SASQUA

SOUTHERN AFRICAN SOCIETY FOR QUATERNARY RESEARCH

NEWSLETTER 2021/2022

A note **from the president**

After a long hiatus between SASQUA congresses, it was extra special to co-host the 23rd SASQUA Congress, in the magnificent location of St Lucia, Kwa-Zulu Natal. I'd like to extend a big thank you from the whole SASQUA community to Jemma Finch (Local Organizing Chair) for her excellent work organizing and running the congress. Many delegates came up to me throughout the course of the congress and commented that it was the best SASQUA yet!

I was particularly happy to see so many students and ECRs in attendance and to see them networking and engaging with the community. Their attendance at the congress was primarily due to generous support from GENUS and SPLOSH- INQUA. We are very grateful to them for swiftly mobilizing funds for us. I look forward to having this reinvigorated student/ECR contingent continue to engage with, and start to lead, SASQUA activities.

I hope we can continue to build our community by maximizing both in-person and virtual initiatives across local, regional and international spaces, with a possible second online SASQUA seminar series and the INQUA Congress in Rome coming up next year.

Remember to keep an eye on our website and social media pages for the latest updates, news and ECR opportunities:

Website: https://sasqua.co.za/

Twitter: @SASQUA1 | Facebook | YouTube Channel

I would like to thank the outgoing committee for their dedication to SASQUA over the last four years and wish Hayley Cawthra and her team the very best for the next inter-congress period.

Thanks also go to Nadia du Plessis, our Newsletter Editor for putting together this edition.

Best wishes

Lynne Quick

Nelson Mandela University

SASQUA 23rd Congress

The Southern African Society for Quaternary Research (SASQUA) XXIII Biennial Congress, St Lucia, KwaZulu-Natal, 25 – 30 September 2022

Venue:

The St Lucia Ecolodge

Organisers:

Dr Lynne Quick (SASQUA president), Nelson Mandela University, and Dr Jemma Finch (local organising chair and host), UKZN.

Awards:

Best student presentation Gemma Poretti, University of Cape Town PhD student

Best student poster Jean Baverstock, UKZN MSc graduate

Plenary speakers:

Dr Tyler Faith, University of Utah

Prof. Judy Sealy, University of Cape Town

Dr Hayley Cawthra, Council for Geoscience and Nelson Mandela University

Delegates:

Total of 59 delegates, 63% female, 58% early career

Including delegates based in the following countries: China, Germany, France, Israel, Spain, USA

plus foreign delegates based in SA from Madagascar, Nigeria, Zimbabwe

Funding:

12 early career researchers, including 4 students and postdocs from UKZN, were sponsored by GENUS Centre of Excellence for Palaeosciences and the International Union for Quaternary Research (INQUA) Submerged PalaeoLandcapes Of the Southern Hemisphere (SPLOSH) project

Sponsorship:

We are grateful to the following generous sponsors: DLD Scientific, Separations, the South African Journal of Science, the University of KwaZulu-Natal.

Programme:

Social highlights included the Hippo and Croc boat cruise along the St Lucia Estuary as an icebreaker, and the conference dinner under the stars at the St Lucia Ski Boat Club. The mid conference field excursion entailed a full tour along of the Eastern and Western Shores of Lake St Lucia on open game vehicles. We visited geological formations from Cape Vidal and Mission Rocks, as well as the Makakatana overview under the guidance of Dr Greg Botha from the Council for Geoscience. We were spoilt with many game sightings, and entertained by breaching whales.

KZN location:

St Lucia, the gateway to the magnificent iSimangaliso Wetland Park – a World Heritage site.

Comments from organisers:

Dr Quick: *We particularly enjoyed the participation of a dynamic and engaging student body*

Dr Finch: *St Lucia is very close to my heart, being the area where I started my career as a palaeoscientist. It was a privilege for our lab to host the SASQUA community here in KZN, and particularly in the St Lucia area, where we were shown geological evidence of Quaternary processes such as sea level fluctuation, dune formation, and were able to discuss evolution of the lake itself.*

Comments from young delegates:

Asithandile Ntsondwa: *SASQUA was a great interactive conference that included a diverse group of researchers from archaeologists to palynologists. As it was my first academic conference, it was worth the while and I hope to stay in touch with the great community that is SASQUA.*

Selina Clark: *The SASQUA 2022 conference was an amazing opportunity to learn and engage with researchers both from SA and beyond. This was one of my first conferences that I have attended and it shall not be the last.*

Gemma Poretti (winner of the best student presentation): *It was a great introduction to the rich interdisciplinary community that is SASQUA. I had an amazing time meeting new people and sharing ideas in such a beautiful place.*

Congress report compiled by: Jemma Finch

Photographs: Brian Chase & Lynne Quick

SASQUA Committee (2022 – 2024)

President	Hayley Cawthra (Council for Geoscience, Nelson Mandela University)
Vice President	Marc Humphries (University of the Witwatersrand)
Past President	Lynne Quick (Nelson Mandela University)
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SASQUA Committee (2019 – 2022)

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Michael Meadows

Lynne Quick

Hayley Cawthra

Margaret Avery

Brian Chase

Jemma Finch

Busiswa Molefe (NRF)

SASQUA Members in INQUA leadership roles (2019 – 2023)

INQUA Executive Council, Vice President: Lynne Quick

Coastal and Marine Processes (CMP) Advisory Board member: Andrew Green

Stratigraphy and Chronology (SACCOM) Advisory Board member: Greg Botha

INQUA – SPLOSH Project: Hayley Cawthra, Andrew Green

INQUA Mapping Ancient Africa Project: Lynne Quick

News and recent publications from our community

Greg Botha

Council for Geoscience

Bernini, A., Bosino, A., **Botha, G.A.**, Maerker, M. 2021. Evaluation of Gully Erosion Susceptibility Using a Maximum Entropy Model in the Upper Mkhomazi River Basin in South Africa. ISPRS International Journal of Geo-Information, 10(11), 729; https://doi.org/10.3390/ijgi10110729

Botha, G.A. 2021. Cenozoic stratigraphy of South Africa: current challenges and future possibilities. South African Journal of Geology, 124/4, 817-842. doi:10.25131/ sajg.124.00541

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Wind erosion susceptibility modelling along the Eastern Cape Wild Coast, South Africa

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ABSTRACT

Wind erosion is a major driver of land degradation, impacting more than a third of all land areas in recent centuries. It has been estimated that approximately 19% of lands in Europe are moderately to highly susceptible to wind erosion, whilst up to 25% of East and Southern Africa are at moderate to elevated risk of soil erosion. Along the eastern seaboard of South Africa, accelerated wind erosion has led to severe, localised land degradation in parts of the Wild Coast.

In data sparse regions where conventional wind erosion modelling is difficult, mitigation of the devastating impacts associated with accelerated wind erosion could be facilitated by the identification of highly susceptible areas. Therefore, the study objectives were to map the regional wind erosion susceptibility conditions and identify vulnerable areas. In this study, general concepts of the Wind Erosion Equation were adopted. Two regional susceptibility methods were implemented and compared. Model 1 employed a geostatistical approach, based on erosion factor class frequency ratio data and Analytical Hierarchy Process importance weights. Model 2 utilised the data driven Weights of Evidence modelling technique. Model 1 has classified large areas of the study area as having low susceptibility (46%) whilst Model 2 classed more than 90% of the areas as very low susceptible zones. Both models show that less than 4% of the study region has a high to very high susceptibility to wind erosion. In general, areas associated with a higher wind erosion susceptibility are poorly vegetated, wind exposed coastal zones that are characterized by unconsolidated, erodible sandy soils. Model 1 and Model 2 are associated with area under the receiver operating characteristic curve values of 0.937 and 0.946 respectively, displaying satisfactory average performances.

The employed modelling approaches provide an effective means to assess regional wind erosion susceptibility in coastal environments worldwide.

Bosino, A., Bernini, A., **Botha, G.A.**, Bonacina, G., Pellegrini, L., Omran, A., Hochschild, V., Sommer, C., Maerker, M. 2020. Geomorphology of the upper Mkhomazi River basin, KwaZulu-Natal, South Africa, with emphasis on late Pleistocene colluvial deposits. Journal of Maps, 17:3, 5-16, DOI: 10.1080/17445647.2020.1790435

Andersen, T., **Botha, G.A.**, Elburg, M.A. 2020. A late Mesozoic – early Cenozoic sedimentary recycling system on the Gondwana rifted margin of SE Africa. South African Journal of Geology. South African Journal of Geology (2020) 123 (3): 343–356. https://doi.org/10.25131/sajg.123.0023

Hayley Cawthra

Council for Geoscience Geophysics and Remote Sensing Unit; Nelson Mandela University African Centre for Coastal Palaeoscience

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The CGS' Marine Geoscience Programme which I lead has been focused lately on mapping offshore faults in the southwestern Cape, where several recent episodes of seismicity have prompted a structural geology investigation of the seafloor. We are trying to determine whether any of the large faults out there are active, or likely to 'slip'. We have completed a 1:50,000 scale geological onshore-offshore sheet in Table Bay, and are currently working in and around False Bay.

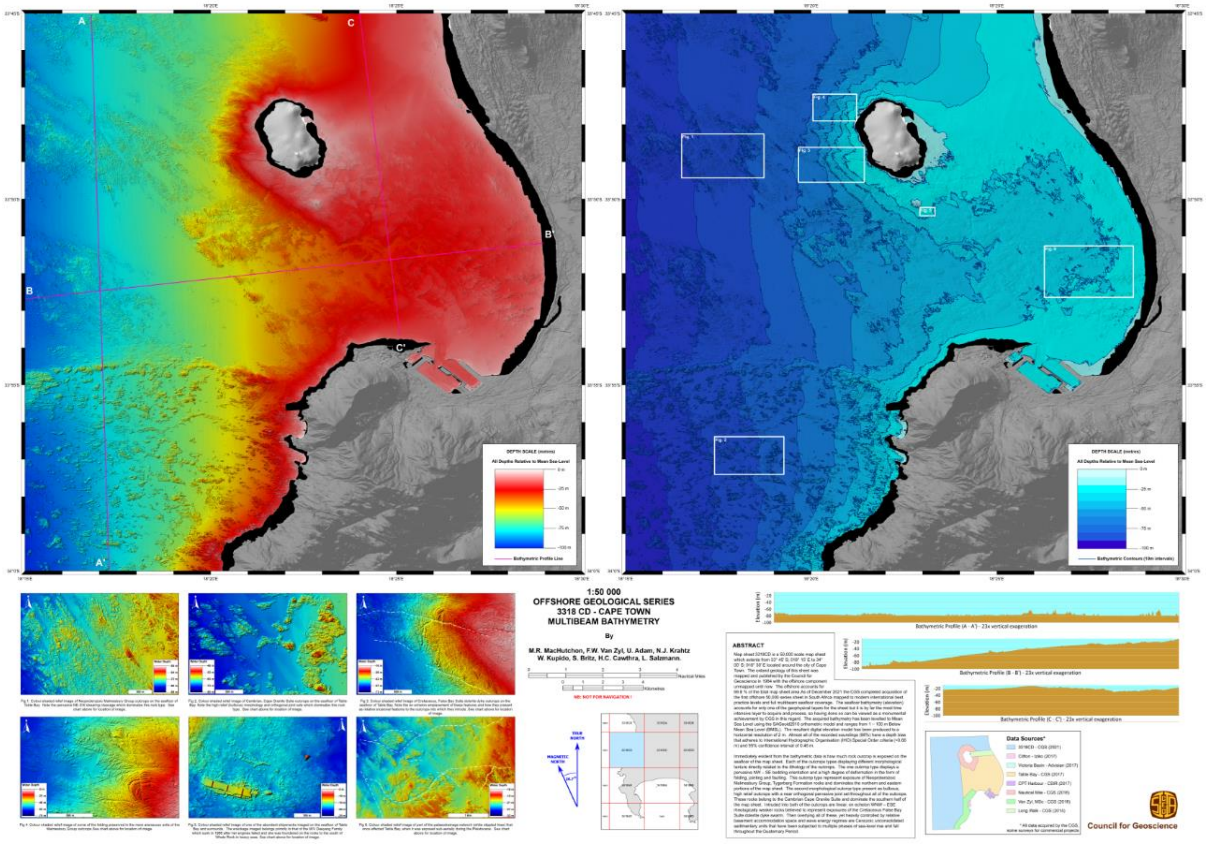

Figure. Multibeam bathymetry in Table Bay.

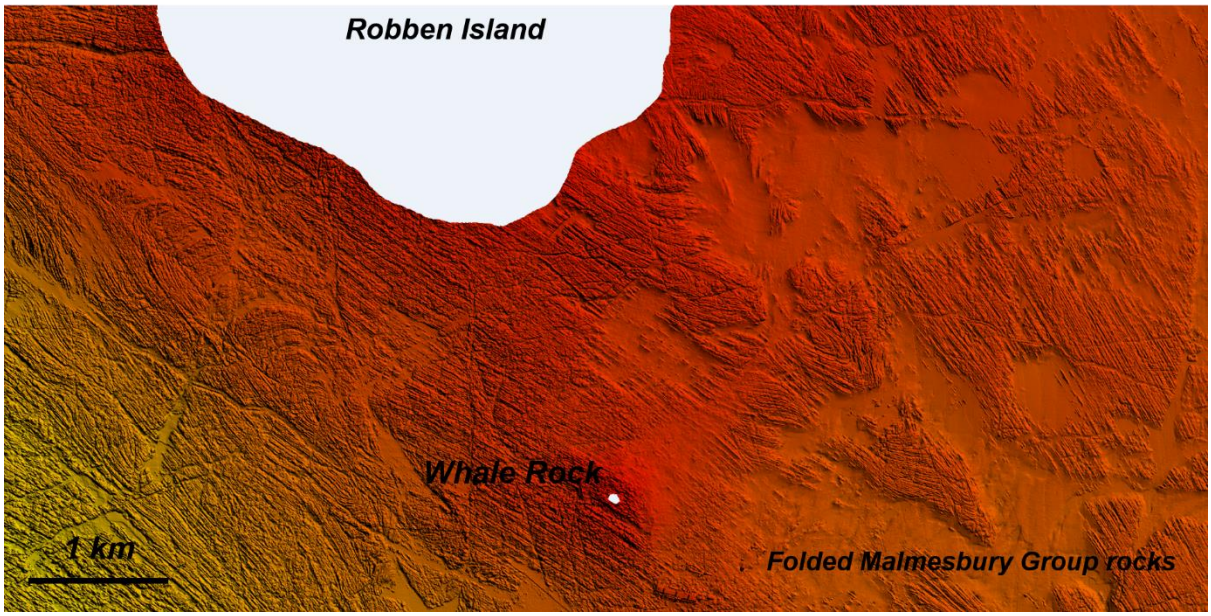

Figure. Zoomed data, showing geological structures in Proterozoic rocks (the Malmesbury Group) on the seafloor. Note the distinct lack of sediment!

For the NRF African Coelacanth Ecosystem Programme, my colleagues & interns at the CGS and I mapped submarine canyon habitats on the Wild Coast shelf in 2021 using a boomer sub-bottom profiler. There are 18 incised canyons offshore of just about all rivers extending from the Umngazana to the Mtentu rivers and we are attempting to map these habitats.

PhD student and then CGS intern Talicia Pillay graduated in 2021 from NMU, and she developed an algorithm that uses machine learning to determine benthic habitats on the seafloor. Backscattered, rather than reflected, sonar beams were worked on and their behaviour with different groups of biota were correlated by Talicia. She now works in our team at the CGS and has published several papers on this topic.

I continue to work on the South Coast shelf and coastal plain and most of that work in the last year has been led by Charles Helm, who specialises in cemented hominin and animal trackways in coastal aeolianites and beachrock. More than 300 trackways are now recorded, and we are working to establish their context, means of preservation, and age.

Figure. Trackway of an extinct Cape Buffalo.

With Gavin Rishworth and a team of collaborators, we are investigating stromatolites on the South African coast and we have an ongoing UK-funded project, too, that considers these deposits in the UK, Australia and Australia. Check out 'Supratidal Spring-fed Living Microbialite Ecosystems – SSLiME project' for ongoing local work (https://www.researchgate.net/project/Supratidal-Spring-fed-Living-Microbialite-Ecosystems-SSLiME)

On the Mpondoland Paleoclimate, Paleoenvironment, Paleoecology, and Paleoanthropology Project (P5), our team of Erich Fisher, Irene Esteban, Justin Pargeter and I are conducting research in rock shelters and on the landscape between Waterfall Bluff and the Mtentu River. (https://p5project.org/)

With Jemma Finch, Finn Vieberg, Kelly Kirsten Delaney and Lauren Pretorius, we organised a summer school in 2021 that took eight African students through coring, sampling and mapping methods in KwaZulu-Natal and the Western Cape. (https://caes.ukzn.ac.za/news/summer-school-trains-students-in-applied-earth-and-aquatic-sciences/) An exciting outcome was a Jive Media Science Spaza worksheet and short videos.

The Submerged Palaeolandscapes of the Southern Hemisphere (SPLOSH) network, funded by INQUA from 2020-2023, aims to develop a Southern Hemisphere network that illuminates drowned landscapes on continental shelves. (https://www.uwa.edu.au/schools/Research/SPLOSH)

Publications since the last SASQUA newsletter:

1. Oertle, A., Szabo, K., Gaqa, S., **Cawthra, H.C.**, Esteban, I., Pargeter, J., Fisher, E.C., 2022. Peering into the unseen: novel methods in identifying shell taxa from archaeological micro-fragments. Journal of Archaeological Science 147, 105667. https://doi.org/10.1016/j.jas.2022.105667
2. Cooper, J.A.G., Smith, A., Rishworth, G., Dodd, C., Forbes, M., **Cawthra, H.**, Anderson, C., 2022. Microbialites of modern siliciclastic rock coasts. Sedimentary Research 92, 619-634. DOI: 10.2110/jsr.2021.071
3. Helm, C.W., Carr, A.S., **Cawthra, H.C.**, De Vynck, J.C., Dixon, M., Stear, W., Stuart, C., Stuart, M., Venter, J., 2022. Possible Pleistocene Pinniped Ichnofossils on South Africa's Cape South Coast. Journal of Coastal Research 38(4), 735-749. DOI: 10.2112/JCOASTRES-D-21-00131.1
4. Ward, I., Bastos, A., Carabias, D., **Cawthra, H.C.**, Farr, H., Green, A., Sturt, F., 2022. Submerged Palaeolandscapes of the Southern Hemisphere (SPLOSH) – What is emerging from the Southern Hemisphere. World Archaeology (RWAR). https://doi.org/10.1080/00438243.2022.2077822
5. Wiles, E.A., Loureiro, C., **Cawthra, H.C.**, 2022. Shoreline variability and coastal vulnerability: Mossel Bay, South Africa. Estuarine, Coastal and Shelf Science 268, 107789. https://doi.org/10.1016/j.ecss.2022.107789
6. **Cawthra, H.C.**, Jacobs, Z., Wadley, L., 2022. Winds of change: Climate variability in a mild glacial on the east coast of South Africa, inferred from submerged aeolianites and the archaeological record of Sibudu. Quaternary International 638-639, 23-36. https://doi.org/10.1016/j.quaint.2022.03.014
7. Lockley, M.G., Helm, C.W., **Cawthra, H.C.**, De Vynck, J.C., Dixon, M.G., Venter, J.A., 2022. Pleistocene small-mammal and arthropod trackways from the Cape south coast of South Africa. Quaternary Research 107, 178-192. doi:10.1017/qua.2021.77
8. Rivers, N., Truter, H.J., Strand, M., Jay, S., Portman, M., Lombard, A.T., Amir, D., Boyd, A., Brown, R.L., **Cawthra, H.C.**, Faure Beaulieu, N., Findlay, K., Gal, G., Grossmark, Y., Perschke, M.J., Pillay, T., Pyrgies, O., Ramakulukusha, M., Smit, K.P., Stockdale, V., Stockill, J., Schwartz, I., Treibitz, T., Vargas-Fonseca, O.A., Vermeulen (Miltz), A., 2022. Shared visions for marine planning: insights from Israel, South Africa and the United Kingdom. Ocean and Coastal Management 220, 106069. https://doi.org/10.1016/j.ocecoaman.2022.106069
9. Helm, C.W., **Cawthra, H.C.**, De Vynck, J.C., Hattingh, R., Lockley, M.G., 2022. Possible Pleistocene hominin tracks from South Africa's west coast. South African Journal of Science 118(1/2), 96-99. https://doi.org/10.17159/sajs.2022/11842
10. **Cawthra, H.C.**, 2022. The offshore geology of Mossel Bay. Explanation: onshore-offshore sheet 3422AA. Scale 1:50,000. 66 pp. ISBN 978-1-990942-11-2
11. Bailey, G., **Cawthra, H.C.**, in press. The significance of sea-level change and ancient submerged landscapes in human dispersal: A geoarchaeological perspective. Oceanologia. https://doi.org/10.1016/j.oceano.2021.10.002
12. Ward, I., Farr, H., **Cawthra, H.C.**, Green, A., Bastos, A., Carabias, D., 2021. SPLOSH – an international focus group on submerged palaeolandscapes of the Southern Hemisphere. Quaternary Perspectives 31, 6-8.
13. **Cawthra, H.C.**, Bergh, E., Wiles, E.A., Compton, J.S., 2021. Late Quaternary deep marine sediment records off southern Africa. South African Journal of Geology 124(4), 1007-1032. https://doi.org/10.25131/sajg.124.0059
14. Malta, J., Castro, J.A.W., Cabral, C.L., Fernandes, D., **Cawthra, H.C.**, 2021. Genesis and age of beachrocks on the Rio de Janeiro coastline, Southeast Brazil. Marine Geology 442, 106649. https://doi.org/10.1016/j.margeo.2021.106649

15. Pillay, T., **Cawthra, H.C.**, Lombard, A.T., 2021. Integration of machine learning using hydroacoustic techniques and sediment sampling to refine substrate description in the Western Cape, South Africa. Marine Geology 440, 106599. https://doi.org/10.1016/j.margeo.2021.106599
16. Pillay, T., **Cawthra, H.C.**, Lombard, A.T., Sink, K., 2021. Benthic habitat mapping from a machine learning perspective on the Cape St Francis inner shelf, Eastern Cape, South Africa. Submitted to Marine Geology 440, 106595. https://doi.org/10.1016/j.margeo.2021.106595
17. Helm, C.W., Lockley, M.G., Moolman, L., **Cawthra, H.C.**, De Vynck, J.C., Dixon, M.G., Stear, W., Thesen, G.H.H., 2021. Morphology of Pleistocene elephant tracks on South Africa's Cape south coast and probable elephant trunk drag impressions. Quaternary Research. https://doi.org/10.1017/qua.2021.32
18. Hahn, A., Neumann, F.H., Miller, C., Finch, J., Frankland, T., **Cawthra, H.C.**, Schefuß, E., Zabel, M., 2021. Mid-to Late Holocene climatic and anthropogenic influences in Mpondoland, South Africa. Quaternary Science Reviews 261, 106983. https://doi.org/10.1016/j.quascirev.2021.106938
19. Helm, C.W., **Cawthra, H.C.**, De Vynck, J.C., Helm, C.J.Z., Rust, R., Stear, W., 2021. Palaeoart on South Africa's Cape South Coast. South African Journal of Art History 35(2), 53-66. ISSN 0258-3542
20. Helm, C.W., **Cawthra, H.C.**, De Vynck, J.C., Helm, C.J., Rust, R., Stear, W., 2021. Large geometric patterns from the Middle Stone Age in aeolianites on the Cape South Coast, South Africa. Rock Art Research 38, 10-22. RAR 38-1343
21. Helm, C.W., **Cawthra, H.C.**, Cowling, R.M., De Vynck, Lockley, M.G., Marean, C.W., Dixon, M.G., Helm, C.J.Z., Stear, W, Thesen, G.H.H., Venter, J.A., 2021. Protecting and preserving South African aeolianite surfaces from graffiti. Koedoe 63(1), 1656. https://doi.org/10.4102/ koedoe.v63i1.1656
22. Helm, C.W., **Cawthra, H.C.**, De Vynck, J.C., Dixon, M., Stear, W, 2021. Elephant tracks: a biogenic cause of potholes in Pleistocene South African coastal rocks. Journal of Coastal Research 37(1), 59-74. 10.2112/JCOASTRES-D-20-00064.1
23. Lockley, M., Helm, C.W., **Cawthra, H.C.**, De Vynck, J.C., Perrin, M., 2021. Pleistocene golden mole sand-swimming trace fossils from the Cape South- and Southeast coastlines of South Africa. Quaternary Research 1–18. https://doi.org/10.1017/qua.2020.97

Antonieta Jerardino

Department of Anthropology and Archaeology; School of Humanities; University of South Africa

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Jerardino, A. 2022. Human resilience in the face of mid-Holocene climate change on the central west coast of South Africa. Journal of African Archaeology 20 (1): 1–20. DOI:10.1163/21915784-bja10011.

Abstract

After the Last Glacial Maximum, important yet milder climatic trends continued to characterise the Holocene. None of them was more challenging to forager groups in the central west coast of South Africa than the mid-Holocene Altithermal (8200–4200 cal BP). Hot and dry weather and 1–3 m higher sea levels were thought once to have barred local foragers from this region because of a lack of sites dating to this period. Instead, this initial scenario reflected largely a sampling problem. Steenbokfontein Cave is one of a few sites with some of the largest mid-Holocene deposits, allowing insights into forager adaptations during this period. Results show high mobility over large distances

and a terrestrial diet mostly dependant on small bovids, complemented with fewer coastal resources. Stone tool kits and lithic raw materials among various sites suggest that much evidence for mid-Holocene occupation is actually found near the local riparian systems.

Michael Meadows

University of Cape Town, South Africa; Nanjing University, China

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New position: I have been appointed as Professor in the School of Geography and Ocean Sciences, Nanjing University, China, from 1 July 2022 to 30 June 2025.

Award: Elected as Foreign Fellow of the Geographical Society of China in May 2022

David J. Nash

School of Applied Sciences, University of Brighton, UK; School of Geography, Archaeology & Environmental Studies, University of the Witwatersrand, South Africa

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The last year has seen a continuation of my research into climates of the past 2000 years, including work specific to southern Africa. I have also continued to publish on aspects of geomorphology and archaeology relevant to southern African researchers. This includes the first two papers arising from the Leverhulme Trust funded "Landscape archaeology of the Kalahari" project, with at least four more papers to come in 2023.

2022 publications on Quaternary geomorphology and archaeology

Burrough, S.L., Thomas, D.S.G., Allin, J., Coulson, S.D., Mothulatshipi, S., NASH, D.J. & Staurset, S. (2022) Lessons from a lakebed: unpicking hydrological change and early human landscape use in the Makgadikgadi Basin, Botswana. ***Quaternary Science Reviews*** **291: 107662. https://doi.org/10.1016/j.quascirev.2022.107662**

The intersection of archaeological material with the landscape is investigated using OSL dating of landforms associated with Middle Stone Age (MSA) archaeology in the Makgadikgadi basin, Botswana. In this study, MSA archaeological sites on the Makgadikgadi pan floor date to two dry periods in the basin during the late Quaternary. Site formation at one site occurred during dry, or seasonally dry conditions that followed a period of high lake levels between 128 ± 18 ka and 81 ± 6 ka. The site was buried by sediments from a subsequent period of high lake levels dating to between 72 ± 5 ka and 57 ± 8 ka. At other investigated sites, the archaeological material was most likely deposited during a second dry period sometime after this. Overlying dunes are much younger (late Holocene) than the late Pleistocene lakebed sediments associated with the archaeological sites. Rapid burial of the archaeological sites by clayey sands has resulted in limited disturbance and weathering of archaeological material which appears to have only been exposed very recently, perhaps in the last 350 years when conditions have been particularly dry and susceptible to deflation. The spatial

patterning of both sediment accumulation and deflation strongly influences archaeological visibility both within and around the Makgadikgadi basin.

Coulson, S.D., Staurset, S., Mothulatshipi, S., Burrough, S.L., NASH, D.J. & Thomas, D.S.G. (2022) Thriving in the Thirstland: new Stone Age sites in the Middle Kalahari, Botswana. *Quaternary Science Reviews* 291: 107695. https://doi.org/10.1016/j.quascirev.2022.107695

This paper documents the abundance of Stone Age finds in the Middle Kalahari, both through earlier publications and newly documented sites. Results of several decades of Stone Age research are presented through a variety of projects and placed within the context of previous archaeological investigations in the region. We argue for the importance of open-air sites in constructing a more representative picture of prehistoric behaviour in the interior of southern Africa.

NASH, D.J. (2022) Dry valleys (*mekgacha*), in Eckardt, F.D. (ed.) *Landscapes and Landforms of Botswana*. Springer, Heidelberg, pp.179-199. https://link.springer.com/book/10.1007/978-3-030-86102-5

Conventional rivers are absent from much of Botswana, with only the Okavango, Chobe and Zambezi systems in the extreme north containing perennial flowing water. Ephemeral rivers occur in the eastern hardveld, but the most extensive components of the surface drainage are the networks of fossil or dry valleys (termed *mekgacha* in Setswana and *dum* in various San languages) that cross the sandveld. This chapter presents the first holistic review of current knowledge about these enigmatic landforms. It does so using a range of evidence types, from radar remote-sensing to the analysis of historical documents written by missionaries and explorers. The chapter considers dry valley distribution, morphology, and contemporary and historical hydrology before discussing valley evolution over longer timescales. It concludes with a synthesis of the main arguments concerning how dry valley systems may have formed, including the balance between conventional fluvial incision and processes such as groundwater seepage erosion.

NASH, D.J. (2022) Calcretes, silcretes and intergrade duricrusts, in Eckardt, F.D. (ed.) *Landscapes and Landforms of Botswana*. Springer, Heidelberg, pp.223-246. https://link.springer.com/book/10.1007/978-3-030-86102-5

Calcretes and silcretes are the most widely encountered 'rocks' in the Kalahari sandveld that covers much of Botswana. This chapter presents the first holistic overview of current knowledge about these duricrusts at a national scale. It does so by considering the distribution, classification, macromorphology, geochemistry and mineralogy of each duricrust type in turn, alongside various models used to explain their formation. The chapter then reviews our understanding of a variant of duricrust encountered more in the Botswana Kalahari than anywhere else in the world – the silcrete-calcrete intergrade duricrust. The chapter concludes with a summary of knowledge about the age of duricrusts in Botswana before pointing to potential directions for future research.

2022 publications on historical climatology

Adamson, C.J.D., NASH, D.J. & Grab, S.W. (2022) Quantifying and reducing researcher subjectivity in the generation of climate indices from documentary sources. *Climate of the Past* 18: 1071-1081. https://doi.org/10.5194/cp-18-1071-2022

The generation of index-based series of meteorological phenomena, derived from narrative descriptions of weather and climate in historical documentary sources, is a common method to reconstruct past climatic variability and effectively extend the instrumental record. This study is the first to explicitly examine the degree of inter-rater variability in producing such series, a potential source of bias in index-based analyses. Two teams of raters were asked to produce a five-category annual rainfall index series for the same dataset, consisting of transcribed narrative descriptions of meteorological variability for 11 'rain-years' in nineteenth-century Lesotho, originally collected by Nash and Grab (2010). One group of raters (n = 71) comprised of students studying for postgraduate qualifications in climatology or a related discipline; the second group (n = 6) consisted of professional meteorologists and historical climatologists working in southern Africa. Inter-rater reliability was high for both groups, at r = 0.99 for the student raters and r = 0.94 for the professional raters, although ratings provided by the student group disproportionately averaged to the central value (0: normal/seasonal rains) where variability was high. Back-calculation of intraclass correlation using the Spearman-Brown prediction formula showed that a target reliability of 0.9 (considered 'excellent' in other published studies) could be obtained with as few as eight student raters, and four professional raters. This number reduced to two when examining a subset of the professional group (n = 4) who had previously published historical climatology papers on southern Africa. We therefore conclude that variability between researchers should be considered minimal where index-based climate reconstructions are generated by trained historical climatologists working in groups of two or more.

Micropalaeontology-Applied Palynology Research Group

North-West University

The North-West University, Potchefstroom Campus, appointed four new geology staff members and a postdoc with micropalaeontology and palynology expertise this year. This is an exciting addition to NWU Geology Soil Science and allows, for the first time, for micropalaeontological research to be undertaken at this university. New micropalaeontology laboratories and facilities are currently being planned and slowly taking shape. The addition of these new fields at NWU will provide our students with the opportunity to explore more opportunities in the oil, mining, marine geology, climate and environmental consulting industries. It also adds value in terms of public health (aerobiology > respiratory diseases) and honey quality testing.

1. Dr Eugene Bergh

Eugene joined NWU as a Senior Lecturer in June this year and will continue his research in late Cenozoic palaeoenvironmental change. He mainly focuses on the use of sediments and microfossils, such as foraminifera in marine and coastal areas, to date rocks and sediments, and to understand how environments and climates change over time.

He is still supervising students (remotely) at the Cape Town universities with various colleagues. Their projects range from assessing modern and Neogene-Quaternary environmental change to determining how sea surface temperatures have changed under glacial-interglacial influences. Eugene is also continuing to extend his collaborations, both locally and abroad. In May this year, he travelled to France to strategise on how we can grow our collaborative research. Since joining NWU, he has also begun talks on future projects with Prof. Frank Neumann, who also joined NWU earlier this year and with British, American and German colleagues. He will also continue to work further with Dr Hayley Cawthra from the Council of Geoscience. These collaborative projects will focus on understanding sedimentary dynamics and Quaternary climate-ocean dynamics along the margins of southern Africa and Brazil. In September he will present his work in Lima, Peru at the Eastern Boundary Upwelling Systems conference.

Publications for 2022

Bergh, E., and Compton, J. 2022. Taxonomy of Middle Miocene foraminifera from the northern Namibian continental shelf. *Zootaxa* 5091(1): 1-55.

Bergh, E., and Compton, J. In review. Palaeoceanographic and palaeoenvironmental controls on late Quaternary benthic foraminifera of the western continental slope of South Africa. Marine Micropalaeontology.

Conference abstracts 2022

Bergh, E. 2022. Late Quaternary Palaeoceanographic Fluctuations associated with glacial-interglacial cycles along the western margin of South Africa. EBUS 2022. Lima, Peru.

Walsh, J.T., **Bergh, E.**, and Fietz, S. 2022. Plio-Pleistocene palaeoceanography of the western continental shelf of southern Africa under the influence of the Benguela Upwelling System. EBUS 2022. Lima, Peru.

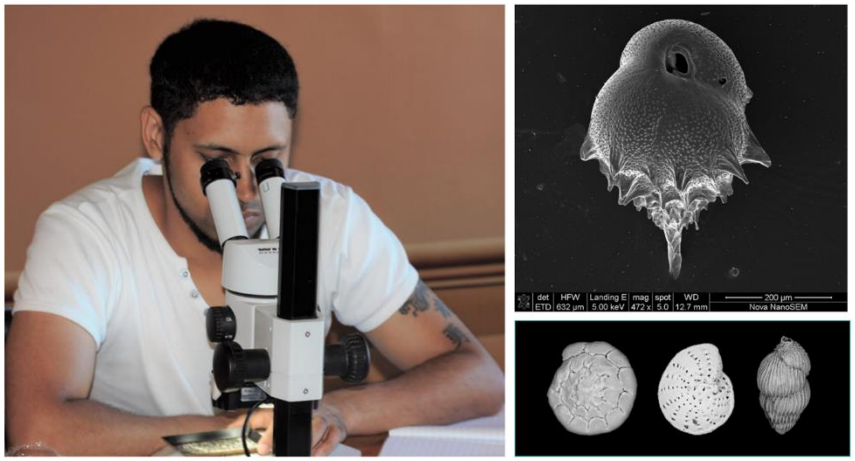

Figure 1. *(left) Eugene Bergh looking at sediments hosting microfossils under a microscope. Top right) Scanning electron microscope (SEM) image of a Bulimina aculeata specimen. Bottom left) SEM images of Ammonia batava, Elphidium advenum and Uvigerina peregrina from the Namibian continental margin. SEM images taken with University of Cape Town Nova NanoSEM.*

Palynology at NWU

Prof. Frank Neumann, Moteng Moseri, Nikiwe Ndlovu and Dorra Gharbi all joined NWU this year as well. Their research expertise is in palynology and they will focus on different aspects of palynology, including, aeropalynology/aerobiology, palaeopalynology and melissopalynology.

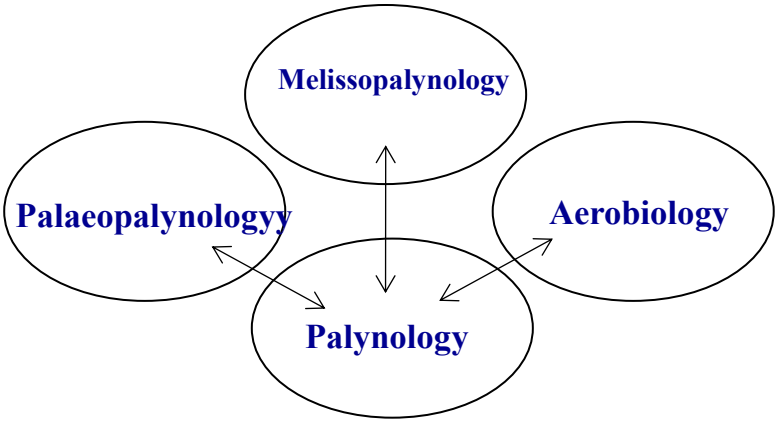

Figure 2. *Applications of Palynology at NWU*

2. Dr Dorra Gharbi

Dorra Gharbi joined NWU this year from Tunisia and completed her PhD at the University of Malaga, Spain. She is an aerobiologist and her main research interest concerns aerospora analysis time-series, its relationship with meteorology, and climate change. In August 2022, Dorra started postdoctoral studies under the supervision of Prof. Frank Neumann and will focus on aerobiology. Aerobiology is the science which is studying the sources, dispersion, and effects of airborne biological materials, such as pollen, spores, and microorganisms. Monitoring airborne allergenic pollen is important for healthcare professionals and allergic persons to manage treatment and avoid exposure to pollen allergens. Regional and national networks routinely monitor the aerobiological content of the atmosphere and provide information in the form of alerts and forecasts. Following the worldwide pattern, the South African Pollen monitoring Network (SAPNET) was created in 2019, and weekly information was provided to the public audience www.realpollencount.co.za. With the same objective, a project has been started to investigate bioaerosol diversity and dynamics in North-West Province in the research group CCAQI (Climate Change and Air Quality). A 7-day volumetric spore trap will be installed on the Potchefstroom NWU campus, and another will run on the Mafikeng campus, to study the spatial and temporal variations in airborne allergenic pollen and fungal in the atmosphere. This information is important for healthcare professionals and allergic persons to manage treatment and avoid exposure to pollen allergens. Not only, but in addition, the aim is to explain the airborne pollen and ecology of plants, the effect of climate change on phenology and its correlation with meteorology.

Figure 3. Aerobiological sampling of airborne pollen and fungal spores during the Comrades Marathon 28/08/2022 taking part by North-West University research group. a. *Curvularia* sp, b. *Drechslera* sp. The runner's exposure to allergenic aerospora can be associated with risk of respiratory symptoms.

Publications for 2022

Gharbi, D., Mobayed, H., Mohammed, A.R., Tuffaha, A., Dason, R., Ibrahim, T., Adeli, M., Sattar, A.H., Trigo, M.M., Al-Nesf, M. First volumetric records of airborne Cladosporium and Alternaria spores in the atmosphere of Al Khor (northern Qatar): a preliminary survey. Aerobiologia. 2022.

Al-Al Nesf M, **Gharbi D**, Mobayed H, Mohammed AR, Tuffaha A, Dason R, Adeli M, Sattar AH, Trigo MM. Aerobiological monitoring in a desert type ecosystem/ Two sampling stations of two cities (2017-2020) in Qatar. Plos one. 2022; 17(7), e0270975.

Al-Nesf M, **Gharbi D**, Mobayed H, Mohammed AR, Tuffaha A, Dason R, Adeli M, Sattar AH, Trigo MM. The correlation between middle schoolchildren allergic symptoms and airborne particle season- a cross sectional study. Medicine Journal. 2022; 101 (17): e2910.

Gharbi D, Al-Nesf M, Trigo MM. First Allergy Conference 2022. Doha, Qatar. Do we need aerobiological air monitoring in desert climates? Qatar experience. Qatar Medical Journal. 2022; 2:28.

3. Nikiwe Ndlovu

Nikiwe Ndlovu joined NWU as a Laboratory Assistant but also plans to pursue their academic career. They have completed their M.Sc. at the University of the Witwatersrand and have since been publishing. The project was aiming at analysing the seasonal shift in the pollen composition of honey samples taken from 15 hives in the Kruger National Park. The results were compared to a set of sediment surface samples from the same locality in order to understand pollination pathways in the savanna.

Melissopalynology studies the pollen composition in honey samples, as this reveals the geographical and botanical origin of the samples. This information is used to determine the regional climatic conditions that contribute to pollen transportation, dispersion, and deposition in the ecosystem and as a result shedding light on pollination pathways. This allows for quantitative analysis of the adulteration of South African honey. Thus far a basic debut quantitative honey pollen analysis outline has been performed using melissopalynology for the Savanna biome of the Greater Kruger National Park. Environmental factors like seasonality, landscape, and vegetation distribution contribute to differences in honey samples and these differences need to be considered in different southern African biomes. This sprouts a new tool for establishing a fundamental understanding of the contribution of southern African vegetation to locally produced honey and creating a reliable tool for food quality investigations, e.g., the analysis of honey adulteration specifically suitable for different biomes in South Africa.

Publications for 2021/2022

Ndlovu, N., Henley, M.D., Cook, R.M. and Neumann, F.H., 2021. Melissopalynology uncovering pollen diversity within the Lowveld honey. The South African Bee Journal, 93(2), pp. 68-72.

Ndlovu, N., Neumann, F.H., Henley, M.D., Cook, R.M. and Reynolds, C., 2022. Melissopalynological investigation of seasonal honey samples from the Greater Kruger National Park, South Africa. Palynology Journal, Pending publication.

Ndlovu, N., 2022. Investigation of Pollination Pathways in the Savanna Biome of the Kruger National Park, South Africa - a Potential Tool for the Interpretation of Holocene Fossil Pollen Archives. M.Sc. Dissertation (*cum laude*), University of the Witwatersrand, Johannesburg.

4. Moteng Moseri

Moteng joined NWU in July 2022 as a Junior Lecturer. She also recently completed her M.Sc. at the University of the Witwatersrand, which aimed to reconstruct the palaeontological environment and local climatic conditions during the deposition of the Oligo-Miocene Elandsfontyn Formation, Langebaanweg (LBW), through the analysis of pollen, spores and dinoflagellate cysts (Fig. 4). Additionally, her research provided biostratigraphic information that contributed to understanding the timing and cause of the transition of subtropical/tropical vegetation to fynbos flora at LBW. Her research interests she would like to grow at NWU include coal petrology and palaeopalynology. She hopes to apply these disciplines in her PhD commencing in 2023, under the supervision of Prof. Frank Neumann at NWU and potential collaborators from the University of the Witwatersrand and Germany.

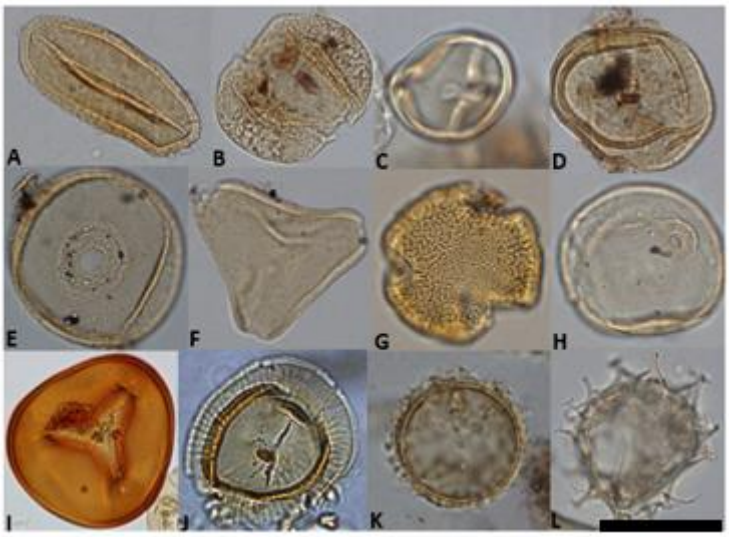

Figure 4. Fossil pollen, spores, algae and dinoflagellates from Oligo-Miocene deposits at Langebaanweg, Western Cape (from MSc thesis by Moteng Moseri). A. *Arecipites otagoensis* (palm); B. *Podocarpidites* sp. (podocarp); C. *Zonocostites ramonae* (mangrove tree); D. cf. *Araucariacites australis* (monkey puzzle tree); E. *Milfordia homeopunctatus* (restio); F. *Proteacidites* sp. (Protea); G. *Rhoipites arnotiensis* (Rubiaceae); H. *Graminidites* cf. *neogenicus* (grass); I. *Leiotriletes maxoides* (fern); J. *Debarya* sp. (algal cyst); K. *Sigmopollis* sp.; L. *Spiniferites* spp. (dinoflagellate cyst). Scale: 10 µm. Photos taken at Evolutionary Studies Institute, University of the Witwatersrand.

Her current research prospects at the North-West University are focused mainly on Cenozoic deposits in South Africa. One such project is that based at METSI (north of Potchefstroom), which is a research facility of the North-West University under the Unit for Environmental Sciences and Management (UESM). This research project - conducted by our Honours student Coert Coetzee - aims to investigate the influence of climate fluctuations and anthropogenic interactions on the last 2000 years of sedimentation in a peat wetland at METSI (Fig. 5). Changes in the palynomorph record over time will be used as a reflectance of the impact of human activity and climate change on the peat wetland in the Holocene. This ongoing project is part of a collaboration between North-West University and the University of the Witwatersrand involving several Honours and Masters students.

Publications for 2021/2022

Moseri, M.E., Neumann, F.H. and Bamford, M.K. (in preparation). Reconstructing Oligo-Miocene palaeoenvironments and the influence of sea level fluctuations on the south-western coast of South Africa.

Moseri, M.E. (2021). Reconstructing Oligo-Miocene palaeoenvironments and the influence of sea level fluctuations on the south-western coast of South Africa. M.Sc. Dissertation (*cum laude*), University of the Witwatersrand, Johannesburg.

Figure 4. *Coert Coetzee (left) extracting core material from a peat wetland during one of the METSI field campaigns in March 2022. His research will focus on the analysis of palynomorphs macerated from the sediment cores to reconstruct the palaeoenvironmental conditions and the influence of human activity on the peat wetland at METSI, in Potchefstroom.*

5. Prof Frank Neumann

Frank joined NWU in January this year as Associate Professor in Geology where he is also appointed as subject chair of the subject group Geology Soil Science. He collaborates with scientists in Africa, Europe, the Near East and northern America.

His expertise includes palaeopalynology of Cenozoic strata in southern Africa, the Near East as well as Central Germany. He has a keen interest in geoarchaeology and how ancient civilizations are affected by climate change. In this research field he recently joined a German team of archaeologists around Prof. Aaron Schmitt (University of Heidelberg) who are excavating the Phoenician site Tell Burak in Lebanon. Since the last 4 years, he extended his research interests to applied fields in palynology, melissopalynology and aerobiology. In melissoplaynology, he tests honey samples provided by beekeepers and the honey industry for their geographical and botanical origin. In aerobiology, he joined SAPNET since the beginning in 2019 and is, together with Dorra Gharbi, busy extending the pollen monitoring network to North West Province.

Since his arrival in Potchefstroom, he co-initiated a research project where peatlands along the Mooi River (including METSI, see above) will be investigated for their palaeoenvironmental potential utilizing drilling equipment recently purchased by Geology Soil Science. The project is part of a larger, NRF-funded, endeavour to investigate the Iron Age in southern Africa and especially the impact Pre-

European farming communities had on the vegetation. Here he collaborates with Prof. Alex Schoeman (PI) and other colleagues at the University of the Witwatersrand as well as Prof. Jonathan Taylor, diatom expert at NWU. In the frame of this project several MSc, BSc Hons students and PhD student Jerry Olatoyan are (co)supervised. In due course phytolith expert Tanya Hattingh will join the NWU team as a postdoc, hosted by Prof. Taylor where Tanya will add diatom analysis to her skill set. Together with Stephan Woodborne (Ithemba Labs), Frank supervises PhD candidate Martie Kemp, who will work on a dendroclimatological project. In addition, he has an interest in ichnofossils, especially coprolites and is an editor for the journal Acta Palaeobotanica.

Publications for 2022

Peer-Reviewed Articles

Olatoyan, J., **Neumann, F.H.**, Orijemie, E.A., Sievers, C., Evans, M., Mvelase, S., Hattingh, T., Schoeman A.M.H. 2022. Archaeobotanical evidence for the emergence of pastoralism and farming in southern Africa. Acta Palaeobotanica 62 (1): 50-75.

Scott, L., Sobol, M., **Neumann, F.H.**, Gil-Romera, G., Fernandez-Jalvo, Y., Bousman, B., Kolska-Horwitz, L., Van Aardt, A. 2022. Late Quaternary palaeoenvironments in the central semi-arid region of South Africa from pollen in cave, pan, spring, stream and dung deposits. Quaternary International 614: 84-97.

Zipfel, B., Montgomery, C., **Neumann, F.H.**, Scott, L., Choiniere, J., Hancox, J. (final decision pending). Overlooked or unimportant? An overview of the coprolite collections at the University of the Witwatersrand, Johannesburg, South Africa. For: The Curator.

Scott, L., **Neumann, F. H.**, van Aardt, A. C., Botha, G. A. (final decision pending). Palaeoenvironmental sequences surrounding Border Cave, South Africa, probing the climate during Middle and Later Stone Age occupation

Hartkopf-Fröder, C., Martini, E., **Neumann, F.H.**, Schäfer, P., Wilkes, H., Böcker, J., Hottenrott, M. (final decision pending): Eocene sediments and a fresh to brackish water biota from the early rifting stage of the Upper Rhine Graben (west of oil field Landau, southwest Germany): implications for biostratigraphy, palaeoecology and source rock potential. For: Palaeobiodiversity and Palaeoenvironments.

Peer-Reviewed Book chapters

Neumann, F.H. (in press). Kapitel 2.5. Die holozäne Vegetations- und Klimageschichte Palästinas auf Grundlage palynologischer Studien. In: Kamlah, J., Riehl, S. (Edts.): Atlas zum Ackerbau im Antiken Palästina, University of Tübingen.

Hahn, A., Schefuss, E., Burdanowitz, N., Cawthra, H.C., Finch, J., Tarryn Frankland, T., Green, A., **Neumann, F.H.**, Zabel, M. (final decision pending). Catchment and depositional studies for the reconstruction of past environmental change in southern Africa. Spaces II, Springer

Several peer-reviewed articles and book chapters are under review or in revision

Conference contributions

Neumann, F.H., Rassalle, T., Shivtiel, Y., Muenger, S., Belmaker, M., Bes, P., Zangenberg, J. (2022). THE CURIOUS CASE OF HORVAT KUR (GALILEE, ISRAEL): A CISTERN BENEATH AN ANCIENT SYNAGOGUE REVEALS A ROMANBYZANTINE LANDSCAPE. EAA 2022, Budapest: 137

Esteban, I., Bamford, M., Cawthra, H., Fisher, E., House, A., Miller, C., **Neumann, F.H.**, Pargeter, J., Schefuss, E. (2022). INTEGRATING CONTRASTING SIGNATURES OF ARCHAEOBOTANICAL PROXIES: THE CASE OF WATERFALL BLUFF, EASTERN CAPE PROVINCE, SOUTH AFRICA. EAA 2022, Budapest: 138

Two peer-reveiwed conference proceedings (SASA) as well as two SASQA conference abstracts are on their way.

Conclusion

Our working group at North-West University is blooming and based on trans-disciplinary research interests related to microfossils, pollen and its applications. We provide a platform to optimise the value of large existing knowledge and transfer it between diverse scientific disciplines related to our multidisciplinary research interest. Past challenges included mentoring students, and early career scientists, and providing an uninterrupted collaborative opportunity for the management of strong micropaleontology and pollen analysis research outcomes.

The establishment of a new micropalaeontology and applied palynology centre at North-West University provides a promising outlook on the future of micropalaeontology and pollen analysis in South Africa. Through the efforts of the emerging and advanced micropalaeontologists/palynologists at NWU, we hope to introduce new methods that are crucial in the geological, biological and geobiological sciences. Whereas palynology, apart from the applied fields, is already strong in South Africa, we realize the potential to strengthen especially micropalaeontology which is currently underutilized in the country. Here, we can build on a strong collaboration especially with Prof. Jonathan Taylor who curates the National Diatom collection which is housed at NWU. We will strengthen the collaboration of NWU researchers with other scientists in Africa and worldwide.

African Centre for Coastal Palaeoscience's Palaeoecology Laboratory

Represented by SASQUA member **Lynne Quick**

We have been very busy in the Palaeolab over the last two years and are now well on our way to meeting our goal of being a highly versatile palaeoscience hub. We are involved in several key research projects which have included lots of labwork, training and fieldwork excursions to the southwestern Cape coast, southern Cape and Klein Karoo (Figure 1). A major focus for both 2021 and this year has been the implementation of student projects and the supervision of new students at both the undergraduate and postgraduate levels. We also gained a new postdoctoral fellow (Welcome Dr Zwane!).

A highlight of 2021 was an undergraduate fieldwork school we hosted in the Zuurberg Mountains, Eastern Cape, thanks to funding obtained from the ACCP. The following is a compilation video of our activities in the field: https://youtu.be/B3dojL82mN4

A highlight for this year was travelling to Spain for a conference and palynology training workshop hosted by Dr Saúl Manzano at the University of León. The workshop was embedded within the NRF's African Origins Platform project funding I received (2022 – 2024) and was a fantastic training experience for the Palaeolab's students

(read about it here: https://news.mandela.ac.za/News/Mandela-students-in-Spain-for-Palaeoecology-Worksh).

We also continue to manage Gqeberha's only pollen and spore trap and generate weekly pollen and spore data for the city. This work forms part of a national monitoring network (www.pollencount.co.za).

Figure 1

Commissions/committee membership:

- Vice-President: INQUA
- President of SASQUA
- ISC/ICSU/SANC-INQUA committee member
- AFQUA (The African Quaternary) Scientific Steering committee member
- African Centre for Coastal Palaeoscience Management Board committee member

- Neotoma Data Steward, southern African regional representative of the African Pollen Database (APD)
- Standing Committee for Gender Equality in Science (SCGES), INQUA representative
- Academic Editor for PLOS Climate

Website & social media:

https://drlynnequick.com/nelson-mandela-palaeolab/

https://twitter.com/The_Palaeolab

https://www.facebook.com/MandelaUniPalaeolab

Invited/keynote addresses 2021 – 2022:

Quick, L.J. (2021). Reconstructing palaeoclimates in the Cape Floristic Region, South Africa: a palynological approach. Palynology Short Talks - Session 7: Palynology and Climate.

Quick, L.J. (2022). Leadership for Conservation in Africa (LCA) Unlocking Nature: Studying the past to conserve the future: Palaeoecological research in the Cape Floristic Region. 16 June 2022.

Publications 2021 - 2022

Chevalier, M. Chase, B.M., **Quick, L.J**., Dupont, L.M. and Johnson, T.C. (2021). Temperature change in subtropical southeastern Africa during the past 790,000 yr. Geology 49 (1): 71–75.

Across the glacial-interglacial cycles of the late Pleistocene (~700 k.y.), temperature variability at low latitudes is often considered to have been negligible compared to changes in precipitation. However, a paucity of quantified temperature records makes this difficult to reliably assess. In this study, we used the Bayesian method CREST (Climate REconstruction SofTware) to produce a 790,000 yr quantified temperature reconstruction from a marine pollen record from southeast Africa. The results reveal a strong similarity between temperature variability in subtropical Africa and global ice volume and CO2 concentrations, indicating that temperature in the region was not controlled by local insolation, but followed global trends at these time scales, with an amplitude of ~4 °C between glacial minima and interglacial maxima. The data also enabled us to make an assessment of the impact of temperature change on pollen diversity, with results showing there is no link between glacial-age temperatures/CO2 and a loss of diversity in this record.

Braun, D.R., Faith, J.T., Douglass, M.J., Davies, B., Power, M.J., Vera Aldeias, V., Conard, N.J., Cutts, R., DeSantis, L.R.G., Dupont, L.M., Esteban, I., Kandel, A.W., Levin, N.E., Luyt, J., Parkington, J., Pickering, R., **Quick, L.J.**, Sealy, J.C., Stynder, D. (2021). Ecosystem engineering in the Quaternary of the West Coast of South Africa. Evolutionary Anthropology 30: 50– 62.

Despite advances in our understanding of the geographic and temporal scope of the Paleolithic record, we know remarkably little about the evolutionary and ecological consequences of changes in human behavior. Recent inquiries suggest that human evolution reflects a long history of interconnections between the behavior of humans and their surrounding ecosystems (e.g., niche construction). Developing expectations to identify such phenomena is remarkably difficult because it requires understanding the multi-generational impacts of changes in behavior. These long-term dynamics require insights into the emergent phenomena that alter selective pressures over longer time periods which are not possible to observe, and are also not intuitive based on observations derived from ethnographic time scales. Generative models show promise for probing these potentially unexpected consequences of human-environment interaction. Changes in the uses of landscapes may have long term implications for the environments that hominins occupied. We explore other potential proxies of behavior and examine how modeling may provide expectations for a variety of phenomena.

Quick, L.J., Chase, B.M., Carr, A.S., Chevalier, M., Grobler, B.A. and Meadows, M.E. (2021). A 25,000 year record of climate and vegetation change from the southwestern Cape coast, South Africa. Quaternary Research: 1-18

The southwestern Cape of South Africa is a particularly dynamic region in terms of long-term climate change. We analysed fossil pollen from a 25,000 year sediment core taken from a near-coastal wetland at Pearly Beach that revealed that distinct changes in vegetation composition occurred along the southwestern Cape coast. From these changes, considerable variability in temperature and moisture availability are inferred. Consistent with indications from elsewhere in southwestern Africa, variability in Atlantic Meridional Overturning Circulation (AMOC) was identified as a strong determinant of regional climate change. At Pearly Beach, this resulted in phases of relatively drier conditions (~24–22.5 cal ka BP and ~22–18 cal ka BP) demarcated by brief phases of increased humidity from ~24.5–24 cal ka BP and 22.5–22 cal ka BP. During glacial Termination I (~19–11.7 ka), a marked increase in coastal thicket pollen from ~18.5 to 15.0 cal ka BP indicates a substantial increase in moisture availability, coincident, and likely associated with, a slowing AMOC and a buildup of heat in the southern Atlantic. With clear links to glacial and deglacial Earth system dynamics and perturbations, the Pearly Beach record represents an important new contribution to a growing body of data, providing insights into the patterns and mechanisms of southwestern African climate change.

Quick, L.J. (2021) Future directions of palaeoecological research in the hyper-diverse Cape Floristic Region: The role of palynological studies. Palaeoecology of Africa Vol. 35. Quaternary Vegetation Dynamics–The African Pollen Database. Pages: 225-238

The Cape Floristic Region (CFR) is a key focus area within southern Africa due to its botanical importance in terms of high levels of biodiversity as well as its rich cultural and archaeological heritage. The area is sensitive to cycles of regional and global environmental change, and palynological records obtained from the region can potentially provide valuable information regarding past vegetation dynamics and climate variability. Prior to the last decade, few high resolution palaeoenvironmental records were recovered from the CFR, and therefore its Late Quaternary environmental history was previously poorly understood. Significant progress was made over recent years and a considerable body of new palynological (as well as palaeoclimatological) evidence emerged. These new records provide greater insight into the nature and timing of past vegetation shifts and improve our understanding of how different subregions of the CFR have responded to past climate changes. They

also highlight that there is a much higher degree of complexity, in terms of both vegetation and climate change, than previously thought. This paper provides a perspective on the progress made towards elucidating the palaeoecological history of the CFR, it highlights the importance of continuing and expanding upon the existing body of work and outlines current and future directions for palynological research in this hyper-diverse southwestern corner of southern Africa.

du Plessis, N., Chase, B.M., **Quick, L.J.**, Strobel, P., Haberzettl, T., Meadows, M.E. (2021). A c. 650 year pollen and microcharcoal record from Vankervelsvlei, South Africa. Palaeoecology of Africa Vol. 35. Quaternary Vegetation Dynamics–The African Pollen Database. Pages: 301-308

The Vankervelsvlei wetland is situated along the southern Cape coast of South Africa, about c. 5 km inland at an elevation of 152 m asl, surrounded by a lithified aeolian dune of Middle to Late Pleistocene age (Illenberger 1996) (Figure 1A, B). The site falls within the year round rainfall zone, with moisture being delivered from both temperate and tropical climate systems.

du Plessis, N., Chase, B.M., **Quick, L.J.**, Strobel, P., Haberzettl, T., Meadows, M.E. (2021). A Late Holocene pollen and microcharcoal record from Eilandvlei, southern Cape coast, South Africa. Palaeoecology of Africa Vol. 35. Quaternary Vegetation Dynamics–The African Pollen Database. Pages: 293 – 300

Eilandvlei forms part of the Wilderness Lakes system located along the southern Cape coast of South Africa (Figure 1A, B). These lakes are located behind Pleistocene dune ridges that run parallel along the coastline. Situated within South Africa's aseasonal rainfall zone, climate is influenced by both temperate and tropical circulation systems.

Chevalier, M., Chase, B.M., **Quick, L.J.**, Scott, L. (2021). An atlas of southern African pollen types and their climatic affinities. Palaeoecology of Africa Vol. 35. Quaternary Vegetation Dynamics–The African Pollen Database. Pages: 239 – 258

Interpretations of fossil pollen data are often limited to broad, qualitative assessments of past climatic and environmental conditions (e.g. colder vs. warmer, wetter vs. drier, open vs. closed landscape). These assessments can be particularly imprecise in regions such as southern Africa, where botanical biodiversity is high, and there exists an associated uncertainty regarding the climatic/environmental sensitivities of the plants contributing to a given pollen type. This atlas addresses this limitation by characterising the climate sensitivities of the 140 pollen morphotypes most often recorded in Late Quaternary palaeoecology studies in southern Africa, relying on their parent plant distributions as one of the basic factors that determine their presence. The atlas is designed as a suite of graphical diagnostic tools and photographs together with analyses of the modern geographical distribution of more than 22,000 plant species to identify their primary climatic sensitivities across southern Africa. Together, the elements included span the complete workflow from pollen identification through interpretation and climate reconstruction. The atlas can be accessed from https://doi.org/10.5281/zenodo.4013452.

Strobel, P., Bliedtner, M., Carr, A. S., Struck, J., du Plessis, N., Glaser, B., Meadows, M. E., **Quick, L. J.**, Zech, M., Zech, R. and Haberzettl, T. (2022). Reconstructing Late Quaternary precipitation and its source on the southern Cape coast of South Africa: A multi-proxy paleoenvironmental record from Vankervelsvlei, Quaternary Science Reviews 284: 107467

The Late Quaternary climate history of South Africa and, in particular, potential changes in atmospheric circulation have been subject to considerable debate. To some extent, this is due to a scarcity of natural archives, and on the other hand the available indirect hydrological proxies are not suited to distinguishing between precipitation originating from temperate Westerlies and tropical Easterlies. This study presents a paleoenvironmental record from Vankervelsvlei, a wetland located on the southern Cape coast in the year-round rainfall zone of South Africa. A 15 m long sediment record was retrieved from this site and analysed using a multi-proxy approach. This includes, for the first time in this region, analysis of both compound-specific δ2H and δ18O from leaf wax-derived n-alkanes and hemicellulose-derived sugars, respectively, to investigate hydrological changes during the Late Quaternary. Our data suggest the driest conditions of the past ~250 ka likely occurred from MIS 6 to MIS 5e, which still caused sediment deposition at Vankervelsvlei, and MIS 2, during which time there was an absence of sedimentation. Moist conditions occurred from MIS 5e to 5a and during parts of MIS 3, while drier conditions prevailed between MIS 5a and early MIS 3 and at the transition from MIS 3 to MIS 2. Besides changes in the amount and proportional contribution of precipitation contributions from Westerlies during glacial and Easterlies during interglacial periods, relative sea-level change affected the continentality of Vankervelsvlei, with a distinct impact on the sites hydrological balance. High-resolution analyses of the Middle- and Late-Holocene parts of the record show moist conditions and increased Easterly/locally-derived summer precipitation contributions from 7230 +160/−210 to 4890 +280/−180 cal BP and after 2840 +350/−330 cal BP. Dry conditions, accompanied by the reduction of Easterly/locally-derived summer rainfall and increased seasonality occurred from 4890 +280/−180 to 2840 +350/−330 cal BP. Our findings highlight that source and seasonality of precipitation play a major role in the hydrological balance of the southern Cape coastal region. By comparing the Vankervelsvlei record to other regional studies, we infer a coherent trend in the overall moisture evolution along South Africa's southern Cape coast during the Late Quaternary.

Davies, B., Power, M.J., Braun, D.R., Douglass, M.J., Mosher, S.G., **Quick, L.J.**, Esteban, I., Sealy, J., Parkington, J., Faith, J.T. (2022). Fire and human management of late Holocene ecosystems in southern Africa. Quaternary Science Reviews 289, 107600

Globally, fire is a primary agent for modifying environments through the long-term coupling of human and natural systems. In southern Africa, control of fire by humans has been documented since the late Middle Pleistocene, though it is unclear when or if anthropogenic burning led to fundamental shifts in the region's fire regimes. To identify potential periods of broad-scale anthropogenic burning, we analyze aggregated Holocene charcoal sequences across southern Africa, which we compare to paleoclimate records and archaeological data. We show climate-concordant variability in mid-Holocene fire across much of the subcontinent. However, increased regional fire activity during the late Holocene (~2000 BP) coincides with archaeological change, especially the introduction and intensification of food production across the region. This increase in fire is not readily explained by climate changes, but rather reflects a novel way of using fire as a tool to manage past landscapes, with outcomes conditioned by regional ecosystem characteristics.

Abi Stone

University of Manchester, UK & Visiting Research Associate- SoGE, University of Oxford, UK

Research Highlights

2022 has heralded the great excitement of returning to fieldwork, and the continuation of hybrid conference meetings, and the chance to give invited talks in a range of formats through 2021 and 2022. 2021 started with the UK QRA conference online, presenting "**Tufa in the semi-arid volcanic landscape of the Arabian Peninsula is non-thermal**", which led to an invitation for a seminar for the UCL Palaeoclimate Seminar series (also online), presenting updates to my research on the tufa in Harrat Al Birk on the Red Sea coastal plain of Saudi Arabia. In April the European Geophysical Union decided vEGU21: Gather Online was safest, so I again spoke about tufa toward my computer's microphone and webcam in a home office in Manchester. The key message is that it is 'cool tufa'. This is a sorely missed opportunity for a better start to the paper title that has now been published in 2022 in *Sedimentary Geology* (which as you will see has a much more convoluted, ghastly-sounding title). It also this captures the key message, which is that this volcanic setting contains cool-water tufa and not hydrothermal travertine, and this means this basin would have been an attractive site for hominins and their prey in the past. Towards, the end of 2021, it was still a world of online talks, but with a switch focus from me back to southern African sand-based research. An invitation to speak to the University of Plymouth School of Geography and Earth and Environmental Sciences about **"Secrets within the sand: Exploring Quaternary sedimentary processes and provenance using a portable luminescence reader"** and from the Liverpool Luminescence Laboratory in November, with a talk **"Using a portable luminescence reader to reveal secrets within the sand: what can we learn about sedimentary processes and provenance in southern Africa".**

In November 2021, the results from a long-term collaboration with Edo Garzanti and his colleagues at the Laboratory for Provenance Studies at the University of Milano-Bicoccaa, and specialists in cosmogenic dating, was published. This explores **sediment pathways for sand in the Kalahari;** "Provenance of Kalahari Sand: Paleoweathering and recycling in a linked fluvial-aeolian system." Guido Pastore presented this work at the 2022 EGU, alongside insights into the Saharan sand sea.

The 2021 online talks trained me well for 2022, giving an invited talk online for the Royal Geographical Society about **"Dunes, Diamonds and Dust: a potted history of the Namib Sand Sea"** in March 2022, and a rare opportunity to talk to people in a room for the Prince's Teaching Institute on the same topic in May. These occurred with the added excitement of knowing that in a few months I would have my feet back in those Namib Sand Sea sands, and these talks gave me a chance to learn more about the history of diamonds in this region, and catch up on colleague's research into dust too, which was a treat. I hope I inspired some excitement about this wonderful UNESCO World Heritage site to a wider audience. I'm excited to hear

there are some UK Geography teachers keen to use the Namib Sand Sea as a case study this coming school year, in the discussions after the talk in May.

I patiently sat back at the laptop in late May for my online appearance at the 2022 EGU to talk about "Reconstructing rainfall in sandy drylands of southern Africa: exploring the potential of the chloride mass balance hydrostratigraphy approach in Kalahari sand dunes". A paper is set to be submitted on this any day soon, so watch this space.

Thanks to research re-stimulation (post-COVID) funds from the University of Manchester, I also had to remember what was involved in trip planning, including fighting frequently with preferred university travel suppliers, and eventually made my way back to southern Africa. In late June and early July I worked with George Leader (College of New Jersey), Dominic Stratford (University of the Witwatersrand), Rachel Bynoe (University of Southampton, UK), Kaarina Efraim (National Museum of Namibia) and a stateside-covid-grounded Ted Marks (New Orleans Centre for Creative Arts) on the Leaky Foundation Funded project '**Early Hominin adaptations in arid landscapes of the Namib desert**", with huge thanks to Eugene Marais and Gillian Maggs-Kölling at the Gobabeb Namib Research Institute. We focussed on a site called Namib IV, which contains Early Stone Age and Middle Stone Age lithics at different elevations and on different surface types. We dug plenty of holes to explore how the stratigraphy links with the geomorphology in this former basin, found fossils and lithics and sampled the sand-rich units for luminescence dating, which I will be doing with the collaboration of the Liverpool Luminescence Laboratory. We even got a moment on the Gobabeb 'small screen' with highlight talks on 'what is happening at Gobabeb Today'. The results of the fieldwork were presented at the UK Luminescence and ESR dating conference at Royal Holloway, University of London in early September, 2022.

LH photo is the sun setting over the Namib IV site, RH (top) shows the team thanking the funder, RH (bottom) shows my dream team of field colleagues taking in the view at Narabeb.

The second piece of fieldwork was undertaken in the Limpopo province of South Africa with Dr Randolph-Quinney (Northumbria University), where we are investigating the record of hominin activity in the Mokopane region. My role is studying the geomorphology and sedimentology and providing age control using luminescence dating. This trip focussed on field survey, observation and sampling of the Nyl floodplain hillslope near Tshamahansi, where there are impressive dongas on the shallow alluvial fans. I look forward to working on these samples, and existing samples from the Makapans valley with Professor Simon Armitage at Royal Holloway, University of London. I also had the opportunity to have a tour of the Makapan Valley World Heritage site, and think about logistics

for future resampling of the Cave of Hearths archaeological site. Sadly a recently wildfire has destroyed the boardwalks around this site.

LH photo is sampling the lower alluvial-fan samples at Tshamahansi for luminescence dating. RH photo is Peter Molomo talking with Patrick Randolph-Quinney at the Cave of Hearths archaeological site.

I send congratulations to **PhD student Sandra Gomes** (University of Manchester), who submitted her thesis this summer, and wish her all the best for her viva that will happen in late autumn. She will be defending her exciting research into pollen records in marine sediments off the Iberian Peninsula. I also would also like to take the opportunity to congratulate **Dr Madeleine Han**n, from the University of Manchester, whose thesis I examined at the start of 2022, and to **Dr Shoopala Uugulu**, from the University of Namibia, whose thesis I also examined this year, with the viva defence presentation in August. Dr Hann's research was on mega boulder formations in Morocco, and Dr Uugulu's research is about recharge processes and quantities along a precipitation gradient in Namibia, particularly exploring the role of vegetation.

Publications

Stone, A., Inglis, R., Barfod, D., Ickert, R., Hughes, L., Waters, J., Jouran, A-L., Alsharekh, A. M. (2022) Hydroclimatic and geochemical palaeoenvironmental records within tufa: A cool-water fluvio-lacustrine tufa system in the Wadi Dabsa volcanic setting, western Saudi Arabia. *Sedimentary Geology* 437, 106181.

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University of KwaZulu-Natal Palaeoecology Laboratory

The UKZN Palaeoecology lab is slowly emerging from a period of dormancy over the height of the pandemic. We are finding our feet again, attending many online meetings, but also in person events, a little bit of international travel, and some fieldwork. Here is an account of activities and developments, and some recent adventures.

Lauren Pretorius

Postdoctoral researcher Lauren Pretorius has been focussing on reconstructing sea-level in the late Holocene using proxies such as stratigraphy, sedimentology, geochemistry and micropalaeontology. During this time, she has collaborated with new co-investigators from the Netherlands, Ireland and the United Kingdom. This research is ongoing and manuscripts on regional sea-level reconstruction along the southern coastline of South Africa are underway.

In September 2021, Lauren visited Professors Torsten Haberzettl and Finn Viehberg at the University of Greifswald. She toured their laboratories and facilities whilst trading notes and helping prepare for the South African leg of the Train-Me2 Connect Summer school.

Lauren presented a talk titled: “High-resolution sea-level reconstruction along the South African coastline using salt marsh foraminifera as proxies” at the South African Marine Science Symposium hosted by UKZN in Durban. She got to rub shoulders with the leaders in South African marine sciences. This year had new foci on Artificial Intelligence and remote data collection methods intended for sampling the ocean water column and sea floor for biological and geological applications.

Travels plans for Singapore fell through for Lauren with the “PALEO constraints on SEA-level rise (PALSEA) meeting”. This did not stop her from presenting latest developments in her research on sea-level reconstruction online. Lauren’s presentation was titled: “Regional Vs. Site-specific Sea-level Reconstruction Along the South African Coastline Using Salt Marsh Foraminifera as Proxies”. The 3am wake ups were definitely worth it as she got incredible feedback from leaders in her field and she got to see the cutting edge of sea-level research first hand as well as be part of the conversation.

Nozizwe Mtshali

Nozizwe Mtshali is undertaking a 2-year masters by research in the discipline of geography at the University of KwaZulu-Natal. She is working on reconstructing historical sea-level rise at the Berg Estuary in the Western Cape using salt marsh foraminifera as a proxy. She has attended CODATA-RDA Research Data Science School to be introduce her to responsible and effective data handling, and most importantly the principals of open science, data sharing and collaboration, since she will be carrying out majority of her MSc data analyses using the R software environment.

Nozizwe busy in the lab (Photo credits: Nozizwe Mtshali)

Salona Reddy

As the subject of her MSc, Salona has been analysing a core extracted in South Lake Futululu in northern KwaZulu-Natal. She worked towards improving the understanding of vegetation and fire history using both pollen and charcoal analysis and has recently submitted her thesis for examination. Salona has attended the South African Scoring System (SASS) course which is a rapid bioassessment technique based on one component of riverine biotas, the benthic macroinvertebrates. She will soon be attending the SASS accreditation.

Talia Enoch

Talia is a current MSc candidate studying the reliability of mangrove fossil pollen as a proxy for sea level reconstruction in southern Africa. She recently attended the SEAmester V cruise in July of this year, and tells of her adventures here:

Biting cold temperatures, heads over toilet bowls, and pirate legs? Ah yes, it sounds like another exciting voyage of SEAmester. The fifth annual SEAmester cruise set to sail on the 27th of June this year, and I was one of the lucky 37 students to attend it. Started by Prof. Isabelle Ansorge, the cruise aims to be a type of “floating university” whereby postgraduate students from across the country are given the opportunity to experience what life on the sea is like for a scientist on the S.A. Agulhas II.

Our route had an eddy in the making (think ice-cream swirls in the ocean – except bigger). Now we had a goal. Usually, students would help to collect pseudo samples for the purpose of learning. Now we were collecting actual samples with the purpose of the scientists on board writing up a report when back on land. My hands had a little shake in them with the pressure of not messing up.

Time was all relative. While we did have a schedule to follow each day, our free time was our own. Many of us took this opportunity to go down to the fondly named “poop deck” to help the scientists with whatever new task they were focusing on – at whatever time. These tasks included shooting XBT’s into the water, preparing the CTD (Google it) for the evening deployment, or simply sorting the samples.

Instead of following the regular SEAmester route, we had to make a detour for a medical evacuation. The detour? Marion Island. We were all *terribly* upset. Okay, so we didn’t actually get to step onto Marion Island. However, the pictures were wonderful. Oh, the drama… For the medivac to be successful, we needed a helicopter. The helicopter broke down before arriving on board. The crew needed to use the tugboats on board. However, the safe and sandy beach was too far off for our patients. The crew had to go close to the rocks.

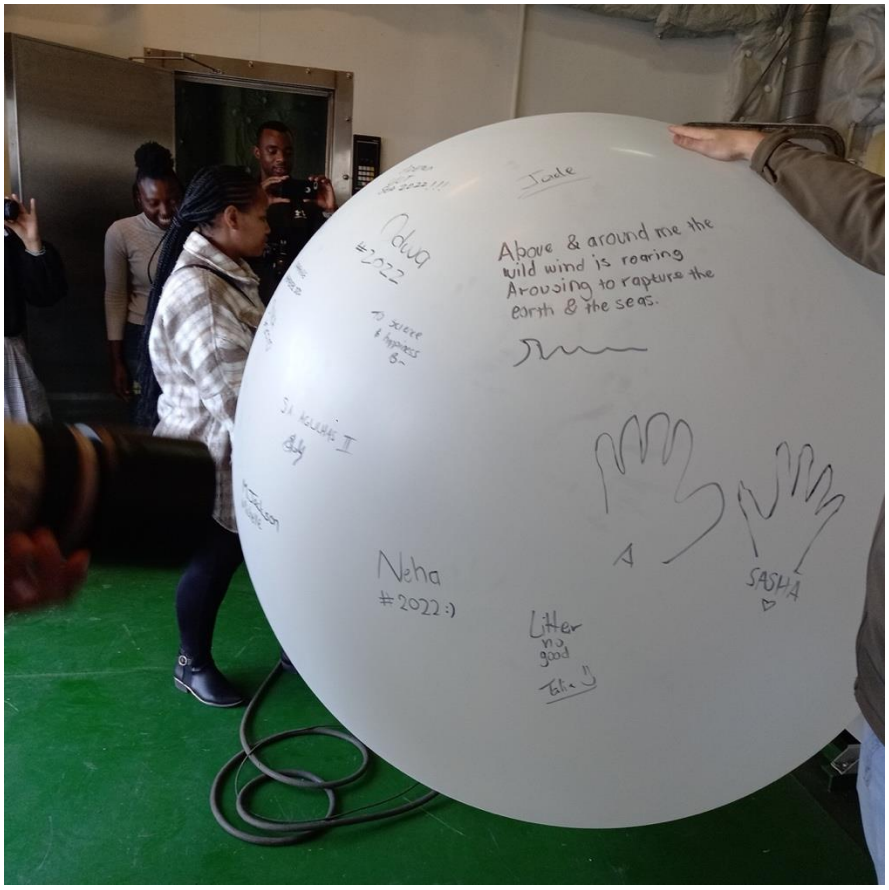
Talia with Marion Island in the background

With the crew looking like characters out of Baywatch and the awaiting Marion team waving the South African flag, it was easy to feel patriotic, and then the boat hit the rocks. Alas, we had to send out another rescue boat to bring back the now damaged rescue boat. With darkness inching in by the minute, hope for a successful medivac was quickly dwindling. It was a literal “all hands on deck” moment. Darkness hit, and that was when the birds started coming in. Rule of thumb when near Marion at night? Never leave your ship’s lights on. Our two floodlights were on. Uncountable numbers of high latitudinal birds started bombarding the ship with their bodies. It was a sore sight. However, students got together, braved the numbing cold and started releasing the birds as they came in. Back on Marion, our valiant doctor managed to jump off his tugboat and onto the island. In his mind, if he was on the island, then the captain surely couldn’t leave him behind. Nine other crew followed his

lead. Then the second boat hit the rocks. To jump ahead, it was a success, albeit an incredibly jarring one. As stated in the debriefing, many things could have gone wrong. Let it be said that the crew on the S.A. Agulhas II are truly some of the most courageous individuals. We're lucky to have them.

The rescue from Marion Island

Speaking of said ship, it wasn't too shabby. When I asked one of the masters of the ship, he described it as luxury. I haven't been on other research vessels, but I can still echo what that master said and say that, yes, it was luxury. Goodness, there was a sauna on board! All in all, I would return tomorrow if I could.



Students on board getting ready to release a weather balloon

Jemma Finch

Jemma presented the results of a collaborative research project on 'African mountain biodiversity research: Utilizing available data to advance our understanding' at the Southern African Mountain Conference in Champagne Valley, March 2022. In early 2022, Jemma was honoured to receive the University of KwaZulu-Natal Vice-Chancellor's Research Award, in recognition of outstanding research achievements and international reputation in her discipline. In mid 2022, Jemma completed the South African Journal of Science Associate Editor Mentorship Programme under the strong guidance of Dr Margaret Avery. She recently took over the reins as Associate Editor for the Archaeology, Anthropology and Palaeontology portfolio of the journal.

Tristan Pillay

MSc candidate Tristan Reece Pillay has completed research using saltmarsh foraminifera from the Kromme Estuary to reconstruct sea level along the southern African coastline. He has also achieved second place at the 2021 University of KwaZulu-Natal Postgraduate Research & Innovation Symposium (PRIS), presenting this work.

Trevor Hill

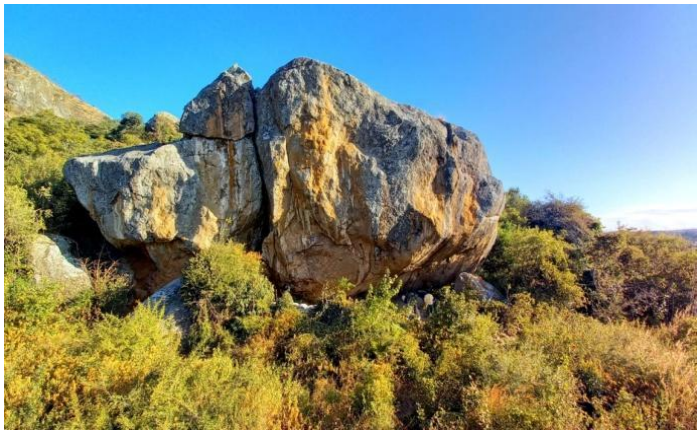
Trevor has been reappointed as Academic Leader for Research within the School of Agricultural, Earth and Environment Sciences, elected as a Fellow of The South African Geographical Society and has taken been appointed as Editor of Transactions of the Royal Society of South Africa. He is not getting into the field anywhere near as much as he should due to spending too much time drowning in admin! He claims this as his own fault, and promises that things will change as we upgrade the lab post-COVID and are able to resume field trips.

Joshua van Schalkwyk

MSc candidate Joshua van Schalkwyk attended the "Human Origins, Migrations, and Evolution Research" (HOMER) sponsored the Malawi Ancient Lifeways and Peoples Project (MALAPP) field campaign led by Professor Jessica Thompson of Yale University. The project involved archaeological surveys and excavations around the Mzimba District in the Northern Province of Malawi between previously identified and/or excavated sites: Hora-1, Mazinga-1, and Sayile-1. The team was hosted at the Lunjika Mission Clinic and School. Josh tells of his experience below:

The region is located in the elevated (>1000m.a.s.l.) western highlands of the country and is characterized by steep, exfoliating inselbergs of basement gneisses exposed by a highly erosional catchment system. Rock shelters are often formed by large outcrop, sub-crop, or boulder formations associated with these geological features. This area is host to a rich archaeological record of early hunter-gatherers (Batwa/Akafula): stone-age artifacts as well as paintings and burials/cremations which suggest a long history of hunter-gatherer occupation and activity. However, the DNA analysis of one individual excavated at Hora-1 shows no close equivalence to the modern (albeit limited) DNA record of people living in Malawi today. Excavations exposed many useful remains associated with hunter-gatherer activity, including excavated shells, charcoal, lithic fragments from stone tools, bone, pottery in the upper–iron age units, beads, and ostrich eggshells. Each new piece excavated can help build a more resolute picture of the conditions, lifestyle, and even trade and culture these early humans existed within and practiced. Deposits have not yet reached a sterile base and it is possible rock-shelter sites in this area may provide sequence well into the Pleistocene.

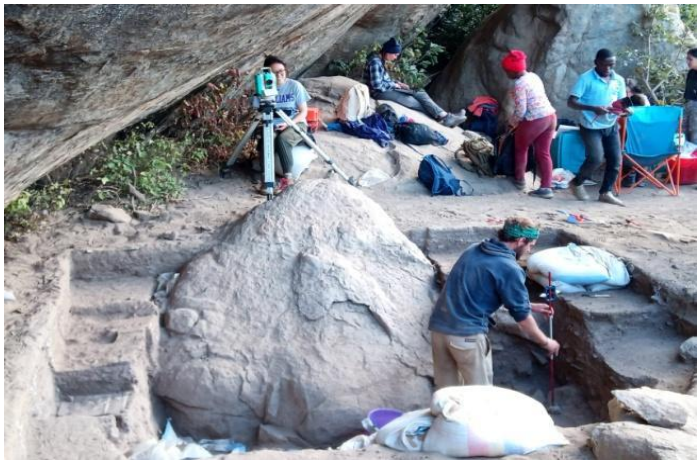
Camp Next to Lunjika Mission Clinic (Photo credits: Alice Zhang)



Mazinga-1 rock-shelter looking South (Photo credits: Joshua van Schalkwyk)

We were also lucky enough to fit in a trip to Karonga and Vwaza Marsh midway through the project. Vwaza Marsh allowed students to get a view of a conserved and still very wild Zambezian environment and one that would, in many ways, resemble the type of environment early hunter-gatherers would have existed in. Karonga sits on the lakeside in the far north of the country, and from here we were able to visit the Karonga Museum and some interesting sites. Uraha is a paleoanthropological site where a jawbone attributed to an early common ancestor *H. rudolfensis* was discovered. We also visited the "Dinosaur Beds"- clastic and diatomiteaceous sedimentary units –that hosted the discovery of the *Malawisaurus*.

An evening in camp (Photo credits: Hannah M. Keller)



Excavation at Mazinga-1 (Photo credits: Hannah M. Keller)

In the last few days of excavation at Mazinga-1, what was thought to be a human bone was recovered whilst removing a rock from the excavation. Upon closer inspection, the rocks seemed to form a shape like that of a cairn. Senior personnel carefully excavated a small 50x50cm quad and concluded that it contained human remains and would let it lay at rest until further need or opportunity for excavation. Indeed, Malawi has much to offer and still more to discover in the way of its deep history, central positioning in the story of human evolution, and fascinating questions still to be answered by the paleo–sciences community.

Malawisaurus at the Karonga Museum, Chisomo on the left for scale (Photo credits: Larry Luhanga)

In summary, the research and field school conducted by Professor Jessica Thompson and her team can be considered of the utmost importance in training young aspiring researchers in palaeo-science fieldwork. Students were exposed to a number of new and old concepts and techniques from the latest in drone survey equipment to fundamentals in good archaeological and excavation practice. Malawi is not an easy country to conduct this kind of research in. Due to the socio-economic status of the country, bad service delivery, and poor access to modern amenities, fieldwork can be challenging and tricky to navigate. However, we overcame these difficulties with resourcefulness, resolute composure, and flexibility with problem-solving. The warm heart of Malawi made us all feel safe and welcome during our stay, and I would like to thank all those that have contributed to the project, especially Professor Jessica Thompson for driving from the front and leading such fine research.

We spent the final days of the trip relaxing and enjoying ourselves at Nkhata Bay on the lakeshore, sipping strong gin and tonics to keep the mosquitoes away.

Trading stores in Lunjika Town (Photo credits: Joshua Van Schalkwyk)

A view of Lake Malawi (Photo credits: Joshua van Schalkwyk)

Train-ME2 Connect Summer school

Together with colleagues from the University of Greifswald (Germany), the Council for Geoscience (CGS), Nelson Mandela University and the University of Cape Town (UCT), our lab helped to organise and run the South African leg of the Training School on Methods in Applied Earth and Aquatic Sciences (Train-ME2 Connect) geoscience summer school in November 2021. The school comprised a 7-day field school for geoscience students from across nine African countries to provide training in bio- and geo-scientific fieldwork sampling in terrestrial and aquatic environments. Funded by the German Academic Exchange Service (DAAD), the school provided training in measurement techniques of physical and chemical parameters, sampling of plankton and benthos, sampling of sediment surface, coring techniques to recover long and continuous sediment sequences on land, and palaeolimnological evaluation methods. It incorporated e-learning components and promoted cultural exchange. During the summer school the participants brainstormed ideas for a Science Spaza theme and helped with the production of media content to promote natural science to school learners.

Students practice stratigraphic mapping in a swamp forest at Mtunzini

Students visiting the West Coast Fossil Park (Photo credits: Hayley Cawthra)

Students conducting fieldwork in the Berg River Estuary at Velddrif (Photo credits: Lauren Pretorius)

Publications

Chomba, MJ, **Hill, TR** & Nkhata, BA, 2021: Relational Capital and Connectedness in Adaptive Governance Processes: A Case Study of the Kafue Flats, Zambia, *Society & Natural Resources*, 34 (11), 1510-1525. DOI: 10.1080/08941920.2021.1992693

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Norström, E., Kylander, M., Sitoe, S.R., **Finch, J.M.** (2021). Chronostratigraphic palaeoclimate phasing based on southern African wetlands: From the escarpment to the eastern seaboard. *South African Journal of Geology* 124, 977-994.

Van Deventer, R., Morris, CD, **Hill, TR**, & Rivers-Moore, NA., 2022: Use of biological and water quality indices to evaluate conditions of the Upper uMngeni Catchment, KwaZulu-Natal, South Africa. *African Journal of Aquatic Science*, 47 (1), 11-22. doi.org/10.2989/16085914.2021.1941743

Graduations

Jean Baverstock. Revisiting the Dendroclimatological potential of *Afrocarpus falcatus*, South Africa. MSc supervised by Prof. T. Hill, Prof. S. Woodborne and Dr J. Finch

Tristan Reece Pillay. The application of saltmarsh foraminifera in the reconstruction of sea level along the southern African coastline (due to graduate September 2022). MSc supervised by Dr J Finch and Dr L Pretorius.