

Freies Thema

Die Rudisten aus Mexiko: Vorkommen, Erhaltungszustand und Potential für geochemische Untersuchungen.Francisco Sánchez-Beristain¹, Pedro García Barrera² & Jaime Urrutia-Fucugauchi¹

Das Kreidesystem keilt in Mexiko aus. Unter den am meisten auftretenden Fossilien befinden sich die Rudisten. Diese riffbildenden Muscheln dominierten zum großen Teil die mexikanische Plattform und sind besonders häufig in den Staaten von San Luis Potosí (El Abra und El Doctor Formationen aus dem Alb-Cenoman, und Cárdenas Formation aus dem Campan-Maastricht); Chiapas (Ocozocoautla Formation aus dem Campan-Maastricht) und Michoacán (Mal Paso Formation aus dem Alb) zu finden.

Alb und Alb-Cenoman sind durch Vorkommen der Arten *Durania arnaudi*, *Hippurites resectus*, *Vaccinites macgillavry* und *Radiolites acutocostata* definiert. Im Gegensatz dazu, sind die Arten *Barretia multilirata*, *Praebarretia sparcilirata*, *Chiapasella radiolitiformis* und *Durania nicholasi* für das Campan-Maastricht typisch.

Exemplare aller genannten Arten besitzen einen hervorragenden Erhaltungszustand, der sich durch ihre im Dünnschliff erkennbare Mikrostruktur sehen lässt. Bei einigen der Fossilien ist sogar das Aragonit der inneren Lage der äußeren Schalenlage noch zu sehen. Dieser Erhaltungszustand erlaubt die Durchführung ausgewählter geochemischer Analysen, wie z.B. die Bestimmung der Paläotemperaturen und die Verteilung verschiedener Haupt- und Spurelemente in der Schale.

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Earliest record of complex tetrapod burrows from palaeoequatorial regions (Middle Triassic, Argana Basin, Moroccan High Atlas)Jörg W. Schneider¹, S. Voigt¹, H. Saber², A. Hminna², A. Lagnaoui², H. Klein³, A. Brosig¹ & J. Fischer¹

During a joint Moroccan-German field campaign in March 2008 unusual large burrows with scratch-marks were discovered in Triassic red-beds of the Argana Basin in the Western High Atlas of south-central Morocco. Detailed analyses of the ichnofossil-bearing strata in May 2009 and February 2010 revealed an occurrence of remarkably abundant, complex tetrapod burrows in fluvial deposits of the middle part of the Timezgadiouine Formation (Alegal Member; T4). Closely associated, well-preserved tetrapod footprints of *Chirotherium*, *Isochirotherium*, *Synaptichnium*, *Atreipus-Grallator*, *Rotodactylus*, *Rhynchosauroides*, and *Procolophonichnium* suggest a Middle Triassic age of the burrow horizon. The scratch-marked burrows occur in well-sorted channel sandstone which is laterally and vertically interbedded with sandy siltstone. This section we interpret as flash-flood and overbank deposits of a braided river system in a semiarid climate with periodic or episodic rainfall. Detailed documentation of the facies pattern for 120 m along a naturally exposed sandstone cliff revealed clustering of burrows at 2.5 – 4.5 m wide and 1 – 3 m laterally spaced aggregations. At least 12 of these aggregations could be identified along the outcrop. All burrows apparently start from the top of ≥35 cm-thick sandstone beds, step down as moderately inclined (10–30°), partially spiral, coiled tunnels and terminate in enlarged chambers in the underlying sandy siltstone. Tunnels represent mostly plan-convex structures up to 20 cm in width and 12 cm in maximum height. The slightly to moderately sinuous tunnel course (wave length $\lambda = 35\text{--}45$ cm; amplitude $f = 10\text{--}20$ cm; sinuosity index $S_s = 1.1\text{--}1.5$) is among the most peculiar features of the recorded burrow systems. Laterally extended terminal chambers with branched alleys, passing areas, grouped alcoves, possible access from different directions and horizontal clustering of tunnels strongly suggest that these burrows have been constructed and used by multiple individuals exhibiting some kind of social behaviour (“family-like communities”). Based on the stratigraphic position of the occurrence at the transition from evaporitic playa to alluvial plain deposits and inferred palaeoenvironmental conditions, the burrows

most likely served as shelter from seasonal or diurnal climatic extremes. Although similar burrows from Permian and Triassic red-beds (South Africa, Antarctica) have primarily been attributed to therapsids we explicitly include procolophonids as potential producers considering some unique features of the burrows and the local footprint record. Unfortunately, skeletal fossil remains, which could clarify the systematic position of the trace makers, were not yet found.

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The horns from Ernstbrunn – Composition and palaeoecology of a Tithonian reef-associated lagoonal bivalve community

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Approximately 30 km to the north of Vienna, a series of tectonic klippen is exposed, the oldest of which are Late Jurassic in age. This area, termed the Waschberg Zone, represents a tectonic nappe bordering the Molasse and Flysch zones. Here several of these large blocks occur in a NE trending chain that starts at the major locality, i.e. Ernstbrunn, and reaches into the Zdanice Unit of the Czech Republic. The prominent hills formed by the klippen in most cases consist of the Middle to Late Tithonian Ernstbrunn Formation. This unit comprises light-coloured, partially dolomitised limestones that are primarily composed of various types of highly fossiliferous lagoonal facies, often dominated by dasycladaceans or a diceratid-nerineid association. The fossil fauna of Ernstbrunn is remarkably diverse and estimated to contain > 500 taxa. To date, only few higher taxa have been treated monographically (sponges, crustaceans, nerineid gastropods), but from these more than 200 species are identified. Bivalves, however, are among several other major invertebrate groups that are still largely unstudied. Based on a first survey of the material a total of ~ 80

bivalve species might be expected. The community is clearly dominated by diceratids (*Epidiceras* & *Diceras*), which are usually found as internal moulds of single and double-valved specimens. These fossils have been first reported in the 18th century and are well known by their informal name „Hörndln“ (= horns). Less common, but collected in large numbers from Falkenstein and karst fissures at Dörfles, are diceratids with shell preservation. Even the outer calcitic layer that shows peculiar ornamentation details is still present in some of these specimens. In fact, the quarries of Dörfles have yielded one of the most extensive and best preserved diceratid faunas of Tithonian age and thus may be regarded a prime locality for research on diceratids. Diceratid biofacies is an important Upper Jurassic facies type that has an impressive geographic range. Autochthonous occurrences are confined to shallow marine settings predominantly along the northern Tethys margin and extend from Portugal to Japan. Moreover, from a phylogenetic point of view diceratids are a highly significant group of bivalves being the basal representatives of the Hippuritida, which became important reef builders in the Cretaceous. The impressive samples from Ernstbrunn area hold great potential to address open questions in diceratid palaeoecology, functional morphology, and phylogeny by exploiting quantitative data.

The diceratids are accompanied by several abundant infaunal (*Palaeonucula*, Lucinidae, ?Veneridae) and epibenthic reclining bivalves (*Pachyrisma*, *Praeconia*, *Pterocardia*). Numerous epifaunal byssate taxa (Arcidae, Bakevelliidae, Pectinidae) occur less frequent. Presumably, the latter were attached to diceratids or corals that formed small lagoonal patch reefs, or lived in adjacent habitats.

A striking feature of the Ernstbrunn Fm. molluscs is their remarkable size. While diceratids and megalodontids are well known as large-sized taxa, and reach ~ 200 mm at maximum, even the usually small *Palaeonucula* may attain a length of more than 40 mm. A similar tendency is seen in the gastropods that include giant taxa like the > 30 cm long “*Purpuroidea*” It may thus be assumed that the organisms lived under conditions close to optimum, especially with regard to food supply.

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