Palynomorphs from drillcores of the Lower Cretaceous sedimentary rocks of the Tamsag Basin, southeastern Mongolia

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SEM palynological studies have been performed on Lower Cretaceous drillcore samples from the Matad area for the first time. The pollen and spore assemblages were retrieved from exploration drillcore 102 in the terrestrial Zuunbayan Formation in the Tamsag Basin, located in the southeastern part of Mongolia (equivalent to the lower Khukhteeg and Shinekhudag Formations of the southeastern Gobi). The palynological data indicate an Aptian to Albian age for the drilled rock succession, in contrast to a previously assumed Hauterivean to Barremian age (biostratigraphical dating based on conchostracans, ostracods and molluscs) and will, therefore, be useful for further correlations with Inner Mongolia. The sedimentary rocks were deposited in an overall fluvio-lacustrine realm with floodplains, floodbasin lakes and perennial lakes resulting in mostly fine-grained sandstones interbedded with mudstones (partly bituminitous), siltstones, marls and limestones, associated with conglomerates, mudstones and coals. The palynomorph assemblages are composed of 26-33% of fern and bryophytes spores (46 taxa) and 67-74% of gymnosperm pollen (31 taxa). The angiosperm pollen has not been studied yet because of their rarity in Aptian to Albian rocks. Spores important for dating are: *Appendicisporites tricornitatus* Berriasian-Albian), *Foraminsporis assymmetricus, Cooksonites variabilis* and *Laevigatosporites ovatus* (Aptian-Albian). Newly discovered microfloral elements for this area are numerous gymnosperm taxa, including *Cycadopites*, *Ginkgocycadophytes* (real *Ginkgo*), *Araucariacidites*, *Inaperturopollenites* (Cupressaceae) and several taxa of *Pinuspollenites* (*Pinus* spp.), *Piceapollenites* (*Picea* spp.), *Cedripites* and *Podocarpidites*, as well as spores of *Aequitriradites spinulosus, Cicatricosisporites hallei, C. australiensis, Pilosisporites trichopapillosus, P. notensis* and many more. The overall composition of the palynoflora suggests a relative densely forested (gymnosperms) landscape surrounding the azonal depositional environments, which were a moist habitat of a diverse fern and moss vegetation.

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Intra-water column drifting as a new taphonomic model of the Konservat-Lagerstätte Hagen-Vorhalle (early Late Carboniferous; Germany)

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The Konservat-Lagerstätte Hagen-Vorhalle (Western Germany; approx. N 51°23, E 007°27) has delivered one of the most important paleo-entomofaunas of the Late Carboniferous (Pennsylvanian: Marsdenian) and is of supra-regional importance. It allows a unique insight into an ecosystem during the Late Namurian B and has already provided remarkable data about the evolution of early Pterygota.

Since the last few years taphonomic settings have been in focus of paleontological work. It has crystallized that these conditions were remarkably unique in comparison to other localities. The particular preservation of Pterygota is conspicuous and shows significant differences between "Palaeoptera" ($n \approx 100$) and Neoptera ($n \approx 210$). The first are almost always completely preserved while the latter invariably lack an abdomen. Furthermore all Neoptera bear tiny bivalve prodissoconchs (diameter: ~0.8–1.2 mm) or few dissoconchs (diameter: ~1.3–1.4 mm) exclusively on the dorsal wing membrane.

The assumed paleo-environment of Hagen-Vorhalle was a fluvial-dominated birdfoot delta the prograded into an epi-continental seaway ("Subvariszische Saumtiefe"). Taking into account geological, sedimentological, paleontological and paleo-oceanological data a novel taphonomic model is presented hereby: After a short period of drifting along the water/air contact layer "Palaeoptera" sank directly to the bottom of the sea whereas the soft-tissued abdomens of Neoptera began to decay under these oxic conditions. After loosing their abdomen the corpses sank to a pycnocline in a strongly stratified water body where a second period of drifting took place. At this stage the wings were settled by attaching bivalve larvae derived from a river. When the weight of the shells increased the insect/bivalve association broke through the pycnocline and sank to the bottom where they were finally embedded and fossilized.

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