Newsletter of the Conservation Paleobiology Network

Issue #30
July 2025

CPN Newsletter

Conservation Paleobiology Network

INSIDE THIS ISSUE:

Stay tuned for updates to the network!

The Conservation Paleobiology Network has been funded by a 5-year grant from the U.S. National Science Foundation. As our fifth year comes to an end, and based on member input, we are in the process of transitioning to a new non-profit organization with the same goals as CPN (education and support for the practice of Conservation Paleobiology). Last month a group of people from the network met for three days in Gainesville, Florida, to plan and take the first steps toward this transition.

Stay tuned for more information about the launch of this new version of the network this Fall!

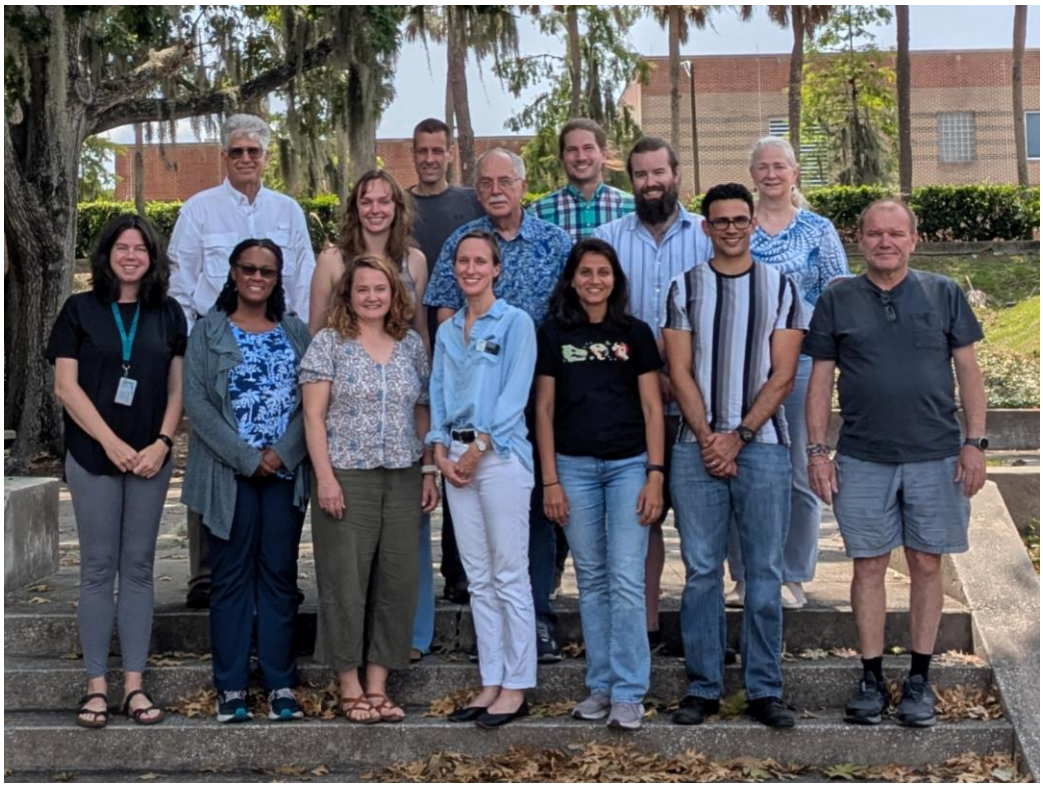

***Image caption**: Participants in the CPN transition meeting in Gainesville, Florida in June 2025 (top row, left to right): Mark Brenner, Claire Williams, Greg Dietl, Karl Flessa, Jansen Smith, Broc Kokesh, Lynn Wingard; (bottom row, left to right): Sahale Casebolt, Melissa Kemp, Jill Leonard-Pingel, Michelle LeFebvre, Priyanka Soni, Luis Torres, Michal Kowalewski.*

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Conservation Paleobiology Research Highlight

By Ben Siggery, Surrey Wildlife Trust, UK

Talking the same language: Co-production of a palaeoecological investigation to inform heathland management

The disconnect between palaeoecology and conservation practice is well known, particularly to readers of this newsletter. The idea of co-producing research with the end users (aka the practitioners) is becoming more prominent and we are beginning to see more examples of this being done successfully in published academic works. We presented one such example in a paper recently published in the Journal of Environmental Management, where we closely collaborated with local site managers and used a palaeo-approach to create management recommendations for the heathland they were responsible for.

"We closely collaborated with local site managers and used a palaeo-approach to create management recommendations for the heathland"

Lowland heathland is an internationally important but very fragmented habitat, with a substantial amount of the remaining global resource being in southern England. Whilst many of these remnants are in protected areas and relatively safe from development pressure, they are still suffering from increasing incidence of wildfire and drying out due to climate change. There are lots of questions surrounding their future and what the best way forward for conservation managers is - Should they be rewetted? Should they be left to undergo secondary succession? Should protections be even stricter? A palaeo-approach provided an interesting opportunity to establish some evidence-based restoration targets and understand how the site responded to pressure in the past.

To address these questions, we collected sediment cores from Chobham Common National Nature Reserve, Surrey, UK. We analysed the macro-charcoal, diatom remains and plant macrofossils to investigate fire history, acidification recovery and vegetative community change. The findings revealed that the site had been much better in the past, with much greater wetland biodiversity and lower levels of scrub. During this period, the site had also burnt significantly less.

***Image caption**: Collection of sediment core samples containing macro-charcoal, diatom remains, and plant macrofossils in heathland habitat, Chobham Common National Nature Reserve, Surrey, UK.*

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Conservation Paleobiology Research Highlight continued

Whilst the scrub levels had begun to decrease after establishment of site protections in the 1990s, the wetland biodiversity had not returned and the fire frequency had continued to increase. On the positive side, the pH had recovered to levels in the early 1900s, after undergoing acidification in the late 20th Century.

Working with the practitioners, we used this information to generate contextually-situated and well-considered recommendations for site management. Three strands emerged: rare species recovery plans for lost wetland biodiversity; increased allowance for natural dynamism of the site and a rewetting approach as a "silver bullet" to address many of the interlinked issues. Through co-producing the research and closely collaborating throughout all stages of it, it meant that the outcomes of the study were more relevant and useful for practitioners, and could subsequently be implemented to support management of the site.

***Image caption**: Heathland habitat where the study was performed, Chobham Common National Nature Reserve, Surrey, UK.*

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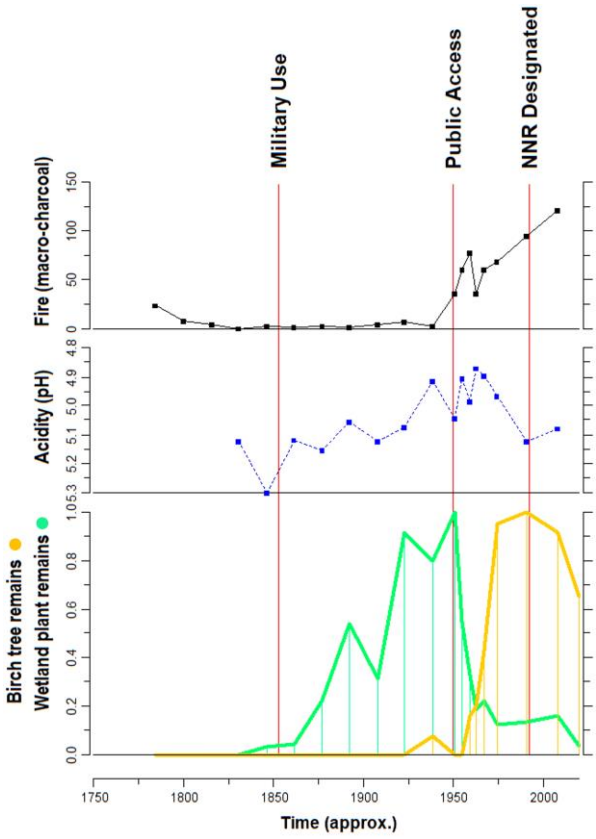

***Image caption**: Plant remains, fire, acidity, and fire over time as documented in samples from a heathland site in Chobham Common National Nature Reserve, Surrey, UK.*

For more information see the article:

Siggery, B., Bennion, H., Herd, J., Kodeeswaran, S., Murphy, R., Morse, S. and Waite, M., 2025. Talking the same language: Co-production of a palaeoecological investigation to inform heathland management. Journal of environmental management, 377, p.124652.

https://doi.org/10.1016/j.jenvman.2025.124652

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Paleo Proxy Spotlight – Nannofossils, Big Clues: How Coccoliths Help Reconstruct Earth's Ancient Oceans

By Dr. Francesca Lozar (University of Turin, Turin, Italy) and Dr. Darja Dankina (Nature Research Centre, Vilnius, Lithuania)

The ecological cycles of ancient oceans have become a major focus for scientists in recent decades. One of the most powerful tools for uncovering these long-lost dynamics comes from tiny oceanic detectives known as coccoliths. These microscopic calcium carbonate fossils help paleontologists unlock the secrets of both ancient and modern marine environments and climate.

What are coccoliths?

Most marine life depends on photosynthetic microorganisms that inhabit the sunlit surface layer of the ocean, known as the photic zone. These microscopic organisms together with diatoms are responsible for nearly 50% of global primary production, making them essential to the Earth's carbon cycle. Among the major photosynthetic groups—cyanobacteria, diatoms, and silicoflagellates—one stands out for its unique geological legacy: the calcareous nannoplankton known as coccolithophores. These single-celled algae produce calcium carbonate plates (coccoliths) that fossilize in marine sediments. Coccolithophores are also exceptional in that they leave both organic (molecular fossils or biomarkers) and inorganic (calcium carbonate) traces—offering valuable clues to past oceanographic and climatic conditions (Choudhari et al., 2020).

A remarkable fossil record

Coccoliths first appear in the fossil record around 215 million years ago, during the Late Triassic (Rhaetian–Norian stages) (Gardin et al., 2012). This long and continuous presence makes them a robust biostratigraphic marker for dating marine sediment layers, reconstructing past climates, and tracing evolutionary changes in marine ecosystems.

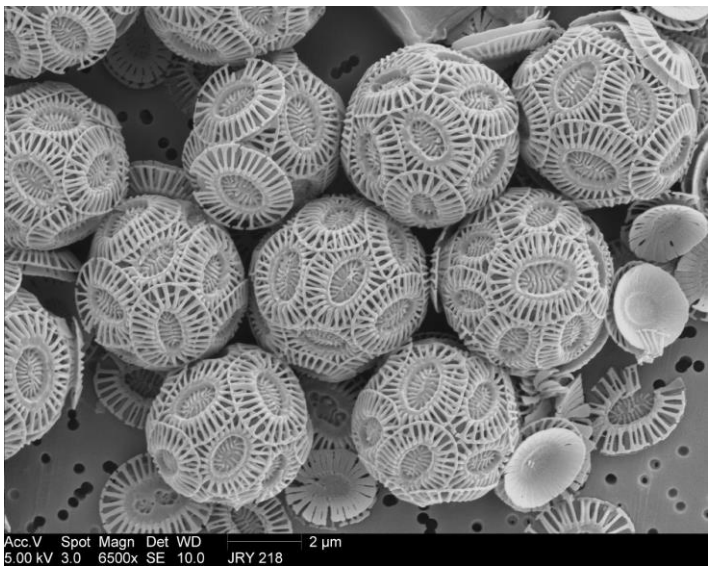

***Image caption**: Coccolithophore under a scanning electron microscope (SEM). Source: aquaticallatin.info.*

Beyond the Mesozoic, changes in coccolithophore size and calcification throughout the Cenozoic era reflect adaptations and evolutionary responses to shifts in climate and the global carbon cycle. These patterns are key to understanding how marine calcifiers may respond to future climate change (Bolton & Stoll, 2024).

In fact, they also show a remarkable record across the Mesozoic Oceanic Anoxic Events and hyperthermals during greenhouse and hothouse intervals (e.g., the T-OAE, OAE1a, and OAE2, among others). Moreover, coccolithophores respond to nutrient availability, and this is recorded in the Sr/Ca ratio of their calcite shells.

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Paleo Proxy continued

These geochemical signatures provide detailed records of marine productivity—from the extreme warmth of the Paleogene to the orbitally paced climate cycles of the late Quaternary. The abundance and species composition of both modern coccolithophores and fossil nannofossil assemblages offer unique insights into oceanic frontal systems, water mass properties, and vertical stratification. In particular, they reveal the cyclic nature of tropical productivity over millions of years.

Why it matters today?

Studying coccoliths provides a deeper understanding of how Earth's oceans and climate have changed over geological time. Coccoliths have responded over long timescales to major climate shifts driven by large-scale additions or removals of CO_2 from the atmosphere and oceans. On shorter timescales, they reacted to climate variations linked to orbital forcing.

This long-term perspective is essential as we seek to forecast the impacts of modern climate change—especially in the context of rising atmospheric CO_2 levels due to human activity. By decoding the stories recorded in these microscopic fossils, scientists are piecing together the complex puzzle of Earth's past and offering clearer insights into its future.

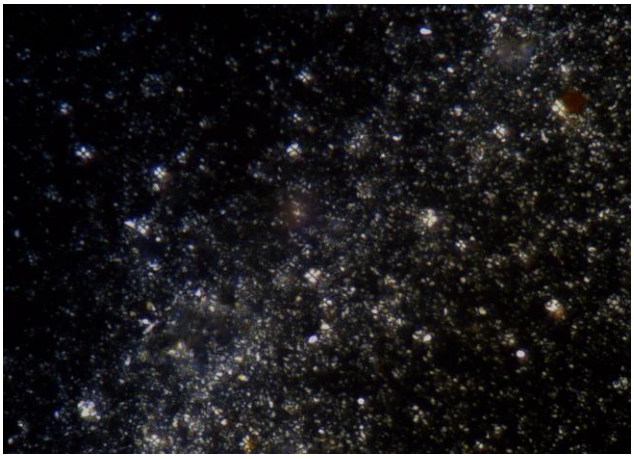

***Image caption**: A "galaxy" of coccoliths under an optical microscope in crossed polars. Photo by Darja Dankina, University of Turin.*

References

• Bolton, C.T. & Stoll, H.M. (2024). *Coccoliths as Recorders of Paleoceanography and Paleoclimate over the Past 66 Million Years.* Annual Review of Earth and Planetary Sciences, 53.

• Choudhari, P.P., Patil, S.M., & Mohan, R. (2020). Use of coccolith-based proxies for palaeoceanographic reconstructions. *Current Science*, 119(2), 307–315.

• Gardin, S., Krystyn, L., Richoz, S., Bartolini, A., & Galbrun, B. (2012). Where and when the earliest coccolithophores? *Lethaia,* 45(4), 507–523.

Seeking Resource Database Volunteers

The Student Panel is seeking 3-4 student volunteers with different academic backgrounds to help us update and maintain the student resources database (linked here). The expected time commitment is no more than a couple hours per month and would facilitate networking with fellow students interested in conservation paleobiology.

If you are interested in getting involved, please contact our Database Coordinator Emilia Galli (students.cpn@gmail.com).

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Postcards from the Field

In this feature of our newsletter, we showcase members' research in the field, lab, or other settings. Please submit your "postcards" with approximately 100 words of text to us at conservationpaleo@floridamuseum.ufl.edu

***Image caption**: Left, Alexis Mychajliw as Zelda and Cosplay for Science co-founder Gabriel Philip Santos (Alf Museum of Paleontology) as Paleontologist Pikachu; Right, Alexis's slide describing the field of conservation paleobiology through pop culture examples drawn from Legend of Zelda: Breath of the Wild.*

Alexis Mychajliw – Middlebury College, Vermont USA

While everyone can think of Jurassic Park as an example of paleontology in pop culture (for better or worse), have you ever tried conveying conservation paleobiology to a general audience? The educational initiative Cosplay for Science uses pop culture to help humanize scientists and share science in novel spaces, such as comicbook conventions (Comic Cons). This year, I learned a new approach for describing conservation paleobiology through connections with one of my favorite video game series, the Legend of Zelda, and shared our research with attendees at San Diego Comic Con. It turns out looking for fossils in asphalt seeps is a lot like avoiding the sticky, HP-saping "malice" of Hyrule, and trying to find ancient packrat middens is a lot like scrambling on cliffs for Korok seeds. As part of the Randall Preserve Working Group, I visited the world's oldest blue oak, which reminded me a bit of paying my respects to the Great Deku Tree. And last but not least, finding whale fossils in a desert might seem like science fiction, but as paleontologists, we know that such remains are amazing evidence of past life and climate change. As the game mechanics of Legend of Zelda involve time travel and preparing for environmental calamities, it can feel eerily similar to being a conservation paleobiologist!

Conservation Paleobiology Network

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Are you interested in:

…contributing to **Postcards from the Field**?
…sharing a recent publication as a **Research Highlight**?
…being featured in a **Practitioner's Perspective** piece?
…providing other content suggestions for this newsletter?

If yes, please email us at conservationpaleo@floridamuseum.ufl.edu

Invite Your Colleagues to Join our Network!

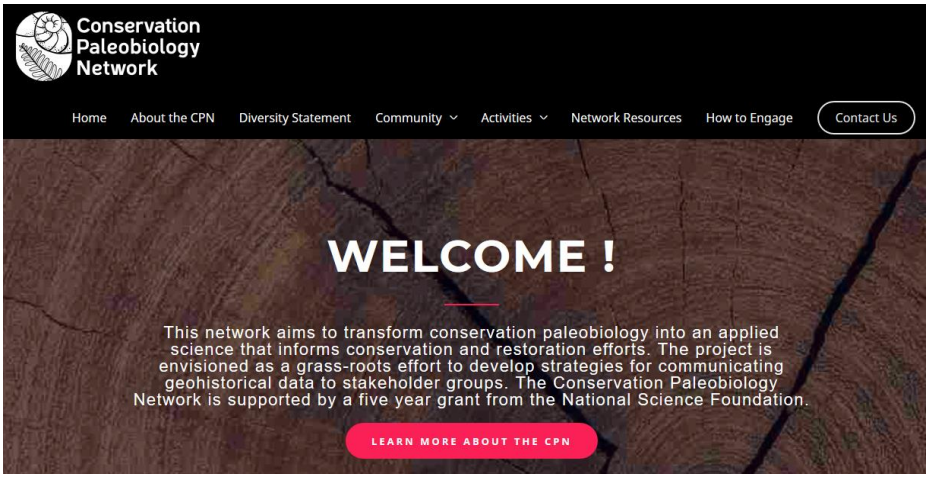
If you know people who might be interested in our network, please invite them to join. You can use the link below to extend your invitation on behalf of our network.

By joining the network, you become a member of our Community of Practice. The membership does not impose any obligations, but enables participants to engage fully in network activities. Members will be able to:

1. Participate in the CPN mailing list
2. Nominate and self-nominate for committees and panels
3. Submit announcements for publication in the CPN Newsletter
4. Apply to participate in the CPN activities
5. View CPN webinars and submit proposals for webinar modules

To join please go to our website and select "Join the Network"

Visit the website! https://conservationpaleorcn.org/



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