BOOK REVIEW – RECENZE

Petr Pokorný – Petr Šída (eds.): Hinterland. Archeologie severočeských pískovcových krajin. Kodudek, *Praha 2025*, ISBN: 978-80-909177-8-1, 288 pages, published in Czech.

If we regard the book as an artefact, *Hinterland* is remarkable in its physical presence. The soft impression of an enlarged microscopic spruce pollen grain image invites the first touch, and the linen cover pleasantly rewards that impulse, drawing the reader in. Yet the book is not merely a technical account of research projects; it tells an engaging story of the sandstone landscapes of northern Bohemia and their prehistoric inhabitants. It can genuinely be read as a grand narrative in which the lives of people and the life of the land and nature interweave with the transdisciplinary perspectives of ecologists, archaeologists, environmental archaeologists, and conservationists. The depth and coherence of its questions and interpretations testify to a truly cross-disciplinary treatment: this is neither an archaeological monograph with environmental data tacked on, nor an ecological survey that only nominally acknowledges human agency, but a single, integrated account of the development of a particular landscape and its living communities. The main title of the book, *Hinterland*, was adopted from German to British archaeology specifically for the territories outside of the main settled areas, simply *backcountry* or if we were in Australia then one would say *outback*. In Czech, the word *zapadákov* has a clearly pejorative meaning and that is not what the authors referred to; thus, *Hinterland* is just right.

Indeed, it is a scientific book, but the language in which the scientific story is told is very natural and engaging. Fascinating artistic original photographs show very atmospheric views of sites and finds but also very lively scenes documenting researchers working in the field and in labs. Throughout the work there is a clear positive spirit among the research team and a deep dedication to the subject.

Well, judge for yourself. Authors review a substantial, meticulously executed body of Quaternary palaeoecological and environmental-archaeological research conducted in the sandstone-based landscapes of northern Bohemia. The authors of this book are a team of archaeologists and natural scientists (Vojtěch Abraham, Přemysl Bobek, Ivan Horáček, Jan Hošek, Kristýna Hošková, Lucie Juřičková, Jan Novák, Jan Oravec, Petr Pokorný, Jindřich Prach, Jan Prostředník, Michaela Prášková, Tomáš Radoměrský, Jiří Sádlo, and Petr Šída). They have long focused on the comprehensive study of a rocky area known as Bohemian Paradise (Český ráj). It is a very distinctive, unique landscape in Bohemia, characterised by sandstone rock formations known for their intricate shapes, often referred to as ‘rock cities’. The sandstones of the Bohemian Paradise are predominantly sedimentary rocks formed during the Cretaceous Period (Middle to Upper Turonian), approximately 80 to 90 million years ago. The work presented in *Hinterland* combines extensive field survey, targeted coring and excavation, rigorous laboratory analyses, spatial modelling, and novel palaeogenetic approaches to reconstruct Holocene vegetation trajectories, fire regimes, land-use histories and biogeographical contexts at fine spatial and temporal resolution. It is, in short, exemplary of how deep-time environmental inquiry can be marshalled to inform present-day conservation and landscape management. The following account summarises principal contributions, assesses methodological rigour and limitations, and explores implications for conservation practice and future research. It seeks to be appreciative and constructive: the research is ambitious in scale and exemplary in its integration of proxies, yet it also points to opportunities for further refinement and broader application. Simply, this is not a book summarising scientific facts; it creates a theoretical background for the present day and future good practices in conservation and protection of this fragile environment.

Intellectual framing and epistemic stance

A recurring strength of the research programme is its clear and thoughtful articulation of epistemological assumptions. The authors explicitly frame palaeoecology as an interpretative science

https://doi.org/10.35686/AR.2026.334

that reads fragmentary, often discontinuous archives. They recognise that past environments are not directly accessible and are instead inferred by integrating multiple independent proxies that each sample represents different dimensions of ecological relationships and human activity. This multi-proxy epistemology—pollen, charcoal, macrobotanical remains, malacofauna, insect fragments, coprolites, phytoliths, radiocarbon dates, stable isotopes, and, more recently, sedimentary ancient DNA (sedaDNA)—is presented not as eclecticism but as a rigorous strategy for cross-validation. Where proxies concur, confidence in interpretation increases; where they differ, the discrepancies are diagnostic and productive. The authors openly emphasise stratigraphic incompleteness, potential hiatuses, post-depositional mixing, and the role of fortuitous preservation in determining which questions can be credibly answered. This intellectual modesty is an asset. Interpretations are advanced as testable models rather than proclamations, and readers are encouraged to see reconstructions as evolving hypotheses subject to refinement as new data emerge.

The richness of sandstone archives and methodological innovation

The volume demonstrates convincingly that sandstone 'rock cities' are exceptional archives for Holocene studies. The landscape mosaic, featuring multi-level plateaux, steep escarpments, deeply incised ravines, rock shelters, springs and isolated loess caps, creates a diversity of depositional niches. The authors systematically exploit three archive classes:

a) Rock-shelter fills. Rock shelters function as sheltered depositional traps with stable microclimates. They have repeatedly yielded stratified archaeological horizons containing hearths, charred plant macrofossils, seeds, wood fragments, mollusc shells, vertebrate bones, insect remains and coprolites. The preservation of such a wide range of proxies in a single vertical sequence enables exceptionally fine-grained reconstructions of occupation intensity, subsistence practices and local vegetation change. The Velký Mamuťák rock shelter (abri) is a particularly striking example: a three-metre sequence with charcoal, uncharred and charred plant and animal remains, coprolites and sedaDNA that span from Mesolithic occupation into the medieval period. The combination of archaeological stratigraphy and environmental proxies at this site provides one of the clearest long-term records of pastoral intensification and its ecological impacts anywhere in the region.

b) Peat and lacustrine sediments. Mires and small lakes supply near-continuous organic sequences ideally suited to high-resolution pollen analysis, micro-charcoal quantification and geochemical proxy work. These records allow reconstruction of regional vegetation trends, fire frequencies, and general hydrological change with decadal to centennial resolution in many instances. The research exploits such records to identify major Holocene transitions (e.g. mid-Holocene thermophilous biota expansion, beech wave, later spruce phases) and changes in (mostly anthropogenic) fire regimes.

c) Soil and colluvial deposits. Although more complex to interpret—owing to episodes of erosion, mass movement and reworking—soils and colluvial sequences provide durable records of macroscopic charcoal deposition and other episodic events. When treated carefully and coupled to direct dating, these deposits reveal local fire episodes, slope stability changes, and anthropogenic disturbances that complement the more continuous mire records.

Field practice is consistently rigorous: reconnaissance coring, small well-documented trenches, flotation for charred plant macroremains, wet sieving for uncharred ones, and careful selection of samples for radiocarbon dating. The explicit emphasis on minimal-impact, small-area excavation to preserve contexts for future methodological advances is an ethically commendable approach and one that strengthens the long-term value of the datasets.

The presented project is methodologically innovative in several respects. First, it systematically integrates sedaDNA into the proxy suite, providing direct molecular evidence for the presence of domesticates (sheep, goats, cattle, pigs) and for aspects of diet and gut microbiomes—data unobtainable from many traditional proxies. Second, the use of malacological assemblages as high-resolution microhabitat indicators is exemplary. Mollusc shells, preserved in calcareous microzones created

by loess deposition and subsequent carbonate movements, reveal microclimatic and substrate conditions with remarkable sensitivity (*Zampirolo et al. 2024*).

The spatial modelling of vegetation dynamics is handled transparently. The authors deploy an extended downscaling approach (EDA) that converts point-based pollen data into spatially explicit reconstructions, using a Lagrangian pollen dispersal model calibrated by local modern pollen productivity estimates. Crucially, the model factors in depositional context (small mires versus large mires and lakes) and topographic classes derived from LiDAR-based terrain indices (slope, aspect, concavity/convexity). The result is a series of plausible, reproducible vegetation maps for four key time slices (c. 8900, 6900, 3900, and 900 BP). The authors are commendably candid about modelling assumptions, pollen productivity parameters, basin radii choices, and parameter tuning, and they treat the outputs as hypothesis-generating reconstructions rather than definitive attestations. Such transparency facilitates subsequent testing, refinement, and extension.

Late-Glacial microrefugia and the persistence of diversity and Holocene vegetation trajectories

One of the volume's most significant contributions is to the debate over Late-Glacial refugia and the spatial complexity of Pleistocene ecosystems. The authors marshal palynological, malacological and small-mammal evidence to argue that sandstone massifs provided microrefugial conditions that sustained both cold-adapted (taiga-affiliated) and opportunistic thermophilous taxa in small, spatially constrained pockets. Wind-blown loess, sometimes enriched in calcium, created microcalcareous niches where molluscs could survive. Springs and spring-fed hollows produced locally mesic conditions and exposed ridges and escarpments offered well-drained, sunlit niches. Together these elements generated unusually high beta-diversity, even during cold phases of the Late Pleistocene.

The authors align these observations with a broader palaeobiogeographical framework (including their recent discovery of silicate sinter deposits preserving thermophilous macrofossils and pollen in southern Moravia) to suggest that glacial survival was more nuanced than simple south–north recolonisation. Local persistence and stepwise range shifts from nearby microrefugia played an important role in shaping the Early Holocene species pool, an implication with important consequences for interpreting subsequent Holocene trajectories.

The Holocene narrative constructed in the volume is richly textured. The Early Holocene parkland of pine and birch gives way in the Middle Holocene to a proliferation of nutrient-demanding broadleaved taxa, a phenomenon the authors attribute in part to the legacy of eolian nutrient inputs of the Late Pleistocene. This explanation is persuasive: aeolian dust deposited in the loess deposition phase is known to be enriched in apatite, carbonate, and other base cations. The authors show how this transient fertility allowed assemblages such as lime, elm and ash to become established on sandy substrates otherwise poor in nutrients. Over millennia, leaching removed these nutrient stores; soils became more acidic and less fertile, setting the stage for later shifts.

Superimposed on this nutrient dynamic is topographic control. The fine-grained terrain classification employed in the modelling demonstrates clear, reproducible habitat-specific trajectories. Sunlit convex slopes and plateaux tend to host light-demanding taxa (hazel, pine), concave hollows and valley bottoms maintain mesic, closed-canopy assemblages (spruce, fir, later beech), and escarpments support exposed communities and fire-prone taxa. The combination of nutrient legacy and microclimatic/topographic heterogeneity therefore explains why the sandstone mosaics developed non-analogous assemblages that do not fit simple region-wide successional expectations.

Fire regimes: conceptual clarity and long-term dynamics

The authors give fire its due as an ecological process with distinct regimes. Rather than treating fire as a uniform disturbance, they evaluate frequency, intensity, seasonality, and spatial extent across time. The charcoal records (microscopic and macroscopic), dendrochronological fire scars (where

available), and soil charcoal profiles collectively show that Early Holocene coniferous stands experienced relatively frequent low-intensity surface fires. Surprisingly, the expansion of broadleaf forests in the Middle Holocene did not reduce the occurrence of fires on the landscape scale. Fires persisted and their frequency and intensity even increased due to the deliberate activities of Mesolithic hunter-gatherers, who used fire as a tool for forest management. Importantly, the charcoal record demonstrates another anthropogenic intensification of fire regimes from the Bronze Age onwards. In that period, charcoal accumulation increases, inter-fire intervals shorten, and charcoal horizons thicken, indicating more frequent and often more intense burning. The authors attribute much of this shift to pastoral practices: burning to create, regenerate and maintain pastureland and to encourage palatable forage and early successional growth. Their interpretation is nuanced. These human fires were often managed and cyclical rather than wholly destructive, and they generated habitat mosaics that were economically productive and ecologically significant (*Pokorný et al. 2022*).

Framed temporally, this perspective provides a sober context for contemporary extreme fires. The 2022 megafire in České Švýcarsko/Bohemian Switzerland (the authors dedicate this book to the 25th anniversary of the establishment of the České Švýcarsko National Park) was extraordinary in scale and social impact, yet the authors show that similar patterns of extensive burning have antecedents under different climatic and vegetational regimes. Thus, understanding modern fire requires a multi-disciplinary approach, involving meteorology, dendrology, fuel modelling, and sociology, informed by the long-term charcoal record.

Human occupation, subsistence economies, and the tempo of change

The integration of archaeological and environmental data yields rich reconstructions of human lifeways. Mesolithic occupation intensifies from about 10750 BP, with rock-shelters used year-round in some places and seasonally in others. The authors convincingly argue for a degree of semi-sedentism: repeated seasonal aggregation at large shelters and the dispersal of small family groups in favourable seasons. This pattern is explained by the exceptional local resource diversity created by sandstone topography.

Key behavioural themes emerge. Mesolithic foragers were active ecosystem engineers who used fire, favoured and perhaps managed hazel stands and exploited a broad range of plant and animal resources (*Pokorný et al. 2022*). The Neolithic transition did not instantly erase forager economies. There were prolonged coexistence and complementarity in many locations, with Neolithic farmers on loess plateaux and hunter-gatherers persisting in rock interiors (*Ptáková et al. 2023*). From the Eneolithic and more forcefully in the Bronze Age, pastoralism penetrated the sandstone interiors. Evidence from rock shelter fills (coprolites, dung horizons, sedaDNA) demonstrates caprine and bovine presence and foddering practices; sediments preserve increasing signals of pasture weeds and coprophilous fungi. The Velký Mamuťák site, again, epitomises these long-term shifts: intensive Mesolithic use, later episodic pastoral occupation, and sustained dung accumulation from the Iron Age onwards marking a transition to pastoral exploitation at the landscape scale.

Malacological records and the timing of biodiversity loss

Terrestrial molluscs constitute one of the volume's more original and revealing datasets. Mollusc shells record local substrate chemistry, litter moisture, deadwood presence, and microclimate with an immediacy that complements regional pollen signals. The authors compile mollusc sequences that document Early and Middle Holocene richness, a Middle Holocene boom in forest specialists (including an exceptional Clausiliidae snail diversity) and a progressive decline through the Late Holocene culminating in catastrophic recent losses.

The mollusc evidence undermines prior arguments for abrupt Bronze Age environmental collapse ('Lusatian catastrophe'). Instead, the decline of specialist molluscs appears protracted, with the most rapid losses coincident with 19th- and 20th-century forestry practices, particularly the planting of dense spruce monocultures, the removal of deadwood, and the simplification of stand structure.

The lesson is stark: small, specialised faunal communities can persist for millennia but eroded rapidly by modern silviculture. This finding has immediate management relevance. Conservation must attend to microhabitat integrity (deadwood, litter, microcalcareous patches) as much as to broad canopy composition.

Rethinking nativeness: European larch and conservation policy

The authors' treatment of European Larch (*Larix decidua*) is methodologically cautious and conceptually important. They problematise simplistic narratives of nativeness and point out the arbitrariness of choosing a temporal benchmark (e.g. 'pre-industrial' vs 'pre-agricultural' vs 'Holocene baseline'). Palaeoecological records demonstrate the Holocene persistence of larch in local, topographically extreme positions, such as exposed ridges and fire-prone rock edges, contradicting claims that larch is wholly non-native in the Czech lands.

Nevertheless, the authors resist romanticism. They acknowledge that most extant larch stands in the Czech Republic derive from modern, Alpine seed sources introduced historically, and phylogeographic data so far do not reveal a clear 'Czech' lineage. Consequently, management choices must be evidence-driven: where genuine relict populations are genetically verifiable, they merit protection and the use of local seed for propagation; where stands are demonstrably introduced, tolerant or utilitarian approaches may be appropriate. This balanced, data-driven stance is a model for how palaeoecological insight should inform, but not dictate, contemporary environmental policy.

Conservation translation: plural strategies and practical examples

One of the book's greatest virtues is its explicit translation of palaeoecological results into operational conservation guidance. The authors cogently argue that conservation in historically mediated temperate landscapes should be pluralistic rather than monolithic. They propose four broad regimes for forested land: a) mixed, site-appropriate selection forestry as the principal working landscape; b) active conservation management (cutting, mowing, grazing, controlled burning, coppicing, veteranisation) to sustain light-demanding and nutrient-poor habitats and their specialist biota; c) non-intervention reserves to allow the restabilisation of long-term natural dynamics; and d) production forests (potentially monocultures) outside core conservation. This mix recognises that different species and ecological processes require different temporal and spatial dynamics.

This part of the book provides practical case studies that demonstrate how Holocene-scale proxies can inform interventions. Sedmihorské wetland restoration re-established pond and marsh mosaics long characteristic of the region; canopy opening at Vyskeř reinstated pasture-like openness to benefit heliophilic flora; targeted scrub removal at Žabakor restored marshy meadow habitat. At Kostelecké bory, a non-intervention reference is maintained to study natural successional dynamics, while at Holý vrch canopy thinning and understorey removal have been used to conserve *Daphne mezereum* and other open-habitat specialists. These examples show that historically informed interventions can work and that palaeoecological evidence is directly relevant to site selection and adaptive design.

The authors also take a pragmatic approach to alien taxa. Invasive species that demonstrably displace native assemblages (e.g. *Pinus strobus*) merit control, but taxa with long-term continuity (e.g. *Larix* in certain locations) can be tolerated or integrated. This stance avoids ideological extremes and grounds decisions in evidence.

Strengths, limitations and research priorities

The strengths of the research programme presented in the book are many: a broad and complementary proxy suite, careful stratigraphic control, transparency in modelling and assumption disclosure, novel use of sedaDNA, and strong translation to management. The authors' willingness to both integrate emergent techniques and to reflect critically on their limitations is notable.

Nevertheless, several limitations and priorities remain. Spatial coverage, while commendable for a regional programme, could be expanded in underrepresented massif sectors; denser sampling

would refine landscape-scale reconstructions. The pollen-to-vegetation modelling depends on parameter choices (pollen productivity estimates, basin radii) that would benefit from further sensitivity analysis and broader modern calibration datasets across more vegetation types. For taxa with management implications (*Larix, Pinus cembra*), comprehensive phylogeographic and ancient DNA analyses are critical for resolving genetic continuity and for informing seed sourcing and conservation priorities. Finally, implementing large-scale measures such as controlled burning, pastoral reintroductions or coppice revival will require building social acceptability, legal frameworks and institutional capacity—areas in which interdisciplinary social science must accompany ecological research.

Broader significance and concluding reflections

The body of work presented in the volume is both scientifically rigorous and socially relevant. It demonstrates that palaeoecology can do more than recapture bygone landscapes; it can provide operational knowledge for contemporary stewardship. The volume's central normative message that conservation must recognise historical contingency and embrace plural, mosaic-based management is persuasive and ethically robust. It rejects the romanticism of a single 'pristine' baseline while valuing traditional ecological knowledge and historical land uses that produced habitats now considered rare and valuable.

For researchers, the study provides a methodological exemplar: integrate high-resolution stratigraphy, multi-proxy analytics, conservative field practice and transparent modelling; use sedaDNA judiciously, and pair palaeoecological data with archaeological and historical evidence to reconstruct socio-ecological trajectories. For conservation practitioners and regional planners, the work offers actionable guidance: prioritise habitat heterogeneity, restore and protect microrefugia, manage nutrient inputs and eutrophication, consider controlled burning and grazing where historically appropriate, and design mixed regimes combining active management with non-intervention reserves.

In conclusion, this research programme substantially advances our understanding of how topography, nutrient legacies, fire regimes, and successive human economies interact to shape temperate landscapes. It offers both conceptual clarity and practical measures for conserving biodiversity in complex, historically mediated terrains. The authors should be commended for their methodological rigour, transparency, and commitment to linking palaeoecological insight with real-world management. The work thus stands as a model for interdisciplinary environmental history and for evidence-based, historically informed conservation in temperate Europe and beyond.

The conclusion for readers is: *Hinterland* is a fabulous book, very special in many respects, simply a must-have book!

Jan Turek

References

Pokorný, P. – Bobek, P. – Šída, P. – Novák, J. – Ptáková, M. – Walls, M. 2022: Managing wilderness? Holocene-scale, human-related disturbance dynamics as revealed in a remote, forested area in the Czech Republic. The Holocene 32, 584–596. https://doi.org/10.1177/09596836221080762

Ptáková, M. – Šída, P. – Vondrovský, V. – Pokorný, P. 2023: Islands of difference: An ecologically explicit model of Central European Neolithisation. Environmental Archaeology 28, 124–132. https://doi.org/10.1080/14614103.2021.1985918

Zampirolo, G. – Holman, L. E. – Sawafuji, R. – Ptáková, M. – Kovačiková, L. – Šída, P. – Pokorný, P. – Pedersen, M. W. – Walls, M. 2024: Tracing early pastoralism in Central Europe using sedimentary ancient DNA. Current Biology 34, 4650–4661. https://doi.org/10.1016/j.cub.2024.08.047