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Abstrakt

V práci sa jedná o palynologickom výskume slabometamorfovaných sedimentov wechselskej série v Rakúsku a sedimentov harmónskej skupiny v Malých Karpatoch. Litologicky majú obe série veľa spoločných znakov. Palynologickým výskumom sa mala potvrdiť aj ich veková identita. Zistili sme, že metasedimenty wechselskej série obsahujú sporomorfy mladopaleozoického veku stefan C — spodný perm (Torispora securis Alp., Colluminisporites ovalis Pepp., Cordaitina div. sp. a iné). Palynomorfy z harmónskej skupiny Malých Karpát obsahovali rody a druhy hlavne zo skupiny Acritarcha veku vrchný silúr — spodný devón (Emphanisporites minutus Allen, Cymatiosphaera nebulosa Down., Duvernaysphaera tenuicingulata Stapl. a iné). Tým sa preukázalo, že vek metasedimentov wechselskej série neodpovedá veku metasedimentov z harmónskej skupiny Malých Karpát.

Zusammenfassung

Die vorliegende Arbeit behandelt die palynologische Untersuchung von gering metamorphen Ablagerungen der Wechsel-Serie in Österreich und der Ablagerungen der Harmónia-Serie in den Kleinen Karpaten. Lithologisch betrachtet gibt es viele Ähnlichkeiten in den beiden Serien. Durch palynologische Untersuchung sollte man auch deren Altersidentität bestätigen. Wir haben festgestellt, daß die Metaablagerungen der Wechsel-Serie die Sporomorphen des jungpaläozoischen Alters Stefan C — Unterperm (*Torispora securis* Alp., *Colluminisporites ovalis* Pepp., *Cordaitina* div. sp. und andere) beinhalten. Die Palynomorphen der Harmónia-Serie der Kleinen Karpaten enthielten Familien und Arten vor allem aus der Gruppe Acritarcha des Alters Obersilur — Unterdevon (*Emphanisporites minutus* Allen, *Cymatiosphaera nebulosa* Down., *Duvernaysphaera tenuicingulata* Stapl. und andere). Dadurch wurde festgestellt, daß es nach derzeitiger Kenntnis keine Altersübereinstimmung zwischen den Metasedimenten der Wechsel-Serie und denen aus den Kleinen Karpaten gibt.

BIOSTRATIGRAPHY OF THE VLÁRA DEVELOPMENT OF THE BÍLÉ KARPATY UNIT ON THE BASIS OF CALCAREOUS NANNOFOSSILS

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The Bílé Karpaty Unit is situated in the area of the Bílé Karpaty Mts., on the boundary between Moravia and Slovakia. The sediments are characteristic by conspicuous facial changes both in the transverse and longitudinal direction. On the basis of these changes Matějka and Roth (1956) defined two lithostratigraphic units from the bottom to the top: 1. the lower part of the Paleogene represented namely by variegated beds; 2. the upper part of the Paleogene represented by flysch beds with noncalcareous claystones and flysch beds with calcareous claystones. In the upper part of the Paleogene they delimited three developments: the Vlára, the transitional and Hluk developments. Micropaleontologic part in the work of Matějka and Roth was written by E. Hanzlíková.

The concept of the Bílé Karpaty Unit structure of Stráník, Krejčí and Menčík (1988) is based on the classical division of Matějka and Roth. They proposed some changes in the upper part of the Paleogene and gave up the theory of an independent status of the transitional development. They delimited a new lithofacial member — the Kopanice development — along the Klippen Belt (Fig. 1).

This contribution deals with the biostratigraphy according to the calcareous nannofossils in the Vlára development of the Bílé Karpaty Unit.

Matějka and Roth (1956) defined the Vlára development as the beds of the upper part of the Paleogene with finely to medium rhythmic flysch with prevalence of sandstones. Stráník, Krejčí and Menčík (1988) include into the Vlára development the Gbely variegated beds as the oldest component, which according to Hanzlíková (1984) and Švábenická (1986) belong to the Cenomanian till lower Paleocene. Above them lie finely to medium rhythmic flysch beds which were established as a new stratigraphic member — the Javorina Formation — by Stráník, Krejčí and Menčík (1988). The flysch beds with calcareous claystones — the Svodnice Formation — are the youngest component (Pesl 1968).

Calcareous nannofossils were determined in all calcareous sediments of the Vlára development of the Bílé Karpaty Unit. Taphocenoses usually showed a greater species diversity and contained forms which permitted to asses the relative age within stages to zones precision (see Fig. 2). Only on the basis of nannofossils it was possible to distinguish which sediments were of Cretaceous and which of Paleogene age. Parallelly studied microfauna contained agglutinated foraminifers and very rarely minute plankton. Their species composition usually indicated a wider stratigraphic range from the upper Senonian to the Paleogene.

The Gbely Member is marked by a dominant development of red-brown noncalcareous claystones. The red and greenish calcareous claystones and marlites of the Santonian and the Campanian to Maastrichtian which form thin layers and intercalations, testify of fading of the variegated calcareous sedimentation of the Gbeľany Member towards NW, with the growing distance from the Klippen Belt. The age of the Gbely Member was determined on the basis of agglutinated foraminifers as the Cenomanian to upper Senonian with a possible overlap to the lower Paleocene (Stráník, Krejčí and Menčík 1988).

In the variegated calcareous claystones of the Gbely Member (Vlára development of the Bílé Karpaty Unit) there were determined nannofossil taphocenoses of Santonian — Campanian — Maastrichtian age without Paleogene indications. The oldest nannoplankton assemblage with Reinhardtites anthophorus, Lithastrinus grillii, Micula decussata, Marthasterites furcatus and Einffellithus eximius corresponds to the lower Santonian CC15 Zone (sensu Sissingh 1977). In the Campanian and Maastrichtian a gradual appearance of the following stratigraphically important species can be observed: Aspidolithus parcus parcus, A. parcus constrictus, Arkhangelskiella specillata, Ceratolithoides aculeus, Quadrum sissinghii, Q. trifidum, Arkhangelskiella cymbiformis, Prediscosphaera grandis, Lithraphidites quadratus, Micula murus, Nephrolithus frequens and very rarely Micula prinsii. The youngest established sediments of the Gbely Member belong to the CC26 Zone (the highest part of the Maastrichtian).

The Javorina Formation is a complex of finely to medium rhythmic flysch sediments characterized by blue-grey, fine- to coarse-grained calcareous greywacke sandstones and green-grey to grey, usually noncalcareous and variably sandy claystones. This formation exhibited nannoplankton ta-

phocenoses of Campanian to Maastrichtian age without Paleogene indications (the same as in the Gbely Member). In the flysch sediments of the Td and Te intervals (sensu Bouma 1962) altogether 65 species were determined (Švábenická, in press).

According to the fossil record the sedimentation of the Javorina Formation started in the lower Campanian (Aspidolithus parcus Biozone — see fig. 2) and continued together with the Gbely Member to the upper Maastrichtian including the Nephrolithus frequens CC26 Biozone. Simultaneously studied microfauna contained only agglutinted foraminifers of a broader stratigraphic range the Upper Cretaceous — Paleocene.

In the Gbely Member and the Javorina Formation the classical Sissingh's (1977) zonation could not be applied in its full extent due to their divergent biofacial development. In both these lithotypes the calcareous nannoplankton taphocenoses exhibit the following common features: 1. They have no Paleogene indications; 2. Within the Campanian — Maastrichtian the species composition is almost identical; 3. There can be delimited identical nannoplankton biochrons; 4. The topmost Maastrichtian CC26 Zone Nephrolithus frequens with rare Micula prinsii has been documented.

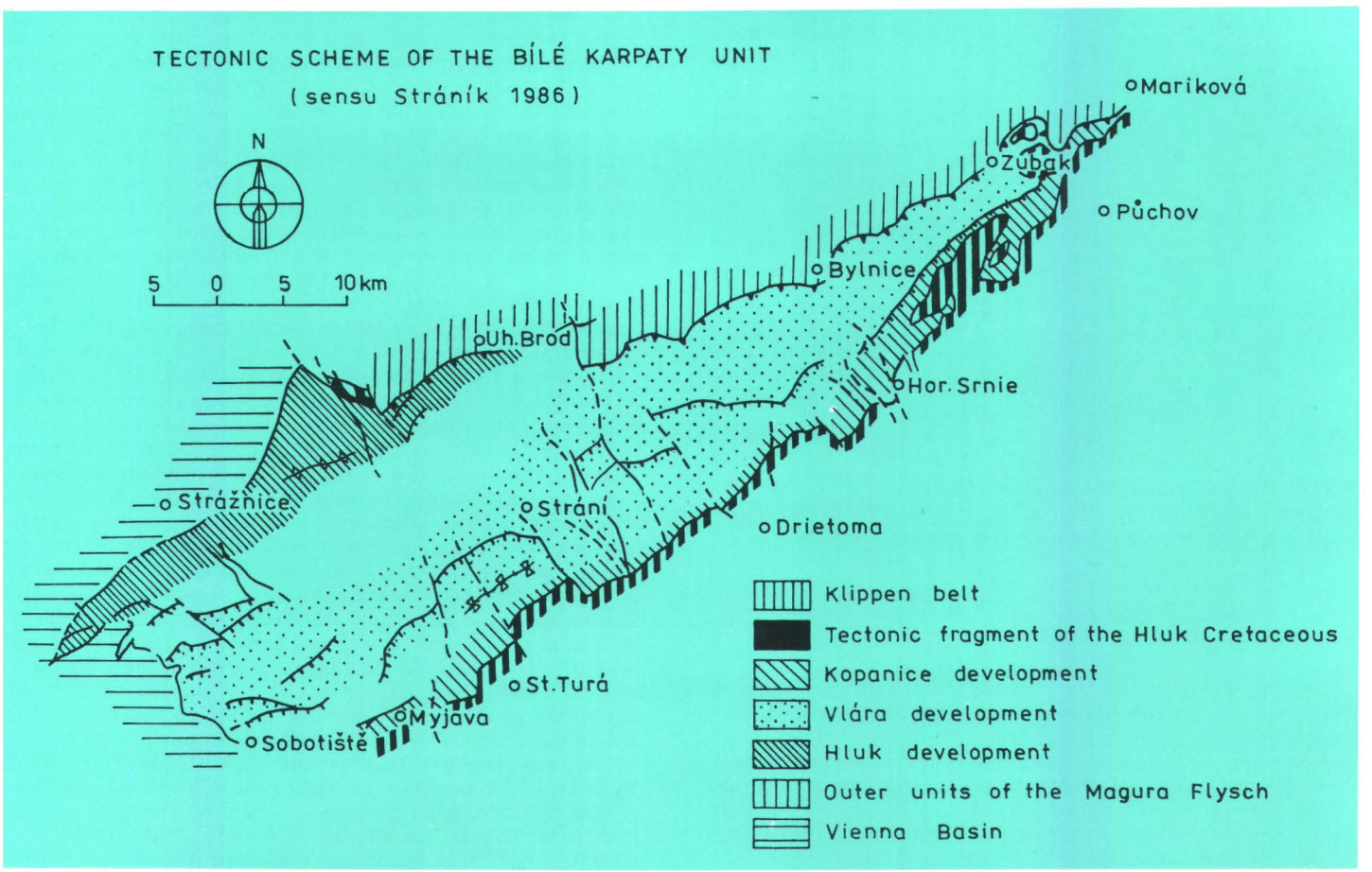
The Svodnice Formation is stratigraphically the uppermost member of the Bílé Karpaty Unit. It is formed by flysch beds with blue-grey fine-grained calcareous, often convolutedly laminated sandstones and by calcareous claystones similar to the Vsetín type of the Zlín Formation and marlites of the Lackov type (Pesl 1968). The Svodnice Formation exhibited a different microfauna and calcareous nannoplankton development compared with the Javorina Formation and Gbely Member. The microfaunas contained, beside agglutinated foraminifers, occasionally also calcareous plankton and benthos and attested to the similar relative age of the rocks as the calcareous nannofossils.

Calcareous nannoplankton (47 species) documents lower Paleocene to lower Eocene age of the Svodnice Formation. The taphocenoses contain species of standard nannoplankton Zones ?NP1—NP2 to NP11 (sensu Martini 1971). The beginning of the sedimentation is characterized by a very poor nannofossil association with a small and big forms of Cruciplacolithus primus, Markalius inversus, Thoracosphaera operculata, Placozygus sigmoides, Braarudosphaera bigelowii and in the NP2 Zone Cruciplacolithus edwardsii, C. tenuis and Ericsonia subpertusa. Biantholithus sparsus has not been determined yet in these sediments. The sedimentation continued probably without a significant interruption to the lower Eocene. The nannofossil taphocenoses of the Svodnice Formation are characteristic by numerous redepositions from the Upper Cretaceous. Redeposited Paleogene material is very rare in the Paleocene and lower Eocene.

According to the micropaleontologic data we may expect sedimentation without any significant interruption at the Cretaceous/Tertiary boundary in the sediments of the Vlára development of the Bílé Karpaty Unit. In the upper Maastrichtian CC25b Lithraphidites quadratus and CC26 Nephrolithus frequens nannoplankton Zones (sensu Sissingh 1977) were documented and already in the lower Paleocene the ?NP1—NP2 biochrone (sensu Martini 1971) with Cruciplacolithus primus, C. edwardsii, C. tenuis, Thoracosphaera heimii, T. saxea and Ericsonia subpertusa were found.

The Cretaceous/Tertiary boundary is "survived" by five species in the Bílé Karpaty Unit: Braarudosphaera bigelowii, Markalius inversus, Cyclagelosphaera reinhardtii, Placozygus sigmoides and Thoracosphaera operculata.

Fig. 1: Tectonic scheme of the Bílé Karpaty Unit



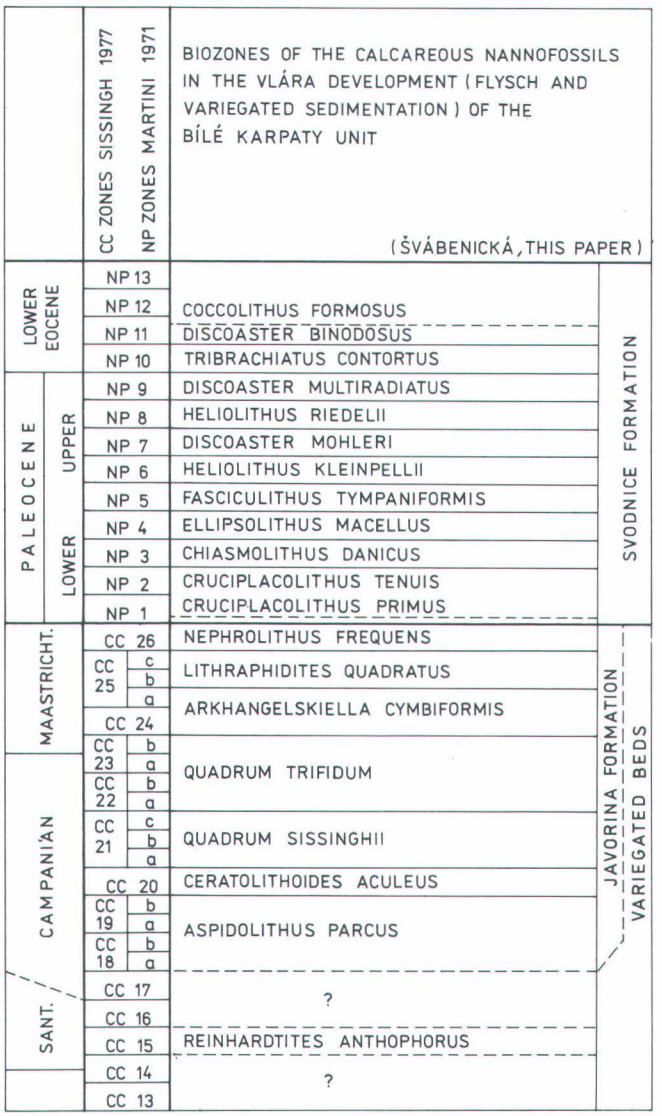


Fig. 2: Biozones of the calcareous nannofossils in the Bílé Karpaty Unit.

Abstrakt

V sedimentech vlárského vývoje bělokarpatské jednotky (flyšové sedimenty a pestré vápnité jílovce) byla zjištěna relativně dobře zachovaná společenstva vápnitého nanoplanktonu s vyšší druhovou diverzitou. Tafocenózy nanofosilií obsahují stratigraficky důležité druhy, pomocí kterých můžeme stanovit relativní stáří s přesností na stupně až zóny v rozmezí santon—spodní eocén. Na hranici křída/terciér předpokládáme sedimentaci bez velkého přerušení.

Zusammenfassung

In Sedimentgesteinen der Vlára-Entwicklung der Bílé Karpaty- (Weißkarpaten-) Einheit (Flyschablagerungen und bunte Kalktonsteine) wurden verhältnismäßig gut erhaltene Vergesellschaftungen des kalkigen Nannoplanktons von einem größeren Artenreichtum ermittelt. Die Taphozönosen der Nannofossilien enthalten stratigraphisch wichtige Arten, aufgrund deren das relative Alter mit einer Genauigkeit auf Stufen bis Zonen in der Zeitspanne von Santon bis zum Untereozän bestimmt werden kann. An der Kreide/Tertiär-Grenze nehmen wir die Sedimentation ohne eine größere Unterbrechung an.

GRANITOID CLASTICS ON THE SE MARGIN OF THE VIENNA BASIN AND BASIN GENESIS

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Breccias and conglomerates on the southeastern margin of the Vienna Basin — on the foothill of the Malé Karpaty Mts. — mostly consist of granitoid material. They crop out at the village Borinka and between the villages Stupava and Lozorno. They were revealed in a surprising thickness by the borehole DNV—1 near Devínska Nová Ves (Vaškovský et al. 1988). Other boreholes show their wedging-out over a shorter distance towards the inside of the Vienna Basin i. e. southwestwards of their outcrops.

The borehole DNV—1 near the brick-kiln of the village Devínska Nová Ves (Fig. 1) drilled the granitoid conglomerates and breccias in total thickness of about 330 m and offered thus biostratigraphical scissors for the determination of age of the clastics studied (Fig. 2). Granitoid clastics are overlain by calcareous friable siltstones and claystones including sandstone layers. The sediments are equivalent to the Studienka Formation of the Vienna Basin and contain Upper Badenian (Kosovian) foraminifers of the Bulimina — Bolivina and Rotalia zone, including the species Bulimina elongata, Bolivina dilatata, Uvigerina venusta liesegensis (Kyjovská — Kučerová 1986). The calcareous nannofloral assemblage comprises species most frequent in Upper Badenian: Cyclococcolithus macintyrei, Cycloperfolithus carlae, Helicosphaera wallichi, H. walsberdorfensis, H. selli, H. obliqua, Sphenolithus abies. The index species of the zone NN 6 — Discoaster exilis is scarce as well as the index species of the zone NN 7 denoted as Discoaster cf. kugleri (Lehotayová 1986) in the upper part of the formation.

The granitoid clastics are underlain by conglomerates with plentiful pebbles of Mesozoic carbonates with pelite layers containing calcareous nannoflora including the index form of the zone NN 5: Sphenolithus heteromorphus, and Discoaster variabilis and Coronosphaera sp. (Lehotayová l. c.). So the age of the granitoid clastics may be Middle Badenian.

Detailed lithological and sedimentological study of the clastics was performed on two natural exposures near Borinka and Lozorno, and in the borehole DNV—1 near Devínska Nová Ves.

On the northern periphery of the village Borinka — in a gorge — with a forest path and a tourist route to the

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