MINING INDABA 2023 COVER SLIDE

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昔 6-9 February, 2023 ♥ CTICC, Cape Town







THE ROLE OF THE COUNCIL FOR GEOSCIENCE IN MINERALS AND ENERGY DEVELOPMENT



WHO WE ARE



- The national geoscience agency
- The trusted advisor to Government on the geology and geography of South Africa
- Formed by the amalgamation of 3 former Surveys, the oldest of which - the Geological Commission of the Cape of Good Hope - was founded in 1895.



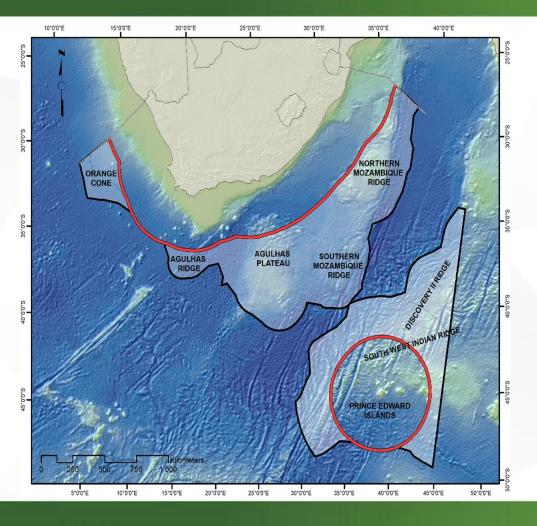
WHO WE ARE



- To provide innovative geoscience solutions to support the NDP and other Government plans that address economic growth, poverty, inequality, job creation, education, clean water, affordable and clean energy, and safer communities.
- The integrated and multidisciplinary geoscience mapping programme (IMMP).
- The IMMP is developed to foster the sustainability of the organisation in a constantly changing state of polity, the economy, society and the ever-shifting scientific and technological landscape.

WHAT WE DO & WHERE WE DO IT





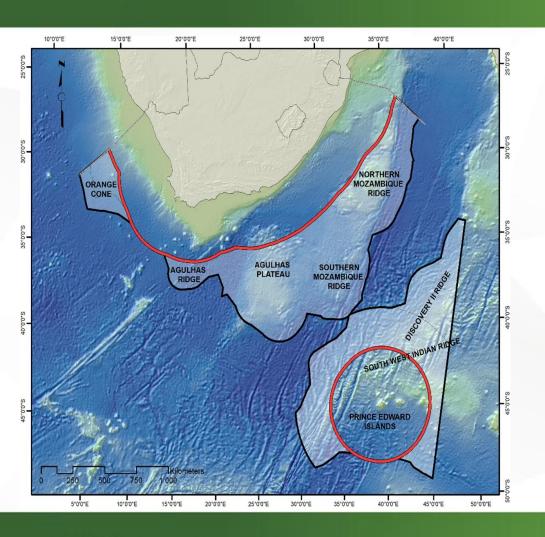
Drivers for economic growth

- Mineral resources pipeline
- Energy security
- Water security
- Marine mapping
- Geohazards mapping
- Infrastructure and land-use
- Innovation
- Geoscience diplomacy

WHAT WE DO & WHERE WE DO IT



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Drivers for economic growth

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ENERGY TRANSITION MINERALS





Lithium, Cobalt, Nickel, *REEs, Aluminum, Copper



Nickel, Platinum Group



REEs, Copper, Zinc



Copper, Aluminum



Copper, Aluminum



Nickel, Chromium

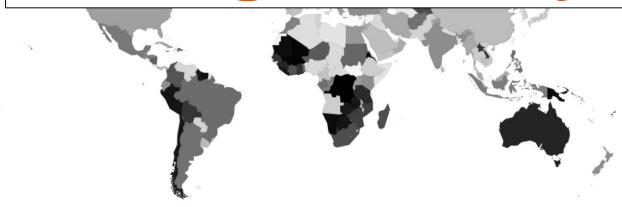


MINING MATTERS





Mining our way to net-zero!!



Ericsson & Lof (2019) https://link.springer.com/article/10.1007/s13563-019-00191-6

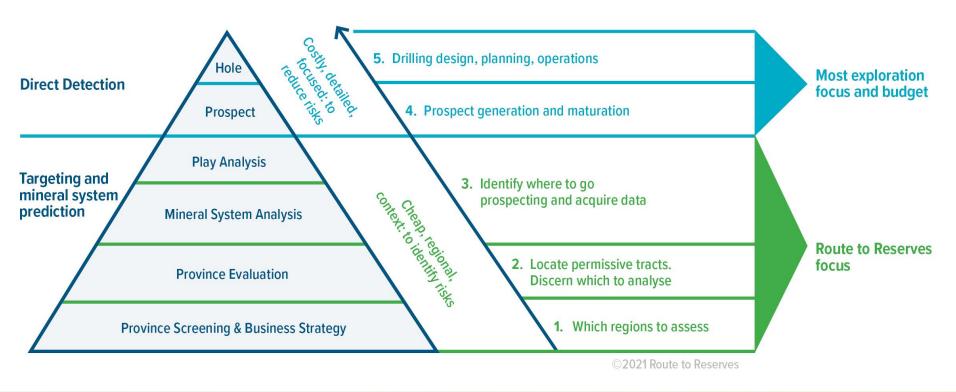
More contribution to wealth

Less contribution to wealth



MINERALS EXPLORATION CHALLENGE AND THE OPPORTUNITY

The Exploration Triangle and Scales of Targeting

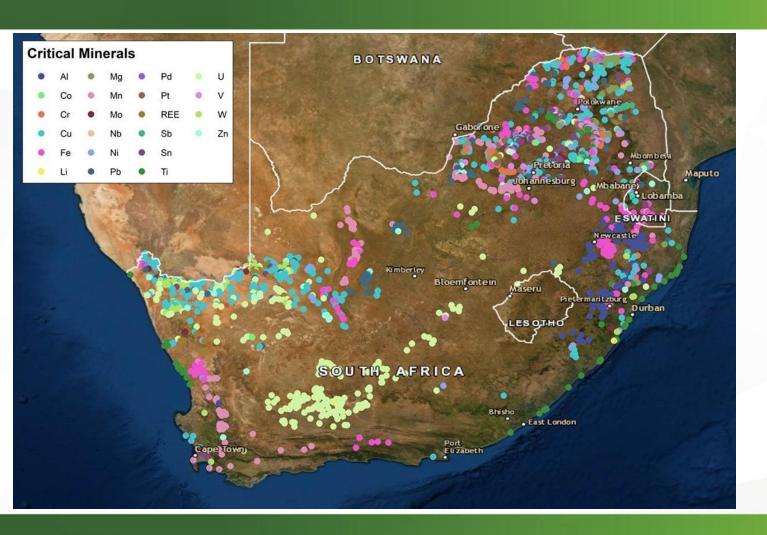


- Scale reduction
- De-risking minerals exploration

https://sgc.com.au/

SOUTH AFRICA'S CRITICAL MINERALS DISTRIBUTION





- Lithium
- Cobalt
- **Graphite**
- REE
- Silver
- Molybdenum
- Aluminium
- Copper
- Manganese

MINERALS EXPLORATION CHALLENGE AND THE OPPORTUNITY

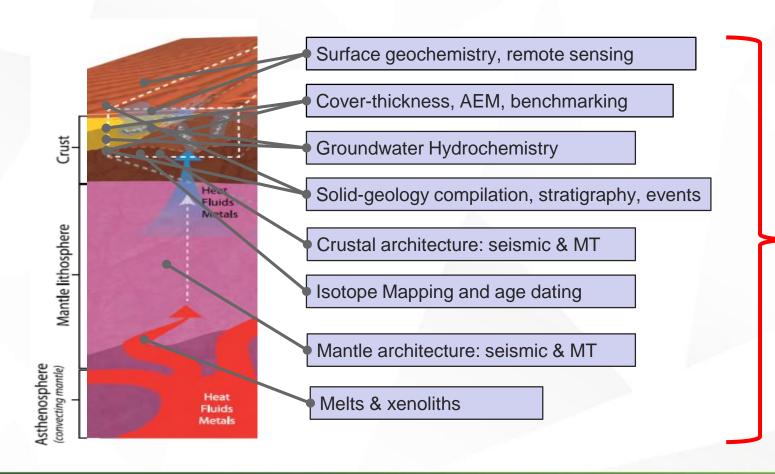




MINERALS EXPLORATION CHALLENGE AND THE OPPORTUNITY

- Finding new resources is getting much harder the easy "stuff" has been found
 - industry consolidation
 - access challenges
 - decreasing grades
 - reduced grassroots spending
 - depleting talent pool of experienced geologists
 - exploring at depth and under cover
 - changing geopolitical environment, which links to the risk appetite of companies





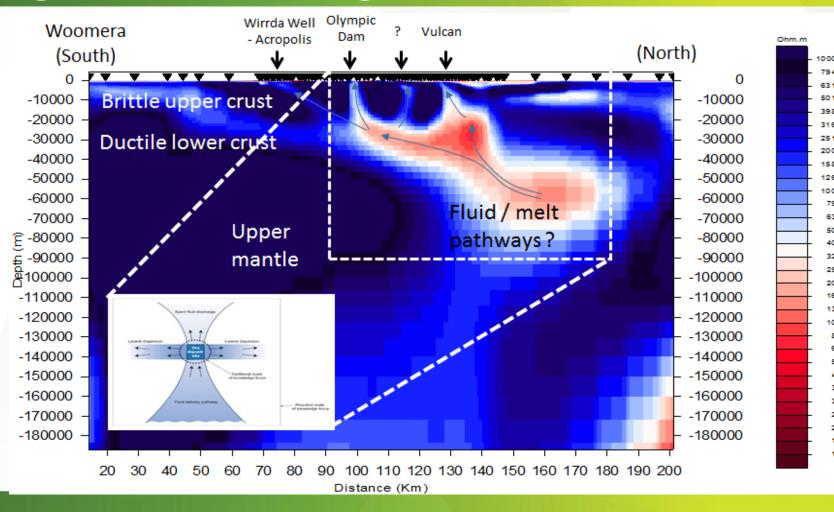
Mineral Potential Prediction

Drilling

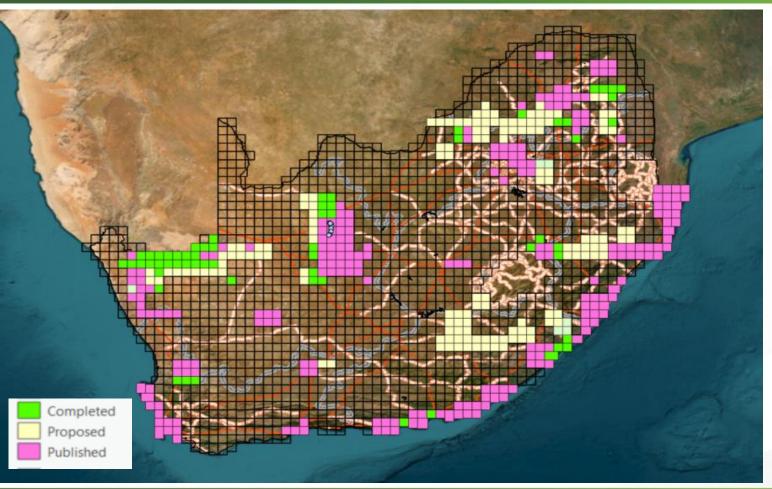
Adapted from R. Blewett (2018)



- Need to know the regional context of mineral systems
- ALL world-class deposits lie above geophysical/geochemical anomalies in the lithospheric mantle



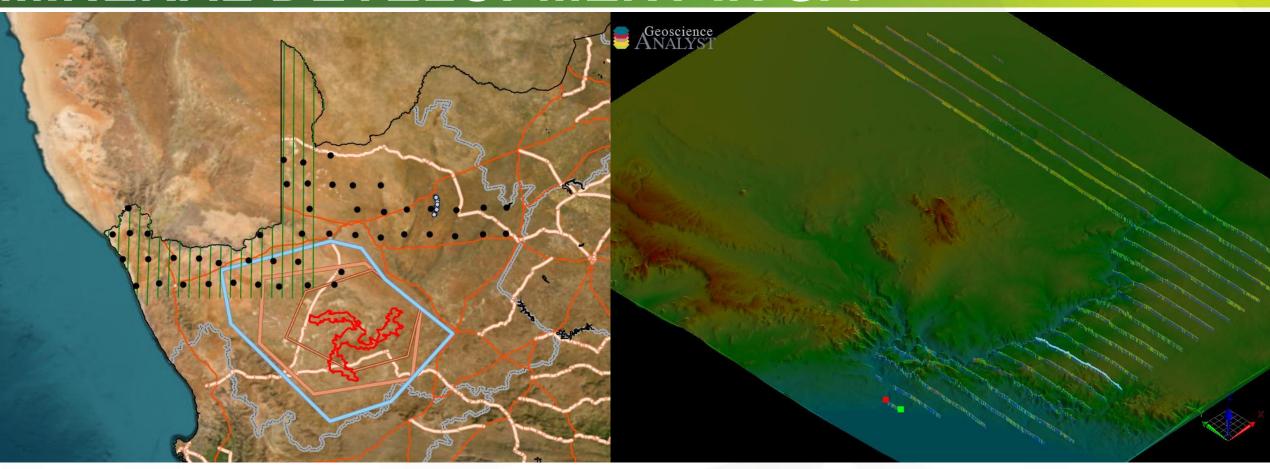




1:50 000 Scale onshore geological mapping

11.5% geological mapping coverage at this scale

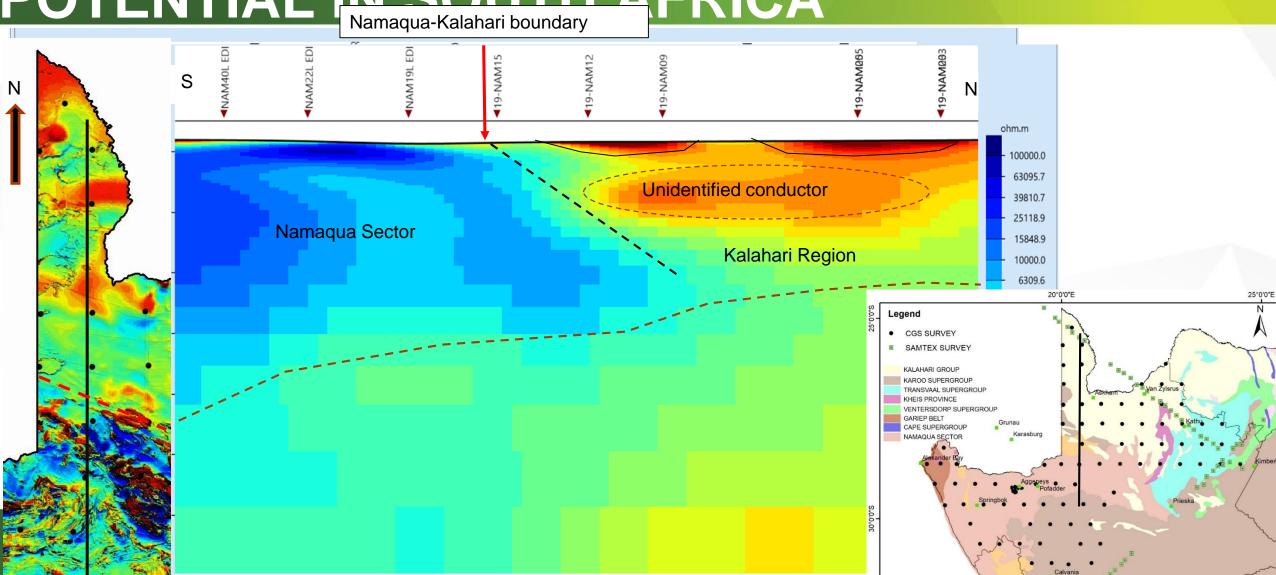




MAPPING COPPER, LEAD, ZINC POTENTIAL IN SOUTH A FRICA Namaqua-Kalahari boundary



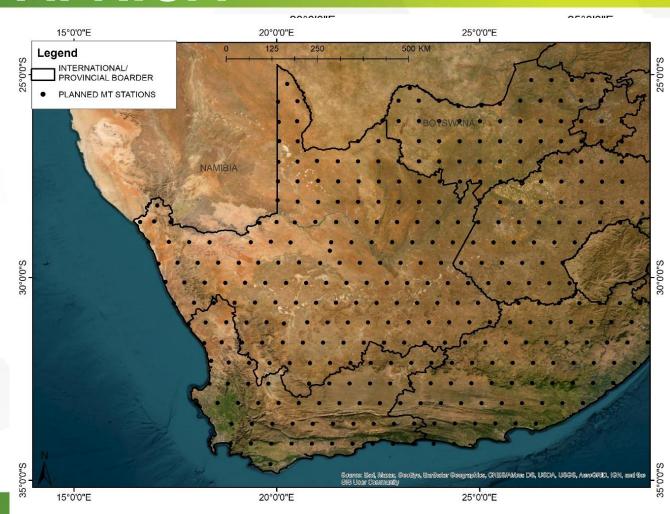
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MAPPING COPPER, LEAD, ZINC POTENTIAL IN SOUTH AFRICA



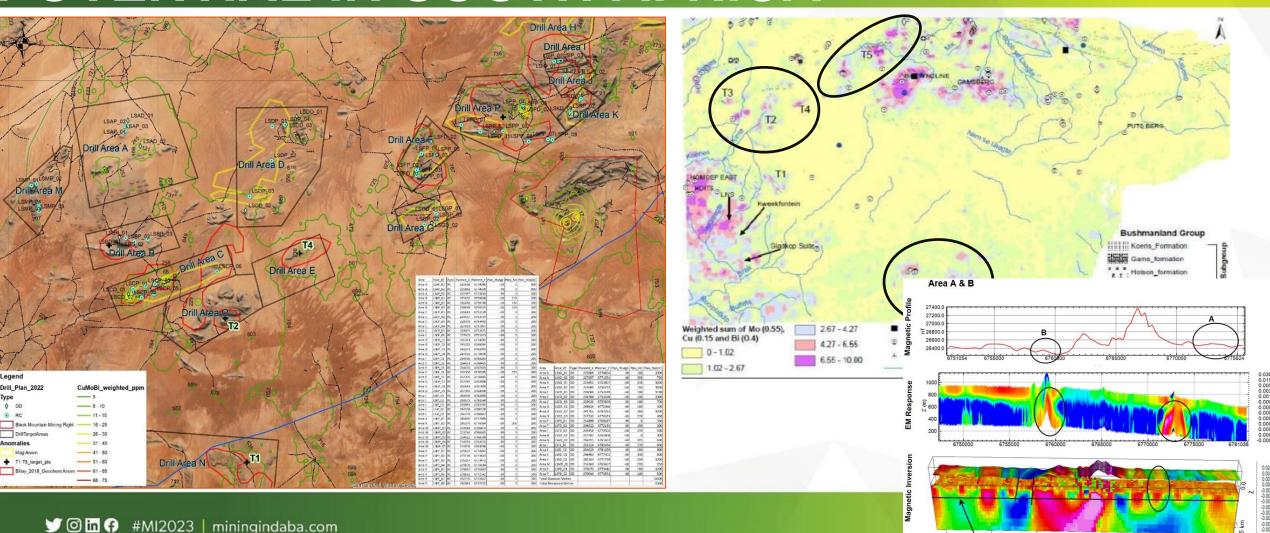
- Thus far, 2/3 of the Northern Cape Province has been surveyed
- The results, though preliminary, correlates with the mapped geology and pointing to structures and could add to understanding the model of the region
- Future plans:
 - Finish the Northern Cape Survey
 - Extend the survey to cover the entire country



MAPPING COPPER, LEAD, ZINC POTENTIAL IN SOUTH AFRICA

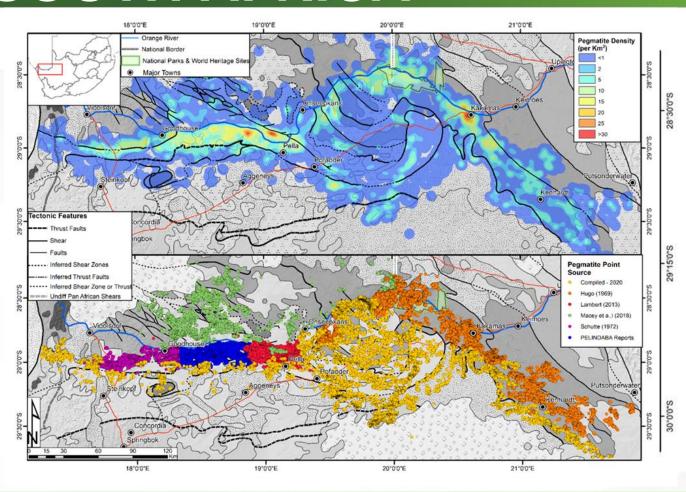


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MAPPING LITHIUM POTENTIAL IN SOUTH AFRICA

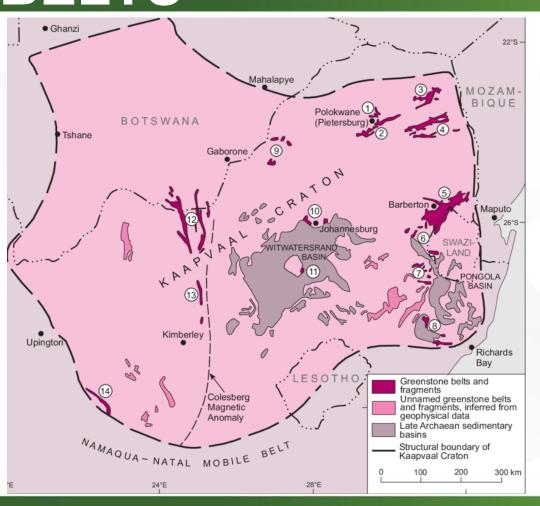






MAPPING GOLD IN GREENSTONE BELTS



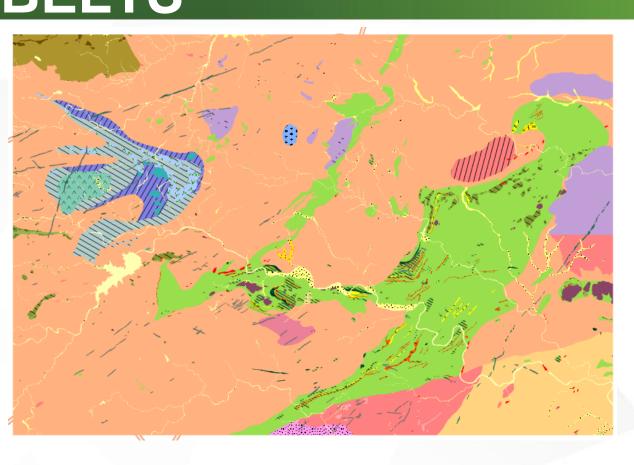






MAPPING GOLD IN GREENSTONE BELTS

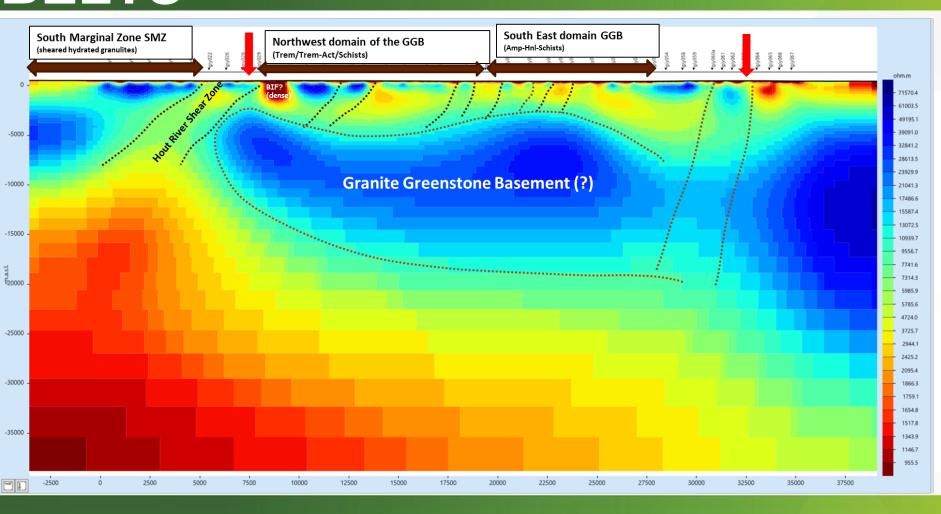




Geological mapping

MAPPING GOLD IN GREENSTONE BELTS

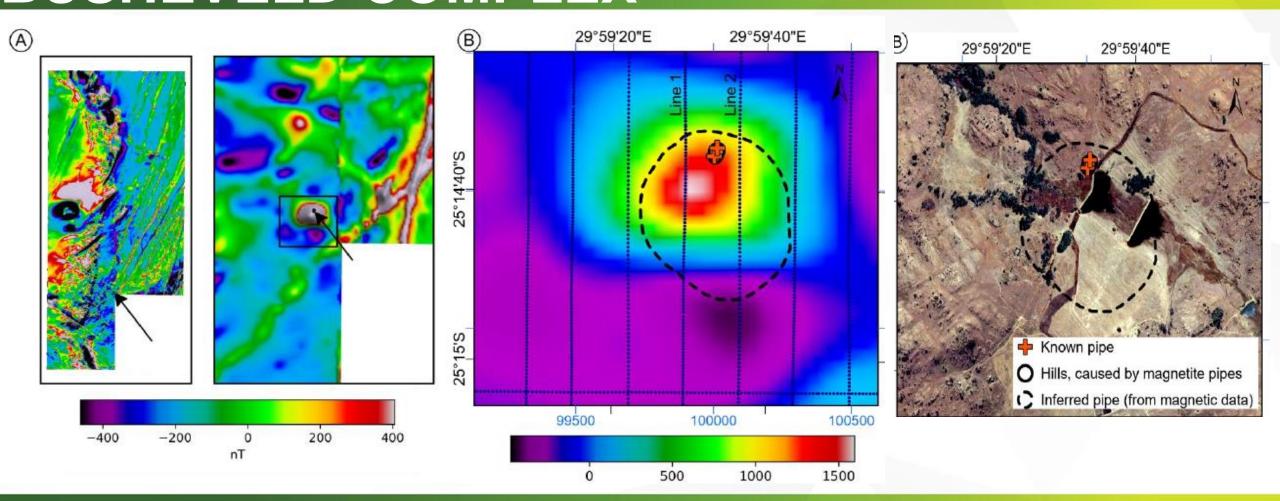




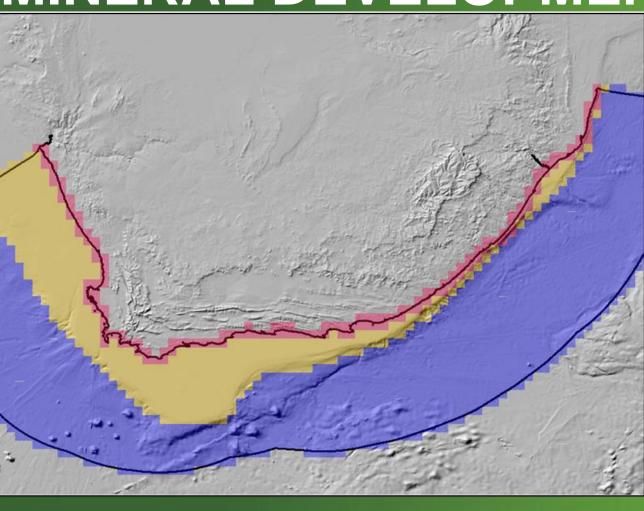
Geophysical mapping

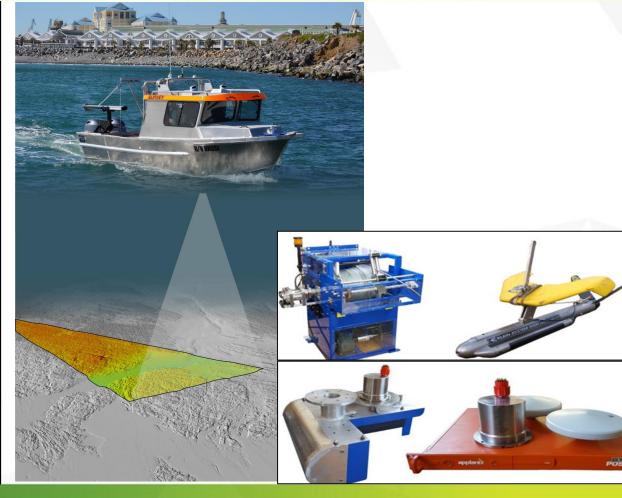
MAPPING VANADIUM PIPES IN THE BUSHEVELD COMPLEX



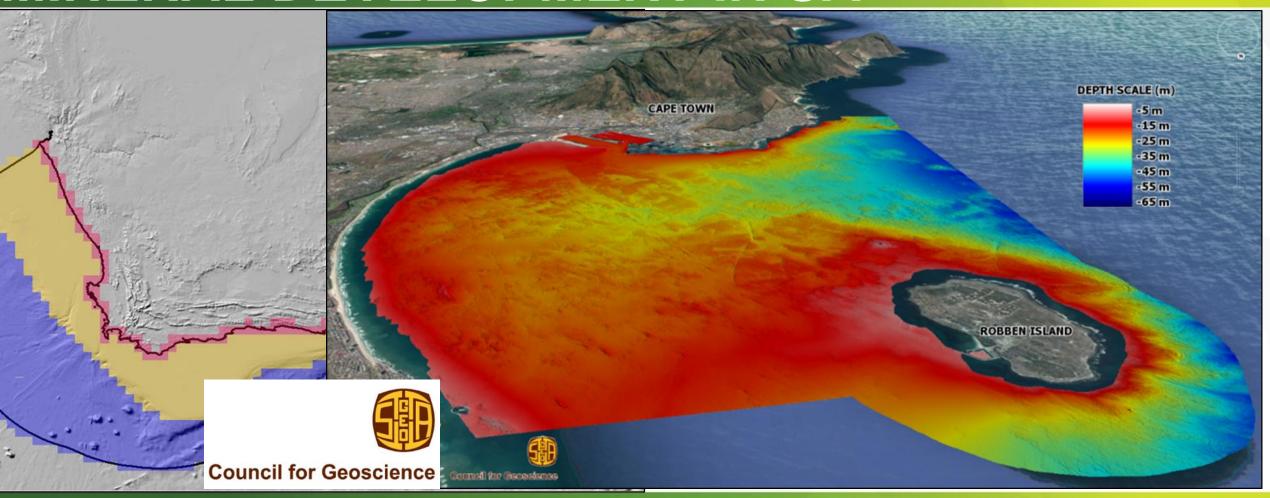




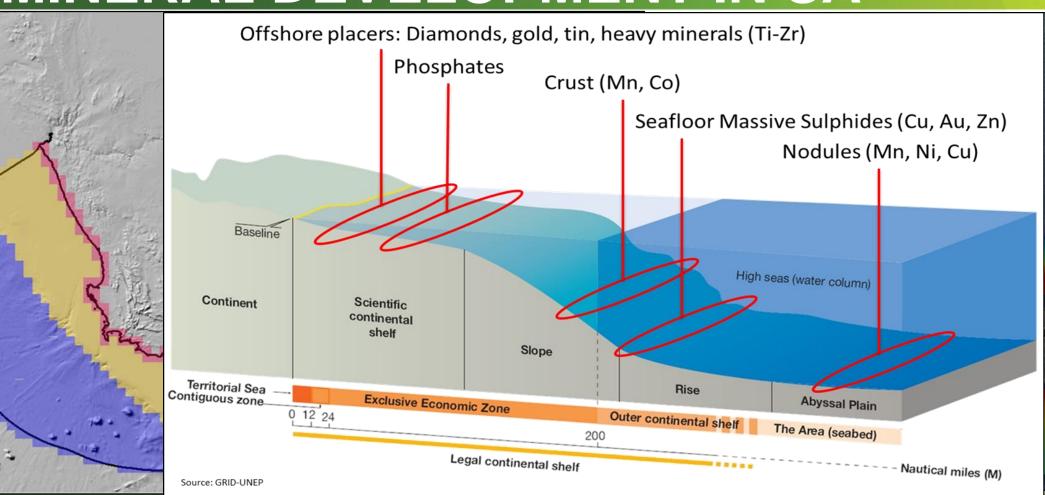




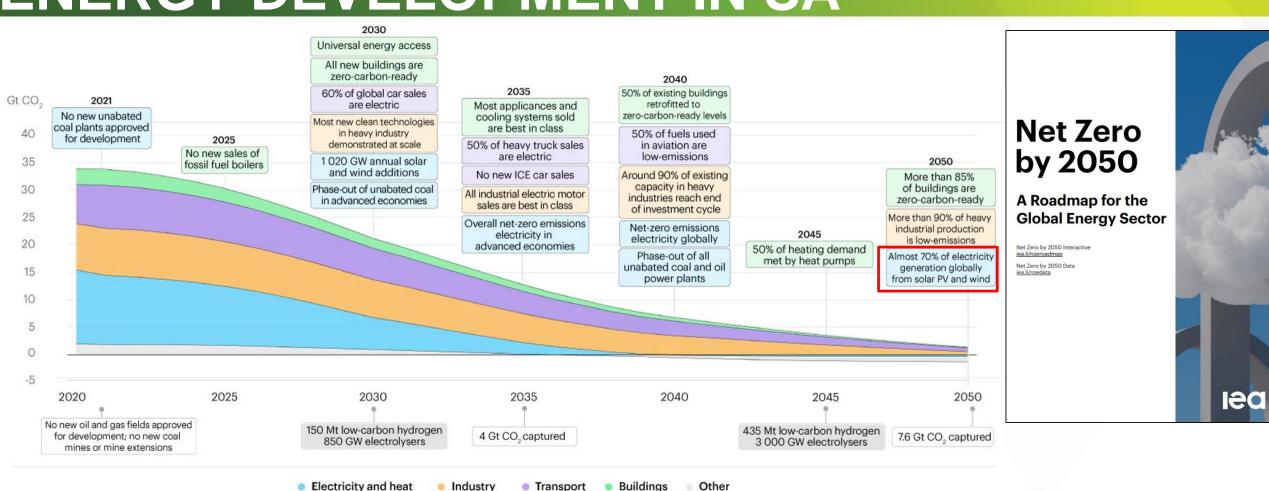




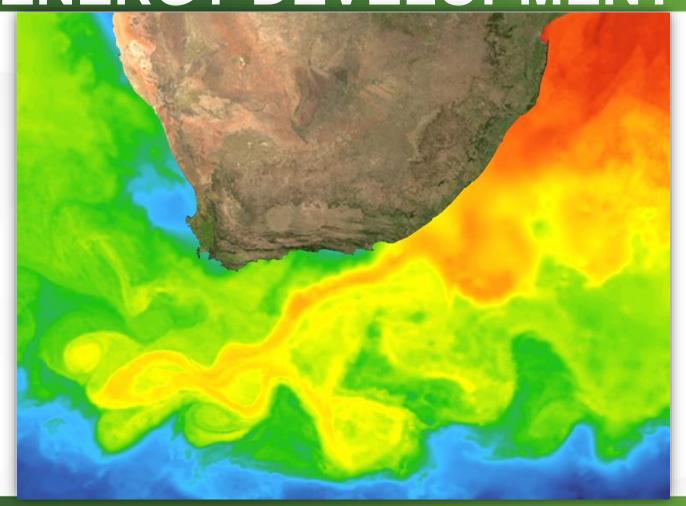






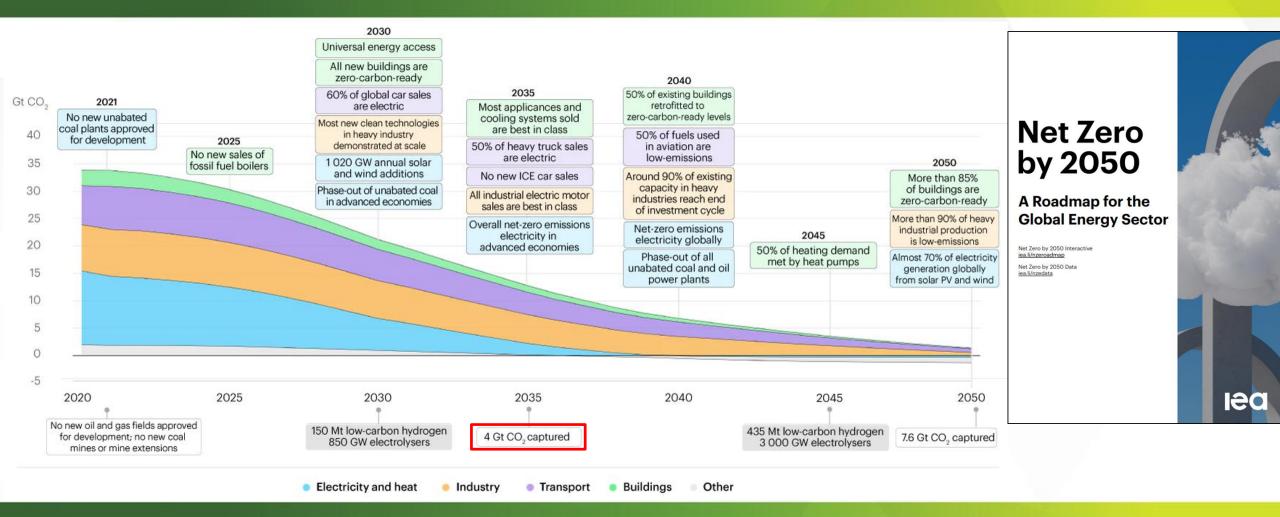




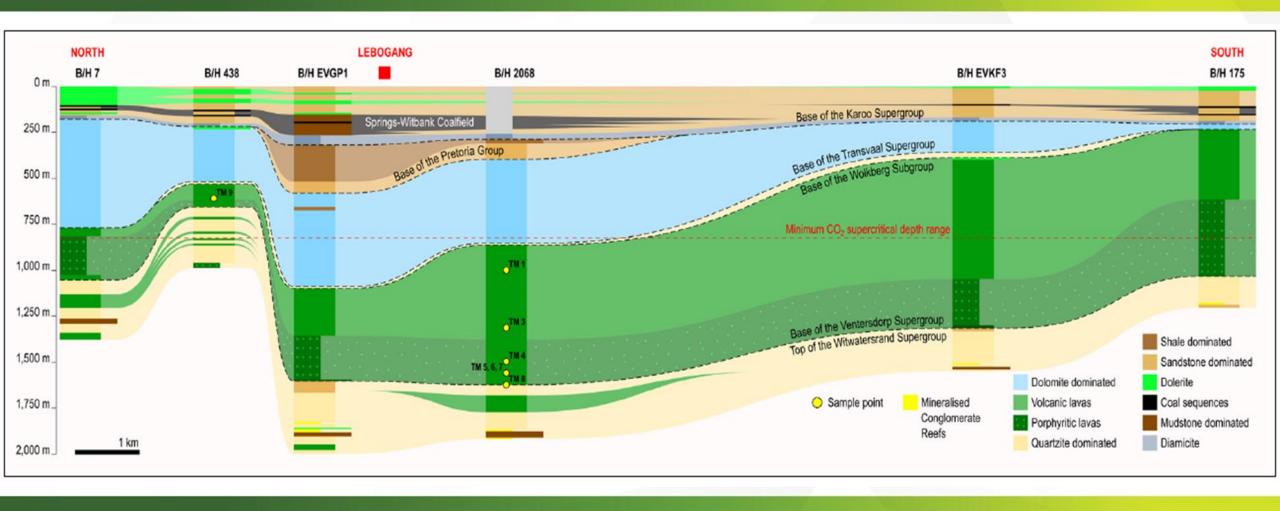




GEOSCIENCE MAPPING FOR ENERGY DEVELOPMENT - CABRON MINING NDABA CAPTURE UTILIZATION AND STORAGE OHYVE EVENT

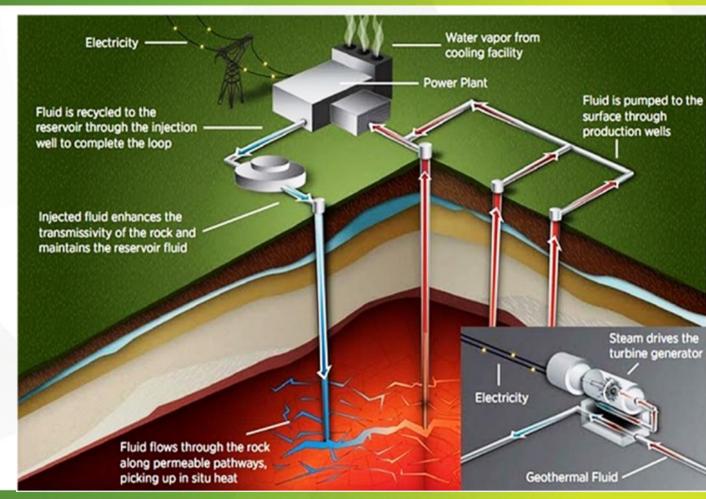


GEOSCIENCE MAPPING FOR ENERGY DEVELOPMENT - CABRON MINING NDABA CAPTURE UTILIZATION AND STORAGE O Hyve event





- The CGS produced SA's first geothermal energy potential map.
- Five key areas were identified for focussed investigations.
- Two of these areas, i.e., Limpopo and KZN has been studied in detail
- Possible presence of low-enthalpy resources.









 The first attempts to produce basalt fiber were made in the USA in 1923 by Paul Dhe who was granted US patent.

• These were further developed after World War II by researchers in the USA, Europe and the former Soviet Union; especially for military and aerospace applications.

Since declassification in 1995 basalt fibers have been used in a wider range of civilian applications.



























Access to sufficient water is a fundamental right, according to section 27 of our Constitution. It is a need - not a want or a luxury. Yet, unfortunately, clean water is a scarce resource in

As it stands, only 64% of South African households have safe drinking water. At least 9% of South Africans draw their water from polluted rivers and springs, whilst the most alarming statistic is that 37% of the water supply in the country is lost through leakages due to lack of maintenance of water infrastructures.







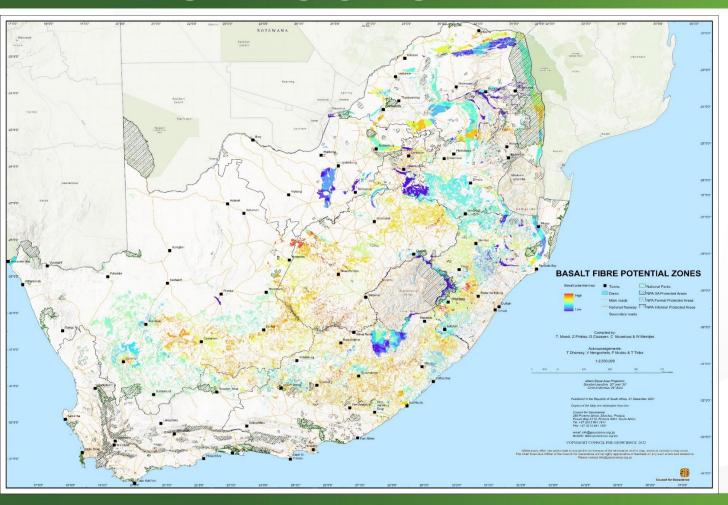
Currently, South Africa is facing its own water crisis. The issue is made worse by the fact that the government, according to Deputy President David Mabuza, does not have the capacity to fix the This is not the first time that government has lamented a lack of capacity when it comes to tackling the water crisis. The question then is: what is lacking? Is it human capital? If so, there are many unemployed graduates whose skills could be utilised. If financial capacity is the issue, government must address corruption - particularly at the level of local government.

The most prevalent causes of the South African water crisis a

- Water leakages due to lack of infrastructural maintenance







- Regional geological assessment for Basalt Fiber across South Africa undertaken by Council for Geoscience (December 2021)
- Further mineralogical characterisation and geochemical studies currently undertaken by CGS



The global basalt fibre market size was \$283.8 million in 2021, and it is projected to reach \$798.6 million by the year 2030, advancing at a projected CAGR of 12.2% during 2021-2030.

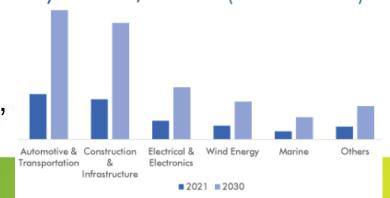
(Source: ReportLinker, 19 July 2022)

- This can be attributed to the fact that glass fibre can be replaced with basalt fibre in polymer matrix composites as a potential polymer reinforcing material.
- The material is considered environment-friendly, with similar properties to carbon fibre and glass fibres.
- Applications in nuclear power, engineering, civil construction, automotive, defence and concrete reinforcement industries.

Basalt Fiber Market (%) 2021 APAC Market Growth \$283.8 Million Will Accelerate Generated at a CAGR 2030 around (2021 - 2030)\$798.6 Million \$150 Million in 2021 12.2%

Growing construction industry





Increasing demand in automotive & transportation sector

MAPPING AGGREGATE POTENTIAL IN SOUTH AFRICA FOR INFRASTRUCTURE DEVELOPMENT



- Government intends to invest on infrastructure development projects over the next 15 years
- The effective implementation of such a programme will require vast amounts of good quality construction materials (e.g., aggregates) in support of infrastructure development.

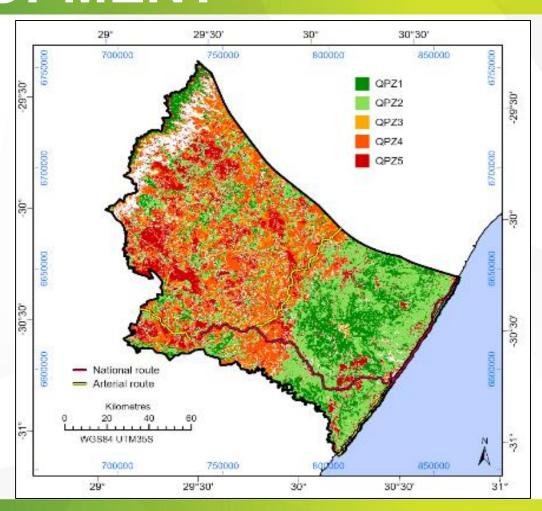




MAPPING AGGREGATE POTENTIAL IN SOUTH AFRICA FOR INFRASTRUCTURE DEVELOPMENT



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GEOSCIENCE DATA PORTAL

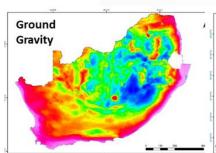


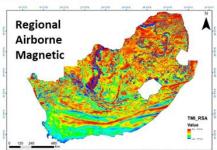
https://maps.geoscience.org.za/portal/apps/sites/#/interactivewebmap

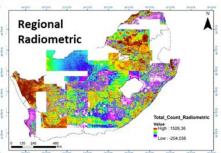


GEOSCIENCE DATA PORTAL

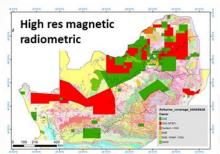


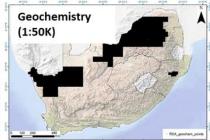


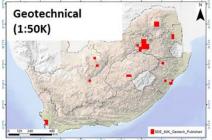


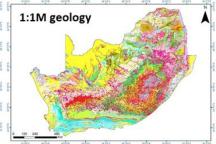






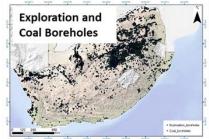




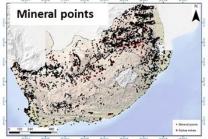












ACKNOWLEDGEMENTS



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mineral resources & energy

Department: Minerals Resources and Energy REPUBLIC OF SOUTH AFRICA



THANK YOU

CONTACT US AT:

- HEAD OFFICE 280 Pretoria Street, Silverton, Pretoria, 0184, South Africa Private Bag X112, Pretoria, 0184
- C Tel: +27 (0)12 841 1911 Fax: +27 (0)12 841 1221
- @ Email: info@geoscience. org.za
- geoscience.org.za





