

LOWER CRETACEOUS FACIES-CHANGES AND BIOSTRATIGRAPHY (TERNBERG NAPPE, NORTHERN CALCAREOUS ALPS, UPPER AUSTRIA)

Alexander LUKENEDER, Daniela REHÁKOVÁ

Lithological, sedimentological and palaeoecological studies of the Lower Cretaceous (KB1-A section, Ternberg Nappe, Northern Calcareous Alps, Upper Austria) uncovered rich spectra of Early Berriasian to Late Valanginian macro and microfaunal elements in addition with microfloral members. The evaluation of the thin sections indicates a change from a calpionellid facies to a echinoid facies within the Steinmühl Formation whereas the Schrambach Formation consists of mudstones with rare microfossils.

Several compositional changes in calcareous dinoflagellate and calpionellid assemblages (bio-events) are detected at the Austrian KB1-A section. They correspond to eustatic sea-level fluctuations observed in the Early Cretaceous of the West-Carpathian and correlate with the Nozdovice Breccia (Nozdovice event) at the end of the Late Berriasian (Calpionellopsis Zone) and with the Oravice turbidite event at the Early Valanginian (Calpionellites Zone).

The surface of the topmost bed of the Steinmühl Formation (latest Early Valanginian) is characterized by an accumulation of pygopids, partly eroded ammonoids with crinoidal epifaunas, and belemnites with *Acrothoracica* burrows. Additionally a probably small biostratigraphic gap in the calpionellid subzonation between the Steinmühl- and the Schrambach Formations show a sedimentation

stop (omission) during the pygopid accumulation.

Several compositional changes in dinoflagellate and calpionellid assemblages (bio-events), which are explained by eustatic sea-level fluctuations in the West-Carpathian (Early Cretaceous; Late Berriasian and Early Valanginian), can be observed in the Austrian KB1-A (Northern Calcareous Alps) section.

The two events, the Nozdovice Event (Nozdovice Breccia) at the end of the Late Berriasian Calpionellopsis Zone explained by a regressive phase and the Oravice Event (Early Valanginian), also explained by a rapid sea-level lowering. Both phases manifested in the Nozdovice and Oravice events, at the approximate end of the Late Berriasian and the end of the Early Valanginian, are evident in the KB1 section. These severe sea-level falls mark the base and the top of the Maiolica-like, light grey biomicritic wackestones of the topmost Steinmühl Formation with abundant *Pygope catulloi*. This interval is not a transition but an independent step. The last sea-level fall was followed by a huge rise in sea level, manifested in the Late Valanginian (Verrucosum Zone) succession of the lowermost Schrambach Formation; it is formed by light grey spotted limestones with marly intercalations, which are very fossiliferous in micro- and macrofossils.

The evaluation of the thin section indicates a change from the calpionellid facies (lower part

of the 'Ammonitico rosso' type limestone), to an echinoid facies (upper part of the Steinmühl Formation) up to nannoconic facies (the Schrambach Formation) with rare echinids and foraminifera.

Beds with the abundant brachiopod *Pygope catulloi* (*Pygope*-bed) reflect a phase of drastic sea-level fall. These layers are represented by the Maiolica-like light grey biomicritic wackestones of the topmost Steinmühl Formation, just below the Schrambach Formation. The *Pygope* accumulation, partly eroded ammonoids with crinoidal epifaunas, belemnites with *Acrothoracica* burrows, as well as the probably small biostratigraphic gap in the calpionellid subzonation between the

Steinmühl- and the Schrambach Formations show a sedimentation stop (omission) during the pygopid accumulation. This favoured the building of a firm- to hardground, which allowed the pygopids and other epifaunal elements to settle on the sea-floor. The associated calpionellid fauna indicates an Early Valanginian (Calpionellites Zone; major Subzone) age of the *Pygope catulloi*-bearing bed. Thus, the occurrence of abundant pygopids and the additional analysis of the micro- and macrofauna support the interpretation of a hardground palaeoenvironment on a swell of the outer shelf.

Alexander LUKENEDER

Natural History Museum

Geological-Palaeontological Department

Burgring 7

A-1010 Vienna

Austria

e-mail: alexander.lukeneder@nhm-wien.ac.at

Daniela REHÁKOVÁ

Faculty of Natural Sciences, Comenius University

Mlynská dolina G 1

842 12 Bratislava

Slovakia

e-mail: rehakova@nic.fns.uniba.sk