Newsletter of the International Network for Conservation Paleobiology

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INCP Newsletter

International Network for Conservation Paleobiology

INSIDE THIS ISSUE:

New Member Expertise

Thank you for everyone who has joined the INCP since our launch earlier this summer. We are thrilled to already see diverse expertise across our new members. Among the new members, the most popular primary area of interest/expertise is Conservation, closely followed by Archaeology and Paleoecology. Other members identify with Paleobiology, Paleontology, Marine Science, and Geobiology. This cross-disciplinary member base highlights our community's unique strength as a professional organization.

Not yet a member? You can still join! Fill out the member form on our webpage HERE.

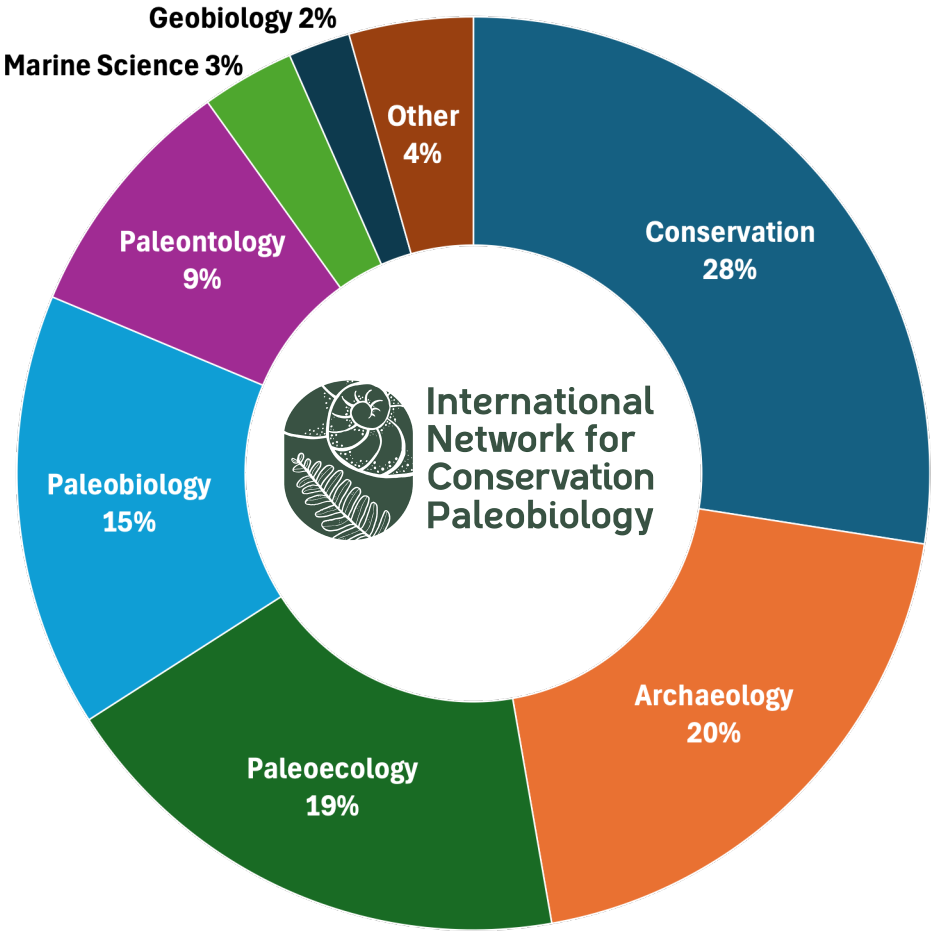

***Image caption**: The primary field of interest or expertise identified by all new INCP members.*

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Conservation Paleobiology Research Highlight

By Claudia Montalvo, Universidad Nacional de La Pampa, Argentina

Conservation Paleobiology in central Argentina

"This research uniquely combines near-time conservation paleobiology, morphology, taxonomy, and taphonomy to uncover the recent past."

How can a historical mass-mortality event in an arid environment help modern conservation? By analyzing a skeletal assemblage recovered from the banks of an ephemeral stream in central-eastern Argentina, a recent study reconstructs a catastrophic event for the endemic rodent tuco-tuco (*Ctenomys mendocinus*). This research uniquely combines near-time conservation paleobiology, morphology, taxonomy, and taphonomy to uncover the recent past.

Taphonomic analysis revealed an absence of rounding, weathering, or digestive corrosion on the skeletal elements, confirming negligible transport and ruling out predator or scavenger involvement. Combined with sedimentological data and the presence of burrows and mounds on the creek terrace, the evidence indicates that the entire multigenerational population was trapped underground and perished during a sudden, catastrophic flood. Subsequent low-energy diagenetic processes allowed for excellent post-burial preservation over the last 150 years, while the study also provides critical taxonomic clarification regarding the type locality of *C. azarae* (currently synonymized with *C. mendocinus*).

From a conservation paleobiology perspective, this historical baseline serves as an exceptional ecological analog, demonstrating how natural geomorphological changes and climatic anomalies can trigger localized population collapses in highly specialized fossorial mammals. As modern ecosystems face accelerating soil degradation and altered hydrological regimes due to anthropogenic pressures, these taphonomic insights become crucial for modeling vulnerability, predicting population responses to environmental change, and refining long-term conservation strategies for South American fauna.

***Image caption**: A* - View of the stream area with exposed unit where the fossil remains were recovered, and B - View of area neighboring the stream in central Argentina, with several current mound in burrows of *C. mendocinus.*

For more information, see: **C.I. Montalvo, F.J. Fernández, A.E. Mehl, M.S. Kin, P. Teta and R.L. Tomassini. 2026. Flood-induced catastrophic mortality of a fossorial rodent of the Western Pampean Region (Argentina) during historical times: Taphonomy, taxonomy and conservation issues. Journal of South American Earth Sciences 179 (2026) 106094.**

DOI: 10.1016/j.jsames.2026.106094

Conservation Paleobiology Research Highlight

By Nathaniel E.D. Morley, University of Alberta, Canada

Geohistorical data reveal an ice age refugium with implications for modern conservation

"Refugia represent natural sources of extinction survivorship, so identifying and protecting successful refugia should be a priority"

During times of adverse environmental conditions, refugia provide a sanctuary for threatened populations and species. Particularly successful refugia might even facilitate ecosystem recovery by serving as a source point for the re-expansion of the beleaguered population after the crisis passes. Refugia represent natural sources of extinction survivorship, so identifying and protecting successful refugia should be a priority for conservation biologists and policymakers; through its insights into the environmental conditions associated with previous refugia, the geohistorical record could be a powerful tool for predicting the locations of refugia in the future.

We propose a new method for identifying refugia using geohistorical data. This method examines the presence of a taxon in a study area through time to identify dips and rebounds that might indicate intervals of regional extirpation. This method also uses geospatial heat maps to determine whether the taxon might have persisted in one locality whilst elsewhere succumbing to extinction.

To test this method, we present a case study using geohistorical pollen data from 25 lake cores sourced from the online Neotoma database: this allowed us to reconstruct the ranges of three plant taxa over the past 20 kyr in northern Alaska, USA. Each taxon showed unique geospatial patterns over this interval. Spruce presence experienced a significant dip between 16.0–11.0 ka, corresponding to a period of relatively warm and dry climate that may have been detrimental to spruce health.

One locality appeared to shelter spruce during this interval and serve as a centre for post-crisis recovery, indicating that it likely served as a refugium (see figure).

This method is taxon-independent and can be applied to other settings, provided the data have sufficient geospatial resolution. Using this method alongside conventional approaches, such as phylogeography and species distribution models, can make the geohistorical record a more accessible tool for conservationists planning protected areas.

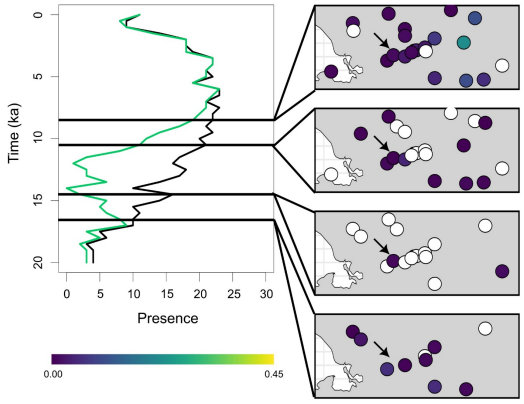

***Image caption**: Spruce presence (green line) generally tracks data availability (black line), but declined relative to data availability between 16–11 ka. Right side maps: A refugium (denoted by arrow) allowed spruce to persist in northern Alaska, USA through this period and served as a source point for re-expansion starting 11 ka.*

For more information, see: **Morley, N.E.D., Schneider C.L., Cahill Jr. J.F., Sullivan C., Leighton L.R. 2026. Geohistorical data reveal an ice age refugium with implications for modern conservation. Communications Earth & Environment.**

https://doi.org/10.1038/s43247-026-03563-3

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Paleo Proxy Spotlight – Earthworm Calcite Granules

By Sahale Casebolt

What are Earthworm Calcite Granules (ECGs)?

Paleoclimate proxies are less common in terrestrial environments compared to marine environments, which have numerous well-understood proxies (e.g. corals, microfossils, sediment cores). Calcite granules in earthworm excrement provide an exciting and relatively new option for a paleoclimate proxy in terrestrial environments (Versteegh *et al.,* 2013). The granules are usually 0.1 to 2.5 millimeters in size, and can be found anywhere there was soil where earthworms lived. The earthworm *Lumbricus terrestris* is widespread and abundant in soil, and is the most common source of ECGs. Earthworms produce these granules in a specialized organ called the Morren's gland, which is connected to their esophagus. As the worm eats organic matter in the solid (e.g. leaf litter), this gland secretes calcium carbonate to regulate the acidity of the gut. This calcium carbonate crystalizes into rounded grains of calcite with an identifiable crystalline structure. Earthworms live in the top 20 cm of the soil profile, and poop out numerous ECGs daily.

Because they are composed of calcium carbonate, the ECGs preserve well in many soils. Scientists can extract these granules from ancient soil samples and determine temperature using oxygen isotopes ($\delta^{18}O$) and precipitation using carbon isotopes ($\delta^{13}C$).

Why are ECGs such a useful paleo proxy?

ECGs can be found in loess (windblown silt deposits) and other ancient soils. ECGs are particularly useful of understanding climate since the last glacial period (45,000 to 22,000 years ago). They are compatible with radiocarbon dating (^{14}C) because the earthworms are eating carbon from recently dead leaves, not older "reservoir" carbon, so this carbon reflects a snapshot of the atmosphere at the time and is not influenced by carbon captured earlier by other means.

***Image caption**: Earthworm in soil.*

Reference

Versteegh, E. A., Black, S., Canti, M. G., & Hodson, M. E. (2013). Earthworm-produced calcite granules: A new terrestrial palaeothermometer?. Geochimica et Cosmochimica Acta, 123, 351-357.

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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 incp@conservationpaleorcn.org

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…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 incp@conservationpaleorcn.org

Invite Your Colleagues to Join our Network!

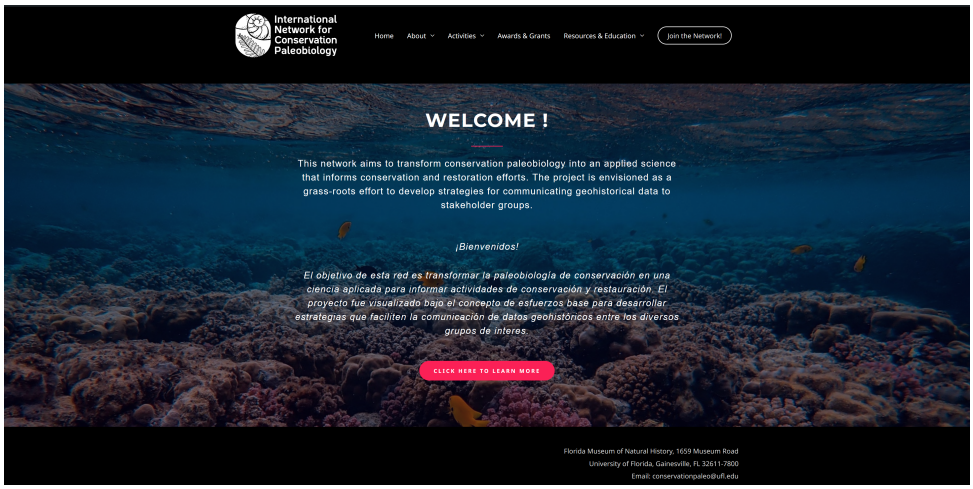
If you know people who might be interested in our network, please invite them to join. You can use the link below to extend your invitation on behalf of our network.

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 mailing list
2. Nominate and self-nominate for committees and panels
3. Submit announcements for publication in the INCP Newsletter
4. Apply to participate in the network activities
5. View 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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