission, strategies, goals, operating policies and priorities of the organisation and monitors compliance with the policies and achievements with respect to the scientific, administrative and financial objectives.

The Board is appointed by the Minister in accordance with the provisions of section 4 of the Geoscience Act (Act No. 100 of 1993). With the exception of the Chief Executive Officer, all the Board Members are non-executive members. The Board Members are continuously and actively involved in, and bring independent counsel and judgement to bear on, all Board discussions and decisions. Board Members are fully conversant with their fiduciary duties as outlined in section 50 of the Public Finance Management Act (Act No. 1 of 1999, as amended) which, among others, requires them to declare their interests in the event of a potential conflict of interest. The Board meets on a quarterly basis, or

as required during the course of a financial year. Five meetings were held during the period under review on 28 May, 28 July, 27 August and 26 November 2015 and on 25 February 2016.

### *Abridged Board Charter per PFMA and Protocol on Corporate Governance*

A Board Charter was developed and established for the Board of the Council for Geoscience. The Charter defines the governance parameters within which the Board exists and sets out specific responsibilities to be discharged by the Board.

The Board is fully committed to applying the fundamental principles of good governance, transparency, integrity, accountability and responsibility in all dealings by, in respect and on behalf of, the Council for Geoscience. It accordingly embraces the principles of good governance as set out in the Public Finance Management Act (Act No. 1 of 1999, as amended) and the Protocol on Corporate Governance in the Public Sector.

The Charter confirms the following with respect to the Board:

- role in exercising leadership, judgement and providing strategic direction
- composition
- accountability
- fiduciary duties and responsibilities
- code of conduct
- appointment of committees
- governance and meeting procedures
- duty to declare conflict of interests
- responsibility for adoption of strategic plans
- monitoring of operational performance and management
- determination of policy and processes to ensure the integrity of the risk management and internal controls of the Council for Geoscience
- communications policy
- director selection, orientation and evaluation.

The Board Charter is reviewed annually to ensure that it remains relevant to the business objectives of the Council for Geoscience.

## Composition of the Board

Name	Designation	Employer	Date appointed	Qualifications	Area of expertise	Other committees
Prof. P E Ngoepe	Chairperson	University of Limpopo	1 October 2012	PhD (Physics)	Physics	-
Mr S M Sikhosana	Acting CEO	Council for Geoscience	1 May 2015	BSc Hons (Geology) Diploma in Geology MBA	Geology	Technical PRT Finance
Mr B A Gerryts	Board Member	Department of Science and Technology	1 February 2013	MSc (Engineering Management)	Technology and Innovation Systems	Technical
Prof. M A Hermanus	Board Member	Council for Scientific and Industrial Research	1 October 2012	MSc (Engineering, Physical Metallurgy)	Mining Engineering	Technical
Mr M Mabuza	Board Member	Department of Mineral Resources	1 October 2012	BSc (Geology)	Mineral Policy and Promotion	Audit and Risk
Dr H Mathe	Board Member	Tranter Resources (Pty) Limited	1 October 2012	PhD (Geology)	Geology	PRT Technical
Dr M Mayekiso	Board Member	Department of Environmental Affairs	1 February 2014	PhD (Marine and Environmental Science)	Conservation of Ocean and Coast	-
Dr J E McGill	Board Member	Anglo Platinum Limited	1 October 2012	PhD (Economic Geology)	Economic Geology	Technical Finance

Name	Designation	Employer	Date appointed	Qualifications	Area of expertise	Other committees
Ms D Mochothi	Board Member	Department of Water and Sanitation	1 October 2012	MSc (Environment and Society)	Environment	Finance
Ms K R Mthimunywe	Board Member	Bluewaves Consulting Services	1 October 2012	BCompt Hons (Accounting) CA (SA)	Accounting	Audit and Risk Finance
Mr M Riba	Board Member	Department of Rural Development and Land Reform	1 October 2012	BSc (Mathematics and Chemistry, Surveying)	Land Surveying	-
Ms D Fischer (Alternate to Dr M Mayekiso)	Alternate Member	Department of Environmental Affairs	1 February 2014	MSc (Environmental Management)	Environmental Management	-
Ms R Mdlubeki (Alternate to Mr M Riba)	Alternate Member	Department of Rural Development and Land Reform	1 October 2012	BSc (Land Surveying)	Land Administration (Cadastral Surveys)	PRT
Ms S Mohale (Alternate to Mr M Mabuza)	Alternate Member	Department of Mineral Resources	1 October 2012	MSc (Globalisation and Development)	Economic Development	PRT Technical
Mr P Nel (Alternate to Ms D Mochothi)	Alternate Member	Department of Water and Sanitation	1 October 2015	BCompt Hons (Accounting) CA (SA)	Accounting	-
Mr D Sibiyi (Alternate to Dr J E McGill)	Alternate Member	Tronox	1 October 2012	MSc (Mining Engineering)	Geology	PRT

## Board Directorships

MEMBER	DIRECTORSHIP
Prof. P E Ngepe	<ul style="list-style-type: none"> <li>• Macibeng — Life member</li> </ul>
Mr S M Sikhosana	<ul style="list-style-type: none"> <li>• None</li> </ul>
Mr B A Gerryts	<ul style="list-style-type: none"> <li>• Centurion Aerospace Village — Director</li> </ul>
Prof. M A Hermanus	<ul style="list-style-type: none"> <li>• AVENG (Pty) Ltd — Non-Executive Board Member</li> <li>• Bokamoso Trust — Chairperson of the Board of Trustees for AngloGold Ashanti Option</li> </ul>
Mr M Mabuza	<ul style="list-style-type: none"> <li>• None</li> </ul>
Dr H Mathe	<ul style="list-style-type: none"> <li>• Zaria Mining — Director</li> <li>• Howden Africa Holdings — Director</li> <li>• African Emissions Trading — Director</li> <li>• Tranter Kismet Investments — Director</li> <li>• Tranter Pangea Diamond — Director</li> <li>• Tranter Pangea Gold Investments — Director</li> <li>• Tranter Holdings — Director</li> <li>• Dorper Wind Farm (RF) — Alternate Director</li> <li>• Wescoal Holdings — Director</li> <li>• Ferret Mining and Environmental Services — Director</li> <li>• Upward Spiral 10 — Director</li> <li>• Eyesizwe Mining — Director</li> <li>• Anaitkulu Gold — Director</li> <li>• Tranter Resources — Director</li> </ul>

MEMBER	DIRECTORSHIP
Dr H Mathe	<ul style="list-style-type: none"> <li>• Scinta Energy — Director</li> <li>• Scinta South Africa — Director</li> <li>• Acetomanzi — Director</li> <li>• Dorper Wind Development — Director</li> <li>• Tranter — Inkwili Engineering — Incorporator</li> <li>• Dorper Wind Farm BBBEE Holdings (RF) — Trustee</li> <li>• Dorper Wind Farm BEE Holdings (RF) — Director</li> <li>• Talent10 Holdings — Director</li> <li>• Ramiscape — Director</li> </ul>
Dr M Mayekiso	<ul style="list-style-type: none"> <li>• Moisoource (Pty) Ltd — 25% interest</li> </ul>
Dr J E McGill	<ul style="list-style-type: none"> <li>• None</li> </ul>
Ms D Mochotlhi	<ul style="list-style-type: none"> <li>• None</li> </ul>
Ms K R Mthimunye	<ul style="list-style-type: none"> <li>• Hatfield Group — Shareholder</li> <li>• NERSA — Director</li> <li>• Mintek — Director</li> <li>• Konika Minolta SA — Director</li> <li>• OCE SA — Director</li> <li>• Cecil Nurse — Director</li> </ul>
Mr M Riba	<ul style="list-style-type: none"> <li>• None</li> </ul>
Ms D Fischer	<ul style="list-style-type: none"> <li>• None</li> </ul>
Ms R Mdlubeki	<ul style="list-style-type: none"> <li>• None</li> </ul>

MEMBER	DIRECTORSHIP
Ms S Mohale	<ul style="list-style-type: none"> <li>• Sasol — Shareholder</li> <li>• Applewood Trading — Shareholder</li> <li>• State Diamond Trader — Non-Executive Director</li> </ul>
Mr P Nel	<ul style="list-style-type: none"> <li>• None</li> </ul>
Mr D Sibiya	<ul style="list-style-type: none"> <li>• None</li> </ul>

### Appointment of Board Committee Members

Audit and Risk Committee	
Chairperson	Mr S M Xulu
Members	Mr M Mabuza Dr M Mayekiso Ms K R Mthimunye Dr B Tema
Finance Committee	
Chairperson	Ms K R Mthimunye
Members	Mr S M Sikkhosana — Acting Chief Executive Officer Dr J E McGill Mr K Mkwanazi Ms D Mochotlhi

<b>Personnel, Remuneration and Transformation Committee</b>	
Chairperson	Dr H Mathe
Members	Ms R Mdubeki Ms S Mohale Mr D Sibiya Mr S M Sikhosana – Acting Chief Executive Officer
<b>Technical Committee</b>	
Chairperson	Dr J E McGill
Members	Mr BA Gerryts Prof. M A Hermanus Dr H Mathe Ms S Mohale Mr S M Sikhosana – Acting Chief Executive Officer

## BOARD AND COMMITTEE MEETINGS

### BOARD MEETINGS

1 APRIL 2015–31 MARCH 2016

MEMBERS	2015/16						Meetings attended
	28 May	28 July	27 August	26 November	25 February		
Prof. P E Ngoepe	Present	Present	Present	Present	Present	Present	5
Mr S M Sikhosana	Present	Present	Present	Present	Present	Present	5
Mr B A Gerrits	Apology	Present	Present	Apology	Present	Present	3
Prof. M A Hermanus	Present	Present	Apology	Present	Present	Present	4
Mr M Mabuza Ms S Mohale*	Apology	Present	Apology	Apology	Apology	Apology	1
Dr H Mathe	Present	Present	Apology	Present	Present	Present	4
Dr M Mayekiso Ms D Fischer*	Apology	Present	Present	Present	Present	Apology	3
Dr J E McGill Mr D Sibiya*	Present	Present	Apology	Present	Present	Present	4
Ms D Mochotlhi Mr P Nel*	Present	Apology	Apology	Present*	Present*	Present*	3
Ms K R Mthimuruye	Apology	Present	Present	Present	Apology	Apology	3
Mr M Riba Ms R Malubeki*	Present*	Present*	Present*	Present*	Present*	Present*	5

\* Alternate members

## Audit and Risk Committee

The Audit and Risk Committee of the Council for Geoscience evaluates the annual internal and external audit plans, the internal and external audit reports and the financial statements. The Audit and Risk Committee also assesses the effectiveness of the internal audit function and the risk mitigation procedures which are in place.

In addition, the Audit and Risk Committee, from time to time, assesses its mandate and charter in order to address emerging risks.

The composition of the Audit and Risk Committee as at 31 March 2016 was:

**Chairperson:** Mr S M Xulu

**Members:** Mr M Mabuza  
Dr M Mayekiso  
Ms K R Mthimunye  
Dr B Tema

## AUDIT AND RISK COMMITTEE MEETINGS

### 1 APRIL 2015–31 MARCH 2016

MEMBERS	2015/16					Meetings attended
	18 May	23 July	13 August	13 November	17 February	
Mr S M Xulu	Present	Present	Present	Present	Present	5
Mr M Mabuza	Apology	Apology	Apology	Apology	Apology	0
Dr M Mayekiso	Apology	Apology	Apology	Apology	Apology	0
Ms K R Mthimunye	Present	Present	Present	Present	Present	5
Dr B Tema	Present	Present	Present	Present	Present	5

## Finance Committee

The Finance Committee of the Council for Geoscience addresses a range of corporate financial issues of the organisation such as the recommendation for the approval of the budget, the recommendation for major capital expenditure, the writing off of bad debts and assets and any other financial matters referred to the Committee by the Board for recommendations.

The composition of the Finance Committee as at 31 March 2016 was:

**Chairperson:** Ms K R Mthimunye

**Members:** Mr S M Sikhosana – Acting CEO  
Dr J E McGill  
Mr K Mkwanzazi  
Ms D Mochotlhi

## FINANCE COMMITTEE MEETINGS

1 APRIL 2015–31 MARCH 2016

MEMBERS	2015/16					Meetings attended
	18 May	23 July	13 August	13 November	17 February	
Ms K R Mthimunye	Present	Present	Present	Present	Present	5
Mr S M Sikhosana	Present	Present	Present	Present	Present	5
Dr J E McGill	Present	Apology	Present	Present	Present	4
Mr K Mkwanazi	Apology	Apology	Apology	Present	Apology	1
Ms D Mochotlhi	Apology	Apology	Apology	Apology	Apology	0

### Personnel, Remuneration and Transformation Committee

The Personnel, Remuneration and Transformation Committee determines the human resources strategies and policies of the Council for Geoscience. The Committee approves the remuneration structure and salary changes in the organisation and evaluates and makes recommendations on the payment of production bonuses. The Committee also decides upon the remuneration of the Executive Management.

The composition of the Personnel, Remuneration and Transformation Committee as at 31 March 2016 was:

**Chairperson:** Dr H Mathe

**Members:** Ms R Mdubeki  
Ms S Mohale  
Mr D Sibiyi  
Mr S M Sikhosana – Acting CEO

## PERSONNEL, REMUNERATION AND TRANSFORMATION COMMITTEE MEETINGS

1 APRIL 2015–31 MARCH 2016

MEMBERS	2015/16				Meetings attended
	19 May	12 August	12 November	16 February	
Dr H Mathe	Present	Present	Present	Present	4
Ms R Mdubeki	Present	Present	Present	Apology	3
Ms S Mohale	Present	Present	Apology	Apology	2
Mr D Sibiyi	Apology	Apology	Present	Present	2
Mr S M Sikhosana	Present	Present	Present	Present	4

## Technical Committee

The Technical Committee of the Council for Geoscience attends to the annual scientific and technical programme of the organisation, evaluates the scientific and technical output, oversees the annual technical audit and makes recommendations on such scientific and technical matters as are referred to it by the Board.

The composition of the Technical Committee as at 31 March 2016 was:

**Chairperson:** Dr J E McGill

**Members:** Mr B A Gerrys  
Prof. M A Hermanus  
Dr H Mathe  
Ms S Mohale  
Mr S M Sikhosana – Acting CEO

## TECHNICAL COMMITTEE MEETINGS

### 1 APRIL 2015–31 MARCH 2016

MEMBERS	2015/16				Meetings attended
	19 May	12 August	12 November	16 February	
Dr J E McGill	Present	Present	Present	Present	4
Mr B A Gerrys	Present	Present	Apology	Present	3
Prof. M A Hermanus	Apology	Apology	Present	Present	2
Dr H Mathe	Present	Present	Present	Present	4
Ms S Mohale	Apology	Present	Apology	Apology	1
Mr S M Sikhosana	Present	Present	Present	Present	4

## Remuneration of the Board Members

Remuneration is paid to Board Members in accordance with departmental-approved guidelines pertaining to Maximum Remuneration payable to Non-Official Members of Commissions and

Committees of Inquiry.

Refer to page 147 of the Financial Statements for the remuneration of Board Members for the year 2015/16.

## 4. RISK MANAGEMENT

The Council for Geoscience considers and controls a number of risks to the organisation. These are outlined in the appropriate risk registers. The Strategic Risk Register comprises risks on the achievement of strategic objectives and the Operational Risk Register is used to handle risks to projects and routine organisational operations. Risks are identified and assessed in risk assessment workshops. Initiatives to manage identified risks and associated timeframes are determined and tracked. The Operational Risk Management Committee of the Council for Geoscience ensures that a proper and effective management process is in place to deal with these risks. The Audit and Risk Committee, appointed by the Chairperson of the Board, performs an oversight and advisory function on risk management in the organisation.

### *Progress made on addressing the identified risks*

A number of projects were undertaken by the Council for Geoscience with the aim of improving the management of the identified risks. Mitigation projects were defined with anticipated dates and are reviewed every quarter to track progress. These projects included the following:

- Develop and implement a new HR strategy and resource plan to include a structured learning and development plan and a staff retention policy.
- Conduct stakeholder engagements to demonstrate capabilities and to lobby for sufficient funding to enable the organisation to achieve its mandate.
- Develop and implement a new marketing strategy, including a resource plan, stakeholder engagement plan, industry communication and promotion plan and a data release policy review.
- Develop an infrastructure strategy to utilise reserves to fund equipment replacement.
- Developed and initiated the implementation of a change management strategy to include awareness programmes, staff satisfaction, performance incentives and reward and career path initiatives.
- Developed and initiated the implementation of an ICT strategy.
- Business process mapping.

## 5. INTERNAL CONTROL UNIT

Management has the responsibility to design, implement and continuously review internal controls to provide assurance regarding the effectiveness and efficiency of operations and reliability of financial reporting. These controls are monitored throughout the Council for Geoscience by Management and employees, with the necessary segregation of duties. The effectiveness of these controls is monitored by internal audits and by internal audit reports to the Audit and Risk Committee.

## 6. INTERNAL AUDIT AND AUDIT COMMITTEES

The internal audit function was established in terms of the Public Finance Management Act (Act 1 of 1999, as amended). The Internal Audit conducts risk-based audits aligned with the Standards for the Professional Practice of Internal Auditing.

An annual Internal Audit Plan was approved by the Audit and Risk Committee of the Council for Geoscience and the internal audit reports were presented to the Audit and Risk Committee on a quarterly basis. The Internal Audit also performed ad hoc tasks that were requested by Management.

The Audit and Risk Committee was established in terms of the PFMA (Act 1 of 1999, as amended). The Audit and Risk Committee discharges its responsibilities in terms of its Charter. The Audit and Risk Committee continuously monitors the quality and reliability of financial information used by the Board, financial statements issued by the Council for Geoscience and various functions in the Council for Geoscience. The Audit and Risk Committee ensures that emerging risks are timeously identified and that appropriate and effective measures are put in place to mitigate these risks.

## 7. COMPLIANCE WITH LAWS AND REGULATIONS

The Council for Geoscience complies with National Treasury regulations through the PFMA Compliance Calendar. The PFMA Compliance Calendar is continuously monitored and updated. Compliance with laws and regulations is monitored through the Audit and Risk Committee.

## 8. FRAUD AND CORRUPTION

The general fraud and corruption risks facing an organisation include personnel risks, management risks, cultural risks, structural risks, business risks and computer risks. The Council for Geoscience has a legal responsibility in terms of the Public Finance Management Act (Act No. 1 of 1999, as amended) to take appropriate steps to prevent unauthorised, irregular, fruitless and wasteful expenditure and losses resulting from criminal conduct.

A Fraud Prevention Policy is in place, as well as a "whistle blowing facility" that is administered by Deloitte. Reports are issued on a monthly basis and fraudulent conduct is investigated by the Internal Auditors and reported to the Audit and Risk Committee.

## 9. MINIMISING CONFLICTS OF INTEREST

In order to comply with the National Treasury regulations, all suppliers of goods and services to the Council for Geoscience are required to complete standardised Treasury documentation (SBD4 Declaration of Interest). In view of possible allegations of favouritism, should the resulting bid, or part thereof, be awarded to persons employed by the Council for Geoscience, or to persons connected with or related to them, it is required that the bidder or his or her authorised representative declare his or her position to the evaluation/adjudication authority.

In addition, all staff members of the Council for Geoscience involved in the Bid Evaluation Committee are required to complete a declaration and nondisclosure form at each meeting in order to indicate that the staff member will not favour any other business or institution, and that he/she further undertakes to disclose all material interest which he/she may have in any bid or quotation or potential contracts.

Similarly, the members of the Bid Adjudicating Committee are also required to complete a declaration of confidentiality and impartiality at each meeting in order to clarify that the committee members have no interest in a person, firm, cooperation or business entity that is competing for a contract within the Council for Geoscience.

Should there be any declaration of interest, the committee member concerned will not be allowed to participate in the evaluation and award of the contract or bid.

## 10. CODE OF CONDUCT

All staff members of the Council for Geoscience abide by the Code of Ethics and Conduct which has been duly adopted. As a result, the Council for Geoscience is committed to ethical and fair business dealings, and promotes a corporate culture which is nonsectarian and which is socially and environmentally responsible. It does so by subscribing to the following values and principles:

- Fairness and integrity in all business dealings, including the ethical handling of actual or apparent conflicts of interest between personal and professional relationships.
- Respect for the human rights and dignity of all employees.
- Acceptance of diverse cultural, religious, race, gender and sexual orientations.
- Honesty, transparency and accountability.
- Adherence to sound standards of corporate governance and applicable laws.

In terms of the Code of Ethics and Conduct, all persons serving on behalf of the Council for Geoscience are required to uphold the highest standard of business ethics and integrity. In furthering this, all staff, contractors, consultants and others acting on behalf of the organisation are required to accurately and honestly represent the organisation, and will refrain from engaging in any activity or scheme intended to defraud anyone of money, property or services. The reputation and integrity of the Council for Geoscience are central to its ability to operate as an effective state-owned organisation.

## 11. QUALITY ASSURANCE

All services delivered by the Council for Geoscience are rendered within the context of the Quality Management System. The Quality Management System ensures that the creation, delivery and monitoring of services occur in line with national and international quality standards. The purpose of quality management in the Council for Geoscience is to ensure that stakeholders receive the best services at all times. The Safety, Health, Environment and Quality (SHEQ) policy was approved by the Board of the Council for Geoscience. A roll-out plan has been developed for the Quality Gap Assessment project which will

be used as a tool to drive quality management system implementation within the Council for Geoscience.

Laboratory testing facilities remain a high priority area within the Quality Management System of the Council for Geoscience. The Analytical Laboratory has commissioned the Laboratory Information Management System (LIMS), which is a database used primarily to process, store and access customer, quality control and sample information. LIMS is also being used to control various laboratory support processes, namely calibration records, standard operating procedures and equipment maintenance data, and to perform other related functions.

## 12. HEALTH, SAFETY AND ENVIRONMENTAL ISSUES

Management of the Council for Geoscience is obliged in terms of the Occupational Health and Safety Act to provide a safe workplace without risk to human life, while staff members have a duty to work and behave in compliance with the safety directives of the organisation. The Safety, Health, Environment and Quality (SHEQ) policy enables the organisation to drive compliance with occupational health, safety and environmental legislation.

The Council for Geoscience uses its health and safety risk assessments to routinely identify hazards and assess risks in order to prevent workplace injuries. Project hazard assessments are conducted on all key projects. Significant hazards are communicated to all project staff members. Identified countermeasures are implemented according to the Health and Safety Programme roll-out. Occupational health and safety performance is monitored through various indicators. Currently, there is a drive to review these indicators to include new indicators. Various management committees, namely the Operational Risk Management Committee and the Business Continuity Committee, as well as the Audit and Risk Committee and the CGS Board,

perform quarterly monitoring on the performance of occupational health and safety in the organisation.

The Council for Geoscience strives to conduct all its activities in an environmentally sensitive manner. The approach that has been adopted by the organisation is to prevent pollution and reduce resource wastage caused in the activities of the organisation by conducting an environmental risk assessment. This was followed by developing and implementing an environmental management plan.

The Council for Geoscience has created and sustains the necessary organisational competency to enable the development of health, safety and environment (HSE) plans for the major projects. Current projects such as the HVAC (Heating, Ventilation and Air Conditioning) and refurbishment projects are handled under controlled conditions to ensure compliance with applicable safety and health legal requirements.

## 13. BOARD ADMINISTRATOR

The Board Administrator is responsible for preparing the schedule of all Board and Committee meetings for the year and for recording and filing the minutes of these meetings. It is the function of the Board Administrator to submit quarterly compliance reports to the National Treasury, the Department of Mineral Resources and the Auditor-General, and to update Board Member details. The Board Administrator plays a key role in the induction process of new members and must ensure that the annual Strategy Reviews in terms of the National Objectives and the annual Board Assessment as per the PFMA (section 53) Treasury regulation 30.1 take place.

## 14. PUBLIC AWARENESS

The Council for Geoscience participated in the following public awareness initiatives:

<b>Visits of Foreign Delegations to the Council for Geoscience</b>		
<b>Purpose of visit:</b> Several international delegations visited the Council for Geoscience to investigate opportunities to enter into collaborations for business development purposes.		
<b>Outcome:</b> Several proposals for business opportunities are awaiting approval or have been finalised.		
<b>Delegation from/for:</b>	<b>Date</b>	<b>Outcome</b>
<b>Bolivarian Republic of Venezuela and the SADPMR</b>	1 July 2015	Discussions took place around potential collaboration between the Council for Geoscience and the Bolivarian Republic of Venezuela for business development purposes.
<b>City of Tshwane Municipality</b>	24 September 2015	Potential business collaboration opportunities between the City of Tshwane Metropolitan Municipality and the Council for Geoscience were explored.

Exhibitions		
Event	Date	Outcome
<b>Budget Vote Speech</b>	7 May 2015	The Council for Geoscience was invited to support the Minister's presentation at the 2016/17 Departmental Budget Vote Speech. The purpose of the Budget Vote is for a department to provide a plan on how it will apportion its budget in the financial year. Support was in the form of co-exhibitions as well as attendance by the CGS Management. Several members of parliament visited the CGS stand to learn more about the work of the organisation.
<b>Small-Scale Mining Imbizo – Northern Cape</b>	16–17 July 2015	The Council for Geoscience was invited to participate in the Small-scale Mining Imbizo in Kimberley in the Northern Cape Province. The aim of the imbizo was to promote small-scale mining initiatives in the Northern Cape region. Participation took place in the form of exhibitions where information on minerals was disseminated.
<b>Small-Scale Mining Imbizo – KwaZulu-Natal</b>	27–28 August 2015	The Council for Geoscience participated in the Small-scale Mining Imbizo led by the DMR in Kimberley in the Northern Cape. The aim of the imbizo was to promote small-scale mining initiatives in the KwaZulu-Natal region. Exhibitions were held where advocacy material was distributed.
<b>Mining Indaba</b>	8–11 February 2016	The Council for Geoscience attended and exhibited at Mining Indaba 2016 in Cape Town. Representatives from various countries visited the CGS stand with a view to explore collaborative initiatives and to learn more about the services that the organisation has to offer.
<b>Prospectors and Developers Association of Canada (PDAC) International Conference 2016</b>	6–9 March 2016	The Council for Geoscience exhibited with the DMR at the biggest mining conference in the world in Toronto, Canada. The aim of attendance was to explore business networking opportunities and to promote mining investment.



DMR KwaZulu-Natal Imbizo

<b>Career Exposure Events</b>		
<b>Event</b>	<b>Date</b>	<b>Outcome</b>
<b>International Museums Day</b>	18 May 2015	International Museums Day is celebrated annually on the 18th of May. The National Geoscience Museum celebrated this event in partnership with Ditsong Museums of South Africa with the aim of highlighting the critical place that museums hold in society. Learners from various schools around the Pretoria area visited the museum on this day to learn more about the history and heritage of the National Geoscience Museum.
<b>Learners Focus Week</b>	5–9 July 2015	The Council for Geoscience partnered with the DMR for the 2015 Learners Focus Week which was held in Cullinan. The main objective was to expose learners to career opportunities in mining and to create awareness of the National Geoscience Museum. The programme was attended by learners from Grades 9 to 12 from all nine provinces. The Council for Geoscience exhibited throughout the week-long programme, gave an informed presentation on the various career opportunities in the geosciences and conducted a science quiz. Furthermore, general awareness was created of the museum with various specimens from the museum being displayed there.
<b>National Science Week</b>	1–8 August 2015	The Council for Geoscience partnered with the DST for the National Science Week. Learners were exposed to and encouraged to study towards the field of the earth sciences. The Council for Geoscience participated in six provinces that were visited.
<b>Richtersveld Science Week</b>	26–30 November 2015	The Council for Geoscience presented an annual Field School to train entry-level geologists in field mapping and map preparation. A Science Week programme was developed that focuses on the science curriculum in schools. The Council for Geoscience donated nine GIS-ready desktop computers, school back packs and pencil cases to schools in the Richtersveld area. Moreover, a series of experiments was performed demonstrating specific scientific processes.

<b>CORPORATE SOCIAL RESPONSIBILITY (CSR) INITIATIVES</b>		
<b>Employee-focussed Initiatives</b>		
<b>Event</b>	<b>Date</b>	<b>Outcome</b>
<b>Nelson Mandela Day</b>	18 July 2015	The aim of the day is to spend at least 67 minutes in remembrance of Nelson Mandela by being of service to communities that are less privileged. As part of its Corporate Social Responsibility programme, all CGS offices commemorated the day by visiting various orphanages. Staff of the head office went to the Tshwaraganang Children's Home, the Limpopo office visited the Samaritans Children's Home, the Bellville office went to Havens Shelter, the Port Elizabeth office went to Ikhaya Macnamee and the Uppington office went to the Vlytige Bejaardes Old Age Home to donate food parcels and blankets. The offices also assisted the shelters with general cleaning services and gardening.
<b>Women's Day Celebrations</b>	14 August 2015	The day was marked by varied activities at head office and the five regional offices as the women of the Council for Geoscience celebrated National Women's Day. The women were treated to an event where renowned motivational speaker, Dimakatso Malwela, CEO of Women of Value SA and Chairperson for Women in Tourism, SADC Regions, addressed women on six areas of life including the mental, physical, spiritual, social, career and financial areas. The aim of the initiative was to celebrate the role women play in the earth sciences as well as the progress they have made in a male-dominated field.
<b>Heritage Day</b>	24 September 2015	The Council for Geoscience created awareness of Heritage Day by putting up posters encouraging the employees to celebrate their respective cultures and diversity of their beliefs and traditions.
<b>Anti-Fraud and Corruption Presentation</b>	28 September 2015	An Anti-Fraud and Corruption Workshop was held in which a presentation was made by a Deloitte representative educating CGS employees on anti-fraud and corruption as well as an anonymous tip-off hotline.
<b>National Breast Cancer Awareness Month</b>	1–31 October 2015	The Council for Geoscience created awareness of breast cancer by displaying posters and sending out internal communications encouraging women to have themselves tested for breast cancer as the month of October is dedicated to breast cancer awareness.

CORPORATE SOCIAL RESPONSIBILITY (CSR) INITIATIVES		
Employee-focussed Initiatives		
Event	Date	Outcome
<b>World Science Day for Peace and Development 2015</b>	10 November 2015	Public awareness was created amongst the CGS community on the role of science for peaceful and sustainable societies through internal communications.
<b>World Diabetes Day</b>	14 November 2015	Employees of the Council for Geoscience were encouraged to lead a healthy lifestyle as well as being physically active in order to prevent lifestyle diseases such as diabetes.



Nelson Mandela Day initiative.



Women's Day

Community-focussed Initiatives			
Event	Date	Activity	Outcome
Izzi Trust Feeding Scheme	19 June 2015	Preparation of food packs	Izzi Trust has partnered with Makro to supply children at five schools and crèches with food every day. In addition, they provide food packs to families for the school vacations, thus ensuring that the children are well fed even when they are not at school.
Izzi Trust Feeding Scheme	27 November 2015	Distribution of food packs to: <ul style="list-style-type: none"> <li>• Madibatlou Middle School in Olifantsfontein</li> <li>• Philena Primary School in Olievenhoutbosch</li> <li>• Orefile Primary School in Olievenhoutbosch</li> </ul>	Food packs were distributed to 4 600 children by teams from Makro, the U21 Blue Bulls and the Council for Geoscience. A total of 330 320 meals were distributed on the day.



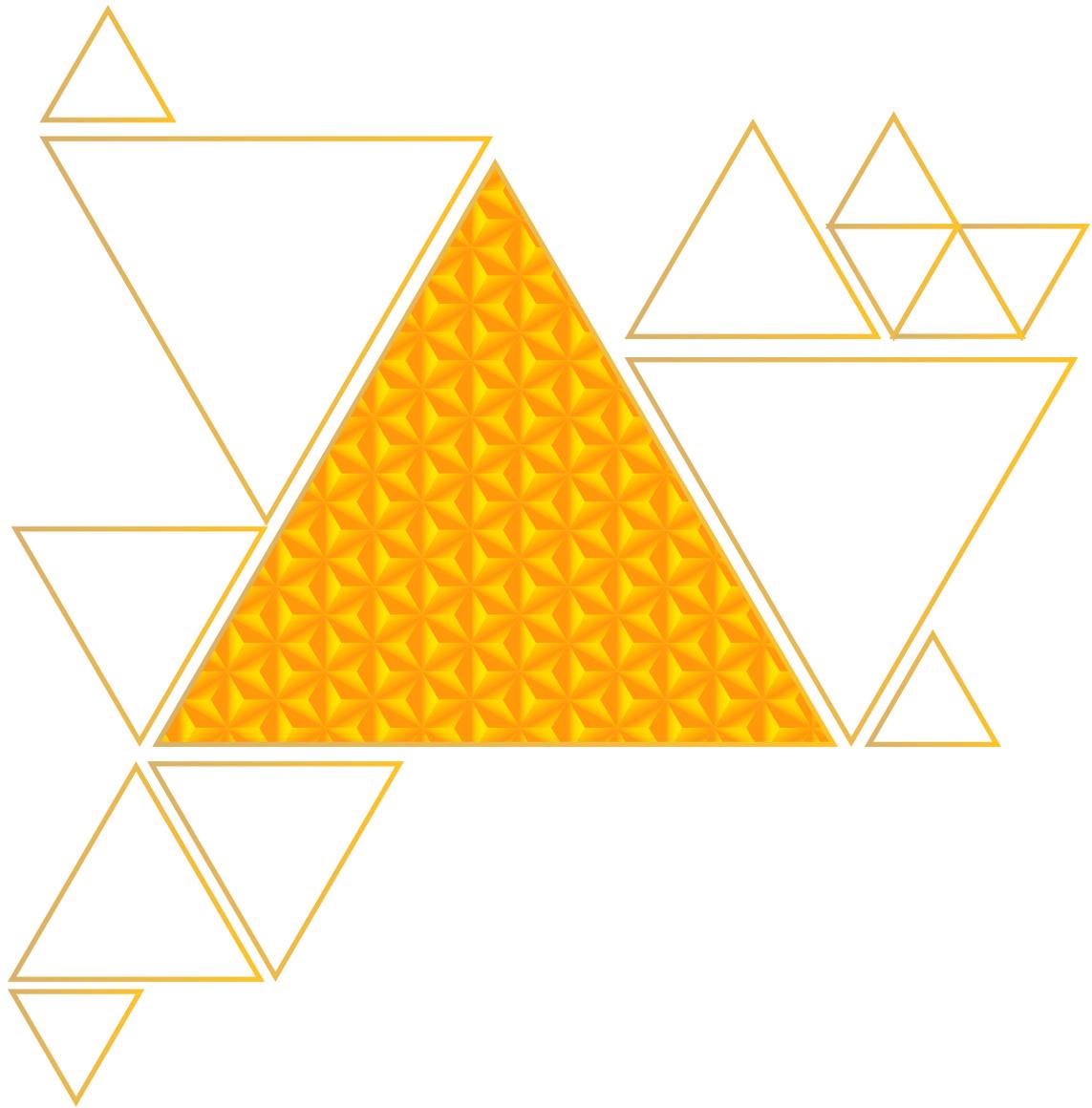
Izzi Trust Feeding Scheme

<b>MEDIA RELEASES</b>				
<b>Industry press releases</b>				
<b>Date</b>	<b>Magazine</b>	<b>Online article</b>	<b>Title</b>	
22/01/2016	Engineering News	<a href="http://www.engineeringnews.co.za/article/joburg-seismic-study-to-help-disaster-management-planning-2016-01-22/searchString:geoscience">http://www.engineeringnews.co.za/article/joburg-seismic-study-to-help-disaster-management-planning-2016-01-22/searchString:geoscience</a>	Joburg seismic study to help disaster management planning	
04/02/2016	Engineering News	<a href="http://www.engineeringnews.co.za/article/council-for-geoscience-advances-shale-gas-research-in-the-karoo-2016-02-04">http://www.engineeringnews.co.za/article/council-for-geoscience-advances-shale-gas-research-in-the-karoo-2016-02-04</a>	Council for Geoscience advances Shale Gas Research in the Karoo	
11/03/2016	Mining Weekly	<a href="http://www.miningweekly.com/article/new-mineral-deposits-need-to-be-found-to-prolong-mining-in-sa-cgs-2016-03-11">http://www.miningweekly.com/article/new-mineral-deposits-need-to-be-found-to-prolong-mining-in-sa-cgs-2016-03-11</a>	Depleting Resource – New discoveries needed to prolong mining says Council for Geoscience	
18/03/2016	Mining Weekly	<a href="http://www.miningweekly.com/article/mechanisation-crucial-to-survival-of-mines-in-s-africa-vogt-2016-03-18">http://www.miningweekly.com/article/mechanisation-crucial-to-survival-of-mines-in-s-africa-vogt-2016-03-18</a>	Survival Imperative – Mechanisation crucial for sustainability of South African mines	
18/03/2016	Mining Weekly	<a href="http://www.miningweekly.com/article/mine-water-management-research-drought-academic-decries-2016-03-18">http://www.miningweekly.com/article/mine-water-management-research-drought-academic-decries-2016-03-18</a>	Declining quality of mine water management research papers bemoaned	
25/03/2016	Mining Weekly	<a href="http://www.miningweekly.com/article/drilled-deep-cored-boreholes-advance-shale-gas-research-in-karoo-2016-03-25">http://www.miningweekly.com/article/drilled-deep-cored-boreholes-advance-shale-gas-research-in-karoo-2016-03-25</a>	New study aimed at improving understanding of potential Karoo Shale Gas reserves	
<b>Popular press releases</b>				
01/11/2015 – Sunday Times. Corporate Social Investment (CSI) Supplement: "Driving Social change". Sunday Times: Business Times Section, page 47				
05/02/2016 – Pretoria News. Print Article. Shale gas talks energise science forum in city.				
<b>Media interviews</b>				
SABC – 18 August 2015 – Orkney Earthquake (5 August 2014)				
EWN – 2 December 2015 – Saron earthquake (2 December 2015)				
Sunday Times – 6 February 2016 – Durban earthquake (6 February 2016)				
East Coast Radio – 7 February 2016 – Durban earthquake (6 February 2016)				
Radio Kwezi – 8 February 2016 – Durban earthquake (6 February 2016)				
eNCA – 8 February 2016 – Durban earthquake (6 February 2016)				
RSG – 7 March 2016 – Cartography and map making (7 March 2016)				
<b>Local event publications</b>				
<b>Date</b>	<b>Publication</b>	<b>Exposure</b>	<b>Format</b>	<b>Pages</b>
2016 edition	South African Business "The guide to business and investment in RSA"	Company profile and advert	Mining Indaba Edition – Media Partner – hard copy and digital	84–85
December 2015	Geobulletin	Advert	Hard copy	6
December 2015	GEOclips Newsletter	Advert	Hard copy	8
January 2016	Mining Decisions	Company profile and advert	Mining Indaba Edition – Media Partner – hard copy and digital	70–71

**D**

**HUMAN RESOURCES  
MANAGEMENT**





## 1. INTRODUCTION

The Human Resources Department plays a pivotal role in ensuring that the Council for Geoscience is resourced with the required expertise to deliver on its mandate and strategic objectives. To this end, various methods and tools are employed to attract and retain qualified staff members.

Employees are afforded opportunities to grow and develop in their respective lines of disciplines to ensure a pipeline of qualified expertise in the organisation. Staff members of the Council for Geoscience are encouraged to use the opportunity to study through the CGS bursary programmes as well as to receive training in the areas of skills required by the organisation.

## 2. OVERVIEW OF HR MATTERS

The Council for Geoscience strives to develop and implement people centric strategies, policies and practices that are fair and equitable.

Effective talent management solutions are pivotal to the success of the CGS strategy and to being an employer of choice.

## 3. HR PRIORITIES FOR THE YEAR UNDER REVIEW

The HR priorities for the year under review focussed on ensuring capacity for the Business Unusual strategy in order to create leverage on the CGS vision of becoming the leading provider of public geoscience expertise in South Africa and beyond.

### *Organisational structure review*

The Council for Geoscience had to halt the implementation of its repositioning strategy and embark on a new strategy, "Business Unusual", in order to unlock deferred funds. This came with the challenge of having to realign the roles and responsibilities of the staff and the reporting structure. The Council for Geoscience is still in the process of establishing a sustainable structure with a view to creating certainty in respect of roles and responsibilities for the staff, especially within the scientific operations. It is envisaged that this process will be finalised before the end of the 2016/17 financial year.

### *Diversity and transformation*

The Council for Geoscience, as a designated employer, is required to develop and submit an Employment Equity Plan in order to monitor progress in achieving its employment equity targets. The three-year Employment Equity Plan is in place and the Council for Geoscience submitted its Employment Equity Report in January 2016.

The CGS overall staff profile in terms of gender is 55% male and 45% female, and the profile in terms of race is 74% blacks and 26% whites. The CGS percentage representation of people with disabilities is 0.86% against the national target of 2%. The Council for Geoscience still has to focus its efforts to attract coloureds, Indians, females and people with disabilities.

### *Employee benefits and compensation*

The Council for Geoscience offers benefits such as life cover and income care schemes to cater for staff members in the event of temporary and permanent incapacitation. The organisation reviews its salaries annually and conducts a benchmarking exercise against the market to assess affordability.

## Training and professional development

### Full-time study bursaries

The Council for Geoscience uses its full-time study bursary programme as a feeder pipeline to build its scientific expertise. For the year under review, the Council for Geoscience awarded a total of 29 bursaries for full-time

studies in respect of PhD, MSc, BSc Honours and BSc.

The racial and gender profile of the students in the bursary programme is as follows:

Category	MALE				FEMALE				Total
	African	Coloured	Indian	White	African	Coloured	Indian	White	
PhD	0	0	0	0	0	0	1	0	1
MSc	5	1	0	0	5	0	0	0	11
BSc Hons	1	0	0	0	6	0	1	0	8
BSc	2	0	0	1	3	0	1	2	9
<b>Total</b>	<b>8</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>14</b>	<b>0</b>	<b>3</b>	<b>2</b>	<b>29</b>

### Internships

The Council for Geoscience has partnered with the Mining Qualifications Authority (MQA) to support skills development, growth and career opportunities for aspiring young graduates. To this end, a total of 75 interns were trained at

the organisation during the period under review.

The gender and racial profile of interns in the internship programme for the period under review is as follows:

Gender	RACE				Total
	African	White	Coloured	Indian	
Female	41	2	1	1	45
Male	28	2	0	0	30
<b>Total</b>	<b>69</b>	<b>4</b>	<b>1</b>	<b>1</b>	<b>75</b>

## 4. PERFORMANCE MANAGEMENT

The Council for Geoscience uses the Balanced Scorecard as a performance measurement tool at corporate level and this is cascaded down to all staff in the organisation. Reviews are done quarterly to measure performance across the organisation.

## 5. EMPLOYEE WELLNESS PROGRAMMES

A new health and wellness programme was launched recently. The programme is conducted in partnership with CAREWAYS and it focusses mainly on the following services: emotional and personal difficulties, family and relationship concerns, alcohol, drug or gambling abuse, managing stress and change, career issues, violence and trauma, HIV/AIDS, general health concerns, bereavement and loss, and financial wellness.

## 6. HIGHLIGHTS OF ACHIEVEMENTS

The CGS staff grew from 316 to 350 during the year under review. It has, however, lost 26 of its staff members during the same period.

As part of the automation of some of the HR transactional activities, the leave automation process was successfully implemented during the period under review.

## 7. CHALLENGES FACED BY THE ORGANISATION

The Council for Geoscience is losing its critical mass of skills owing to natural attrition and other reasons. Succession planning has become pivotal to ensure skills transfer to young scientific staff. A framework for succession planning was developed based on the current CGS Succession Planning policy and this programme will be implemented in the 2016/17 financial year.

Attraction of critical skills remains a challenge owing to non-competitive salary packages and budgetary constraints.

## 8. FUTURE HR GOALS

The Council for Geoscience is currently reviewing its remuneration practices to ensure attraction and retention of staff. A review of most of the existing policies is also planned for the 2016/17 financial year to align the organisation with best practices and regulatory prescripts.

## 9. HUMAN RESOURCES OVERSIGHT STATISTICS

### Age profile

	Age group	25–34	35–44	45–54	55–64	>65	Total
2015/16	Number of staff	138	91	78	41	2	350
	Percentage of staff	39.60	25.93	22.22	11.68	0.57	100

### Employment changes

Levels	Employment at the beginning of the period	Appointments	Terminations	Employment at end of the period
Top Management	4	1	2	3
Senior Management	17	2	3	16

Levels	Employment at the beginning of the period	Appointments	Terminations	Employment at end of the period
Professional qualified	146	23	11	158
Skilled	82	26	6	102
Semiskilled	58	7	4	61
Unskilled	9	1	0	10
<b>Total</b>	<b>316</b>	<b>60</b>	<b>26</b>	<b>350</b>

### *Reasons for staff leaving*

Reason	Number	Percentage of total number of staff leaving
Death	1	4
Resignation	15	58
Dismissal	2	8
Retirement	6	22
Ill health	0	0
Expiry of contract (No renewal)	1	4
Other	1	4
<b>Total</b>	<b>26</b>	<b>100</b>

### *Labour Relations: misconduct and disciplinary action*

Nature of disciplinary action	Number
Verbal warning	0
Written warning	1
Final written warning	0
Dismissal	2

### Equity targets and employment equity status

Levels	MALE							
	AFRICAN		COLOURED		INDIAN		WHITE	
	Current	Target	Current	Target	Current	Target	Current	Target
Top Management	2	4	0	0	0	0	0	1
Senior Management	8	6	0	0	1	1	4	6
Professional qualified	50	45	3	7	3	2	33	33
Skilled	63	48	3	5	0	0	8	7
Semiskilled	9	11	2	2	0	0	2	2
Unskilled	6	5	0	0	0	0	0	0
<b>Total</b>	<b>138</b>	<b>119</b>	<b>8</b>	<b>14</b>	<b>4</b>	<b>3</b>	<b>47</b>	<b>49</b>

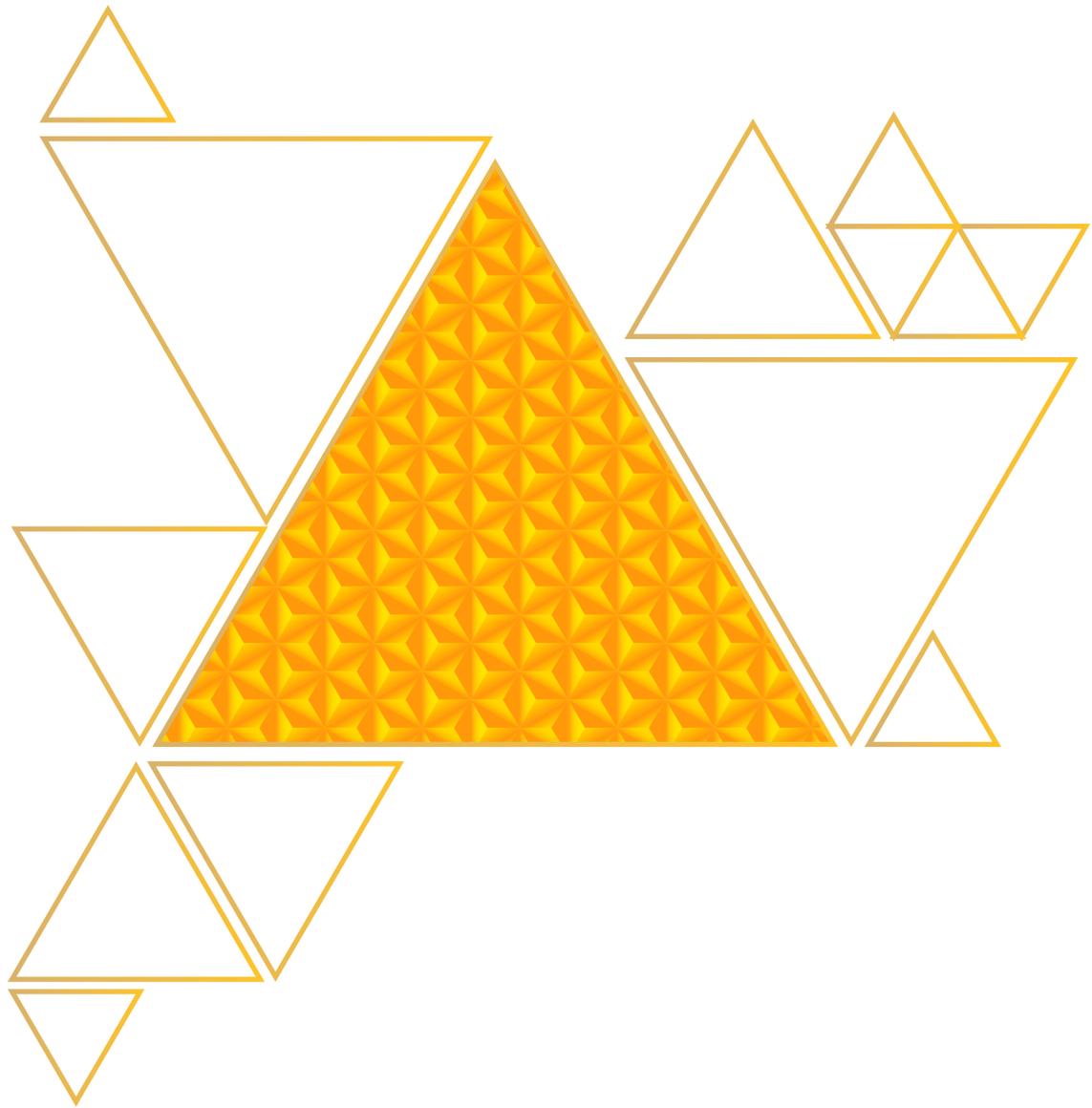
Levels	FEMALE							
	AFRICAN		COLOURED		INDIAN		WHITE	
	Current	Target	Current	Target	Current	Target	Current	Target
Top Management	1	1	0	0	0	0	0	0
Senior Management	1	3	0	0	0	0	2	3
Professional qualified	44	43	3	7	4	3	19	20
Skilled	16	20	0	4	1	1	10	11
Semiskilled	35	31	4	3	0	0	10	12
Unskilled	3	4	0	0	0	0	0	0
<b>Total</b>	<b>100</b>	<b>102</b>	<b>7</b>	<b>14</b>	<b>5</b>	<b>4</b>	<b>41</b>	<b>46</b>

Levels	DISABLED STAFF			
	MALE		FEMALE	
	Current	Target	Current	Target
Top Management	0	0	0	0
Senior Management	0	0	0	0
Professional qualified	0	0	1	1
Skilled	0	0	0	0
Semiskilled	2	2	0	0
Unskilled	0	0	0	0
<b>Total</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>

**E**

**FINANCIAL  
INFORMATION**





## 1. STATEMENT OF RESPONSIBILITY

### Statement of Responsibility for the Annual Financial Statements for the Year ended 31 March 2016

The Board is responsible for the preparation of the Annual Financial Statements of the Council for Geoscience and for the judgements made in this information.

It is the responsibility of the Accounting Authority to establish and implement a system of internal controls designed to provide reasonable assurance as to the integrity and reliability of the Annual Financial Statements.

In our opinion, the financial statements fairly reflect the operations of the Council for Geoscience for the

financial year ended 31 March 2016.

The external auditors are engaged to express an independent opinion on the Annual Financial Statements of the Council for Geoscience.

The Annual Financial Statements of the Council for Geoscience for the year ended 31 March 2016 have been audited by the external auditors and their report is presented on page 121 to page 124.

The Annual Financial Statements of the Council for Geoscience set out on page 125 to page 156 have been approved.



**Mr S M Sikhosana**  
ACTING CHIEF EXECUTIVE OFFICER  
Council for Geoscience  
28 July 2016



**Prof. P E Ngoepe**  
CHAIRPERSON OF THE BOARD  
Council for Geoscience  
28 July 2016

## 2. AUDIT AND RISK COMMITTEE REPORT

The Audit and Risk Committee of the Council for Geoscience is pleased to present its report for the financial year ended 31 March 2016.

### Audit and Risk Committee Responsibility

The Board of the Council for Geoscience has the overall responsibility to ensure that the organisation has and maintains effective, efficient and transparent systems of risk management and internal controls. The responsibility to ensure the adequacy and effectiveness of these systems is delegated to the Audit and Risk Committee. The Audit and Risk Committee is an advisory committee of the Board, with an oversight role that is independent and objective.

The Audit and Risk Committee has adopted formal terms of reference, which have been confirmed by the Board through its charter, and is satisfied that it has discharged its duties and responsibilities as set out in the charter. In performing its responsibilities, the Audit and Risk Committee has reviewed the following:

- The functioning of the internal control systems
- The functioning of the internal audit programme
- The risk areas of the operations of the entity to be covered in the scope of the internal and external audits
- The reliability and accuracy of the financial information provided to Management and other users
- The accounting or auditing concerns identified as a result of the internal or external audits
- The compliance by the entity with legal and regulatory provisions.

### The Effectiveness of Internal Control

The members of the Audit and Risk Committee are of the opinion that the system of internal controls is adequately designed to cover organisational, financial and operational risks. The control system provides reasonable, but not absolute, assurance that the assets of the organisation are safeguarded, transactions are authorised and recorded properly, and that material errors and irregularities are either prevented or detected timeously. These controls are monitored throughout the organisation by Management and employees with the necessary segregation of authority and duties. The Operational Risk Management Committee, which reports to

the Audit and Risk Committee on a quarterly basis, continuously evaluates and monitors the effectiveness of all internal control systems in respect of all areas of risk that have been identified.

### Monthly/Quarterly Reports

The Audit and Risk Committee met five times during the year under review and submitted monthly and quarterly reports to the Executive Authority.

### Evaluation of Financial Statements

The Audit and Risk Committee has reviewed and discussed the financial statements of the Council for Geoscience for the year ended 31 March 2016 with the Auditor-General. The Audit and Risk Committee has also reviewed the management letter of the Auditor-General and the responses of Management thereto. The members of the Audit and Risk Committee are of the opinion that the financial statements comply, in all material respects, with the requirements of the Public Finance Management Act (Act No. 1 of 1999, as amended) and the South African Standards of Generally Recognised Accounting Practice (GRAP). The Audit and Risk Committee agrees that the adoption of the going-concern premise is appropriate in preparing the Annual Financial Statements.

### Auditor's Report

The Audit and Risk Committee has reviewed the implementation plan of the Council for Geoscience for audit issues raised in the prior year and is satisfied that the matters have been addressed adequately.

The Audit and Risk Committee concurs and accepts the conclusions of the Auditor-General on the financial statements and is of the opinion that the audited Annual Financial Statements be accepted and read together with the report of the Auditor-General.



Mr S M Xulu  
Chairperson: Audit and Risk Committee  
Council for Geoscience  
28 July 2016

### 3. REPORT OF THE CHIEF EXECUTIVE OFFICER

#### General Financial Review of the Council for Geoscience

The statement of the financial position shows growth in total assets from R496.8m to R572.7m. Current assets amount to R343.7m and current liabilities to R174.4m for the reporting period, meaning that the Council for Geoscience will be able to meet its current financial obligations. An amount of R40m was spent on CGS infrastructure such as scientific and office equipment, machinery, buildings and computer equipment. Plans are in place to increase this investment to build a sustainable organisation. For the year under review, the financial performance of the Council for Geoscience shows an increase in total revenue and a surplus to the amount of R54.2m.

The increase in revenue and surplus are attributable to the changes that are being implemented in the organisation for better future performance and stability. There were also challenges in respect of both the ring-fenced MTEF funding and the contracting revenue systems. There was a delay in the conclusion of a work plan agreement for the Water Ingress project. Neither the Eskom Nuclear Plant Siting project nor the Mine Health and Safety Seismic Stations project resumed as had been anticipated.

#### New Proposed Activities

The Geoscience Amendment Act (Act No.16 of 2010) mandates the Council for Geoscience to, among others, be the custodian and curator of all geotechnical information in South Africa. The Council for Geoscience is also the national mandatory authority in respect of geohazards related to infrastructure development. Thus, the Act empowers the Council for Geoscience to be the custodian of all geotechnical data, with the purpose of advising government, state institutions, private organisations and the public on the complete geotechnical risk profile of the country.

#### Request for Rollover of Funds

In terms of Section 53(3) of the Public Finance

Management Act (Act No. 1 of 1999), the Council for Geoscience has to obtain approval from the National Treasury to retain surpluses. Approval was obtained for the use of accumulated surpluses for the maintenance of and investment in scientific equipment and infrastructure and the implementation of the repositioning strategy. A new request will be made for the reported year.

#### Supply Chain Management

A Supply Chain Management Section is operational under the division of the Chief Financial Officer. This business unit provides an appropriate procurement and provisioning system which is fair, equitable, transparent, competitive and cost effective and is established in accordance with section 54 of the PFMA Act of 1999 (as amended by Act No. 29 of 1999).

#### Audit Report Matters

The Council for Geoscience obtained an unqualified audit opinion from the Auditor-General for the year ended 31 March 2016. A number of issues were raised but were resolved during the current financial year.

#### Plans for Future Additional Financial Challenges

The Council for Geoscience is in the process of implementing the repositioning strategy for the alignment of operations to the organisational structure. This shortcoming was evident in the increasing deferred income in current liability on the statement of financial position. The Council for Geoscience is focussing on the delivery on all contracts in a prescribed period and, to this end, a Project Management Office was established and equipped with the necessary project management systems needed for both statutory and commercial projects.

The endeavour to increase the grand allocated to the organisation through both the MTEF process and the Economic Competitiveness Support Package process will continue, together with an integrated business development strategy to solicit projects from government departments and from other clients.

## 4. REPORT OF THE AUDITOR-GENERAL TO PARLIAMENT ON THE COUNCIL FOR GEOSCIENCE

### Report on the financial statements

#### Introduction

1. I have audited the financial statements of the Council for Geoscience set out on pages 125 to 156, which comprise the statement of financial position as at 31 March 2016, the statement of financial performance, statement of changes in net assets and cash flow for the year then ended, as well as the notes, comprising a summary of significant accounting policies and other explanatory information.

#### Accounting authority's responsibility for the financial statements

2. The accounting authority is responsible for the preparation and fair presentation of these financial statements in accordance with the South African Standards of Generally Recognised Accounting Practice (SA Standards of GRAP) and the requirements of the Public Finance Management Act of South Africa, 1999 (Act No. 1 of 1999) (PFMA) and for such internal control as the accounting authority determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

#### Auditor-General's responsibility

3. My responsibility is to express an opinion on these financial statements based on my audit. I conducted my audit in accordance with International Standards on Auditing. Those standards require that I comply with ethical requirements, and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.
4. An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.
5. I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my audit opinion.

#### Opinion

6. In my opinion, the financial statements present fairly, in all material respects, the financial position of the Council for Geoscience as at 31 March 2016 and its financial performance and cash flows for the year then ended, in accordance with SA Standards of GRAP and the requirements of the PFMA.

#### Emphasis of matter

7. I draw attention to the matter below. My opinion is not modified in respect of this matter.

### *Restatement of corresponding figures*

8. As disclosed in note 24 to the financial statements, the corresponding figures for 31 March 2015 have been restated as a result of an error discovered during 2016 in the financial statements of the Council for Geoscience at, and for the year ended, 31 March 2015.

### **Report on other legal and regulatory requirements**

9. In accordance with the Public Audit Act of South Africa, 2004 (Act No. 25 of 2004) (PAA) and the general notice issued in terms thereof, I have a responsibility to report findings on the reported performance information against predetermined objectives for selected objectives presented in the annual performance report, compliance with legislation and internal control. The objective of my tests was to identify reportable findings as described under each subheading but not to gather evidence to express assurance on these matters. Accordingly, I do not express an opinion or conclusion on these matters.

### **Predetermined objectives**

10. I performed procedures to obtain evidence about the usefulness and reliability of the reported performance information for the following selected objectives presented in the annual performance report of the public entity for the year ended 31 March 2016:
- To address stakeholder needs on page 32
  - To generate revenue on page 33
  - To attract and retain a skilled workforce on page 35
  - To enhance present levels of excellence on page 35
  - To reflect and embrace RSA diversity on page 36.
11. I evaluated the usefulness of the reported performance information to determine whether it was presented in accordance with the National Treasury's annual reporting principles and whether the reported performance was consistent with the planned objectives. I further performed tests to determine whether indicators and targets were well defined, verifiable, specific, measurable, time bound and relevant, as required by the National Treasury's Framework for managing programme performance information (FMPPPI).
12. I assessed the reliability of the reported performance information to determine whether it was valid, accurate and complete.
13. I did not identify any material findings on the usefulness and reliability of the reported performance information for the following objectives:
- To address stakeholder needs on page 32
  - To generate revenue on page 33
  - To attract and retain a skilled workforce on page 35
  - To enhance present levels of excellence on page 35
  - To reflect and embrace RSA diversity on page 36.

### **Additional matters**

14. Although I identified no material findings on the usefulness and reliability of the reported performance information for the selected objectives, I draw attention to the following matters:

### Achievement of planned targets

15. Refer to the annual performance report on pages 32 to 36 for information on the achievement of the planned targets for the year.

### Adjustment of material misstatements

16. I identified material misstatements in the annual performance report submitted for auditing on the reported performance information for the objectives listed below. As management subsequently corrected the misstatements, I did not raise any material findings on the usefulness and reliability of the reported performance information.

- To generate revenue
- To address stakeholder needs
- To attract and retain a skilled workforce.

### Compliance with legislation

17. I performed procedures to obtain evidence that the public entity had complied with applicable legislation regarding financial matters, financial management and other related matters. My material findings on compliance with specific matters in key legislation, as set out in the general notice issued in terms of the PAA, are as follows:

### Financial statements, performance and annual report

18. The financial statements submitted for auditing were not prepared in accordance with the prescribed financial reporting framework as required by section 55(1)(a) of the Public Finance Management Act. Material misstatements of the non-current assets and commitments balances identified by the auditors in the submitted financial statements were subsequently corrected, resulting in the financial statements receiving an unqualified audit opinion.

### Internal control

19. I considered internal control relevant to my audit of the financial statements, annual performance report and compliance with legislation. The matters reported below are limited to the significant internal control deficiencies that resulted in the findings on non-compliance with legislation included in this report.

### Leadership

20. Material adjustments in the financial and performance information that was submitted for audit could have been prevented through additional levels of oversight.

### Financial and performance management

21. Management did not implement appropriate review procedures to enable the preparation of accurate and complete performance reports that are supported and evidenced by reliable information.

## Other reports

22. I draw attention to the following engagement that could potentially impact on the public entity's financial, performance and compliance related matters. My opinion is not modified in respect of this engagement that is in progress.

## Investigations

23. The public protector has performed an investigation during the prior financial year on a contract awarded by the Council for Geoscience. A report from the public protector has not been issued.

*Auditor General*

Pretoria

31 July 2016



**A U D I T O R - G E N E R A L**  
**S O U T H A F R I C A**

*Auditing to build public confidence*

## 5. ANNUAL FINANCIAL STATEMENTS FOR THE PERIOD ENDED 31 MARCH 2016

### 5.1 STATEMENT OF FINANCIAL POSITION AT 31 MARCH 2016

	Notes	2016 R'000	2015 R'000
<b>Assets</b>			
<b>Non-current assets</b>			
Property and equipment	3	207 584	201 424
Intangible assets	4	3 812	3 579
Heritage assets	25	17 562	17 567
<b>Current assets</b>		343 707	274 195
Inventories	5	5	5
Trade and other receivables	7	31 183	22 253
Cash and cash equivalents	8	312 519	251 937
<b>Total assets</b>		<b>572 665</b>	<b>496 765</b>
<b>Net assets and liabilities</b>			
<b>Net assets</b>			
Accumulated surplus		390 422	336 242
<b>Non-current liabilities</b>			
Post-employment benefit liabilities	6	7 872	7 012
<b>Current liabilities</b>			
Trade and other payables	9	34 109	25 844
Deferred income	10	125 188	112 867
Accruals	11	15 074	14 800
<b>Total net assets and liabilities</b>		<b>572 665</b>	<b>496 765</b>

## 5.2 STATEMENT OF FINANCIAL PERFORMANCE FOR THE PERIOD ENDED 31 MARCH 2016

	Notes	2016 R'000	2015 R'000
<b>Revenue</b>	12	384 085	287 347
<b>Cost of commercial projects</b>	12	(28 454)	(20 875)
<b>Cost of statutory projects</b>	12	(145 831)	(114 487)
<b>Gross surplus</b>		209 800	151 985
Other operating income	12	8 587	9 401
Administrative expenses		(166 142)	(184 574)
Other operating expenses	12	(17 965)	(5 231)
Interest received	13	19 919	13 368
<b>Surplus from operations</b>		54 199	(15 051)
Finance cost	14	(19)	(20)
<b>Net surplus/(deficit) for the year</b>		<b>54 180</b>	<b>(15 071)</b>

## 5.3 STATEMENT OF CHANGES IN NET ASSETS FOR THE PERIOD ENDED 31 MARCH 2016

	Notes	Accumulated surplus R'000	Total R'000
<b>Balance at 31 March 2015</b>		336 658	336 658
Correction of prior period error	24.2	(416)	(416)
<b>Balance at 31 March 2015 as restated</b>		336 242	336 242
Net profit for the period		54 180	54 180
<b>Balance at 31 March 2016</b>		390 422	390 422

## 5.4 CASH FLOW STATEMENT FOR THE PERIOD ENDED 31 MARCH 2016

	Notes	2016 R'000	2015 R'000
<b>Cash inflow from operating activities</b>		100 995	57 833
Cash receipts from customers		375 149	286 073
Cash paid to suppliers and employees		(294 054)	(241 588)
Cash generated from operations	15	81 095	44 485
Interest received	13	19 919	13 368
Finance cost	14	(19)	(20)
<b>Cash outflow from investing activities</b>		(40 413)	(31 741)
Acquisition of:			
Property and equipment	16.1	(40 002)	(31 192)
Intangible assets	16.2	(1 719)	(549)
Recovery of losses from property and equipment		1 308	-
<b>Net increase in cash and cash equivalents</b>		60 582	26 092
<b>Cash and cash equivalents at beginning of period</b>	8	251 937	225 845
<b>Cash and cash equivalents at end of period</b>	8	312 519	251 937

## 5.5 NOTES TO THE FINANCIAL STATEMENTS FOR THE PERIOD ENDED 31 MARCH 2016

### 5.5.1 ACCOUNTING POLICIES

#### 5.5.1.1 Basis of preparation

##### *Statement of compliance*

1. The financial statements have been prepared in accordance with the Standards of Generally Recognised Accounting Practices (GRAP) including any interpretations, guidelines and directives issued by the Accounting Standards Board. The financial statements have been prepared on a historic cost basis and accounting policies are consistent with prior years. These annual financial statements have been prepared on a going concern basis, i.e. the assumption that the Council for Geoscience will continue to operate as a going concern for at least the next twelve months.
2. The cash flow statement was prepared in accordance with the direct method.
3. Specific information has been presented separately on the statement of financial position such as:
  - (a) receivables from non-exchange transactions, including taxes and transfers;
  - (b) taxes and transfers payable;
  - (c) trade and other payables from non-exchange transactions.

The budget reporting standard does not apply to the Council for Geoscience as our budget is not tabled independently as an entity in parliament or legislatures.

#### 5.5.1.2 Revenue recognition

Revenue comprises the revenue from non-exchange transactions recognised as income in the current year, contract income and sales of publications.

##### 5.5.1.2.1 Recognition of income

The Council for Geoscience measures revenue at the fair value of the consideration received or receivable. Revenue is recognised only when it is probable that the economic benefits associated with a transaction will flow to the Council for Geoscience, and the amount of revenue and associated costs incurred or to be incurred, can be measured reliably.

##### 5.5.1.2.2 Revenue from non-exchange transactions

The Council for Geoscience received grants in the form of a baseline allocation from the Department of Mineral Resources. Revenue from non-exchange transactions is recorded as deferred income when it is received. It is then recognised as income on a systematic basis over the period intended to match this revenue with the related costs.

##### 5.5.1.2.3 Revenue from exchange transactions

Revenue from exchange transactions comprises sales and contract revenue as follows:

##### *Sales revenue*

Sales revenue represents the invoiced value of goods and services supplied by the Council for Geoscience. This revenue is recognised when the revenue recognition criteria are met.

### **Contract revenue**

Revenue from contracts is recognised by means of progress payments over the duration of the contracts. Revenue from contracts in progress is recognised when the revenue criteria are met. When the outcome of a contract can be estimated reliably, revenue is recognised by referring to the stage of completion of the contract outcome.

#### **5.5.1.3 Interest received**

Interest is recognised on a time proportionate basis with reference to the principal amount receivable and the effective interest rate applicable.

#### **5.5.1.4 Property and equipment**

Property and equipment are tangible non-current assets that are held for use in the production or supply of goods or services, or for administrative purposes, and are expected to be used during more than one period.

The cost of an item of property and equipment is recognised as an asset when:

- it is probable that future economic benefits associated with the item will flow to the Council for Geoscience; and
- the cost of the item can be measured reliably.

Land and buildings were valued at initial recognition and subsequently only the building is depreciated on a straight-line method.

Costs include costs incurred initially to acquire or construct an item of property and equipment and costs incurred subsequently to add to, replace part of, or to service it. If the cost of a replacement part is recognised in the carrying amount of an item of property and equipment, the carrying amount of the replaced part is derecognised.

Property and equipment are carried at cost less accumulated depreciation and any impairment losses.

Day to day expenses incurred on property and equipment are expensed directly to surplus and deficit for the period.

Where an asset is acquired at no cost, or at a nominal cost, its cost is its fair value as at date of acquisition.

Major maintenance that meets the recognition criteria of an asset is capitalised.

Depreciation is provided on all property and equipment other than freehold land, to write down the cost, less residual value, by equal instalments over their average useful lives, as follows:

Land	Not depreciable
Buildings	30 years
Motor vehicles	5 to 8 years
Equipment	5 to 7 years
Aircraft and helicopter - body	15 years
Aircraft and helicopter - components	Useful hours per Civil Aviation Authority
Boat	10 years
Office furniture	20 years
Computer equipment	6 years
Specialised equipment	15 years

The depreciation charges for each period are recognised in the statement of financial performance, unless they are included in the carrying amount of another asset.

The average useful lives and residual values are reviewed on an annual basis and changes are reflected as changes in accounting estimates on a prospective basis.

#### **5.5.1.5 Intangible assets**

An intangible asset is recognised when:

- it is probable that the expected future economic benefits that are attributable to the asset will flow to the entity; and
- the cost of the asset can be measured reliably.

Capitalised computer software is carried at cost less accumulated amortisation and less accumulated impairment losses. Computer software is tested annually for impairment or changes in estimated future benefits. Amortisation is provided to write down the intangible assets to their residual, on a straight-line basis, being two to five years.

#### **5.5.1.6 Heritage assets**

Heritage assets are assets held for their cultural, environmental or historical significance. Heritage assets are initially recognised at fair value which has been determined, due to the nature of heritage assets, by specialised valuers. Heritage assets are reflected at fair value and are not depreciated.

#### **5.5.1.7 Inventories**

The Council for Geoscience is a custodian of scientific information and produces publications in the form of books, maps and map explanations, etc. These publications are distributed to the public for free or at a nominal charge. Inventories are initially measured at fair value.

#### **5.5.1.8 Translation of foreign currencies**

##### ***Foreign currency transactions***

A foreign currency transaction is recorded, on initial recognition in Rands, by applying to the foreign currency amount the spot exchange rate between the Rand and the foreign currency at the date of the transaction.

##### ***At each balance sheet date:***

- foreign currency monetary items are translated using the closing rate.

Exchange differences arising on the settlement of monetary items or on translating monetary items at rates different from those at which they were translated on initial recognition during the period or in previous annual financial statements are recognised in the statement of financial performance in the period in which they arise.

Cash flows arising from transactions in a foreign currency are recorded in Rands by applying to the foreign currency amount the exchange rate between the Rand and the foreign currency at the date of the cash flow.

#### **5.5.1.9 Research and development**

Expenditure on research activities is recognised as an expense in the period in which it is incurred.

An internally generated intangible asset arising from research and development is recognised as part of intangible assets only if all of the following conditions are met:

- An asset is created that can be identified;
- It is probable that the asset created will generate future economic benefits;
- The development cost of the asset can be measured reliably;
- It is technically feasible to complete the intangible asset so that it will be available for use or sale;
- The ability to use or sell the intangible asset; and
- It is the intention to complete the intangible asset so that it will be available for use or sale.

Where no internally generated intangible asset can be recognised, development expenditure is recognised as an expense in the period in which it is incurred. Internally generated assets are amortised on a straight-line basis over their useful lives.

#### **5.5.1.10 Deferred income**

Deferred income is recognised using the accrual basis and accounted for in the statement of financial position in the period in which it satisfies the revenue recognition criteria.

#### **5.5.1.11 Retirement benefit costs**

##### ***Short-term employee benefits***

The cost of short-term employee benefits (those payable within twelve months after the service is rendered, such as bonuses, paid vacation leave and sick leave) is recognised in the period in which the service is rendered and is not discounted.

The expected cost of compensated absences is recognised as an expense as the employees render services that increase their entitlement or, in the case of non-accumulating absences, when the absence occurs.

##### ***Defined contribution and defined benefit plans***

The Council for Geoscience operates both a defined contribution pension and provident fund and a defined benefit plan in respect of post-retirement medical aid contributions. For the defined benefit plan, the defined benefit obligation and the related current service cost are determined by using the projected unit credit method. The defined benefit plan is subject to an annual actuarial valuation. The qualifying plan asset of this scheme is held and administered by Momentum Group Limited.

The actuarial gains or losses are further limited to the extent that the net cumulative unrecognised actuarial gains or losses (before recognition of that actuarial gain or loss) exceed the unrecognised part of the transactional liability. Payments to defined contribution retirement benefit plans are charged to the statement of financial performance in the year to which they relate.

#### **5.5.1.12 Provisions and contingent liabilities**

##### ***Provisions are recognised when:***

- the entity has a present obligation as a result of a past event;
- it is probable that an outflow of resources embodying economic benefits will be required to settle the obligation; and
- a reliable estimate can be made of the obligation.

The amount of a provision is the present value of the expenditure expected to be required to settle the obligation.

##### ***Commitment***

The Council for Geoscience classifies commitments as contracted future transactions that are non-cancellable or only cancellable at significant cost, and that will normally result in the outflow of cash.

This excludes steady routine transactions such as salary commitments relating to employment contracts or social security benefits.

A distinction is made between operational and capital commitments.

Disclosure is made of the aggregate amount of operational and capital expenditure contracted for at the reporting date, to the extent that the amount has not been recorded in the financial statements.

If a commitment is for a period longer than a year, this fact is stated in the note to the commitments.

No disclosure of expenditure that has been approved, but that has not yet been contracted for, is made.

#### **5.5.1.13 Financial instruments**

##### ***Initial recognition***

The entity classifies financial instruments, or their component parts, on initial recognition as a financial asset, a financial liability or an equity instrument in accordance with the substance of the contractual arrangement.

Financial assets and liabilities are recognised on the entity's statement of financial position when the Council for Geoscience becomes party to the contractual provisions of the instrument.

Financial assets and liabilities are recognised initially at fair value.

#### ***Derecognition of financial instruments***

The entity derecognises a financial asset only when the contractual rights to the cash flows from the asset expire; or it transfers the financial asset and substantially all the risks and rewards of ownership of the asset to another entity.

The entity derecognises financial liabilities when the entity's obligations are discharged, cancelled or they expire.

#### ***Impairment of loans and receivables***

Financial assets are assessed for indicators of impairment at each balance sheet date. Financial assets are impaired where there is objective evidence that, as a result of one or more events that occurred after the initial recognition of the financial asset, the estimated future cash flows of the investment have been impacted.

The carrying amount of trade receivables is reduced through the use of an allowance account (bad debt provision). When a trade receivable is considered uncollectible, it is written off against the allowance account. Subsequent recoveries of amounts previously written off are credited against the allowance account. Changes in the carrying amount of the allowance account are recognised in surplus or deficit.

Fair values of trade and other payables are determined at a price charged at transaction date and impaired when indicators of impairment are present. At period end there were no differences between the book value and the fair values of trade and other payables.

#### ***Fair value of trade and other receivables***

Fair values of trade and other receivables are determined at a price charged at transaction date and impaired when indicators of impairment are present. At period end there were no differences between the book value and the fair values of trade and other receivables because of the short-term maturity.

#### ***Financial assets carried at amortised cost***

Loans and receivables are measured at amortised cost less any impairment losses recognised to reflect irrecoverable amounts. Impairment is determined on a specific basis, whereby each asset is individually evaluated for impairment indicators. Write-offs of these assets are expensed in surplus or deficit.

#### ***Cash and cash equivalents***

Cash and cash equivalents are short-term, highly liquid investments that are readily convertible to known amounts of cash.

Cash and cash equivalents are measured at fair value.

#### ***Financial liabilities carried at amortised cost***

Trade and other payables are initially measured at fair value, and are subsequently measured at amortised cost.

#### **5.5.1.14 Operating leases**

Leases of assets under which all the risks and rewards of ownership are effectively retained by the lessor are classified as

operating leases. Lease payments under an operating lease are recognised as an expense on a straight-line basis over the lease term.

Any contingent rents are expensed in the period they are incurred.

#### **5.5.1.15 Impairment**

The entity assesses at each balance sheet date whether there is any indication that an asset may be impaired. If there is any indication that an asset may be impaired, the recoverable amount is estimated for the individual asset. The recoverable amount of an asset is the higher of fair value less assumed costs to sell and its value in use.

If the recoverable amount of an asset is less than its carrying amount, the carrying amount of the asset is reduced to its recoverable amount. That reduction is an impairment loss recognised immediately in surplus or deficit.

At each reporting date the entity assesses impairment losses recognised in prior years for continued existence or decreases. If such indication exists, the recoverable amounts of those assets are estimated. The increase in the carrying amount of an asset attributable to a reversal of an impairment loss does not exceed the carrying amount that would have been determined had no impairment loss been recognised for the asset in prior periods. A reversal of an impairment loss of assets carried at cost less accumulated depreciation or amortisation is recognised immediately in surplus or deficit.

The Council for Geoscience identifies Cash generating assets as assets that are managed with the objective of generating a commercial return, and Non -Cash generating assets as assets that do not generate market related cash flows from that asset.

#### **5.5.1.16 Critical accounting estimates and judgements**

##### ***Provision for bad debts***

Past experience indicates a reduced prospect of collecting debtors over the age of four months. Debtor balances are regularly assessed by management and provided for in line with the policy.

##### ***Provisions***

Provisions were raised and management determined an estimate based on the information available and in line with the policy.

##### ***Property and equipment***

Management has made certain estimations with regard to the determination of estimated useful lives and residual values of items of property and equipment.

##### ***Leases***

Management has applied its judgement to classify all lease agreements to which the entity is party as operating leases, as they do not transfer substantially all risks and ownership to the entity. Furthermore, as the operating lease in respect of premises is only for a relatively short period of time, management has made a judgement that it would not be meaningful to classify the lease into separate components for the land and for the buildings for the Polokwane office current lease, and the agreement will be classified in its entirety as an operating lease.

#### **5.5.1.17 Sources of estimation uncertainty**

There are no key assumptions concerning the future and other key sources of estimation uncertainty at the balance sheet date that could have a significant risk of causing material adjustment to the carrying amounts of assets and liabilities within the next financial year.

## 5.5.2 NEW STANDARDS AND INTERPRETATIONS

### 5.5.2.1 Standards and interpretations issued, but not yet effective

The Council for Geoscience has not applied the following standards and interpretations which have been approved but are not yet effective for accounting periods beginning on or after 1 March 2015 or later periods:

GRAP statement	Description	Impact	Effective date
GRAP 20	Related-Party Disclosure	None	No effective date
GRAP 32	Service Concession Arrangements: Grantor	None	No effective date
GRAP 108	Statutory Receivables	None	No effective date
GRAP 109	Accounting by Principals and Agents	None	No effective date

## 5.5.3 PROPERTY AND EQUIPMENT

	Land R'000	Buildings and fixtures R'000	Equipment R'000	Office furniture R'000	Aircraft and boat R'000	Motor vehicles R'000	Computer equipment R'000	Total R'000
2016								
Gross carrying amount	18 231	141 457	112 959	14 600	31 324	18 922	23 505	360 998
Accumulated depreciation at the beginning of the period	-	(40 570)	(76 304)	(8 034)	(9 781)	(9 790)	(15 095)	(159 574)
<b>Opening net carrying amount at 31 March 2015</b>	18 231	100 887	36 655	6 566	21 543	9 132	8 410	201 424
Movements during the period:								
Work in progress	-	16 133	2 400	-	-	-	-	18 533
Acquisitions	-	3 864	12 534	170	3 224	-	1 677	21 469
Impairment	(1 600)	(4 304)	-	-	-	-	-	(5 904)
Disposals	-	-	(908)	(262)	(8 829)	(906)	(539)	(11 444)
Disposals - Cost	-	-	(7 518)	(768)	(11 166)	(2 426)	(3 775)	(25 653)
Disposals - Depreciation	-	-	6 610	506	2 337	1 520	3 236	14 209
Depreciation	-	(4 911)	(6 828)	(686)	(688)	(1 584)	(1 797)	(16 494)
<b>Closing net carrying amount at 31 March 2016</b>	16 631	111 669	43 853	5 788	15 250	6 642	7 751	207 584



Property and equipment (continued)

2016	Land R'000	Buildings and fixtures R'000	Equipment R'000	Office furniture R'000	Aircraft and boat R'000	Motor vehicles R'000	Computer equipment R'000	Total R'000
Gross carrying amount	18 231	161 454	120 375	14 002	23 382	16 496	21 407	375 347
Accumulated depreciation/ Impairment	(1 600)	(49 785)	(76 522)	(8 214)	(8 132)	(9 854)	(13 656)	(167 763)

2015	Land R'000	Buildings and fixtures R'000	Equipment R'000	Office furniture R'000	Aircraft and boat R'000	Motor vehicles R'000	Computer equipment R'000	Total R'000
Gross carrying amount	18 231	139 080	111 083	14 585	23 263	20 082	22 399	348 723
Accumulated depreciation at the beginning of the period	-	(35 712)	(80 828)	(7 447)	(9 264)	(9 347)	(15 261)	(157 859)
<b>Opening net carrying amount at 31 March 2014</b>	18 231	103 368	30 255	7 138	13 999	10 735	7 138	190 864
Movements during the period:								
Work in progress prior year	-	2 377	80	-	8 173	-	-	10 630
Adjustments	-	-	41	(32)	(8)	6	(226)	(219)
Cost	-	-	41	(32)	(64)	61	(640)	(634)
Accumulated depreciation	-	-	-	-	56	(55)	414	415
Acquisitions	-	-	15 560	305	-	947	3 750	20 562
Disposals	-	-	(2 325)	(142)	(35)	(625)	(392)	(3 519)
Disposals - Cost	-	-	(13 805)	(258)	(48)	(2 168)	(2 004)	(18 283)
Disposals - Depreciation	-	-	11 480	116	13	1 543	1 612	14 764
Depreciation	-	(4 858)	(6 956)	(703)	(586)	(1 931)	(1 860)	(16 894)
<b>Closing net carrying amount at 31 March 2015</b>	18 231	100 887	36 655	6 566	21 543	9 132	8 410	201 424

*Property and equipment (continued)*

	Land	Buildings and fixtures	Equipment	Office furniture	Aircraft and boat	Motor vehicles	Computer equipment	Total
2015	R'000	R'000	R'000	R'000	R'000	R'000	R'000	R'000
Gross carrying amount	18 231	141 457	112 959	14 600	31 324	18 922	23 505	360 998
Accumulated depreciation	-	(40 570)	(76 304)	(8 034)	(9 781)	(9 790)	(15 095)	(159 574)

The transfer of the following land and buildings as stipulated under section 26 of the Geoscience Act (Act No. 100 of 1993) has not yet been completed.

Location	Fair value at date of transfer
474 Carl Street, Town Lands 351 JR, Pretoria West	R2 800 000
280 Pretoria Street, Silverton, Pretoria	R94 000 000

The value of these properties has been included in the carrying amount of land and buildings as at 31 March 2016 and was determined by an independent valuator.

Details regarding land and buildings are kept at the Council for Geoscience head office and will be supplied upon written request.

**Impairment of property**

	2016	2015
	R'000	R'000
<b>Description</b>		
Buildings and fixtures	4 304	-
Land	1 600	-
	5 904	-

The events and circumstances that led to the recognition of impairment loss was as a result of a devaluation on Land and Buildings. The recoverable service amount used is the higher of the fair value less cost to sell and value in use. A certified property valuator was contracted and based on their findings the appropriate recoverable service amount is its value in use.

**Property and equipment fully depreciated but still in use**

The below-listed categories of assets have been fully depreciated to their residual value as at 31 March 2016, but are still currently in use.

Category	Salvage amount R'000
Audio, visual and other equipment	47
Office furniture	6

Property and equipment (continued)

Category	Salvage amount R'000
Office equipment	28
Vehicles	561
Computer equipment	578
Computer software	164
Technical equipment	367
Scientific equipment	2 345
	<b>4 096</b>

### 5.5.4 INTANGIBLE ASSETS

	2016 R'000	2015 R'000
<b>Computer software</b>		
Gross carrying amount	8 878	10 950
Accumulated amortisation	(5 299)	(6 587)
<b>Opening net carrying amount at 31 March 2015</b>	3 579	4 363
Movements during the period:		
Adjustments	-	(237)
Cost	-	179
Accumulated depreciation	-	(416)
Acquisitions	1 719	549
Disposals	(183)	(327)
Disposals - cost	(1 958)	(2 800)
Disposals - amortisation	1 775	2 473
Amortisation	(1 303)	(769)
<b>Closing net carrying amount at 31 March 2016</b>	3 812	3 579
Gross carrying amount	8 639	8 878
Accumulated amortisation	(4 827)	(5 299)

### 5.5.5 INVENTORIES

Publication inventories	5	5
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## 5.5.6 RETIREMENT BENEFIT

2016	2015
R'000	R'000

### 5.5.6.1 Post-retirement medical aid fund (PRM)

The Council for Geoscience has made provision for the medical aid fund covering substantially all its employees. All eligible employees are members of the defined benefit scheme. To improve management of this defined benefit scheme the Council for Geoscience established a qualifying plan asset in October 2010 which is held and administered by Momentum Group Limited and evaluated annually as at 31 March.

The amount recognised in the statement of financial performance is determined as follows:		
Current service costs	144	207
Interest charge	1 651	1 631
Expected return on planned assets	(1 158)	(1 219)
Actuarial loss recognised	1 873	1 335
Recognition of loss on asset realisation	(1 650)	(300)
	860	1 654

2016	2015	2014	2013
R'000	R'000	R'000	R'000

The amount included in the statement of financial position arising from Council for Geoscience obligation in respect of PRM is as follows:				
Present value of fund obligations	22 931	21 863	19 504	26 226
Fair value of planned assets	(15 059)	(14 851)	(14 147)	(11 844)
Liability recognised in statement of financial position	7 872	7 012	5 357	14 382

Movement in net liability during the period is as follows:	2016			2015		
	Liability	Planned asset	Net	Liability	Planned asset	Net
Liability at beginning of period	21 863	-	21 863	19 504	-	19 504
Value of planned assets at beginning of period	-	(14 851)	(14 851)	-	(14 147)	(14 147)
	21 863	(14 851)	7 012	19 504	(14 147)	5 357
Interest charge/expected return of planned asset	1 651	(1 158)	493	1 631	(1 219)	412
Contributions received	-	(1 650)	(1 650)	-	(300)	(300)
Current service costs	144	-	144	207	-	207

*Retirement benefit (continued)*

Movement in net liability during the period is as follows:	2016			2015		
	Liability	Planned asset	Net	Liability	Planned asset	Net
Benefits paid	(1 549)	1 549	-	(1 402)	1 402	-
Actuarial loss/(gain)	822	1 051	1 873	-	(587)	(587)
Actuarial loss/(gain) recognised on curtailment	-	-	-	1 923	-	1 923
Closing balance	22 931	(15 059)	7 872	21 863	(14 851)	7 012

**Contributions expected to be paid**

No top-up payments are expected to be made during the 2017 year.

Expected rate of return on assets	9.00%
<b>Assumptions</b>	
Discount rates	9.00%
Basis of discount rates	JSE zero coupon bond yield after the market closed on 31 March 2016
Return on assets	9.00%
Expected salary increases	7.50%
Health care cost inflation rate	7.12%

**Sensitivity analysis on accrued liability (R millions)**

Assumption	Change	In service	Continuation	Total	Change
Central assumptions	-	3.542	19.389	22.931	-
Health care inflation	1%	4.126	21.065	25.191	10%
	-1%	3.066	17.910	20.976	-9%
Discount rate	1%	3.066	17.892	20.958	-9%
	-1%	4.136	21.116	25.252	10%
Post-retirement mortality	-1 year	3.660	20.253	23.913	4%
Average retirement date	-1 year	3.738	19.389	23.127	1%
Continuation of membership at retirement	-10%	3.194	19.389	22.583	-2%

The table above indicates, for example, that if medical inflation is 1% greater than the long-term assumptions made, the liability will be 10% higher than that shown.

Retirement benefit (continued)

**Sensitivity analysis for current service and interest cost for the year ending 31 March 2016**

Assumption	Change	Current service	Interest cost	Total	Change
Central assumptions	-	143 700	1 651 300	1 795 000	-
Health care inflation	1%	171 900	1 831 600	2 003 500	12%
	-1%	121 200	1 496 600	1 617 800	-10%
Discount rate	1%	122 400	1 687 300	1 809 700	-1%
	-1%	170 800	1 600 800	1 771 600	1%
Average retirement age (60)	-1 year	135 800	1 662 300	1 798 100	0%

The table above indicates, for example, that if medical inflation is 1% greater than the long-term assumptions made, the liability will be 12% higher than that shown.

**5.5.6.2 Pension and provident fund benefits**

The Council for Geoscience and its employees contribute to a defined contribution plan. The assets of the scheme are held separately from the Council for Geoscience in funds under the control of trustees. The total cost charged to income of R9 175 899 (2015: R8 462 352) represents equal contributions of 7.5% by the employer and employee.

2016	2015
R'000	R'000

**5.5.7 TRADE AND OTHER RECEIVABLES FOR EXCHANGE REVENUE**

Trade receivables	6 810	7 750
Contract customers	20 500	10 931
Other receivables	5 545	3 757
Personnel debt	-	33
	32 855	22 471
Less - Provision for bad debts	(1 672)	(218)
	31 183	22 253
Provision for bad debts		
Opening balance	218	218
Movement	1 454	-
Closing balance	1 672	218

*Trade and other receivables for exchange revenue (continued)*

**Analysis of impairment**

	<b>2016</b>	<b>2015</b>
	<b>R'000</b>	<b>R'000</b>
Debtors liquidated	-	27
Long overdue debtors considered impaired	1 672	191
	<b>1 672</b>	<b>218</b>

There is no difference between the fair value of trade and other receivables and their book value.

### 5.5.8 CASH AND CASH EQUIVALENTS

Cash and cash equivalents at the end of the period are represented by the following balances:		
Cash at bank	20 389	27 864
Call accounts	292 130	224 073
Cash and cash equivalents at the end of the period are represented by the following balances:	<b>312 519</b>	<b>251 937</b>
Certain foreign funds are considered not available for use	15 898	12 717

There is no difference between the fair value of cash and cash equivalents and their book value.

### 5.5.9 TRADE AND OTHER PAYABLES

Trade payables	18 782	20 576
Other payables	15 327	5 268
	<b>34 109</b>	<b>25 844</b>

There is no difference between the fair value of trade payables and their book value.

### 5.5.10 DEFERRED INCOME

**Exchange revenue**

<b>5.5.10.1</b>	<b>Deferred income arising as a result of an agreement entered into with the Department of Science and Technology to investigate rock innovation.</b>		
Amounts received	304		-
Amounts used during the period	(112)		-
Carrying amount at the end of period	<b>192</b>		<b>-</b>

Deferred income (continued)

		2016	2015
		R'000	R'000
<b>5.5.10.2</b>	<b>Deferred income arising as a result of an agreement entered into with the Department of Science and Technology to develop an intellectual property management office. (Geoscience Act par 5(1)(g)).</b>		
	Amounts received	1 421	-
	Amounts used during the period	-	-
	Carrying amount at the end of period	1 421	-
<b>5.5.10.3</b>	<b>Deferred income arising as a result of a contract entered into with the European Commission for Earth Observation and Observing Environmental and Societal Impacts of Mineral Resources Exploration and Exploitation.</b>		
	Carrying amount at the beginning of period	33	1 371
	Amounts received	-	(1 338)
	Amounts used during the period	(33)	-
	Carrying amount at the end of period	-	33
<b>5.5.10.4</b>	<b>Deferred income arising as a result of an agreement with the Department of Science and Technology for the Environmentally Friendly and Efficient Methods for the Extraction of Rare Earth Elements.</b>		
	Carrying amount at the beginning of period	1 299	-
	Amounts received	203	1 299
	Carrying amount at the end of period	1 502	1 299
<b>5.5.10.5</b>	<b>Deferred income arising as a result of an agreement with the Department of Science and Technology in terms of the Earth Observation and Geohazards Assessment.</b>		
	Carrying amount at the beginning of period	2 922	2 922
	Carrying amount at the end of period	2 922	2 922
<b>5.5.10.6</b>	<b>Deferred income arising as a result of an agreement with the Department of Science and Technology to study the Witwatersrand Central Basin Mine Water Apportionment.</b>		
	Carrying amount at the beginning of period	35	1 867
	Amount used during the period	-	(1 832)
	Carrying amount at the end of period	35	35
<b>5.5.10.7</b>	<b>Deferred income arising as a result of an agreement entered into with the National Research Foundation.</b>		
	Carrying amount at the beginning of period	110	110
	Carrying amount at the end of period	110	110

Deferred income (continued)

		2016	2015
		R'000	R'000
<b>5.5.10.8</b>	<b>Deferred income arising as a result of an agreement entered into with the Department of Mineral Resources to develop and implement various measures to mitigate the effect of mining-induced contamination.</b>		
	Carrying amount at the beginning of period	108 468	65 995
	Amounts received	177 613	136 752
	Amounts used during the period	(167 075)	(94 279)
	Carrying amount at the end of period	119 006	108 468
	<b>Total deferred income</b>	<b>125 188</b>	<b>112 867</b>

<b>5.5.11</b>	<b>ACCRUALS</b>		
	<b>Accruals for leave pay</b>		
	Carrying amount at the beginning of period	10 856	10 038
	Provision current period	1 357	1 456
	Amounts used during the current period	(1 286)	(638)
	Carrying amount at the end of period	10 927	10 856
	The leave pay provision relates to the estimated liabilities as a result of leave days due to employees.		
	<b>Accruals for 13<sup>th</sup> cheque</b>		
	Carrying amount at the beginning of period	3 944	4 015
	Provision current period	203	(71)
	Carrying amount at the end of period	4 147	3 944
	The 13 <sup>th</sup> cheque accrual relates to the structuring of the employee costs to the company and is paid out on employees' birthday.		
	<b>Total accrual</b>	<b>15 074</b>	<b>14 800</b>

<b>5.5.12</b>	<b>SURPLUS/DEFICIT FROM OPERATIONS</b>		
	Operating deficit/surplus is arrived at after taking the following items into account:		
	<b>Revenue</b>		
	<b>Non-exchange revenue</b>		
	Total grant received	342 914	292 839
	Project related revenue	(177 613)	(136 752)
		165 301	156 087

Deficit/surplus from operations (continued)

	<b>2016</b>	<b>2015</b>
	<b>R'000</b>	<b>R'000</b>
<b>Exchange revenue</b>		
Department of Mineral Resources project related revenue	167 075	94 279
Contracting revenue	45 893	36 755
Publication revenue	5 816	226
	<b>218 784</b>	<b>131 260</b>
	<b>384 085</b>	<b>287 347</b>
<b>Cost of contracts</b>		
Direct cost	17 625	12 411
Personnel expenditure	10 829	8 464
	<b>28 454</b>	<b>20 875</b>
<b>Cost of statutory projects</b>		
Direct cost	67 633	61 772
Personnel expenditure	78 198	52 715
	<b>145 831</b>	<b>114 487</b>
<b>Other operating income</b>		
Foreign currency gains	4 503	383
Recovery of asset losses	1 308	204
Sundry income	2 776	8 814
	<b>8 587</b>	<b>9 401</b>
<b>Administrative expenses include -</b>		
Audit fees	1 913	2 967
- Current period	1 538	1 076
- Prior period	-	969
- Internal audit	238	605
- Fee for other services	137	317
Bad debts written off	-	112
Provision for bad debts	1 454	-
Depreciation - on owned assets	16 494	16 894

*Deficit/surplus from operations (continued)*

	<b>2016</b>	<b>2015</b>
	<b>R'000</b>	<b>R'000</b>
- Buildings	4 911	4 858
- Equipment	6 828	6 956
- Office furniture	686	703
- Motor vehicles	1 584	1 931
- Aircraft	688	586
- Computer equipment	1 797	1 860
Amortisation - intangible assets		
- Computer software	1 303	769
Rentals in respect of operating leases		
- Land and buildings	1 035	834
- Photocopying machines	546	22
<b>Other operating expenses</b>		
Net loss on disposal of equipment and vehicles	2 620	4 300
Net loss on disposal of intangible assets	184	-
Net loss on disposal of aircraft	8 828	-
Impairment of assets	5 904	-
Foreign currency losses	429	931
	17 965	5 231
<b>Staff costs</b>	<b>187 620</b>	<b>176 844</b>
Included in staff costs are:		
Defined benefit plan expense for the post-retirement medical-aid fund	2 510	1 955
Current service cost	144	207
Interest cost	1 651	1 631
Expected return on plan assets	(1 158)	(1 219)
Recognised actuarial loss	1 873	1 336
- Defined contribution plan expenses for the pension and provident fund	9 176	8 462

Deficit/surplus from operations (continued)

**Emoluments**

Senior management	2015/2016			
	Pensionable salary	Provident/ Pension fund contributions	Other contributions	Total
	R	R	R	R
Mr Kota M (CEO) End date April 2015	440 584	12 076	27 714	<b>480 374</b>
Mr Matsepe L D	1 575 652	102 760	86 108	<b>1 764 520</b>
Mr Ramagwede L F	1 558 845	94 795	86 217	<b>1 739 857</b>
Dr Makgae M E	1 503 411	91 179	82 544	<b>1 677 134</b>
Mr Sikhosana S M (Acting CEO) Start date May 2015	2 346 785	-	28 600	<b>2 375 385</b>

	2014/2015			
	Pensionable salary	Provident fund contributions	Other contributions	Total
	R	R	R	R
Mr Kota M (CEO)	2 235 216	144 913	302 047	<b>2 682 176</b>
Mr Matsepe L D	1 462 331	88 926	81 811	<b>1 633 068</b>
Mr Ramagwede L F	1 478 097	96 398	83 393	<b>1 657 888</b>
Dr Graham G	1 484 238	90 258	83 856	<b>1 658 352</b>

**Board emoluments**

**Non-executive Board Members**

	2016	2015
	R	R
Prof. Ngoepe P E	399 530	277 654
Ms Mthimunye K R	123 153	152 624
Dr Mathe H	100 754	175 880
Mr Sibiyi D	9 792	34 680
Prof. Hermanus M M	51 633	71 232

Deficit/surplus from operations (continued)

<b>Board emoluments</b>		
<b>Non-executive Board Members</b>		
	<b>2016</b>	<b>2015</b>
	<b>R</b>	<b>R</b>
Dr McGill E	108 022	115 056
	<b>792 884</b>	<b>827 126</b>

Details regarding Board Members' service contracts:

Board Members representing government departments are not included above as they received no emoluments.

The current term of office of the non-executive Board Members expires on 30 September 2016.

	<b>2016</b>	<b>2015</b>
	<b>R'000</b>	<b>R'000</b>
<b>5.5.13</b>	<b>INTEREST RECEIVED</b>	
Interest received		
- Interest income on call accounts	17 517	11 469
- Interest income on current accounts	2 402	1 899
	<b>19 919</b>	<b>13 368</b>

<b>5.5.14</b>	<b>FINANCE COST</b>	
Interest	19	20

<b>5.5.15</b>	<b>RECONCILIATION OF NET SURPLUS FOR THE PERIOD TO CASH GENERATED FROM OPERATIONS</b>	
Net surplus/(deficit) for the period	54 180	(15 071)
Interest	19	20
Depreciation on property and equipment	16 494	16 894
Amortisation - intangible assets	1 303	769
Impairment of assets	5 904	-
(Net proceeds) on disposal of fixed assets	(1 308)	-
Net loss on disposal of fixed assets	11 632	4 300
Interest earned	(19 919)	(13 368)

Reconciliation of net surplus for the period to cash generated from operations (continued)

	<b>2016</b>	<b>2015</b>
	<b>R'000</b>	<b>R'000</b>
Provision for post-retirement medical-aid benefits	860	1 655
Operating cash flows before working capital changes	69 165	( 4 801)
Working capital changes -		
Increase in provision for accumulated leave pay and 13th cheque	274	747
Increase in trade and other receivables	(8 934)	(4 845)
Increase in trade and other payables	8 265	12 781
Increase in deferred income	12 325	40 603
Cash generated from operations (including finance costs)	81 095	44 485

## 5.5.16 ACQUISITION OF ASSETS

### 5.5.16.1 Property and equipment

Land and buildings	3 864	-
Equipment	12 534	15 560
Office furniture	170	305
Aircraft and boat (including WIP Aircraft)	3 224	-
Motor vehicles	-	947
Computer equipment	1 677	3 750
	21 469	20 562
<b>Work in progress - Acquisitions</b>		
Land and buildings	16 133	2 377
Equipment	2 400	80
Aircraft	-	8 173
	18 533	10 630
	40 002	31 192

### 5.5.16.2 Intangible assets

Computer software	1 719	549
	1 719	549

Acquisition of: (continued)

		2016	2015
		R'000	R'000
<b>5.5.17</b>	<b>CONTINGENT LIABILITY</b>		
<b>5.5.17.1</b>	<b>Bank guarantees</b>		
	Performance bonds and bid bonds issued for contract work to various financial institutions	-	407
		-	407
<b>5.5.17.2</b>	<b>Pending legal action</b>		
	The Council for Geoscience has an estimated legal liability due to a pending labour case	990	900
	The Council for Geoscience has an estimated legal liability due to a pending court case	-	15
		990	915
<b>5.5.18</b>	<b>TAXATION</b>		
	No provision for income tax was made as the Council for Geoscience is exempted in terms of section 10(1)(Ca)(i) of the Income Tax Act		
<b>5.5.19</b>	<b>OPERATING LEASE COMMITMENTS</b>		
<b>5.5.19.1</b>	<b>Lease of office space</b>		
	At reporting date, the outstanding commitments under non-cancellable operating leases, which fall due are as follows:		
	Up to 1 year	492	447
	Total lease commitments	492	447
<b>5.5.19.2</b>	<b>Lease of office printing equipment</b>		
	The operating lease between a supplier and the Council for Geoscience entered into on 01 October 2015 to 30 September 2018.		
	At the reporting date, the outstanding commitments under non-cancellable operating leases, which fall due are as follows:		
	Up to 1 year	1 689	3 025
	2 to 5 years	4 090	-
	Total lease commitments	5 779	3 025

Operating lease commitments (continued)

		2016	2015
		R'000	R'000
<b>5.5.19.3</b>	<b>Commitments</b>		
	Operating expenditure		
	Approved and contracted	74 270	64 016
	Capital expenditure		
	Approved and contracted: Property and equipment	23 689	44 283
	<b>Total commitments</b>	<b>97 959</b>	<b>108 299</b>
	Commitments		
	Up to 1 year	88 538	100 856
	2 to 5 years	9 421	7 443
	<b>Total commitments</b>	<b>97 959</b>	<b>108 299</b>
	The Council has usage based contracts for the provision of the following services		
	-Sampling services - Geophysics		
	-Accommodation and travel		
	-Courier services		

## 5.5.20 FINANCIAL INSTRUMENTS

Financial instruments consist of cash and cash equivalents, investments with financial institutions, trade and other receivables and trade and other payables.

### 5.5.20.1 Credit risk

Financial assets, which potentially subject the Council for Geoscience to concentrations of credit risk, consist principally of cash, short-term deposits and trade receivables. The cash equivalents and short-term deposits of the Council for Geoscience are placed with high credit quality financial institutions. Trade receivables are presented net of the allowance for doubtful debts. Credit risk with respect to trade receivables is limited due to the large number of customers being dispersed across different industries and geographical areas. Accordingly, the Council for Geoscience has no significant concentration of credit risk.

Financial instruments (continued)

		2016 R'000	2015 R'000
	The carrying amounts of financial assets included in the statement of financial position represent the Council for Geoscience's exposure to credit risk in relation to those assets.		
	Trade and other receivables are controlled by well-established policies and procedures which are reviewed and updated on an ongoing basis. The Council for Geoscience does not have any significant exposure to any individual customer or counterparty.		

5.5.20.2	Interest rate risk		
	The organisation's exposure to interest rate risk and the effective interest rates on the financial instruments at reporting date are: 31 March 2016		
		Weighted average effective interest rate	Weighted average effective interest rate
	<b>Assets</b>		
	Cash	3.95%	3.95%
	Call accounts	7.04%	6.40%
	<b>Investments</b>		
	The risk is perceived to be low due to the following factors:		
	- Funds are only invested with approved financial institutions according to the policy of the Council for Geoscience.		
	- Investments are only reinvested or invested with Management approval.		

5.5.20.3	Foreign currency risk		
	The Council for Geoscience undertakes certain transactions denominated in foreign currencies, hence exposures to exchange rate fluctuations arise. It is not policy for the Council for Geoscience to take out cover on these outstanding foreign currency transactions due to the fact that these transactions take place on an ad hoc basis. The Council for Geoscience exposure at 31 March 2016 is disclosed in note 21.		

Financial instruments (continued)

		2016 R'000	2015 R'000
<b>5.5.20.4</b>	<b>Airborne operations risk</b>		
	It is the policy of the Council for Geoscience to transfer risk in respect of airborne operations to third parties, namely insurance and an external operator		

<b>5.5.21 FOREIGN CURRENCY EXPOSURE</b>							
		2016 R'000			2015 R'000		
		Exchange rate	Foreign amount	R value	Exchange rate	Foreign amount	R value
<b>5.5.21.1</b>	<b>Trade receivables</b>						
	Foreign currency						
	British Pound	R 20.80070	£7	146	R 17.69040	£43	761
	US\$	R 14.51300	\$33	479	R 11.97730	\$77	922

<b>5.5.21.2 Banks</b>							
	Foreign funds						
	Moroccan Dirham	R 1.51791	7 861	11 932	R 1.21271	7 934	9 622
	Euro	R 16.53060	€ 240	3 967	R 12.83340	€ 240	3 080

		2016 R'000	2015 R'000
<b>5.5.22</b>	<b>RELATED-PARTY TRANSACTIONS</b>		
	During the period, the following related-party transactions took place between the Council for Geoscience and the Department of Mineral Resources:		
	Total grant received	342 914	292 839
	Refer to note 10 for further details regarding transactions with the Department of Mineral Resources.		
	All other related-party transactions were concluded at arm's length.		
	Relationships:		
	Parent National Department:	Department of Mineral Resources	
	Other Government Departments and Entities:	Mine Health and Safety Council	

Related-party transactions (continued)

		2016 R'000	2015 R'000
<b>5.5.23</b>	<b>IRREGULAR EXPENDITURE</b>		
	Opening balance	1 428	-
	Expenditure condoned	(1 428)	-
	Irregular expenditure incurred in the current year	217	1 428
		217	1 428
	<b>Analysis of expenditure not condoned per age classification</b>		
	Current year - payments not in line with supply chain management requirements	217	1 314
	An investigation was performed and it was confirmed that the irregular expenditure was not the result of fraudulent, corrupt and criminal activities or actions that deprived the state of value for money that may result in the state instituting a civil claim against a third party		
	Prior year	-	-
		217	1 314
	<b>Analysis of expenditure condoned per age classification</b>		
	Current year - condoned by the accounting authority of the Council for Geoscience	1 314	114
	Prior year - condoned by the accounting authority of the Council for Geoscience	114	-
		-	114

<b>5.5.24</b>	<b>CORRECTION OF PRIOR YEAR ERRORS</b>		
<b>5.5.24.1</b>	<b>Correction of prior year cost and accumulated depreciation</b>		
	<b>Nature</b>		
	Capitalisation of small assets to comply with GRAP 17		
	<b>Effect</b>		
	Statement of financial position		
	Property and equipment	-	-
	Cost	-	5 254
	Accumulated depreciation	-	(4 190)
		-	1 064

<b>5.5.24.2</b>	<b>Correction of prior year unrecorded revenue and accruals</b>		
	<b>Nature</b>		
	Revenue recorded in the incorrect period - MTEF	129	2 324

Correction of prior year errors (continued)

	2016 R'000	2015 R'000
Revenue recorded in the incorrect period - commercial revenue	48	-
13 <sup>th</sup> cheque not accrued for in prior year	-	4 016
Expenditure captured in the incorrect period	497	353
Re-instatement of equipment	-	1 064
<b>Effect</b>		
Statement of financial position as 31 March 2015		
Government grant project related revenue recognition	129	2 324
Commercial revenue work in progress - trade debtors	(48)	-
13 <sup>th</sup> cheque not accrued for in prior year	-	(4 016)
Expenditure captured in the incorrect period - trade payables	(497)	(353)
Re-instatement of equipment	-	1 064
Statement of net assets for the period ended 31 March 2015		
Accumulated surpluses	(416)	(981)

**5.5.24.3 Correction of prior year commitments disclosure**

Nature		
Correction of prior year commitments disclosure	-	-

**5.5.25 HERITAGE ASSETS DISCLOSURE**

GRAP 103 defines heritage assets as assets which have a cultural, environmental, historical, natural, scientific, technological or artistic significance and are held indefinitely for the benefit of present and future generations.		
Certain heritage assets are described as inalienable items, thus assets which are retained indefinitely and cannot be disposed of without consent as required by law or otherwise.		
<b>Nature</b>		
The Council for Geoscience has the following different classes of heritage;		
- Gemstone collections	1 445	1 445
- Meteorite collections	2 804	2 804
- Mineral collections	13 313	13 318
Take on value	13 318	13 318
Scrapped during the year (minerals)	(5)	-
	17 562	17 567

Heritage assets disclosure (continued)

	2016 R'000	2015 R'000
The heritage assets were at initial recognition valued at fair value using evaluators with the following credentials:		
Fossils - Professor for Palaeontological Research, University of the Witwatersrand		
Mineral collections - MSc Geology, Professor and Chairman of the Department of Geology, University of the Witwatersrand		
Meteorite collections - Author of "Meteorites", Private collector of meteorites		
Gemstones - MSc Geology		
<p>Various valuation methods were used, taking into account the different types of heritage assets held by the Council for Geoscience.</p> <p>The valuation reports are held at the Council for Geoscience offices and are available for inspection.</p> <p>The Palaeontological (fossils) assets have no monetary value as legislation does not permit the purchase or sale of fossils. (National Heritage Resources Act 1999 par 35(4)(c)).</p> <p>The Council for Geoscience is in possession of old scientific equipment for display purposes only. This equipment does not carry any value.</p>		





## COUNCIL FOR GEOSCIENCE OFFICES IN SOUTH AFRICA



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