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ABSTRACT BOOK

**25th Czech-Slovak-Polish Paleontological Conference
& MIKRO 2026**

ABSTRACT BOOK



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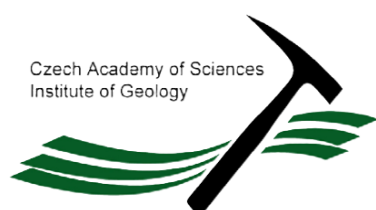
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FOREWORD

The 25th Czech-Slovak-Polish Paleontological Conference is an annual meeting for the presentation and discussion of research carried out by paleontologists dealing with various fossil groups from different ages. This scientific meeting presents new research, multi- and interdisciplinary studies and innovative methods. The tradition of this Paleontological Conference originally started as an opportunity for scientific Exchange within Czech, Slovak and Polish paleontological communities but it meets interest among researchers from the central-eastern European region every year, and this year is no exception. This year, the MIKRO 2026 is held in cooperation with the annual Czech-Slovak-Polish Paleontological Conference. The Grzybowski Foundation organizes the micropaleontological workshop guided by Michael A. Kaminski. The conference also includes two additional assemblies, the Vertebrate Paleontology Session and the AI in Paleontology workshop guided by Milan Chroust.

Each Paleontological Conference takes place in one of the three founding countries. The last conference held in Prague took place in the Vila Lanna in 2018. After eight years, it is Prague's turn again, and the conference is returning to Villa Lanna, the Representative residence of the Czech Academy of Sciences. The capital of Prague is beautiful not only in its traditional historical monuments but also in a number of hidden interesting geological localities. The meeting will consist of two days of technical sessions and a one-day field excursion in the Prague area. The first excursion will take place in a unique museum Dinosauria Museum Prague guided by Štěpán Pícha. The second excursion will guide you to nine stops in the Prague Basin: Arethusina Gorge, Mušlovka Quarry, Loboloth Hillside and Black Quarry, Opatřilka and Červený lom („Red Quarry“), Klukovice Swimming Pool, Prokop Quarry, Hlubočepy Lake, Vysoká Quarry and Hlubočepy Railway Cutting guided by Matěj Šilinger.

We wish to thank all the members of the Organizing Committee as well as everyone who made this meeting possible. We are also grateful to the Institute of Geology of the Czech Academy of Sciences and the Grzybowski Foundation. We would also like to thank the Sponsors of the Meeting – Strategy AV21, Dinopark, Dinosauria Museum Prague and Keyence.

On behalf of the Organizing Committee,

Jana Votočková Frojdová

FORAMINIFERA OF THE AUSTRALO-ANTARCTIC GULF: THE UPPER CRETACEOUS OF IODP SITE U1512

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Abstract

We present a detailed taxonomic assessment of Late Cretaceous (Turonian–Santonian) agglutinated and calcareous benthic, and planktonic foraminifera from IODP Site U1512 in the Great Australian Bight, also known as the “Australo-Antarctic Gulf” (AAG). This study expands upon the dataset of Wolfgring et al. (2021, 2023) with 25 additional samples and a systematic revision of key taxa.

Agglutinated foraminifera (*Kalamopsis grzybowskii*, *Haplophragmoides*) dominate the assemblages, reflecting the persistent low-carbonate setting. Dysoxic conditions in the semi-restricted AAG were influenced by high terrestrial input from the Ceduna River system. The marginal marine seaway documents limited oceanic exchange. Calcareous benthic (e.g., *Notoplanulina*, *Gyroidinoides*) and planktonic foraminifera (e.g., *Whiteinella baltica*) occur only sporadically, marking short-lived phases of improved marine connectivity, possibly tied to tectonic subsidence and eustatic highs during the Turonian–Coniacian.

The Coniacian–Santonian strata record an increase in calcareous taxa and the appearance of *Uvigerinammina jankoi*, together with the consistent presence of *Bulbobaculites problematicus*, offering a link to the Tethyan agglutinated foraminiferal biozonation of Geroch and Nowak (1984). By integrating new taxonomic data with existing geochemical and biostratigraphic records, this work refines paleoenvironmental reconstructions of the AAG, highlighting the interplay of tectonics, freshwater runoff, and ocean circulation patterns during the stages of the opening of the AAG and the breakup of eastern Gondwana.

NEW BIOSTRATIGRAPHIC AND PALEOECOLOGICAL DATA FROM THE PALEOGENE SEDIMENTS OF UPPER HRON VALLEY IN THE KYNCEĽOVÁ KY-1 BOREHOLE

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Abstract

Important information about the Paleogene sediments of Upper Hron Valley has been obtained from a new ENVIGEO borehole in the Kynceľová village near Banská Bystrica. They were discovered by former drilling works in the sites near Pohronská Polhora, Polomka, Ľubietová, Rudlová, etc. (see Pulec et al. 1967). Paleogene sediments in the KY-1 borehole near Kynceľová cored 20 m thick sequence of ochre-yellow and dark grey claystones and marlstones with a rich microfauna of planktonic foraminifera and calcareous nannofossils.

The dark claystones from the lower part of the KY-1 section (16.2 – 20,0 m) are rich in calcareous nannoplankton, dominated by the species *Reticulofenestra lockeri*, *R. hillae* and *Corannulus germanicus*. The first occurrences of these nannofossils are known from zone NP 17 (Bartonian). Their foraminiferal microfauna consists mainly of the species *Morozovella crater*, *Acarinina praetopilensis*, *Planorotaloides capdevilensis*, *Globigerinatheka index* and *Turborotalia cerroazulensis*. According to the mentioned species, the claystones from the lower part of the KY-1 section can be assigned to the Middle Lutetian zones (E9 – E 10).

A major change in the composition of the foraminiferal microfauna occurred in the middle part of the KY-1 section by the appearance of new species such *Tenuitella gemma*, *Dentoglobogerina venezuelana*, *Pseudohastigerina naguiewichiensis*, *Globoturborotalita pseudopraebulloides*, etc. Enhanced oxygen-poor conditions led to pyritization of clavate species of planktonic foraminifera like *Hastigerinella*, *Quiltyella* and *Bolliella*, and their malformed specimens. Above the dark anoxic sediments, the microfauna is enriched by dentoglobigerinids, subbotinids, globoturborotalids, cata-psydracids, etc. Late Priabonian age of ochre-yellow marls in the topmost part of the KY-1 section is evidenced by the last occurrences of *Acarinina* species, and first occurrences of nannofossils *Isthmolithus recurvus* in the NP 19/20 zone (sensu Martini 1971). Paleogene sediments from the KY-1 borehole revealed a shelf environment of the Veporic Land.

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FOSSIL EVIDENCE OF EARLY EVOLUTION OF HIGHER CAENOCASTROPODA

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Purpurinidae is a group of gastropods that diversified first in the Late Triassic and subsequently in the Early Jurassic, giving rise to several higher caenogastropod lineages. Some of these, including the families Purpurinidae s.s. and Colombellinidae, are now extinct, whereas their other derived groups, such as Tonnoidea, Cypraeoidea, and Neogastropoda, have diversified, proliferated and subsequently survived to the present day. The stem lineage of Neogastropoda likely diverged from Purpurinidae s.s. during the Late Triassic, while the lineage ancestral to Tonnoidea had separated by the Early Jurassic at the latest. Tonnoideans also may either represent the sister group of colombellinids or a lineage that evolved from colombellinids at an early stage of their evolutionary history. However, this hypothesis requires further testing, particularly through the study of colombellinid protoconch morphology, which remains unknown to date. A comprehensive revision of the family Colombellinidae—marine gastropods occurring in carbonate facies from the Middle Jurassic to the lowermost Upper Cretaceous and distributed primarily in Europe and rarely in Asia—revealed their close affinity with representatives of Cypraeoidea. A gradual morphological transition from colombellinids to cypraeoids is reflected in a proportional reduction of the spire, peristome thickening, and pronounced expansion of the inner lip (particularly well documented in the type species of *Zittelia*), as well as in several other apertural characters. These changes provide compelling evidence for the placement of Colombellinidae within the evolutionary history of the Cypraeoidea (Bakayeva et al. 2026).

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A PRELIMINARY ACCOUNT OF THE UPPER MISSISSIPPIAN–LOWER PENNSYLVANIAN ICHTHYOFAUNA OF THE UPPER SILESIAN BASIN, CZECH REPUBLIC

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Abstract

The Upper Silesian Basin (USB) represents an early to late Carboniferous coal-bearing foreland basin of the Variscan Orogen, fragments of which are distributed in a belt extending from the Western to the Central Europe. In the eastern part of the Czech Republic, the deposits of the USB are distributed in an approximately triangular area extending from the Polish border at least to the Frenštát area, and mostly overlain by younger sediments (Dopita et al. 1997). The lower lithostratigraphic unit of the basin, the Ostrava Formation, represents the Upper Mississippian (Serpukhovian) paralic series characterized by cyclic sedimentation of continental, transitional, and marine deposits (e.g., Jirásek et al. 2018). On contrary, the overlying Lower Pennsylvanian (Bashkirian) Karviná Formation represents solely continental sedimentation. At least 200 faunal bands have been recognized in both formations, which together represent 35 groups of faunal horizons (Řehoř & Řehořová 1972). Although a number of marine, brackish and freshwater invertebrates have been described in the past from these horizons (Řehoř & Řehořová 1972), little attention has been paid to vertebrate remains (Šusta 1932; Řehoř & Řehořová 1988). Herein, the preliminary account of the ichthyofauna from the Czech part of the USB is provided. The studied material consists mainly of isolated skeletal elements housed in the collections of the Ostrava Museum, which have so far been determined as belonging to actinistians, megalichthyid and rhizodontid tetrapodomorphs, as well as various actinopterygian fishes. Their remains span the stratigraphic range of the Ostrava Formation from the Petřkovice to the Poruba Member, while in the Karviná Formation they are limited mainly to the Suchá Member.

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LATE DEVONIAN CONODONT BIOSTRATIGRAPHY AND GEOCHEMISTRY OF GLOBAL ANOXIC EVENTS WITHIN THE LÍŠEŇ FORMATION, MORAVIAN KARST

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Abstract

The Upper Devonian/lower Carboniferous Líšeň Formation in the Moravian Karst (Czechia) comprises the upper-slope Hostěnice facies (dominated by Křtiny Limestone) and the lower-slope Hórakov facies (dominated by Hády-Říčka Limestone), whose contact was highly deformed by the Variscan orogeny (Rez, 2011). A less deformed transitional facies was exposed in the Mokrá-Central quarry, 5km NE of Brno. The section thickness is 27 m and can be divided into three members: 1) the hemipelagic Křtiny Lst., 2) the calciturbidites of Hády-Říčka Lst., and 3) the second interval of Křtiny Limestone at the top of the section.

The conodont biozones identified in the Líšeň Fm. range from the Famennian *Palmatolepis marginifera marginifera* to the Tournaisian *Siphonodella wilberti*. Conodont biofacies in the "lower" Křtiny Lst. are dominated by the genus *Palmatolepis*, characteristic of the middle to lower carbonate slope. The Hády-Říčka Lst. shows an increase in pelagic conodonts that, together with its lithology, indicates a deepening of the depositional environment.

The bed that represents the global anoxic *annulata* event is near the base of the Hády-Říčka Limestone. Near the top of the Hády-Říčka Lst. are two peaks of increased U/Th ratio into anoxic values, followed by an increase in Zn/Rb, Cu/Rb, and Mo/Rb ratios. These values, together with a conodont zone, might indicate the presence of the Dasberg Events; however, a more detailed analysis is required. A dark grey, laminated microbial layer occurs near the top of the section in the Křtiny Limestone, just above the *Siphonodella praesulcata* conodont Zone. This facies was described as equivalent to Hangenberg Black Shale from the Hády-Říčka Lst. (Kalvoda *et al.*, 2018) and was previously unknown in the Křtiny Lst. of Hostěnice or transitional facies.

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MIDDLE PLEISTOCENE MAMMOTHS FROM BĚSTOVICE (CZECH REPUBLIC)

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Abstract

Whilst the fossil record of Late Pleistocene mammoths from the Czech Republic is expansive, finds from older strata are much rarer. The Middle Pleistocene steppe mammoth, *Mammuthus trogontherii* is rare even in the few Middle Pleistocene sites known from the Czech Republic. In the Czech Republic this species has been recorded from sites such as Přezletice, Stránská Skála and Úvoz (Part of Brno) (Fridrich, 1989; Musil & Jelínek 1972, Musil, 1955).

Here we report a new fossil assemblage from Běstovice, near Choceň, which alongside other large mammals yielded several third molars of *M. trogontherii* alongside multiple fragmentary molars, tusks and limb bones. The morphology of the molars is similar to that of the late Middle Pleistocene *M. trogontherii* from Steinheim and Illford (Lister, 2022). The morphology of the mammoth molars alongside the other fauna present, such as *Coelodonta* sp. and *Megaloceros* sp., suggests a late Middle Pleistocene date for the fauna in Běstovice. This point in the evolution of *M. trogontherii* is not well understood and the material from Běstovice could shed new light on the paleoecology and evolution of the steppe mammoth. The material from Běstovice represents the largest sample of *M. trogontherii* from the Czech Republic to this day.

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A NEW ALOSID FISH (CLUPEIFORMES) FROM THE UPPER OLIGOCENE (CHATTIAN) TRBOVLJE FORMATION OF SLOVENIA

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Abstract

The upper Oligocene (Chattian) laminated marls of the Trbovlje Formation near Trbovlje, Slovenia, preserve a diverse fossil fish assemblage from the Central Paratethys. Previous investigations have documented a rich ichthyofauna together with crustaceans, molluscs and abundant plant remains, indicating deposition in a low-energy, oxygen-depleted basin above the Trbovlje coal seam (Gašparič et al., 2024a). Recent fieldwork employing bed-by-bed sampling of a measured section yielded hundreds of articulated fish specimens, providing an opportunity to investigate both taxonomic diversity and the vertical distribution of individual taxa within the succession. Among the collected material, clupeiform fishes are the dominant component of the assemblage. An occurrence of the extinct alosid genus *Sanalosa* from the lower Oligocene of Poland demonstrated that the genus formed part of the Paratethyan fish fauna, but its morphology and variability remain poorly understood owing to the limited available material (Bienkowska-Wasiluk et al., 2024). Detailed comparison indicates that the majority of the Slovenian specimens belong to *Sanalosa*, but differ from the Polish material. The abundance of exceptionally preserved specimens, including individuals representing different ontogenetic stages, allows evaluation of intraspecific variability. The bed-by-bed sampling further demonstrates that *Sanalosa* occurs throughout the exposed succession but reaches abundance peaks within several discrete fish-mortality horizons, providing valuable insights into population dynamics and taphonomic processes (Gašparič et al., 2024b). The Slovenian assemblage expands the known palaeobiogeographic and stratigraphic distribution of the genus within the Central Paratethys and represents the largest population of *Sanalosa* currently known. Ongoing investigations will improve our understanding of the diversity, palaeoecology and evolutionary history of Oligocene clupeiform fishes in the Paratethys.

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LATE PALEOCENE BRACHIOPODS FROM THE BABICA CLAYS OF THE POLISH OUTER CARPATHIANS

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Abstract

The Babica Clays are a rock formation named after Babica village near Rzeszów by Kropaczek (1917). They consist of weakly consolidated dark sandy clays rich in shell debris and are interpreted as submarine sediment flows. Based on foraminifers, their age is determined as Late Paleocene (Thanetian) (Szczechura & Pożaryska 1974).

Although the Babica Clays contain rich micro- and macrofaunas (e.g. Krach 1963, 1969), brachiopods have never been reported from those deposits. Brachiopods are rare and of low diversity; additionally, the material is poorly preserved, mostly fragmented, but relatively well diversified for the Palaeocene. The assemblage comprises five species belonging to four genera within three families. The families Thecideidae and Cancellothyrididae are represented by one species each, *Thecidea* sp. nov., and *Terebratulina squamulosa* (Baudon, 1855), respectively. The remaining three species, i.e. *Megathiris* sp., *Argyrotheca* cf. *semicostata* (Baudon, 1855) and *Argyrotheca alavensis* Pajaud, 1972, are representatives of the family Megathyrididae. The species *T. squamulosa* and *Megathiris* sp. are extremely rare in the studied material. The genus *Thecidea*, known so far from the Upper Cretaceous (Baker 2006), is recorded for the first time from the Paleocene, extending its stratigraphical range. The presence of thecideide and megathyridid brachiopods indicates a warm, shallow-water environment which agrees with the interpretations of other faunas (molluscs, corals).

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TESTING THE ROBUSTNESS OF IREVIKEN BIOEVENT DATUM POINTS: CONODONT BIOSTRATIGRAPHY AND $\Delta^{13}\text{C}_{\text{CARB}}$ CHEMOSTRATIGRAPHY ACROSS THE ESCIE IN THE KALINGA GULLY SECTION, AUSTRALIA

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Abstract

The early Silurian Ireviken Bioevent represents one of the most profound intervals of species turnover recognized in the Palaeozoic. This bioevent is associated with a prominent positive carbon isotope excursion, the early Sheinwoodian carbon isotope excursion (ESCIE). The ESCIE has been documented globally, however, data from Gondwana remain sparse. The only previously available measurements comprise five elevated $\delta^{13}\text{C}_{\text{carb}}$ values reported by Talent et al. (1993) from the Boree Creek Formation in the Kalinga Gully section, New South Wales, Australia. This single eastern Gondwanan occurrence of the ESCIE has recently been resampled and analysed, yielding the first high-resolution $\delta^{13}\text{C}_{\text{carb}}$ record of the entire excursion from Gondwana (Frýda et al., 2026). In contrast to the chemostratigraphic work, detailed biostratigraphic investigation of this section has been ongoing for several decades. All conodont biostratigraphic data from the section were recently summarized by A. Simpson (in Frýda et al., 2026). On the basis primarily of the Gotland successions, the extinction phases of the Ireviken Bioevent have been subdivided into smaller segments bounded by Datum points (Jeppsson, 1998). The stratigraphic range of the Ireviken Bioevent has been divided into eleven reference Datum points (Jeppsson, 1998). However, Lloydell and Large (2019) noted that the conodont record shows less consistency regarding the onset of the ESCIE in relation to the Ireviken Datum points, possibly reflecting environmental controls on conodont distribution. Here, using several numerical methods, we analyse the conodont biostratigraphy of the Kalinga Gully section, focusing primarily on the robustness of the Datum points and their relationship to $\delta^{13}\text{C}_{\text{carb}}$ chemostratigraphy.

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LAMINATED SEDIMENTS OF THE BÍLINA DISTAL PRODELTA (LOWER MIOCENE, MOST BASIN): TOWARDS UNDERSTANDING THEIR PALEOENVIRONMENTAL RECORD

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Abstract

The Lower Miocene deposits of the Most Basin preserve one of the most complete continental lacustrine successions in Central Europe. Within the Bílina Delta, an approximately 70 m thick sequence of finely laminated siltstones and claystones preserves a detailed sedimentary record of distal prodelta deposition during the early stages of lake expansion (Rajchl & Uličný, 1999). Although cyclic sedimentation has been recognised in the basin since Hurník-Luft (1959), and geochemical records from the overlying lacustrine succession have been interpreted in terms of orbital forcing (Matys Grygar & Mach, 2013), important questions regarding the formation, variability and chronological implications of these laminated sediments remain unresolved.

The siltstone-claystone sequence is being investigated through detailed sedimentological logging, lamina-thickness, colour analysis, ichnological observations, palaeontological evidence and comparison with available stratigraphic and geochemical data. Initial field observations indicate systematic variations in lamina thickness, sedimentary structures and bioturbation, consistent with changes in sediment delivery and depositional processes across the distal prodelta. Attention is paid to the origin and chronological implications of each type of lamination, which provide the basis for reconstructing sediment accumulation patterns and, ultimately, for paleoenvironmental interpretation.

By improving understanding of the depositional evolution of the Bílina distal prodelta, this study aims to strengthen the paleoenvironmental interpretation of the laminated succession while providing the sedimentological context necessary for future evaluation of the cyclic patterns recorded within this unique strata.

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CENOZOIC COPROLITES FROM POLAND: PALEOECOLOGICAL AND PALEOBIOLOGICAL IMPLICATIONS

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Abstract

Trace fossils are 3D modifications of a substrate by producing organisms (Bertling et al., 2006). A footprint, a burrow, or a bite trace results from substrate modification by external body parts – these offer an intuitive way of matching the ichnofossil morphology with a producer's body plan. Coprolites, however, are the results of much more complex processes, starting with in-mouth processing, via chemical digestion, up to excretion. This necessitates an "inside-out" approach when interpreting them. This is one of the main reasons why coprolites have been and still are so challenging to interpret. The project undertaken by the authors tackled diversified sets of fossil feces from the Oligocene and Miocene of Poland, derived from marine (deep and shallow) and terrestrial facies (Brachaniec et al., 2025). It is worth emphasizing that Cenozoic coprolites from Poland were poorly known. Previously, only Bajdek and Bieńkowska-Wasiluk (2020) described coprolites from the Oligocene sediments of the Outer Carpathians in southern Poland. In this project, the emphasis was on the attempt to link coprolites with their plausible producers. This was approached by a morphological comparison with an extensive database of extant feces, their internal structures, and inclusions. The studied material comprised coprolites assignable to crustaceans, fish, squamates, small mammals and – plausibly – birds. The recorded wide spectrum of morphologies and internal features of fossil examples, and their cross-referencing with extant counterparts, create a dataset for future interpretations of coprolites, trophic interactions as well as paleoecological reconstructions.

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STINGING NEWS

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Abstract

Over the past few decades, conulariids have been regarded as representatives of fossil cnidarians, specifically scyphozoan cnidarians. Thanks to their typical ornamentation, consisting of tiny nodes arranged in rows and columns, and the characteristic shape of their shell - elongated pyramidal or conical and usually with four walls- they are generally easily recognizable in the fossil record. Conulariids reached their greatest diversity during the Ordovician, but they are known from the Ediacaran through the Triassic. They are found on every continent except Antarctica, where they form an important part of ecosystems. In recent years, major changes have occurred in the study of these cnidarians; several papers have addressed their systematic position, phylogeny, and paleoecology and taphonomy. We now know that they reproduced both by budding and, apparently, sexually, as their skeletons often form massive accumulations of individuals of similar age. Following previous discussions, they have also been successfully classified as sessile benthos. Epibionts such as bryozoans, brachiopods, and edrioasteroids are often found on them, and their presence provides insight into the lifestyle of the conulariids. Conversely, some individuals were found to be interested in interactions with one another or with other animals that served as a hard substrate for their attachment. Thanks to the findings from Morocco, it was possible to define pioneer communities following storm events in the Lower Fezouata Shales (Tremadocian, Ordovician), and also to identify their tentacles for the first time. However, a modern revision of Czech conulariids is still needed, as in several cases they serve as type species for genera with a worldwide distribution.

NEW MIDDLE MIOCENE VERTEBRATE LOCALITY IN THE TŘEBOŇ BASIN

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Abstract

Only a few vertebrate localities are known from the Neogene of the South Bohemian Basins (e.g., Čech et al. 1962; Fejfar 1990). Ongoing bentonite mining near Maršov, on the northwestern margin of the Třeboň Basin, has exposed Miocene fossiliferous beds. Since the locality was discovered in 2022, extensive rescue fieldwork (with fossils documented with respect to their stratigraphic and spatial distribution) and laboratory processing (including sieving, palynological maceration and preparation of diatom samples) have revealed several bone beds containing isolated remains and articulated skeletons of fishes, amphibians, turtles, squamates, crocodiles, birds and mammals (rodents, lagomorphs, palaeomerycids, bovids, suids, rhinocerotids, proboscideans, and carnivorans), associated with pollen-rich sediments and plant macrofossils.

These sediments represent the typical development of the Mydlovary Formation (Řeháková 1964). The palynological assemblage, thermophilous herpetofauna, and small-mammal taxa are consistent with a Langhian age previously proposed for the upper part of the Mydlovary Formation by Čtyrský and Fejfar (1962) or Malkovský (1995).

Bone taphonomy (degree of weathering and fragmentation, tooth marks, insect traces, etc.) indicates a primary, time-averaged accumulation of subaerially exposed bones, whereas the occurrence of multiple fish taxa suggest periodic flooding and connection with a lake. Extremely rare diatoms imply that flooding lasted only days to weeks, supporting the earlier interpretation of fluctuating water levels in the Mydlovary Formation (e.g., Čech et al. 1962). The new locality Maršov thus provides the most comprehensive fossil record of terrestrial Miocene ecosystems yet known from the South Bohemian Basins.

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AGGLUTINATED FORAMINIFERAL ASSEMBLAGE FROM THE MENILITE FORMATION AT THE HONĚTICE SECTION: A REFUGE IN THE ANOXIC EARLY SOLENOVIAN SEA?

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Abstract

The trench excavated during construction of the Moravia gas pipeline at Honětice (South Moravia, Czech Republic) provided an exceptional opportunity to investigate the Menilite Formation of the Ždánice Unit. Tectonically somewhat reduced section comprises the Subchert (2.7 m), Chert (28.3 m), and Dynów (3.5 m) members; thus, the reported thicknesses are minimum values. Planktonic foraminifera dominate over benthic taxa in the Subchert Member. *Pseudohastigerina nagewichensis* (S.), *Dipsidripella danvillensis* (H. & W.), *Globigerina officinalis* S., and *G. archaeobulloides* H. & O. indicate the early Rupelian age (O1 Zone). The accompanying dwarf benthic assemblage reflects dysoxic bottom waters. In the upper non-calcareous part of the member, radiolarians (*Peripyramis* sp.) predominate. Claystones of the Chert Member locally contain a unique agglutinated foraminiferal assemblage composed of *Ammodiscus aequispiralis* S., *A. tenuiculus* S., *Haplophragmoides* sp., and *Hyperammia*? sp., whereas planktonic foraminifera are absent. The Dynów Member lacks foraminifera and is characterized by an acme of *Reticulofenestra ornata* M. accompanied by rare *Pontosphaera pax* (S. & S.) A. Elsewhere in the Carpathians, the Chert Member generally lacks autochthonous foraminifera owing to severe bottom-water anoxia caused by geographic isolation and water-column stratification during the initial phase of the Solenovian Sea (Rögl, 1999). In contrast, the Honětice benthic assemblage indicates a local dysoxic refuge. This interpretation is supported by relatively low TOC (0.34 wt%) compared with the underlying and overlying members, although the Chert Member elsewhere typically yields the highest TOC values within the Menilite Formation (e.g. Jirman et al. 2019). The relatively high Hydrogen Index (HI = 139 mg HC/g TOC) excludes enhanced organic-matter degradation as the cause of the low TOC.

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LACUSTRINE MARLY FACIES OF THE OTTNANGIAN (LATE BURDIGALIAN) IN BRNO AND ITS FAUNA AGAIN AFTER 100 YEARS

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Abstract

A drilling survey conducted during the construction of the Brno Arena in 2023 encountered a sedimentary succession of variegated clays, sands, and gravels, capped by a horizon of freshwater lacustrine marls. Processing the marls by wet sieving yielded charophytes, fragmentary ostracods, and isolated microvertebrate remains. The recovered charophyte gyrogonites belong to *Lychnothamnus* cf. *barbatus* var. *antiquus* S.-M. and *Sphaerochara* cf. *ulmensis* (S.) G. – taxa known from the Tertiary of Europe and elsewhere. The highly fragmentary ostracod material represents at least three genera, although only *Eucypris hagni* W. could be identified at a species level. Fish remains include teeth of the genera *Leuciscus*, *Barbus*, and either *Tinca* or *Palaeocarasius*. Rare occurrences include indeterminate anurans, represented by a fragmentary coracoid and phalanges, a tooth of a juvenile crocodilian and mammalian remains consisting of an indeterminate carpal (possibly tarsal), a phalanx, and a premolar of the gymnure *Galerix* sp. The fossil assemblage from the lacustrine marls indicates a Miocene age. The ostracod *Eucypris hagni* is known from the Upper Ottnangian to the Lower Badenian. Based on the recovered fossil record, the depositional environment is interpreted as a freshwater lake or a low-energy fluvio-lacustrine system with slowly flowing water. The lacustrine marls from the Brno Arena site closely correspond to the variegated clays described by Rzehak (1902, 1919) from several brickworks in Brno. Rzehak assigned these deposits to the Ottnangian and reported a fauna comprising freshwater bivalves, landsnails, and remains of turtles, crocodilians, and mammals. Following the closure of the brickworks, this unique freshwater Ottnangian facies remained inaccessible for further investigation for more than a century.

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THE SEMTÍN DIATREME BRECCIA: DISCOVERY, DOCUMENTATION AND ITS GEOHERITAGE SIGNIFICANCE

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Abstract

The Semtín diatreme breccia offers an exceptional glimpse into the underlying basement of the Bohemian Cretaceous Basin in eastern Bohemia. In 1896, Jaroslav Jiljí Jahn documented Precambrian, Lower Palaeozoic, and Mesozoic rocks preserved as xenoliths within the breccia. The locality became largely inaccessible after the construction of an ammunition factory in 1920, and the last samples were collected in 1928. As a result, the Semtín diatreme breccia remained unstudied for the following century. After Jahn's death and the profound geopolitical changes of the 20th century, the original locality was gradually forgotten. In 2020, a substantial part of Jahn's original collection was rediscovered in the GeoSphere Austria collection in Vienna. Subsequent systematic searches led to the identification of additional material in the collections of two Austrian and three Czech institutions. This contribution outlines the history of the original discovery together with the recent rediscoveries. The locality and the associated collections are now recognized as an important part of the geological heritage and are legally protected in both Austria and Czechia.

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EARLY CRETACEOUS (LATE VALANGINIAN–BARREMIAN) AMMONITE-DOMINATED MACROFAUNA, RADIOLARIANS, AND TRACE FOSSILS FROM THE KARAVANKE MOUNTAINS (SLOVENIA)

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Abstract

Private collectors' persistent activity (Ocepek & Krivograd 2018) between 2005 and 2026 at the Lower Cretaceous outcrop at Leše (Prevalje, Karavanke Mountains, North-East Slovenia) resulted in a poorly preserved faunal assemblage of 158 specimens representing the Upper Valanginian to Lower Barremian. The ammonite fauna has a typical Tethyan, Mediterranean character (phyllo- and lytoceratid ammonites comprise 68% of the collected ammonite specimens). The rest of the ammonites is dominated by ancyloceratids. Additional faunal elements are aptychi, belemnites, brachiopods, gastropods, ?bivalves, cnidarians, and trace fossils. *Triangope* cf. *triangulus*, *Didayilamellaptychus didayi*, *D.* aff. *angulocostatus*, *Adiakritobelus peyroulesensis*, *Abrytusites* sp. ex gr. *thieuloyi*, *Himantoceras acuticostatum*, *Karsteniceras beyrichoide*, *Subsaynella sayni*, ?*Pseudothurmannia* sp., ?*Palaequorea* sp., and *Thalassinoides paradoxicus* isp. are first records from Slovenia.

The ammonite fauna represents the Upper Valanginian (Peregrinus and Furcillata zones), the Lower Hauterivian, and the Sayni and Ligatus zones of the Upper Hauterivian. A *Karsteniceras beyrichoide* specimen collected nearby refers to the presence of the upper part of the Barremian. Besides the macrofauna, a moderately diverse radiolarian fauna is present, consisting of 30 species. The assemblage is assigned to unitary association zones (UAZ) 17–20, which correspond to the late Valanginian – late Hauterivian time interval. The age assignment is based on *Cecrops septemporatus* (FAD in UAZ 17) and on *Acaeniotyle dentata* (LAD in UAZ 20). The ammonite fauna shows close similarity to the Puez section (Dolomites, North Italy).

The palaeoenvironment reflects a well-oxygenated, nutrient-rich substrate with rich infauna (burrowing decapods), epifauna (brachiopods) and ichnofauna (*Thalassinoides paradoxicus*). The rare finding of *Palaequorea* sp. may overbridge the gap in the fossil record between the Lower Tithonian (Upper Jurassic) *Palaequorea* (Adler & Röper 2012) and Recent *Aequorea*.

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COMPARISON OF THE FOSSIL RECORD IN THE SAPROPELIC SEDIMENTS IN THE NÝŘANY GROUP OF COALS (ASTURIAN) AT THE PANKRÁC AND MANTOV LOCALITIES (PILSEN BASIN)

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Abstract

Sapropelic sediments of the Nýřany Coal Group at Pankrác and Mantov document fossil-record variability within Asturian sediments of the Plzeň Basin. At Pankrác, a 20 cm thick, sapropelic coal (cannel) was discovered at the base of the Nýřany Main coal during drilling in 2011. It is dominated by pinnules *Dicksonites pluckenettii*, with less common *Pecopteris* sp. and rare lycopsid, cordaitalean and sphenopsid fragments. Faunal remains are also present (Bureš & Tichávek, 2011). At Mantov, a 4 cm thick sapropelitic aleuropelite was discovered at the same stratigraphic position during drilling in 2025. Unlike Pankrác, it is dominated by charcoalified pycnoxylic *Cordaite*s wood. Macroscopic plant remains are rare, while abundant charcoal indicates redeposition and environmental disturbance, including forest fires.

Dispersed palynological assemblages yielded the smallest monolete spores of genera *Torispore*, *Punctatosporites*, *Laevigatosporites* and *Latosporites* (produced by tree ferns) that predominate at both localities. Spore and pollen genera at the Pankrác locality include *Lycospore* (produced by arborescent lycopsids), *Florinites* /produced by cordaites), *Calamospore* and *Vestispore* (produced mainly by sphenopsids). *Triquitrites* (produced by gleicheniacean ferns), *Calamospore*, *Vestispore fenestrata*, *Laevigatosporites desmoinesensis* (produced by sphenophylls), *Crassispora*, *Tuberculatiporites* /produced by sigillarians), *Cirratiradites*, *Triangulatisporites* /produced by lycopsid herbs) and *Florinites* are common. The general character of this assemblage corresponds to the Asturian age, i.e., the Nýřany Group of coal.

Pankrác represents a relatively undisturbed environment with abundant macro-remains, whereas Mantov records charcoal dominance, redeposition and forest fires. Both assemblages reflect diverse surrounding vegetation and are dominated by marattialean fern spores.

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THE OLDEST TETRAPOD FOOTPRINTS FROM THE CZECH REPUBLIC (LAMPERTICE MEMBER, INTRASUDETIC BASIN): A PRELIMINARY OVERVIEW

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Abstract

Tetrapod footprints from the Lampertice Member of the Žacléř Formation (late Namurian – Duckmantian, Early Pennsylvanian) represent the oldest evidence of tetrapods in the Czech Republic. The studied collection, housed in the National Museum in Prague, originates from the spoil heap of the Jan Šverma coal mine in Žacléř, where the tracks are preserved in grey, fine-grained fluvial sediments (Opluštil et al. 2016). To date, this collection has not been studied in detail; there are only a few brief mentions in the literature (Turek et al. 2008, Marchetti et al. 2021, Opluštil et al. 2022). Taxonomic identification and revision of the selected material yielded four ichnotaxa: *Dimetropus*, *Hylopus*, *Limnopus*, and *Notalacerta*. These footprints document the occurrence of early-diverging synapsids, reptiliomorphs, temnospondyls, and early reptiles. As Early Pennsylvanian tetrapod track localities are extremely rare in Europe, the Žacléř ichnological assemblage, representing one of the oldest Carboniferous footprint records on the continent, fills a crucial gap in our understanding of terrestrial ecosystems from this period.

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LARGER FORAMINIFERA ACROSS THE OUTER CARPATHIAN UNITS: A TRIBUTE TO EDUARD KÖHLER

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Abstract

Eduard Köhler (1936–2022) was the leading specialist on larger foraminifera in former Czechoslovakia. In collaboration with the flysch geologist Z. Stráník, he investigated larger foraminifera from 17 localities in the Ždánice, Subsilesian, Silesian, Fore-Magura and Rača units of the Outer Carpathians. The results were compiled in six comprehensive unpublished reports deposited at the Czech Geological Survey, Prague, and the Geological Institute of the Slovak Academy of Sciences, Bratislava. In 2016, we initiated preparation of a synthesis of Köhler's lifelong research. The original material, deposited in the Czech Geological Survey, Brno, was revised, all localities were re-examined, and their stratigraphy refined using newly collected samples of smaller foraminifera. The project was interrupted by Köhler's unexpected death during the COVID-19 pandemic. The systematic part comprises 62 Paleocene–Eocene taxa: *Operculina* (2), *Heterostegina* (2), *Assilina* (5), *Nummulites* (36), *Discocyclina* (8), *Asterocyclina* (4), *Orbitoclypeus* (4), and *Spiroclypeus* (1). Biostratigraphic interpretation follows the SBZ zonation of Serra-Kiel et al. (1998) and was refined by the accompanying smaller foraminiferal assemblages. The smaller foraminiferal assemblages demonstrate that exceptionally well-preserved larger foraminiferal assemblages, previously regarded as in-situ inner-shelf deposits (e.g. Holý vrch Hill near Kurdějov), are redeposited into the bathyal to abyssal zone of flysch basins. All thin sections, mostly representing oriented sections, were digitally documented, catalogued and incorporated into the Czech Geological Survey collections. The recent orthophragminid revision of Özcan et al. (2022) required taxonomic reassessment of *Asterocyclina*, *Discocyclina*, *Orbitoclypeus* and *Spiroclypeus*, affecting the biostratigraphic interpretation of several assemblages.

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NEW INSIGHTS INTO CHAMELEON EVOLUTION BASED ON THREE-Dimensionally PRESERVED FOSSILS FROM KENYA

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Abstract

Chamaeleonidae comprises predominantly arboreal lizards from Africa, Madagascar, Asia, and Europe (Uetz et al. 2026). Although molecular data suggest their Cretaceous origin, the fossil record of these reptiles does not predate the Neogene. The majority of the fossils are represented by isolated elements. Two notable exceptions exist, both from Kenya. The first is the remarkably 3D preserved skull of *Calumma benovskyi* from the Early Miocene (18 Ma) of Rusinga Island (Čerňanský et al. 2020). This taxon challenged the long-held view of the Madagascar origin of chameleons, by providing a strong evidence of an African origin for Malagasy lineages. Thus, both molecular and palaeontological data indicate that the clade originated in continental Africa (Tolley et al. 2013, Čerňanský et al. 2020). The second is "*Chamaeleo*" *intermedius* from the Middle Miocene (13.7 ± 0.3 Ma) of Fort Ternan. Its head and part of the body are preserved as a mummy (calcite cast), revealing details of its skin. It was briefly described by Hillenius (1978) as a new species of *Chamaeleo*. He suggested that it might be considered as a "missing link" between the group of extant species around the common chameleon (*Ch. chamaeleon*) and the group around the side-striped chameleon (*Trioceros*). Later, this position was rejected by several researchers (Estes 1983). Using µCT, we present the first detailed description of this mummy, demonstrating that it represents a distinct new genus. This enables a robust phylogenetic analysis to test Hillenius' hypothesis of its transitional position, estimate minimum divergence times, and test the relationship between chameleon diversification and Miocene equatorial environments. Finally, this mummy offers a rare glimpse into the external appearance of an extinct reptile.

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THE IMPORTANCE OF MORPHOMETRIC ANALYSES AS A METHODOLOGICAL INDICATOR: DATA SCIENCE APPROACH

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Abstract

The organism's size is one of the most crucial traits which makes it simple to utilise in quantitative studies of physiology, ecology and evolution. At the Jurassic-Cretaceous boundary, the evolutionary alterations in calpionellids reveal significant changes.

The aim is to investigate the differences in calpionellids body size and shape based on data science approach. Examining differences within the morphometry framework may indicate the importance of morphometric analyses as an indicator in the framework of identifying single genera and species. A total of 1277 individuals were examined (*Calpionella* = 763; *Crassicollaria* = 464; *Tintinnopsella* = 50). Measurements were taken of the lorica length without the collar and width. The ratio, which represents a shape based on the calculated ellipticity, was calculated from the lorica length and width. The collar was not measured due to its poor preservation.

The results indicate differences between the investigated genera (*Calpionella*, *Crassicollaria* and *Tintinnopsella*). We also observed differences in body size and shape within the genus *Calpionella*. There are significant differences in size and shape between *Calpionella alpina* and *Calpionella grandalpina*. Within the genus *Crassicollaria* there are significant differences but the size effect is very low. Given that, the genus *Tintinnopsella* was represented only by the species *Tintinnopsella carpathica*, it was not possible to investigate differences with other species.

It should be noted that the results also have their limits. Firstly, the presented study is rather pilot, as it points to the importance of differences but does not take into consideration the evolutionary framework. This methodological approach complements existing stratigraphic studies. Secondly, the error rate of the measurements, which result from the preservation of the lorica itself, affected by diagenesis, recrystallisation, or deformation.

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IN BETWEEN THE LATE DEVONIAN MASS EXTINCTIONS: FAMENNIAN CONODONT BIOSTRATIGRAPHY AND BIOFACIES OF THE LÍŠEŇ FORMATION, MORAVIAN KARST

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Abstract

The southern part of the Moravian Karst features extensively exposed Famennian calciturbidites of the Hády-Říčka Limestone (Kalvoda et al. 1999), deposits rare in Central Europe offering exceptional potential for inter-basinal correlation. Although numerous biostratigraphic studies exist for mass extinctions at Frasnian/Famennian and Famennian/Tournaisian boundaries, the succession spanning the interval between them remains relatively understudied. In this conference contribution, we are presenting the results of conodont studies from sections in Brno-Hády, Brno-Lesní lom, Mokrá, and Říčka Valley, filling the gap.

The most significant genera found were *Bispathodus*, *Branmehla*, *Palmatolepis*, *Polygnathus* and *Pseudopolygnathus*. In the Hády section, the studied 120m thick succession records almost the complete Famennian, in the range between lower Famennian *Palmatolepis deliculata* to upper Famennian *Bispathodus costatus* conodont zones. In the Lesní lom section, the studied Famennian succession is about 55 m thick, and two zone intervals were recorded – lower Famennian *Palmatolepis glabra prima* to *Palmatolepis rhomboidea* in non-typical “Zebra-limestone” facies, and upper Famennian *Palmatolepis gracilis expansa* to *Bispathodus ultimus* in the typical Hády-Říčka Limestone. In Mokrá and Říčka Valley sections, only the upper Famennian (*Palmatolepis gracilis expansa* to *Bispathodus ultimus* zones) was documented.

In samples with an appropriate number of conodonts, several biofacies were determined for depositional environment interpretation – polygnathid-icriodid biofacies pointing to outer shelf to shelf margin in lower Famennian and palmatolepid-polygnathid, palmatolepid and palmatolepid-bispathodid biofacies pointing to carbonate slope environment in middle to upper Famennian.

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BRAINCASE MORPHOLOGY OF THE MIDDLE PLEISTOCENE DICE SNAKE (*Natrix tessellata*) FROM MLADEČ: A COMPUTED TOMOGRAPHY STUDY

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Abstract

The dice snake, *Natrix tessellata*, is a species with wide geographic distribution, inhabiting Europe, Asia, and Africa. Based on mtDNA analysis, nine phylogenetic clades have been established, of which the Europe and Greece clades occur in continental Europe (Guicking et al. 2009). A recent study examined the morphology and cranial anatomy of extant individuals from the Europe and Greece clades of *N. tessellata* (Papežíková et al., 2024).

Here, we present an unusually well-preserved, almost complete braincase of a fossil dice snake from the Middle Pleistocene (Saalian Complex, probably MIS 9e) at the Mladeč Caves locality (Excavation II). The braincase was scanned using Micro-CT (Phoenix V|tome|x S240) and processed in Dragonfly 3D World 2025.1. Three-dimensional models of the cranial elements were then created in Meshlab 2025.07, described in detail, and preliminarily compared with extant individuals of the Europe and Greece clades.

Although braincase elements of extant representatives display high intraspecific variability, even within a single lineage (Papežíková et al. 2024), the distinctive morphology of parietal and parabasisphenoid enabled the attribution of fossil *N. tessellata* from Mladeč to the Greece clade. According to mtDNA analysis, the Greece and Europe clades most likely inhabited continental Europe since the onset of the Pleistocene (Jablonski et al. 2024). The presence of the Greece clade, now restricted to western Greece, in the Mladeč Caves indicates that this lineage had a much wider geographical distribution during the Middle Pleistocene. The sympatric occurrence of the Greece and Europe clades in Central Europe therefore appears likely; however, the MIS 9e was probably the last warm interval during which the Greece clade occurred in Central Europe.

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SQUAMATES FROM THE EARLY MIOCENE OF THE 4/2018 KARSTIC FISSURE IN MOKRÁ-WESTERN QUARRY

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Abstract

The Mokrý Quarry is one of the best-documented Early Miocene (late MN 4) vertebrate localities in Central Europe. Investigations of fossiliferous karstic fissures at Mokrý (Western Quarry: MWQ 1/2001, MWQ 2/2003, MWQ 4/2018; Central Quarry: MCQ 3/2005) have revealed more than 50 taxa of amphibians, reptiles, and mammals. However, the herpetofauna has been thoroughly studied only from the MWQ 1/2001 and MWQ 2/2003 fissures (Ivanov 2008; Ivanov et al. 2018, 2020). Here, we present results of a preliminary study of the squamates from the MWQ 4/2018 fissure.

The MWQ 4/2018 squamate community shows lower species diversity than those of MWQ 1/2001 and MWQ 2/2003, with Lacertoidea and Scincoidea completely absent. Nevertheless, Anguidae (*Pseudopus* sp.) and Varanidae (*Varanus mokrensis*) were identified. Among snakes, alethinophidians (including the Booidea and Pythonoidea) are not present, but representatives of “Oriental vipers”, as in the other Mokrý fissures, were identified. Two vertebrae of an elapid snake, most likely referable to *Naja* (cf. *Naja* sp.), represent the first reliable evidence of true cobras from the Czech Republic. Although the most thermophilic Pythonoidea have not been documented, *Varanus mokrensis* and cf. *Naja* sp. indicate warm subtropical conditions, with mean annual temperatures probably exceeding 18 °C. This is consistent with the environmental conditions prevailing during the Miocene Climatic Optimum. Preliminary study of the herpetofauna from the MWQ 4/2018 fissure indicates that palaeoenvironmental conditions did not differ substantially from those in the other Mokrý fissures: a mosaic of open forests, shrublands and humid habitats with wetlands and lakes.

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RHYNCHOTEUTHIS AS AN ALTERNATIVE PALEOCLIMATE ARCHIVE IN DIAGENETICALLY AFFECTED SETTINGS

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Abstract

The stable isotope composition of carbonate shells has long been a benchmark for paleotemperature and paleoclimate reconstructions. Earlier studies (Bujtor et al., 2024; Demény et al., 2025) have shown that well-preserved Jurassic ammonite aptychi can serve as a reliable paleotemperature archive. In addition to specimens of *Laevaptychus* and *Lamellaptychus*, we also collected and studied rhynchoteuthids (the arrow-shaped calcified tip of the beak of nautilids) from two localities in the Northern Karawanks (Eastern Alps). The first location is the Wildensteiner Wasserfall in Austria, where samples were collected from the uppermost Jurassic to lowermost Cretaceous Aptychenkalk. The second location is Črni Vrh near Uršlja Gora (Slovenia), which is highly tectonized. These samples were collected from red, aptychus-bearing limestone of supposed Middle to Late Jurassic age. However, due to a lack of up-to-date geological studies in the area, both its precise age and assignment to a formal lithostratigraphic unit remain uncertain.

We have measured the stable carbon ($\delta^{13}\text{C}$) and oxygen ($\delta^{18}\text{O}$) isotope compositions of the collected samples to evaluate the effect of diagenesis on the original stable isotope signature and to calculate primary paleotemperature values from the best-preserved samples. Preliminary investigations have shown that rhynchoteuthids have a very fine (<0.1 mm) micro-laminated structure, where the individual laminae consist of a dense network of isometric, amoeboid calcite. Because of this specific microstructure, we infer that these samples have resisted diagenetic overprinting of their stable isotope composition and may yield the most accurate paleotemperature data.

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REMAINS OF THE DIGESTIVE SYSTEM IN THE MIDDLE CAMBRIAN TRILOBITE *PTYCHOPARIOIDES HENKLI* KORDULE, 2006

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Abstract

Preservation of the digestive system in trilobites is usually very rare (Budil & Fatka 2022). In the Barrandian area, such remains have been recorded in two Cambrian and eight Ordovician trilobite genera (Fatka et al. 2026). One uniquely preserved specimen of *Bohemolichas incola* from the Middle Ordovician Šárka Formation displays even the gut content (Kraft et al. 2023). In this study, we discuss eight examples of articulated trilobite specimens with remains of the digestive system. These specimens were collected by the senior author (VM) at a small new locality in the middle Cambrian Buchava Formation of the Skryje-Týřovice Basin. All studied specimens belong to *Ptychoparioides henkli* Kordule, 2006 and exhibit up to four pairs of cavities and/or light-coloured markings under the central and posterior parts of the glabella, one pair in the occipital ring and up to six pairs in the axis of the anterior thoracic segments. These cavities or coloured markings are interpreted as remains of metamerically paired digestive caeca of the «perigastric organ». The anteriorly rounded, posteriorly V-shaped body is seen in the frontal glabellar lobe of the glabella in one specimen. It most probably represents remains of the foregut chamber. A dark-coloured axial surface seen in eight thoracic segments between and behind paired cavities is preserved in two specimens; this surface is interpreted as remains of the hindgut. The occurrence of trilobites preserving digestive-system remains together with locally abundant articulated echinoderms and ontogenetic stages of trilobites, as well as previously described bivalved arthropods, confirms that the depositional environment of the Buchava Formation was favourable for exceptional preservation of fossils, including soft-tissue preservation.

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DEEP-WATER AGGLUTINATED FORAMINIFERA FROM THE UPPER CRETACEOUS GUAYAGUAYARE FORMATION OF TRINIDAD: THEIR PALEOECOLOGICAL AND PALEOBIOGEOGRAPHICAL SIGNIFICANCE

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Abstract

The Guayaguayare Formation, an Upper Cretaceous (Maastrichtian) deep-water unit in southern Trinidad, contains a diverse assemblage of agglutinated foraminifera. This study presents a systematic investigation of these assemblages based on subsurface well material, providing taxonomic descriptions and evaluating their paleoecological significance. A total of 61 species belonging to 33 genera were identified, dominated by tubular and elongate forms such as *Nothia excelsa*, ammodiscids including *Ammodiscus cretaceus* and *Ammodiscus peruvianus*, rzehakinids such as *Rzehakina epigona*, and textulariids including *Dorothia* and *Remesella* (Flores et al. 2026).

The assemblage composition corresponds to a mixture of slope marl and flysch-type faunas, indicating deposition in a deep-marine environment near or below the lysocline. Variations in morphogroup composition reflect changes in benthic conditions, including shifts in sedimentation regime, organic matter supply, and bottom-water oxygenation. The dominance of cosmopolitan taxa known from the European flysch basins supports the interpretation of broadly similar ecological conditions across deep-marine settings during the Late Cretaceous. No faunal provinciality is observed between the Caribbean and Western Tethyan faunas. Our results provide new taxonomic data and contribute to a better understanding of deep-water agglutinated foraminiferal assemblages and their paleoecological and paleobiogeographical significance.

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ECOSYSTEM RESPONSE AND CLIMATE VARIABILITY OF A SUBALPINE BALKAN LAKE: A HOLOCENE CHIRONOMID RECORD FROM LAKE PROKOŠKO, BOSNIA AND HERZEGOVINA

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Abstract

High-altitude lakes provide exceptional environmental archives, yet multi-proxy records from the Balkan region remain scarce. We reconstruct the Holocene climate and ecological history of subalpine Lake Prokoško (1670 m a.s.l., Bosnia and Herzegovina) over the last 11,700 years using high-resolution chironomid analysis, chironomid-inferred quantitative mean July temperature reconstruction, sediment lithology and regional pollen data. The earliest Holocene was characterised by cold-adapted chironomid relicts (*Micropsectra radialis*-type) under cold (<11.2 °C), oligotrophic conditions. Post-glacial warming subsequently promoted meso-oligotrophic assemblages dominated by *Cladotanytarsus mancus*-type. This trend was interrupted by the 8.2 ka cooling event, which triggered a 1–2 °C drop in mean July temperatures, reduced chironomid richness, and enhanced river discharge. The chironomid-inferred Mid-Holocene thermal optimum peaked at ~6820 cal BP (~14.0 °C) under stable mesotrophic conditions and closed forest canopies, followed by a transition (~6000–5500 cal BP) toward cooling, severe catchment erosion and forest openings. After ~2500 cal BP, an expansion of semi-terrestrial chironomid taxa and sand fraction indicates a developed shore-sedge wetland. Late Holocene climate oscillations align with Mediterranean records, including the Roman Warm Period (~2000 cal BP). Over the last millennium, pastoral activities increased erosion and the chironomid fauna indicates rapid eutrophication causing hypolimnetic oxygen depletion. Regionally, these trends show broad coherence with western Dinaric and Apennine records but contrast with Aegean and South Carpathian sequences, highlighting a basin-specific ocean-atmosphere response between the Adriatic and Eastern Mediterranean.

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SEDIMENTOLOGY AND PALEOECOLOGY OF GRAVITATIONAL SLUMP BODIES AND OLISTOSTROMES IN THE BAŠKA FORMATION (SILESIA UNIT)

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Abstract

This study evaluates the geological, biostratigraphic, and paleoecological characteristics of the Baška Formation (Silesian Unit, Outer Western Carpathians) at the Vlčovice locality. Field documentation was conducted along three profiles (P1–P3) parallel and transverse to the Lubina River, spanning a total length of approximately 150 m. The studied section represents a typical flysch sequence composed of fine-grained calcareous laminated marlstone and organogenic limestone alternating with claystone, which pass upward into sequences with frequent sandstone layers. The strata are tectonically overturned, with dips varying significantly from 20° to 75° to the east-northeast. A prominent feature of the locality, particularly along the P3 profile, is the presence of slump bodies and olistostromes. These chaotic intervals contain large limestone blocks (olistoliths reaching up to 6.5 × 4.4 × 1.5 m in size) along with exotic clasts of coal. These features indicate significant gravitational transport within a tectonically active basin slope environment. Palynological analysis of the claystones and marlstones yielded rich dinoflagellate cyst assemblages comprising 64 species. Biostratigraphic evaluation places the sediments in the Upper Albian to Lower Cenomanian interval. This age determination is supported by Upper Albian marker species such as *Palaeohystrichophora infusorioides* and *Pervosphaeridium pseudhystrichodinium*, while the upper limit is constrained by *Cribrroperidinium edwardsii*. Deformed bivalves of the genus *Inoceramus* sp. were also documented. Additionally, palynofacies analysis revealed high heterogeneity in organic matter composition, with frequent dominance of black rounded phytoclasts (up to 38 %), suggesting a proximal oxic shelf with terrestrial input. Sharp variations in the preservation of amorphous organic matter between adjacent layers reflect the mixing of sediments from distinct depositional settings, confirming redeposition within the slump bodies.

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TO DUNGEONS DEEP AND CAVERNS OLD: GEOLOGICAL PATHWAYS INTO SUBTERRANEAN FRESH WATERS

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Abstract

Stygobionts, are often discussed in terms of their adaptations to darkness. Their evolution also depended on geological changes that created new habitats, connected different aquatic environments, and later separated populations. Sea-level changes exposed coastal areas, isolate former marine basins, or create lagoons and estuaries where animals gradually adapted to lower salinity. Tectonic uplift redirect rivers, divide drainage systems, and separate populations that had been connected. At the same time, karst development opened new underground pathways and allowed surface-water animals to enter caves and aquifers. Climate played an important role. During periods of drought, cooling, or major environmental change, groundwater could provide a more stable refuge than surface habitats. Some populations entered subterranean waters actively, while others were gradually isolated as rivers disappeared, basins changed, or surface connections were lost. These processes did not produce one single pathway into the underground. Some stygofaunal lineages may have evolved from freshwater ancestors, while others trace their history back to marine or brackish-water environments. Taxa such as the bivalve *Congerina*, the serpulid polychaete *Marifugia*, and crustaceans of the order Spelaeogriphacea show how different geological histories may lead to similar subterranean lifestyles (Bilandžija et al., 2013; Gašparič et al., 2026; Kočí et al., 2026). A geonomic approach, combining molecular data with fossils and geological reconstruction, help connect evolutionary splits with events such as sea-level fall, uplift, drainage reorganisation, and karstification. In this way, stygofauna can be viewed as living evidence of long-term changes in landscapes, coastlines, and freshwater systems.

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RED ALGAE IN THE OUTER CARPATHIANS

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Abstract

The flysch successions of the Outer Carpathians include numerous limestones and sandstones containing remains of red algae. These algae-bearing deposits provide evidence for the presence of structural highs that separated individual flysch basins. During the Paleocene, these intrabasinal ridges became increasingly pronounced, creating suitable conditions for the formation of shallow-water carbonate banks and platforms inhabited by diverse algal communities.

Calcareous red algae are of particular importance for paleoecological and paleogeographic reconstructions because they are characteristic of shallow-marine and nearshore environments. The composition of algal assemblages is closely linked to depositional settings and can therefore be used to distinguish among reefal, lagoonal, bahamite, and other facies. In the flysch realm, the occurrence of red algae indicates the development of carbonate platforms both along basin margins and on intrabasinal ridges. Their abundance may also reflect periods of tectonic activity associated with basin rifting or the progressive closure of flysch basins. The red algae documented from the Carpathians are assigned primarily to the family Corallinaceae. Identified genera include *Sporolithon*, *Lithothamnion*, *Mesophyllum*, *Archaeolithothamnion*, *Paleothamnium*, *Ethelia*, *Lithoporella*, *Spongites*, *Neogoniolithon*, *Distichoplax*, and *Karpathia* (Kowal-Kasprzyk et al., 2021). Although fossil coralline algal species are now widely regarded as artificial taxonomic entities and many historical determinations require revision (e.g., Rasser & Piller, 1999), numerous species have been reported from the *Lithothamnion* sandstones of the Magura Nappe.

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SMALL FOSSILS, LARGE QUESTIONS: STUDYING JURASSIC REEF-DWELLING ANOMURAN AND BRACHYURAN DECAPOD CRUSTACEANS

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Abstract

The Mesozoic Marine Revolution was marked by the reef expansion and diversification of reef-associated organisms, including decapod crustaceans, which since the Jurassic became a significant component of marine ecosystems (Klomp maker et al. 2013). These animals are preserved as small carapaces (~5–15 mm long), that are almost never associated with claws. Multiple species of one genus (e.g. *Goniodromites*), differing in subtle morphological characters, usually occur at one locality (Hyžný et al. 2015). Elliptic Fourier analysis followed by principal component analysis can thus test whether species that are abundant represent distinct taxa, or whether morphological differences are attributed to ontogenetic growth or intraspecific variability. Jurassic decapods occur in sponge- or coral-dominated reef environments, the latter supporting more diverse fauna (Schweitzer et al. 2018). Within *in situ* preserved sponge reefs, different decapod species occupy distinct microenvironments (Frăntescu 2011). The *ex situ* sponge-dominated reefs are preserved as bedded facies; differences in paleocommunity structure and species richness in different beds may reflect reef habitat heterogeneity. Therefore, collecting new specimens from standardized masses of rock and microfacies analysis are essential for linking decapod assemblages to specific microenvironmental settings. Decapod diversity at different localities is assessed using diversity indices; rarefaction curves compare paleocommunity evenness, species/individuals ratio, and species richness at various levels of sampling effort; while multivariate statistical methods (e.g. non-metric multidimensional scaling) compare assemblages across localities, ages, and habitats, identifying temporal or paleoecological turnovers.

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FIRST ISOTOPIC DATA FROM THE ČERTOVA PEC CAVE AND THEIR PALAEOECOLOGICAL INTERPRETATIONS

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Abstract

As part of the revisory research of the fossil record from the Čertova pec Cave, one of the main parts is also focused on the reconstruction of environmental conditions in the vicinity of the site during the Late Pleistocene. This reconstruction is based on a plethora of isotopic analyses, specifically on analyses of $\delta^{18}\text{O}$, $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$.

This research, along with the taxonomy and taphonomy of fossil finds, provide information about the mean annual temperature and environmental conditions in the studied area based on the water and dietary sources available to the animals (Bocherens, 2003; Moravcová, 2011).

Current research has demonstrated the presence of an intermediate woodland to cold steppe-tundra environments, indicating both colder and warmer phases. The studied site was used by various groups of animals, such as bears, cave hyenas, and even humans, which is also confirmed by archaeological research. The pilot isotope analysis provides the first isotopic data on the Late Pleistocene environment in this part of the Western Carpathians.

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**DECAPOD CRUSTACEANS FROM THE LATE TRIASSIC (CARNIAN)
KONSERVAT-LAGERSTÄTTEN OF CAVE DEL PREDIL (ITALY)
AND POLZBERG (AUSTRIA): STATE OF THE ART**

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Abstract

Decapod diversification was a significant component of the Mesozoic Marine Revolution. Related to that, the Triassic period marked the early radiation of major decapod lineages (Smith et al. 2022). Among the first documented Triassic decapod assemblages are those from the Raibl Beds exposed at Cave del Predil (Bronn 1858) and the Reingraben Fm at Polzberg (Glaessner 1931), both of Late Triassic (Carnian) age. Taxonomically, the decapod faunas of both localities are largely similar, with the lobster *Clytiella spinifera* (Glypheidea: Clytiopsida) being the only taxon known from Polzberg but missing at Cave del Predil; all other taxa occur at both locations. Shrimps *Aeger straeleni* (Dendrobranchiata: Aegeridae) and *Distaegeer crassipes* (Dendrobranchiata: Aegeridae), as well as the lobster *Tetrachela raiblana* (Polychelida: Coleiidae), are distinctly larger at Cave del Predil than at Polzberg. However, the largest lobster specimen, belonging to *Platychela trauthi* (Glypheidea: Platychelidae) and reaching ca. 10 cm in body length (excl. chelipeds), was collected at Polzberg. The most striking difference includes the mode of preservation. Numerous individuals of *T. raiblana* from Cave del Predil, preserved without carapaces, suggest the specimens represent moults (Audo et al. 2018), whereas at Polzberg, the lobsters *Clytiella*, *Platychela*, and *Tetrachela* are preserved in near-complete condition. There are comparatively fewer shrimps (Aegeridae) at Polzberg than at Cave del Predil. Nevertheless, uneven sampling prevents relevant (semi)quantitative comparison between the two associations. In the latest taxonomic evaluation by Hyžný et al. (2026), the shrimp *Bombur aonis* is regarded as a juvenile of *D. crassipes*, one of the dominant species at Cave del Predil. Preliminary work on further material suggests the presence of further shrimp species at Cave del Predil, likely belonging to at least one new taxon.

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EARLY RADIATION OF NEOGASTROPODA: AN INTEGRATED FOSSIL AND MOLECULAR APPROACH

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Abstract

The origin and early diversification of Neogastropoda remain among the most debated issues in gastropod evolution. We conducted a global re-evaluation of Cretaceous neogastropod occurrences, integrating morphological, systematic, and stratigraphic evidence to reconstruct the earliest stages of neogastropod radiation. Reassessment of the oldest records indicates that several Valanginian taxa traditionally assigned to Muricoidea are more plausibly attributable to Buccinoidea, representing the earliest reliably documented crown-group neogastropods. Our synthesis suggests that the principal neogastropod lineages originated during the Cretaceous, although their diversification was strongly uneven through time. Neogastropods remained a minor component of marine faunas during most of the Early Cretaceous and experienced a marked expansion at the beginning of the Albian. The revised fossil record allows recognition of a temporal sequence in the appearance of major lineages and associated morphological innovations.

Comparison with recent molecular phylogenies reveals significant discrepancies in both the timing and pattern of early diversification. Molecular analyses place Volutoidea among the earliest-diverging crown groups, whereas the fossil record documents the appearance of Buccinoidea considerably earlier and suggests an alternative sequence of lineage emergence. The absence of unequivocal pre-Maastrichtian Muricoidea further highlights the mismatch between palaeontological and molecular evidence (Bakayeva et al. 2026). Our results suggest that Late Jurassic and Early Cretaceous Tethyan environments played a key role in the initial diversification of neogastropods and provide new insights into the caenogastropod evolution. They also highlight the importance of integrating palaeontological and molecular data to reconstruct the timing and sequence of neogastropod radiation during the Mesozoic Marine Revolution.

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EXTENDED ABSTRACT:**RECENT ACQUISITIONS (2026) TO THE COLLECTIONS OF THE EUROPEAN MICROPALAEONTOLOGICAL REFERENCE CENTRE IN KRAKÓW**

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The European Micropalaeontological Reference Centre is located in the offices of Micropress Europe at the AGH University of Krakow. The rationale and main highlights of the micropalaeontological collections of the EMRC have been recently described by Waśkowska et al. (2026).

During the summer of 2026 a new wooden slide cabinet was purchased and number of important collections of microslides were added to the existing curated collections. Many of the published collections newly curated in 2026 were donated by Prof. William A. Berggren. Additional microscope slides are from the published collections of the Kaminski Laboratory currently housed at KFUPM in Dhahran, Saudi Arabia. The new collections include:

- Picked assemblage slides from the Burdigalian mixed carbonate and siliciclastic Dam Formation, Al-Lidam area, Eastern Province of Saudi Arabia (Chan et al. 2016).
- The picked samples and type slides from the Silurian Qusaiba Shale of the Qassim District, Saudi Arabia published by Kaminski and Perdana (2017, 2020).
- Plesiotypes of foraminifera illustrated from the Eocene Rashrashiya Formation of NW Saudi Arabia, studied by Dr. Asmaa Korin for her PhD thesis at KFUPM (Kaminski and Korin, 2025; Korin et al., 2025a,b; 2026a,b).
- Picked assemblage slides from the Paleogene Appollonia Limestone Formation of Libya, used for the study of Barr and Berggren (1980), published in the “*Geology of Libya*” volumes.
- Picked assemblage slides from the “Globigerina marls” of the Krosno district, Polish Carpathians, studied by Van Couvering et al. (1981). The samples were collected by a field party consisting of Van Couvering, Naeser, Berggren, and Wieser in May, 1977. The faunal slides are specifically from the Polany, Znamirów, and Krosno localities, and include several samples from the underlying “Green Clays” and the overlying Menilite Shales. The study raised a number of eyebrows in Poland when published in 1981, and served as a model for the DSDP-style of integrated micropaleontological studies that were lacking in Poland at the time.
- A large number of faunal slides and an identified type collection of specimen slides from the “Eureka Cores” that were drilled in the Gulf of Mexico by the Shell Oil Co in the 1960’s on the continental slope south of Pensacola, Florida. The Eureka Cores were used to provide plesiotypes for the “Van Morkhoven Atlas of Cenozoic deep-water foraminifera” (Van Morkhoven et al. 1986), and the planktonics from the core samples were studied by Jijun Zhang for his PhD thesis at Rutgers University (Zhang et al. 1993). Whether or not the collection contains any of the plesiotype specimens remains to be determined.
- Miscellaneous samples from the Dababiya boreholes, Egypt (Berggren et al., 2013, Ouda et al., 2013).
- Washed residues and picked faunal slides from DSDP Site 384 (Berggren et al. 2000),
- Miscellaneous slides from DSDP Sites 502, 577, and 608. These slides have yet to be linked to specific publications.

- Picked assemblage slides from deep water Paleogene and Cretaceous deposits of the Outer Carpathian deposits (Waśkowska et al. 2025a,b, Waśkowska and Kaminski 2022, Waśkowska and Szczęch 2023, Szczęch et al. 2026).
- Picked assemblage slides and picked residue slides from the Cretaceous of the Australo-Antarctic Gulf, IODP Site 1512, studied by Al-Hilali et al. (2026).

The task of curating the recent acquisitions will continue into 2027, and another wooden microslide cabinet has been ordered to house the remaining part of the Berggren Collection. An updated list of publications from which we hold slide collections will be posted on the website of Micropress Europe.

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ARE WE DEALING WITH "MERMAIDS" OR "LANDLUBBERS"? ARGUMENTS IN FAVOUR OF AN AQUATIC LIFESTYLE AMONG PLEISTOCENE SMALL MAMMALS, BASED ON ENAMEL ISOTOPES – A PILOT STUDY

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Abstract

Small mammals are not only important for biostratigraphic dating but they are also frequently used for palaeoecological and palaeoclimatic reconstructions. For Pleistocene records of extant species similar ecological requirements can be assumed for analyses. This is more difficult when dealing with extinct species. In such cases the associated fauna, their morphological adaptations or the embedding sediments are used as palaeoecological proxies.

In this study, we examine the distinction between some aquatic ("mermaids") and terrestrial ("landlubbers") rodent species employing a geochemical approach: the analysis of stable carbon ($\delta^{13}\text{C}$) and oxygen ($\delta^{18}\text{O}$) isotopes of the carbonate fraction in tooth enamel of incisors. As a reference frame, we analysed three extant species: the strictly aquatic European beaver (*Castor fiber*), the predominantly aquatic water vole (*Arvicola amphibius*), and the strictly terrestrial common vole (*Microtus arvalis*). These are compared with fossil specimens of *Trogontherium cuvieri* (ancient beaver, related to *Castor*), *Mimomys savini* (predecessor of *Arvicola*) and *Microtus arvalinus* and *Microtus thenii* (fossil vole species) from the Pleistocene sites of Untermassfeld (1.0 Ma, Calabrian) and Voigtstedt (0.7 Ma; Chibanian) in central Germany.

The oxygen isotope results show a clear distinction among the three recent species: the lowest $\delta^{18}\text{O}$ values for *Castor*, intermediate values for *Arvicola* and the highest values for *Microtus*. The $\delta^{13}\text{C}$ values are lowest in *Microtus*, intermediate in *Castor* and highest in *Arvicola*. For the fossil *Mimomys* specimens, there is a relatively good correspondence in both isotopes with the extant *Arvicola*, and for *Trogontherium* from Untermassfeld with the extant *Castor*. Surprisingly, the $\delta^{18}\text{O}$ values for *Microtus arvalinus* from Voigtstedt are close to those of extant *Castor*, while the $\delta^{13}\text{C}$ values for *Trogontherium* from this site show considerable variation. Possible reasons for these unexpected deviations are discussed. Diagenetic causes appear more likely than ecological ones for this pattern, a possibility that will be assessed.

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CIRRIPEDIA (BALANOMORPHA) FROM THE LOWER MIOCENE (EGGENBURGIAN) OF KÜHNRING-HOCHSTRASE, LOWER AUSTRIA

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Abstract

The barnacle assemblage from the early Miocene deposits of Kühnring–Hochstraße near Eggenburg, Lower Austria, represents an important contribution to the fossil record of sessile cirripedes from the Central Paratethys. It includes a diverse association of *Concavus concavus*, *Perforatus perforatus*, *Acasta* sp. cf. *A. martillacensis*, and *Ceratoconcha* sp. cf. *C. miocaenica*, expanding previous records of Miocene barnacles from the Eggenburg area (De Alessandri, 1910).

One of the most significant elements of the assemblage is the nearly complete articulated capitulum of *Acasta* sp. cf. *A. martillacensis*. Although the specimen lacks the basis and opercular plates, it is exceptional because fossil acastines are usually represented only by isolated or fragmentary plates, limiting their taxonomic interpretation. The occurrence of *Acasta* indicates sponge hosts, while *Ceratoconcha* points to coral-associated microhabitats, showing that the barnacle fauna formed part of a structurally complex benthic community.

Abundant remains of *Concavus concavus* and *Perforatus perforatus* locally form barnacle-rich deposits within the Burgschleinitz Formation. At least two well-defined horizons in this formation consist of more than 50% barnacle plates and can therefore be classified as barnamols (Buckeridge et al., 2018; Coletti et al., 2018). These horizons, composed mainly of disarticulated and abraded cirripede plates, indicate localized high-energy depositional conditions with low clastic input in a transgressive nearshore setting. At the same time, articulated specimens and opercular plates preserved *in situ* suggest quieter depositional intervals.

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SCALPELLID BARNACLES (CIRRIPIEDIA: SCALPELLIFORMES) FROM THE CENTRAL PARATETHYS: OVERVIEW AND NEW EARLY MIOCENE MATERIAL FROM SLOVENIA

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Abstract

Scalpellid barnacles form a distinctive but still incompletely known component of Miocene cirripede faunas of the Central Paratethys. Their fossil record is strongly biased towards isolated capitular plates, reflecting rapid post-mortem disarticulation, and many historical records were described under broad or outdated concepts of *Scalpellum* s.l. A modern framework for Paratethyan material was provided only recently, especially through the revision of Oligocene and Miocene stalked barnacles by Harzhauser and Schlögl (2012), and by subsequent reassessments of scalpellid taxonomy and plate morphology (Young, 2002; Gale, 2016). The first formally documented scalpellid from Slovenia was *Scalpellum burdigalense* from the Middle Miocene, represented by a single right scutum (Gašparič et al., 2025).

Here we report new Early Miocene (Karpatian) scalpellid material from Meljski hrib, northeastern Slovenia. This locality exposes deep-water marls and siltstones of the Central Paratethys and is known for exceptional preservation (Gašparič et al., 2021). The new material consists of well-preserved, disarticulated plates most probably belonging to a single individual: two scuta, one tergum, one carina, one upper latus, one rostral latus and one peduncular scale. The association of multiple diagnostic plates from one specimen provides a rare opportunity for comparison with Miocene Paratethyan and Mediterranean species, including *S. burdigalense*, *S. pfeifferi*, *S. hungaricum*, *S. moraviense*, *S. molinianum* and *S. paratethyanum*. This second Slovenian scalpellid record expands the regional dataset and contributes to understanding the diversity, palaeoecology and palaeobiogeographic links of Miocene stalked barnacles in the Central Paratethys.

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MULTIDISCIPLINARY PALAEOONTOLOGY ACROSS CENTRAL AND EASTERN EUROPE: INSIGHTS FROM THE SLOVENIAN-CZECH COLLABORATION

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Abstract

The Slovenian-Czech palaeontological collaboration has developed into an important multidisciplinary research initiative focused on the fossil record of Central and Eastern Europe. Bringing together researchers from the Institute for Palaeobiology and Evolution in Kamnik, the Institute of Geology of the Czech Academy of Sciences, and the National Museum in Prague, the partnership combines extensive field experience with modern analytical, imaging, and geological approaches. The cooperation is uniquely suited to address complex regional palaeontological questions related to the Tethys and Central Paratethys realms, ranging from Triassic marine ecosystems to Miocene deep-water and karst-related faunas. Despite the rich geological heritage of the region, many fossil assemblages remain insufficiently studied due to fragmented historical research, limited international integration, and the lack of modern systematic revision. As a result, Central and South-Eastern Europe still preserve major gaps in palaeobiogeographic, taxonomic, and palaeoecological knowledge. Current joint research focuses on exceptionally preserved marine and continental fossil assemblages, including Triassic crustaceans (Gašparič et al, 2025c), Miocene deep-water faunas (Gašparič et al., 2025b), cirripedes (Gašparič et al., 2025a; Kočí et al., 2023), and karst cave-related organisms (Kočí et al., 2026). The collaboration has resulted in numerous scientific publications and presentations at major regional and international conferences. Strong emphasis is also placed on outreach through cooperation with private collectors, local societies, schools, and students, including the developing interdisciplinary initiative for the future Museum of Evolution in Kamnik, aimed at presenting fossil heritage and evolutionary history to the broader public through exhibitions, workshops, and educational programmes.

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PALYNOMORPHS FROM THE EARLY DEVONIAN DEPOSITS OF LUBLIN BASIN (SOUTH-EASTERN POLAND)

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Abstract

The Lower–Middle Devonian (Lochkovian–Eifelian) strata of the Lublin Basin, southeastern Poland, yield diverse, exceptionally preserved palynological assemblages of miospores, cryptospores, acritarchs, chitinozoans, and other non-pollen palynomorphs. Palynostratigraphic analysis of alluvial and continental deposits from the Terebin IG4, Terebin IG5, and Korczmin IG1 boreholes assigns them to the *newportensis*–*micrornatus* through *apiculatus*–*protea* Oppel zones. The lowermost fully marine interval in Terebin IG5 was independently dated using chitinozoans and acritarchs. Its ten-genus chitinozoan assemblage includes *Ancyrochitina tomentosa*, *Bursachitina abnormalis*, *B. mawsonae*, *Calpichitina annulata*, *C. gregaria*, *C. velata*, *Linochitina ceneratiensis*, *L. diegui*, and *Urochitina santullanensis*, together with several *Angochitina* and *Ancyrochitina* species, indicating a Lochkovian–Eifelian age. Integrating chitinozoan and miospore data improves marine–terrestrial correlation and regional stratigraphic calibration.

The successions record marked environmental fluctuations: a Lochkovian transgression followed by rapid terrestrialization, expansion of early vegetation and nematophytes, and predominantly alluvial deposition. This first palynofacies study of the interval reveals a complex, spatially heterogeneous biosphere and a variable marine contribution, documenting highly dynamic Early Devonian conditions.

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APPLICATION OF 3D DIGITAL MICROSCOPY KEYENCE IN THE TAPHONOMIC STUDY OF MISSISSIPPIAN FOSSIL ASSEMBLAGES FROM THE MYSLEJOVICE FORMATION (DRAHANY UPLAND CULM BASIN OF EASTERN BOHEMIAN MASSIF)

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Abstract

The Culm deposits of the Moravian-Silesian region are preserved in an elongated SW-NE structure on the eastern margin of the Bohemian Massif. The lithostratigraphic succession of the Drahaný Upland Basin has been subdivided into Protivanov, Rozstání and Myslejovice formations (Upper Viséan, Go_a – Go_y), consisting of several members (Kumpera, 1971). Fossil fauna and flora for taphonomic study come from sites of the Myslejovice Fm. in the zones Go_{βfa}, Go_{βel} and Go_{βmu} (Kováček & Lehotský, 2018).

A total of 51 samples were analyzed. Fossil flora of pteridospermophytes (*Diplotmema* cf. *stocesianum*, *Neuropteris antedecens*, *Sphenopteris striatula*) and ochrophytes (*Opatovicia chlupaci*) were recognized. Bivalves (*Posidonia radiata*, *P. becheri*, *P. trapezoedra*, *Dunbarella mosensis*, *Polidevcia* sp., *Streblochondria* sp.), gastropods (*Eucochlis* sp.), nautiloids (*Kionoceras gesneri*, *Cyrtospyroceras rugosum*, *Pseudorthoceras striolatum*), goniatites (*Girtyoceras brüningianum*), ostracods, hyoliths, brachiopods (*Propriopugnus papyraceus*), crinoids (*Lophocrinus minutus*) and trilobites (*Cyrtoproetus* (C.) *moravicus*) represent a broad spectrum of marine invertebrate taxa.

A KEYENCE VHX-X1 digital microscope was used to document microtaphonomic characteristics and preservation patterns of Mississippian fossils. Digital techniques, including depth-composition imaging, 3D surface visualization, multi-view morphometry, and optical enhancement of surface relief, were employed to identify subtle taphonomic signatures, assess preservation quality, and characterize diagenetic modifications.

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FAMENNIAN AND TOURNAISIAN FISH MICROREMAINS OF THE MORAVIAN KARST

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Abstract

The end-Devonian Hangenberg Crisis represented a major bottleneck in the evolution of fishes, and the Frasnian to Viséan Líšeň Formation of the Moravosilesian Basin records this critical interval in the Moravian Karst, Czechia. Disarticulated fish macrofossils are rare in the formation, but isolated microscopic remains (ichthyoliths; e.g., teeth, scales, jaw fragments) are common, offering a good record of the fish fauna evolution. This contribution reviews previously published ichthyolith occurrences in the Famennian and Tournaisian of the Líšeň Formation and presents new findings.

The Frasnian–Famennian boundary sections at Brno-Lesní lom and Brno-Šumbera yielded chondrichthyan (Symmoriiformes, Phoebodontiformes, Protacrodontidae) and onychodontid sarcopterygians teeth, and placoderm or sarcopterygian bone fragments (Ginter in Hladil et al. 1991; Smutná 1996). New lower Famennian material from Mokrá-west and Lesní lom comprises sparse conical actinopterygian teeth with occasional jaw fragments and scales, accompanied by chondrichthyans (Symmoriiformes, Phoebodontiformes) teeth and rare placoderms (?) plates. Data on the middle Famennian ichthyoliths are missing and will be the target of future research. Upper Famennian material from Křtiny and Lesní lom is limited, comprising Chondrichthyes (Symmoriiformes, Phoebodontiformes) and Actinopterygii (Palaeonisciformes) (Kumpan 2013). By contrast, the most diverse assemblages occur in the lower Tournaisian at Mokrá, Lesní lom and Křtiny, comprising Chondrichthyes (Symmoriiformes, Phoebodontiformes, Squatinactiformes, Ctenacanthiformes, Protacrodontidae), Acanthodii (Acanthodiformes, Ischnacanthiformes), Sarcopterygii (Onychodontiformes), and Actinopterygii (Smutná 1996; Kumpan 2013), with new material currently under study.

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**PATHOLOGICAL CHANGES IN THE SKELETON
OF A SAUROPOD DINOSAUR OF THE SPECIES *DIPLODOCUS CARNEGII*
FROM THE DINOSAURIA MUSEUM PRAGUE EXHIBITION**

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Abstract

One of the many fascinating ways of studying fossil material is an approach that shifts its focus away from body structures shaped during phylogenesis in order to investigate abnormalities that developed during the lives of extinct animals as a result of injury or disease. This approach falls within the realm of paleopathology and offers valuable insights into the ethology, physiology, and overall lifestyles of long-extinct organisms, as well as into the distribution of diseases across evolutionary lineages (e.g., Rothschild et al. 2003; Wolff et al. 2009). In this presentation, I provide an overview of ongoing research on numerous abnormalities observed in the skeleton of the dinosaur *Diplodocus carnegii*, displayed at Dinosauria Museum Prague. These pathological changes include a distinct lesion on the right fibula, smaller lesions on metatarsals and metacarpals, and abnormal growths on the sacral vertebrae, as well as adjacent dorsal and caudal vertebrae. Medical CT data and the morphology of the lesion suggest that it represents a neoplastic process. The differential diagnosis currently includes several possibilities that will be discussed during the presentation. The lesions in the feet are interpreted as stress fractures, which may have resulted, at least in part, from abnormal loading on the limbs and compensatory limping caused by pain associated with the fibular lesion. The origins of the vertebral outgrowths and their relationship to the other abnormalities remain under investigation. As this research is still ongoing, all interpretations should be considered preliminary. The presentation will also briefly discuss the methods employed thus far and outline the direction of future research.

Acknowledgements: I would like to express my sincere gratitude to my supervisor, Martin Mazuch, Ph.D., for his valuable guidance and support throughout this research. I am also deeply grateful to Irena Buksakowska, M.D., Ph.D., and the entire team of the Department of Imaging Methods, Second Faculty of Medicine, Charles University and Motol University Hospital, Prague, for their invaluable cooperation and for providing access to the CT data used in this study. I would also like to thank Mgr. Štěpán Pícha, Scientific Supervisor of the Dinosauria Museum Prague, for granting access to the studied specimen and for providing the opportunity to conduct this research.

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NEW INSIGHTS IN PALAEOECOLOGY AND STRATIGRAPHY OF THE KLIKOV FORMATION OF THE SOUTH BOHEMIAN BASINS

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Abstract

New investigation in palaeontology, palaeoecology, and stratigraphy of the Klikov Formation is based on documentation of large road cuts of the D4 highway in České Budějovice, combined with newly drilled boreholes in Dunajovice and České Velenice. The oldest part of the formation infill is attributed to the Lower Coniacian, while most of the Klikov Formation was deposited during the middle and late Coniacian. The youngest parts of the formation contain the Lower Santonian index pollen fossil *Quedlinburgipollis*.

Marine influence has recently been identified at several horizons of the the České Velenice borehole. This is evidenced by the presence of agglutinated foraminifera and *Classopollis classoides* pollen, produced by the halophytic conifer *Frenelopsis alata*.

Based on earlier climate studies using the CLAMP method, a humid and warm climate with short dry seasons can be inferred. This interpretation is supported by the presence of mostly well-drained argillisols with vertic features in the Dunajovice borehole, large tree trunks transported by a river at the Dobrovodská road cut, and presence of vegetation of exposed substrates. A striking manifestation of this seasonality is the abundant accumulation of charcoalified mesofossils, which mainly comprise reproductive organs of plants from the Normapolles Complex.

Preliminary reconstruction of the Klikov vegetation is as follows:

- 1) River floodplain vegetation was dominated by platanoids with *Ettingshausenia* leaves and *Quadriplatanus* reproductive organs, as well as lauroids, including *Paraphylantoxylon* wood and *Grevilleophyllum* and *Cocculophyllum* leaves. Their understory was formed by ferns and selaginelloid lycophytes.
- 2) Exposed soils were colonized by liverworts (*Ricciopsis pactovae*), hornworts such as *Notothylacites filiformis*, and small monocots.
- 3) Upland vegetation included plants of the Normapolles Complex, such as *Budvaricarpus*, *Caryanthus* and *Zlivifructus*, together with ericoid angiosperms (e.g. *Epacridops*), mesophytic-xerophytic ferns, and gymnosperms.

A NEW NARAOIID ARTHROPOD FROM THE UPPER ORDOVICIAN OF PRAGUE

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Abstract

The family Naraoiidae comprises a group of Lower Paleozoic euarthropods with non-biomineralized exoskeletons that are particularly abundant in Cambrian Konservat-Lagerstätten. Despite this early abundance, naraoiids are much rarer in post-Cambrian deposits. *Soomaspis splendida* Fortey & Theron, 1994, one of the few known Ordovician species, was described from the Hirnantian Soom Shale Member of the Cedarberg Formation, South Africa. This naraoiid is characterized by a circular, featureless cephalon, three thoracic tergites, and a pygidium with five pairs of interpleural furrows. We report a new species of *Soomaspis* – *Soomaspis labutai* sp. nov. – from the Katian Králův Dvůr Formation of the Prague Basin (Czech Republic), based on a single specimen discovered by collector Radek Labut'a during the construction of a new metro line in Prague. *Soomaspis labutai* sp. nov. differs from *S. splendida* in having a proportionally shorter pygidium and a distinct exoskeletal sculpture. The occurrence of *Soomaspis* in Bohemia demonstrates that this genus was present along the Gondwanan margin prior to the Hirnantian glaciation and survived both pulses of the end-Ordovician mass extinction. The distribution of *Soomaspis* in two geographically distant regions, coupled with its occurrence in high-latitude settings, indicates a broader paleogeographic and ecological distribution than previously recognized. The new species also suggests that naraoiids were more widespread during the Ordovician than the current fossil record implies.

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A RE-EVALUATION OF HISTORICAL TRIASSIC MARINE REPTILE FOSSILS FROM THE MUSCHELKALK OF SILESIA (SOUTHERN POLAND)

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Abstract

The Lower-Middle Triassic Gogolin Formation in southern Poland yielded some of the oldest known Mesozoic marine reptile fossils from Europe. Although the remains of animals from the Silesian Muschelkalk were first mentioned as early as the early 19th century, and numerous fossils have been excavated since then, the diversity of marine reptiles from this area is still relatively poorly understood. We re-evaluated the reptile fossils from the Silesian Muschelkalk housed in the collection of the Faculty of Biological Sciences, University of Wrocław. The collection includes specimens collected between 1830s and 1910s in several localities, including three-dimensionally-preserved fossils, rare trace fossils and a few palaeohistological thin sections. Although it contains almost exclusively isolated bones, as is typical of Muschelkalk deposits, it still provides important data on the diversity of Triassic reptiles. Several lineages of Triassic marine reptiles are represented in the collection, including tanysaurian stem-archosaurs and diverse sauropterygomorphs, such as saurosphargids, placodonts, pachypleurosaurs, nothosauroids and pistosauroids. A notable find is a round pubis from Nakło Śląskie which bears similarities to the placodont *Pararcus diepenbroeki* (supported also by a geometric morphometric analysis), otherwise known only from the Vossenveld Formation in Winterswijk (The Netherlands). If this similarity reflects a close phylogenetic relationship, it would suggest a lower level of regional endemism among marine faunas from the Germanic Basin.

DOES SPORANGIA MORPHOLOGY IN THE GENUS *COOKSONIA* REFLECT EVOLUTIONARY TRENDS?

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Abstract

Cooksonia is one of the best-known genera of early vascular land plants and contains the earliest known polysporangiophytes (Libertín et al., 2018). This is a clade that includes all plants with sporophytes that have branched axes bearing sporangia. *Cooksonia* has a cosmopolitan distribution and a long stratigraphic range, spanning mid-Silurian (Wenlock) to Upper Devonian (Pragian–Emsian) strata (Edwards & Feehan, 1980; Edwards et al., 2004; González & Gerrienne, 2010). Recent studies of *Cooksonia* and other early land plants have provided numerous new insights into this enigmatic and highly heterogeneous group (Edwards et al., 2021). Well-preserved plant mesofossils, in particular, have provided more detailed morphological information than was previously known, elucidating the diversity and systematics of early land plants (Edwards et al., 2021). Re-examination and revision of previously described taxa have also provided valuable new information on the taxonomy of the genus *Cooksonia*. Based on the morphology of the sporangia and how the sporogenous tissues are arranged, *Cooksonia* can be divided into three groups. The first group has a sporogenous tissue immersed in a widening terminal axis. The second group has convex sporangia and the sporogenous tissue is partially immersed in the subtending axis. The third group has spherical to kidney-shaped sporangia; the sporogenous tissue is not immersed and the terminal axis is not expanded, or only slightly so. These three morphological groups reflect different levels of sporangial protection. This is probably a response to environmental change rather than to heterogeneous evolutionary trends.

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LATE CRETACEOUS PLATANACEAE FROM CENTRAL EUROPE: NEW EVIDENCE FROM THE SOUTH BOHEMIAN BASINS

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Abstract

Crucial perspectives on early platanoid evolution are provided by Late Cretaceous fossil assemblages from Central Europe. Focusing on the Bohemian Cretaceous Basin (Cenomanian) and the South Bohemian Basins (Coniacian–Santonian), this study analyses newly recovered and established Platanaceae material.

The Cenomanian record from the Czech Republic reveals diverse floral structures, including two distinct types of staminate inflorescences borne on common axis. Small globular forms, identified as *Platananthus* sp. possess male flowers with five stamens, featuring well-developed connectives, and five tepals (Kvaček 2006). In contrast, a potentially tetramerous arrangement is indicated by larger globular inflorescences associated with *Ettingshausenia bohemica* foliage, which presumably consist of four stamens. Additional Cenomanian foliage also includes *E. laevis* and *E. cuneifolia* (Kvaček & Váchová 2006). Younger Coniacian–Santonian successions of the South Bohemian Basins yield highly heterophyllous species *Ettingshausenia senonensis* (Kvaček & Váchová 2006) alongside a newly recovered staminate inflorescences of *Quadriplatanus* reported in this study.

Discovered near České Budějovice in the fluvio-lacustrine claystones and sandstones of the Klikov Formation, these platanoid mesofossils were extracted via bulk-maceration and sieving. The specimens display globular inflorescences on a common axis, with individual flowers exhibiting four tepals and four stamens with reduced connectives. Reticulate, prolate to spherical tricolporate pollen grains are preserved *in situ*. Palaeoenvironmentally, these Late Cretaceous platanoids are reconstructed as components of river plain communities, reflecting the alluvial habitats favoured by extant *Platanus* species.

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MICROFOSSILS FROM THE MIDDLE MIOCENE OF THE CARPATHIAN FOREDEEP, CZECHIA: PRELIMINARY DATA

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Abstract

Two groups of microfossils were recovered from Lower Badenian (Lower Langhian) deposits in southern Moravia. At both the Židlochovice and Lomnice localities, calcareous spicules of tunicate ascidians (Ascidiacea) and siliceous spicules of sponges (Porifera) were present. The tunicates are primarily represented by stellate spicules—characterized by a variable number and arrangement of blunt to conical rays—as well as flat, disc-shaped sclerites. At least 15 distinct morphotypes were recognized. The majority of these belong to the ascidian family Didemnidae, alongside at least three types attributed to the genus *Cystodytes* (family Polycitoridae). Among the sponges, Demospongiae spicules are dominant. While spicules belonging to Astrophorina are the most common, the presence of other specific spicules indicates the occurrence of samids, bubarids, agelasids, and lithistids. Additionally, we documented a few Hexactinellida spicules and skeletal fragments. Overall, the diversity of the ascidians is moderate, whereas sponge diversity appears to be quite low. To reconstruct the ascidian and sponge assemblages that inhabited this area in the Middle Miocene in order to compare it with other faunas of this region at that time and to interpret the environment they lived in, more insightful studies are needed.

THE FRANZ ZIMMERMANN PALAEOBOTANICAL COLLECTION: HISTORICAL SIGNIFICANCE AND RESEARCH POTENTIAL

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Abstract

Among the many palaeobotanical collections documenting Carboniferous plants, particular importance is attached to those assembled during field investigations at the end of the nineteenth and the beginning of the twentieth century. One of the researchers involved in these studies was Franz Zimmermann, a palaeobotanist and geologist associated with investigations of the Carboniferous deposits of Lower Silesia (Kuleszo, 2019).

The Zimmermann Collection, currently housed at the Lower Silesian Branch of the Polish Geological Institute in Wrocław, comprises nearly 4,000 fossil plant specimens representing various groups of Carboniferous flora. Although the collection has been used in selected studies on Carboniferous macroflora, it has not yet been comprehensively revised using modern palaeobotanical approaches. It is currently undergoing digitisation and inventory within the Digital Geological Database (CBDG).

As part of this work, selected specimens are being re-examined and compared with current taxonomic concepts. Of particular interest are specimens assigned to the genus *Lepidodendron*, representing arborescent lycopsids that formed a major component of Carboniferous vegetation. The material exhibits considerable variation in leaf-cushion morphology and preservation, allowing a re-evaluation of characters traditionally used in the taxonomy of *Lepidodendrales*. Some historical identifications require revision. For example, a specimen originally identified as *Lepidodendron lossenii* is now referred to *Lepidodendron jaschei*, following the taxonomic revision of Cleal et al. (2024), who regarded *L. lossenii* as a junior synonym of *L. jaschei*.

These preliminary results demonstrate the scientific significance of the Zimmermann Collection and emphasise the importance of the digitisation and taxonomic revision of historical palaeobotanical collections. The collection represents an important source of material for future studies on the diversity, morphology and systematics of Carboniferous plants.

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A GEM THAT WAS FORGOTTEN—REDISCOVERY OF A RARE CENTRAL EUROPEAN PLESIOSAUR DOCUMENTED ON THE EVE OF WORLD WAR II

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Abstract

The Early–Late Cretaceous transition marked an interval of significant restructuring in marine faunas, affecting various clades of tetrapods. The once-dominant thalattosuchians, ichthyosaurs, and pliosaurids became extinct. In turn, mosasauroids, elasmosaurids, and polycotyliids diversified and flourished (Madzia and Cau, 2020). Polycotyliids, in particular, experienced a burst of disparity early in the Late Cretaceous, colonizing new niches and increasing their ecological diversity. They are known from marine deposits across both the Northern and Southern Hemispheres. However, despite their growing representation in Upper Cretaceous strata, the geographic distribution and preservation of polycotyliid fossils remain uneven. For example, while the polycotyliid record from the Western Interior Basin of North America comprises rich and diverse assemblages of well-preserved specimens, remains recovered in Europe are typically scarce, often represented by isolated elements, and usually too fragmentary to be interpreted in sufficient detail, although some notable exceptions exist. Here, we report the rediscovery of a partial plesiosaur postcranial skeleton from the upper Turonian of Třebovice, Pardubice Region, Czechia. Discovered in 1932 and briefly described in January 1939 (Augusta and Soukup, 1939), it comprises parts of the cervical and dorsal series, a partial left ischium and several other girdle fragments, along with incomplete metapodials and phalanges, dorsal rib fragments, and some indeterminate elements. Although lacking most of the skeleton, the specimen clearly represents a polycotyliid, likely a polycotyline. It is by far the best-preserved plesiosaur specimen from the Czech Republic and one of the best-preserved polycotyliids from Europe outside Russia.

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LARGE BENTHIC FORAMINIFERA FROM BŘEZŮVKY (ZLÍN FORMATION OF THE MAGURA GROUP OF NAPPEs)

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Abstract

The site in Březůvky exposes sediments of the Zlín Formation. The first mention of this site was in 1913 by R. Schubert; since then, the outcrop has not been the subject of any detailed research. The outcrop, where sandstone was mined in the past, is located on the road between the villages of Březůvky and Ludkovice near the Lukáščena spring. Rocks with large benthic foraminifera belong to the Luhačovice member of the Zlín Formation. The total length of the former quarry is about 100 m, and the height is roughly 10 meters, though the outcrop is interrupted by vegetation and soil. Tests of large benthic foraminifera were found in coarse-grained sandstones and fine-grained conglomerates. The tests were often abraded and incomplete, which made identification difficult.

Due to the crumbly and loose nature of the sediments, the tests were separated from the matrix and subsequently embedded in epoxy resin blocks. The identification of large benthic foraminifera was based on the external morphology of the tests and equatorial sections in thin sections. The identification was consulted with Dr. Laura Jane Cotton of the Natural History Museum, Denmark. The genera represent the fauna of large benthic foraminifera found at the Březůvky site: *Asterocyclina* sp., *Nummulites* sp., and *Discocyclina* sp.

Based on the association of the large benthic foraminifera fauna, biostratigraphy was performed according to Serra-Kiel et al. (1998), and paleoenvironmental reconstructions were carried out. Biostratigraphically, the sediments belong to the Eocene period. The information obtained suggests that the environment was a relatively warm, open marine setting with a well-developed photic zone. The morphology of tests indicates a coarser-grained substrate and a higher-energy water environment.

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MICROSCOPIC VERTEBRATE REMAINS FROM SELECTED STRATA OF THE PRAGUE BASIN

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Abstract

Microscopic remains of early vertebrates, often referred to as "ichthyoliths," comprise small, phosphatic fish elements such as scales, spines, teeth, and fragments of shields or bones. Early vertebrates are characterized by their highly mineralized dermal tissues—generally consisting of bone, dentine, and enamel/enameloid—which are usually preserved as apatite fossils. The standard method for extracting these remains involves dissolution of carbonate rocks. Even though the Prague Basin (within the Barrandian area) is world-famous for its invertebrate fossils, valuable vertebrate remains are also documented. Among these, microvertebrates are considered rare, but this may reflect the lack of comprehensive studies rather than actual scarcity. This presentation will introduce the key Silurian and Devonian localities of the Prague Basin from which new material was recovered, alongside an overview of the processing methods used. Ultimately, the microscopic vertebrate remains provide valuable new insights into the composition of the fish fauna in the Prague Basin. Furthermore, studying these microremains has the potential to supplement global datasets regarding the palaeogeographic distribution of these taxa, as well as to open up new avenues for a broader study of early vertebrates.

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NEW DATA FROM THE MIDDLE JURASSIC FOSSIL FLORA OF THE UNGET BASIN, EAST GOBI, MONGOLIA

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Abstract

The studied flora comes from the Unegt Basin, Mongolia, which originated during orogenic activity associated with the closure of the Mongol-Okhotsk Ocean during the lower half of the Mesozoic. The basin is a part of the Central Asia Orogenic Belt and corresponds, at present, to the modern East Gobi region in Mongolia. Flora comes from the Khamarkhoovor Formation, that containing of five productive coal seams. The fossil flora is assigned to the Lower–Middle Jurassic stratigraphical interval. However, despite our initial efforts, a detailed biostratigraphic framework for this formation has not yet been established.

In this study, we expand upon earlier work (Muraviev et al. 2025) by presenting new fossil taxa from the Unegt Basin and conducting a comprehensive analysis of the fossil flora. The aim is to identify potential local index taxa for age determination of the deposits. The assemblage includes *Hausmannia crenata*, *Coniopteris hymenophylloides*, *C. burejensis*, *Cladophlebis haiburnensis*, *Cl. nebbensis*, *Cl. suluktensis*, *Cl. kanskiensis*, as well as representatives of numerous Cycadophyta (including new species), Ginkgoales (*Ginkgo* and *Baiera*), and *Podozamites lanceolatus*.

A detailed study of cycadaleans using cuticle analysis identified the following taxa: *Nilssonia mongolica* and *N. gobiensis*, which are reported here for the first time. The remaining cycadalean assemblage is represented by numerous pinnate leaves of *Nilssonia* cf. *syllis* and entire-margined leaves of *Nilssonia* cf. *orientalis*.

In comparison with Czekanowskiales (especially *Czekanowskia*), cycadaleans constitute a significant component of the studied taphoflora. In addition to the mentioned fern assemblage (especially *Hausmannia crenata* and *Coniopteris burejensis*), we suppose that cycadaleans played a key role in the vegetation and may serve as potential index fossils for the studied deposits, suggesting a warming climatic trend during the investigated time interval.

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PALEOECOLOGY OF THE FOSSIL FAUNA FROM THE LOWER OXFORDIAN TRANSGRESSIVE BED OF THE HÁDY QUARRY (BRNO, CZECHIA)

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Abstract

The Hády Quarry in Brno, Czechia, is an important paleontological locality representing a record of a Jurassic carbonate platform (Hykš & Kumpan, 2025). This research presents the results of a study of new paleontological material collected in the Lower Oxfordian transgressive layer at the Hády section. The study was focused on the evaluation of faunal diversity and taphonomy, with implications for depositional environment reconstruction. The material consists of 469 specimens, of which 245 were ammonites belonging to 7 families (Aspidoceratidae, Peltoceratidae, Cardioceratidae, Lytoceratidae, Oppeliidae, Phylloceratidae, Perisphinctidae). Other identified groups include Brachiopoda, Belemnoidea, Gastropoda, Porifera, Echinodermata, Bivalvia, Nautiloidea, and Chondrichthyes. Only representatives of the subclass Ammonoidea were systematically evaluated at the genus and species level (14 genera in 4 species), whereas other groups at the family or even order level. The genera *Prososphinctes* and *Lytoceras*, and the species *Peltoceratoides* cf. *eugeniforme*, are reported for the first time at the locality. The documented ammonite association supports the Early Oxfordian age (Cordatum Zone) of the deposit. The composition of fossil communities suggests a relatively stable environment of the continental shelf with good connection to the open sea, which is also supported by the preservation of material with a low occurrence of abrasion facets (sensu Fernández-López, 2011). The presence of glauconite and micritic limestone indicates a low sedimentation rate. Detailed results are presented in Navrátil et al. (*in press*).

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NEW INSIGHTS INTO EOCCRINOID DIVERSITY AND ONTOGENY IN THE EARLY ORDOVICIAN FEZOUATA BIOTA

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Abstract

Located in the Anti-Atlas of southern Morocco, the Fezouata Biota represents a significant Early Ordovician (late Tremadocian–middle Floian) fossil lagerstätte. It offers an unparalleled perspective on a major evolutionary shift and the beginning of the Great Ordovician Biodiversification Event within high-paleolatitude environments. This period was characterized by a significant radiation of echinoderms, indicating a transition from the low-diversity, opportunistic communities of the Cambrian to the increasingly complex benthic ecosystems of the Palaeozoic Evolutionary Fauna. The Fezouata Biota is known for its rich and varied marine assemblages, which include both traditional shelly fossils and exceptionally preserved non-biomineralized or lightly sclerotized taxa. Alongside arthropods, echinoderms constitute a primary element of this biota. To date, at least 62 echinoderm species have been identified, belonging to more than 45 genera and 8 different classes. Notable groups include stylophorans, solutans, somasteroids, and also eocrinoids—a paraphyletic group of basal blastozoans ranging from the Cambrian Series 2 to the Late Silurian. The Fezouata Biota exhibits significant morphological disparity among eocrinoids, with thecal heights ranging from a few millimetres to over 10 cm. Although the genus *Rhopalocystis* and *Balantiocystis* have been known since the mid-20th century, ongoing investigation of new material is expanding our understanding of their diversity. Current studies are revealing previously unknown genera, further increasing the taxonomic richness of the site. Furthermore, the exceptional preservation of these fossils allows us to study ontogenetic series within certain taxa, providing valuable insights into the life history of Early Palaeozoic blastozoans.

MORPHOMETRIC VARIABILITY AND COMPARISON OF THE GENUS CRASSICOLLARIA DURING THE JURASSIC AND CRETACEOUS

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Abstract

The study of calpionellids is complicated by the random orientation of loricae in thin-sections, which can create a large variation in length or width, or can also bias the estimates of morphometric variables. Depending on the angle of sections, one species can thus acquire shapes resembling other species, which leads to the loss of key characters, such as the caudal part or the collar shape. This problem is significant in distinguishing the species *Cr. parvula* and *Cr. colomi* (Remane, 1985; Boughdiri et al., 2020).

The aim of our work is a morphometric analysis of both species based on randomly selected individuals from Brodno and Strapkova sections in the Pieniny Klippen Belt. We evaluated the lorica length and width, the aboral pole shape (tapering vs. caudal part), and the collar (shape and wall thickening). The Mann-Whitney test was used to test the differences in median length and width between the groups.

The most significant difference was in the lorica width, where *Cr. parvula* is significantly ($p < 0.0001$) wider (median = 42.52 μm) than *Cr. colomi* (median = 38.40 μm), although the wall thickening under the collar remains relatively stable in both forms. With respect to the lorica length without the collar, the trend is the opposite, *Cr. colomi* is longer (64.23 μm) than *Cr. parvula* (61.51 μm). A significant difference was also noted in the collar width, while the collar length did not differ between the two species ($p=0.262$). Our results indicate that *Cr. parvula* is wider whereas *Cr. colomi* is longer and narrower.

The morphometric differences are also supported by the presence of qualitative characters. *Cr. colomi* exhibits a short caudal part and its collar is deflected outwards, while in *Cr. parvula*, the aboral pole is pointed and the collar is oriented approximately parallel to the lorica axis. These traits suggest that *Cr. colomi* cannot simply be interpreted as a randomly deformed form of *Cr. parvula*, although further morphometric analyses from other populations and sections will be needed to definitively resolve their taxonomic relationship.

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BROADENING THE LITOLOGICAL AND TAPHONOMIC CONTEXT OF THE CAMBRIAN BRZECZÓW LAGERSTÄTTE IN THE HOLY CROSS MOUNTAINS (POLAND)

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Abstract

Brzechów is a village located c. 20 km to the east of Kielce city, geologically situated within the Palaeozoic inlier of the Holy Cross Mountains. The site, known for about 100 years, yields fossils from the Cambrian Series 2/Miaolingian boundary interval, including the eldoniids *Velumbrella czarnockii* and *Maoyanidiscus* sp. which are preserved as 3D sandstone moulds (Masiak & Żylińska, 1994). Exhibiting evidence of plastic deformation and scavenging traces, the fossils are regarded as imprints of soft organisms. Such exceptional preservation of labile tissues is unusual for the Phanerozoic, strongly resembling the ‘Eldiacara-style’ of preservation characteristic of the earliest animal communities from the Precambrian (Tarhan et al., 2016). The surfaces of the eldoniids from Brzechów are coated with thin iron- and aluminium-rich veneers comprising mostly clay minerals. Such preservation is consistent with the claim that enhanced authigenic clay mineralisation was the predominant taphonomic pathway promoting exceptional preservation during the Precambrian and the early Palaeozoic (Tarhan et al., 2026). The fossiliferous sandstones from Brzechów were so far known only from loose boulders recovered in one isolated location, but now are shown to extend along a 2.5-km-long belt in the vicinity of the village. Additionally, the first *in situ* exposure of the sandstones is reported, in which they contact with a shale unit. The new exposure provides an opportunity for a detailed study of the depositional environment, as well as refining the age based on acritarch analysis. Geophysical surveys performed in the area helped to prove that the fossiliferous strata are in reality interbeds resulting from high energy sedimentation located within a fine-grained siliciclastic background.

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**AGGLUTINATED BENTHIC FORAMINIFERA
FROM THE SOUTHEASTERN ARABIAN GULF:
A MODERN ANALOGUE TO MIOCENE FAUNAS IN THE PARATETHYS?**

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Abstract

The modern benthic foraminiferal faunas in the Arabian Gulf, and particularly those containing agglutinated foraminifera, are perhaps the best modern analogue of the Miocene shallow-water faunas of the Parathethys. In this study, we sampled the offshore area of the southeastern Arabian Gulf area off Abu Dhabi, a region that displays elevated sea-surface temperatures and salinity. The newly collected core and grab samples from the southeastern sector of the Arabian Gulf reveals that the agglutinated forms comprise as much as 12.5 to 45% of the total benthic foraminiferal assemblage, a proportion never previously reported from the Arabian Gulf. We documented the occurrence and taxonomic composition of modern benthic foraminiferal assemblages with abundant and diverse agglutinated species, particularly the genus *Textularia* and the related genus *Sahulia*. We record a total of 23 species of agglutinated foraminifera from the studied samples, of which 14 are textulariids, with many species displaying grain selectivity (Prayudi et al. 2026). The general pattern from shallow to deep stations shows depth-related abundance trends and variability in the morphology of the textulariids, with laterally compressed and coarsely agglutinated taxa more abundant at bathymetrically deeper stations. This study is part of a larger project to investigate the taxonomic composition and distribution of benthic foraminifera from the southeastern portion of the Arabian Gulf, with emphasis on their ecological preferences.

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THE STRUCTURE OF THORAX IN PALAEODICTYOPTERA ILLUMINATES EVOLUTION IN EARLY PTERYGOTES

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Abstract

The hexapod thorax is the tagma specialized for locomotion, and its morphology has been studied from various aspects, particularly in connection to the evolution of flight. A number of studies deal with the comparative morphology of the wing base, lateral sclerites, and structure of the pterothoracic muscles among the main lineages of Pterygota to uncover the origin of insect flight, studying homologies, ordinal relationships and reconstructing the ancestral state of characters. The part of the thorax that underwent the largest structural changes during the process of the wing acquisition is represented by the reinforcement of the thoracic lateral body wall. We present newly discovered material of a palaeodictyopteran from Pennsylvanian of the Mazon Creek Lagerstätte in Illinois (USA), which sheds light on the functional morphology of thorax and tackles the unresolved issue of the basal split of Pterygota. Moreover, we reconstructed a 3D model of palaeodictyopteran and compared flight-related traits with a broad range of recent insect taxa. Our results provide a new, complex insight into how the thoracic structure and flight-related traits may have looked like at the very beginning of the insect flight evolution.

Acknowledgements: The contribution was supported by the Czech Science Foundation (No. 24-11498S).

ARE EXTINCT EUROPEAN FROGS PALAEOBATRACHIDAE ACTUALLY ANTIPODS OF GONDWANAN PIPIDAE IN THE NORTHERN HEMISPHERE?

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Abstract

Frogs of the genus *Palaeobatrachus* first appeared in the Late Cretaceous in Spain and southern France. They spread throughout Europe during the Paleogene and Neogene, with their last recorded occurrences being at the Muchkap interglacial (621–568 Ka) in Russia. Like the Pipidae in Africa and South America, they were obligate water-dwellers. However, the Pipidae were never found on the Laurasian continents. Astonishing anatomical similarities have been found not only between adults of the Palaeobatrachidae and Pipidae, but also between their perfectly preserved tadpoles. Nevertheless, a few but notable differences do exist. This raises questions about how the pipid ancestors of the Palaeobatrachidae could have migrated from Gondwana to Europe, and about how the anatomical differences between the two groups originated.

PROGRESS IN THE RESEARCH OF PALEOGENE AND NEOGENE FOSSIL WOODS FROM NORTHERN BOHEMIA OVER THE PAST 25 YEARS: SUMMARY

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Abstract

The Paleogene and Neogene of northwestern Bohemia are spread in the northwestern part of Czechia as a continuous zone of magmatic and sedimentary complexes, parallel to the Czech-German boundary. The present overview has been limited to the three regions: Doupovské hory Mts., Most Basin and České středohoří Mts. The two volcanic complexes, i.e., České středohoří and Doupovské hory Mts., represent the easternmost branch of magmatic activity in the Central European Volcanic Province, developed in late Eocene–Miocene by an alternating deposition of various rocks as lavas, tuffs, or debris flows. The Most Basin is limited tectonically in the NW and SE, and by the two volcanic complexes in the NE and SW. Its main fill, including the "Main Seam", and the richly fossiliferous overlying clays and sands, belongs to the lower Miocene Most Formation.

All three areas are rich in the fossil record, being of interest to the scientific community for many years since the 19th century to the present, but the study of macrofossil plants has mainly focused on the leaves and reproductive structures, and the fossil wood studies were rather limited. Over the past 25 years, the systematical research on fossil wood has made significant progress, and the results can be found in the following overview studies by Koutecký (2024) and Sakala (2004, 2015, 2024). Additional systematic results are also found in several other works (e.g., Mantzouka et al. 2016).

Acknowledgement: The fossil wood research was supported by the projects Cooperatio Programme Research Area GEOL and SVV (both Charles University).

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UNDERSTANDING ANCIENT SEAGRASSES USING ORGANIC GEOCHEMISTRY

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Abstract

Seagrass meadows are ecologically significant habitats due to their role in ocean primary productivity, carbon cycling and storage (Hemminga & Duarte, 2000). Despite their recognized ecological and economic importance, their identification in the geological record remains limited due to scarce fossil preservation. Recognizing their presence would provide vital insights into ecosystem responses to environmental change through time (Duarte et al., 2013). As seagrass fossils are rare, their presence is inferred from associated organisms (Koskeridou et al., 2018) and organic geochemical data, particularly *n*-alkanes (Xu et al., 2006).

This study presents a geochemical analysis of fossilised seagrass samples from Greece (Early Pleistocene) and seagrass-associated sediments from Oman and Slovakia (Eocene), analysed using GC-MS. Modern *Posidonia oceanica* and *Zostera marina* were included as a comparative framework, and biomarker ratios were calculated to assess organic matter (OM) sources. Fossilised *P. oceanica* from Greece shows dominant C21, C23, and C25 *n*-alkanes, typical of submerged embryophytes. Oman samples are characterised by short- to medium-chain odd *n*-alkanes (*n*-C17–*n*-C25), indicating algal and aquatic OM input. Slovak samples show medium-chain odd *n*-alkanes (*n*-C19–*n*-C25) with even-chain homologues (*n*-C14–*n*-C20) suggesting mixed OM sources and thermal alteration. Together, these findings demonstrate that *n*-alkane distributions can effectively identify the indirect presence of seagrasses across different depositional settings and geological ages.

Acknowledgements: This research was supported by the Grant Agency of the Czech Republic (Project No. 23-05217S).

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PALYNOFACIES AND DINOFLAGELLATE CYST STRATIGRAPHY OF SEDIMENTARY ROCKS ACCOMPANYING SUBMARINE VOLCANISM IN THE SILESIA UNIT

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Abstract

New results of stratigraphic investigations of the Early Cretaceous sediments of the Hradiště Formation accompanying magmatic rocks of the teschenite association of the Silesian Unit (flysch belt, the Western Carpathians) were obtained from samples of black shales from the Baška and Petřkovice localities.

All types of sedimentary organic matter (SOM) have been investigated in the samples. In the studied samples spores and pollen grains (max. 23%) and dinocysts (max. 22%) form the main component of the palynomorphs. Phytoclasts composed of maximum 55% of palynofacies. Amorphous organic matter is completely absent. In terms of composition of organic matter paleoecologically corresponds to an oxidised shelf.

The stratigraphical position of samples at most locations is Barremian based on the occurrence of the important dinoflagellate cyst *Cerbia tabulata* and *Odontochitina operculata*. The oldest sediments belong to the upper Valanginian, based on the species *Circulodinium vermiculatum*.

The youngest lower Aptian (*Forbesi* ammonite zone) sediments were identified at the Požaha locality, based on the occurrence of *Florentinia mantellii*. From the palynofacies composition, significant re-sedimentation can be interpreted. We observe an increased content of plant phytoclasts (in the Petřkovice area where carbonized plant remains were found), spores and pollen grains. The paleoenvironment of the studied samples is variable, but most belong to the pelitic oxic shelf and the marginal dysoxic-anoxic basin.

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PRAGIAN-EMSIAN SECTIONS IN THE PRAGUE SYNFORM – A POSSIBLE KEY TO REDEFINING THE BASE OF THE EMSIAN?

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Abstract

There is still a pending problem within the Devonian stratigraphy – the lower boundary of the Emsian Stage. The current basal Emsian GSSP was defined in the Zinzil’ban Gorge (southern Tian Shan) based on the FAD of conodont taxon *Polygnathus kitabicus*. However, the detailed correlations with the Mauro-Ibero-Armorican, Rheno-Ardennan and Barrandian faunas revealed that the boundary lies well below the base of the Emsian in German sense (Carls et al. 2008). As a result, the GSSP correlates with the level in the lower part of the Praha Formation. But, the Pragian Stage was originally defined to correspond precisely to the Praha Fm. (i.e. the original Pragian). Seven years ago, at the STRATI in Milan, the Subcommittee on Devonian Stratigraphy decided to search an alternative section with stratigraphically appropriate level for the new basal Emsian GSSP. For several years, the SDS repeatedly called for suitable proposals to be submitted from any region, including southern Tian Shan. The most promising candidate sections outside the stratotype area are situated in regions of Perigondwana. In the past decades, Lower Devonian successions in the Prague Synform have been extensively studied for biostratigraphy and palaeontological, sedimentological, geochemical and petrophysical records. Intensive research in recent years has led to proposals for both the prospective new stratotype (GSSP) and SABS (Standard Auxiliary Boundary Stratotype) for the basal Emsian boundary (Weinerová et al. 2024; Slavík et al. 2025, 2026; Mikuláš et al. 2026). The *gracilis* Event represents the critical marker for possible redefinition; it is stratigraphically much closer to the traditional boundary between the originally defined Pragian and Zlichovian and Siegenian and Emsian stages than the present GSSP.

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COTONEASTER SP. NOV. AND THE RELICT PLIO-PLEISTOCENE TRAVERTINE FLORA OF DREVENÍK (SLOVAKIA)

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Abstract

The travertine deposits at Dreveník (Slovakia) represent a unique taphonomic window into the Late Pliocene–Early Pleistocene vegetation of Central Europe. Yielding 37 distinct taxa, the site preserves a critical transitional ecosystem where Neogene relicts flourished alongside modern lineages prior to their regional extinction. The gymnosperm elements are characterised by *Ginkgo adiantoides* (Unger) Heer, *Torreya* cf. *nucifera* Siebold & Zucc., *Pinus* sp., and *Picea* sp. The remarkably rich angiosperm assemblage includes *Cercidiphyllum crenatum* (Unger) R.W.Br., *Liquidambar europaea* A.Braun, *Zelkova zelkovifolia* (Unger) Bůžek & Kotl., *Ulmus cocchii* C.T.Gaudin, *Fagus haidingeri* Kováts, *Betula subpubescens* (Göpp.) G.Worobiec, *Populus tremula* L., and *Phillyrea* aff. *latifolia*. Recent systematic reassessment of this diverse macroflora has brought forward significant taxonomic novelties. A primary highlight is the formal description of *Cotoneaster* sp. nov., providing crucial evidence for the diversification of tribe Maleae in this region during the Plio-Pleistocene cooling. Furthermore, the exceptional preservation of the Dreveník material permitted detailed micro-morphological studies of Hamamelidaceae leaves. We identified well-preserved pit- and pocket-type acarodomatia on the foliage of *Parrotia persica* (DC.) C.A.Mey. The presence of these specific structures serves as a key diagnostic feature, allowing us to confidently differentiate the extant *Parrotia persica* from the broader, extinct morphotype *Parrotia pristina* (Ettingsh.) Stur. Together, these findings elevate the importance of the Dreveník travertines for understanding late Cenozoic plant taxonomy, palaeoecology, and plant-mite interactions.

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PLANKTONIC FORAMINIFERAL RESPONSE TO STEPWISE COOLING, COASTAL UPWELLING AND WIDESPREAD ANOXIA IN THE CENTRAL-CARPATHIAN PALEOGENE BASINS

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Abstract

Planktonic foraminifers reveal temperature and oxygenation of the seawater. The temperature preferences of planktonic foraminifera were used as a proxy of climatic deterioration and Eocene/Oligocene cooling in the Central-Carpathian Paleogene Basin (CCPB). Warm-water muricate foraminifera like acarininids and morozovelloids disappear at the Bartonian/Priabonian boundary, being followed by temperate-water globigerinathekids, turborotaliids and last hantkeninids at the Eocene/Oligocene boundary. Oligocene microfauna dominates by cool-water species of tenuitellids, pseudohastigeriniids, dentoglobigerinids, chiloguembelinids, etc. Climatic improvement is indicated by reappearance of warm-water species of *Trilobatus primordius* and *Paragloborotalia pseudokugleri* during the Late Oligocene.

Paleogeographic changes during the Early Oligocene changes resulted in development of the Paratethyan euxinic basins. The expansion of the oxygen-depleted zone in the CCPB induced peculiar changes of planktonic foraminifers developing a clavate and digitate morphologies. These foraminifers from sulfidic-rich sediments of Sub-Menilite the Menilite formations belong to species *Protentella rohiensis*, *Quiltyella clavacella*, *Q. nazcaensis*, *Beella digitata* and *Bolliella adamsi*. These species were also described from the Transylvanian Basin (Popescu & Brotea 1989), the Ždánice Unit (Švábenická et al. 2007) and the Fore-Alpine molasse basins (Rögl, 1969). The presence of digitate foraminifers indicates the conditions of Paratethyan anoxia by developing of radially elongated forms to escape from the oxygen minimum zone (OMZ). Beside clavate and digitate species, there are also malformed tests with various abnormalities and morphological deformities. Their tests are filled by framboidal pyrite. Digitate species proliferated mainly in upwelling conditions (e.g. Coxall et al. 2007), which are also indicated by a high-rate productivity of *bulloides*-type globigerinids, pteropods and diatoms in coastal zones of the CCPB.

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TIME-CALIBRATION OF BIOSTRATIGRAPHIC AND RADIOISOTOPIC DATING OF THE EOCENE – OLIGOCENE STRATOTYPE SECTIONS IN THE CENTRAL-CARPATHIAN PALEOGENE BASIN

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Abstract

Composite sections of the Central-Carpathian Paleogene Basin (CCPB) allow stratigraphic boundaries to be determined using biostratigraphic and radioisotopic dating. Ypresian/Lutetian boundary in transgressive sequence of the CCPB is marked by overlapping ranges of foraminiferal species *Morozovella subbotinae* and *Guembelitrioides nuttalli* (E6/E7 Zones). Lutetian microfauna is rich in *Hantkenina* and *Clavigerinella*-species, with a prevalence of *H. mexicana* (E8 = P10 Zone sensu Berggren et al. 1995), and later followed with the first occurrence of *Globigerinatheka kugleri* and last occurrences of *Morozovella aragonensis* (E 9). The Bartonian horizon is marked by planktonic foraminifera *Orbulinoides beckmanni* (E12 Zone), agglutinated foraminifera *Ammodiscus latus* and nannofossil species such as *Reticulofenestra umbilicus* (NP16 Zone). The tuffite sediments from these horizons provide the zircon age of 40.91 Ma (□ Polany Tuff 15, sensu Van Couvering et al. 1981). The Bartonian/Priabonian boundary is indicated by last occurrence of *Morozovelloides* and *Acarinina topilensis* (E 13 Zone) and the first occurrence of the nannofossil *Cribrocentrum erbae* (Agnini et al. 2011). This boundary is also dated by the presence of tuffaceous material containing zircons and apatites, yielding an age of 35.7 Ma.

Late Eocene microfauna consists mostly of globigerinathekid foraminifers, like *G. semiinvoluta* in the Lower Priabonian (E 14 zone) and species *G. index* in the Upper Priabonian (E 15 zone). These species disappear at the Eocene / Oligocene boundary, together with last occurrences of *Hantkenina alabanensis* (E 16), small acarininids and nannofossils *Isthmolithus recurvus* (NP 19/20). Coeval volcanism is recorded by crystal tuffs of bipyramidal volcanic quartz. Oligocene microfauna rapidly changes to small-sized foraminifers such as pseudohastigerinids, tenuitellids, chiloquembelinids and dentoglobigerinids (O1). Tuffite-bearing horizons at the E/O boundary yield the U–Pb zircon age of 33.96 Ma. Early Oligocene turnover in foraminiferal fauna and calcareous nannoplankton reflects stepwise cooling, coastal upwelling and widespread anoxia of the CCPB (see also this issue).

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FOSSIL COLLAGEN AS A QUALITATIVE MOLECULAR ARCHIVE: PRESERVATION, DIAGENETIC MASKING, AND EARLY ANTHROPOGENIC SIGNATURES IN PLEISTOCENE ANIMAL REMAINS

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Abstract

Collagen is the primary organic component of bone and a key molecular archive for reconstructing past environments, ecosystems, and chronologies. In Pleistocene contexts, it underpins radiocarbon dating and isotopic studies, yet it is still commonly treated as “present” or “absent,” overlooking its qualitative molecular state. This simplification obscures important information about diagenesis, environmental conditions, and the reliability of analytical results. Here, we investigate collagen preservation in faunal bones from four Central European Pleistocene sites representing diverse depositional contexts: open-air loess, cave and karst settings. These assemblages vary in sediment chemistry, taphonomy, and degrees of human involvement. However, to test the impact of anthropogenic activity, an ideal framework would involve a single site containing stratigraphically distinct layers: one clearly associated with human activity, and another formed exclusively through natural processes, that would allow comparison under similar environmental conditions. For instance, sites like Spadzista yield extensive anthropogenic mammoth accumulations but lack equivalent remains from naturally deceased individuals for direct comparison.

Using ToF-SIMS and FTIR, we conducted low-destructive analyses focusing on molecular fragmentation, peptide signals, and markers of advanced glycation and lipoxidation (AGEs/ALEs). These features reveal oxidative stress, cross-linking, and chemical modification of collagen. We propose that patterns of collagen alteration may serve as proxies for early anthropogenic pressure. Human activities such as hunting, carcass processing, and fire use likely accelerate molecular degradation, producing detectable signatures. Integrating molecular data with archaeological context demonstrates that fossil collagen is not only a dating substrate but also a sensitive recorder of post-mortem processes and human-environment interactions.

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CORALLINE ALGAE OF MIOCENE AGE FROM AREA OF SLOVENIA

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Abstract

Corallinophycidae is a monophyletic group of red algae (Rhodophyta), characterized by high morphological variability, wide geographical distribution and a rich fossil record. They are the main component of Miocene limestones of the Central Paratethys. The aim of our research is to describe the coralline algal assemblage in the Badenian (— Sarmatian?) coralline algal communities from several localities in eastern Slovenia. Assemblages from this area have not yet been analyzed in detail. We focused on samples from the Mura-Zala basin, Styrian basin, Senovo basin and Kozjansko area involved in the Laško formation and Špilje formation (Ivančič, 2025). Based on our results, we can conclude that 1. Majority of the coralline algae occur in monospecific or multispecific rhodoliths, less of them are present as crusts forming hard substrate. Both growth form types are embedded/surrounded in bioclastic sand-gravel facies (debris). The algal assemblage consists of genera *Lithophyllum*, *Lithothamnion*, *Mesophyllum*, *Phymatolithon*, *Roseolithothamnion*, *Chamberlainium*, *Spongites* and *Sporolithon* hence is similar with assemblages known from other Paratethyan basins (Hrabovský 2015). In general, there is also a similarity in their abundance i.e. Hapalidiales dominate, Corallinales are more or less common while Sporolithales are minor but locally abundant. Species identified in the studied limestones are species well-known from other Paratethyan Basins. Our preliminary results thus suggest that ecological controls as are e.g. substrate, irradiance, temperature or dynamics were more important in dispersity of coralline algae than the proposed (weak) thermal gradient documented across the Central Paratethys.

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A UNIQUE SERPULID–BIVALVE ASSOCIATION: A CASE STUDY FROM THE MEDOBORY HILLS (WESTERN UKRAINE, PARATETHYS)

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Abstract

The Middle Miocene Medobory reefs in western Ukraine and northern Moldova form a distinct 300 km long ridge with varied relief along the southwestern edge of the East European Platform. Two generations of reefs, separated by a distinct erosional boundary, originated during the Late Badenian–Early Sarmatian (Volhynian) time. As observed in numerous quarries, the Upper Badenian reefs, composed of laminar thalli of red algae and the sessile snail *Petalonchus intortus* (Lamarck, 1818), reach several hundred meters in length and up to 100 m in height. In the latest Badenian, the Mediterranean connection was severed, causing a drastic change in environmental conditions that halted coralline-algal-vermetid reef growth. The younger (Early Sarmatian) reef generation developed under stressed semi-marine conditions with fluctuating mesohaline salinity and elevated alkalinity. Overgrowing eroded and karstified Upper Badenian reefs, they form dome-shaped massifs composed of incrusting serpulids (rarely bryozoans), microbialites, and synsedimentary cements. Serpulids played a key role in reef framework construction, forming dense aggregates that provided a stable substrate for byssate bivalves *Musculus sarmaticus* (Gatuev, 1916) and *Mytilaster volhynicus* (Eichwald, 1829). Furthermore, the occurrence of *Obsoletiforma volhynica* (Grischkevitch, 1967) is largely restricted to the serpulid-microbialite framework, exhibiting similar behavior to *M. sarmaticus*. Additionally, the oyster species *Crassostrea gryphoides* (Schlotheim, 1813), together with densely packed serpulid tubes, produced massive biostructures up to 3 m high. The co-occurrence of rock-forming serpulids and microbialites represents a unique phenomenon in the fossil record.

A STEP FORWARD: THE IMPACT OF APPENDICULAR SKELETON AND ASSOCIATED STRUCTURES ON THE UNDERSTANDING OF THE EARLIEST TURTLE DIVERSITY

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Abstract

The appearance of turtles (Testudinata) in the Late Triassic was first recognized in the 1860s, with more informative specimens recovered in the early 1900s. Despite that, and despite new discoveries being made in the following decades, new material was rarely noted and the knowledge of the earliest turtles remained rather cursorial for nearly a century. This partially changed with the description of a new early turtle from Thailand (Broin, 1984), publication of Gaffney's (1990) landmark monograph on *Proganochelys*, and identification of a separate early turtle lineage in the southern hemisphere (Rougier et al., 1995), followed by a handful of new contributions providing additional documentation and describing new taxa around the turn of the century. Even so, the landscape of Triassic turtle taxonomy remained pretty similar around the end of the second decade of the 21st century, as it was in 1995, with eight species and only three genera recognized by Joyce (2017), all geographically restricted except for the genus *Proganochelys* that inhabited most of the northern hemisphere. Revisions of the Triassic turtle material done over the last decade, however, reveal a strikingly different picture: up to 12 genera, *Proganochelys* restricted to central Europe, and the previously underestimated clade, Proterochersidae, being much more diverse and widespread than anticipated (e.g., Szczygielski & Drózdź, 2026). This change owes to the employment of 3D imaging and much more pronounced inclusion of appendicular data, allowing the establishment of over 60 new phylogenetic characters, many pertaining to limbs and associated structures (e.g., epiplastra). Appendicular anatomy remains poorly documented even in extant turtles, so its future study promises further phylogenetic developments.

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JUVENILE SEA TURTLES *GLARICHELYS* (TESTUDINES, PAN-CHELONIIDAE) FROM THE OLIGOCENE OF CZECHIA AND POLAND

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Abstract

The history and palaeobiogeography of the genus *Glarichelys* (Pan-Cheloniidae) provide insights into early ontogeny and migratory patterns of marine turtles during the Oligocene of Europe. The genus remains poorly understood as the hypodigm consists primarily of immature individuals and questionable taxonomic referrals. Confirmed records from the Rupelian of Switzerland, Czechia (Litenčice), and Poland (Winnica, Hermanowa) define its known distribution within the Central Paratethys. All *Glarichelys* specimens exhibit juvenile characters, including large orbits, narrow interorbital bridges (approximately 60% of prefrontal length), rounded, elevated cranial scales, and poorly to moderately ossified shells. However, a significant anatomical paradox exists: these small individuals possess well-ossified, articulated autopodia despite their otherwise immature shell development. This indicates either an ontogenetic shift in ossification timing or a prolonged delay in shell maturation relative to patterns observed in extant cheloniids. The Polish material is exceptional due to soft-tissue preservation around the natural skeletal molds revealing paddle outlines and shell scute impressions. Additionally, specimen UR/1055 from Hermanowa contains impressions of cololites: linear clusters of nodular concavities interpreted as voids left by digestive tract remnants associated with 3D relief and charcoal-like residue.

In conclusion, the genus *Glarichelys* in Czechia and Poland represents a taxonomically distinct lineage of small-bodied pan-cheloniids. These records provide indispensable data on chelonian early ontogeny, soft-tissue anatomy, and palaeobiogeography in the Central Paratethys.

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MICROFOSSILS FROM OLIGOCENE CARPATHIAN FLYSCH CONTAINING EXOTIC BLOCKS (KROSNO FM., SE POLAND): ENVIRONMENTAL AND PALEOGEOGRAPHIC IMPLICATIONS

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Abstract

This study examines microfossils from Oligocene flysch sediments (Krosno Fm.) of the Silesian unit in the Baligród region (SE Polish Outer Carpathians). Basin fill dominated by turbidity currents and debris flows contains exotic carbonate rocks (limestones, marls, Globigerina marls). Gravity sediments in local horizons (e.g. Mchawka, Kielczawa, Roztoki Dolne) comprise sandy mudstones with small planktonic foraminifera, ostracods (*Cytheridea*, *Hemicyprideis*, *Cytherella*), LBF (*Nummulites*, *Heterostegina*, *Spiroclypeus*, *Operculina*, *Orthophragminidae*), SBF (*Fabiania*, *Spirolina*, *Chapmanina*, *Angulogerina*, *Sphaerogypsina*, *Asterigerina*), and red algae. Accompanying bryozoans include cyclostomes and ascophorine cheilostomes (*Crisia*, *Heteropora*, *Celleporaria*). Assemblages include late Eocene species alongside Oligocene indicators (*N. fichteli*, *N. vasus*), indicating that many Eocene taxa are reworked. Plankton (*Globigerina*, *Catapsydrax*) and SBF (*Lenticulina*, *Uvigerina*) along with *G. selli* and *T. munda* document early Oligocene conditions at the EOT. Preservation varies: planktonic tests are mostly sediment-filled, whereas SBF retain calcareous walls. Microfossils indicate transport of detrital material from basin margins to deeper zones by gravity sediment flows, documenting the geotectonic and paleogeographic reorganization of the northern Carpathians at the Eocene/Oligocene transition.

NEW INSIGHTS INTO MICROANATOMY AND FUNCTIONAL MORPHOLOGY OF TRILOBITE EXOSKELETONS: CASE STUDY OF *MOROCOPS ? DEGENER*

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Abstract

With more than 20,000 described species, trilobites were a diverse component of Paleozoic marine ecosystems. Despite extensive research, internal and external exoskeletal microanatomy and paleobiology remain understudied, particularly regarding original mineralogy, functional morphology, and diagenetic influences. Addressing these gaps is essential for understanding trilobite evolution.

In this study, exoskeletons of *Morocops? degener* (Barrande, 1852) from the Lower Devonian Zlíchov Formation (Emsian; Barrandian area, Czech Republic) were investigated via EDTA acid etching of oriented sections. This method, established by Dalingwater (1973), uses differential dissolution resistance to reveal micro-topography under scanning electron microscopy (SEM) and is applied here for the first time to Czech material. This approach was supplemented by surface SEM, thin-section transmission microscopy, microprobe chemical analysis, cathodoluminescence, and fluorescence to provide a comprehensive overview of exoskeletal architecture.

Analysis revealed several microanatomically distinct structures in the cephalic exoskeleton of *Morocops? degener*. Comparisons with extant arthropods suggest that some structures are functionally analogous to specialized sensory and defensive organs, while others appear unique without obvious modern counterparts. These results provide new perspectives on exoskeletal functionality and highlight the potential of microanatomical studies to clarify trilobite biology and broader arthropod evolutionary disparity.

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TRACE FOSSIL ASSEMBLAGE FROM THE TOMÁŠOVCE MEMBER (UPPER PRIABONIAN) IN THE SUBTATRIC GROUP (SLOVAKIA)

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Abstract

The basal sequences of the Subtatric Group formed through a gradual transition from shallow-marine to deep-water turbidite facies in a progressive/regressive regime, with a trend toward significant deepening of the environment (Filo & Siráňová, 1996). This trend in changing sedimentary environments is also reflected in a specific ichnofauna. The trace fossil community is exceptional due to the presence of the trace fossils *Helicodromites helix* and *Curvolithus simplex*, which have been described from the CKP only at the Ďurkovec quarry site, the stratotype locality of the Tomášovce Mb (Borové Fm). Infaunal bivalves (*Panopea*, *Pholadomya*) occur directly in association with vertical burrows, which may explain at least part of the origin of the simple vertical burrows (*Skolithos*). The origin of the *Thalassinoides suevicus* found here is associated with the shrimp *Ctenocheles* sp. (Hyžný & Heteš, 2025). Based on the occurrence of trace fossils, part of the Ďurkovec site sequence could belong to the deeper *Skolithos* Ichnofacies, characterised by a low-energy environment with a fine-grained to muddy bottom and a relatively significant sediment supply. *Curvolithus simplex* and *Helicodromites helix*, along with the frequent occurrence of plant remains and the presence of borings in woody substrates, indicate a fan-delta facies environment. The fine-grained sediments could be attributed to environments ranging from the proximal lower shoreface to the lower offshore and possibly even deeper. The trace fossil assemblage ranges from a distal *Skolithos* Ichnofacies to a distal *Cruziana* Ichnofacies. The presence of the species *Nereites irregularis* suggests that the sequence at the site could extend into even deeper ichnofacies.

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CORDAITALEAN ASSEMBLAGE FROM THE HUBERT COAL SEAM, KARVINÁ FORMATION, UPPER SILESIAN BASIN, LANGSETTIAN

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Abstract

Plant remains from coal seams are determinable only after chemical treatment. Except palynology, they are the only source to reconstruct the peat-forming assemblage. Recently, coal seams 23–25 from the Upper Silesian Basin were macerated. Coals 23 and 24 contain a high percentage of lycopsid cuticles, however, coal seam 25 (Hubert) contains a high percentage of cordaitalean remains (cuticles and conducting tissues). Some conducting tissues can belong to medullosaleans, but tracheids with multiple bordered pits are more typical for cordaitaleans, even though similar tracheids have been found in medullosaleans (Luthardt et al. 2021). Adaxial and abaxial cordaitalean cuticles have been observed. The adaxial cuticle is typically without stomata, but the abaxial cuticle has stomata with strongly cutinised crypts and papillate ordinary epidermal cells. There is great resemblance with *in situ* cuticles of *Cordaite karvinensis* Šimůnek (Šimůnek, 2007) and subsequently revised (Šimůnek, 2019). This demonstrates that the flora forming Langsettian coal seams was not always homogenous with dominance of lycopsids, but that locally other plant groups (sphenopsids, ferns Pteridosperms) and even cordaitaleans played an important role, as it is in this Hubert coal seam from the Lower Suchá Member of the Karviná Formation.

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LOWER RHUDDANIAN (LOWERMOST SILURIAN) GRAPTOLITES, BIOSTRATIGRAPHY, AND SEDIMENTARY RECORD IN THE PRAGUE SYNFORM, CZECH REPUBLIC

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Abstract

Twenty graptolite species assigned to ten genera have been identified in the condensed succession of lowermost Silurian black graptolitic shales preserved in nine Ordovician–Silurian boundary sections in the Prague Synform. Of the twelve species described from the Czech Republic for the first time, two species are new (*Normalograptus retusus* and *Normalograptus acutissimus*), whereas five are left in open nomenclature. Virgellar branching preserved in the early Rhuddanian *Akidograptus ascensus* and *Parakidograptus acuminatus* closely resembles the ancora branching introduced by the upper Rhuddanian and Aeronian petalolithines. This structure, termed herein a pseudancora, may have resulted from an independent parallel evolutionary process, producing a homoplastic structure that preceded the true ancora developed in evolutionarily distant petalolithines. The sedimentary and faunal succession was disrupted by two significant gaps in sedimentation. The first gap is marked by a firm ground separating upper Hirnantian calcareous mudstone containing a locally developed, brachiopod-dominated *Hirnantia* Fauna and the zonal index graptolite *Metabolograptus persculptus* from overlying black shale dated to the middle–upper part of the lowermost Rhuddanian *ascensus* Biozone. In the most complete sections, black-shale sedimentation continued through the upper *ascensus* and lower *acuminatus* biozones before being replaced by condensed sandy-micaceous laminites in the upper *acuminatus* Biozone. In other sections, however, the upper part of the *acuminatus* Biozone is missing, together with much of the succeeding *Cystograptus vesiculosus* Biozone. The second hiatus is capped by black sandy-micaceous laminites containing abundant graptolites of the uppermost *vesiculosus* and/or *Coronograptus cyphus* biozones. The proposed depositional scenario has been refined through high-resolution correlation with the biostratigraphically well-dated, continuous Estana section (Štorch et al. 2019) in the Spanish Pyrenees, supplemented by data from other relevant sections (Toghill 1968, Štorch & Serpagli 1993, Štorch & Schönlaub 2012, Melchin et al. 2020).

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LOWER PALEOZOIC SCOLECODONTS FROM THE PRAGUE BASIN

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Abstract

The Prague Basin is a classic geological region exposing an Ordovician to Devonian succession. Over the past decade, intensive study of fossil jawed polychaetes from this area has yielded substantial new data and significantly expanded the known diversity of the group. As in other regions, research remains unevenly distributed stratigraphically, with the Silurian record being the most thoroughly documented. A further strength of this material is its palaeogeographic value: it provides rare insight into a peri-Gondwanan setting, still far less well known than the Baltic or Laurentian records (Eriksson et al. 2013).

Lower Ordovician assemblages are very low in diversity and dominated by morphologically ‘primitive’ placognath maxillae. Diversity increased markedly during the Middle Ordovician, although data from the Prague Basin remain sparse for this interval. A major diversification occurred in the Late Ordovician (Katian and Hirnantian), with assemblages comprising at least 14 genera (Tonarová et al. 2023), including the most diversified atraktoprionids and the only regional record of polychaeturids. Silurian faunas continue to be dominated by the polychaetaspids, although paulinitids become increasingly prominent. By the latest Silurian, placognaths with simple saw-like maxillae nearly disappear from the record, and never regain their former diversity before going extinct later in the Paleozoic. A further shift toward modern faunas occurred in the Lower Devonian with the appearance of kielanoprionids, a derived lineage that gave rise to extant hartmaniellids. Notably, the Prague Basin remains the only region where transitional paulinitid-kielanoprionid maxillae have been described (Tonarová et al. 2017).

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PLIO-PLEISTOCENE SITE NOVÁ VIESKA (SLOVAKIA) AND THE LAST PROBOSCIDEAN PARADISE IN CENTRAL EUROPE

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Abstract

Nová Vieska (Danube Basin, Western Slovakia) is one of the key Plio-Pleistocene large mammal sites in Central Europe. The locality yielded numerous remains of proboscideans, perissodactyls, artiodactyls, and, rarely, carnivores and primates. Because fossils are fluvially redeposited and likely mixed, the exact age of the site has long been debated and remains uncertain (Šujan et al., 2022). The identified taxa are correlated with the biozones MN16 and MN17. More than half of the fossils belong to proboscideans (Vlačíky, 2026). Three species were determined: “*Mammuthus borsoni*”, *Anancus arvernensis* (both abundant), and *Mammuthus meridionalis* (scarce). The high abundance of the first two species suggests that they were present here for a longer time (most likely since the late Pliocene, MN16b, 2.8–2.6 Ma). *Anancus* teeth have intermediate morphometry between *A. arvernensis arvernensis* and *A. arvernensis alexeevae*. The rare elephantid fossils of archaic *M. meridionalis* (more advanced than *M. rumanus* and with an affinity to *M. gromovi*) are typical for the early Pleistocene. This implies that elephantid immigrated here somewhat later (~2.5–2.4 Ma, early MN17). Hence, the Nová Vieska site can provide evidence of a unique (very brief?) co-occurrence of these three proboscidean species in Central Europe. Younger (late middle Villafranchian) sites yielded only *A. arvernensis* and *M. meridionalis* fossils (Iannucci et al., 2020). Ongoing research focuses on clarifying the subspecies *A. arvernensis* and on using isotope analyses to assess possible trophic competition between “*M. borsoni*” and *M. meridionalis*.

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NEW FINDS OF TERTIARY PLANT MACRO-REMAINS FROM SOUTHWESTERN BOHEMIA

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Abstract

Several opportunities have arisen to collect new paleontological material from southwestern Bohemia during last years. New findings significantly improved our current knowledge of the Tertiary flora of this region. Preliminary results come from two sites with exceptionally well-preserved plant fossils: Rokycany – Na Nivách and Horní Bříza – Modrý kříž.

At the Rokycany – Na Nivách site, a profile of fluvial gravels and sands was uncovered in 2024 during road construction. At the base of the relict, these are cemented into a brown conglomerate containing fossil flora. Historically, only isolated findings have been reported from the vicinity of this site, as this layer has not been exposed anywhere (Běhounek 1604, Purkyně 1913). The fossil material includes exceptionally well-preserved leaves, wood, and fruits. The preservation is three-dimensional and, for most leaves, allows for the study of internal and epidermal structures, including stomata. Taxonomic analysis of the fossil flora is currently underway, and the age of the sediments has not yet been definitively determined.

The second site studied is Horní Bříza – Modrý kříž, known from earlier paleobotanical research based on material from an exploratory borehole (Pouba & Špinar 1955). Numerous plant fossils, including several new species, as well as one insect species, have been described from these boreholes (Němejč et al. 2003; Štys & Říha 1975). Field research in 2023 revealed that the fossil-bearing horizon is not limited to the original borehole but occurs in the wider vicinity in the remnants of other boreholes. In addition to leaves and fruits, the newly collected material also contains a large number of coprolites and various insect remains (e.g., ephippia—diapause stages of the genus *Daphnia*).

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FROM LEGACY LITERATURE TO TAXONOMIC DATABASES: THE USE OF ARTIFICIAL INTELLIGENCE

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Abstract

Although the legacy palaeontological literature contains taxonomic, stratigraphic, geographic and descriptive information, converting these heterogeneous records into reusable digital resources remains challenging. This study presents an AI-assisted workflow integrating LLM extraction, relational database construction and local processing.

A corpus of 194 publications comprising 3,799 pages of OCR-processed text in six languages was used to extract structured taxonomic records. These were then consolidated, cleaned, and expanded into 39 fields covering nomenclature, stratigraphy, occurrence, morphology, and sources (Valent in press). The final curated dataset contains 1,540 records, of which 1,264 were retained for primary analysis after excluding wastebasket genera (Valent 2026a). To make the data searchable, editable and reusable, the dataset was implemented as a Microsoft Access database featuring a graphical interface for filtering, editing, comparison, import/export, validation, change tracking and taxonomic review (Valent 2026c).

The workflow was then extended to SciNexus, a local Streamlit environment supporting extraction, translation, taxon validation, data cleaning, style polishing, workflow automation, history tracking, and database-oriented export — all while keeping user data local (Valent 2026b). Qualitative validation through repeated extraction of selected publications demonstrated consistent recovery of core taxonomic elements, with discrepancies primarily attributed to OCR artefacts, diacritics, omissions or translation variability. Together, the extraction workflow, the Access database and the SciNexus framework provide a scalable means of converting legacy palaeontological literature into curated, inspectable and reusable taxonomic data resources.

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A BRIDGE FROM QUARRY TO CLINIC: SYNCHROTRON IMAGING REWRITES PITUITARY GLAND EVOLUTION

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Abstract

In recent decades, computed tomography has revolutionized palaeontology, providing an invaluable, non-destructive tool for visualizing internal structures of fossils. Our research group FOSSILiveS at the Institute of Geology and Palaeontology (Charles University, Prague) focuses on leveraging high-resolution synchrotron data to unlock these hidden secrets across both vertebrate and invertebrate lineages. Our previous discoveries have highlighted spectacular evolutionary morphology, such as uncovering the origin of teeth and jawbones in our most ancient vertebrate ancestors (Vaškaninová et al., 2020). Moving beyond anatomy, our detailed 3D virtual renders of tomographic datasets literally revived the iconic Palaeozoic fossils, illuminating the complex palaeophysiology and behaviour of a trilobite (Kraft et al., 2023).

Building on this diverse framework, we recently made an important anatomical discovery by analysing a perfectly 3D preserved hypophysial region of the basal jawed vertebrate genus *Radotina* from the Prague Basin. The pituitary gland (hypophysis) is a crucial endocrine organ that, in all living jawed vertebrates, is a single midline structure housed entirely within a specialized cavity deep inside the braincase. However, our comparative analysis of tomographic data from a diverse range of early vertebrate fossils reveals a completely unexpected evolutionary pattern for the hypophysis. By utilizing advanced imaging to uncover previously hidden skeletal correlates, we fundamentally reframed our understanding of vertebrate brain evolution, offering an entirely new anatomical context for both developmental biology and human pituitary pathologies.

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ECOLOGICAL ADAPTATION AND DISTRIBUTION OF THE FORAMINIFER *AMMOLAGENA CLAVATA* IN CARPATHIAN DEPOSITS

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Abstract

Ammolagena clavata (Jones et Parker) is a deep-sea agglutinated foraminifer inhabiting the continental slope, continental rise, and abyssal plains, occurring at depths reaching approximately 5000 m. The species is known from the latest Jurassic, and has been documented from numerous Upper Cretaceous and Paleogene sites in the Western Tethys and North Atlantic regions.

Ammolagena clavata is an attached epifaunal organism that grows on particles lying on the sea-floor. Its substrate preference varies regionally: in the Mediterranean it colonizes shell fragments and fish otoliths, while in the Paleogene Norwegian Sea it is associated mainly with larger quartz grains. In contrast, within the Carpathians it occurs exclusively on the tests of other agglutinated foraminifera. The highest abundances are recorded in the shelly complexes or thin-bedded Eocene deposits of the Tethys.

Typically, the species constitutes less than 0.5% of agglutinated assemblages. However, in the Hieroglyphic beds its proportion rises to about 7.5%, and individuals are markedly larger than elsewhere. This suggests particularly favorable environmental conditions for its development. The Hieroglyphic beds, dominated by clay-rich shale intervals interbedded by fine-grained thin-bedded sandstones, yield extremely abundant agglutinated foraminifera.

Its exclusive attachment to other foraminiferal tests indicates adaptation to environments deficient in coarse clastic material. Under conditions of low sedimentation rates and weak suspension supply, the species utilizes organic matter derived either from the occupied substrate or directly from the sediment surface. During growth, the aperture of *A. clavata* changes position, enabling access to areas richer in nutrients, while passive feeding strategies likely played an important role.

Based on these ecological preferences, *Ammolagena clavata* can be interpreted as an indicator of deep bottom currents and/or condensed sedimentation in ancient Carpathian basins.

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FOSSILS IN POTTERY: A MICROPALAEONTOLOGICAL APPROACH TO IDENTIFYING RAW MATERIAL SOURCES OF IRON AGE CERAMICS FROM TYRE (LEBANON)

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Abstract

Pottery from Iron Age contexts recovered in the so-called Acropolis of Tyre (Lebanon) contains a diverse assemblage of bioclasts, including algae, planktonic, benthic and large foraminifers, molluscs, and echinoderms. The study of these bioclasts, particularly foraminifers, made it possible to determine the raw material used for ceramic production.

The fossil assemblage is typical of the environment of the shallow marine carbonate platform. It is usually preserved in limestones, which were indicated primary as a raw material for ceramics. The development of organic assemblages took place in a photic-zone seafloor setting under relatively low-energy conditions, likely below wave base. Age of raw material was based on planktonic foraminifers, which exhibit considerable taxonomic diversity. The co-occurrence of *Globoturborotalita ouachitaensis*, *Globigerinatheka index*, *Subbotina crociapertura*, *Turborotalita carcoselleensis*, *T. pomeroli* and *Pseudohastigerina* points to a Middle Eocene rock source (Lutetian–Bartonian; biozones E10–E12). Coralline algae, although of lower stratigraphic resolution, further support a Paleogene age for the raw material.

A strong correlation exists between age, fossil content, and petrographic characteristics observed in both the regional bedrock belonging to the carbonate platform and the ceramic fabric. Exposures of the Middle Eocene platform carbonates are located approximately 5 km east of Tyre, while the city itself lies on weathering-derived soils formed on Ypresian–Lutetian carbonate substrates (BouDagher-Fadel & Clark, 2006). The raw material used for pottery production was most likely derived from weathering products developed on Lutetian carbonate rocks from eastern part of the city. The weathered material enriched in clay minerals constituted a suitable ceramic raw material, easily workable. The fossils were resistant enough to survive both weathering and the technological processes involved in ceramic production.

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**CONIACIAN TO CAMPANIAN FORAMINIFERAL BIOSTRATIGRAPHY
AND COOLING SIGNALS ALONG THE NORTHWESTERN TETHYAN MARGIN
- NEW RESULTS FROM THE UPPER GOSAU SUBGROUP, AUSTRIA**

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Abstract

We revisit a Coniacian through Santonian succession of the Upper Gosau Subgroup (Austrian Northern Calcareous Alps) on the northwestern Tethyan margin to investigate biostratigraphy, palaeoecology, and possible cooling signals across shallow- to deeper-water settings.

The stratigraphic framework is constructed using calcareous nannofossil and planktonic foraminiferal biostratigraphy, while benthic foraminiferal assemblages and stable isotope data are used to reconstruct ecological and palaeoceanographic change. Stable isotope records further suggest the presence of cooling trends across the studied palaeoenvironments, indicating that such signals are expressed in both shallow and deeper settings.

The offset in isotopic values between benthic and planktonic foraminifera illustrate distinct trends in bottom and surface waters, facilitating the assessment of temperature gradients independent of depositional environments. Emphasis is placed on benthic foraminiferal assemblages, which display distinctly different communities reflecting palaeoecological patterns. In addition to other shallow-water indicators, benthic foraminifera reveal a clear bathymetric gradient, documenting a progressive deepening from neritic settings to upper- and mid-slope environments. Among forms indicative of shallower environments, we document miliolid taxa such as *Quinqueloculina* sp. and large agglutinated forms (e.g., *Haplophragmium* sp.). A second assemblage, including taxa such as *Gavelinella* spp. and *Reussella* sp., occurs alongside these but is more abundant in more distal, neritic to upper bathyal and slope settings.

Together, these assemblage patterns provide insights into the organization of benthic ecosystems along the northwestern Tethyan margin. By integrating biostratigraphic, palaeoecological, and geochemical proxies, the study refines regional correlation and assesses how northwestern Tethyan palaeocommunities responded to environmental and climatic change during the Late Cretaceous.

UPPER CRETACEOUS OSTRACODS FROM KLESZCZÓW GRABEN – PRELIMINARY RESULTS

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Abstract

The study area is located in central Poland, between the Łódź and Miechów Depressions. Research material was obtained from the B837 borehole in the vicinity of the Kleszczów Graben, where Cretaceous deposits overlie Upper Jurassic strata and are covered by Miocene sediments (Olchow^{et al.}, 2019). The Cretaceous sedimentary succession begins with clastic deposits (sands, weakly consolidated sandstones, and clayey sandstones with phosphorites) passing into claystones and mudstones with inoceramid fragments, overlain by a mixed clastic–carbonate complex. This complex consists of marly mudstones with phosphorite concretions, glauconite, and sponge impressions, interbedded with glauconitic sandstones. Microfaunal samples collected from the clastic–carbonate interval yielded residue containing abundant glauconite, quartz grains, and pyrite. The microfaunal assemblage consists mainly of planktonic and benthic foraminifera, ostracods, and bivalve fragments. The ostracod assemblage is dominated by species typical of full-marine environments, indicating a deeper, outer-shelf zone: *Argilloecia fortior*, *A. communis*, and *A. decussata* (Bonnema, 1940, 1941). These are accompanied by typically neritic forms, including *Bairdoppilata subdeltoidea denticulata*, *Schuleridea* sp., and ?*Cythereis* sp., as well as eurybathic species such as *Cytherella ovata* and *Eucytherura tumida*. The occurrence of *Xestoleberis pergensi* and *Pulaviella ovata* may suggest a phytal habitat within the photic zone, although representatives of these genera are also known from bathyal environments (Szczuchura, 1965). The species composition of the ostracod assemblage indicates a Late Cretaceous age (Cenomanian–Maastrichtian) (Walaszczyk ^{et al.}, 2016).

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