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CGS's Lindiwe Nkabane Leads WISA Young Water Professionals Nationally

Ms. Lindiwe Nkabane has been serving as the National Lead of the WISA Young Water Professionals (YWP) since October 2024, a term that runs until the end of 2026. Her nomination followed her impactful leadership in the KwaZulu-Natal YWP Provincial Committee, where she brought vibrancy, innovation, and a strong youth voice to water resource management (WRM). This role aligns with her passion for WRM, leadership, and research, and complements her work at the Council for Geoscience (CGS) as a Junior Scientist focusing on hydrology, water quality, and geohydrological research.

As National Lead, she oversees YWP structures across all nine provinces, championing inclusion, representation, and visibility guided by the belief that **young people cannot become what**



Figure 1: Ms. Lindiwe Nkabane.



Figure 2: Ms. Lindiwe Nkabane with the Gauteng Provincial Committee Leads

they cannot see. Together with the national committee, she collaborates with partners including the Department of Water and Sanitation (DWS), Water Research Commission (WRC), Umngeni-uThukela Water (UUW), Rand Water, and private-sector stakeholders, working alongside their Young Professional structures. The committee convenes and contributes to webinars, seminars, and panel discussions, including platforms such as the DWS Youth Indaba, which elevate youth voices while accelerating skills development and career pathways.

Looking ahead, the YWP is preparing the WISA YWP Conference, to be held in the Eastern Cape in November 2025, building on the journey from “*Breaking Silos*” (2023) to “*From Silos to Synergy*” (2025). In parallel, Lindiwe contributes to sector thought leadership through service on conference advisory and programme



Figure 3. Ms. Lindiwe Nkabane presenting on behalf of the WISA YWP at the DWS Youth Indaba.

development committees with the International Water Association (IWA) and Water Security Africa (WSA), reinforcing the bridge between research, policy, and practice.

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CGS delegates attend GeoCongress 2025 in Bloemfontein

The Council for Geoscience proudly participated in the Biennial GeoCongress 2025, hosted by the Geological Society of South Africa (GSSA) in Bloemfontein, Free State, from 23 to 27 June 2025 Figures 1-3. Held under the theme “*Embracing change through collaboration*”, the conference brought together industry leaders, researchers, and students to share innovations, explore emerging challenges, and advance geoscientific knowledge. The conference served as an important platform for CGS to highlight projects that contribute towards responsible and sustainable development and engagement with stakeholders in the geoscience space.

GeoCongress 2025 featured a wide range of plenary sessions across diverse subthemes, including Geo-Energy and Petroleum Resources, Geoscience and Society, AI-driven GIS-based Mineral Systems Approach to Mineral Prospectivity Mapping, Groundwater, Environmental Geoscience, Kimberlites, Diamonds, and the Deep Lithosphere, Applied Mineralogy, and Geoheritage,

Geotourism and Geoparks. The breadth of topics reflected the evolving role of geoscience in addressing societal, environmental, and economic priorities.

Ahead of the official opening, delegates could participate in field excursions and workshops. One highlight was the field excursion to the Big Hole Museum



Figure 1. Council for Geoscience delegates at GeoCongress 2025: Back row (L-R): Mr. Mawande Ncume, Ms. Mahiako Mathabatha, Dr. Nigel Hicks and Mr. Hakundwi Mandende. Front row (L-R): Mr. Zusakhe Nxantsiya, Dr. Sameera Mohamed, Dr. Thakane Ntholi, Ms. Phuti Masegela and Dr. Johann Neveling.



in Kimberly, an iconic site which was excavated between 1871 and 1914 and recognised as the deepest hand-dug excavation in the world (Figure 1-3). The excursion also included a visit to the Boshoff Road Kimberlite dump, known for containing visible peridotite mantle xenoliths. Pre-conference workshops focused on critical technical areas. These included the Resource Geology Workshop on resource estimation and classification, the SAMCODES Workshop based on South African Mineral Reporting Codes, and the Drone Technologies Workshop showcasing innovations in aerial data collection.

The CGS was represented by 11 delegates Dr. Thakane Ntholi, Mr. Hakundwi Mandende, Dr. Hayley Cawthra, Dr. Nigel Hicks, Dr. Johann Neveling, Dr. Sameera Mohamed, Mr. Mawande Ncume, Ms. Phuti Masegela, Mr. Zusakhe Nxantsiya, Ms. Mahlako Mathabatha and Ms. Mahlatsi Maibelo (Figure 1).

CGS made significant contributions across the programme, including a keynote address delivered by Dr. Hayley Cathwra entitled "Marine geoscience perspectives on mapping South Africa's coast and 'blue backyard'" highlighting the extent of marine mapping conducted by the CGS. Mr. Mawande Ncume provided an update on the status of the South African Committee for Stratigraphy (SACS), for which the CGS serves as the secretariat. Dr. Nigel Nicks shared findings on deformation ages within the Southern Structural domain of the Pongola basin. Mr. Zusakhe Nxantsiya presented seismic & electrical

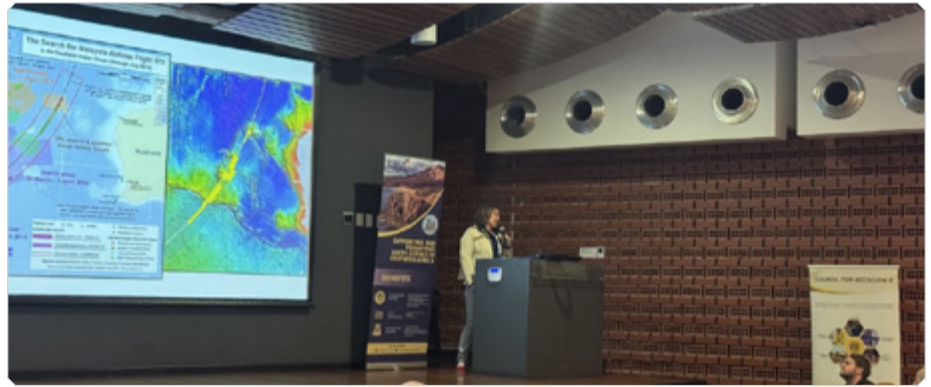


Figure 2. Dr. Hayley Cawthra presenting the keynote address.



Figure 3. Mr. Mawande Ncume giving an update on the status of SACSS.

resistivity imaging of marine terraces and determination of depth to bedrock at Duynefontyn, Koeberg Nature Reserve, SA.

Dr. Sameera Mohamed presented on 'Extraction and synthesis of silica nanoparticles from mine residues of the South African Bushveld Igneous Complex. The final presentation was delivered by Ms. Phuti Masegela who discussed the use of artificial intelligence (AI) and Geographic Information System (GIS) methods to

map groundwater potential zones in the Capricorn & Sekhukhune districts.

GeoCongress 2025 was an opportunity to exchange knowledge and a reminder of the importance of collaboration in advancing geoscience for societal benefit.

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SAGA Engineering Geophysics Symposium

Ten representatives from the Council for Geoscience joined researchers, consultants, and industry specialists at the Engineering Geophysics Symposium, held at the Southern Sun Hotel in Rosebank on 19–20 August 2025. The purpose of the symposium was to explore how geophysics can address engineering and mining challenges in Southern Africa.

The two-day programme combined keynote addresses, technical sessions, and thematic discussions on sinkholes, mining geophysics, tailings dam safety, and geotechnical engineering.

Day 1 began with the Geotechnical theme, highlighted by a keynote address from Dr. Linzer of SRK Consulting. He presented ongoing innovation and

insights into blast modeling and Seismic Cone Penetration Test (SCPTu) testing. This was followed by presentations on gravity surveys in dolomitic terrains, drone magnetics for cavity detection, and seismic monitoring of infrastructure. Speakers from SkyTEM, Geolinks, and the University of the Witwatersrand showcased cutting-edge technique approaches to sinkhole detection and risk





Figure 1: The CGS representatives in attendance. Front row, left to right: Ms. Zinhle Khalishwayo, Ms. Sinovuyo Myendeki and Ms. Janet Bunk. Back row, left to right: Mr. Jama Lengisi, Mr. Tsakane Mothose, Ms. Minenhle Buthelezi, Ms. Leonie Mare, Dr. Thifhelimbilu Mulabisana, and Mr. Joseph Matamela.

mitigation. Among those presentations was one by Ms. Janet Bunk from the CGS whose talk focused on sinkhole rehabilitation using case-studies from the Centurion area. The afternoon highlighted tailings dam management, with contributions on pore pressure monitoring, digital solutions, and case studies in foundation characterisation.

Day 2 kicked off with the “Geotech and Mining theme” featuring a keynote address by Professor Stacey from the University of the Witwatersrand. His talk focused on how geophysics can enhance the quality and volume of geotechnical data for better design and prediction in mining engineering. This was followed by a presentation by Dr. T. Malubisana from the CGS, she discussed the advances in mining geophysics focusing on the impact of blasting in communities located near open-cast coal mines in South Africa. The afternoon session addressed geotechnical applications such as InSAR monitoring, groundwater detection, and the safe storage of radioactive waste, with insights from Wits, the University of the Free State, and Geofocus.

Key highlights:

The talks by Ms. Janet Bunk and Dr. T. Mulabisana highlighted CGS’s broad mandate: advancing scientific understanding of geohazards while ensuring that geoscience remains relevant to public safety, environmental stewardship, and sustainable resource use. By bridging technical research with societal concerns, the CGS reaffirmed its role as a national leader in applied geoscience.

The discussions sparked by CGS’s talks demonstrated the importance of integrating geophysical methods with community-focused research, ensuring that geoscience contributes not only to engineering solutions but also to broader social resilience.

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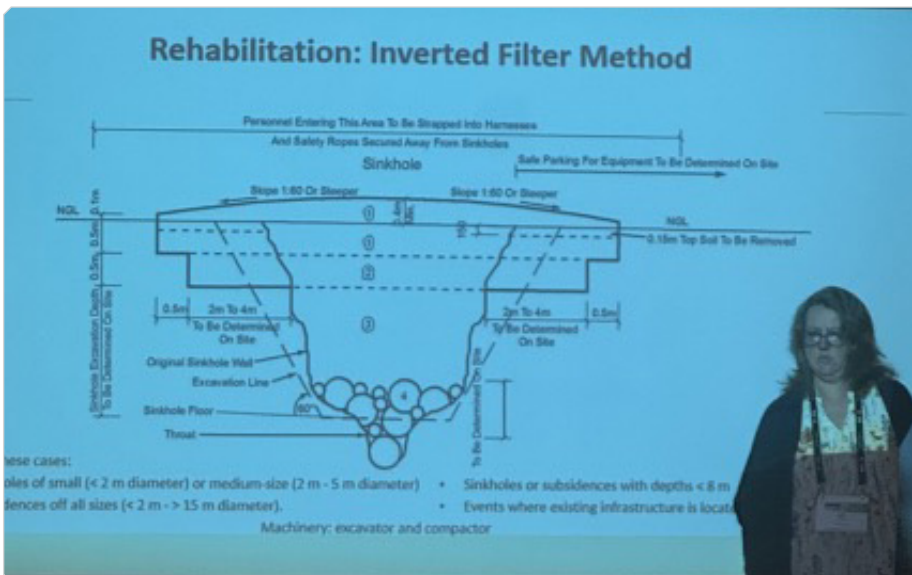


Figure 2: Ms. Janet Bunk giving her talk on day 1.



Figure 3: Dr. Thifhelimbilu Mulabisana Giving her talk on day 2.



The 2025 National Science and Technology Forum– South32 Awards

INTRODUCTION

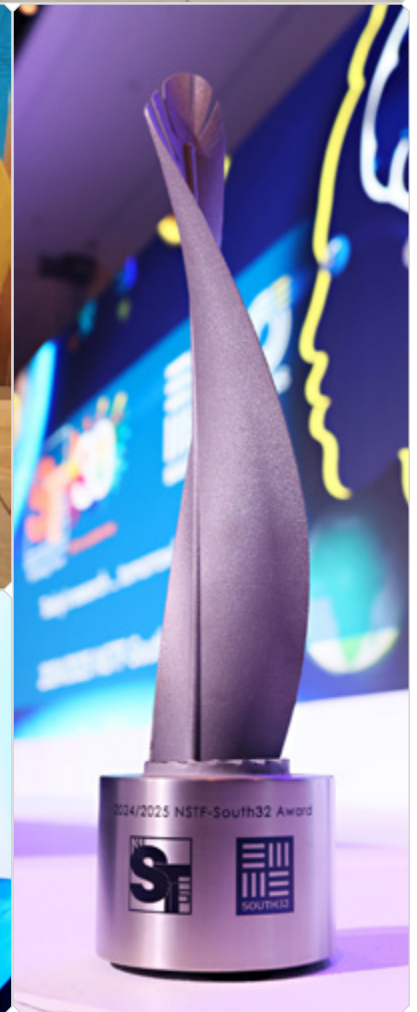
On Thursday, 31 July 2025, the prestigious National Science and Technology Forum (NSTF)-South32 Awards were held in a hybrid format, with live participation in Johannesburg and Cape Town, and streaming available via the NSTF's YouTube channel, enabling broad national and international engagement. Renowned as South Africa's "Science Oscars," the event celebrated excellence in science, engineering, innovation, and technology enabling broad national and international engagement.

The NSTF-South32 Awards continue to be the largest and most comprehensive national platform to recognise outstanding contributions to science, research, and technological innovation in South Africa. The event celebrated South Africa's scientific and technological excellence across diverse fields, under the theme "Quantum Science and Technology", aligning with the UN's designation of 2025 as the International Year of Quantum Science and Technology

ATTENDEES

The Council for Geoscience (CGS) was honoured to participate in the ceremony, with Mr. Neo Moabi, representing the CGS, and Mr. Mosa Mabuza, the Chief Executive Officer of the CGS, in attendance. Their presence underscored the organisation's commitment to promoting the role of earth sciences in addressing national developmental priorities.

Prominent leaders from government, academia, industry, and civil society were also present, highlighting the awards' cross-sectoral impact. Minister of Higher Education, Science and Innovation, Dr. Blade Nzimande, delivered the keynote address, emphasising the need for continued investment in research excellence to secure South Africa's global competitiveness.



HIGHLIGHTS

Award categories ranged from contributions to basic sciences, engineering, and technological innovation, to recognition of emerging researchers, research teams, and capacity development initiatives. Notable winners included researchers pioneering climate adaptation strategies, renewable energy innovations, and advanced mineral resource development methods.

The CGS delegation engaged with fellow scientists and innovators, strengthening collaborations and highlighting the

organisation's research and mapping efforts as part of South Africa's broader science and innovation ecosystem. Although geoscience-specific awards were not part of this year's ceremony, the participation of CGS leaders underscores the importance of earth sciences in addressing national challenges such as natural resource management, environmental sustainability, and infrastructure development.

SUMMARY

The 2025 NSTF-South32 Awards once again showcased South Africa's scientific

and technological excellence. For the CGS, the event provided an important platform to affirm its role as a leader in geoscience research and innovation. The participation of Mr. Neo Moabi and Mr. Mosa Mabuza reinforced the Council's commitment to advancing scientific excellence and its contribution to sustainable national development.

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The AusIMM: Life of mine, mine waste and tailings conference: Brisbane, Australia

In recent years, South Africa's Department of Mineral and Petroleum Resources (DMPR) and Council for Geoscience (CGS) have undertaken the development of a National Mine Closure Strategy (NMCS), which aims to promote sustainable mine closure, improve mine closure practices through a process of life-cycle mine closure planning, ensure fit-for-purpose environmental remediation aligned with post-mining economies, improve the social impact of mine-closure related activities, and implement a process of concurrent economic diversification to foster post-mining economies through economic succession. The strategy development process has involved extensive multi-stakeholder engagement and is currently in an advanced stage of development towards approval. To further disseminate the strategy to a broader stakeholder group and international audience, the CGS gave a comprehensive presentation of South Africa's NMCS at the AusIMM: Life of Mine, Mine Waste and Tailings Conference in Brisbane, Australia.

The conference, held from 29 to 30 July 2025, merged the Life of Mine Conference and the Mine Waste and Tailings Conference into a single, dynamic event, offering a broader scope and even greater opportunities



Figure 1: Dr. Viswanath Vadapalli and Ms. Sisanda Gcasamba at the conference.



Figure 2: Dr. Vadapalli delivered a presentation under the theme, "Integrated planning for long-term value."

for knowledge sharing, innovation, and collaboration.

. This combined conference brought together two established audiences, providing access to professionals involved in every aspect of mine

development, sustainability, waste management, and environmental responsibility. This unified platform provided an expanded technical program featuring 110 presentations, keynote addresses, and panel discussions organised under various conference



themes, which were delivered across four parallel sessions over the two days of the conference. About 24 sponsors and 67 exhibitors featured at the conference, enhancing the attendee experience. Over 800 delegates attended the conference and engaged in various topics. Two delegates from the CGS, namely, Dr. Viswanath Vadapalli and Ms. Sisanda Gcasamba, attended the conference (Figure 1).

During the conference, Dr. Vadapalli delivered a talk on “Mine Closure – A liability or an opportunity – A South African Perspective” (Figure 2). In his presentation, Dr. Vadapalli highlighted the importance of changing the narrative of mine closure from a liability to an opportunity. The presentation was well-received with positive feedback. Some observations made following the presentation are as follows:

- South Africa and Australia have different approaches to mine closure. Australia has more robust and proactive mine closure frameworks, particularly in areas like financial provisioning and compliance enforcement.
- South Africa, although it has legal requirements for mine closure, gaps in enforcement and planning are



Figure 3: Dr. Vadapalli is participating in a question-and-answer session following his presentation.

evident by challenges of abandoned mines and prolonged care-and-maintenance periods.

Pertinent questions were raised following the presentation and were deliberated on during the question-and-answer session (Figure 3). It is noteworthy that, although the benefits of economic succession post-mining were acknowledged, emphasis was placed on the importance of sustainable practices and responsible mine closure to mitigate negative environmental impacts. Little emphasis was given to post-mining land use to support economic diversification, which could be attributed to the fewer socio-economic impacts of mine closure in the region compared to those experienced in South Africa.

Overall, the presentation from CGS was received positively, and it has been observed that the challenges experienced by the South African mining industry and regulator(s) are not unique to South Africa. A couple of potential networking opportunities were identified, particularly in relation to post-mining land use, and should be pursued further to fully leverage the potential of these collaborations.

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A first of its kind at the CGS Palaeontology collections: *Lystrosauravus bothae*

A newly identified species of therapsid dicynodont, named *Lystrosauravus bothae*, has been described by Dr. Christian Kammerer a research curator from the North Carolina Museum of Natural Sciences. The holotype, catalogued as CGP/1/324, is preserved within the collection at the Council for Geoscience (CGS), alongside other notable *Lystrosaurus* specimens. This specimen was found on the Middelwater farm, situated in the Eastern Cape, within the *Cistecephalus* Assemblage Zone. Remarkably, this specimen has been part of the palaeontological collection for several years, awaiting this significant recognition and study.

Lystrosauravus bothae is based on a single skull that exhibits morphological traits consistent with known *Lystrosaurus* species, yet it also possesses distinct and previously unrecognized characteristics that warrant its classification as a new species. This taxon is positioned as the most basal within *Lystrosaurus* phylogeny, belonging to the Lystrosauridae family. The nomenclature, as outlined by Kammerer *et al.* (2025), derives from its proximity to the sister group, *Lystrosaurus*, coupled

Figure 1. Holotype of *Lystrosauravus bothae* (CGP/1/324), skull in dorsal view. Scale bar = 2cm.



with the Latin suffix “-avus,” meaning grandfather, which underscores its position as an “outgroup” within the *Lystrosaurus* lineage.

The specimen is particularly important for elucidating the phylogenetic, ecological, and evolutionary dynamics of the Lystrosauridae family. Its significance is further highlighted by its confirmation of certain plesiomorphic traits among *Lystrosaurus* specimens from South Africa, thus linking anatomical disparities between *Dicynodon* and *Lystrosaurus*. Kammerer *et al.* (2025) also remarked on the global scarcity of such specimens, emphasising *Lystrosaurus* as a predominant group, while *Lystrosauravus* is represented by this singular known specimen. The discovery of *Lystrosauravus* has also provided valuable insights into the adaptations of this group following the Permo-Triassic Mass Extinction Event. Other CGS specimens were also used in this project as reference material for *Euptychognathus bathyrhynchus*, a taxon from the Ruhuhu Basin of Tanzania. These specimens played a significant role in supporting the phylogenetic and evolutionary findings mentioned above. They also provided the morphology of the mandible which is not preserved in the holotype. Therefore, these importantly

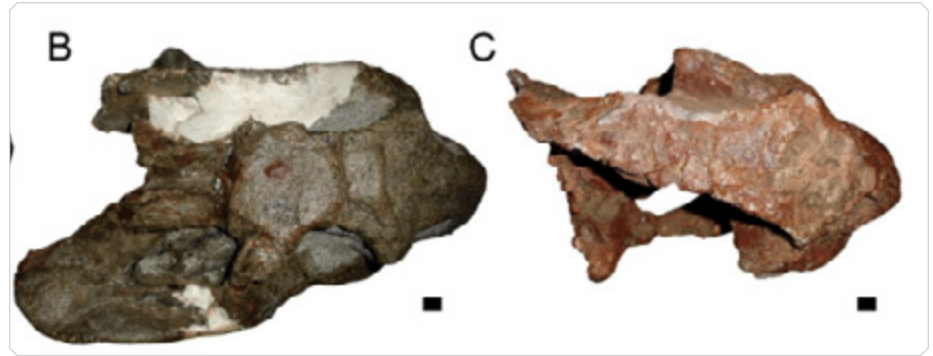


Figure 2. *Euptychognathus bathyrhynchus* skull. A. CGSAF107-83. B, CGP/1/310. Scale bar = 1cm. Images taken from Kammerer *et al.* (2025).

add to a somewhat full cranial description of *E. bathyrhynchus*.

Ultimately, this highlights the critical role that the palaeontological collections of the CGS play within the broader palaeoscience community. These collections not only serve as invaluable repositories of fossil specimens but also provide essential data that facilitates research and enhances our understanding of Earth's historical biodiversity and evolutionary processes. By preserving and safeguarding these fossils, the CGS contributes to ongoing studies and comparisons, enriching the scientific discourse and enabling discoveries in the field of palaeontology. The paper also

highlighted the contributions of other researchers in Karoo palaeontological research, who have also made use of the CGS collections in different studies. Dr. Kammerer also shared, after his frequent visits to these collections, their importance in facilitating ongoing research and discoveries in the field of palaeontology.

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Gully Expansion and Its Projected Threat to Arable Land in the Mthatha area

Africa experiences some of the most severe soil erosion rates globally. In South Africa erosional gullies, locally known as ‘dongas’, are regarded as the main cause of accelerated soil erosion and land loss. The expansion of these features poses a very high and ever-growing threat to arable land in South Africa. This threat is especially pressing in the rural areas of the impoverished Eastern Cape Province where communities rely on subsistence farming. The continuous reduction of arable land in such socio-economically vulnerable areas undermine agricultural productivity, long-term food security and compromises sustainable socio-economic growth. While continued gully expansion is highly

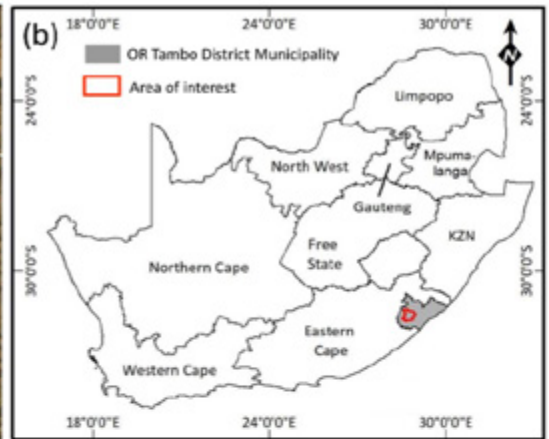
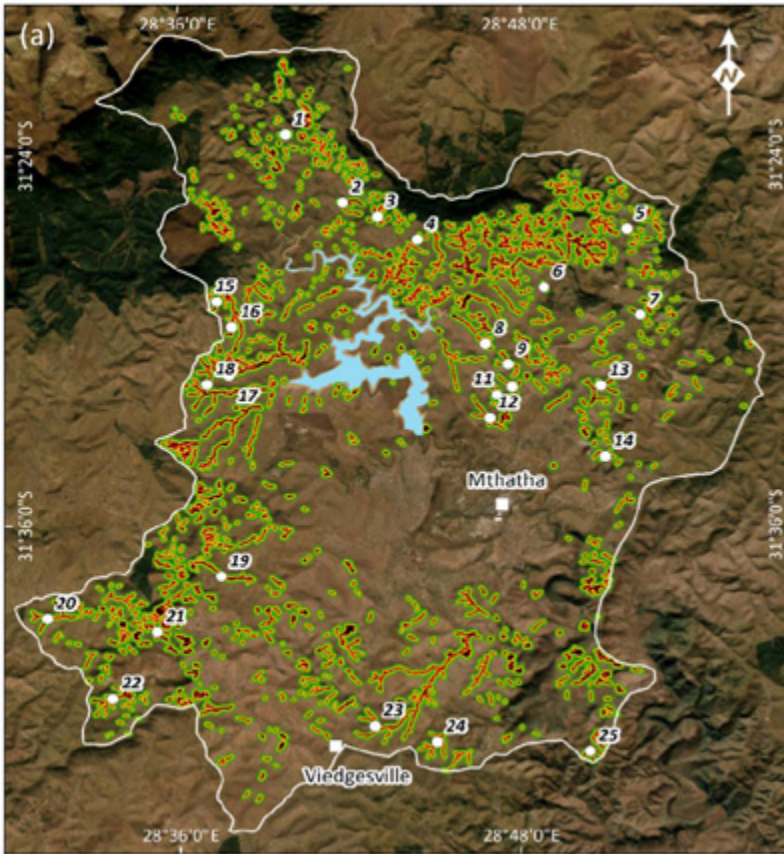
probable should current erosion trends persist or intensify, the magnitude of future expansion remains uncertain.

By 2020, erosive gullies had already eroded 2.3% (2579 ha) of arable land in the Mthatha area. Over an 82-year period (1938–2020), a multi-temporal analysis of 25 gullies revealed that their areal extent increased by an average of 2.08% per year, ranging from a minimum of 0.61% to a maximum of 4.15%. These expansion rates can be used to calculate the estimated projected loss of arable land over the next 10 to 20 years under three gully expansion scenarios of conservative (minimum), expected (average) and progressive (maximum).

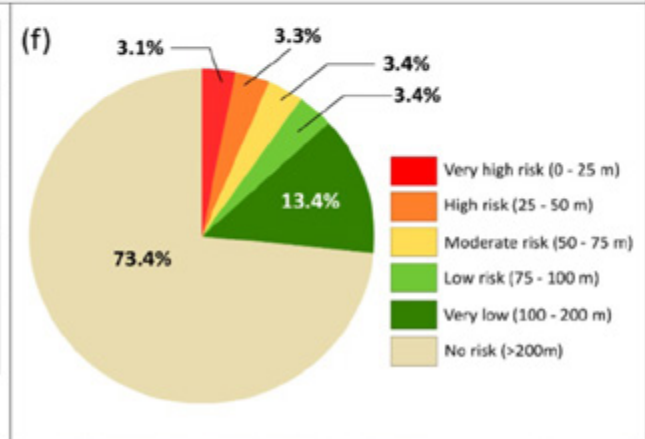
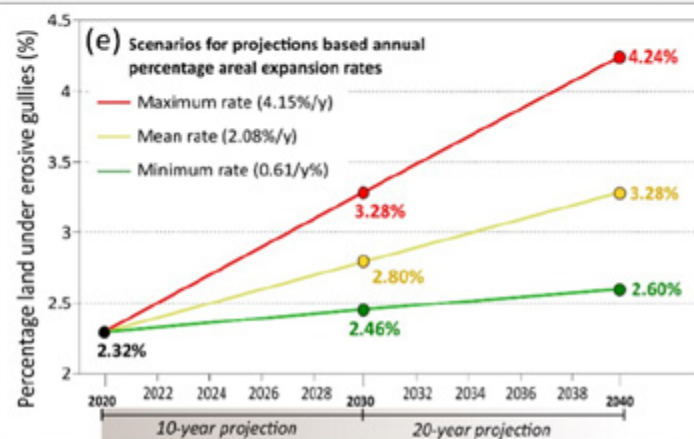
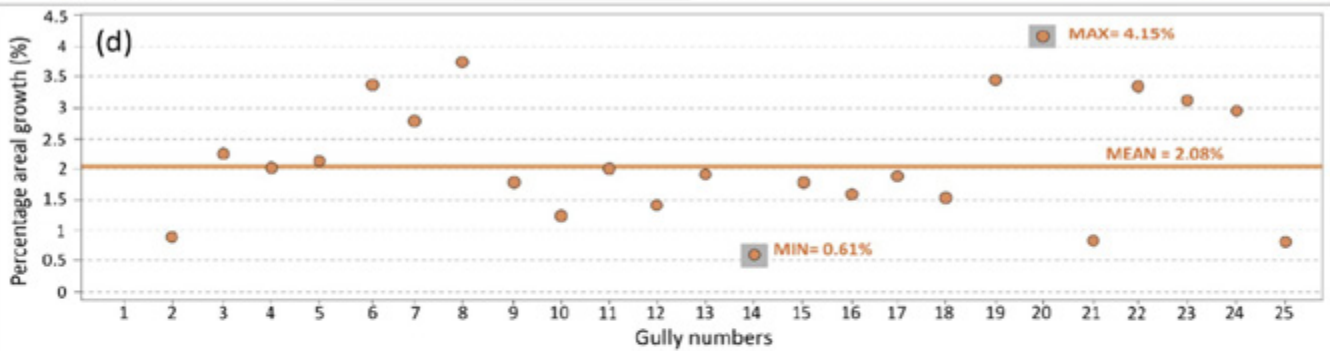
Assuming consistent erosion rates and spatially uniform gully expansion, the 2.3% (2579 ha) of arable land affected by erosive gullies in 2020 is projected to increase to 2.6% (2894 ha) under a conservative scenario, 3.28% (3652 ha) under an expected growth scenario, and 4.24% (4720ha) under a progressive scenario by 2040. This equates to a conservative loss of an additional 0.3%, an expected loss of 0.98%, and a progressive loss of 1.94% of arable land over the next 20 years.

Projections are based on the expansion of existing gullies documented in the Mthatha area in 2020. Actual land loss may thus be higher than projected if new





Spatially defined risk zones



gullies initiate or erosive drivers intensify. Conversely decreases in the projected values may occur as gullies reach their upslope limit of erodible regolith or become stabilised through vegetation growth. Additionally, projections assume a constant and uniform gully growth rate, however, multi-temporal analysis reveals that this is rarely the case. Rather, expansion rates fluctuate over time in response to complex and often unpredictable interactions between dynamic natural and anthropogenic drivers, that either accelerate or suppress gully growth and thus future soil loss risk at any given time. A major factor in accelerating growth rates, is climate cycles. The rate of erosion increases with rainfall events during or immediately after a dry climate cycle, droughts, or periods of below-average rainfall. Consequently, the future risk of arable land loss is also expected to be higher during these times especially when combined with anthropogenic pressures such as increases in population and livestock numbers. Conversely, that risk may be reduced during future wet climate cycles when the rate of erosion decreases and sufficient rainfall supports the growth of vegetation to stabilise and protect slopes against erosive elements, provided human activities, such as overgrazing are minimised.

While these projections can estimate the percentage future land loss from gully, it does not project where specifically that land loss will occur. Spatially, land immediately surrounding

encroaching gullies is assumed most at risk, as gullies expand laterally, upslope and underground through piping. While it is difficult to predict the exact spatial direction of gully growth, it is assumed that the severity of an area's risk to land loss decreases with increasing distance from the expanding gully margin. For example, an area located 10 m from a gully margin is at greater risk of eroding in the immediate short term, than an area situated 100 m away. Thus, under these assumptions, an area's spatial risk to land loss from encroaching gullies is defined by a set of buffered zones that incrementally increase in distance away from gully margins ranging within 25 m (very high risk) to 100-200 m (very low risk). In 2020, a total of 3.1% (34.6 km² or 3457.4 ha) of the area was at a very high risk, 3.3% (36.3 km² or 3633.4 ha) at high risk, 3.4% (37.4 km² or 3736.6 ha) at moderate risk, 3.4% (38 km² or 3797.1 ha) at low risk, and 13.4% (149.5 km² or 14947.6 ha) at very low risk in the Mthatha area. The remaining 73.4% of land is not at risk from encroaching gullies.

At first glance the spatial extent and projected loss of arable land could appear insignificant. However, the branching and interconnected dendritic morphology of these features has far-reaching implications on land use, extending well beyond their immediate footprint. This is because, erosional features dissect the surrounding landscape into smaller, disconnected sections. The fragmentation disrupts land management and farming

practices by dividing fields into smaller, less productive units, leaving many areas between gullies uneconomical to cultivate. The intervening zones often experience declining soil fertility, reduced accessibility for agricultural equipment or communities and eventually become degraded to the point of abandonment. Over time, the cumulative effect of fragmentation makes large portions land surrounding gullies unusable and significantly increase the proportion of land ultimately considered as sterilised.

These spatio-temporal estimates of projected risk of arable land loss are vital for guiding stakeholders and decision-makers in developing and implementing long-term conservation, monitoring, and intervention strategies to reduce gully growth and safeguard land for future generations.

Figure descriptions:

(a) Distribution of gullies in the Mthatha area alongside the 25 gullies selected for multi-temporal analysis. Buffered risk zones are defined at distances ranging from 25 m to 200 m from the marginal extent of erosional features. (b) Index map showing the location of the study area. (c) Example of a typical erosional gully in the Mthatha area. (d) Erosion rates of 25 selected gullies, expressed as percentage areal growth over the period 1938–2020. (e) Projected percentage land subjected to gully under 10- and 20-year minimum, mean and maximum growth rate scenarios. (f) The percentage of land within each of the buffered risk zones within the Mthatha area.

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