MARCH 2024

SOUTHERN AFRICAN SOCIETY FOR QUATERNARY RESEARCH

SASQUA

QUATERNARY RESEARCH

Newsletter

SASQUA

SOUTHERN AFRICAN SOCIETY FOR QUATERNARY RESEARCH

Letter from the President

I was thrilled to read this newsletter and the activities & achievements of our members. Congratulations to each of you on your graduations, publications, engagements, and ongoing exciting projects. It is particularly encouraging to note the number of postgraduate students becoming more involved in SASQUA.

I am proud to work with a dynamic new committee and we have several young, enthusiastic new people at the helm of various portfolios. This newsletter with its fresh new look is a testament to this, and our newsletter editor, Ms Asithandile Ntsondwa, is gratefully acknowledged for her creative ideas and hard work.

We a few months away from the 24th biennial SASQUA conference, which will be held in the beautiful Cango Valley, and I thank our committee and the organisers of the upcoming meeting for their planning and dedication to this so far.

I do hope that you will enjoy reading our news here as much as I did, and look forward to seeing as many of you as possible in May!

Sincerely,
Hayley Cawthra

IN THIS ISSUE

VISIT OUR WEBSITE FOR INFORMATION ABOUT SASQUA

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
Secretary	Saúl Manzano	- University of León
Treasurer	Vincent Hare	- University of Cape Town
Early Career Representative	Bongekile Zwane	- Nelson Mandela University
Newsletter Editor	Asithandile Ntsondwa	- Nelson Mandela University

SA-INQUA Committee (2023)

Hayley Cawthra	- Council for Geoscience, Nelson Mandela University
Lynne Quick	- Nelson Mandela University
Jemma Finch	- University of KwaZulu-Natal
Vincent Hare	- University of Cape Town
Greg Botha	- University of KwaZulu-Natal
Saúl Manzano	- University of León
Bongekile Zwane	- Nelson Mandela University (ECR Capacity Building Delegate)
Asithandile Ntsondwa	- Nelson Mandela University (ECR Capacity Building Delegate)

Hayley Cawthra

Marc Humphries

Lynne Quick

Saul Manzano

Vincent Hare

Bongekile Zwane

Asithandile Ntsondwa

SASQUA XXIV BIENNIAL CONGRESS

Preparations for the 24th Biennial Congress are well underway, with registrations and call for abstracts open until 31st March 2024.

In response to the announcement of the upcoming South African Presidential elections overlapping with the initial schedule, thoughtful adjustments have been made. The congress dates have been rescheduled to a week earlier than previously communicated, ensuring a seamless experience for all participants. The congress will occur from 19 - 24 May 2024 at Cango Valley, Oudtshoorn, South Africa.

Join us in Cango Valley's beautiful and historic landscapes as we delve into the latest advancements in Quaternary science, exchange groundbreaking ideas, and forge lasting connections in the heart of South Africa.

CONGRESS DETAILS
>> CLICK HERE!

INQUA 2023 CONGRESS UPDATE

During the inter-congress term from 2019 – 2023, Dr Lynne Quick served on the INQUA Executive Committee in the position of vice president: communications. Lynne's term ended after the XXI INQUA conference in July 2023 which was held at the Sapienza University of Rome, Italy. On behalf of our SASQUA members, I wish to congratulate her on her work in this role and am delighted that her contributions to the Quaternary science community have been recognised at both a local and also international level. Since she joined SASQUA almost twenty years ago, Lynne has consistently assisted with and led conference organisation, kept us up to date with news and updates, initiated new ways of looking at old problems, fixed our website (and continues to maintain it), shown leadership in her various portfolios, and in the last twelve years has held every position we have on the SASQUA committee. We can feel incredibly proud that Lynne was selected as a vice president of the INQUA Executive Committee and thank her for representing us in this time. She steadily keeps the southern African community's best interests at heart.

Following the Council meeting at the INQUA conference, several updates were communicated by the INQUA secretariat from this 2019 – 2023 inter-congress period and these changes are:

- The start of the INQUA Foundation (click here!),
- Appointment of the position of INQUA secretary,
- Launch of a monthly newsletter (click here!),
- Launch of the INQUA Fellowship programme* (click here!), and
- Launch of the new INQUA-Elsevier Journal Quaternary Environments and Humans (QEH) (click here!).

*The INQUA Fellowship Programme financially supports early-career scientists (ECRs), as well as scientists from low- and middle-income countries/developing countries (DCRs), to gain international Quaternary research experience at a foreign institution for 3–6 months.

In the INQUA Council meetings, a suggestion was raised to increase the number, or reconsider the structure, of the INQUA Commissions. This conversation initiated fairly complex debate and, as such, was 'parked'. However, in this current inter-congress term there may be a call for proposals to suggest new or different commissions. The Executive Committee, together with the new Commission officers, will consult the community and develop a proposal for a new structure for comment by the community. Please do look out for that.

SASQUA COMMUNITY UPDATES

Prof Francis Thackeray
Honorary Research Associate, Evolutionary Studies Institute
University of Witwatersrand, South Africa
Email: mrsples@global.co.za

Francis Thackeray has recently published three articles (one with the late Sue Dykes) which relate to the dating of fossils representing *Australopithecus* from sites in the Cradle of Humankind, notably Sterkfontein, Taung, and Makapansgat. Remarkably it has been possible to estimate ages from measurements of hominin molars. A biochronological method has been explored, making use of well-dated fossils from East Africa. The new mean date for *Australopithecus* as at Sterkfontein (Member 4) is 2.76 Ma, with a wide range. A date of 2.58 Ma has been estimated for the Taung Child, and circa 3 Ma for *Australopithecus* at Makapansgat.

In addition to the dates, Francis' interdisciplinary approach relates to anatomy, gene-flow and palaeo-environments, emphasising the lack of clear boundaries between species and genera. A TERAVEGANT GENEMORPH model has been proposed (see Thackeray, 2023b).

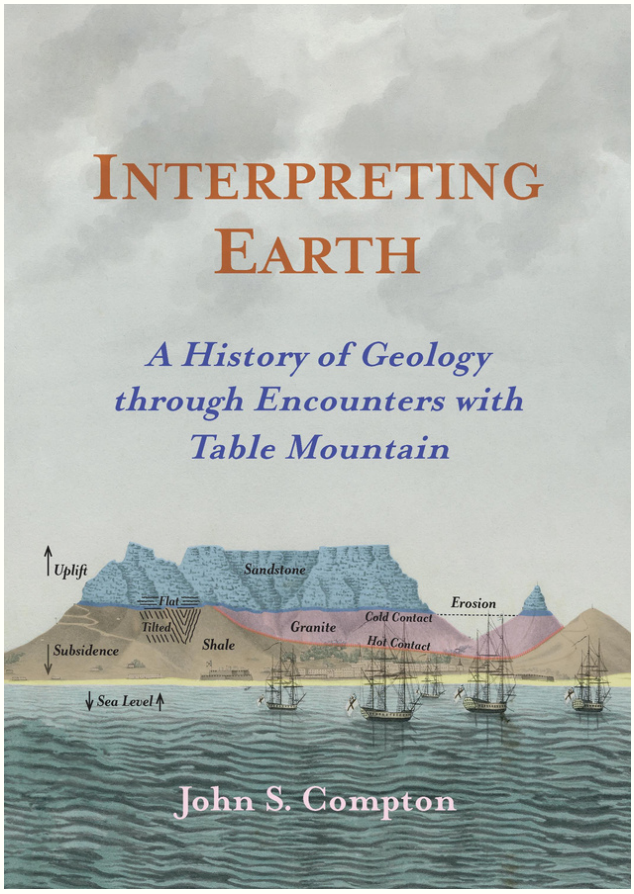
Prof John Compton
Emeritus Associate Professor, Department of Geological Sciences
University of Cape Town, South Africa
Website: johnscompton.com

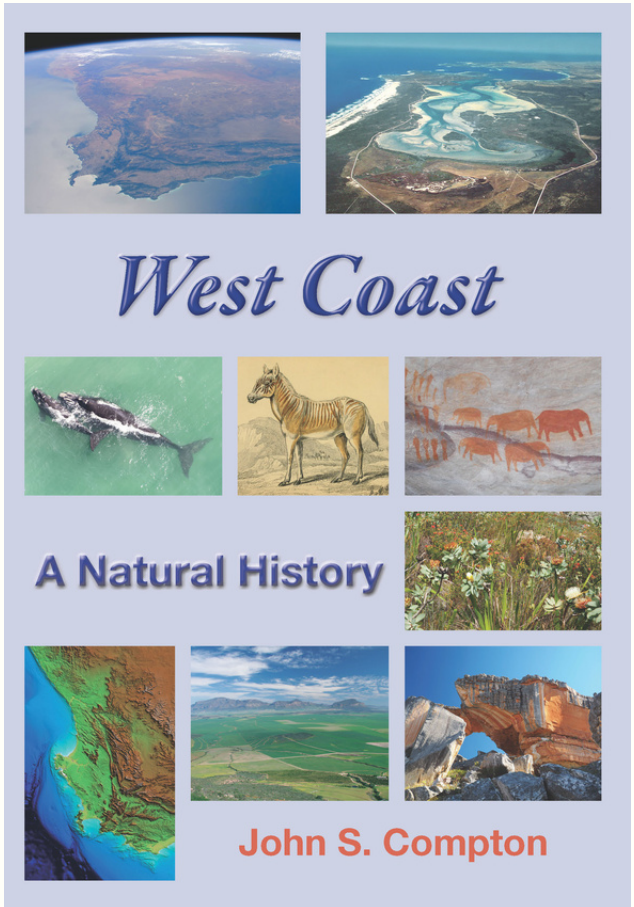
I am happy to announce that since taking early retirement from the University of Cape Town, I have published two books on the popular science of the region. West Coast, A Natural History was published in 2021 and presents a comprehensive summary of the many different aspects of the geology, climate, and ecosystems of the West Coast through a series of illustrated essays. The focus is mainly on the recent past, with many examples of processes that have been active throughout the Quaternary. The book explores how the many landscapes, habitats and life forms have evolved through time, with the last of the three chapters addressing how humans have impacted the West Coast (the Anthropocene). Interpreting Earth, A History of Geology through Encounters with Table Mountain was published in 2023 and relates what the many visitors to the Cape thought of Table Mountain and how their understanding of its origin reflected the development of geology as a science. Towering above the city of Cape Town, Table Mountain has a tumultuous story to tell that extends back over 500 million years. The iconic landmark at the southwestern tip of Africa has been a welcome sight to locals and overseas visitors for more than 500 years.

One of the most-climbed mountains in the world, Table Mountain has inspired many to record their thoughts and impressions. While the rocky massif has remained virtually unchanged, people's perceptions of it have changed dramatically. The written records of those who encountered Table Mountain reveal how we learned to read the region's deep history in parallel with the development of geology as a science. Interpreting Earth chronicles the evolution of how we think and feel about mountains.

Together with my other two publications, The Rocks & Mountains of Cape Town and Human Origins, How Diet, Climate and Landscape Shaped Us, these titles now complete my goal of conveying most of what I have learned about the region to the public. I feel it is important to make the science we do accessible to the public at large, as they are ultimately the people who fund our research and the better they understand the outcomes, the more likely they are to support basic research.

If you are interested in learning more about my books or accessing other resources on the region, then please visit my website, johnscompton.com.

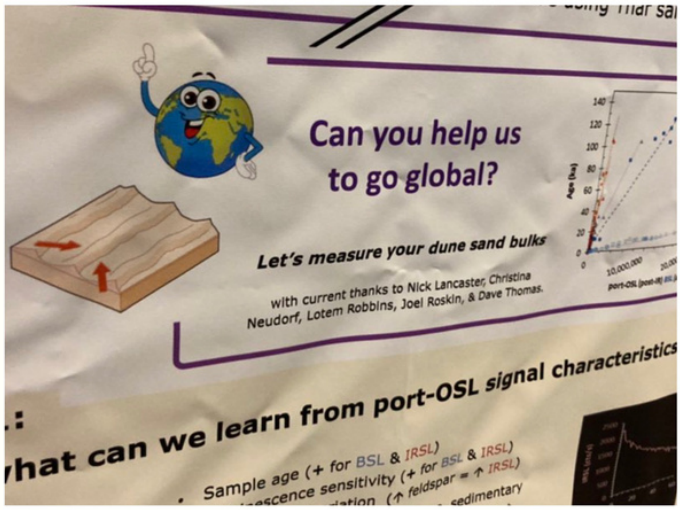




Dr Abi Stone
Senior Lecturer, Physical Geography, University of Manchester
Visiting Research Associate, School of Geography and the Environment, University of Oxford. United Kingdom.
Email: abi.stone@manchester.ac.uk

2023 started with work on the S.A.N.D.S. (Surface Archaeology of the Namib Desert Surface) team paper about the Achuelean at Namib IV, before the somewhat unsettling experience of major abdominal surgery and a long, slow phase of recuperation. With the support of family and friends, the months moved by, sometimes very slowly, as I managed to get out and take walks of increasing speed and distance. Time off whilst not being well is certainly an odd experience, and as much as we note successes and good times, sometimes it is worth remembering the perseverance through the less ideal of times. My wonderful colleagues from around the world, including SASQUA crowd, were instrumental in keeping me going. Many thanks! An online phased-return to work turned to a little in-person teaching by May, and then the attendance of the annual UK 'Windy Day' (meeting of aeolian scientists, hosted in 2023 in Oxford). I was able to present (i) a poster of the excellent work undertaken by undergraduate BSc student Paulius Jakaitis on "Holocene coversands at Olando Kepure (Dutchman's Cap) on the Lithuanian Baltic Sea Coast", as well as (ii) a poster "Dating Hominin occupation of the north of the Namib Sand Sea (NSS), Namibia." The latter set out the S.A.N.D.S. team 2022 fieldwork strategy, and initial findings at Namib IV and Narabeb, with George Leader, Dominic

Sunrise at New Bluff field site in the desert margin in Australia



Help us "go global" with your bulk (non-light exposed) dated sands.

Stratford, Rachel Bynoe and Kaarina Efraim (and absent Ted Marks, battling a family COVID set back) and with the invaluable navigational support of Eugene Marais from the Gobabeb Namib Research Institute along with the support of Gillian Maggs-Kölling. The initial Namib IV work landed in print in the Journal of Field Archaeology in May.

In June, I headed to Uppsala as part of the panel examining Yunus Baykal's excellent thesis "Source and age of late Quaternary loess deposits in Europe", keeping with the 'windy theme'. Meanwhile, PhD student Sepehr Akhavan Kharazian (joint University of Melbourne and University of Manchester) was packing to join the S.A.N.D.S. team 2023 field visit back to Namib IV, where he collected some micromorphology samples from the calcareous-rich units preserved there and some samples for luminescence dating. This will make up part of his PhD, which is a comparative study of Namib IV and the pan and lunette system at New Bluff on a private Station located within Millewa Mallee Country (Murray Darling Basin) in southeastern Australia. Later in June, I attended the 17th International Luminescence and Electron Spin Resonance Dating conference in Copenhagen and presented: "Exploring dryland dynamics with portable luminescence readers: the good, the bad and the ugly."

Delegates at LED in Copenhagen.

SASQUA catch-up on a balcony in Rome at INQUA

And I really enjoyed the first international conference catch-up for a few years, including some excursions for dips in the Copenhagen harbour pools. Late July was time for the XXI INQUA Congress (Time for Change) in the heat at Sapienza University of Rome, and very happy reunions with SASQUA members. I convened Session 183, "Frontiers in Drylands Research", with Kat Fitzsimmons and Dave Thomas and enjoyed a fantastic array of talks and posters about drylands research across the world. I spoke about "Using signals from portable luminescence readers to explore dryland geomorphology and Quaternary environmental dynamics across southern Africa." in Session 58 "The new challenges for luminescence dating". I had a poster, "Wetter intervals in southern African drylands not (always) paced by Marine Oxygen Isotopes stages or precession?" in Session 21 ", Records of climate change from MIS 3 and MIS 2 in the Southern Hemisphere: The Lynda Petherick Memorial Session."

I was disappointed not to have an animated chat with Brian at the poster (hee-hee). Following the memorial session for Lynda, the SheMAX members met to plan the next stages of collective research in the Southern Hemisphere, and James Shulmeister's suggestion of a new acronym WiSH (Warm Intervals in the Southern Hemisphere) was approved. After a productive brainstorm in a very warm room, Jasper Knight wrote this up, and in November, it was funded by INQUA for 2024-2027. Thanks to Jasper, James and the steering committee and congratulations to all members. Exciting science and funding of ECRs to attend meetings to come over the next three years.

In August, I travelled to the University of Melbourne for a workshop with Dr Jan-Hendrik (Henne) May and colleagues and visited the New Bluff Field site with Sepehr, Henne and Sam Marx (Wollongong). Many thanks to the Nulla Station owners and we acknowledge the First Peoples of the Millewa-Mallee, The Ngintait and Latji Latji as the Traditional Owners and Custodians of the Country and we pay our respects to the Elders past and present of First Peoples of Millewa-Mallee and the ancient connection they hold with their Country. In August, I travelled to the University of Melbourne for a workshop with Dr Jan-Hendrik (Henne) May and colleagues and visited the New Bluff Field site with Sepehr, Henne and Sam Marx (Wollongong).

Many thanks to the Nulla Station owners and we acknowledge the First Peoples of the Millewa-Mallee, The Ngintait and Latji Latji as the Traditional Owners and Custodians of the Country and we pay our respects to the Elders past and present of First Peoples of Millewa-Mallee and the ancient connection they hold with their Country. It was great to get a field understanding of this site with Sepehr and I did my first bit of hand augering since recuperation. The sunrises whilst camping were stunning! Sepehr is now hard at work analysing his samples. Luckily for me, there was also a certain football tournament in Australia during August and when in Melbourne I enjoyed the atmosphere in Federation Square. I took a short hop across to Sydney and got a last-minute ticket to watch the Lionesses battle to win against the Matildas (what an atmosphere in Stadium Australia in the Olympic Park!).

The team at New Bluff (Sam Marx, Sepehr Kharazian, Abi Stone, and Henne May).

Top: Back to work with augering on a lunette. Middle: Looking out for a snake at a glacial boulder sampling site in the Dibang Valley of Arunachal Pradesh. Bottom: Getting used to perching on top of boulder on fieldwork.

In late August, I was packing my bags again, this time to head to India to accompany PhD student Shashank Nitundil to the northeast of India, to the stunning Dibang Valley of Arunachal Pradesh, and the warmest welcome at the Mishmi Takin Homestay. Glacial geomorphology and sampling boulders for cosmogenic dating are exciting new directions, and I'm learning from Shashank as well as co-supervisors Phil Hughes and Chris Darvill. We are grateful to the RGS-IBG for the Walters Kundert Fellowship for funding this expedition. I got some dryland time too, heading to Rajasthan to extend the MSc research that Shashank started, establishing the age of linear dunes in the far west of the Indian portion of the Thar Desert. The logistics would not have been possible without Komal Songara, who accompanied me to a meeting with the collector (magistrate) of the Jaisalmer region for a short chat (was it an interview?) when picking up the permit.

I spoke enthusiastically about glowing sand, which he met with a smile. Rajasthan is a rapidly changing landscape, and the juxtaposition of irrigated green fields amongst areas with drifting sand is striking, as are the roads, empty of cars, but often full of cows and camels. A huge thanks to Mangilal Sharma, Vain Singh, Umaram and Mahuresh for their support and hard work in the field.

We now have ~10 m age-depth profiles to add to the 2-3 m pits investigated by Shashank during his MSc (and now published in Quaternary Geochronology, where he explored the usefulness of the portable luminescence reader as a rapid assessment tool). On the subject of the portable luminescence reader (POSL), we've been expanding the coverage of these sandy endeavours with materials kindly shared by Joel Roskin, Nick Lancaster and Dave Thomas... If you want to join the "go global" with comparing POSL signal characteristics between locations and comparing POSL and published laboratory ages, please get in touch! The rest of the UK autumn from October was spent closer to home, working on applications for future fieldwork with the S.A.N.D.S. project and visiting some UK colleagues to talk about sand, first in Cambridge and then Liverpool.

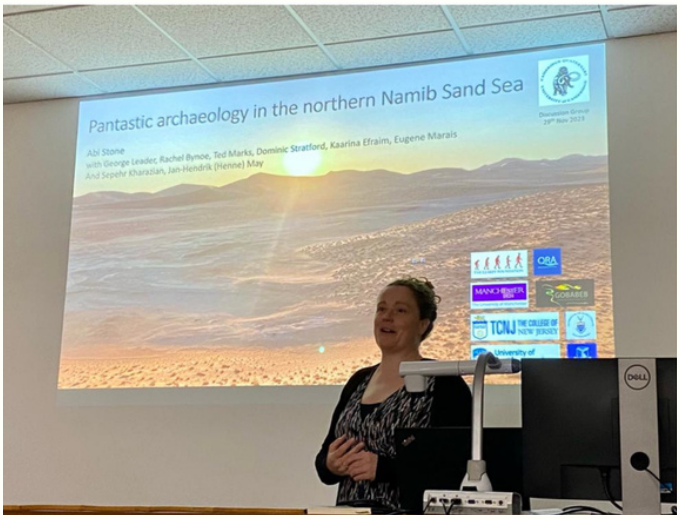
I wish everyone a happy 2024.

See page 33 for publications.

Social media:

@AbiStone

@abistone.bsky.social



Top: Sunset in the western Thar when working on a linear dune. Middle: In a hole at another dune site. Bottom: Presenting S.A.N.D.S research in Cambridge.

Dr Abraham Dabengwa
Postdoctoral researcher, Evolutionary Studies Institution
University of the Witwatersrand, South Africa

ACADEMIC HIGHLIGHTS

I am happy to report that my postdoctoral academia reprise at the University of the Witwatersrand has led to interesting ideas and projects keeping me on my toes. Some of you may be aware of my interest in palaeoecology, particularly, the dynamics, stability, resilience, and restoration of disturbance-driven ecosystems. Long-term vegetation effects of fires, large mammal herbivores, mega-droughts, and hominins pique my curiosity because they shed light on ecosystem conservation, and sustainable development, and climate change issues. Grasslands and savanna-type ecosystems have been on the menu since my PhD studies, but I'm keen to expand to other biomes.

Lately, I've been preoccupied with fire, its dynamics, reconstruction, and representation by charcoal and other proxies. Current postdoctoral work at Tswaing Crater and Wonderkrater, previously worked on by Professor Louis Scott, is aimed at re-interpreting vegetation change from an eco-evolutionary perspective by assessing ecological responses to fire in the last 200 000 years. New phytolith, fossil fungal spore, and charcoal records are being developed to reconstruct vegetation, herbivory/local moisture, and herbivore biomass at sites. This work is done in collaboration with my host, Professor Marion Bamford, and others.

Top: Visiting Twaing Crater, Pretoria Saltpan, to get a overview of landscape setting and contemporary vegetation. Bottom: Ms Megan Govender and Enele Twala, my research trainees, during the PAGES fellowship in 2023.

Palaeoecological studies are complemented by modern soil charcoal and fossil dung fungal spore at long-term ecological experiments in Kruger National Park to infer fire and grazing regimes. I developed this work together with Professors Sally Archibald and Caroline Lehmann. The charcoal-fire work is at an advanced stage and is being compared to previous work by Dr Kristina Duffin.

In the interim, 2022-2023, I got involved in an exciting project funded by the Past Global Changes (PAGES) African Inter-Mobility fellowship to re-assess sedimentary charcoal data from my PhD using digital analysis. Dr Jemma Finch and Professor Trevor Hill hosted me at the University of Kwazulu-Natal, where I learned a few techniques and later trained two students at the University of the Witwatersrand. It was fun and exciting learning while simultaneously teaching a method, but I had a motivated team. From our trials, we determined the minimum needs for analysis and ways to assess quality control.

Last but not least, I presented on-going research at the XXI International Union for Quaternary Research (INQUA) congress in Rome in 2023. I met many old friends and made new acquaintances. I got to do science and tourist stuff, which was exciting. I look forward to India in a few years!

Posing in front of the conference mascot with old friends.

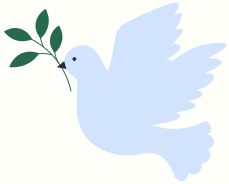
COMMITTEE MEMBERSHIPS

- International Paleofire Network (IPN) – Southern Africa representative and committee member – we are involved in curating global sedimentary charcoal records and migrating them to secure databases for future use. I am currently training as a Neotoma data steward and look forward to accessing, curating, and uploading your records. Also, if you are interested in paleofire, do not hesitate to contact me.

- International Committee for Open Phytolith Science (ICOPS) – Africa Representative and committee member. This is a Turing funded project to make phytolith proxy data meet open science FAIR principles, i.e., findable, accessible, interoperable, and reusable. We are currently working on ontologies and bridging the knowledge-data divide among disciplines. Feel free to contact me so I can keep you updated!

PERSONAL

Personally, 2023 was a difficult year as I lost my undergraduate mentor and then my mother to cancer. They continue to be important in my life as they supported my journey in several ways. I love and miss them.



See page 33 for publications!

Dr Rieneke Weij

Postdoctoral researcher, Evolutionary Studies Institution
University of the Witwatersrand, South Africa

For many years, we have worked on a study reconstructing climatic moisture availability in the Southern Hemisphere. In 2023, we finally submitted the manuscript, which has now been published in Nature. In this paper, we show that glacial periods in the Southern Hemisphere subtropics were much wetter than previously thought, including the Last Glacial Maximum. We draw attention to an aspect of Pleistocene glacial climates that has long been overlooked: because of the effect of low atmospheric CO2 on C3 plant growth, low biological productivity (i.e., suppressed tree growth) may misleadingly suggest aridity. Across the Southern Hemisphere subtropics, wetter times always occurred within glacial periods while interglacials were consistently dry over the past 350,000 years. This new understanding of what glacial conditions were like will change how we interpret the movement and expansion of plants, animals, and even humans in the past.

CLICK HERE TO READ ARTICLE

FULL-TEXT VIEW-ONLY VERSION
READ HERE!

CONVERSATION ARTICLE
READ HERE!

Dr Hayley Cawthra
Chief Scientist, Marine Geoscience, Council for Geoscience Minerals and Energy Unit
Research Associate, African Centre for Coastal Palaeoscience
Nelson Mandela University
Email: hcawthra@geoscience.org.za

NEWS

Since 2021, our Council for Geoscience marine geoscience team has worked on several projects for Eskom in order to calculate various types of seismic hazards for a potential new coastal nuclear plant. In parallel with this, we continue with our seafloor mapping programme and are currently working in False Bay, Cape Town.

Unfortunately, our team has shrunk considerably as we lost four scientists to industry positions last year. We also bid farewell to our beloved technician, Mr Willem Kupido, after an over-forty-year long career in mapping the seafloor as he commenced a well-earned retirement. Willem has assisted in just about all seafloor and lakefloor surveys which we have worked on over the years.

See page 35 for publications!

I serve as a technical advisor on the South African delegation to the United Nations International Seabed Authority (from 2015 to present), where we are contributing to writing legislation for eventual deep seabed mining as global demand for metals continues to increase and terrestrial sources cannot sustain the demand indefinitely. The United Nations document on Biodiversity Beyond National Jurisdiction preceded the Mining Code and is helping to guide the considerations on seabed mineral exploitation.

Two PhD students which I have co-supervised have graduated in the last year at Nelson Mandela University and I feel extremely proud to congratulate Dr Charles Helm and Dr Athi Mfikili on their contributions to South African Quaternary science!

Left: Dr Charles Helm, thesis title: Pleistocene fossil tracks and traces on the Cape South Coast of South Africa. Right: Dr Athi Nkosibonile Mfikili, thesis title: Evidence of Late Holocene tsunami deposits in estuaries along the South African coast and implications for coastal zone management.

RESEARCH GROUP UPDATES

PLAN TO AUTOMATE WOOD CHARCOAL TAXANOMIC IDENTIFICATIONS

Dr Bongekile Zwane
Lecturer, Palaeo-Research
University of Johannesburg, South Africa
Email: bzwane@uj.ac.za

The Palaeo-Research Institute, University of Johannesburg, Palaeoecology Lab, Nelson Mandela University, and New York University are collaborating to automate wood charcoal taxonomic identifications. This ongoing project will build on the initial proposal that was presented by Dr Allisoun House during the 23rd SASQUA conference, where she suggested that the application of machine learning is suited for anthracological use. The project is headed by Dr Bongekile Zwane, University of Johannesburg, along with a group of researchers who are principal investigators of various archaeological sites that are excavated in South Africa and Malawi under the name HOMER (Human Origins, Migration and Evolution Research), namely: Dr Justin Pargeter, Dr Naomi Cleghorn and Dr Jessica Thompson. The aim of developing this method in South Africa is for archaeological application and the trial study will be conducted on charcoal from the HOMER sites. Anthracology contributes to palaeoecological studies. However, this relies on the process of reconstructing disintegrated wood charcoal pieces

by identifying the unique cellular patterns that make up the wood of different plant species. The process involves a deep knowledge of wood cell composition which is based on the knowledge of the structure and function of woody plant tissues. Wood is the collection of microscopic cells (tube-like structures or bundles of tubes) that make up four wood tissues which serve a living plant. These are vascular tissue, fibres, axial parenchyma and ray parenchyma. They are mostly porous structures whose main function is to transport nutrients axially and radially while the plant grows in height and girth, respectively.

Their replication pattern is identical and consistent within each plant species and is used like a fingerprint by anthracologists to identify burnt woody plant pieces taxonomically. Although the structure of wood is 3-dimensional, the traditional method for describing/identifying diagnostic tissues is based on 2-dimensional surfaces of wood when cut flat along the transverse and longitudinal sections. A faster and more accurate method that relies on machine learning is being developed to automate wood taxonomic identification for archaeological applications. The method will improve on the use of reference collections by increasing the efficiency and accuracy of wood charcoal taxonomic identifications. The technique is based on the use of Imageomics – the science of extracting biological traits from images, using biological knowledge and guided by machine/deep learning. This science makes image contents, e.g., biological traits in microphotographs, computable. It then creates an algorithm to learn the suit of unique biological features that can be used to taxonomically identify unknown specimens of the same taxon with ease.

We have identified the required material, knowledge and expertise that will combine the science of wood identification and pattern recognition. In April 2023, a plan that detailed the project scope was drawn and is now in place to be executed.

This plan was also approved by Dr Caroline Cartwright, a renowned anthracologists who has worked extensively on charcoal remains from archaeological sites in the Cape Floristic Region of South Africa. Between August and September 2023, a Masters student from the Palaeoecology Lab, Marishka Govender, completed photographing the first set of Protea species that will be used in the trial study. This involved carbonising wood and photographing the microstructure of four *Protea* species that will soon be used to create an algorithm to identify archaeological charcoal of this genus. This initial trial study will test the applicability of this method using only the Cross Section (or Transverse Section) of wood. The idea is to test whether the taxonomic identification of archaeological charcoal will be possible, notwithstanding many taphonomic and growth factors. The trial study will be done in 2024 on archaeological charcoal from Knysna Eastern Head Cave 1 and Boomplaas Cave.

AFRICAN CENTRE FOR COASTAL PALAEOSCIENCE'S PALAEOECOLOGY LABORATORY
NELSON MANDELA UNIVERSITY

Dr Lynne Quick
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Email: lynne.j.quick@gmail.com

The Palaeolab research group has been very busy over the last year. We are involved in several key research projects (particularly our NRF African Origins Platform Project: https://drlynnequick.com/nrf-aop-project/), which have included lots of labwork and fieldwork excursions to the southwestern Cape, southern Cape coast and interior and the Klein Karoo. A major continued focus has been the implementation of student projects and the supervision of new students at both the undergraduate and postgraduate levels.

One student submitted their Masters dissertation at the end of the year (congrats Asithandile Ntsondwa), and three students (Erin Hilmer, Marishka Govender and Luke Nel) signed up for their MScs in 2023, successfully presented their proposals and are well on their way to completing their research this year (2024).

We congratulate Tshiamo Sepato, Rachel Mey and Viwe Dyubele for being awarded their Masters degrees in 2023. We also excited to have gained a new postdoctoral fellow: welcome Dr Kenwinn Weiner!

HIGHLIGHTS FROM 2023 INCLUDE:

- In March the Palaeolab hosted a Palaeosciences Symposium where we showcased our work (researchers, postdocs, students all presented) to the Science Faculty and also had representatives from the leadership of Centre of Excellence: Palaeoscience – Genus join us and interact with our postgraduate student body.

- In July we travelled to Italy to attend the INQUA congress in Rome, and showcased our research through several presentations:

1. L.J. Quick, S. Manzano, M.S. Humphries, B.A. Grobler, M. Chevalier, M.E. Meadows, P.T. Gama and B.M. Chase: Palaeoenvironments of the Cape Floristic Region: New research & current developments. INQUA XXI Rome, Italy, July 2023.
2. E. Hilmer, A. Julier, B.A. Grobler, N. du Plessis and L.J. Quick. Establishing connections between contemporary vegetation distributions, modern pollen representation and the fossil pollen record in the Cape Floristic Region. INQUA XXI Rome, Italy, July 2023.

3. B. Zwane, L.J. Quick and N. Cleghorn. Wood charcoal from Knysna Eastern Heads Cave 1: Evidence for the impact of the Last Glacial Maximum climate on woody vegetation and people of the Palaeo-Agulhas Plain, southern Africa. INQUA XXI Rome, Italy, July 2023.
4. M. Chevalier, B.M. Chase, L.J. Quick, W. Gosling and C. Cordova. Reconstructing the role of temperature changes in determining the glacial-interglacial aridity variability in tropical regions. INQUA XXI Rome, Italy, July 2023.
5. S. Manzano, M.T. Hoffman, L. Gillson, B.M. Chase and L.J. Quick. Holocene palaeoecological reconstructions of landscape dynamics at the year-round/winter rainfall boundary in the Cape Floristic Region (Southwestern South Africa). INQUA XXI Rome, Italy, July 2023.
6. Ntsondwa, M.S. Humphries, S. Manzano and L.J. Quick. Reconstructing the fire history and palaeoenvironment at Thyspunt, southern Cape coast, South Africa. INQUA XXI Rome, Italy, July 2023.
7. S. Mosher, M.J. Power, L.J. Quick, T. Haberzettl, T. Kasper and J.T. Faith. High-resolution sedimentary charcoal records of fire link burning, vegetation change, climate, and pastoralism in the Cape Floristic Region, South Africa. INQUA XXI Rome, Italy, July 2023.

COMMISSIONS/COMMITTEE MEMBERSHIP:

- Deputy Director of the African Centre for Coastal Palaeoscience
- Vice-President: INQUA (end of term: July 2023)
- Immediate Past President of SASQUA
- ISC/ICSU/SANC-INQUA committee member
- AFQUA (The African Quaternary) Scientific Steering committee member
- Neotoma Data Steward, southern African regional representative of the African Pollen Database (APD)

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).

See page 34 for publications!

MEDIA ENGAGEMENTS

Scientific America - April 2023

READ HERE!

The Conversation - September 2023

READ HERE!

GENUS Centre of Excellence Palaeoscience Profile Piece - March 2023

READ HERE!

Website and Social media:

drlynnequick.com/nelson-mandela-palaeolab/

@The_Palaeolab

MandelaUniPalaeolab

@thepalaeolab

UNIVERSITY OF KWAZULU-NATAL PALAEOECOLOGY LABORATORY

Prof Jemma Finch
Senior Lecturer, School of Agricultural Earth and Environmental Sciences
Palaeoecology Laboratory, Department of Geography
University of KwaZulu-Natal, South Africa

INRODUCTION

2023 has been a busy year for the University of KwaZulu-Natal (UKZN) Palaeolab. We were fortunate to host and interact with international visitors and students, spend our fair share of time in the field, and take advantage of wonderful career development opportunities. We have invested time and resources into growing the science outreach component of what we do, and have been fortunate to collaborate with local company Jive Media Africa to help make this happen and expand our reach. Trevor Hill is continuing on as Editor-in-chief of the Transactions of the Royal Society of South Africa, while Jemma Finch is Associate Editor for the South African Journal of Science Archaeology, Anthropology and Palaeontology portfolio, both roles include additional early career development activities.

We were proud to have Salona Reddy graduate with her MSc focussed on Holocene palaeoenvironments of Lake Futululu in northern KwaZulu-Natal. Salona was featured in the NRF Women's Month series: https://www.nrf.ac.za/womens-month-2023-salona-reddy/

ACTIVITIES

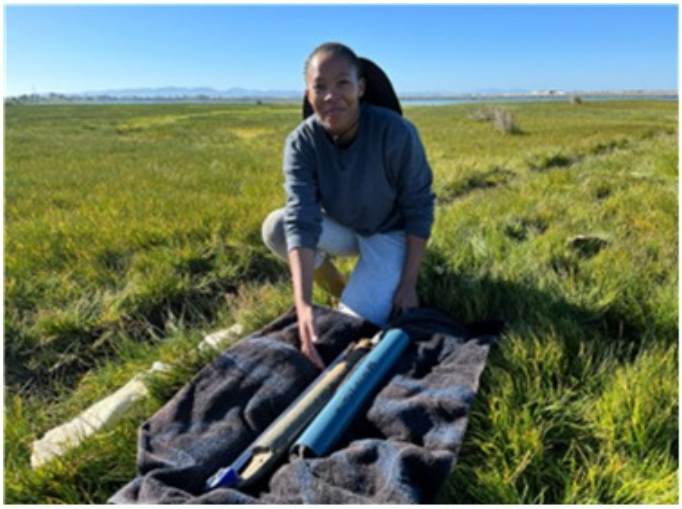
HOSTING PROFESSOR WILL GOSLING, MARCH 2023

In March 2023, we were delighted to host William Gosling, Professor of Palaeoecology & Biogeography at the University of Amsterdam and Head of the Department of Ecosystem & Landscape Dynamics. During the visit we were able to spend time in the Cathedral Peak area discussing common research interests. This collaboration has now grown into co-supervision of a Masters candidate at UVA who is working on palaeoecology in the Drakensberg.

BERG ESTUARY SAMPLING CAMPAIGN, MAY 2023

On the 26th of May 2023, had the privilege of embarking on a field trip to the Berg River Estuary in Velddrif on the western coast of South Africa. The trip was for field work sampling the sediment cores, aimed at conducting a study of the area and data collection to facilitate our project's research.

We were lucky to get assistance from the Cape Nature team, who provided us with valuable support and knowledge of the study area, which greatly enhanced our understanding of the region. We were impressed with the warm welcome we received from the Velddrif community, which made our stay more comfortable. We also had the opportunity to work under the watch of the police station commander, for which we are grateful. We were able to locate a survey benchmark outside the police station, which allowed us to measure the locality relative to a highly accurate fixed elevation. This data made a significant difference in our project which, focuses on sea level reconstruction. During our trip, we were able to core around 2 m long and recover about 24 of 48 cm short cores from the site located at coordinates 32° 47' 28'' S, 18° 09' 08'' E. We also successfully took about 58 modern samples from all the transects, which were added to our dataset.



Field sampling at the Berg Estuary

Overall, our field trip was a success, and we thank everyone who made it possible.

BOOMPLAAS CAVE EXCAVATION, MAY-JUNE 2023

Zahra Omarjee was lucky enough to be selected to be part of an archaeological research team in Boomplaas cave, in the Western Cape. This project was directed by Dr Justin Pargeter who is a researcher at New York University. This project is part of the Human Origins, Migration and Evolution Research (HOMER) group. The fieldwork team comprised a group of students and researchers from a diverse background across Africa and the world. The project is a significant part of African palaeoscience research, and the archaeological framework of Southern Africa. Zahra found this experience to be greatly beneficial, especially regarding the learning experience to work with professionals from different institutions, and academic disciplines relating to palaeoarchaeology.

Top: Outside view of the Boomplaas cave series. Middle: The Boomplaas 2023 Team. Bottom: The dig site, with sediment that dates back to the late Pleistocene, and the gunners scanning plotted finds.

During the season at site, Zahra's role as a recorder was to manage all the paperwork, databases and forms related to the excavation. This included capturing photographs of different areas of the dig site, conducting interviews with the excavating team, and transferring all dig activities and excavated finds into the recorded database. It was an exciting experience to be involved hands-on in the discovery and investigation of past human occupation in the area. Boomplaas cave is an area of interest for palaeoecology, and human origins research, and lends significance to Zahra's own research of the Southern Cape palaeoecology.

MNGAZANA ESTUARY SAMPLING CAMPAIGN, OCTOBER 2023

We joined former postdoc Dr Lauren Pretorius and her UK host Prof. Sarah Woodroffe, University of Durham, UK in a collaborative sampling campaign to the Mngazana mangroves in October 2023. The campaign was a great success, with valued support from Mr Riaan Wietz and Prof. Janine Adams at Nelson Mandela University.

The Mngazana 2023 field team looking rather smug with samples in hand.

UNIVERSITY OF GREIFSWALD EXCHANGE, JANUARY 2024

Nozizwe Mtshali and Talia Enoch were successful in securing DAAD exchange funding under the SPACES project to spend time at the University of Greifswald in Germany in January 2024. The two were generously hosted by Prof. Torsten Haberzettl and Dr. Marie-Luise Adolph.

A) The cold storage filled solely with sediment cores from South Africa. B) Group photo with some of the lab team. C) Talia posing with equipment D) Nozizwe running some spectrophotometry on her core.

While braving the cold and snowy weather, the two of them were trained in new techniques such as spectrophotometry, magnetic susceptibility and XRF scanning. The members of the Greifswald Physical Geography laboratory were nothing less than welcoming to Nozizwe and Talia. In between their hours in the lab, they also managed to squeeze in some touring, immersing themselves in the Pomeranian architecture while enjoying the the local culture.

A) The original building of the University of Greifswald in the foreground with the St. Nikolai Cathedral peaking out in the background. B) Some classic Shiraz from our shores that made its way onto some German racks. C) Mini reunion with some of our friends from the 2023 Train-Me Summerschool.

With some challenges, laughs, and close calls with the icy pavements, the trip was a memorable experience for them both. Germany is a beautiful country with a rich history and amazing people. That being said, when they return for a visit, they're gunning for Summer next time.

> One of the biggest benefits of being an exchange student is the exposure to a different educational system. Trying new foods and exploring new places has broadened my horizons and made me more open-minded. Of course, being away from home can be challenging at times. Homesickness and culture shock are common struggles that every exchange student faces. All in all, being a German academic exchange student has been a life-changing experience. I have learned so much both academically and personally.
>
> *-Nozizwe*

OUTREACH

TRAIN-ME FIELD SUMMERSCHOOL, SEPTEMBER 2023

After a hot day of sampling on the Train-ME summerschool.

We helped organise and co-taught on the 2023 Train-ME field summerschool for Aquatic and Terrestrial Geoscience Methods together with Torsten Haberzettl and Marie-Luise Adolph from the University of Greifswald, Germany, and funded by the DAAD. The 2023 summerschool, now the third in the series, was hosted in Richards Bay, KwaZulu-Natal and involved collaborative science engagement outputs (video and educational worksheet) produced together with Jive Media Africa. Dr Gavin Whitelaw kindly hosted us for a morning at Sibhudu Cave, as part of our cultural exchange component.

Additionally, two of our students, Nozizwe and Talia. had the opportunity to attend the Train-Me Summerschool. The two of them presented South Africa from the multinational group of students.

> The Train-Me Summerschool was an amazing experience. Being exposed to a different sampling method is always an exciting learning curve. On a field campaign you tend to not have the time to delve into the specifics. This summerschool allowed us that leeway to really understand the nuances that come with the different sampling techniques. It was also great to share the field with our German peers. Apologies to the other guests at our BnB for our passionate but not always-on-key singing during the evenings. We thought we sounded lovely.
>
> *-Talia*

ASSAF WORKSHOP, APRIL 2023

Trevor Hill and Jemma Finch were panelists for the Academy of Science of South Africa (ASSAF) workshop 'What it means to be a Journal Editor', 24 April 2023 as part of a series inducting new journal editors to the editorial process.

PEER REVIEW WORKSHOP, SEPTEMBER 2023

Jemma Finch presented at the South African Journal of Science Workshop 'Peer review in scholarly journals', 13 September 2023 as part of Peer Review Week.

BEACHWOOD OUTREACH, JANUARY 2024

Our lab hosted a group of Grade 9 learners from Newlands East at the Beachwood Mangroves in Durban to discuss pollen, mangroves, sea level and climate change. This event was facilitated in conjunction with Jive Media Africa and included a short educational worksheet, and a video in which learners interviewed young researchers from our lab.

OUTPUTS

INQUA CONGRESS, JULY 2023

Jemma Finch and Trevor Hill attended the XXI INQUA Congress at Sapienza University of Rome, Italy https://inquaroma2023.org

CONFERENCE PRESENTATIONS

1. Finch, J.M. Perceptions of undergraduate learners on bilingual English-isiZulu teaching materials. Innovations in the Scholarship of Teaching and Learning (iSoTL) Conference September 2023, Durban, KwaZulu-Natal.
2. Mtshali, N. Using salt marshes to understand long-term sea-level variability on the Berg River estuary on the western coast of South Africa. Postgraduate Research & Innovation Symposium (PRIS), November 2023, Durban, Kwazulu-Natal.
3. Enoch, T.N. An assessment of fossil pollen as a sea-level proxy in a southern African mangrove system. Postgraduate Research & Innovation Symposium (PRIS) November 2023, Durban KwaZulu-Natal.
4. van Schalkwyk, J. Application of phytoliths in palaeoenvironmental reconstructions, eastern escarpment, South Africa. Postgraduate Research Innovation Symposium (PRIS), November 2023, Durban, Kwazulu-Natal.

See page 35 for publications!

PUBLICATIONS

Dr Brian M. Chase
Director of Research, Centre National de la Recherche Scientifique (CNRS)
Honorary Professor, Department of Environmental and Geographical Sciences,
The University of Cape Town
Director of AFQUA; The African Quaternary – Environments, Ecology and Humans

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Email: Brian.Chase@umontpellier.fr

Chase, B.M., *Carr, A.S., Boom, A., Reimer, P.J. 2023.* *Linking upwelling intensity and orbital-scale climate variability in South Africa's winter rainfall zone: insights from a ~70,000-year hyrax midden record.* *Quaternary Science Advances.*

The climate of Africa's southwestern Cape is characterised by a strongly seasonal winter precipitation regime, with late Quaternary climate variability generally considered to have been driven by the position of the southern westerlies. This paper presents a unique ~70,000 year-long palaeoclimatic record from a rock hyrax midden from South Africa's winter rainfall zone, enabling the analysis of regional climate systems since the beginning of marine isotope stage 4. The data suggest that the last glacial period was relatively humid compared to the Holocene, likely due to cooler temperatures, more extensive Antarctic sea-ice extent and an equatorward displacement of the westerly storm track.

However, orbital-scale climate variability associated with the 23 kyr precessional cycle primarily correlates with changes in upwelling intensity in the Benguela system, implying an important role for the blocking of tropical easterly flow in driving long-term climatic variability. These factors combined during glacial periods to significantly amplify rainfall seasonality in the southwestern Cape, bringing more winter rainfall via mid-latitude frontal systems, while reducing the proportion of summer rainfall, particularly during the glacial periods of the late Quaternary. The results therefore highlight the need to consider a complex suite of circulation systems and dynamics when inferring drivers of long-term environmental change in the region.

***Chase, B.M.**, Boom, A., Carr, A.S., Meadows, M.E., Lim, S. 2023. A ca. 39,000-year record of vegetation and climate change from the margin of the Namib Sand Sea. Quaternary Research.*

This paper presents the first continuous multi-proxy record of climate and vegetation change from the central Namib Desert extending over much of the last ca. 39,000 years. Derived from rock hyrax middens, evidence from stable carbon and nitrogen isotopes, pollen, and microcharcoal reveals significant differences between glacial-age and Holocene climates and vegetation types. Although still arid to semi-arid, conditions during Marine Oxygen Isotope Stages (MIS) 2–3 were significantly more humid than in the Late Holocene. Considerable associated vegetation change is apparent, with cooler temperatures and higher/more-regular rainfall promoting the westward expansion of relatively mesic shrubby karroid vegetation during MIS 2–3. With the last glacial–interglacial transition, increasing temperatures and less/less-regular rainfall resulted in marked vegetation changes and the establishment of current xeric grasslands. The inter-plant spacing of the karroid vegetation promoted by wetter conditions does not carry fire effectively, and the microcharcoal record indicates that more extensive fires may develop only with the development of grassier vegetation under drier conditions.

As with other terrestrial records from the Namib Desert and environs, no Cape flora elements were found to support previously hypothesised expansion of the Fynbos Biome during the last glacial period.

*Carr, A.S., **Chase, B.M.**, Birkinshaw, S.J., Holmes, P.J., Rabumbulu, M., Stewart, B.A. 2023. Paleolakes and socioecological implications of last glacial "greening" of the South African interior. Proceedings of the National Academy of Sciences.*

Determining the timing and drivers of Pleistocene hydrological change in the interior of South Africa is critical for testing hypotheses regarding the presence, dynamics, and resilience of human populations. Combining geological data and physically based distributed hydrological modeling, we demonstrate the presence of large paleolakes in South Africa's central interior during the last glacial period, and infer a regional-scale invigoration of hydrological networks, particularly during marine isotope stages 3 and 2, most notably 55 to 39 ka and 34 to 31 ka. The resulting hydrological reconstructions further permit investigation of regional floral and fauna responses using a modern analog approach. These suggest that the climate change required to sustain these water bodies would have replaced xeric shrubland with more productive, eutrophic grassland or higher grass-cover vegetation, capable of supporting a substantial increase in ungulate diversity and biomass.

The existence of such resource-rich landscapes for protracted phases within the last glacial period likely exerted a recurrent draw on human societies, evidenced by extensive pan-side artifact assemblages. Thus, rather than representing a perennially uninhabited hinterland, the central interior's underrepresentation in late Pleistocene archeological narratives likely reflects taphonomic biases stemming from a dearth of rockshelters and regional geomorphic controls. These findings suggest that South Africa's central interior experienced greater climatic, ecological, and cultural dynamism than previously appreciated and potential to host human populations whose archaeological signatures deserve systematic investigation.

Prader, S., Gillson, L., Hoffman, T., ***Chase, B.M.*** *2023. Late-Holocene fynbos-forest dynamics in Orange Kloof, Table Mountain National Park, South Africa. The Holocene.*

Fynbos and afrotemperate forest exist as alternate stable states in the Cape Floristic Region of South Africa. In parts of Table Mountain National Park, afrotemperate forest has expanded in recent decades. The aim of this project was to explore the drivers of this change and distinguish whether this expansion represents a recovery of forest after previous clearance during the 18th century or is a novel expansion of forest range that resulted from policies of fire suppression in the 20th century.

To determine the relationships between forest and fynbos and its key drivers, pollen, non-pollen palynomorphs, charcoal, stable isotope ratios (δ 13 C) and major and trace elements were analysed from late-Holocene sediments extracted from Orange Kloof. Pollen data show that forest cover has fluctuated over the past 3690 years. At the start of the record, under drier conditions from 1670 BCE to ~170 CE, forests contracted, and dry, asteraceous fynbos dominated the landscape. Around ~170 CE there was a shift to ericaceous fynbos as water availability increased. Weak signals of Khoekhoen pastoralists may be visible in the record around 50 CE, indicated by increased spores and charcoal. A regime shift towards increased dominance of the forest occurred ~250 CE, associated with wetter climate. Clear anthropogenic signals are associated with European settlement from 1650 CE. Reinforced by human clearance of forest, fynbos expanded during the cool conditions of the late phase of Little Ice Age (~1750–1850 CE). Forest expansion in the 20th century likely reflects fire suppression and recovery from past forest clearance. Fire needs to be managed accordingly if further expansion of forest into fynbos is to be curbed.

Hawthorne, D., Lawson, I.T., Dargie, G.C., Bocko, Y.E., Ifo, S.A., Garcin, Y., Schefuß, E., Hiles, W., Jonay, A., Jovani-Sancho, Tyrell, G., Biddulph, G.E., Boom, A., ***Chase, B.M.,*** *Gulliver, P., Page, S.E., Roucoux, K.H., Sjögersten, S., Young, D.M., Simon L. Lewis, S.L. 2023.* *Genesis and development of an interfluvial peatland in the central Congo Basin since the Late Pleistocene.* *Quaternary Science Reviews.*

The central Congo Basin contains the largest known peatland complex in the tropics. Here we present a detailed multi-proxy record from a peat core, CEN-17.4, from the centre of a 45 km wide interfluvial peatland (Ekolongouma), the first record of its kind from the central Congo peatlands. We use pollen, charcoal, sedimentological and geochemical data to reconstruct the site's history from the late Pleistocene to the present day. Peat began accumulating at the centre of the peatland ~19,600 cal BP (~17,500-20,400 cal BP, 95% confidence interval), and between ~9500 (9430-9535 cal BP) and 10,500 (10,310-10,660 cal BP) cal BP towards the margins. Pollen data from the peatland centre show that an initial grass- and sedge-dominated vegetation, which burned frequently, was replaced by a Manilkara-type dominated flooded forest at ~12,640 cal BP, replaced in turn by a more mixed swamp forest at ~9670 cal BP. Mixed swamp forest vegetation has persisted to the present day, with variations in composition and canopy openness likely caused at least in part by changes in palaeo-precipitation. Stable isotope data (dDn-C29) indicate a large reduction in precipitation beginning ~5000 and peaking ~2000 cal BP, associated with the near-complete mineralization of several metres of previously accumulated peat and with a transition to a drier, more heliophilic swamp forest assemblage, likely with a more open canopy. Although the peatland and associated vegetation recovered from this perturbation, the strong response to this climatic event underlines the ecosystem's sensitivity to changes in precipitation. We find no conclusive evidence for anthropogenic activity in our record; charcoal is abundant only in the Pleistocene part of the record and may reflect natural rather than anthropogenic fires. We conclude that autogenic succession and variation in the amount and seasonality of precipitation have been the most important drivers of ecological change in this peatland since the late Pleistocene.

Manzano, S., ***Quick, L.J., Chase, B.M.,*** *Gillson, L., Hoffman, T. 2023. Long-term vegetation response to rainfall seasonality and fire in the heathlands and shrublands of the Cape Floristic Region (SW South Africa). Global and Planetary Change 220.*

Mediterranean environments are biodiversity hotspots in which strongly seasonal winter rainfall regimes and fire play major roles in driving ecosystem dynamics. Global predictions forecast unreliability of winter rainfall and increases in summer rainfall that are expected to result in major changes in community structure. Mediterranean systems are difficult to model, and although ecophysiological responses can be studied at observational timescales, a long-term understanding is necessary to address uncertainties and refine predictive models at landscape scales. Here we provide a ~ 1100 year-long palaeoecological reconstruction of vegetation (palynology), fire (sedimentary charcoal) and sedimentological change at a site adjacent to a multi-annual rainfall manipulation experiment designed to test plant population and community responses to altered seasonal regimes in the Greater Cape Floristic Region hotspot (southwestern Africa). We use these data to test whether long-term vegetation dynamics are controlled by changes in rainfall seasonality. We conclude that vegetation dynamics correlate with centennial-scale seasonality fluctuations, with transitions between two ecologically distinct fine-leaved shrub communities. These transitions are consistent with results of responses to experimental manipulations of summer rainfall. This study demonstrates the value of ecophysiological research in interpreting palaeoecological reconstructions and scaling up the results of observational research to answer long-term questions about environmental change.

Carr, A.S., ***Chase, B.M.,*** *Birkinshaw, S.J., Holmes, P.J., Rabumbulu, M., Stewart, B.A. 2023. Paleo-landscapes and hydrology in the South African interior: implications for human history. South African Journal of Science.*

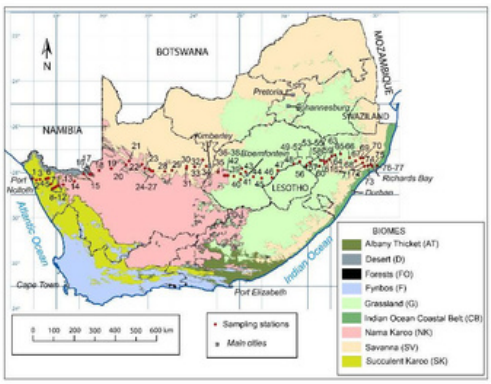
Recent research reveals that the arid western interior of South Africa experienced substantially more humid conditions on several occasions during the last 70,000 years. These findings, likely regional in scope, speak to changes to the resource base available to prehistoric hunter-gathers. Together with recent archaeological findings from this region, there has emerged a growing recognition that previously archaeologically overlooked areas of South Africa's arid interior need to be included in models of human history. This presents new challenges for archaeologists and palaeoclimatologists, particularly given the prevalence of surficial, rather than stratified, archaeological evidence throughout much of this region.

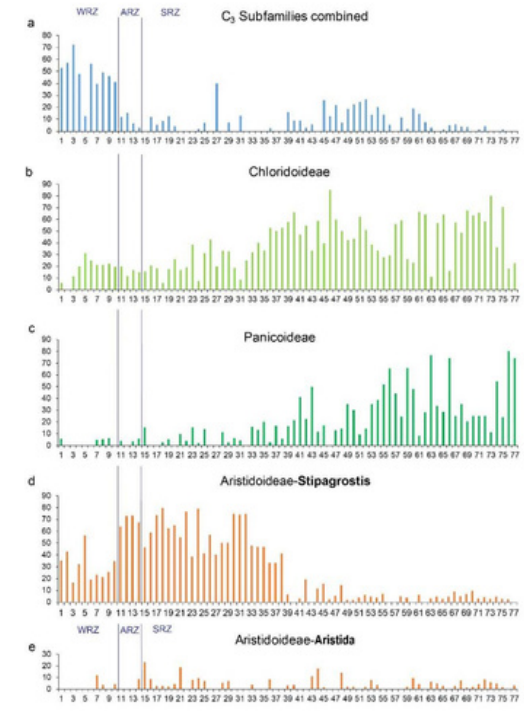
Prof. Carlos Cordova
Professor, Department of Geography
Oklahoma State University, United States of America

Cordova, C.E. 2023. Soil surface grass phytolith morphotypes across bioclimatic gradients and biomes at about latitude 29° S in South Africa. *Review of Palaeobotany and Palynology,* 313:104887

Abstract

This study examines the distribution patterns of grass subfamilies and their diagnostic silica phytoliths along a transect running approximately at latitude 28° S in South Africa. The transect encompasses 77 surface samples collected along moisture and temperature gradients, across 6 biomes and 39 ecozones, and spanning elevations between near-sea level and over 2253 m. This study tests the relation between the distribution and density of grass subfamilies and the proportions of their diagnostic grass silica short cell phytoliths (GSSCP) representing them, and how these proportions correlate with five climatic variables (mean temperature of the wettest quarter, annual precipitation, precipitation of the wettest quarter, precipitation variability, and the aridity index). The results suggest that C 3 -grass diagnostic GSSCP morphotypes increase with a decline in temperature in the wettest quarter, occurring in areas receiving mostly winter rain or at high elevations in areas of summer rain. Of the C 4 grass subfamilies, the Panicoideae increase with summer precipitation and low precipitation variability, while the Aristidoideae-Stipagrostis the opposite. The distribution of Chloridoideae depends on complex changes in all climatic variables, suggesting aridity gradients only in the eastern half of the transect. In view of the data, this study reviews the usefulness of the phytolith humidity-aridity index (Iph) and the water stress index (Fs) and proposes the Panicoideae index (PI) and Stipagrostis index (SI) as indicator of aridity and high precipitation variability in southern Africa.





Prof Francis Thackeray
Honorary Research Associate, Evolutionary Studies Institute
University of Witwatersrand, South Africa

Thackeray, J. F. 2023a. A tribute to Yves Coppens: age estimation of *Australopithecines* in South Africa. *Bulletin du Musée d'anthropologie préhistorique de Monaco, Hors-série* 10, 23-27.

Thackeray, J. F., Dykes, S. 2023. Biochronological ages for South African Australopithecus and a Plio-Pleistocene African hominin lineage (1,5 – 3,5 Ma)? *The Digging Stick 40 (1), 11-12.*

Thackeray, J. F. 2023b. Hypothetical relationships between Australopithecus, Early Homo and Paranthropus in the context of a TERAVEGANT GENEMORPH model. *Palaeontological Society of Southern Africa, PalBlog.*

Dr Abi Stone
Senior Lecturer, Physical Geography, University of Manchester
Visiting Research Associate, School of Geography and the Environment, University of Oxford. United Kingdom.

Leader, G., Byone, R., Marks, T., **Stone, A.**, Efraim, K., Stratford, D., Marais, E. 2023. Revisiting the Acheulean at Namib IV in the Namib Desert, Namibia. *Journal Field Archaeology 48(5).*

Nitundil, S., **Stone, A.**, Srivastava, A. 2023. Applicability of using portable luminescence reader for rapid age-assessments of dune accumulation in the Thar desert, India. *Quaternary Geochronology 78, 101468.*

***Stone, A.**, Inglis, R., Candy, I., Sahy, D., Jourdan, A-L., Barfod, D., Alsharekh, A. 2023. Humid phases on the southwestern Arabian Peninsula are consistent with the last two interglacials. Quaternary Science Reviews 319, 108333.*

Dr Abraham Dabengwa
Postdoctoral researcher, Evolutionary Studies Institution
University of the Witwatersrand, South Africa

***Dabengwa, A.,** Ndlovu, M. 2023. Peter Mundy 1941-2023. African Journal of Wildlife Research 53: 19-20.*

Dabengwa, A., Twala, E., Govender, M., Finch, J., Archibald, S., Bamford, M. 2023. Interrogating the digital eye: Building capacity to analyze and interpret sedimentary charcoal records from African grassy biomes. *PAGES Magazine 31-32.*

Sayedi, S.S., et al. 2024. Assessing changes in global fire regimes. *Fire Ecology 20-18.*

Dr Lynne Quick
Senior Research Fellow, Palaeoecology Laboratory,
Botany Department
African Centre For Coastal Palaeosciences
Nelson Mandela University, South Africa

Esterhuizen, N., Berman, D., Neumann, F., Ajikah, L., **Quick, L.J**., Hilmer, E., Van Aardt, A., Hoek, W., John, J., Garland, R., **Hill, T., Finch**, **J**., Bamford, M., Seedat, R., Manjra, A. Peter, J. 2023. The South African Pollen Monitoring Network: Insights from two years of national aerospora sampling (2019-2021). *Clinical and Translational Allergy 13 (11).*

Background

Pollen monitoring has been discontinuously undertaken in South Africa, a country with high biodiversity, a seasonal rainfall gradient, and nine biomes from arid to subtropical. The South African Pollen Monitoring Network was set up in 2019 to conduct the first long-term national aerospora monitoring across multiple biomes, providing weekly reports to allergy sufferers and healthcare providers.

Methods

Daily airborne pollen concentrations were measured from August 2019 to August 2021 in seven cities across South Africa. Updated pollen calendars were created for the major pollen types (>3%), the average Annual Pollen Index over 12 months was calculated, and the results were compared to available historical data.

Results

The main pollen types were from exotic vegetation. The most abundant taxa were Poaceae, Cupressaceae, Moraceae and Buddleja. The pollen season start, peak and end varied widely according to the biome and suite of pollen taxa. The main tree season started in the last week of August, peaked in September and ended in early December. Grass seasons followed rainfall patterns: September–January and January–April for summer and winter rainfall areas, respectively. Major urban centres, for example, Johannesburg and Pretoria in the same biome with similar rainfall, showed substantive differences in pollen taxa and abundance. Some major differences in pollen spectra were detected compared with historical data. However, we are cognisant that we are describing only 2 years of data that may be skewed by short-term weather patterns.

Conclusions

Differences in pollen spectra and concentrations were noted across biomes and between geographically close urban centres. Comparison with historical data suggests pollen spectra and seasons may be changing due to anthropogenic climate change and landscaping. These data stress the importance of regional and continuous pollen monitoring for informed care of pollinosis.

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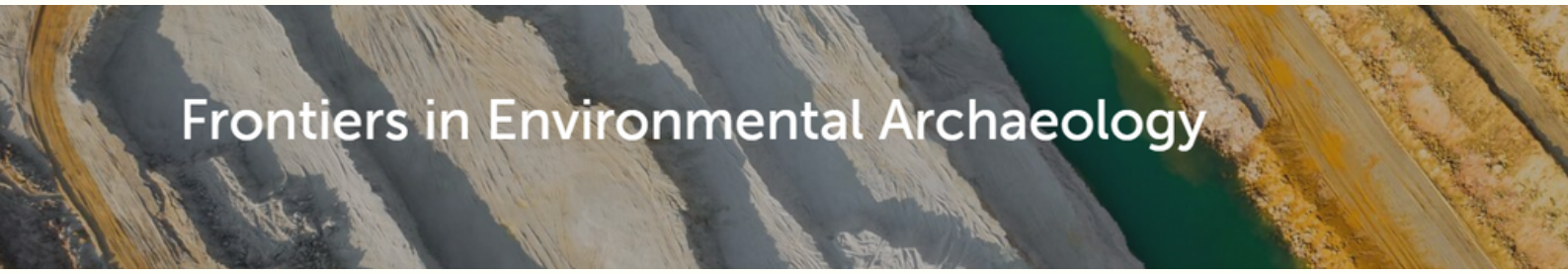
SPECIAL ISSUE



AFRICAN QUATERNARY ARCHAEOZOOLOGY APPLIED TO CONSERVATION AND INVASIVE BIOLOGY

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Background

Charles Elton is regarded by many as the founder of modern invasion biology, which dealt initially with the effects of alien invasive species (AIS) on native biota. However, this branch of science may perhaps be regarded as coming into its own at the beginning of this century, along with the establishment of the eponymous journal Biological Invasions in 1999. Today, scientists acknowledge the additional need to consider the persistent threat of AIS to the economies of the countries they invade. Moreover, it is recognised that global climate change is another factor to be incorporated in studies because it can exacerbate the deleterious effects of AIS, and vice versa.

A further concern is that overall economic and ecological costs are likely to be much higher than was once thought. Additionally, the costs of biological invasions, to both 'sender' and receiver' countries, are unevenly distributed across the world. There are various reasons for this, including both trade and differential reporting to the international InvaCost database. Both these reasons are likely to explain, at least in part, why Africa appears not to be greatly affected in cost terms. Indeed, it is probably no coincidence that South Africa, where increasing attention has been paid to AIS during the last 15 years, is among the top 10 cost-inflow countries.

This example indicates that knowing more about the real costs of AIS to African countries is vital, and we suggest that African archaeology has a contribution to make. While archaeological data have limitations connected to identifying and dating specimens, they have one unique advantage.

By extending the history of AIS in an area they allow possible patterns to emerge in the possible effects of AIS on local habits and the climatic conditions under which they occurred. Two important East African examples that document the early introduction of Asian species illustrate the potential of this line of investigation, to which evidence from numerous Iron Age and proto-historic sites in Africa could contribute.

Goals

The over-arching aim of the research topic is to develop the potential of mammalian remains from African archaeological sites to help improve our knowledge of the costs of AIS to their host countries. Much is already known about human activities in Africa during approximately the last two millennia. There are also several journals dedicated to the subject. This work provides a framework within which to place the history and significance of AIS on the continent. Now specific attention needs to be paid to understanding the inter-connectedness between humans and AIS, and the relative costs of each.

It is anticipated that several areas of research will be included.

Site-specific practical goals include:

- Identifying potential AIS material to species level,
- Dating potential AIS material or its containing deposit,
- Establishing invasion routes,
- Establishing environmental conditions during invasion,
- Establishing mechanisms of invasion.
- Interpretational goals include identifying:
- Interconnections between human activities, invasions and environments,
- Patterns in these interconnections,
- Signs of impacts on the livelihood of the host community, and on the native fauna and/or vegetation.

Broader goals include:

- Developing relevant methodologies,
- Placing the history and effects of AIS within the broad framework of human activities, especially those relating to expanding trade networks,
- Applying the archaeological data to modern invasion biology concerns.

Scope and Information for Authors

The goals outlined above clearly show that the scope and potential of this topic are broad. For this reason and to focus initial research agendas, we propose to restrict attention to mammals.

We encourage contributions from everyone whose work will help achieve these goals.
In addition, studies of specific issues relating to invasive mammals are welcome. These include, but are not confined to, the following:

- Their effect on native vegetation and fauna
- The influence of climate and/or vegetation change on their movements
- The dating of their arrival in specific regions
- Their origins and dispersal routes
- The different effects of domestic, commensal and non-commensal taxa.

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