

specific decision consequences, recorded by the confusion matrices of different λ values. Although our experiments are restricted to a specific geochemical data set, we believe that the application of such modern learning methods is a promising approach and deserves further attention.

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Drilling predation from the Early and Middle Miocene marine fossil record of the Central Paratethys

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Drilling predation is among the most studied biotic interactions in the fossil record, and its overall patterns are well established on Cenozoic molluscs from North America. Few studies have examined such predation in Europe. This study aims to evaluate molluscan drilling intensities from the Burdigalian, Langhian and Serravallian of the Central Paratethys. Using drill frequency (DF) and prey effectiveness (PE), a measure of prey's ability to survive predatory attacks, we examine taxonomic and environmental effects on drilling predation, evaluate local and regional spatial variation, and compare Central Paratethys values to other contemporaneous basins using >38500 whole shells from 162 Karpatian (Upper Burdigalian) and Badenian (Langhian and Lower Serravallian) bulk samples from Austria and Slovakia.

DF and PE were slightly higher in bivalves than gastropods, and DF could vary drastically within single environments at single localities (maximum at Immendorf: mean = 10.9 %, standard deviation = 12.9 %). Both DF and PE were more variable in the Karpatian than Badenian. Higher overall DFs, but lower PEs were seen in the Badenian than in the Karpatian. A similar pattern was observed between intertidal and sublittoral deposits.

We interpret the increase in predation from the Lower to Middle Miocene to reflect environmental shifts from restricted estuarine to deeper, normal marine conditions. Regional predation intensities from the Central Paratethys are distinctly lower than those of other Miocene seas, potentially due to lower predator abundance, differences in faunal composition, and/or fluctuating salinities typical of inland seas.

The Zottachkopf Formation: A new formation in the Lower Permian Rattendorf Group (Carnic Alps, Austria)

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Sedimentological study of the Lower Permian succession at Zweikofel, Trogkofel and Zottachkopf in the Carnic Alps showed that a well-bedded succession underlying the unbedded Trogkofel Limestone of Trogkofel and Zottachkopf differs significantly from the Zweikofel Formation at Zweikofel and Garnitzenbach (as defined by KRÄINER 1995). The bedded succession was originally termed „Oberer Schwagerinenkalk“ by KAHLER & KAHLER (1937); it is characterized by dark gray, thin- to medium-bedded limestone rich in small oncoids and, in its lower part, by siltite intercalations and reddish limestones rich in crinoid fragments. In addition, algal mounds are present, particularly along the southern flank of Trogkofel.

This bedded facies is not an equivalent of the Zweikofel Fm, but is younger and differs significantly in facies. We herein introduce the term Zottachkopf Formation (of the Rattendorf Group), as the section along the northern slope of Zottachkopf was originally regarded as the type section for the „Oberer Schwagerinenkalk“ by KAHLER & KAHLER (1937).

The new type section of the Zottachkopf Fm is located in the basal part of the northern cliff of Trogkofel, and may be up to approximately 120 meters in thickness; there, the basal part of the Zottachkopf Fm starts with a bed of reddish to grey, karstified limestone, overlain by a package of well-bedded, red-coloured limestones and two intervals of calcareous siltstone are intercalated. Sedimentary structures, such as festooned cross-lamination, ripple drift cross-lamination, cross-bedding, parallel-laminated siltites with interspersed quartz grains up to 2 cm in size are common, and record deposition in shoreface environment. These intervals are overlain by wavy- to evenly-bedded packstones to rudstones rich in echinoderms, fusulinids and/or oncoids. Thick-bedded oncolithic pack- to wackestones represent the top of this package. The described package is separated by an E-W trending, south-dipping fault from grey well-bedded limestones of the remainder of the Zottachkopf Fm in the lower part of the northern Trogkofel cliff. The section on the northern side of Trogkofel attains 90 m in thickness, and is characterized by alternating thin- to thick-bedded limestones, locally showing cross-bedding. Five small, laterally arrayed mounds with thin-bedded intermound facies are intercalated. Oncolithic floatstones are overlain by bioclastic pack- to grainstones and oncolithic packstones. Our preliminary biostratigraphic data from fusulinids of the north-facing Trogkofel cliff indicate an Artinskian age for the Zottachkopf Fm. From reddish limestones exposed at Rudnigsattel east of the Trogkofel massif, FORKE (1995) and SCHÖNLAUB & FORKE (2007) described a conodont fauna of Late Sakmarian to Early Artinskian age; these limestones may correlate in age with the lower part of the Zottachkopf Fm in the northern cliff.