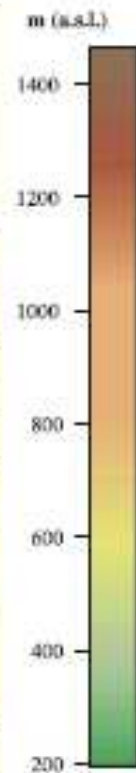
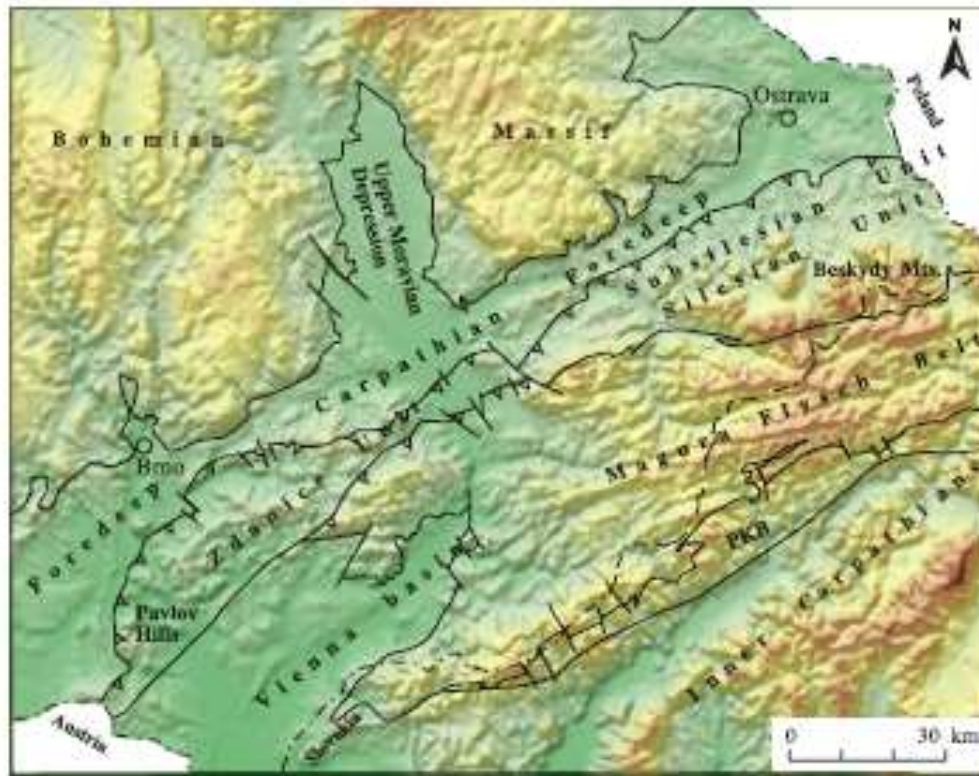


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Figure 21. Topographic map of the Western Carpathians and their European foreland in Moravia.

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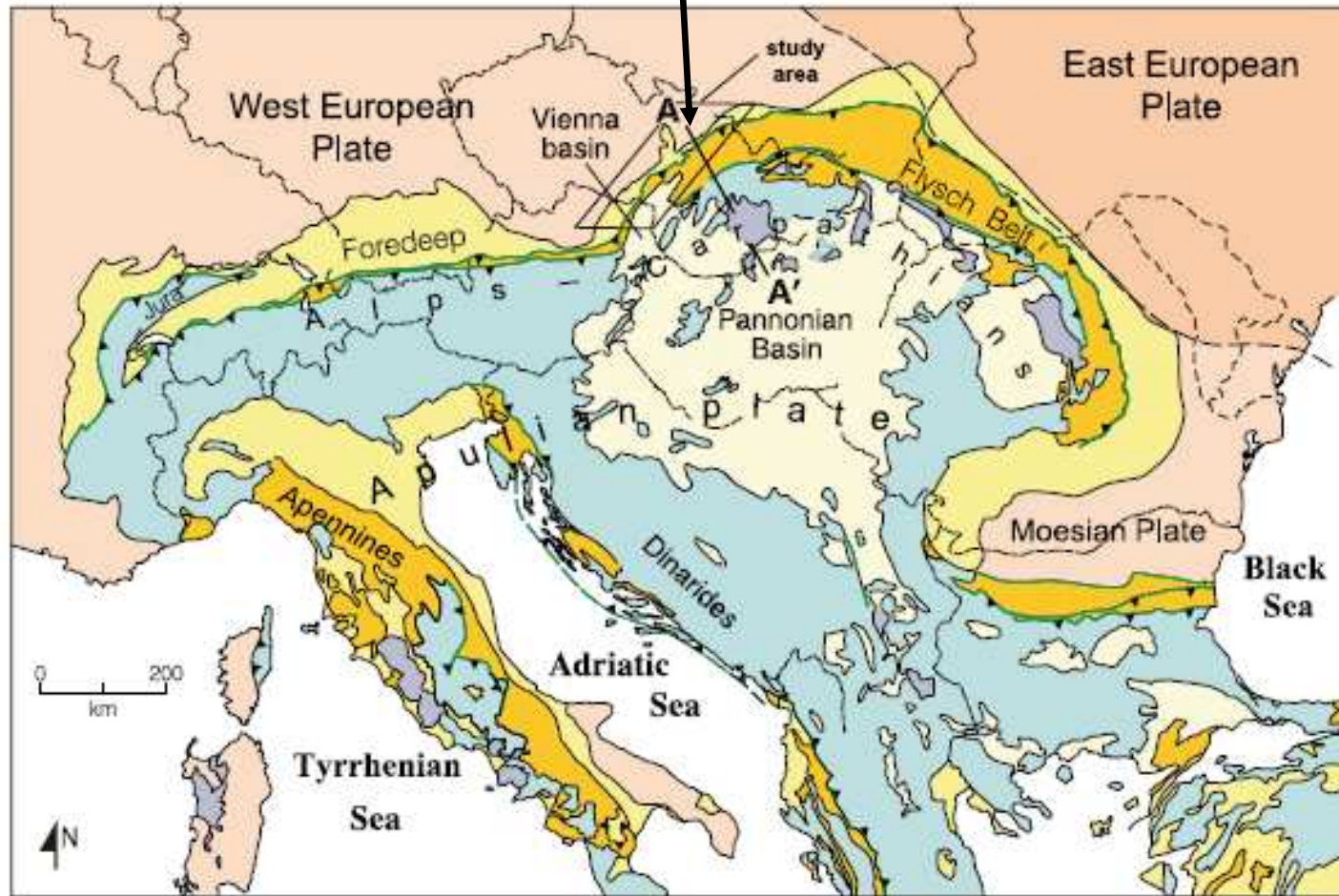


Figure 1. Generalized geologic map of the Alpine-Carpathian orogenic system of Europe. Study area is located in the box. The inner zones of the Alpine-Carpathian orogen are shown in blue. Modified from Picha (1996). Cross section of AA' is shown in Figure 2. 8 # , ;\$

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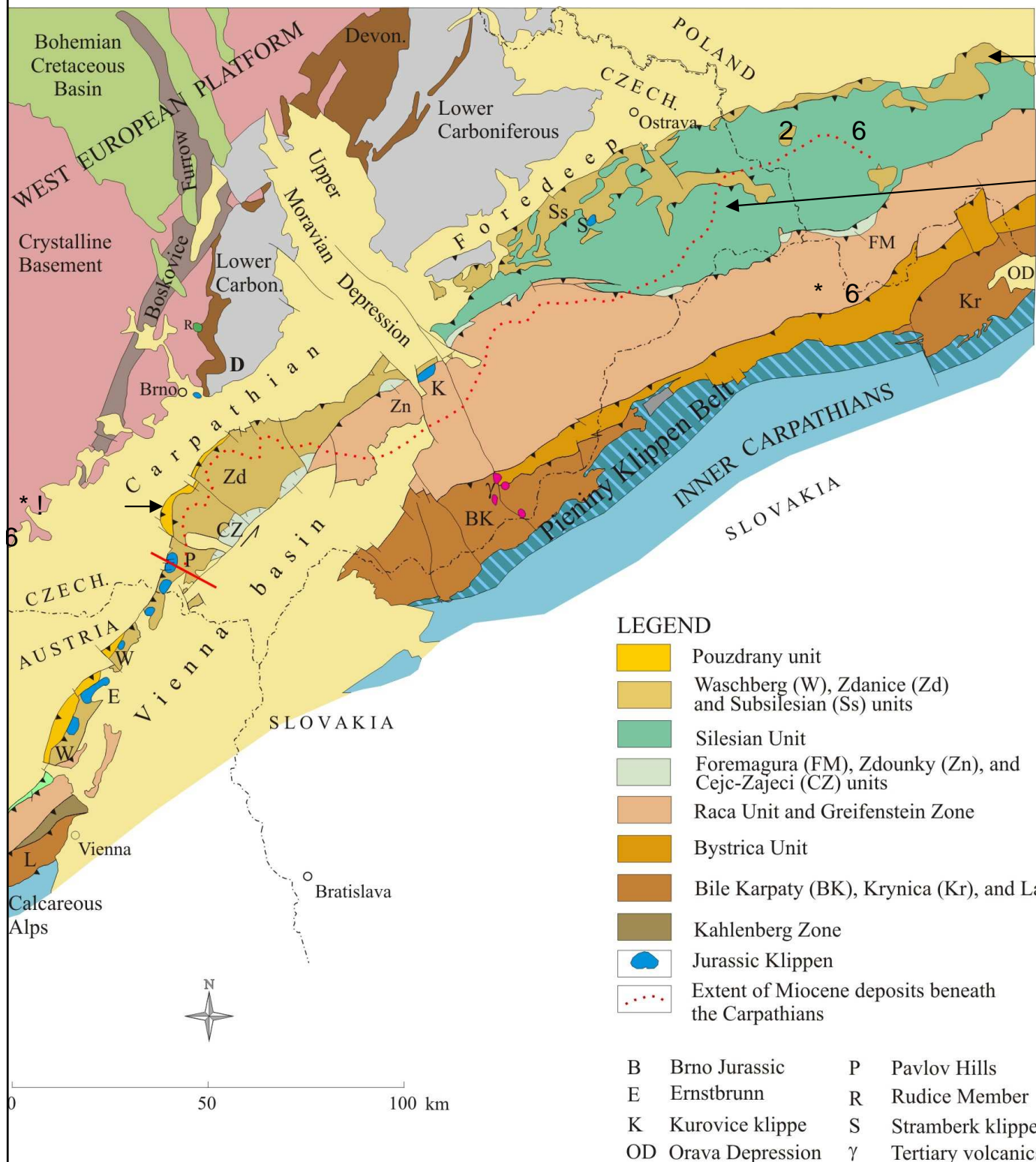
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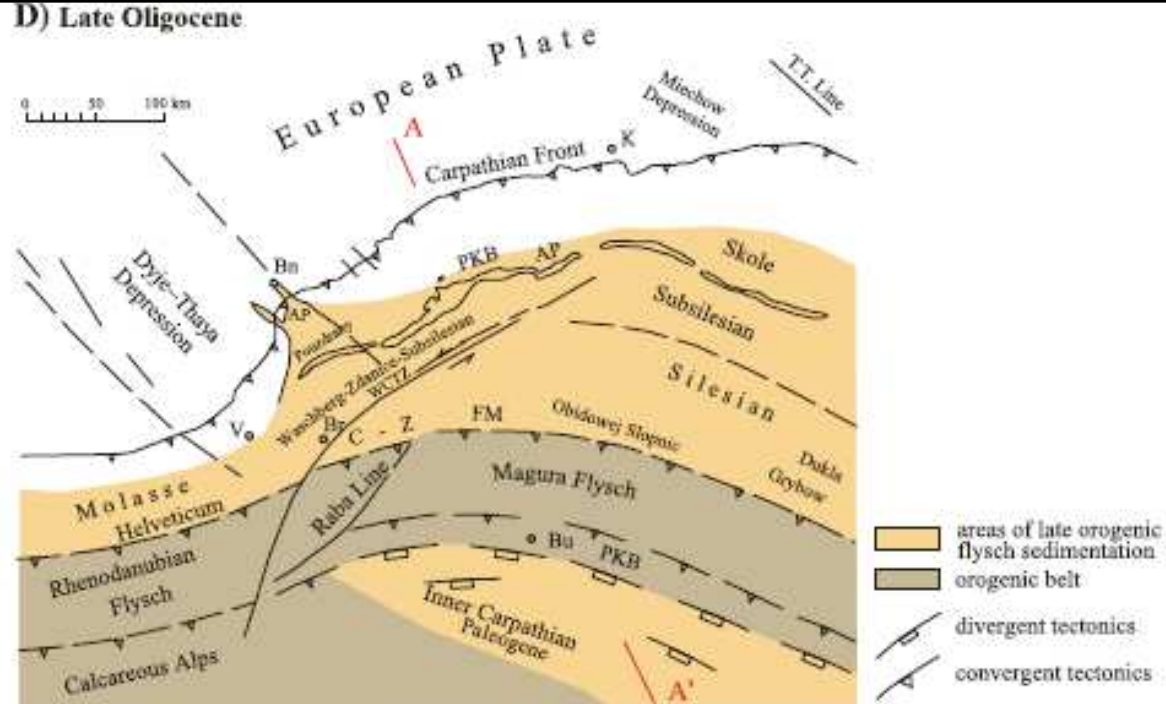


Figure 5. (cont.). In the Late Cretaceous (C), the divergent regime of the Tethyan margins changed into a convergent regime; and the motion along the Western Carpathian transfer zone reversed from dextral to sinistral. The sedimentary system spread farther northwest over the foreland. In the late Oligocene (D), the inner Magura unit was deformed and uplifted, whereas the Krosno-type flysch synorogenic sedimentation continued in the external zones of the Outer Carpathian system. The Inner Carpathian Paleogene basin formed on the top of the Inner Carpathian nappes. Line AA' marks the section used for the geotectonic reconstructions in Figure 6. AP = autochthonous Paleogene; Bn = Bmo; Br = Bratislava; Bu = Budapest; C-Z = Cejc-Zajeci unit; FM = Fore-Magura unit; K = Krakow; OK = Outer Klippen Belt carbonate buildups; PKB = Pieniny Klippen Belt; S = Stamberk carbonate buildup; V = Vienna; WCTZ = Western Carpathian transfer zone.

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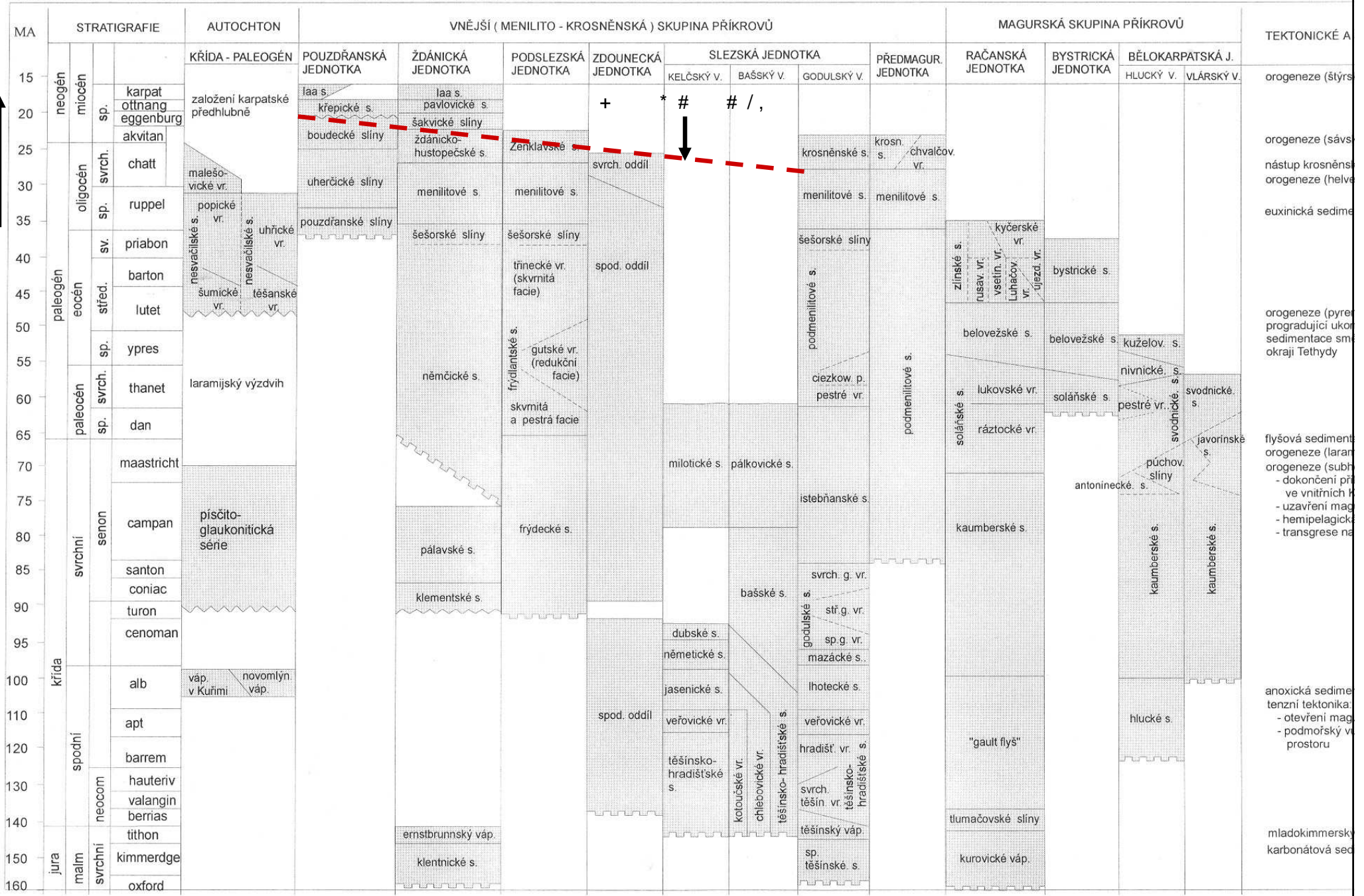
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LITOSTRATIGRAFIE JURY AŽ SPODNÍHO MIOCÉNU AUTOCHTONU A FLYŠOVÉHO PÁSMO MORAVSKO-SLEZSKÝCH KARPAT 2 .# \$



přesunutí
 transgrese
 s. - souvrství
 vr. - vrstvy
 váp. - vápence

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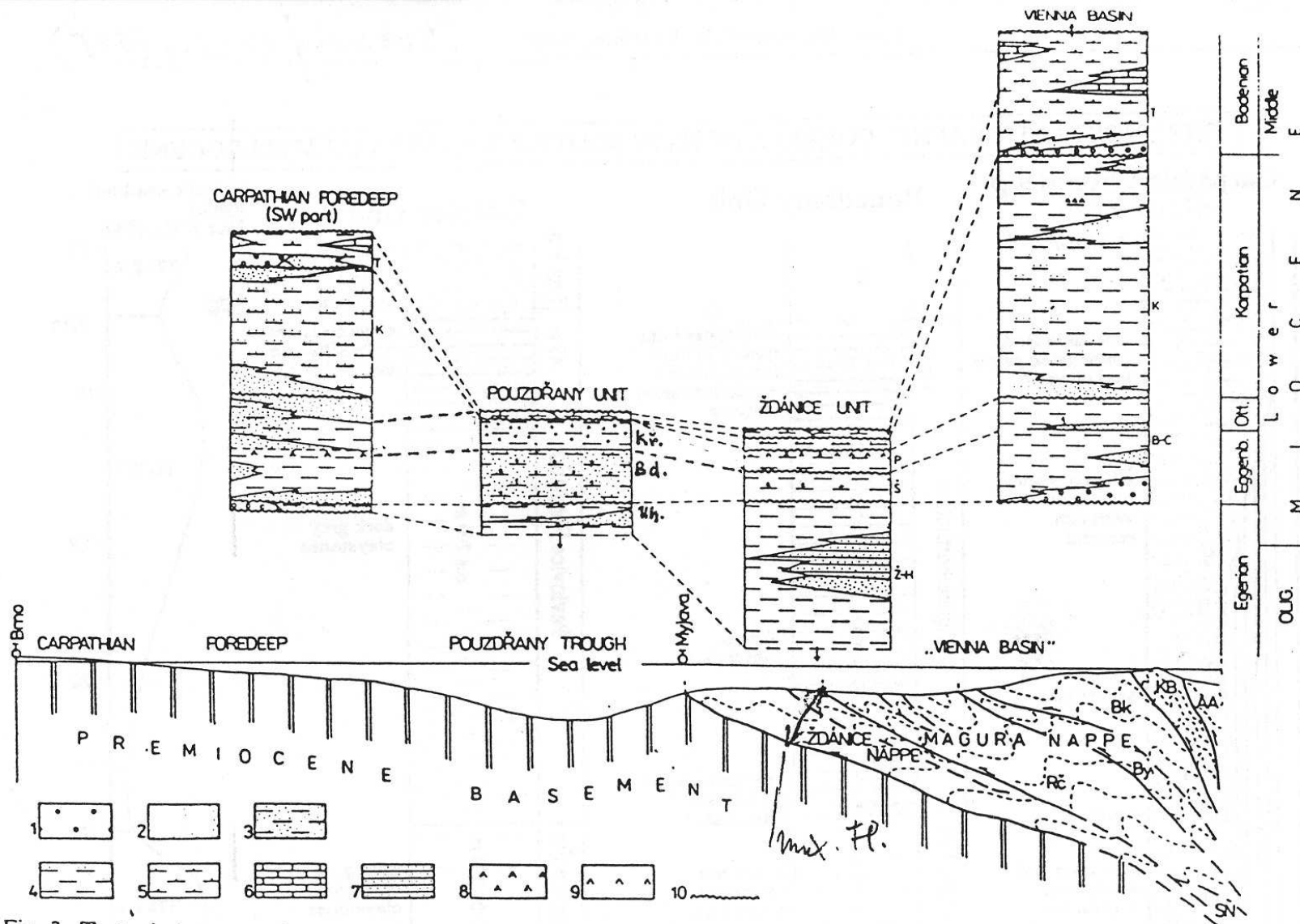


Fig. 2. Tectonic interpretation of the South Moravia during the earlier Eggenburgian (bellow); main lithofacies in the Egerian - Badenian time (top)

Explanations: 1 - Conglomerates, 2 - Sands, sandstones, 3 - Sandy clays, 4 - «Schlien», 5 - Calcareous clays (T-«Tegel», 6 - Biogenic limestones, 7 - rhythmic alternation of sandstones and claystones («Krosno» lithofacies), 8 - Tuffites, 9 - Diatomites, 10 - Discordance, Z-H - Zdanice - Hustopeče Formation, Kř - Křepice Formation, S - Sakvice Marls, P - Pavlovce Member, B-C - Bathysiphon-Cyclammina «Schlien», K - Karpathian «Schlien», T - «Tegel», AA - Austroalpine, KB - Klippen Belt, Bk - Bílé Karpaty Unit, By - Bystrica Unit, Rč - Rača Unit, SN - Silesian Nappe

(Strašník - Krystek - Brzobohatý 1995) - upraveno

Bd. - Boudky Fu.
Uh. - Uherčice Fu.

CHRONOSTRATIGRAPHIC CORRELATIONS IN SOUTH-MORAVIAN LOWER MIOCENE

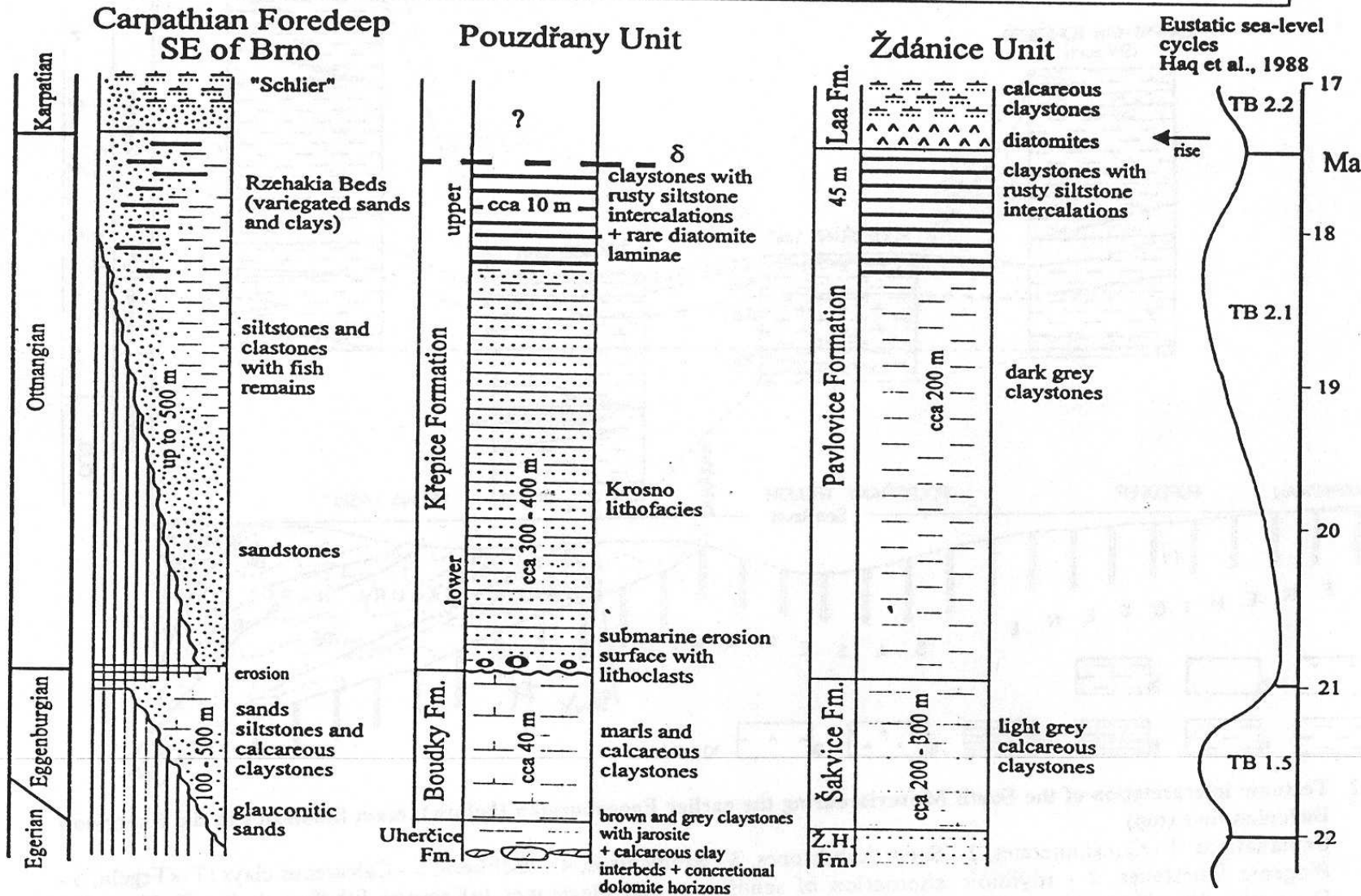
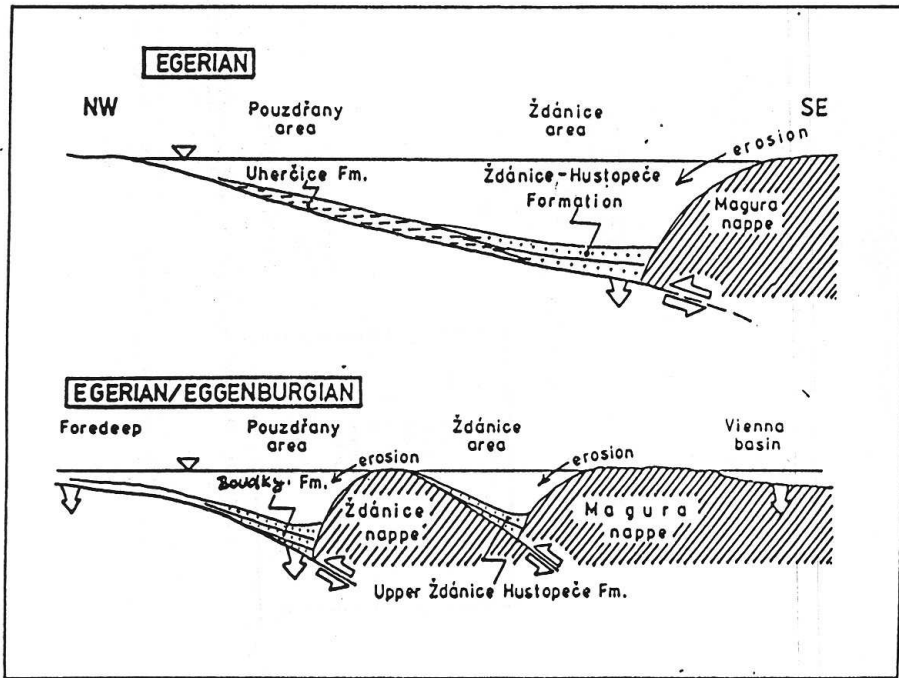


Fig. 1: Chronostratigraphic correlations of the Lower Miocene deposits in South Moravia.

OTTOMANGIAN					KŘEPICE FORMATION
		Stránilk, Hanzlíková, and Jurášková, 1981	Stránilk and Molčíková 1980	Krhovský, 1981	
EGGENBURGIAN		KŘEPICE FORMATION	ŠAKVICE MARL	KŘEPICE FORMATION	BOUDKY FORMATION
		BOUDKY MARL.		BOUDKY MARL	
EGERIAN		UHERČICE FORMATION	KŘEPICE FORMATION	UHERČICE FORMATION	UHERČICE FORMATION
	BOUDKY BEDS		BOUDKY MARL		

Tab.1: Comparison of stratigraphic divisions of Miocene of the Pouzdřany Unit. (Krhovský et al. 1995)

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Fig. 17: Development of the Flysh-Belt nappe system in Southern Moravia, paleogeographic reconstruction, not to scale. The cross-sections show the Pouzdřany and Ždánice sedimentary areas at the time of restricted communication with the open sea and illustrate the time differences in the beginning of molasse sedimentation (Krosno Facies) in the particular areas. Compiled by KRHOVSKÝ.

(Stránilk - Krhovský - Brzobohatý - Hauršmid, 1991) - upraveno

CORRELATION OF LOWER MIOCENE LITHOSTRATIGRAPHIC UNITS IN SOUTH MORAVIA

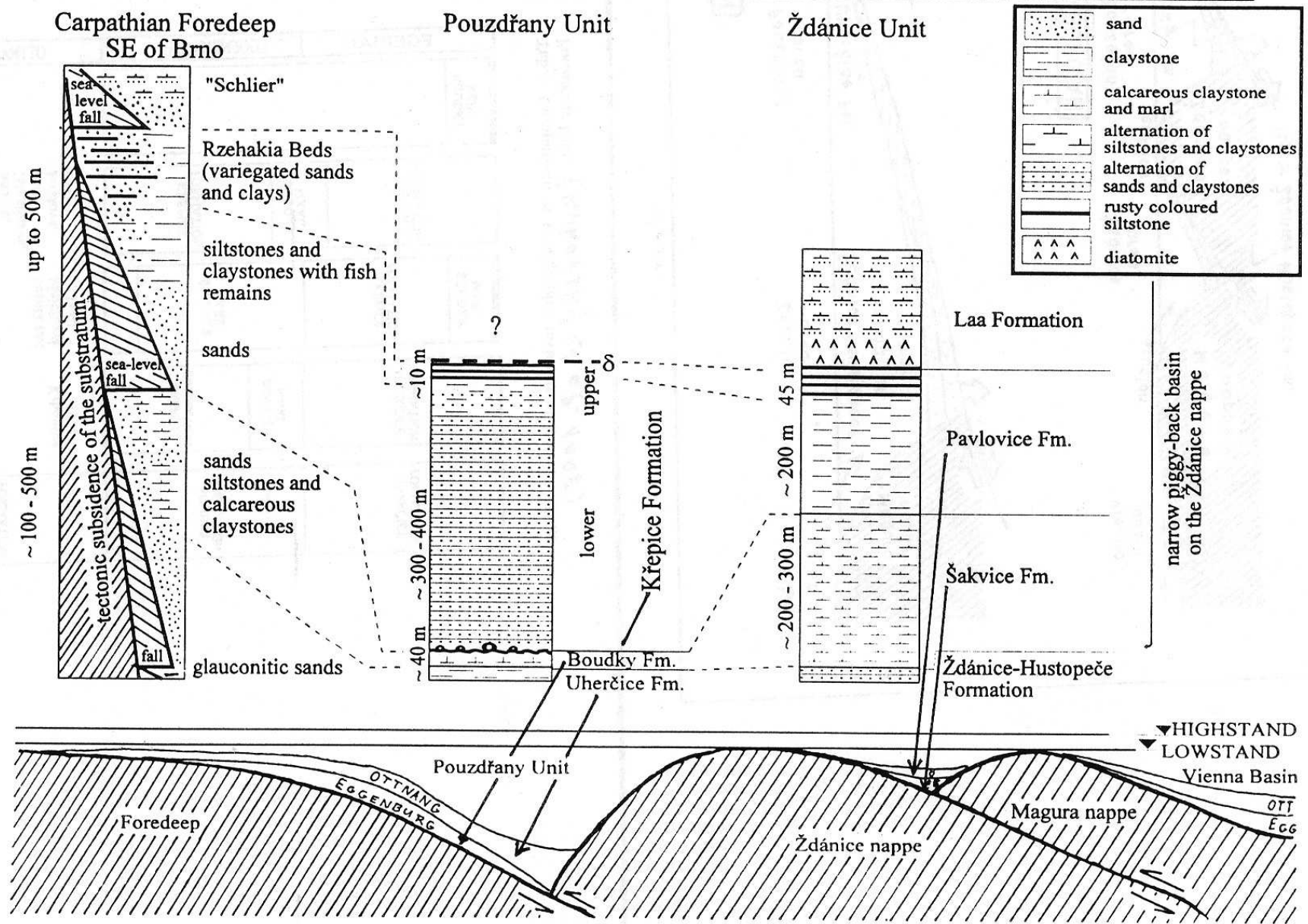
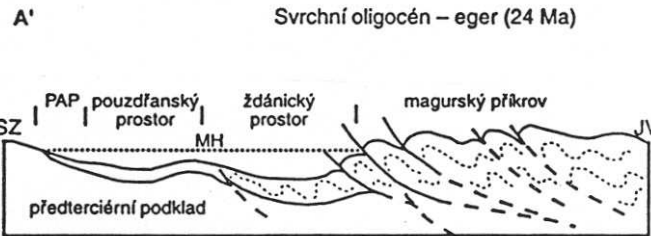
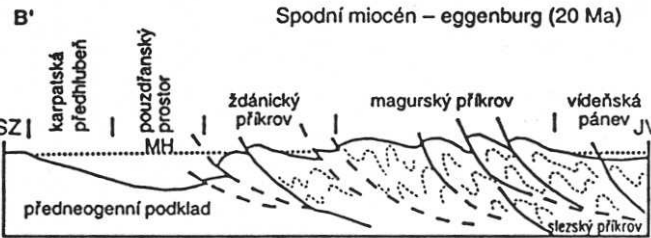
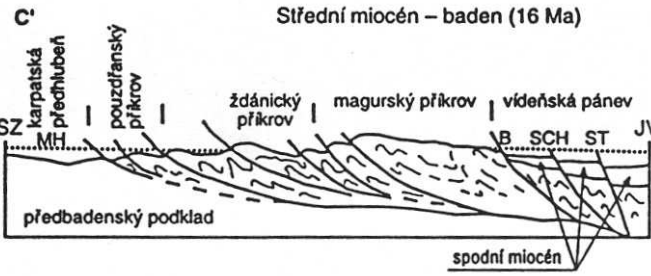
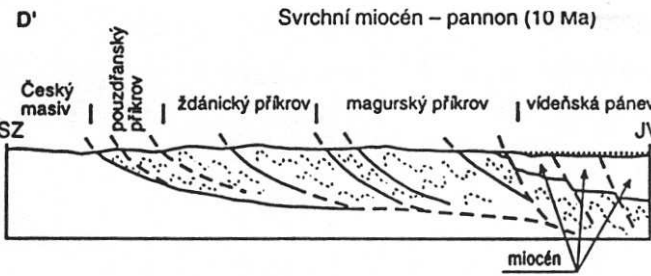
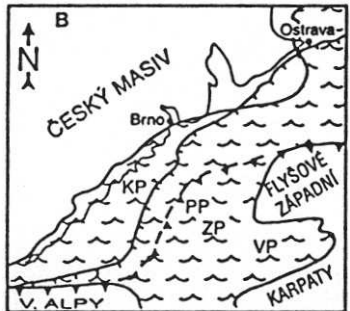
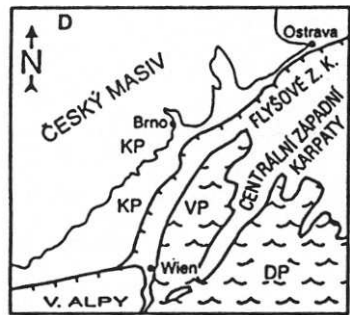


Fig. 2: Correlation of the Lower Miocene lithostratigraphic units in South Moravia.

M.A.	EPOCH	AGE	CENTRAL PARATETHYS	WASCHBERG UNIT	ZDANICE UNIT	POUZDRANY UNIT	BIOSTRATIGRAPHY							
							Planktic Foraminifera	Calcar. Nanno-plankton						
20	Early MIOCENE	BURDIGALIAN	KARPATIAN	Laa Formation	Laa Formation	Laa Formation	M4	NN4						
			OTTNANGIAN	Eisenschüssige Tone / Sande	Pavlovice Fm.	Krepice Fm.	M3	NN3						
			EGGENBURGIAN	Schieferige Tonmergel	Sakvice Fm.	Boudky Fm.	M2	NN2						
		AQUITANIAN	EGERIAN	Michelstetten Formation					Zdanice - Hustopece Formation	Uhercice Formation	M1	b	NN1	
				?	a									
		25	OLIGOCENE	CHATTIAN	KISCELLIAN	Thomasl Formation	Sitborice Mb.	Pouzdранy Formation	P22	NP25				
						?					"Menilitic fm."	P21	b	NP24
				RUPELIAN	KISCELLIAN	Ottenthal Fm.	Dynow Marlstone	Sheshory Marl	P20	P19			NP23	
							Galgenberg Mb.				"Chert member"	P18		NP22
							Ottenthal Mb.				"Subchert mb."			
30	Late EOCENE	PRIABONIAN	PRIABONIAN	Reingrub Formation	"Green Clay mb."	?	P16	NP19-20						
				?					Nemcice Fm.	P15	NP18			
35	Late EOCENE	PRIABONIAN	PRIABONIAN	Reingrub Formation	calcareous claystones	?	P15	NP18						

Fig. 2: Correlation scheme between the Waschberg, Zdanice and Pouzdrany Units, based on the biozonation of BERGGREN et al., 1995.

(Krhovský, Rößl & Haueršmid 2001)



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Obr. 244. Paleogeografické a tektonické schéma vývoje Západních Karpat na Moravě v terciéru (Z. Stráník – R. Brzobohatý, orig.). 1 – okraj Českého masivu vystupující na povrch; 2 – dnešní okraj přesunutých Západních Karpat; 3 – vnější okraj flyšových příkrovů; 4 – mořské pánve. MH – mořská hladina; PAP – prostor autochtónního paleogénu; B – zlomový systém Bulhar; SCH – schraattenberský zlomový systém; ST – steinberský zlomový systém; RP – zbytkové (reziiduální) pánve; VP – vídeňská pánev; ZP – ždánický prostor; PP – pouzdřanský prostor; KP – karpatská předhlubeň; DP – dunajská pánev.

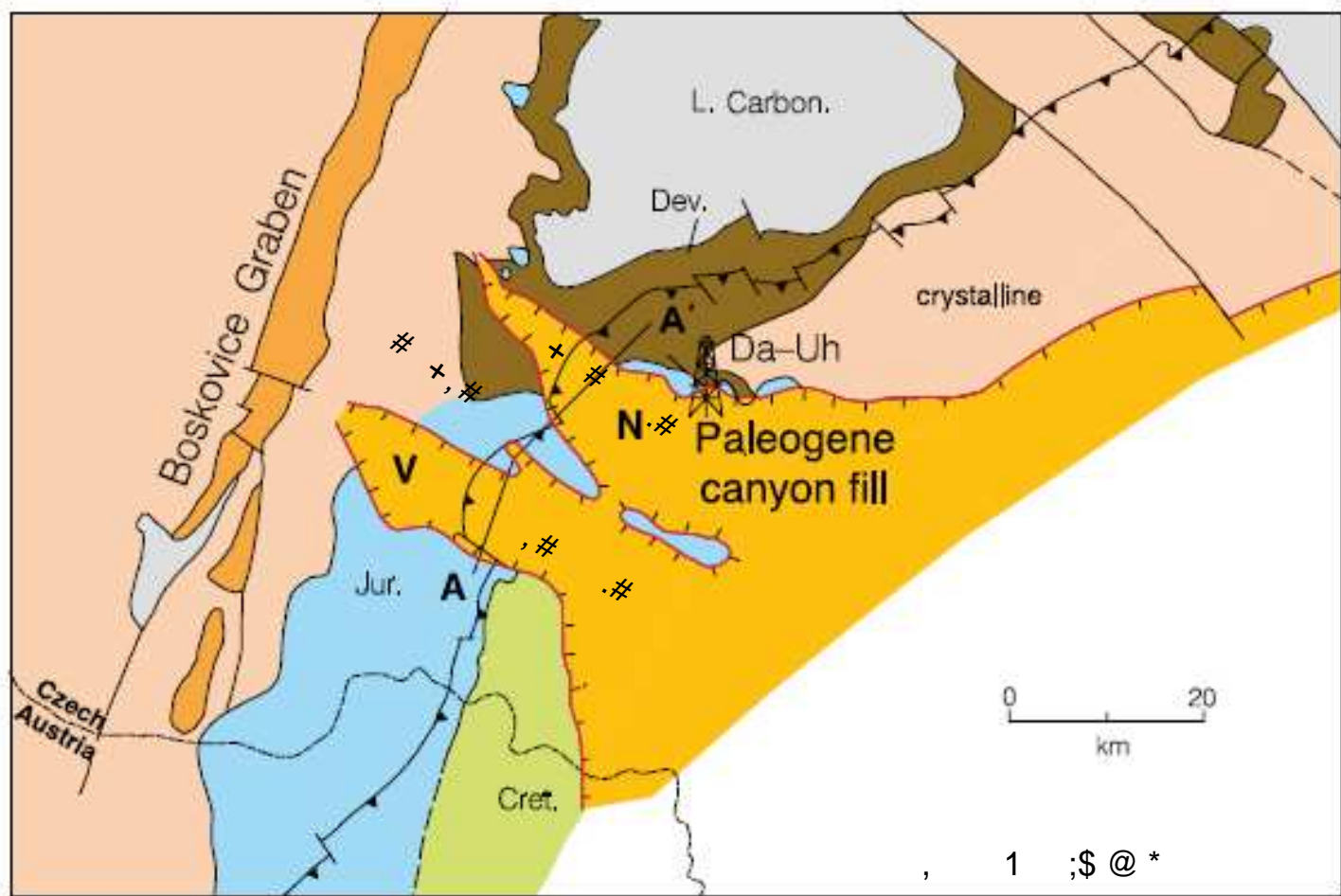


Figure 12. Pre-Neogene subcrop map showing the Nesvacilka (N) and Vranovice (V) paleovalleys cut into the European foreland plate, filled with Paleogene deposits, and later buried below the edges of the Western Carpathian thrust belt and the Neogene foredeep. Da-Uh marks the location of the Dambořice and Uhrčice oil and gas fields, respectively (Pícha, 1996). Cross section of AA' shown in Figure 13.

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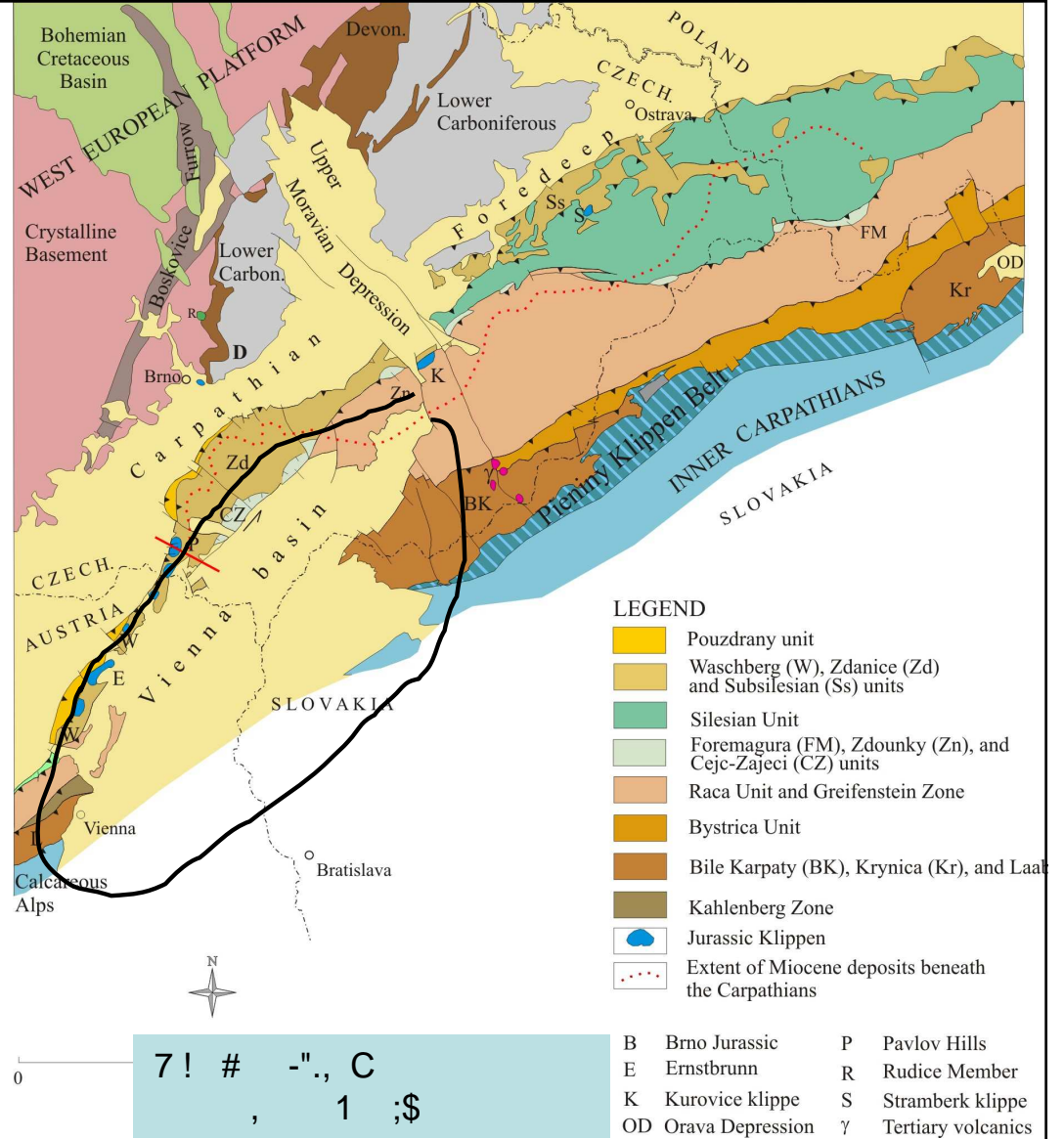
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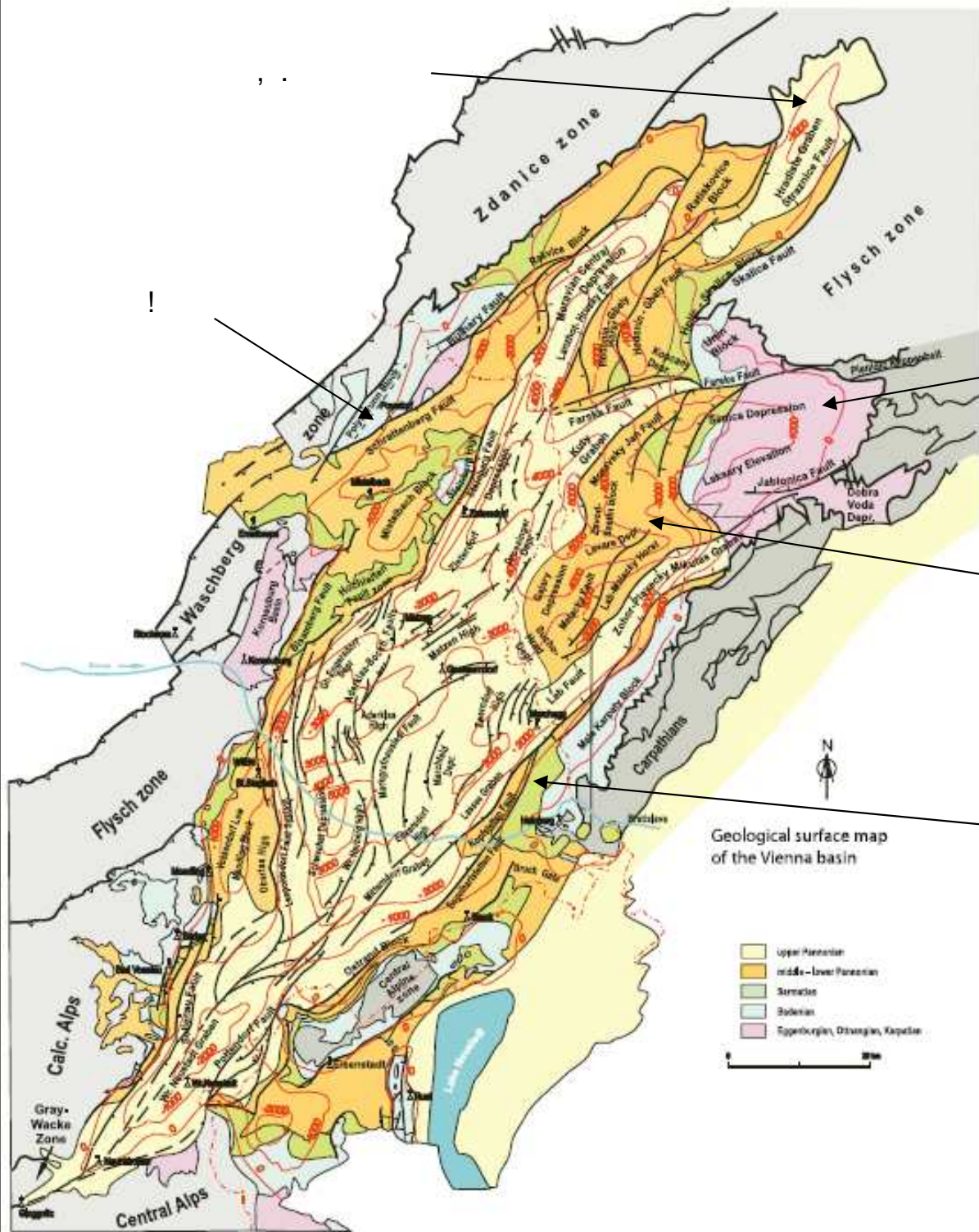


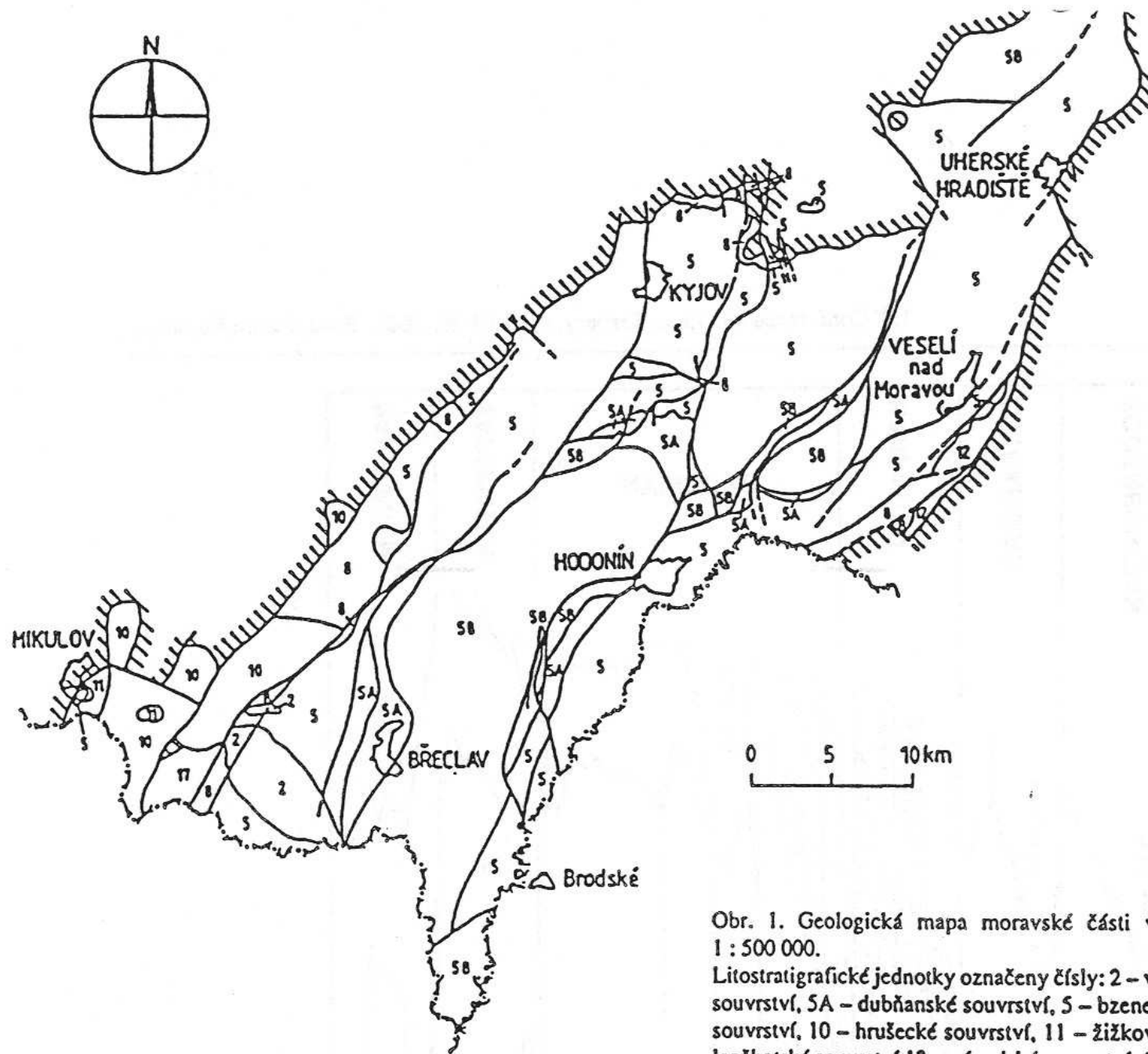
Figure 3. Geological surface map of the Vienna basin with contours of the pre-Neogene basin fill.

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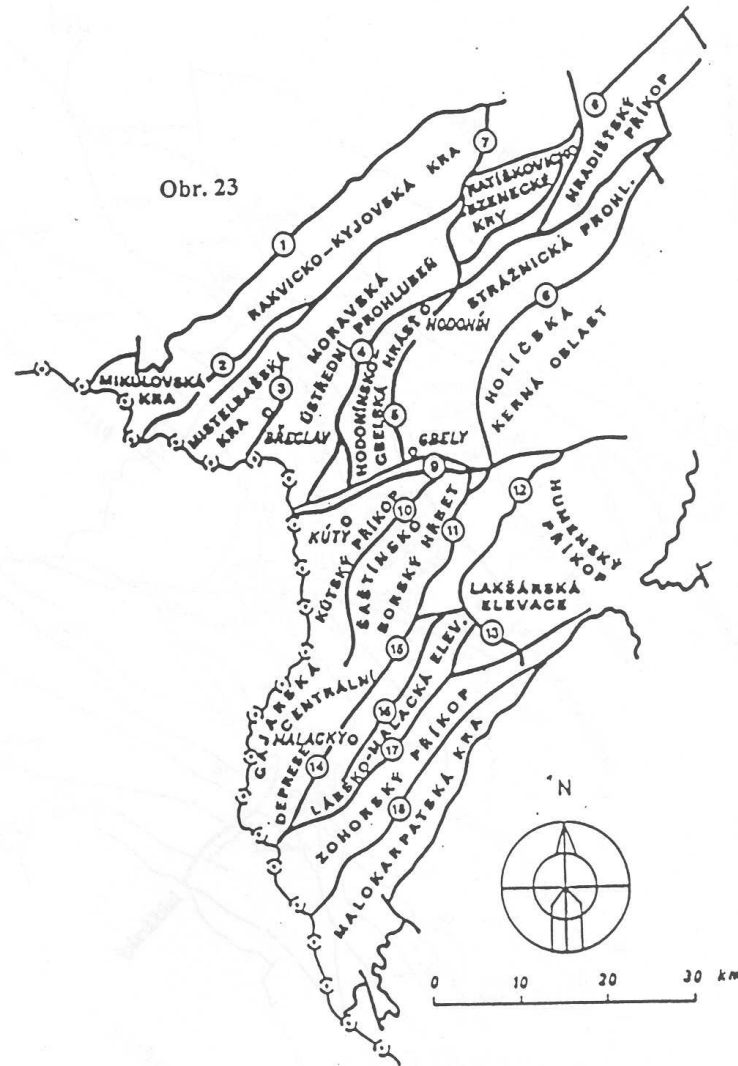
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Obr. 1. Geologická mapa moravské části vídeňské pánve v měřítku 1 : 500 000.

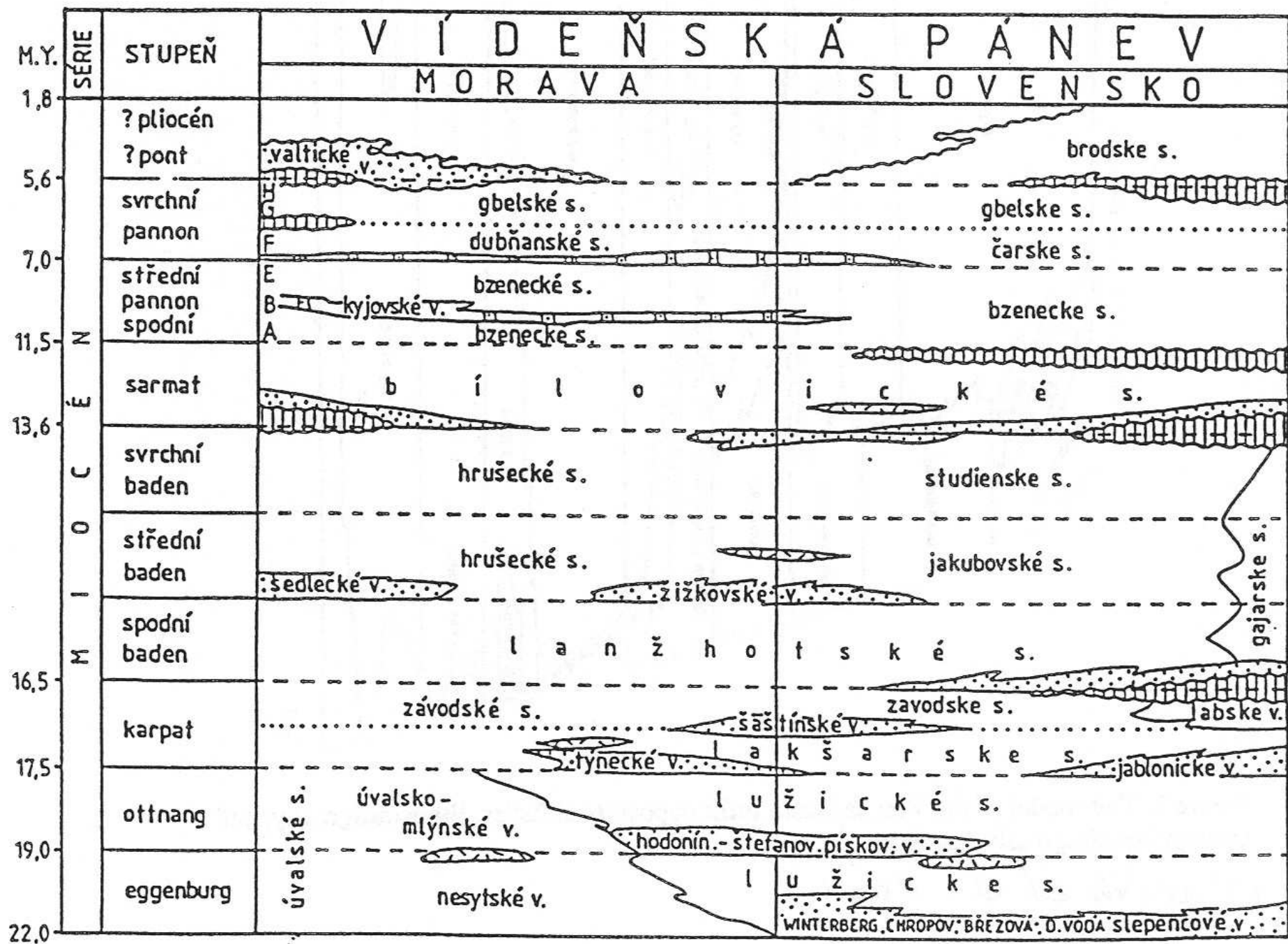
Litostratigrafické jednotky označeny čísly: 2 – valtické vrstvy, SB – gbelské souvrství, SA – dubňanské souvrství, S – bzenecké souvrství, 8 – blfovické souvrství, 10 – hrušecké souvrství, 11 – žižkovské a sedlecké vrstvy, 12 – lanžhotské souvrství, 13 – závodské souvrství, 17 – úvalské souvrství.



Ve vídeňské pánvi jsou na obr.23 znázorněny zlomy uvedené odpovídajícími čísly v závorce:

a/ podélné: schrattenberský zlomový systém /2/, lanžhotsko-hrušecký systém /4/, zlomy polešovický /8/, koválovský /12/, jánský /svatojánský/ /10/, medlovický, syrovínský, liděřovický, strážnicko-petrovický a skalický /6/, bulharský /1/, steinberský /3/, lábský /též lábsko-plavecký/ /17/ a lužický, hodonínsko-gbelský /5/, rohožnický /též malacký/ /16/, litavský /též okrajový malokarpatský/ /18/, šaštínský /15/, jehož součástí je jakubovský zlom /14/ a zlomy studienské, dubnický zlom, brezovský /mikulášovsko-brezovský zlom/, jablonický zlom,

b/ příčné /SZ-JV/: hlucký, napajedelský, buchlovický, lakšárský /13/, podivínské zlomy, tomecký. Směr S-J má zlom ježovský /7/, v jižní části označovaný též hodonínsko-gbelský a Z-V zlomový systém farský /9/.



Obr. 2. Korelace neogenních litostratigrafických jednotek moravské a slovenské části vídeňské pánve (stav podle ČTYROKÉHO, březen 1998b).

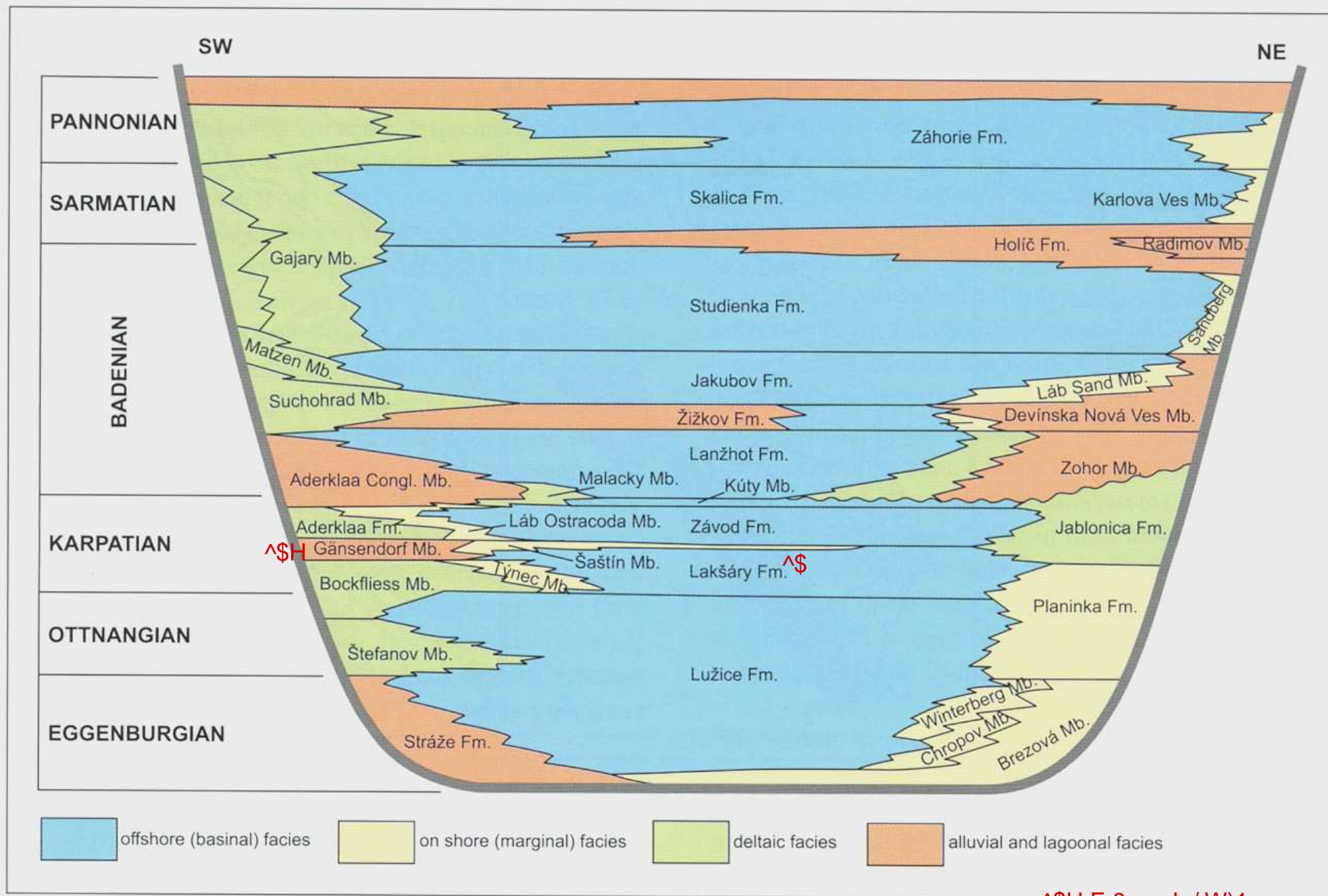


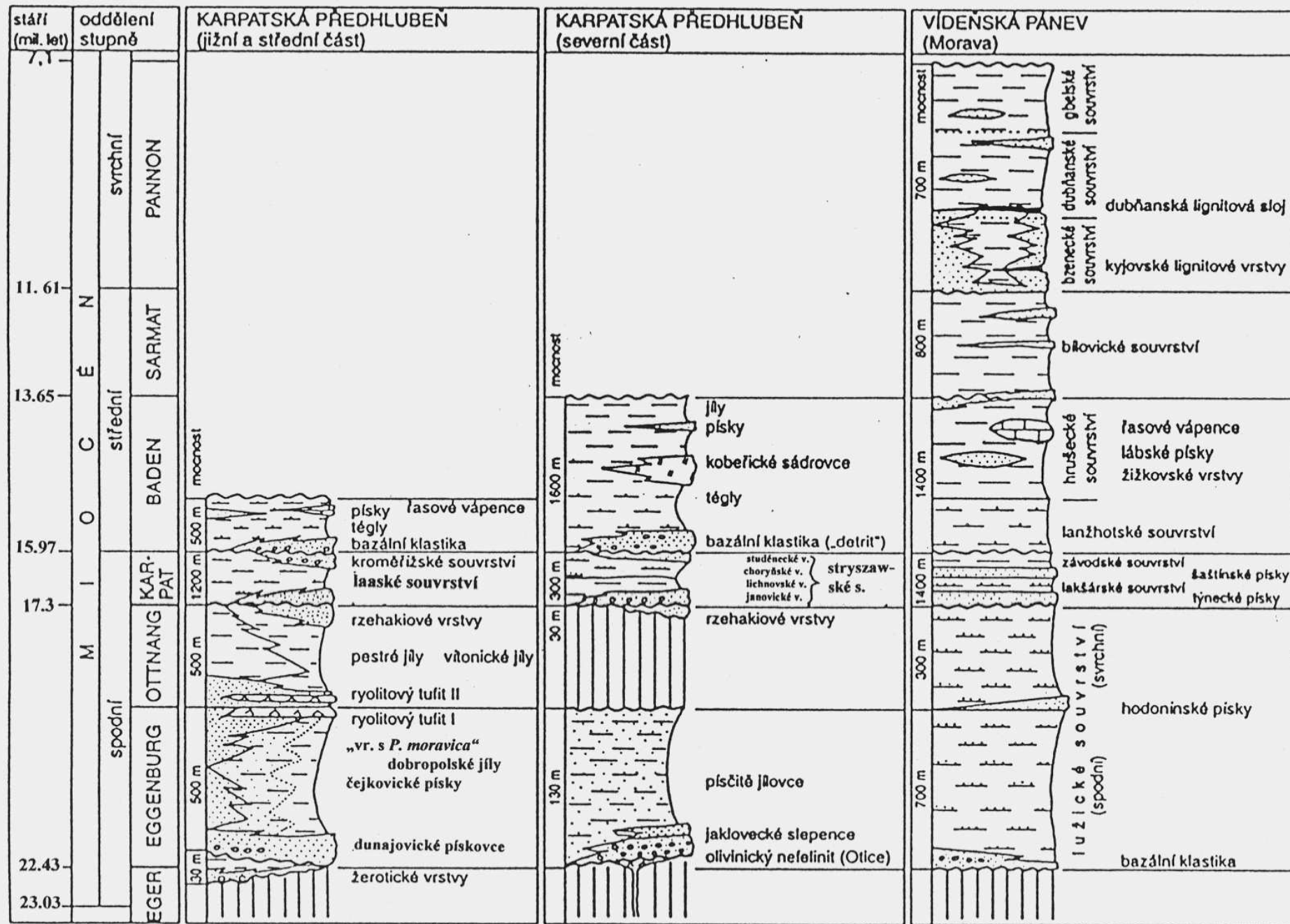
Fig. 3: Depositional systems of the Vienna Basin (modified after Baráth et al. 2001).

1B

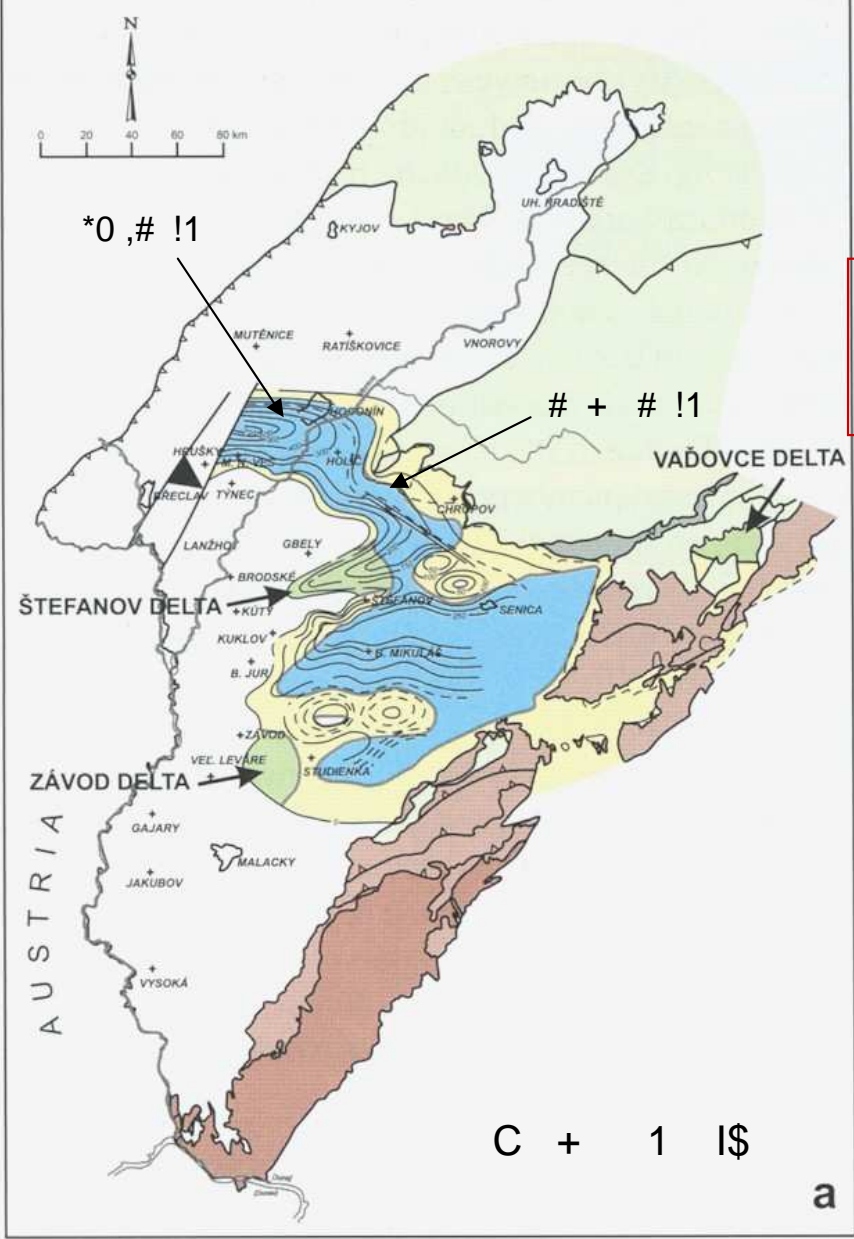
@

^\$HE8 ! / W)1
^\$ EX # # (A W)1

Obr. 247. Stratigrafické schéma neogénu karpatské předhlubně a vídeňské pánve na Moravě (R. Brzobohatý, orig.).



* ' > !. *0,# >



NEOGENE:

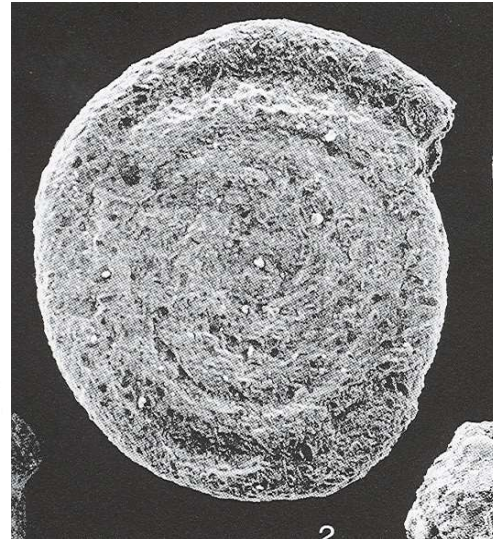
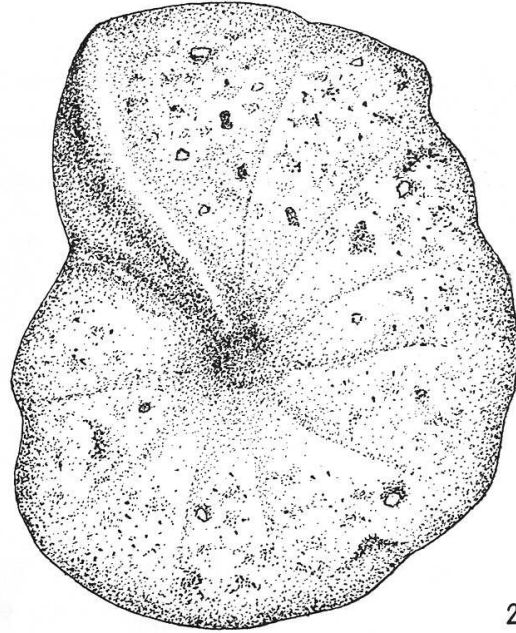
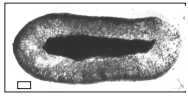
- littoral
- deltaic
- neritic
- non-depositional area
- nappes boundaries
- thickness of sediments
- fault zone
- present erosive boundary of dep.
- transport direction

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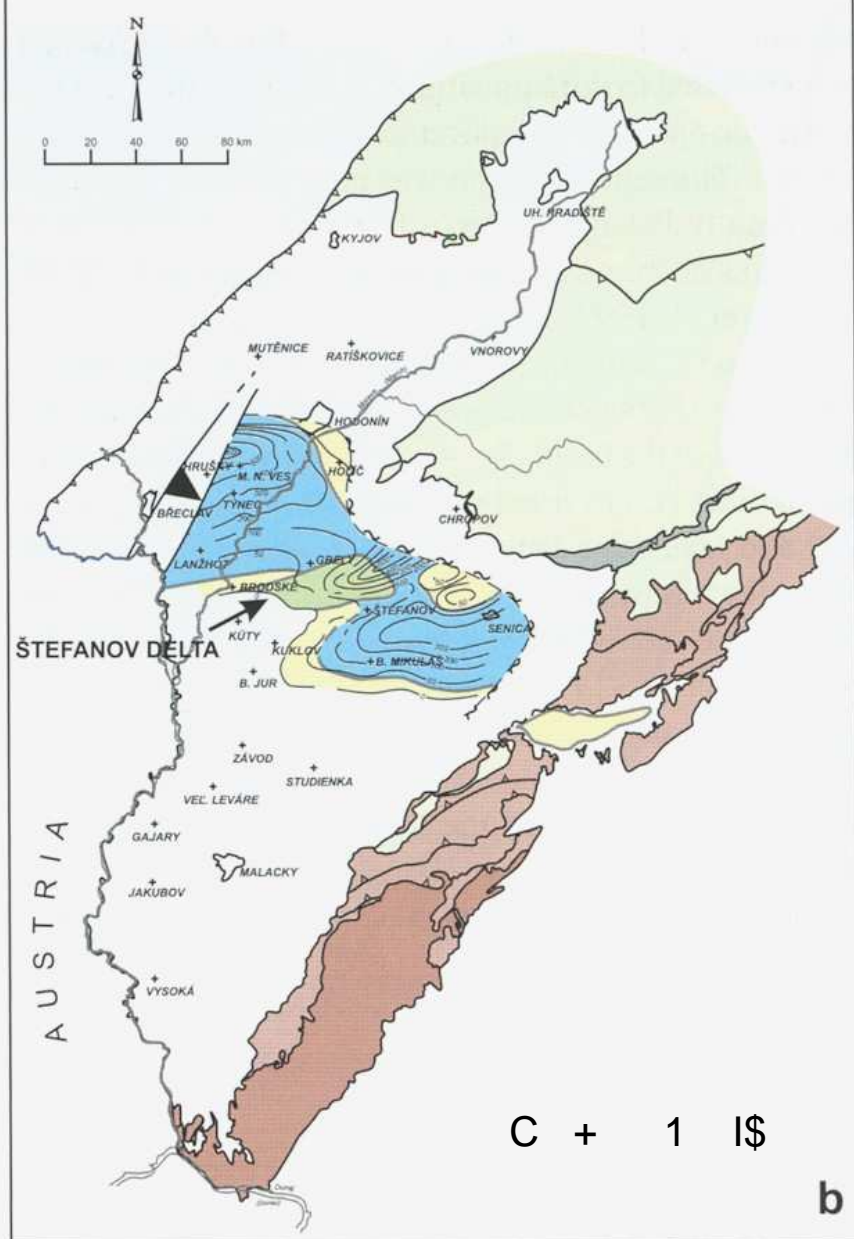
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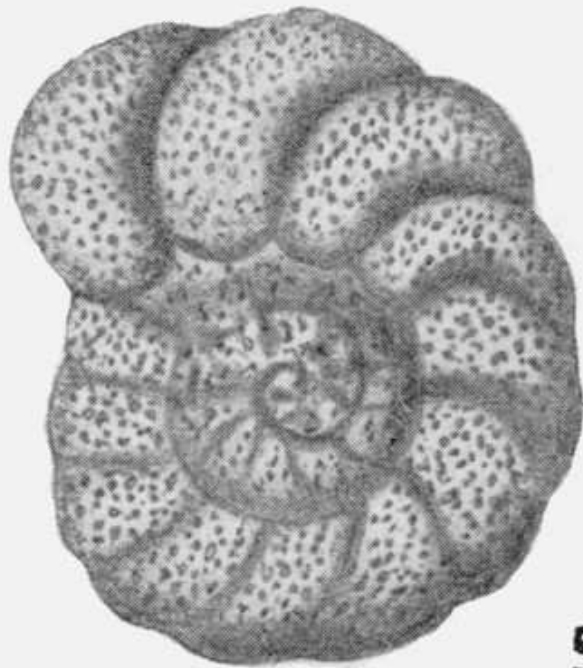
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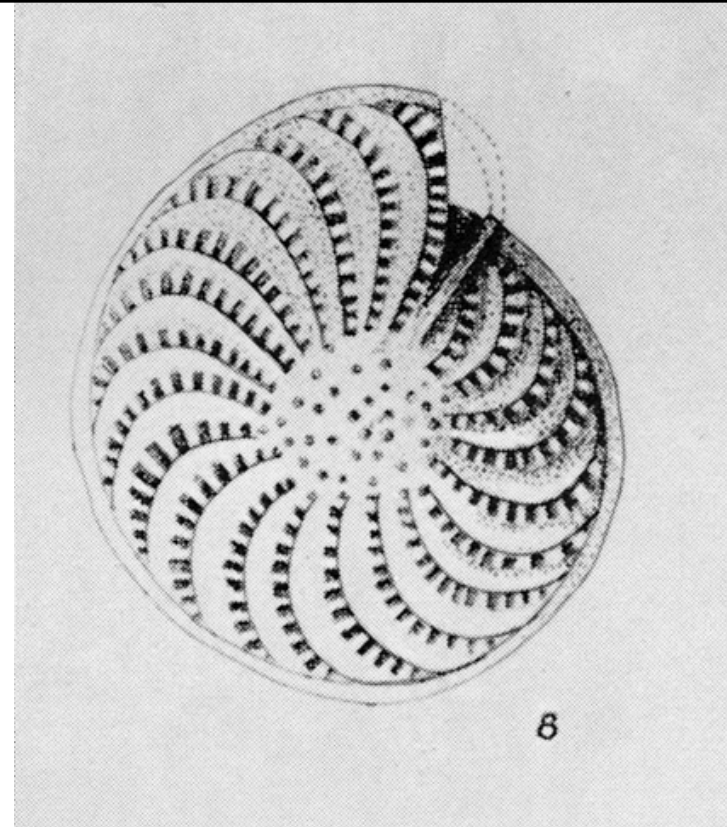


b



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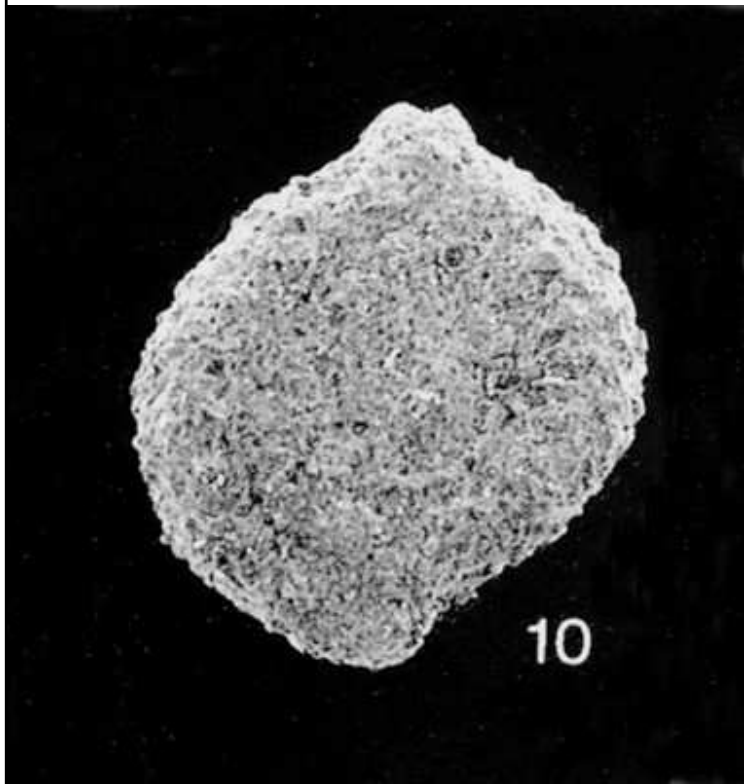
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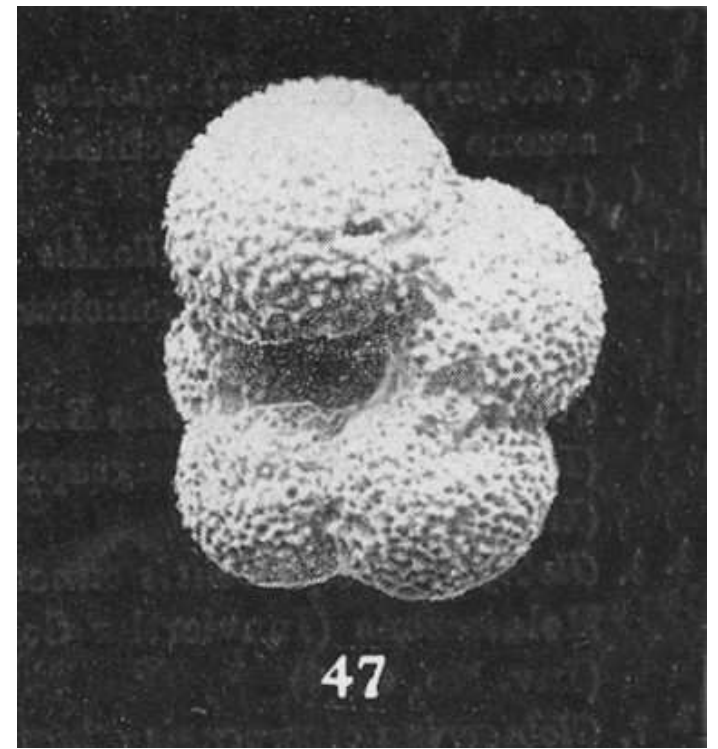
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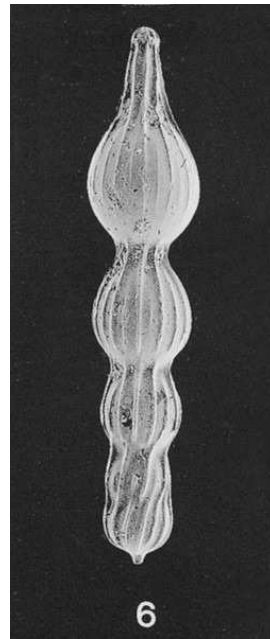


&

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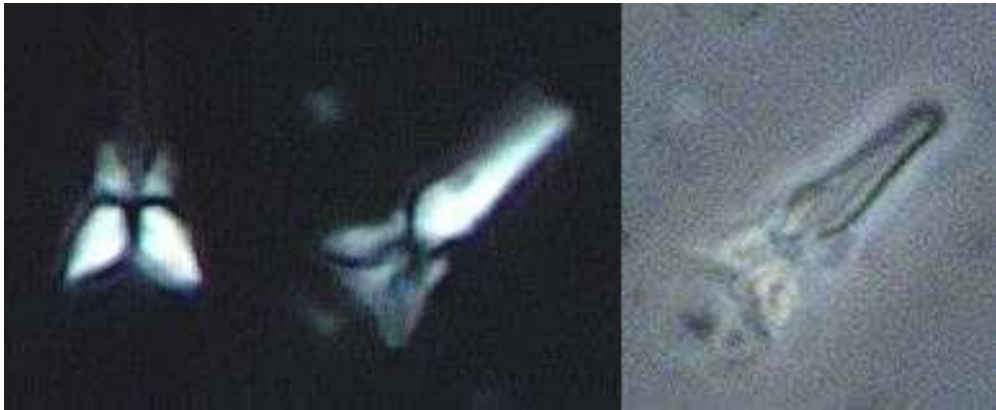


, X 3 V, 1 H\Q\$^a

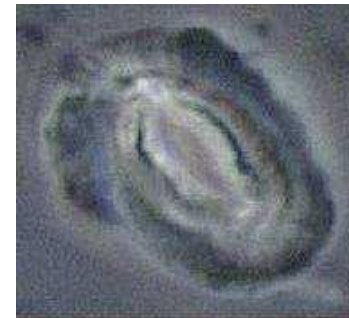


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J*

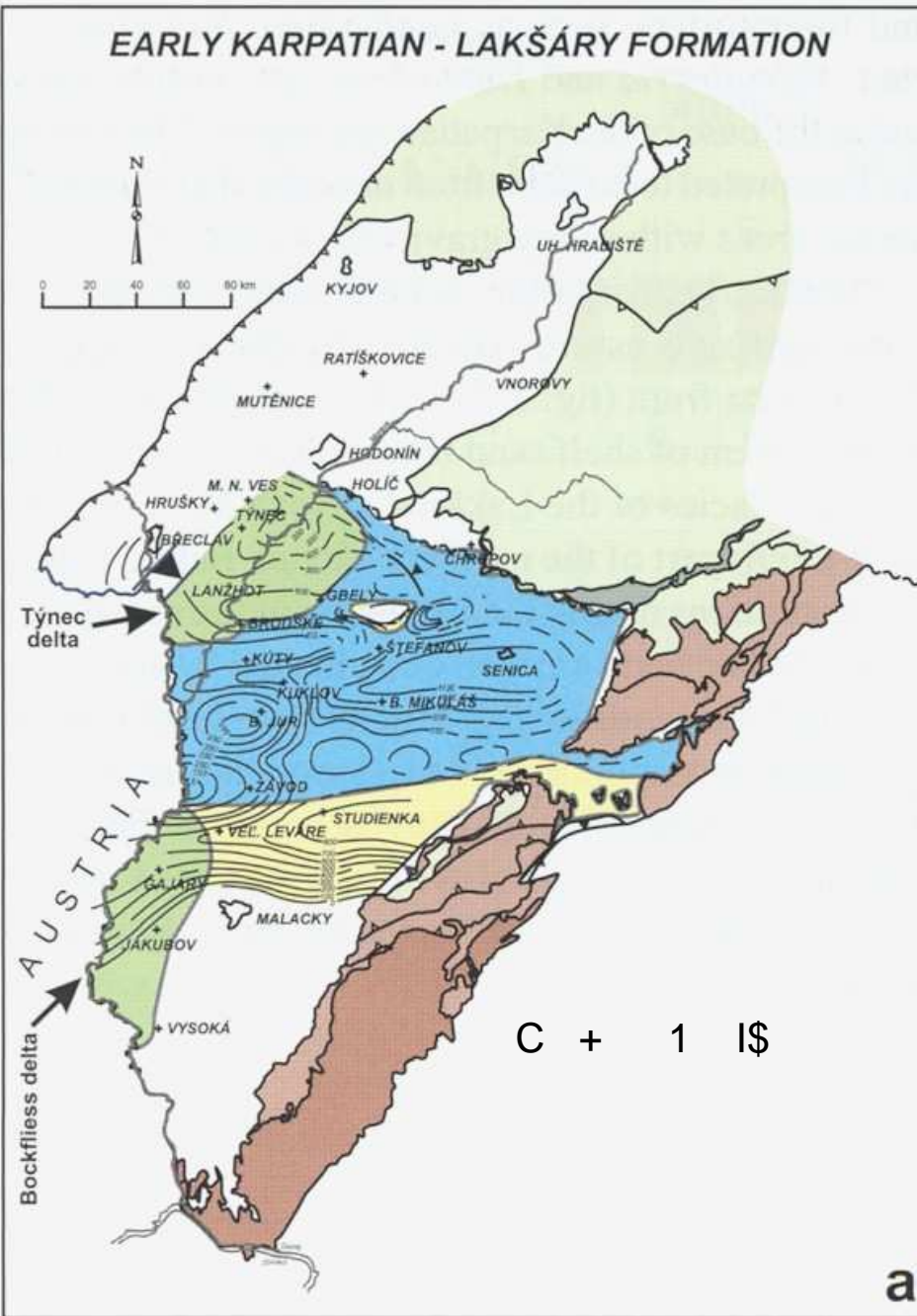


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LATE KARPATIAN - ZAVOD FORMATION

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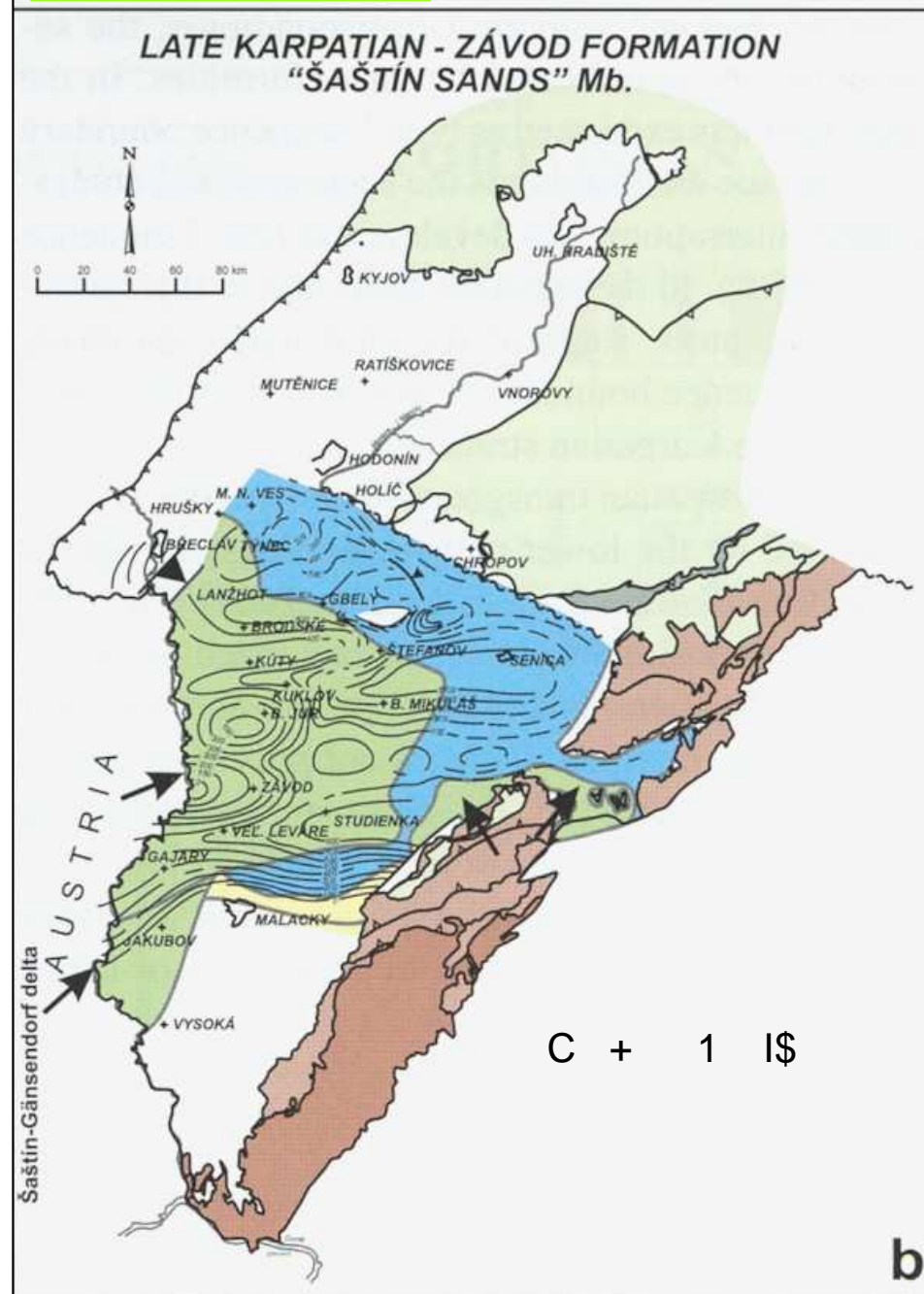
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phy of the Vienna Basin

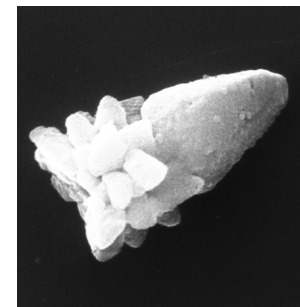
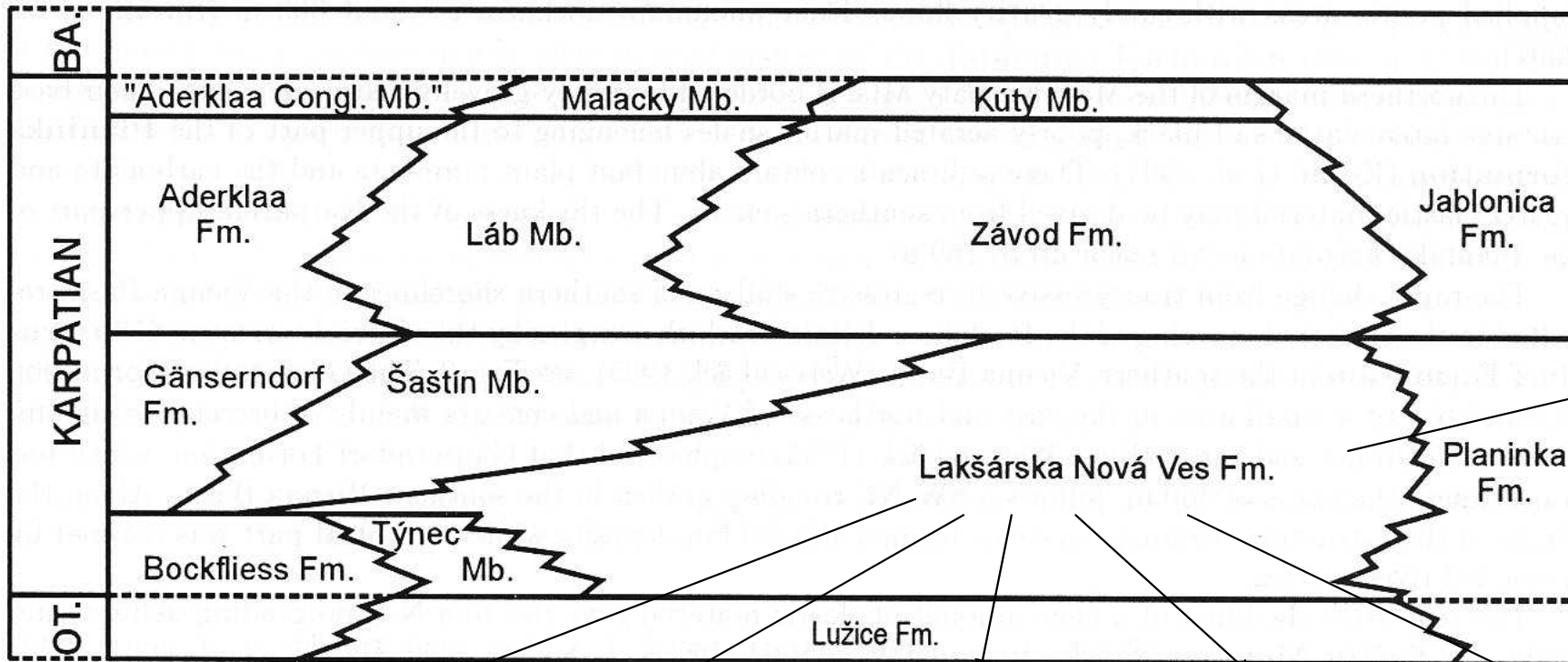
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LATE KARPATIAN - ZÁVOD FORMATION

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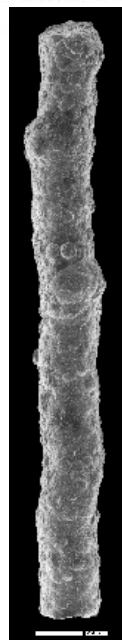
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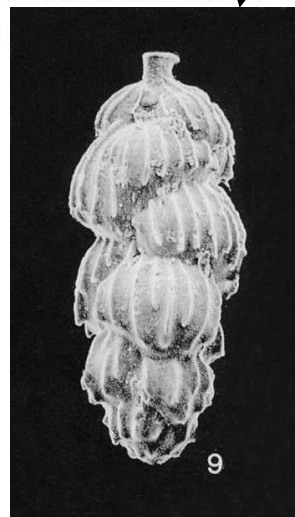
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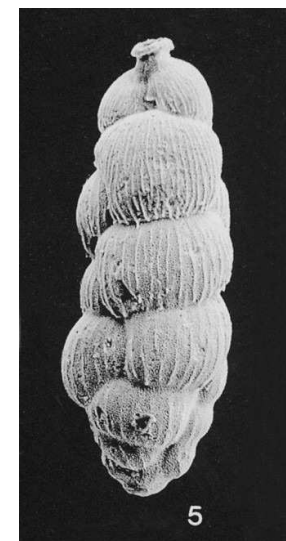


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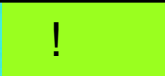
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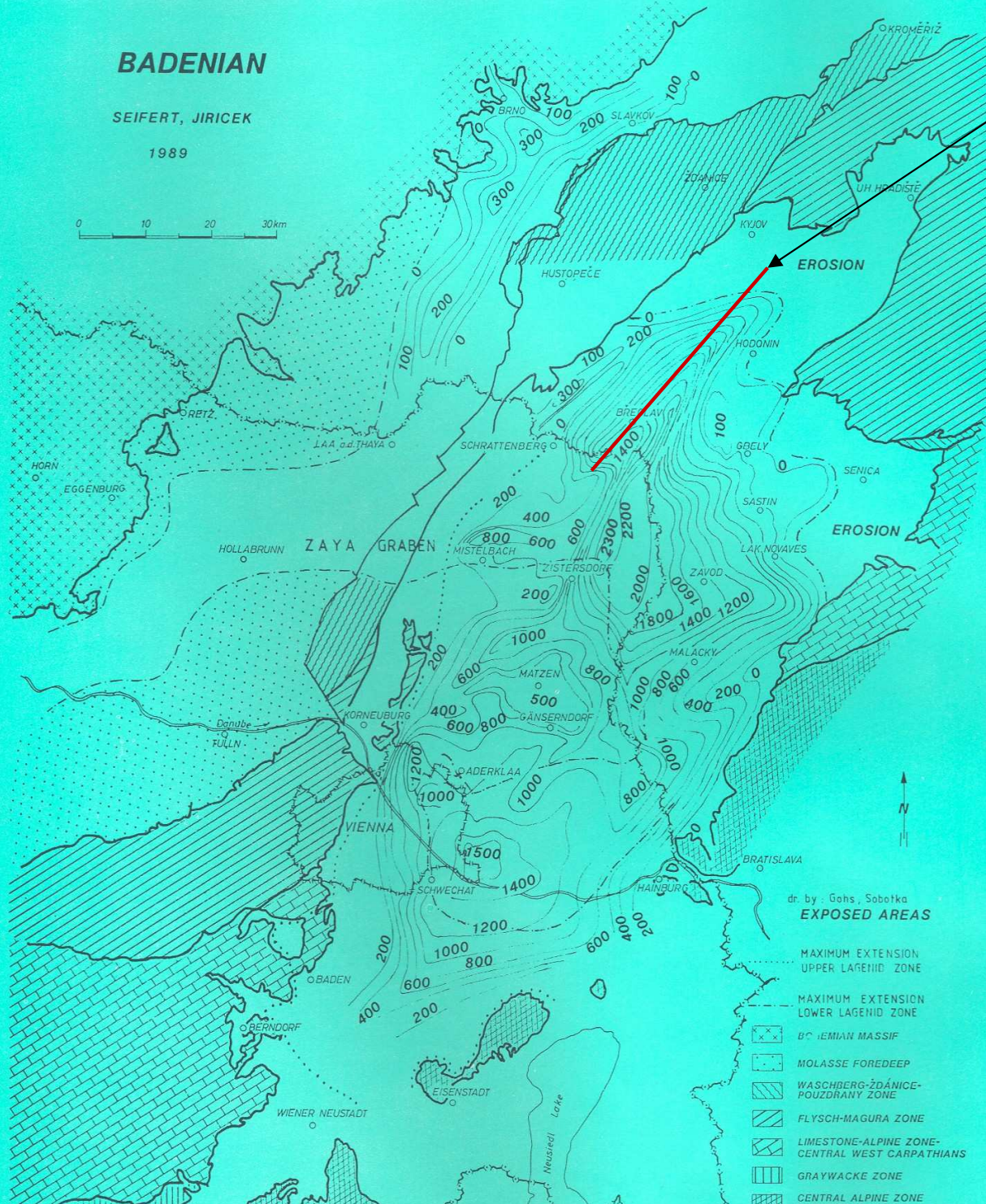
VIENNA BASIN AND MOLASSE FOREDEEP PALEOGEOGRAPHIC MAP WITH ISOPACHS



BADENIAN

SEIFERT, JIRICEK

1989



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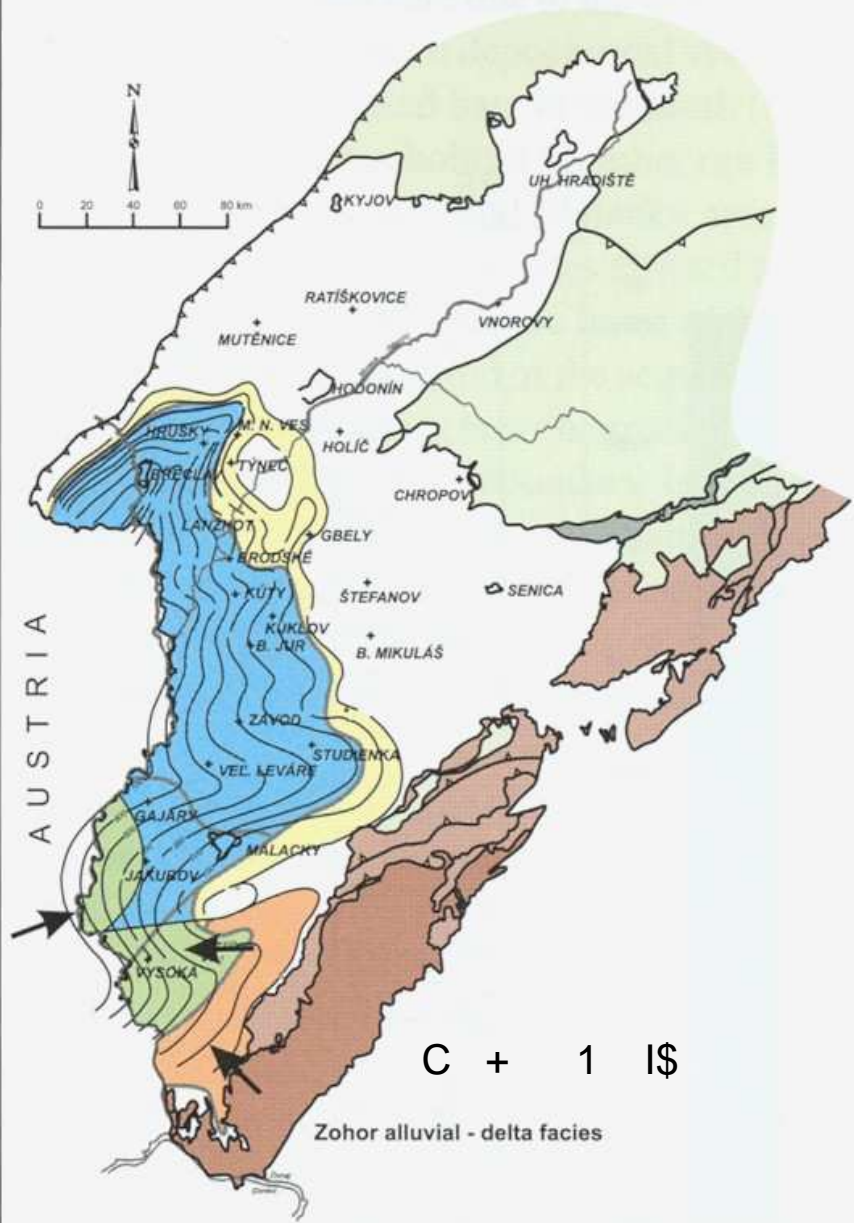
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EARLY BADENIAN



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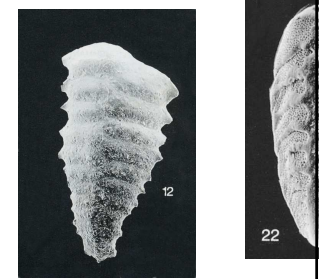
LATE BADENIAN

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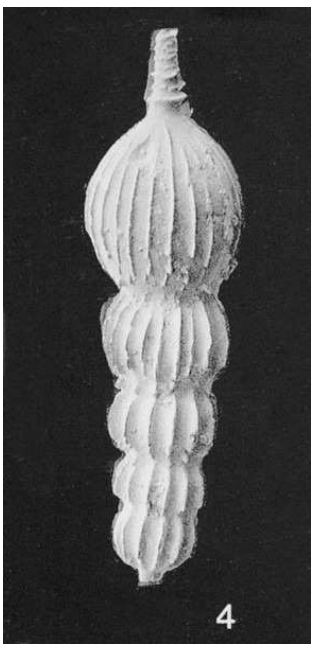
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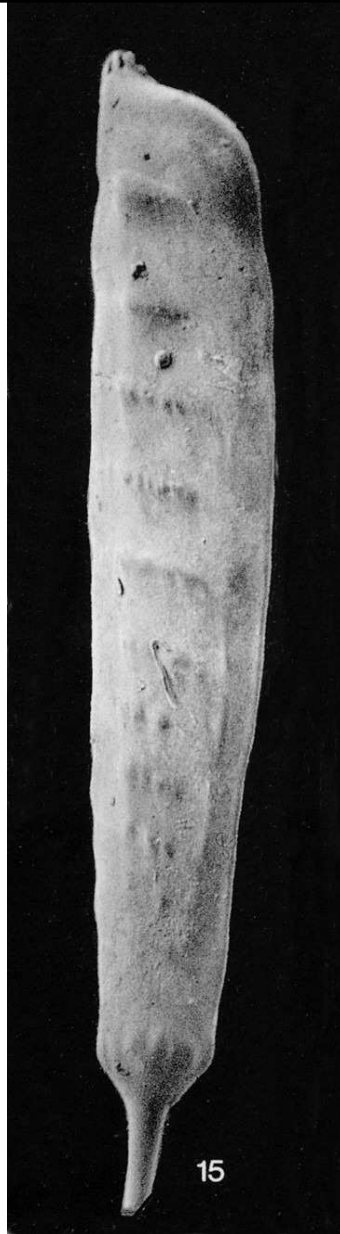
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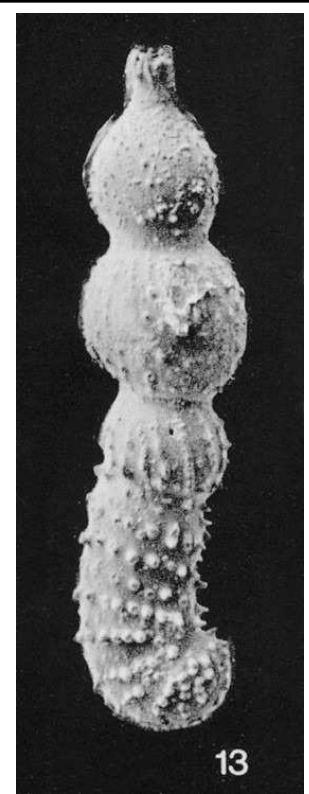
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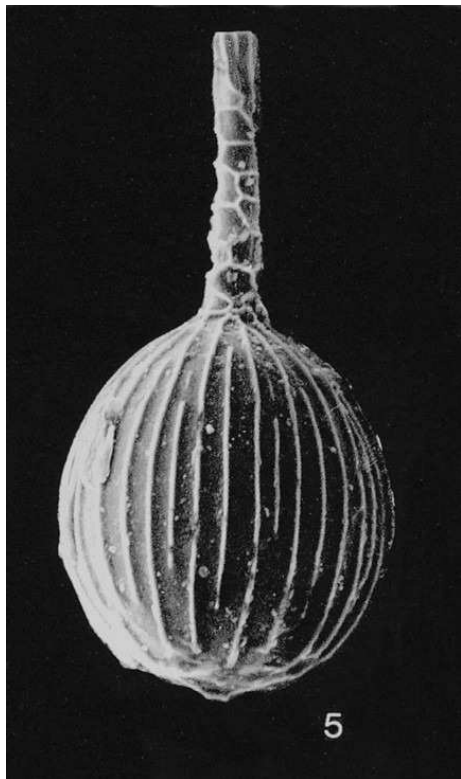


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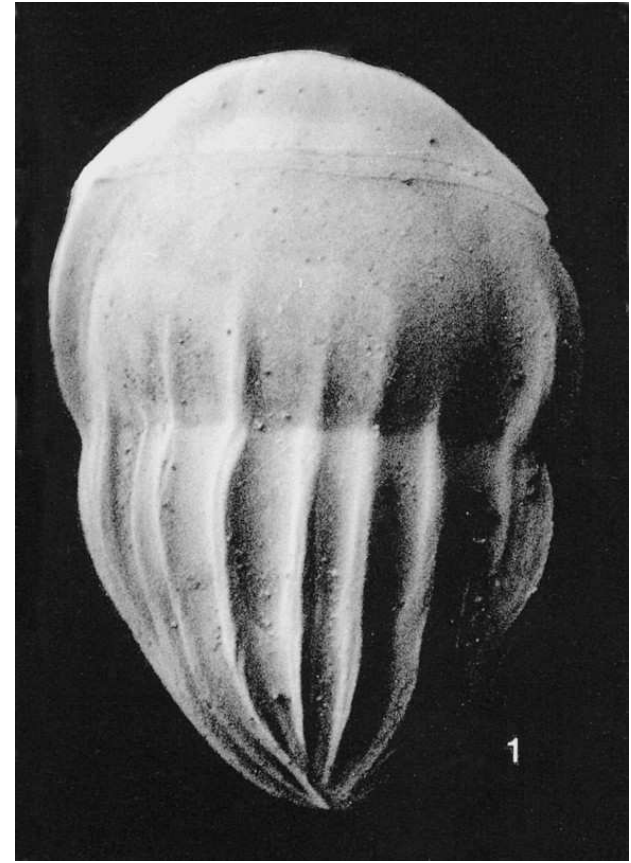
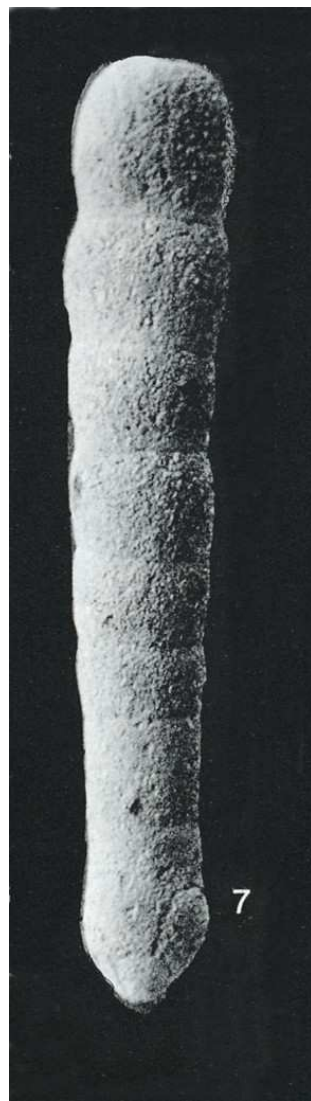
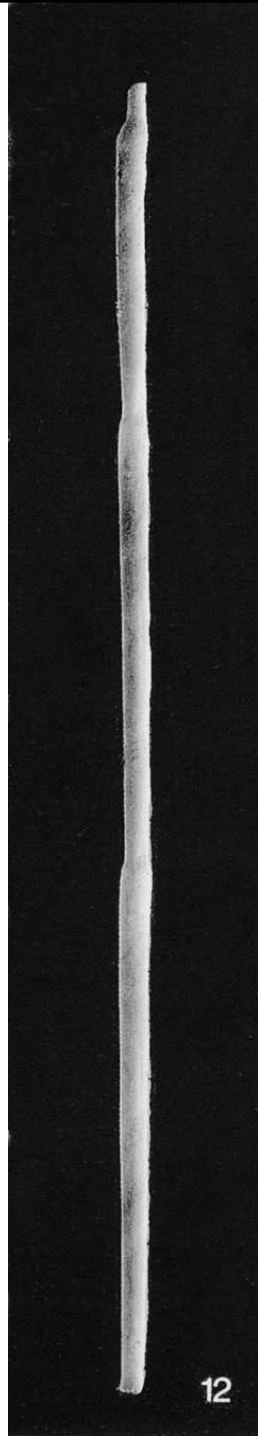
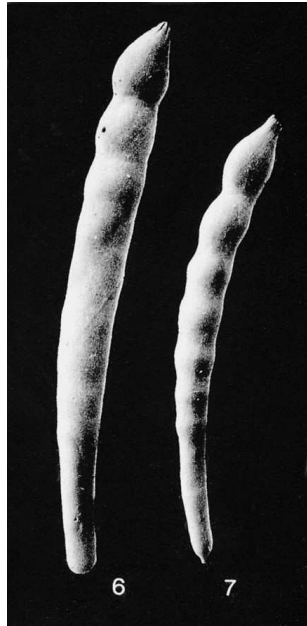
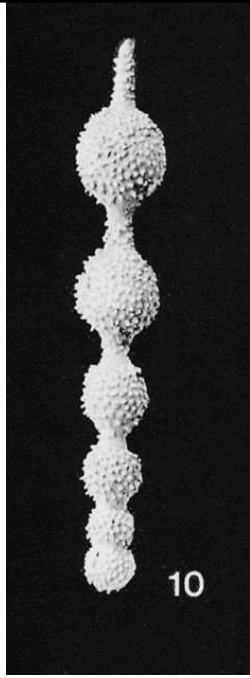


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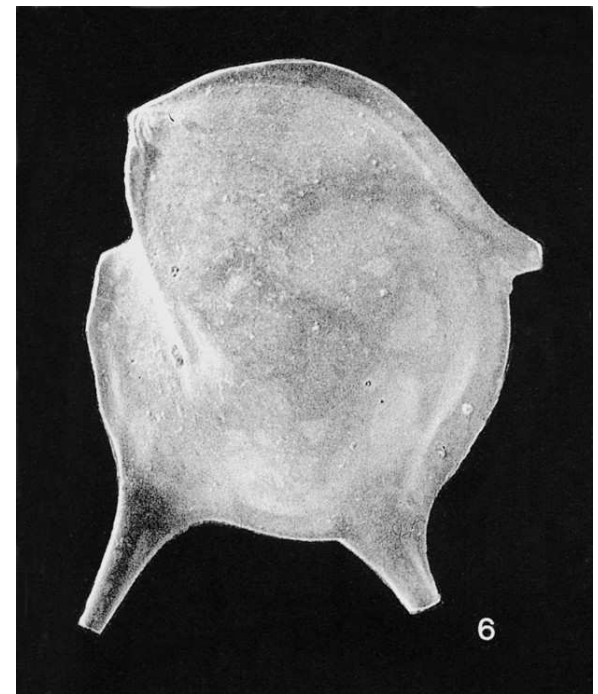
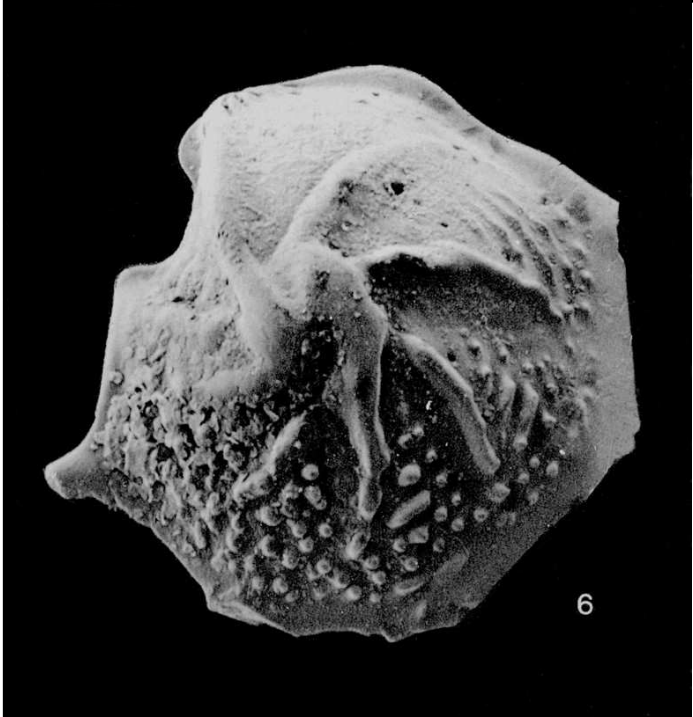
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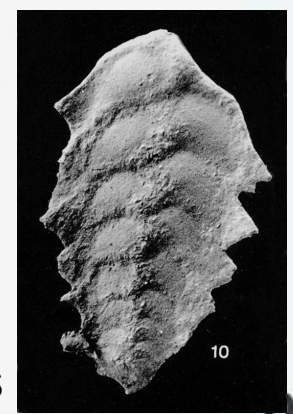
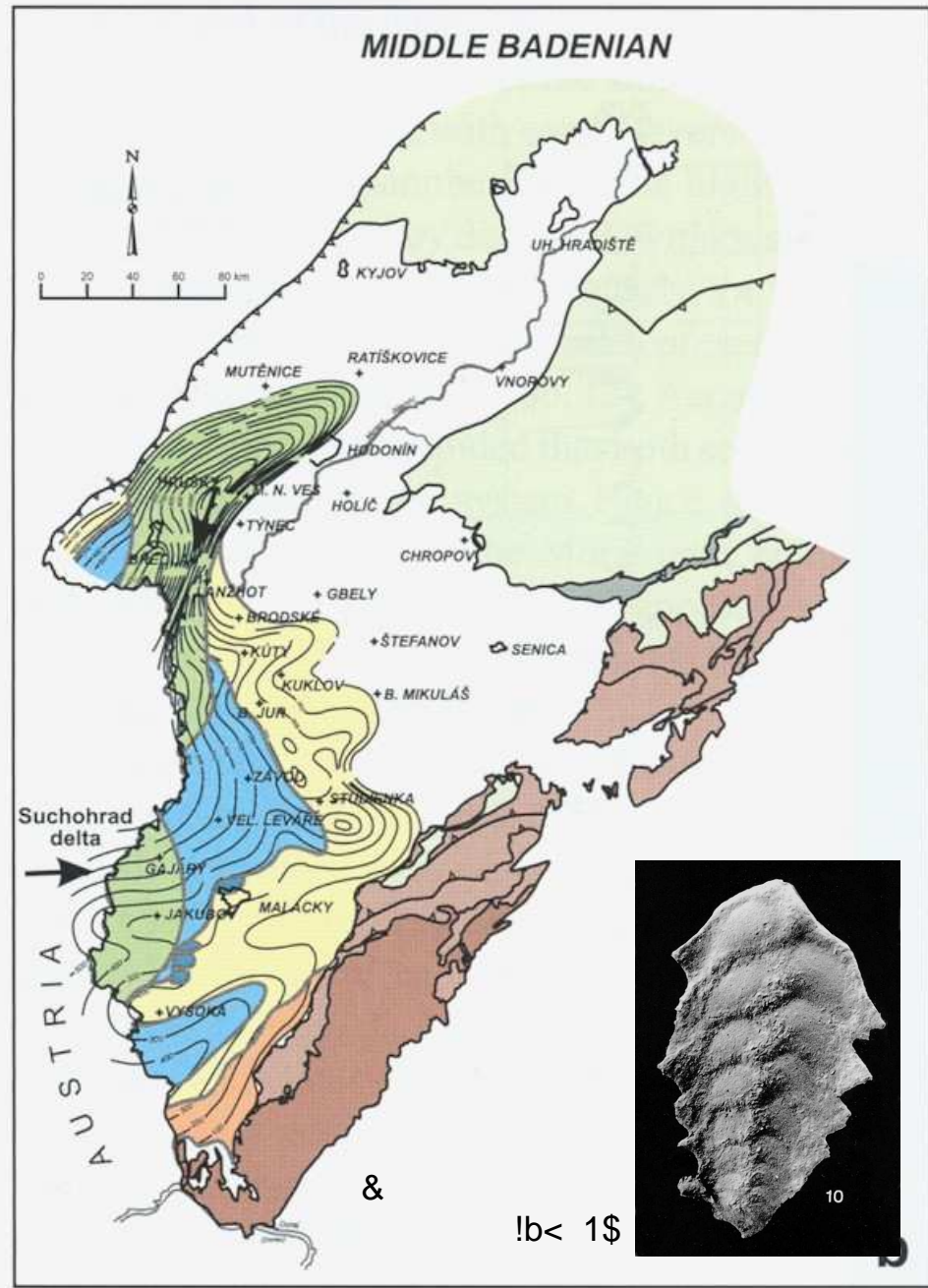
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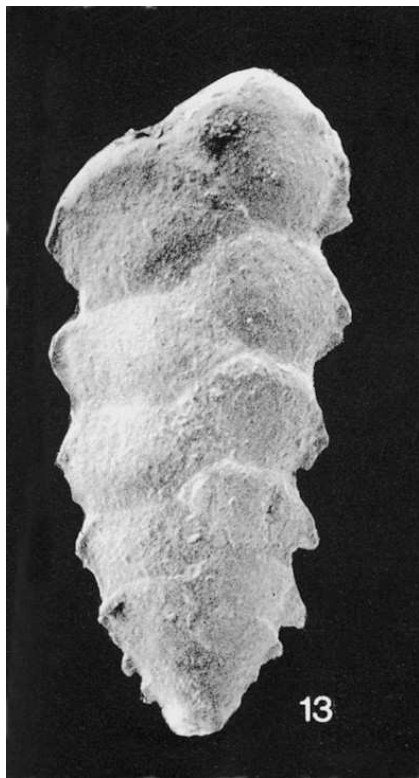
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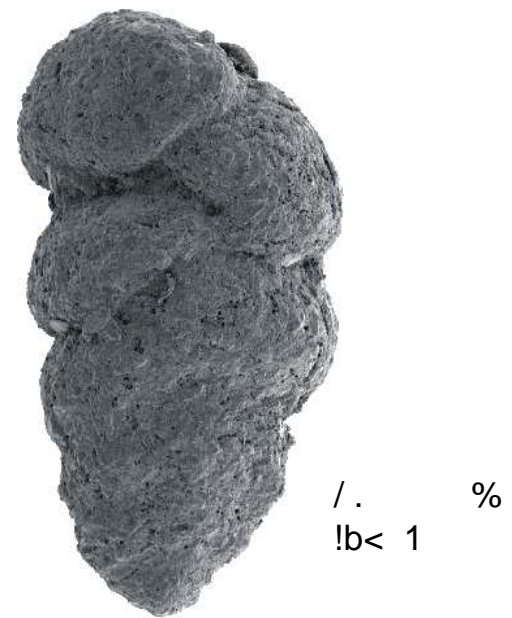
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W) / L * ,.

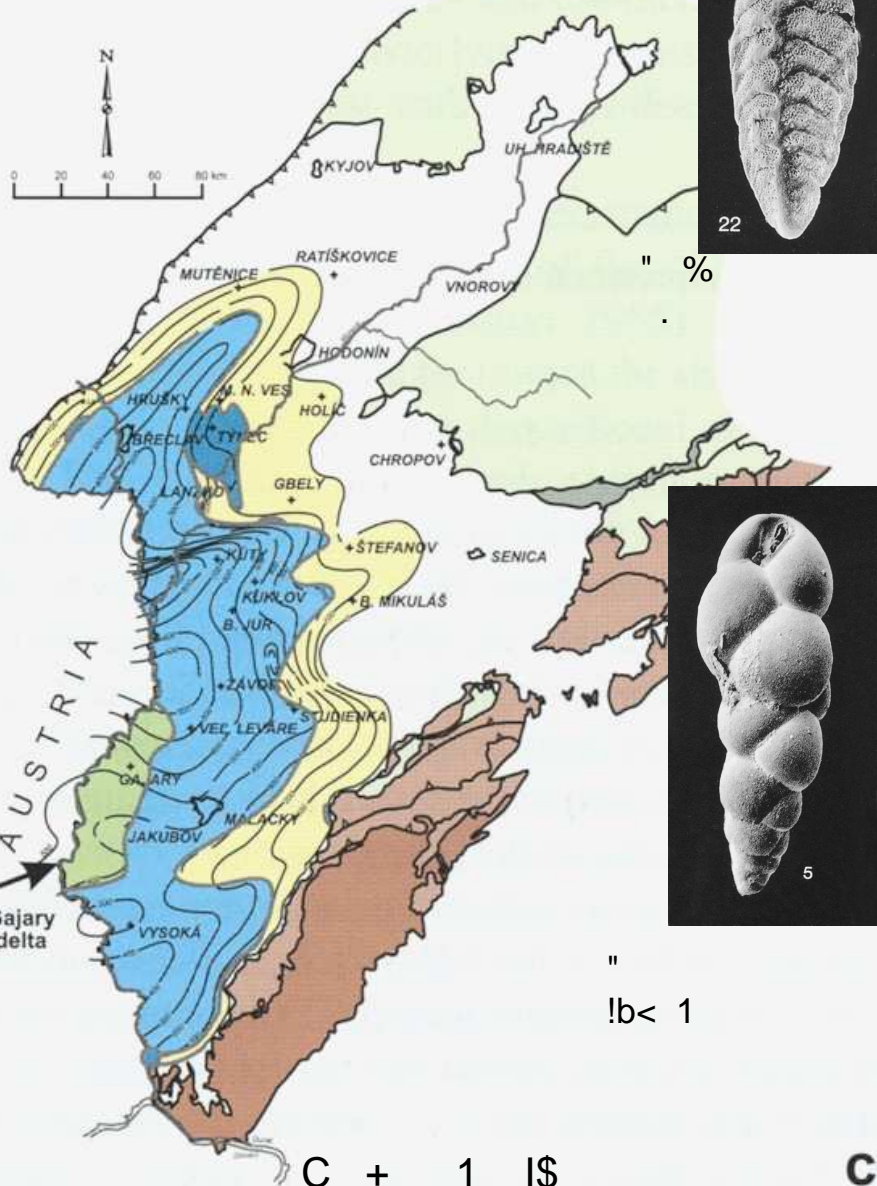


, . !

LATE BADENIAN



22



5

NEOGENE:

- littoral
- deltaic
- neritic
- alluvial sediments
- non-depositional area
- nappes boundaries
- thickness of sediments
- transport direction
- algal limestones

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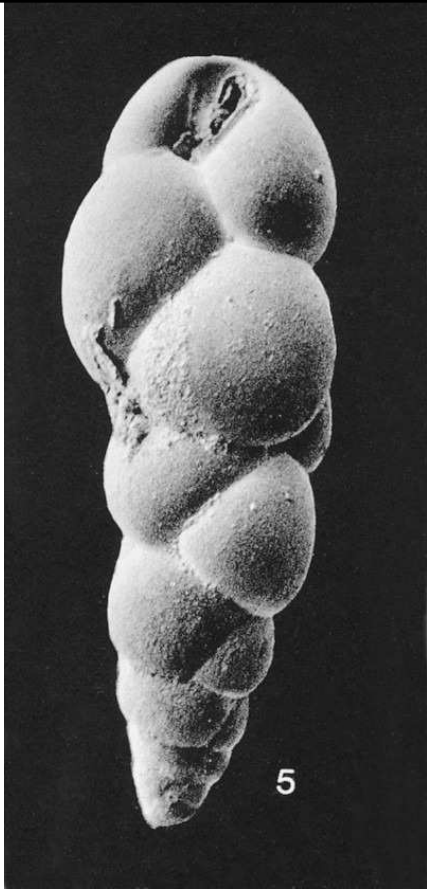
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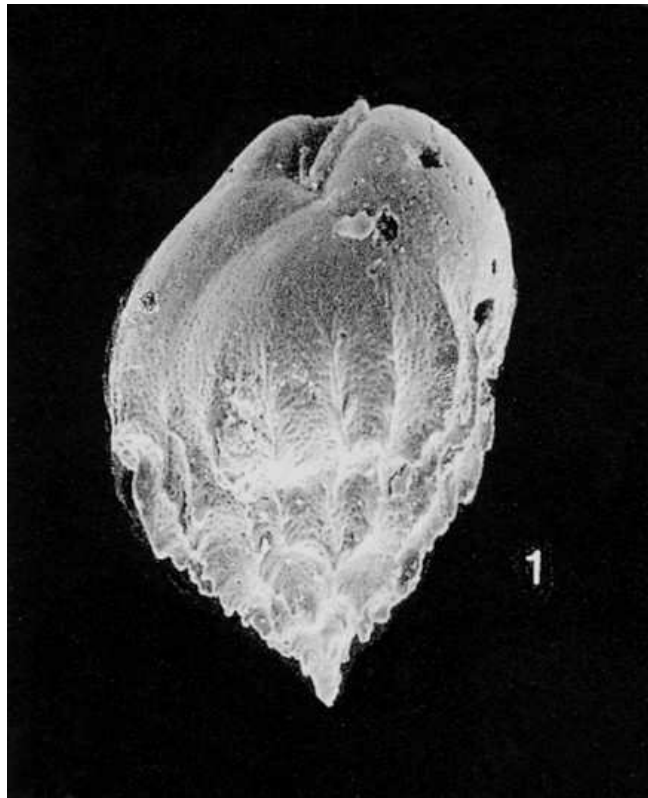
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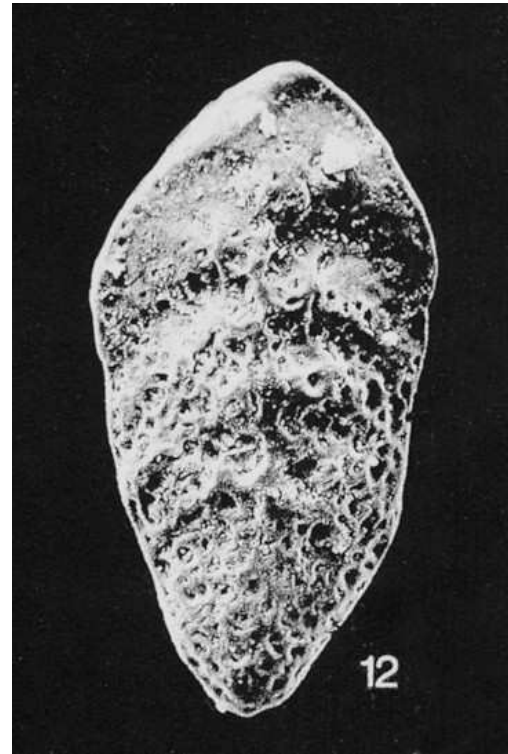
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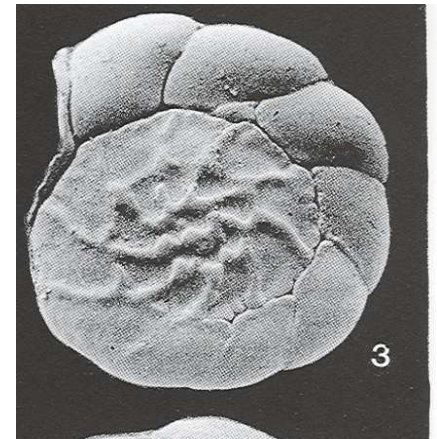
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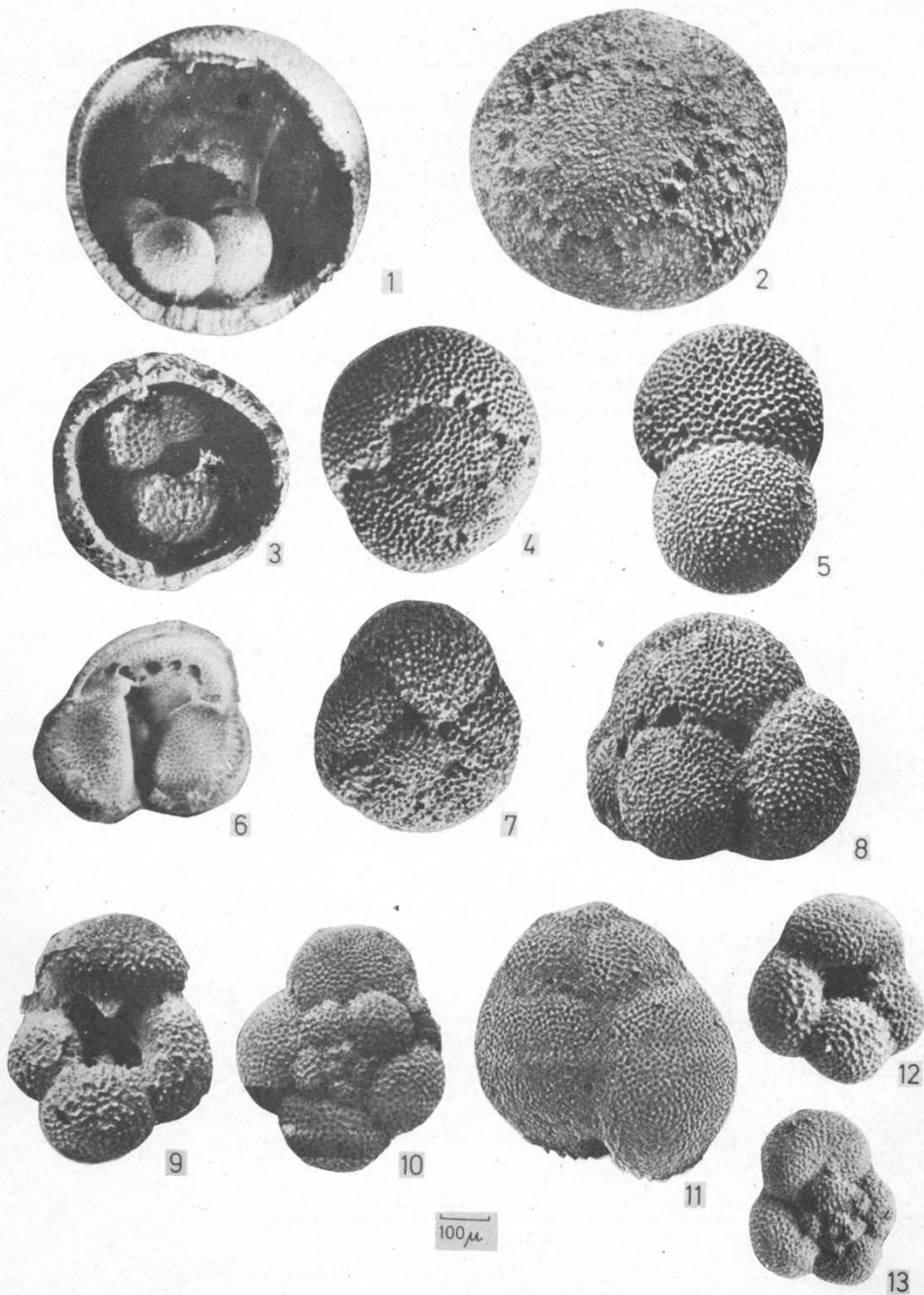
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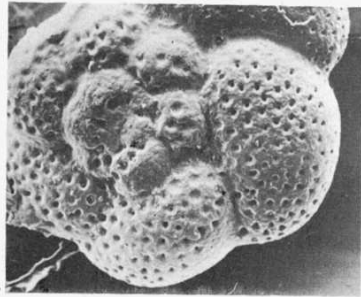
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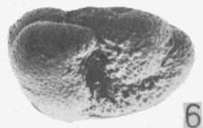
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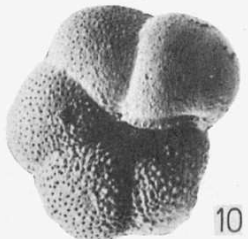
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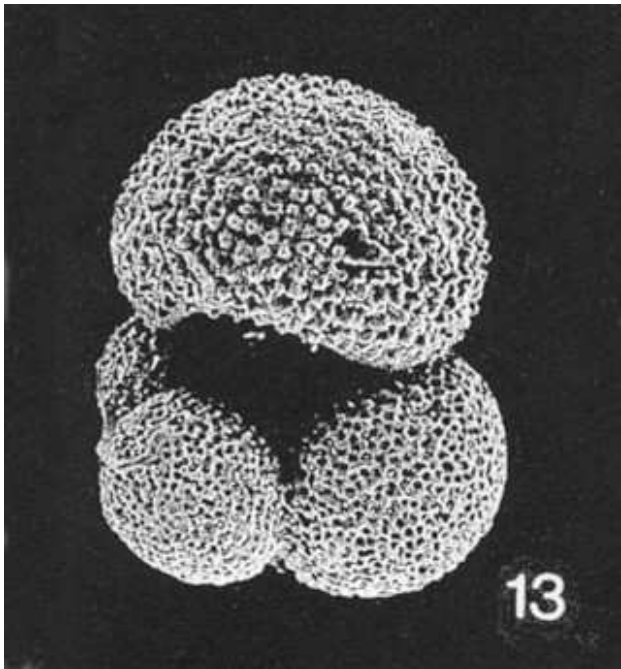
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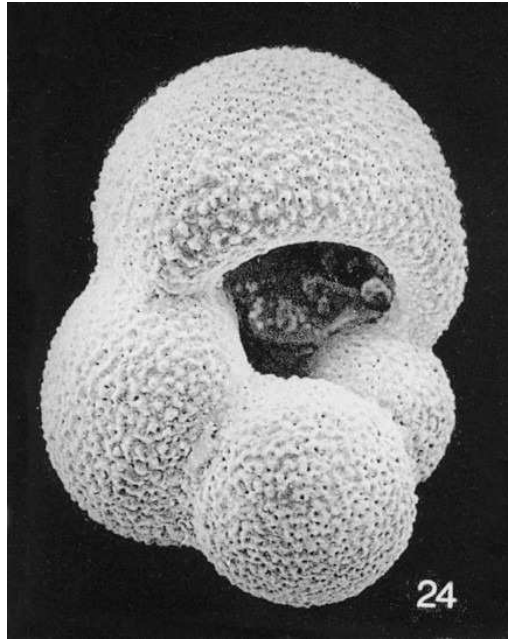
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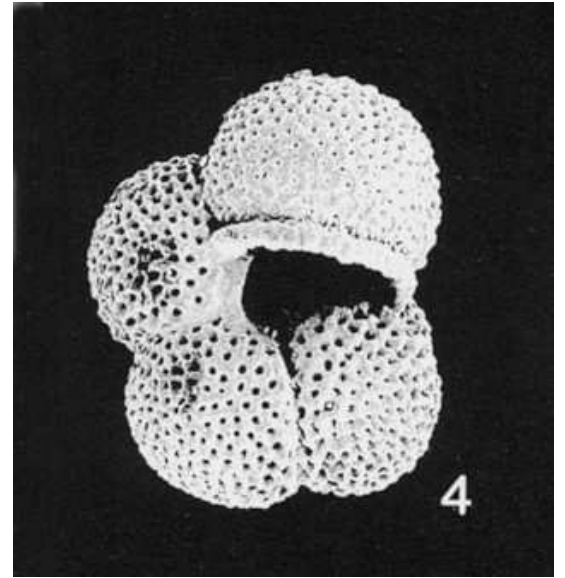
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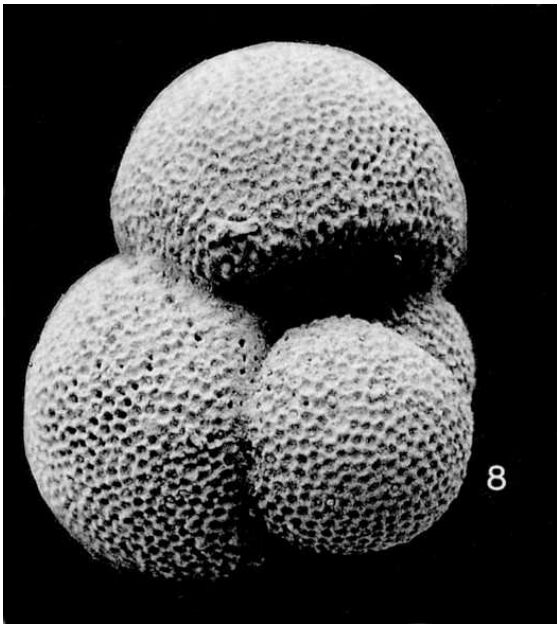


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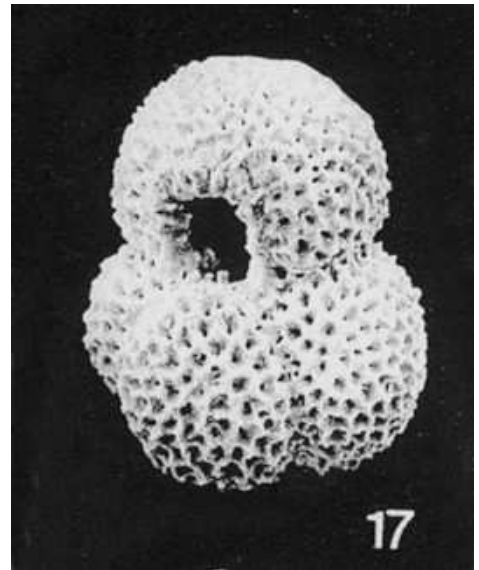
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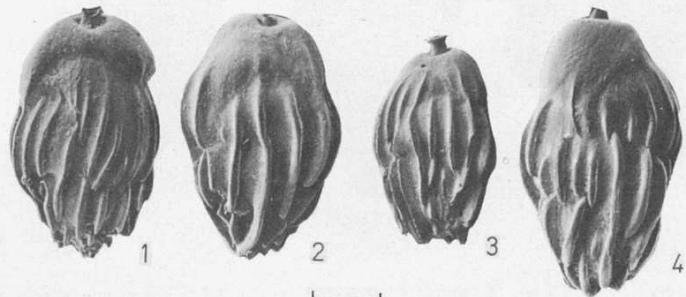
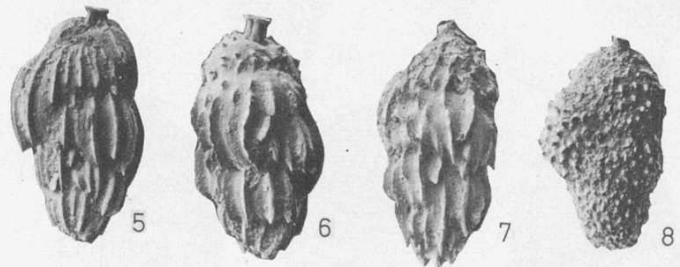
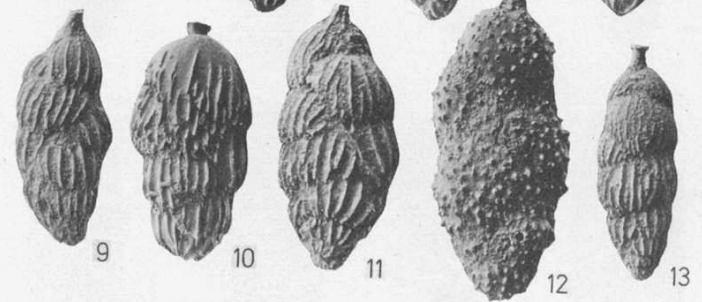
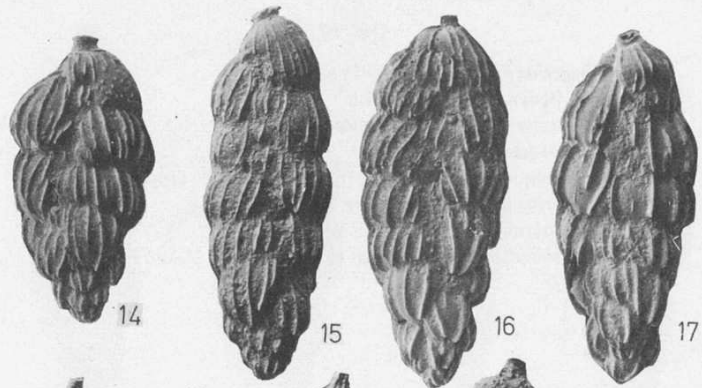
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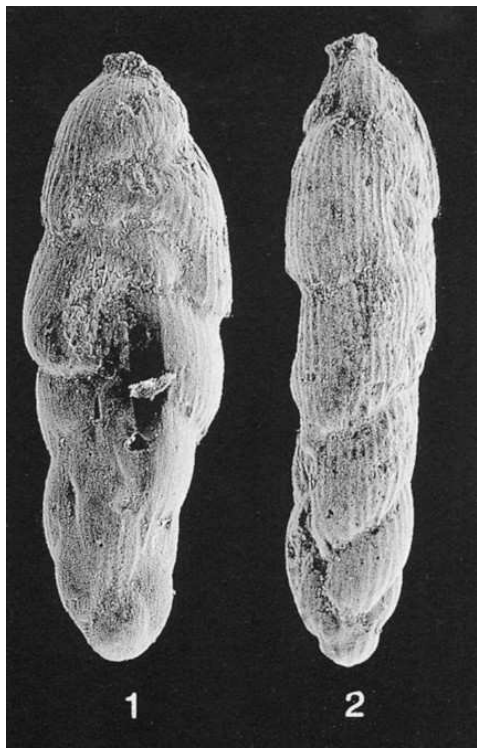
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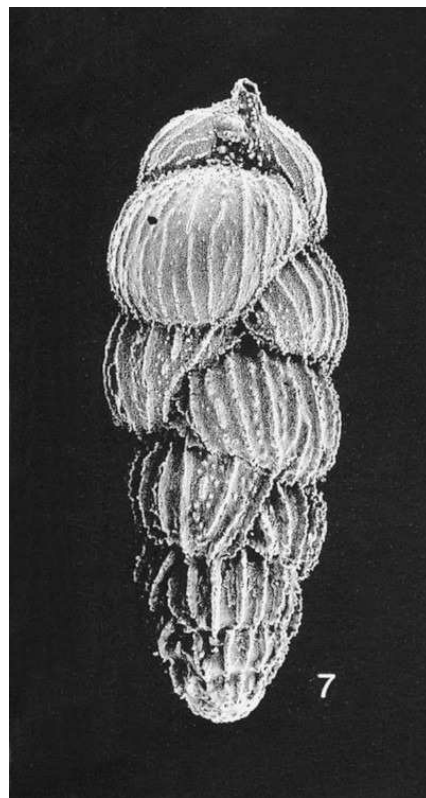
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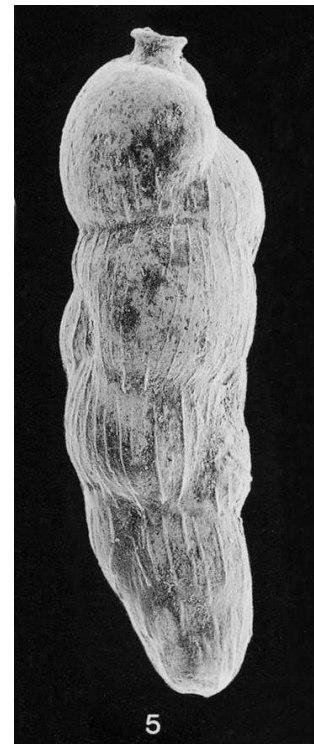


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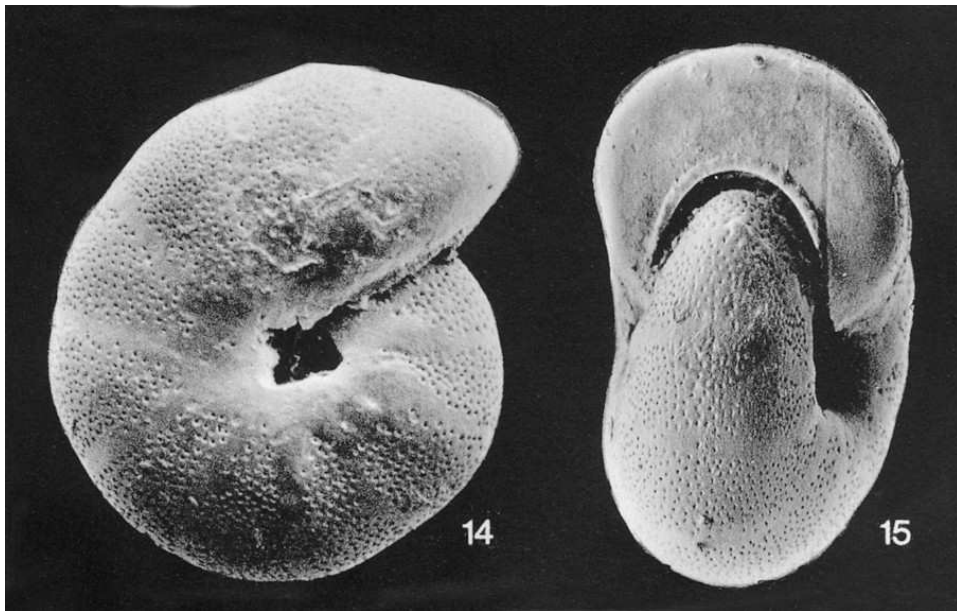
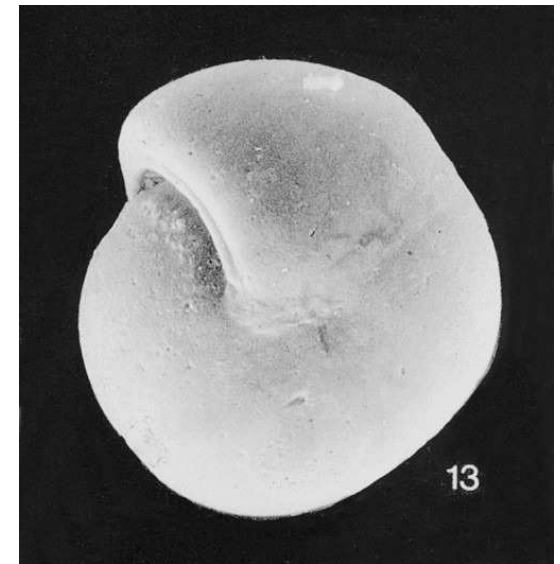
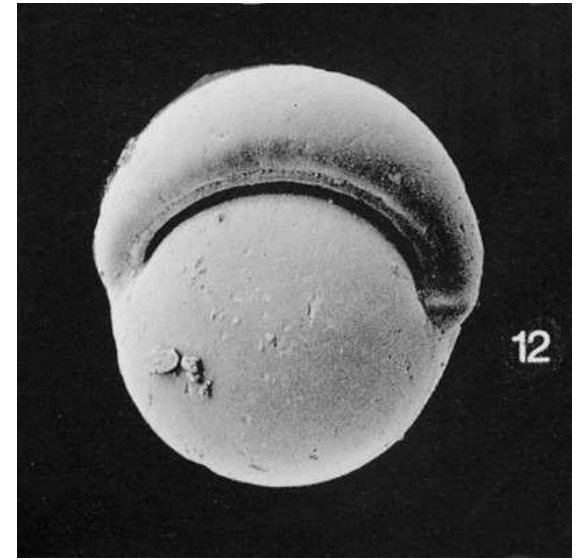
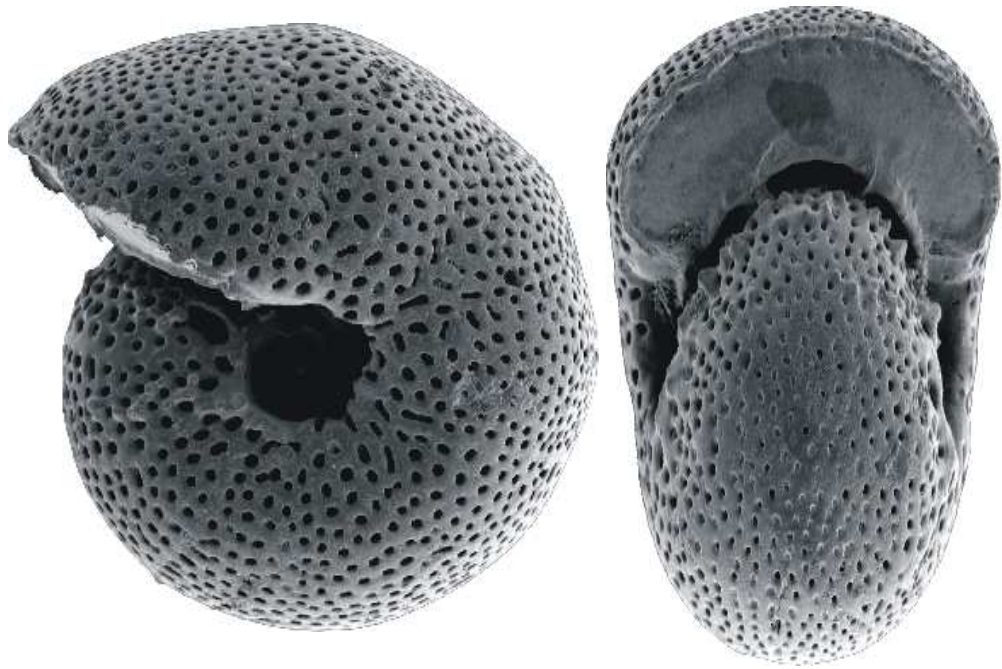
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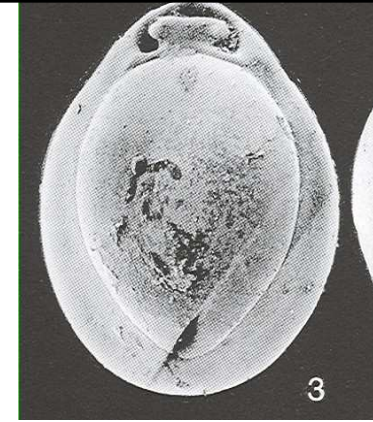
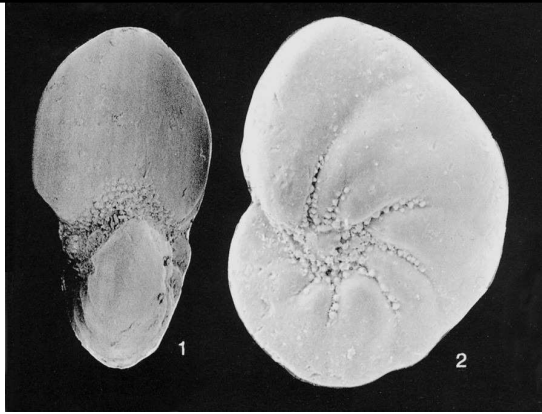
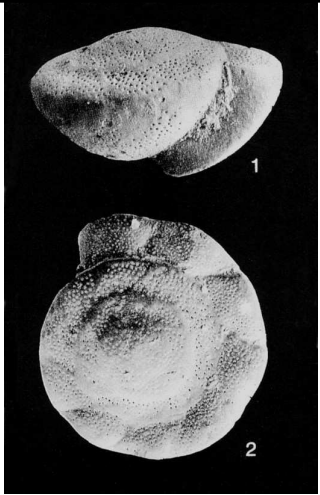
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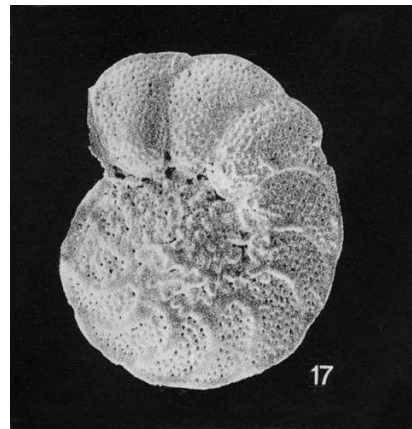
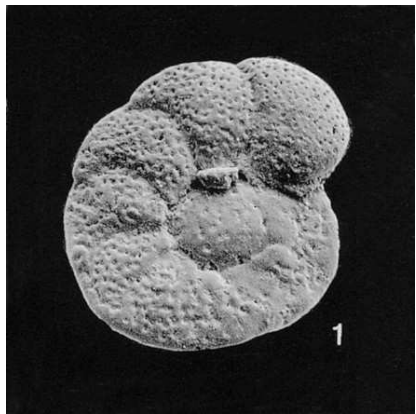
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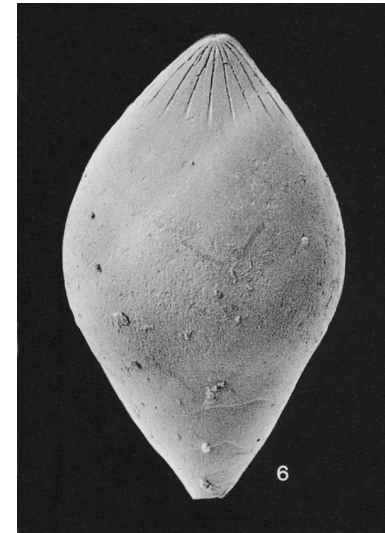
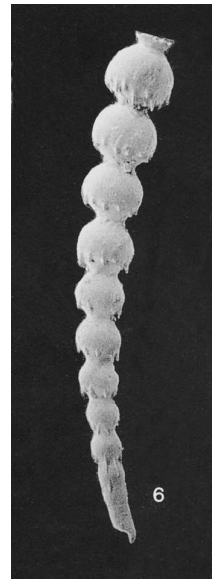
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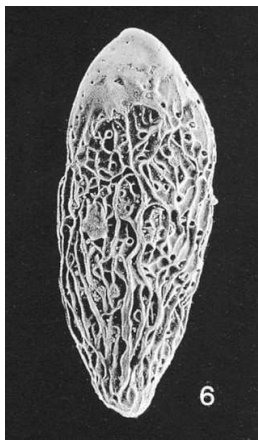


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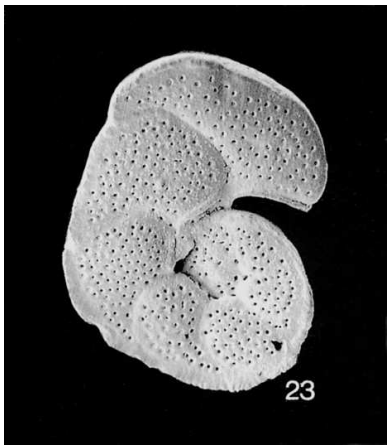
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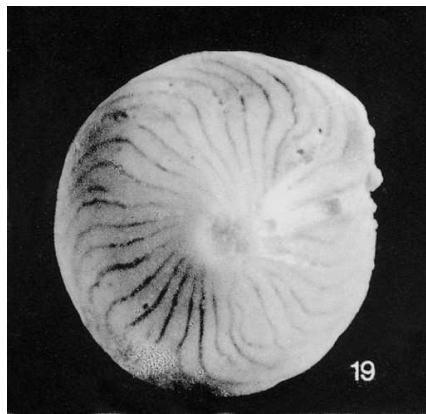
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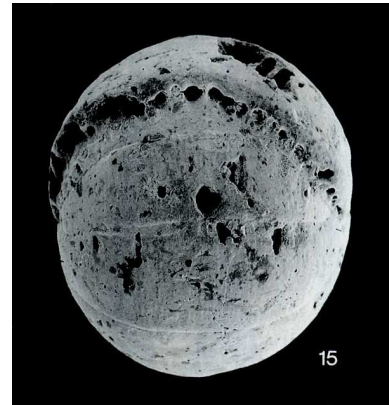
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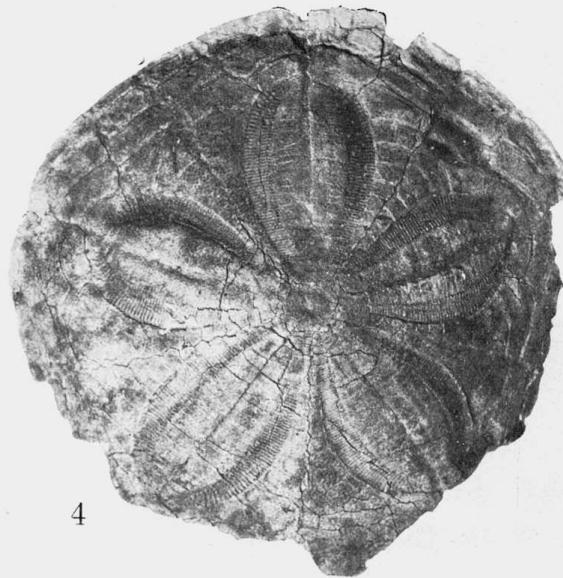
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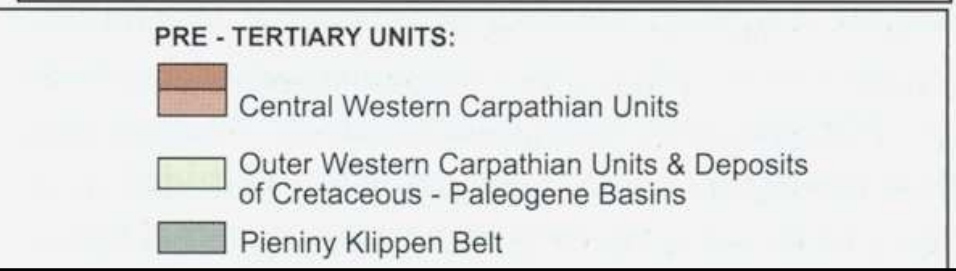
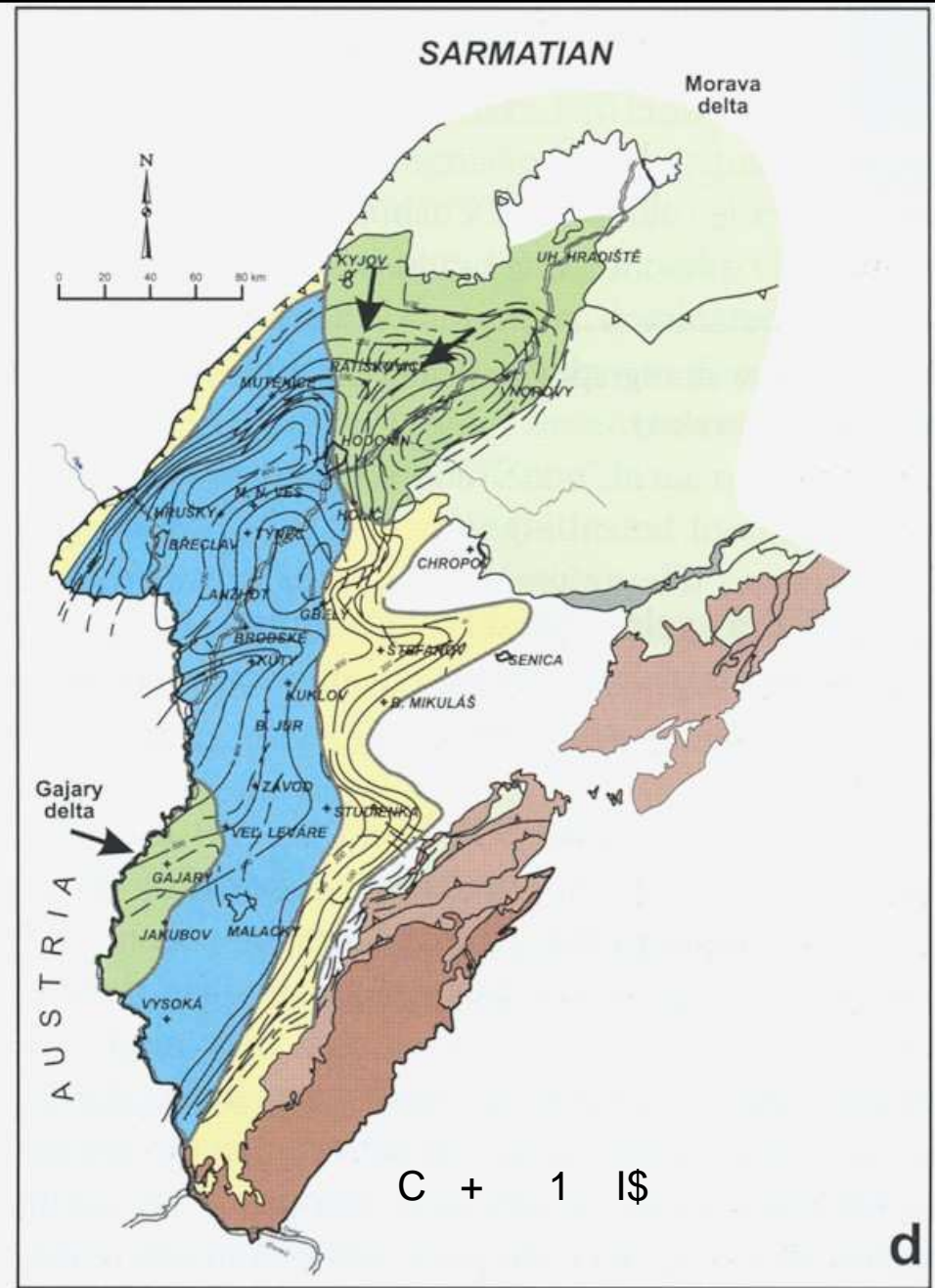
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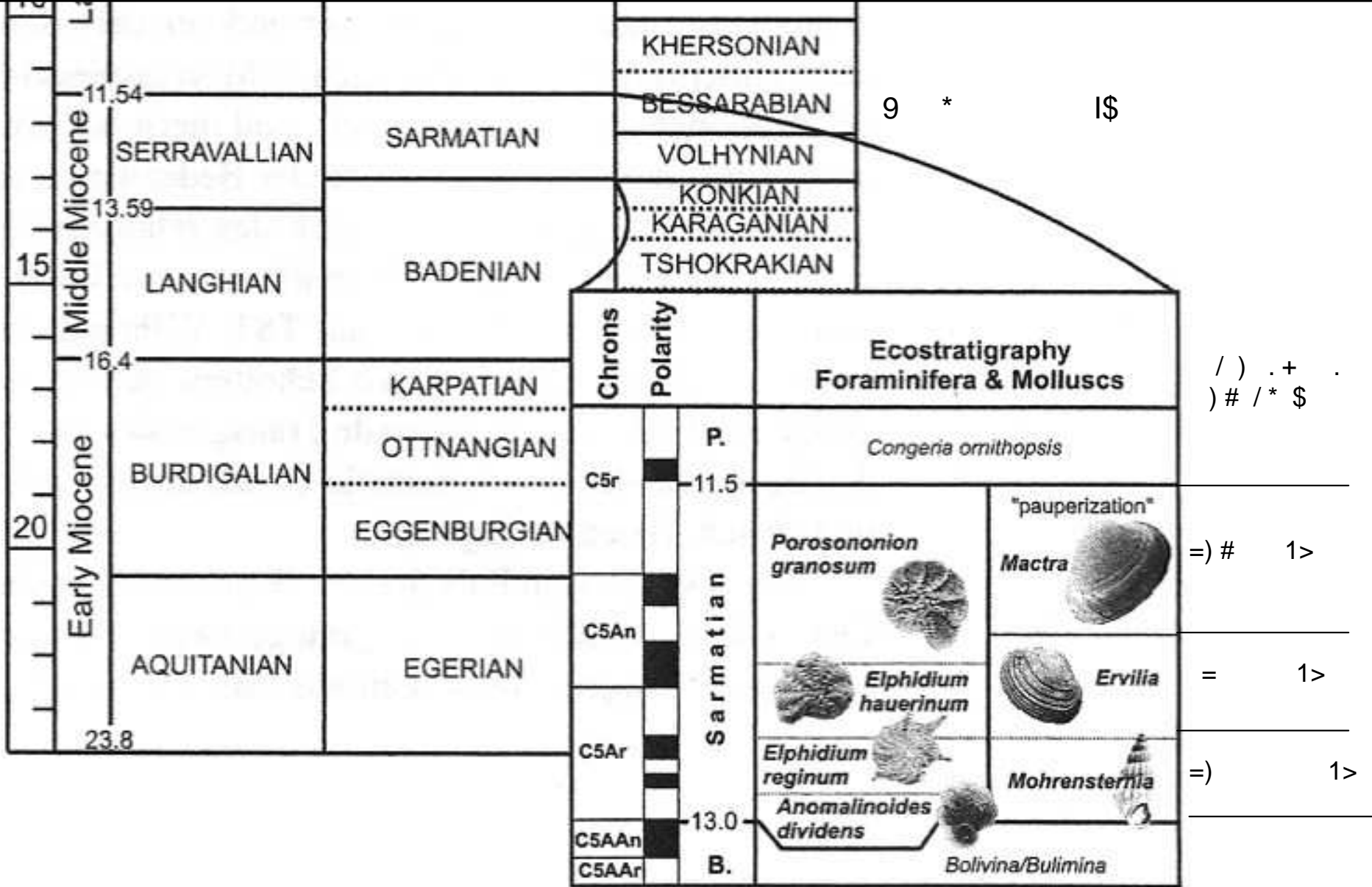
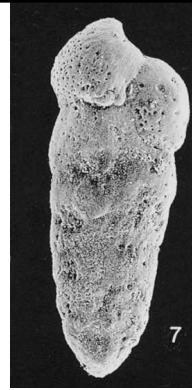


Fig. 1: Miocene chronostratigraphy of Europe modified after RÖGL (1998) with ecostratigraphic zonation of the Sarmatian based on molluscs and benthic foraminifera.

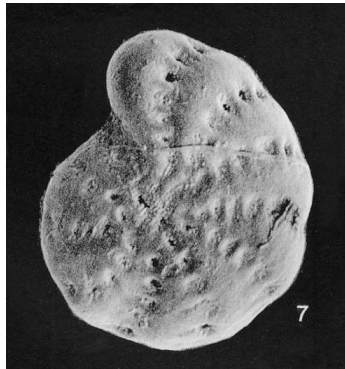


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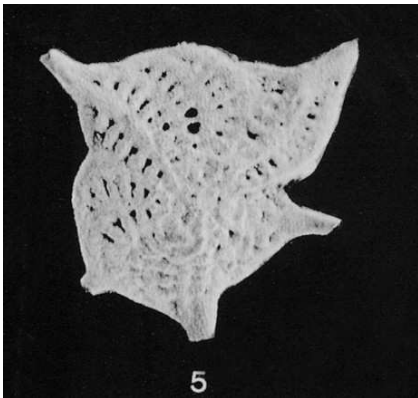
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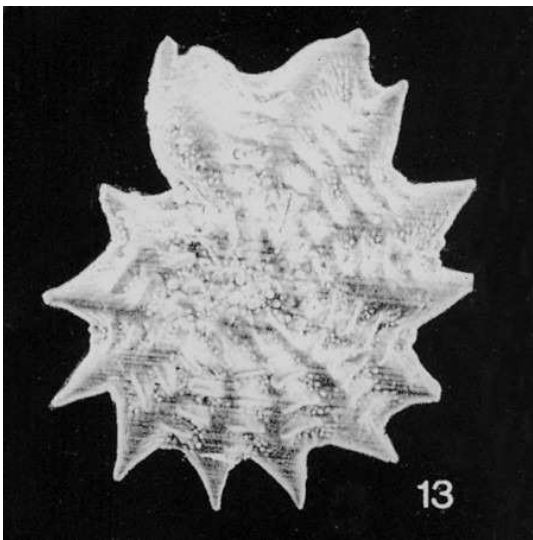
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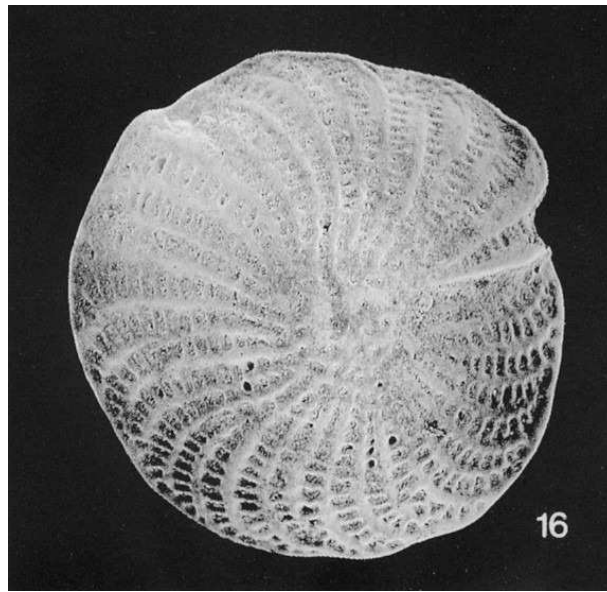
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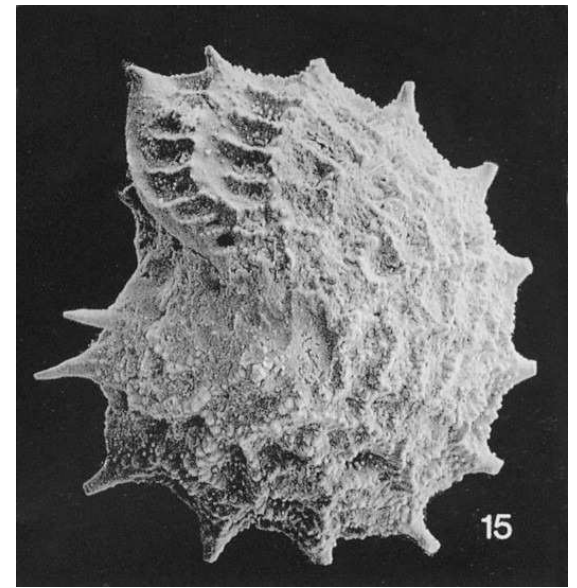
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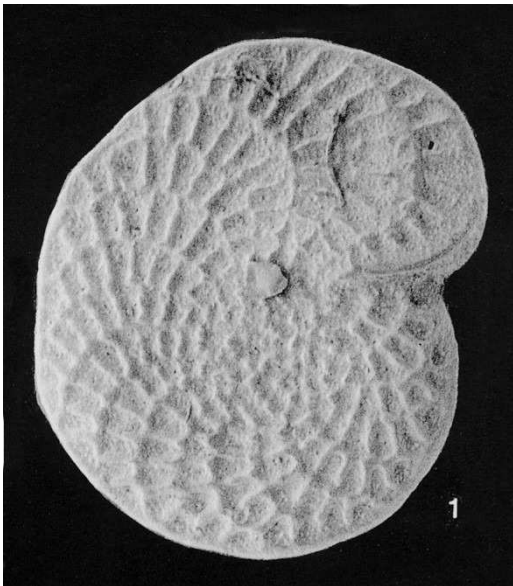
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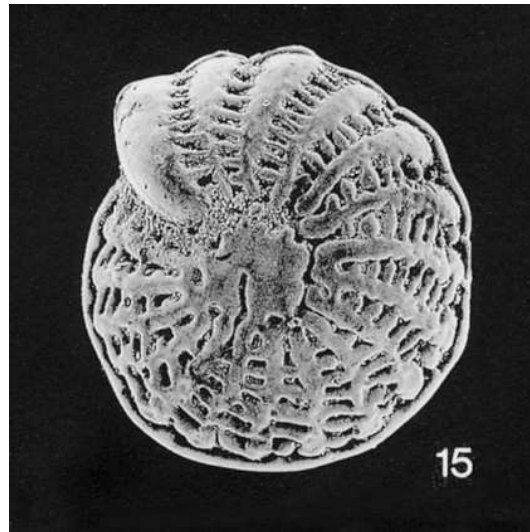
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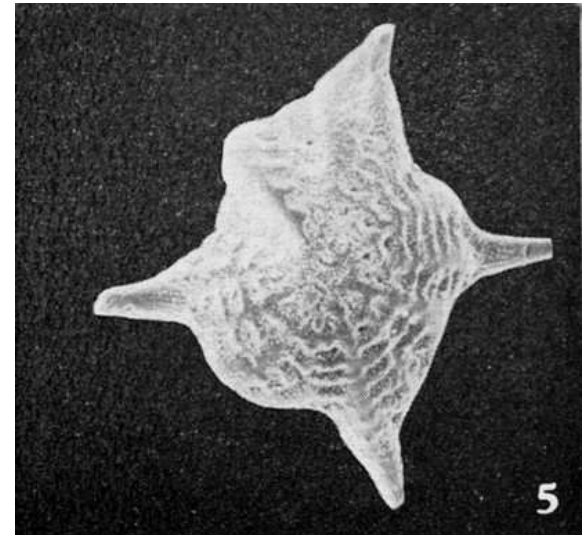
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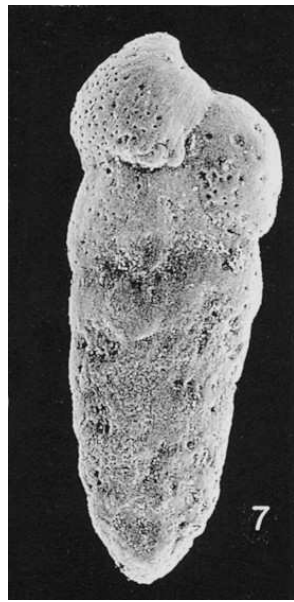
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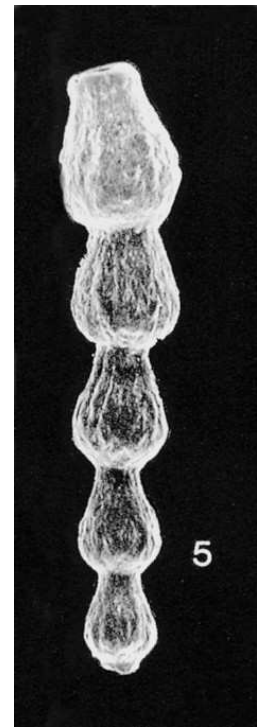
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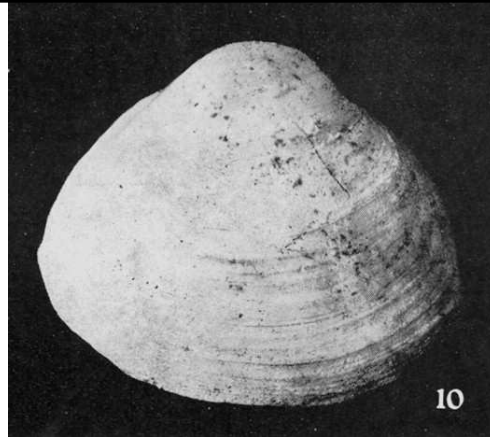
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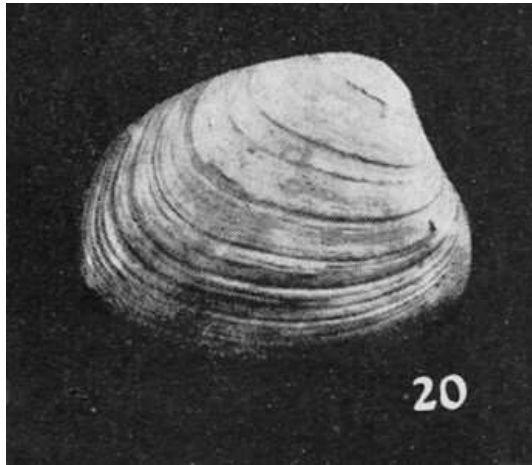
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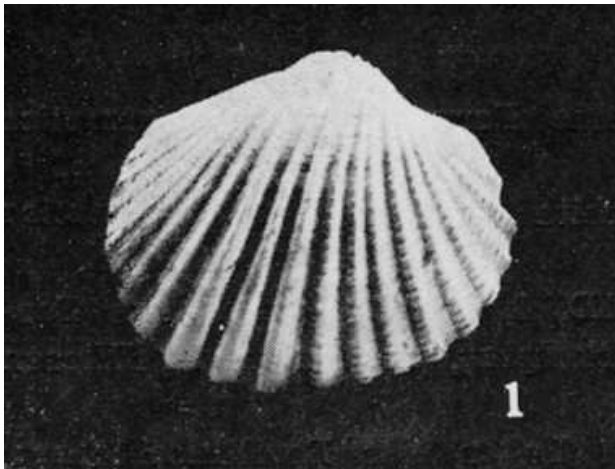
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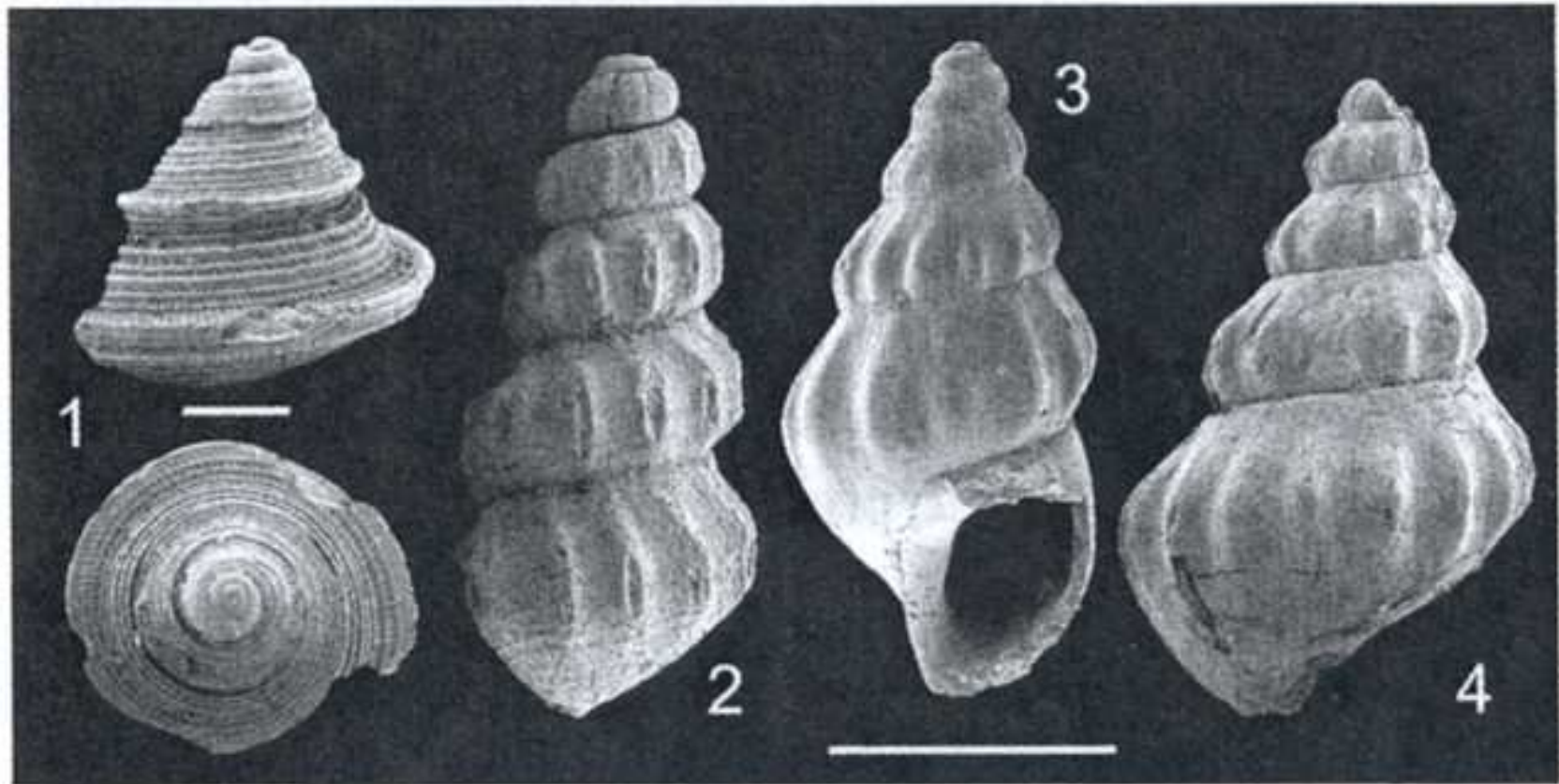


Fig. 10: Gastropods from the section Klapping which are restricted to the Lower Sarmatian *Mohrensternia* Zone. 1: *Calliostoma marginatum* (EICHWALD), 2: *Mohrensternia pseudoangulata* HILBER, 3: *Rissoe turricula* (EICHWALD), 4: *Mohrensternia sarmatica* (FRIEDBERG) (scale bar: 1 mm).

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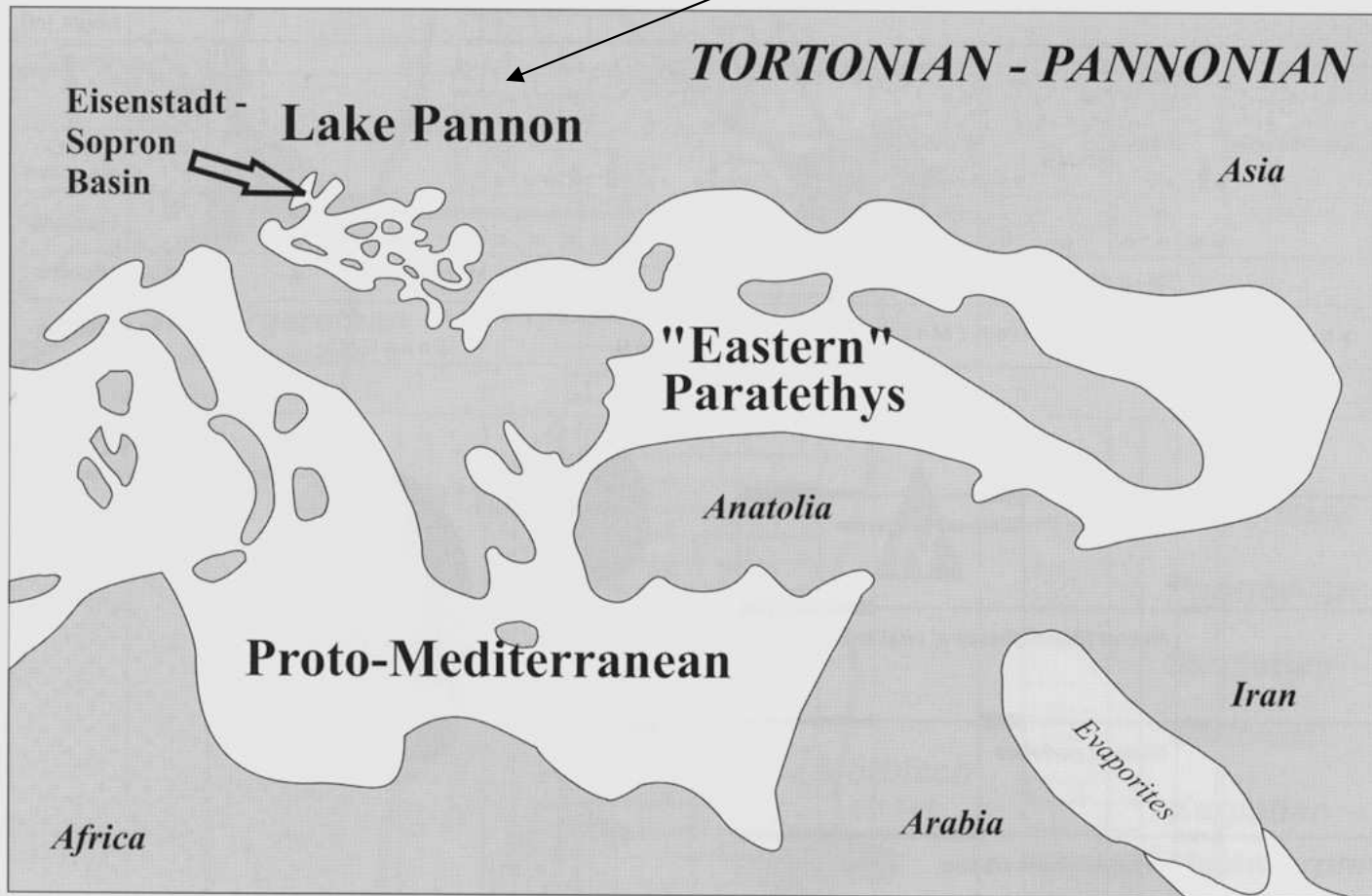


Fig. 4: Paleogeography of Lake Pannon, the Eastern Paratethys, and the Proto-Mediterranean during the Pannonian (after RÖGL, 1999)

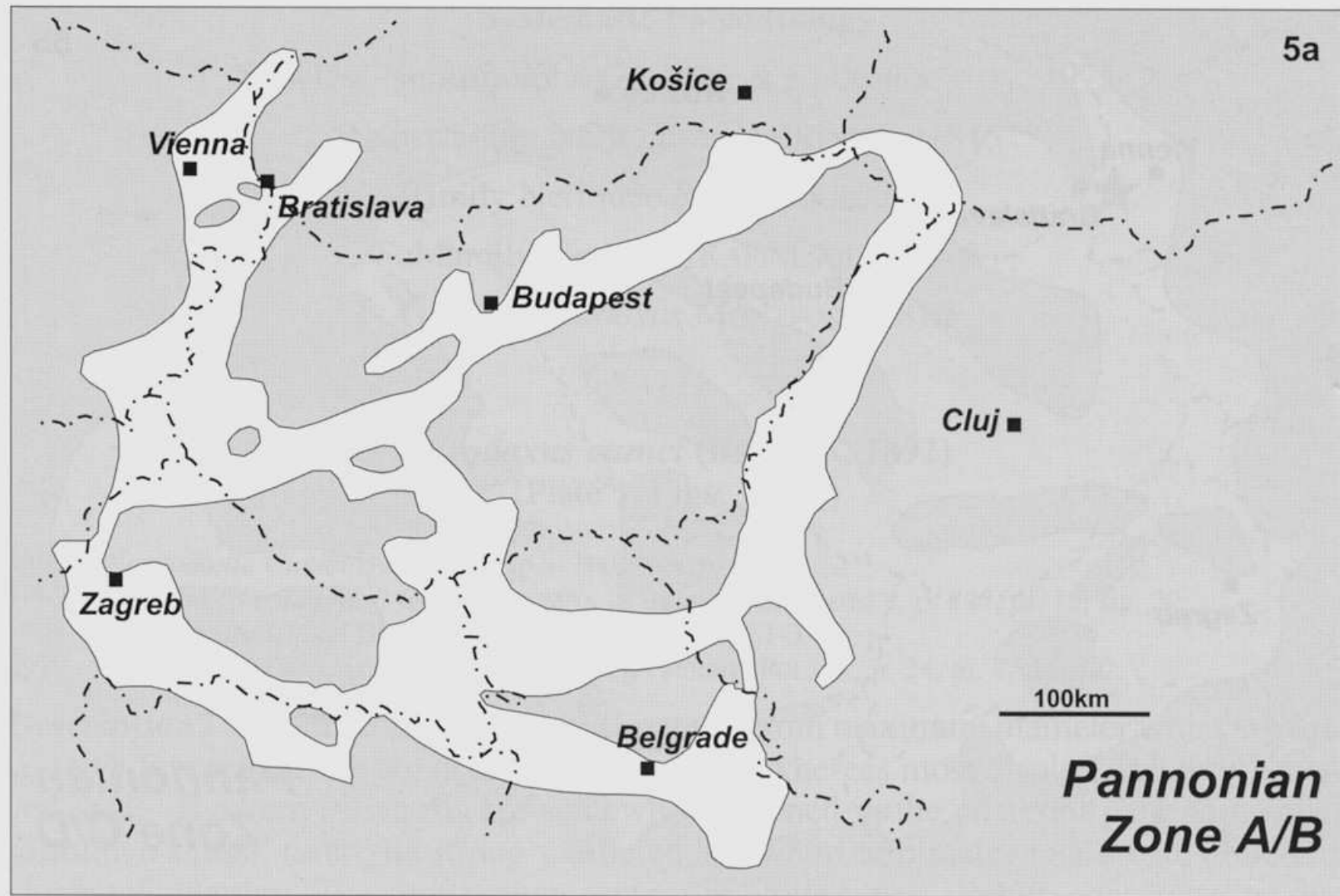
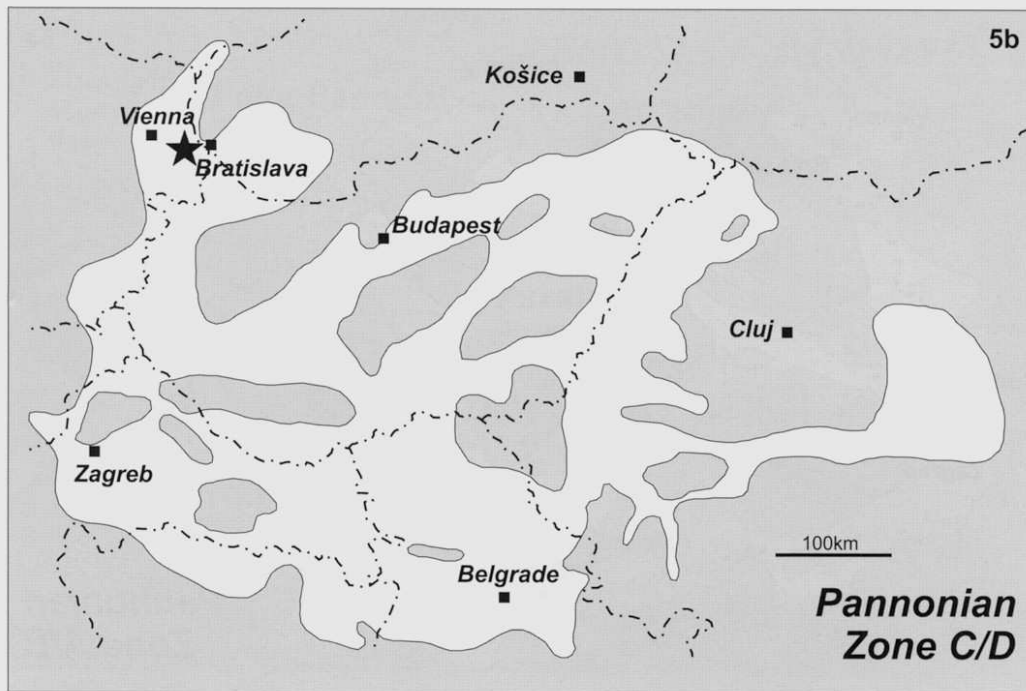
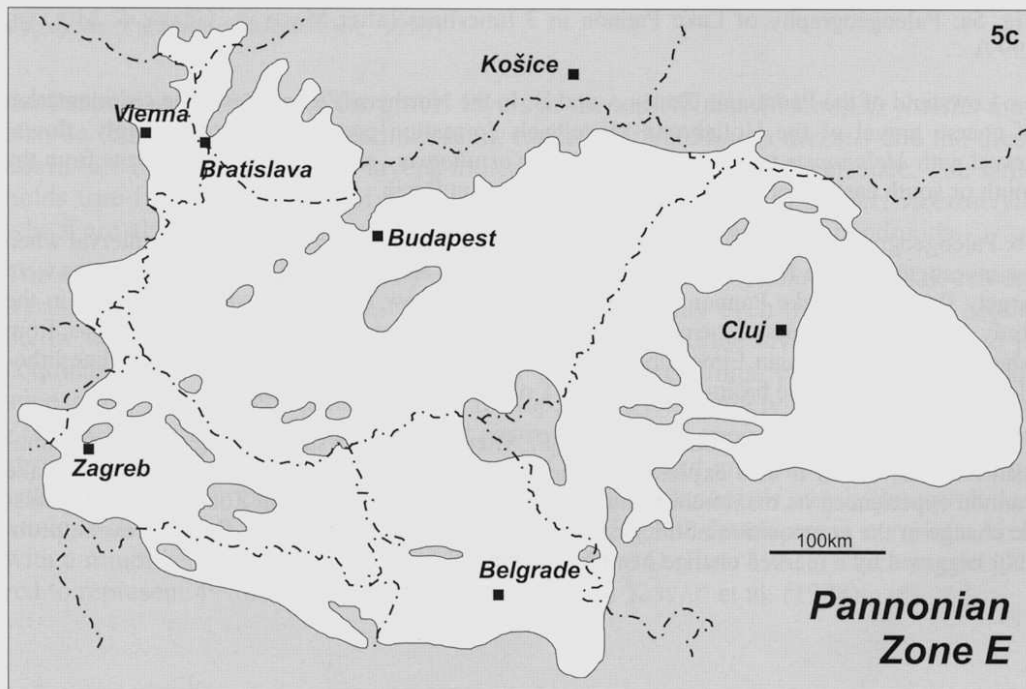


Fig. 5a: Paleogeography of Lake Pannon in 3 timeslices (after MAGYAR, GEARY & MÜLLER, 1999)

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Fig. 5b-c (continued): Paleogeography of Lake Pannon in 3 timeslices (after MAGYAR, GEARY & MÜLLER, 1999)

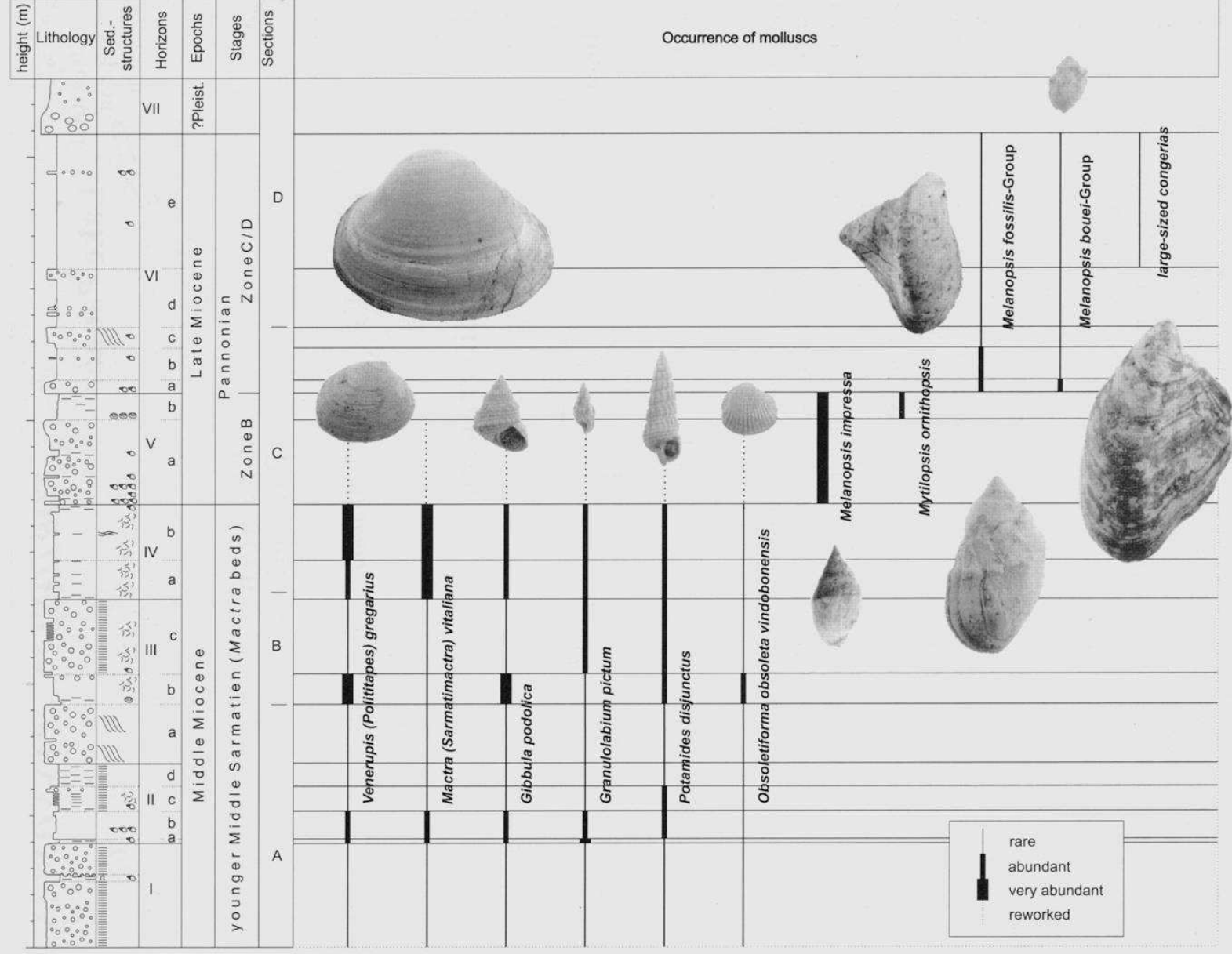
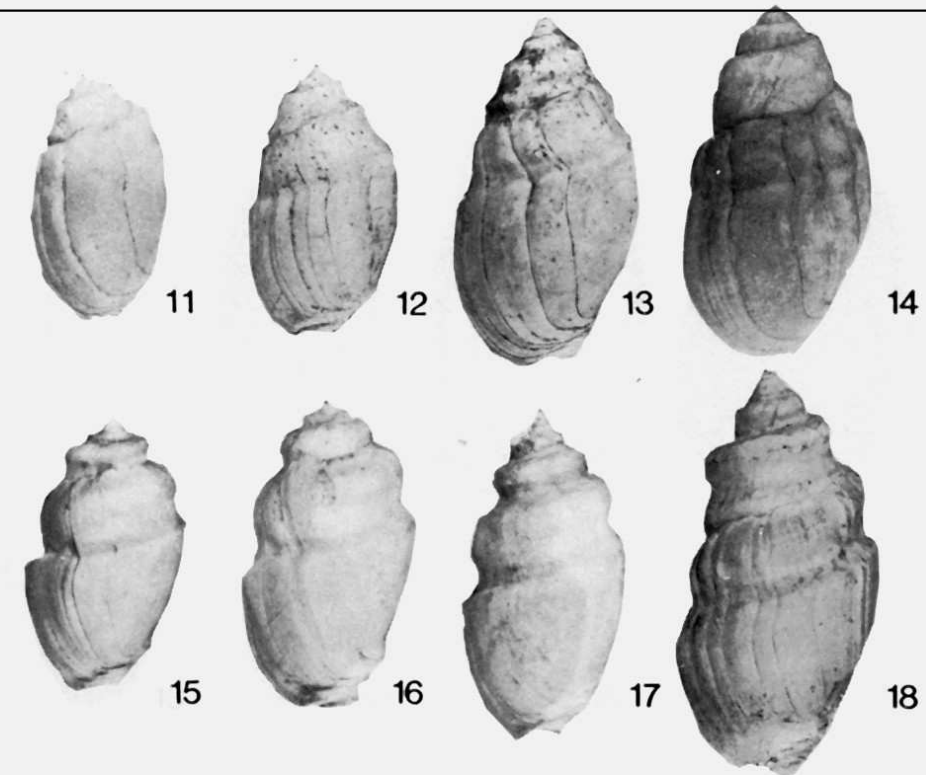
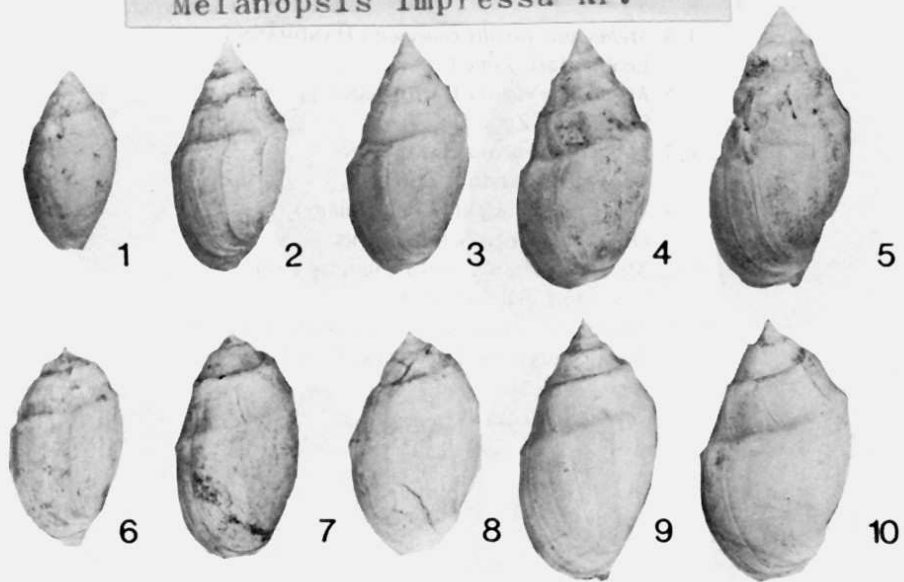


Fig. 3: Idealised log of the section with correlation of biozones.

Towards the top of the succession, only scattered layers (1-4 cm thickness) of fine gravel can be detected which are enriched in shells of various melanopsid species. Rare lithoclasts of Late Sarmatian marl are bound either to the high energetic, basal marls of

Melanopsis impressa Kr.

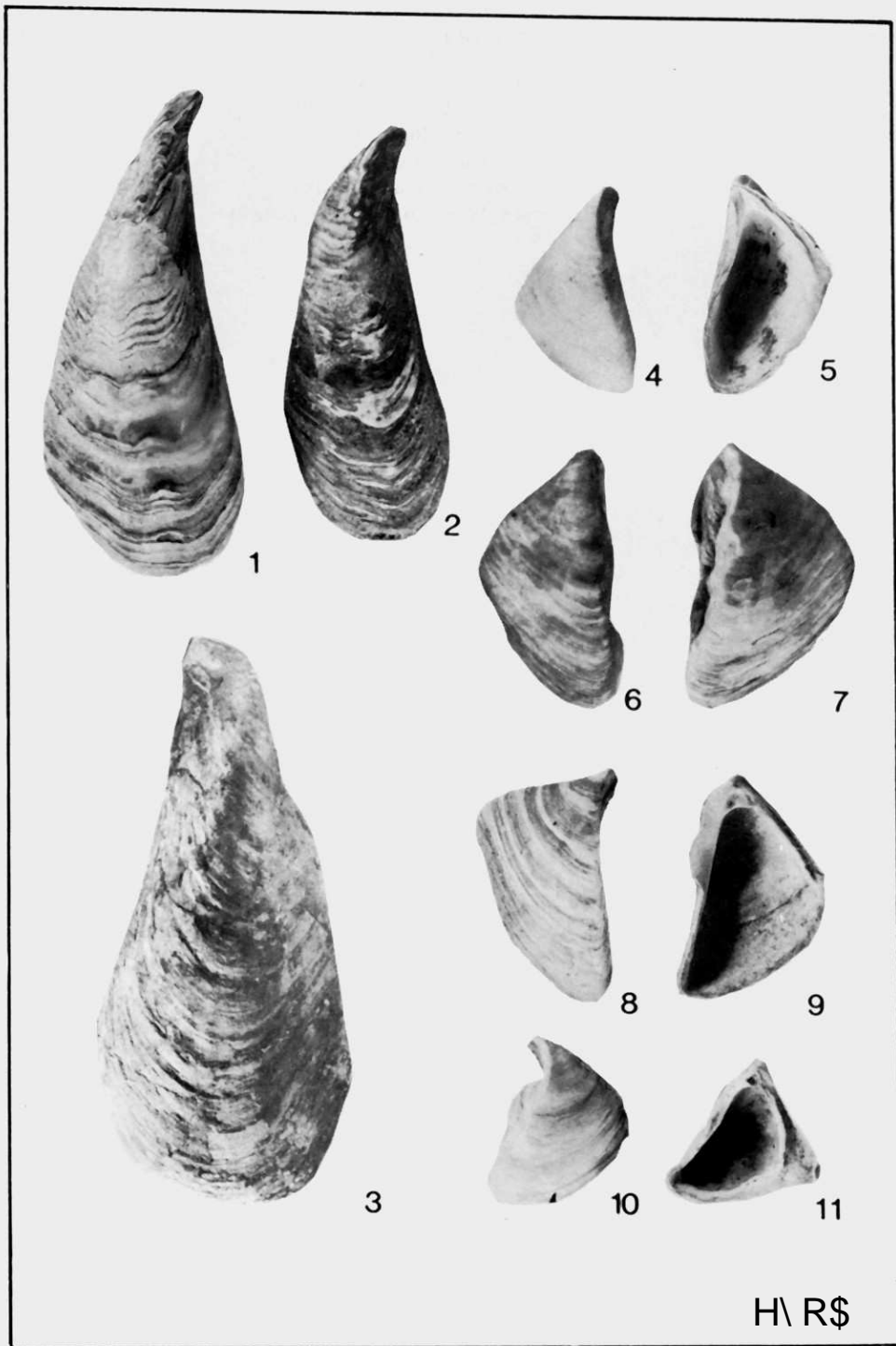


Melanopsis fossilis (M.-Gm.)

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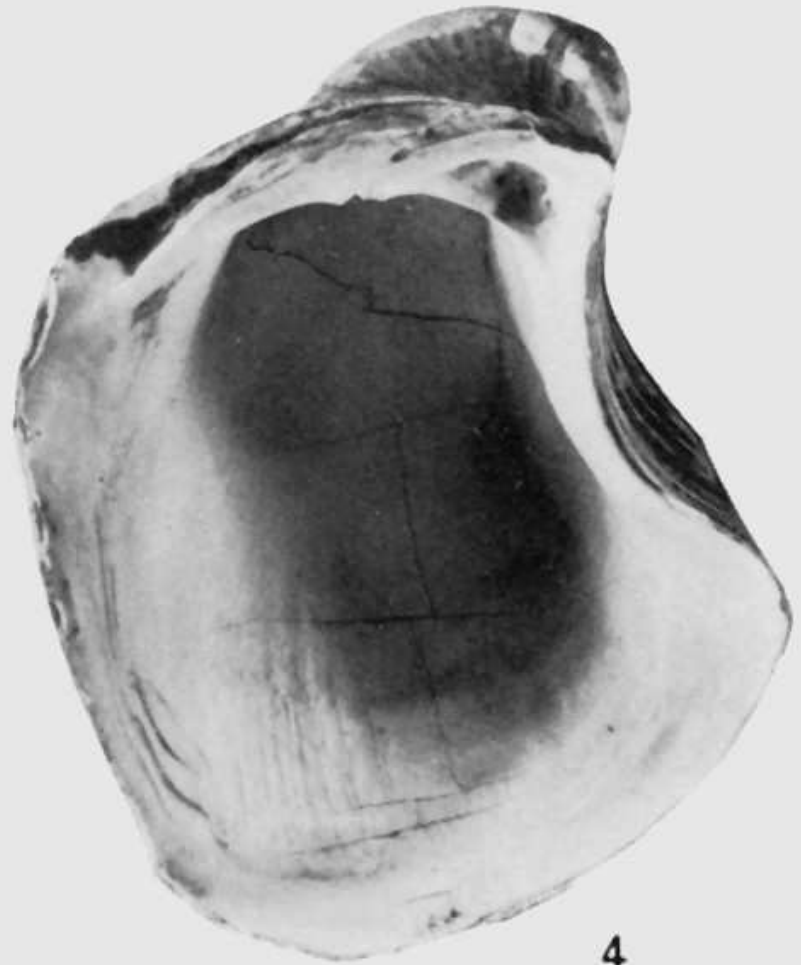
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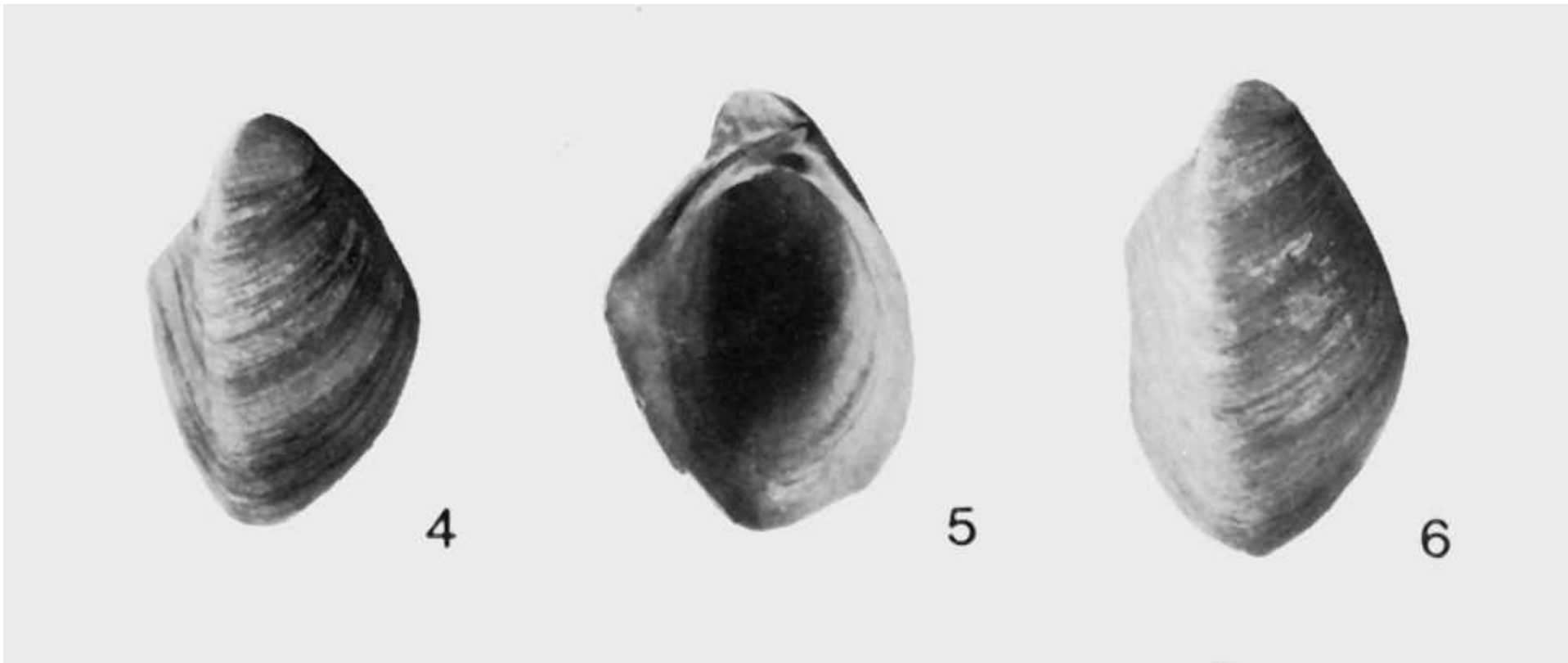
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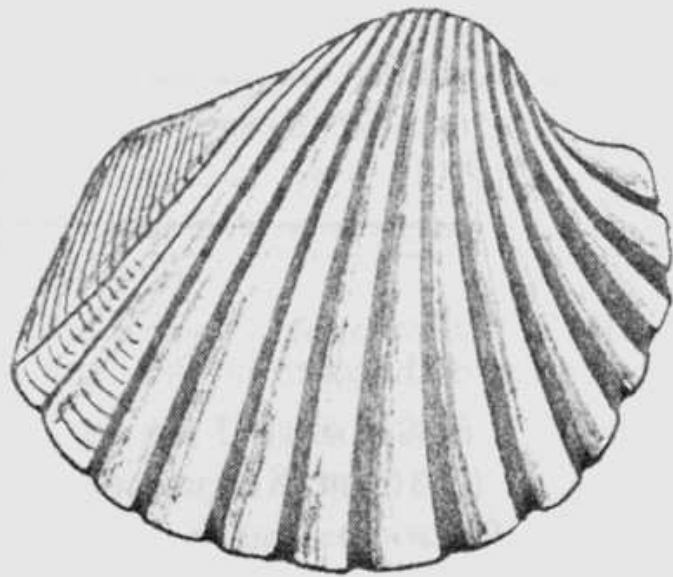
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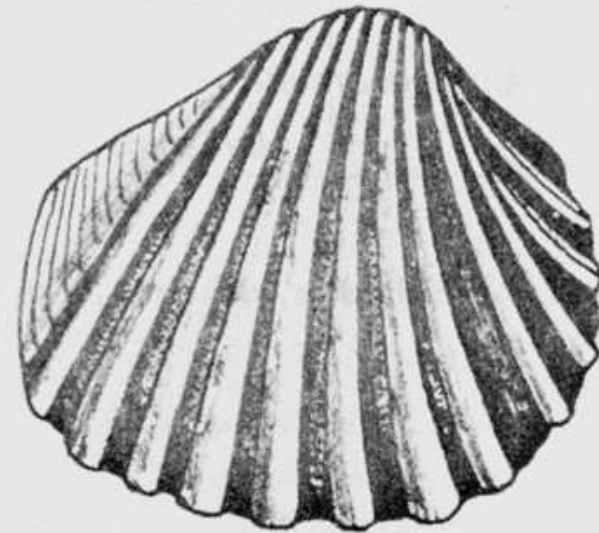
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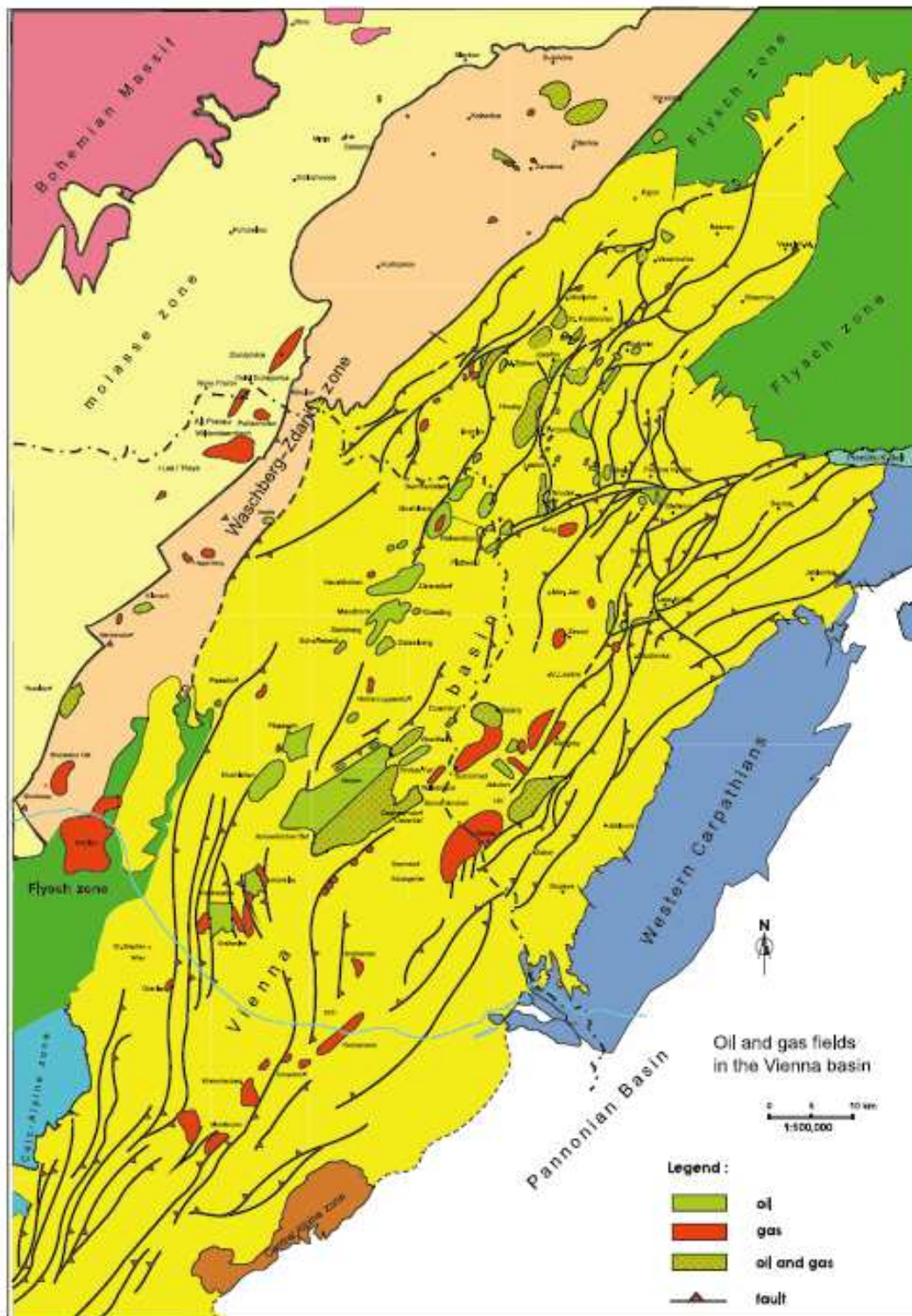
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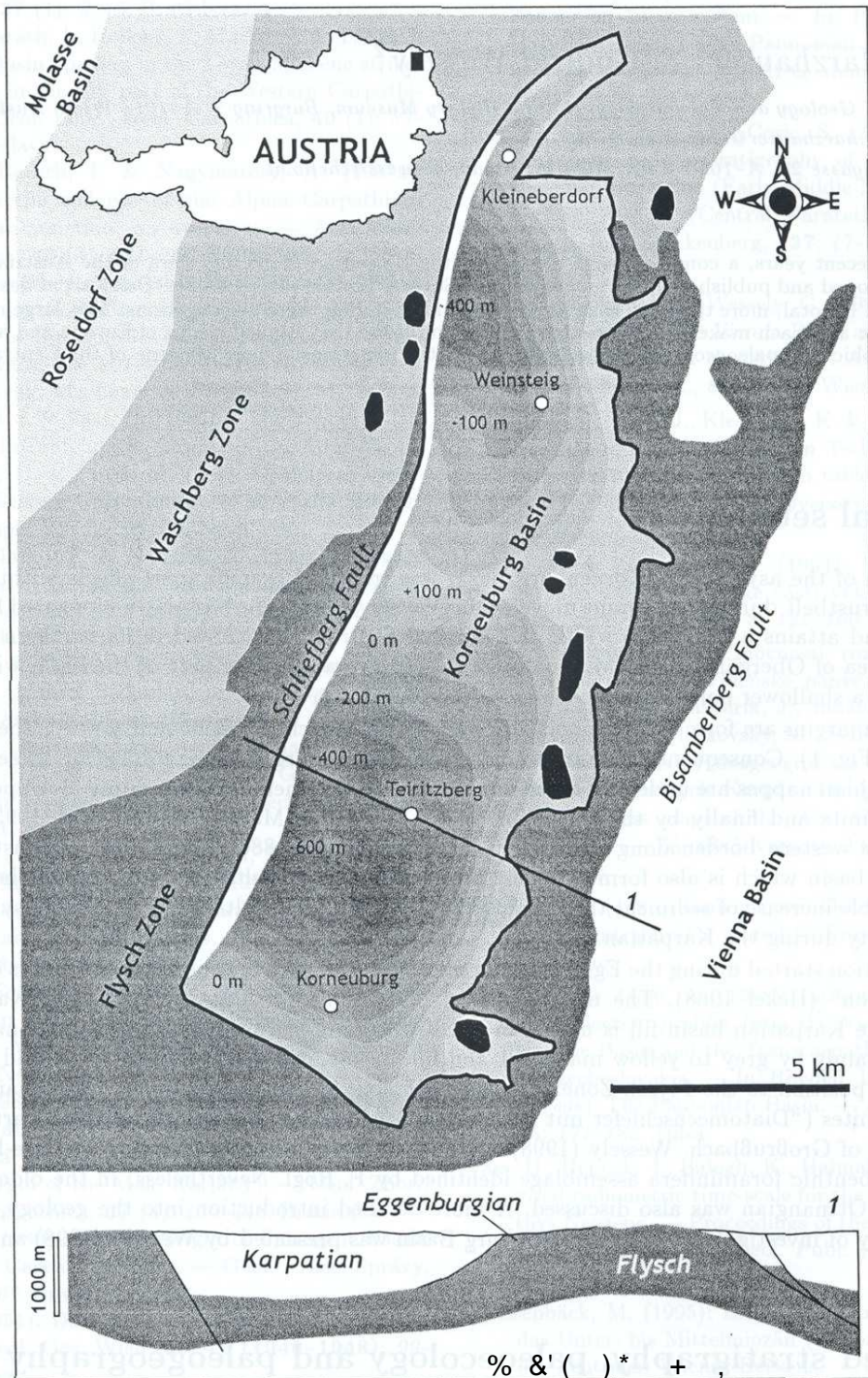
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Figure 6. Oil and gas fields in the Vienna basin.



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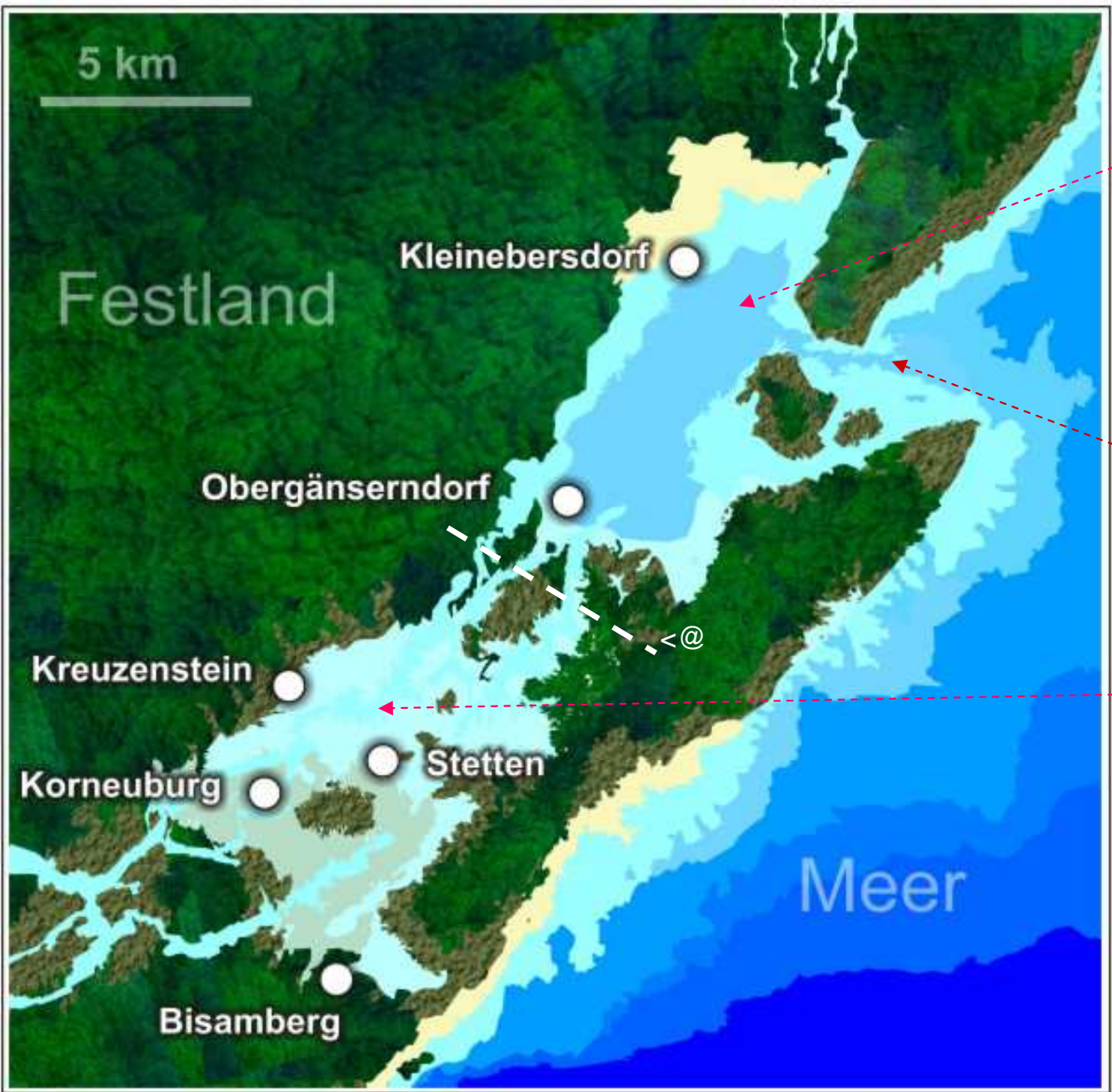
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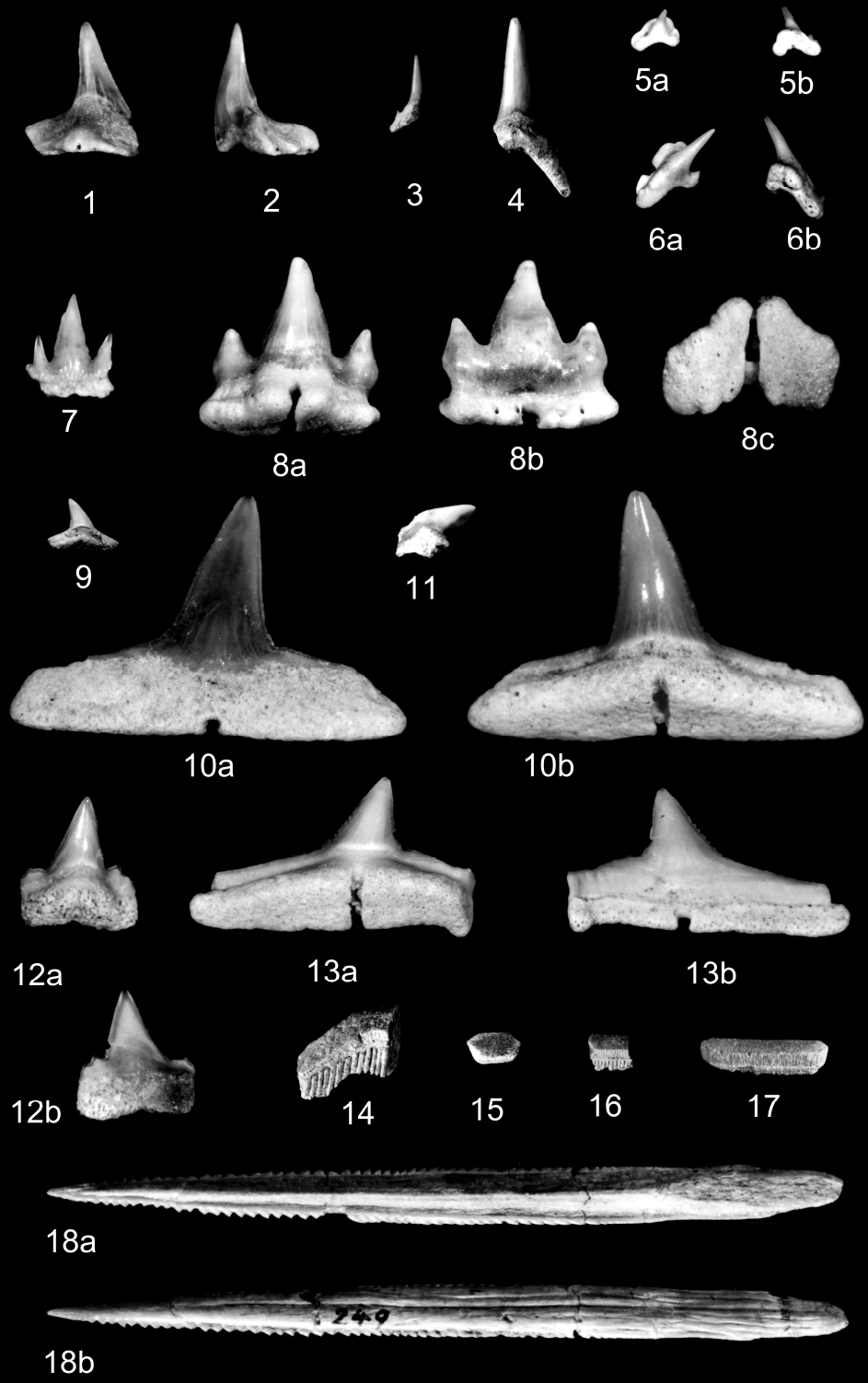
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Ogilbia sovisi Reichenbacher, 1998



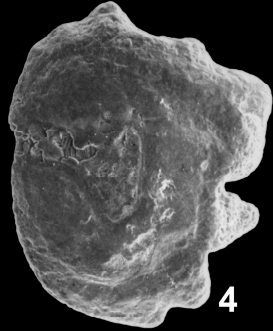
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Batrichthys steiningeri
Reichenbacher, 1998



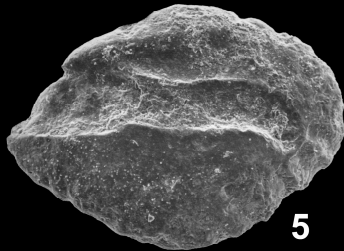
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Atherina austriaca
Schubert, 1906



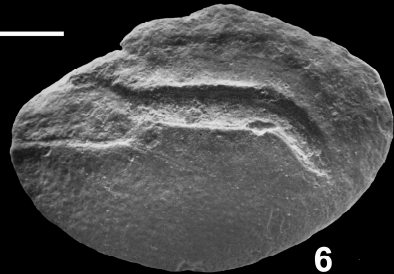
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Paraplagusia roseni
Nolf & Cappetta, 1980



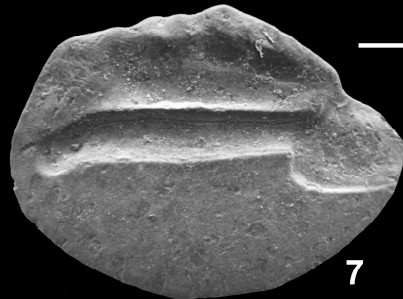
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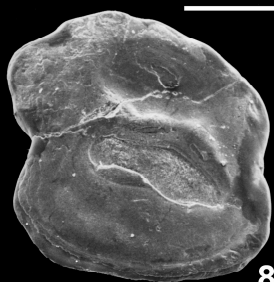
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Pomadasys arcuatus
(Bassoli & Schubert, 1906)



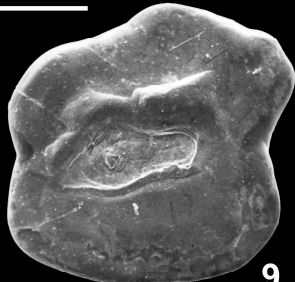
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Brachydeuterus latior (Schubert, 1906)



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Lesueurigobius vicinalis (Koken, 1891)



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Gobius multipinnatus
(H. v. Meyer, 1852)

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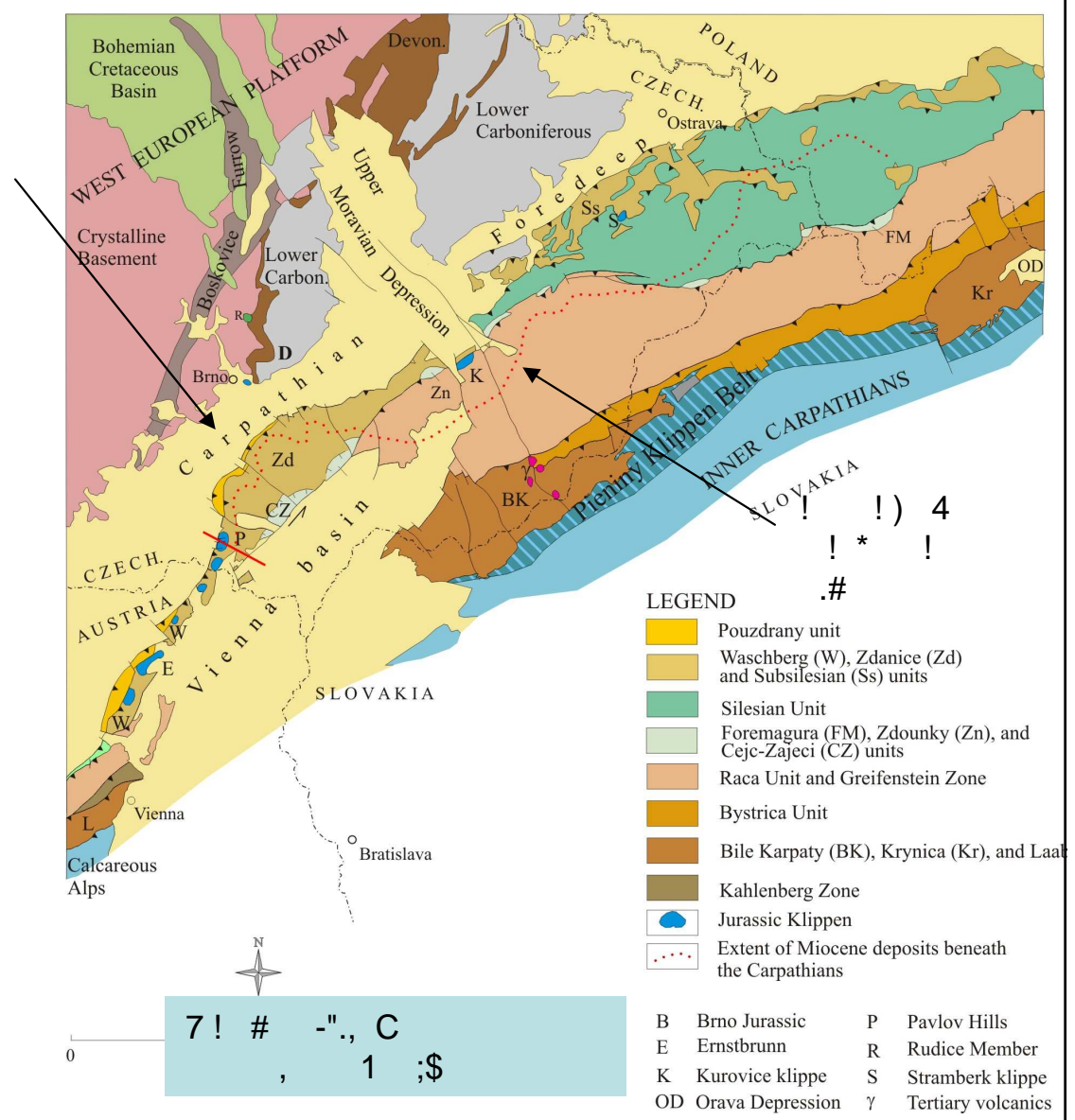
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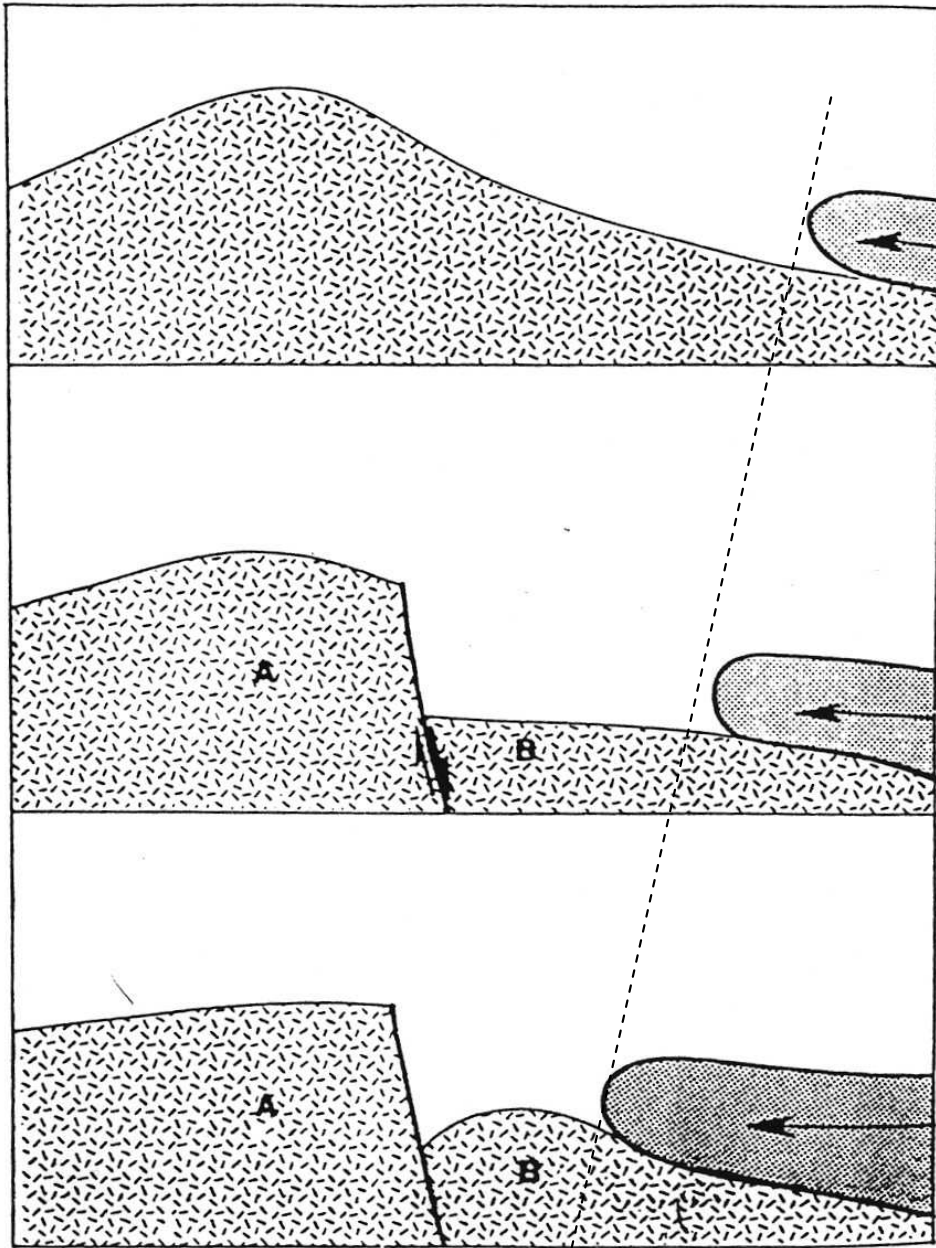
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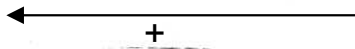


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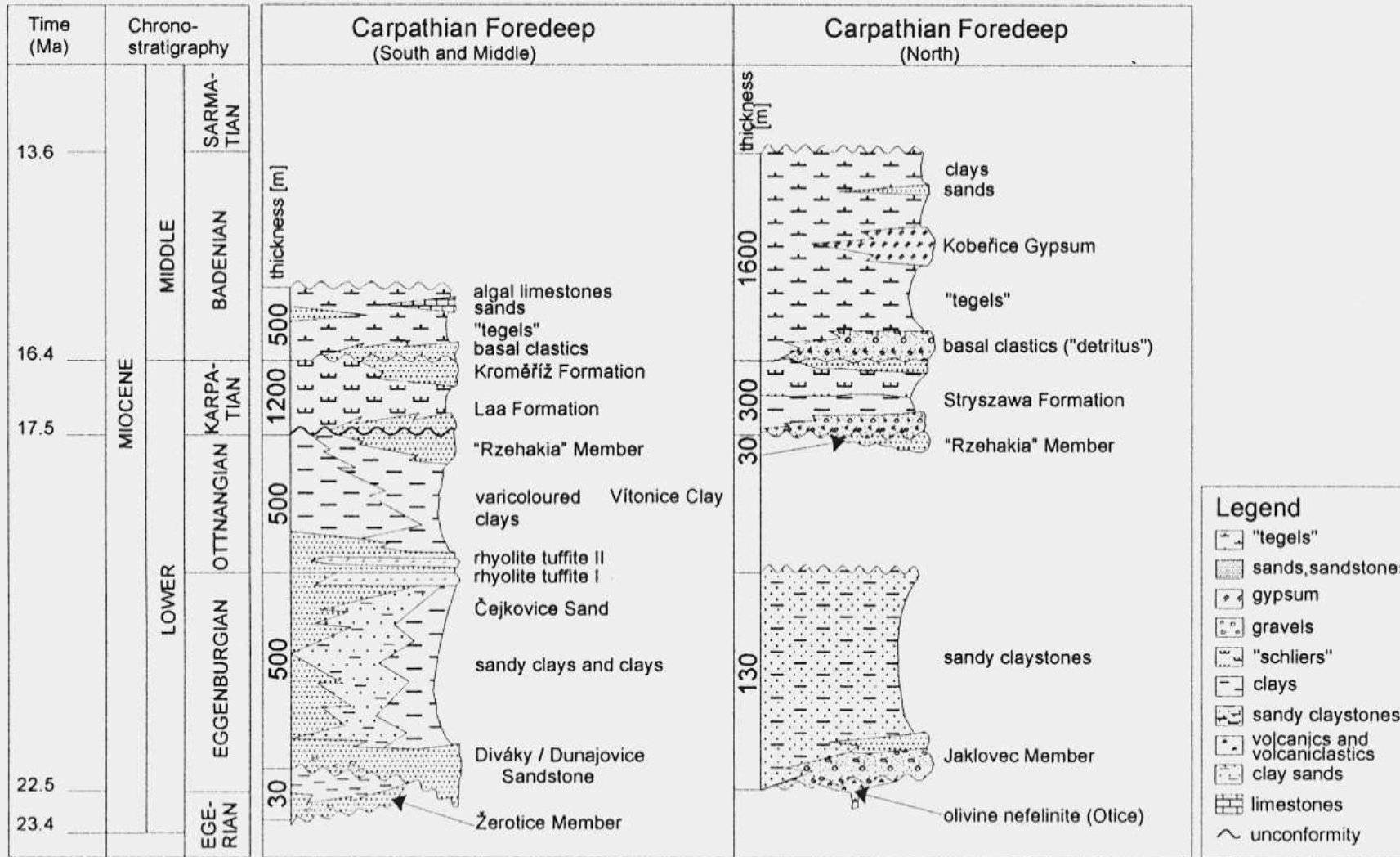
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Figure 21 Conceptual model for the development of flexure in separate fault blocks. Detailed description given in text.



Stratigraphic scheme of the Miocene of the Carpathian Foredeep in Moravia

(modified after Brzobohatý in Chlupáč et al. 2002, Adámek et al. 2003 and Adámek 2003)



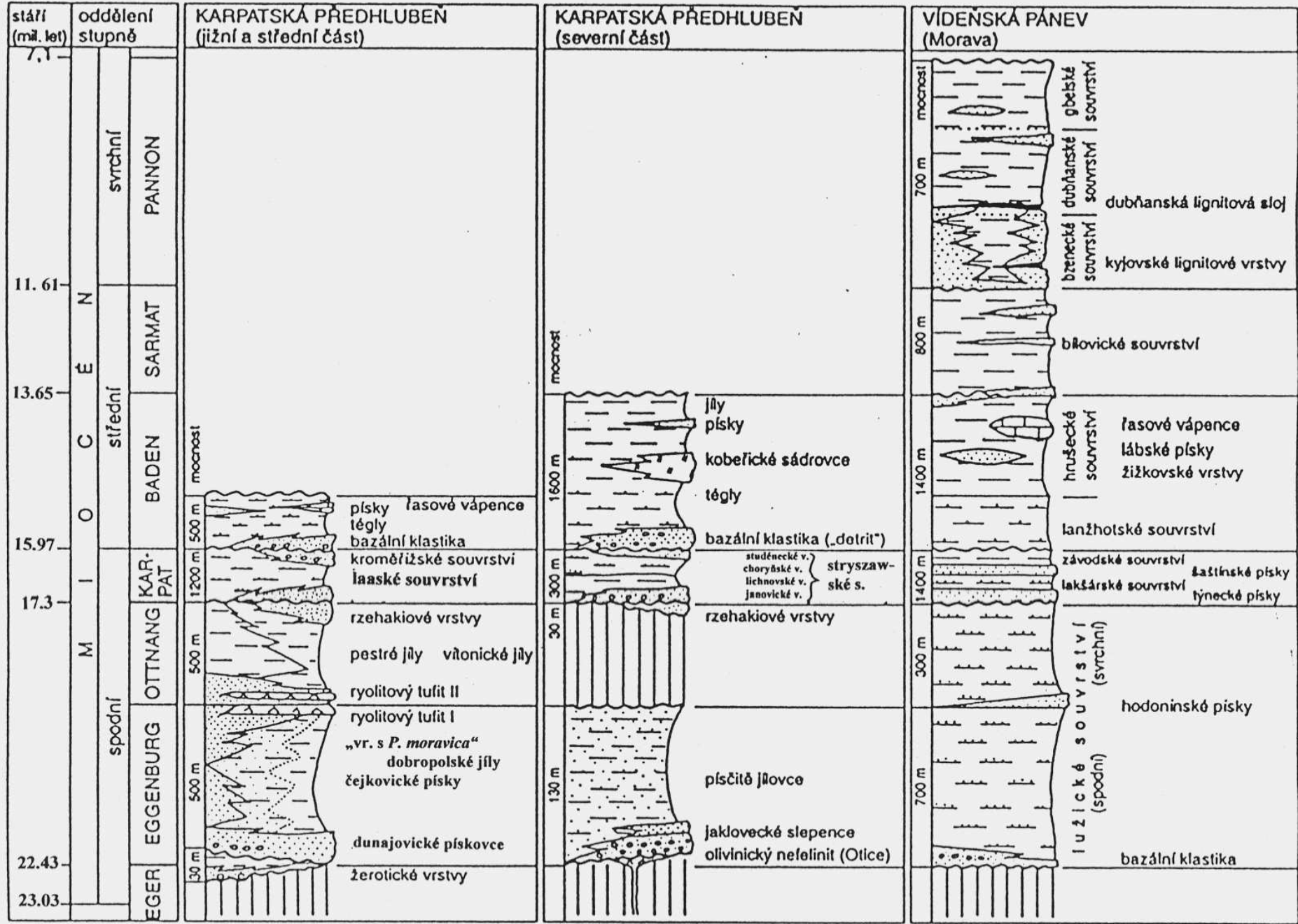
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Obr. 247. Stratigrafické schéma neogénu karpatské předhlubně a vídeňské pánve na Moravě (R. Brzobohatý, orig.).



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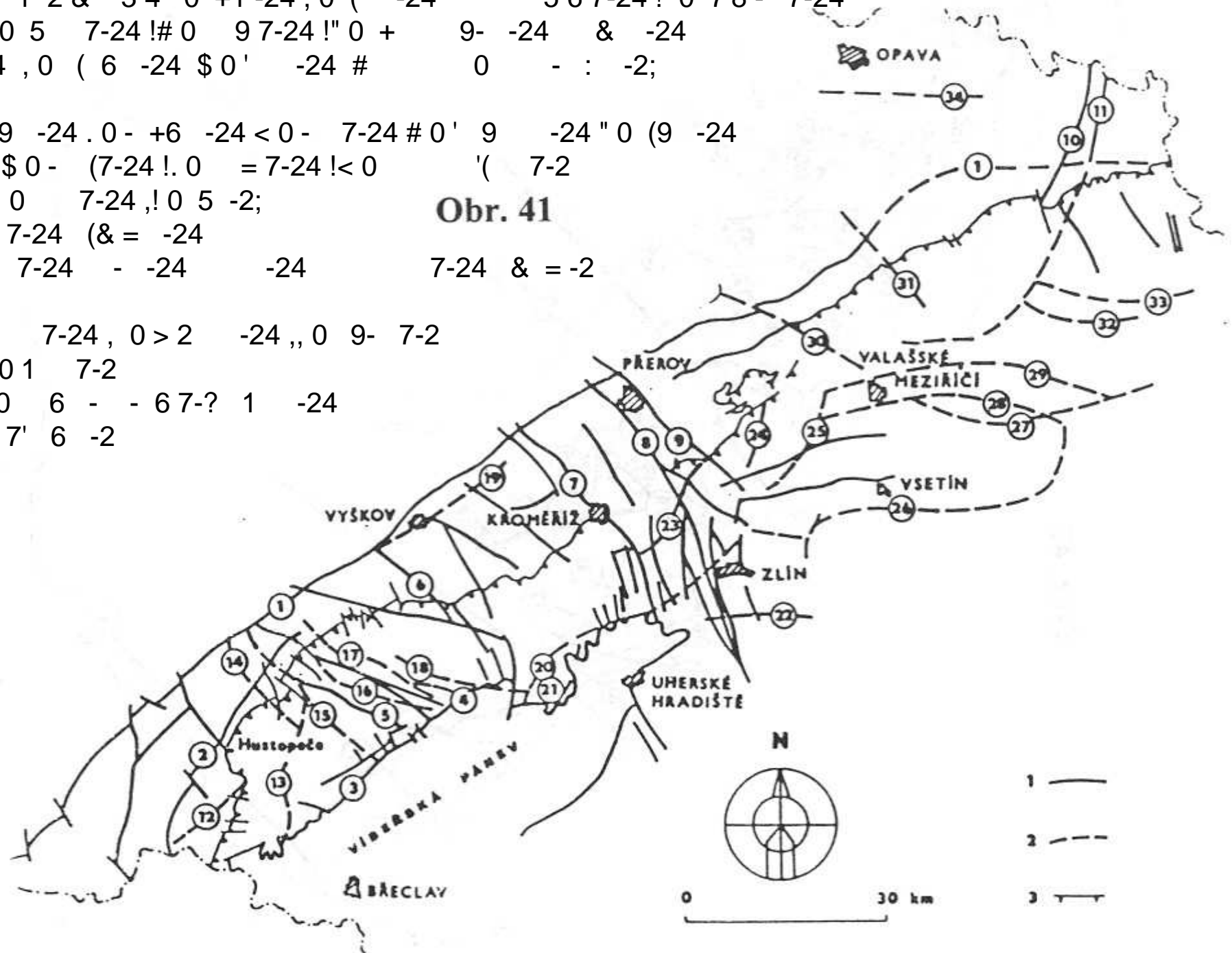
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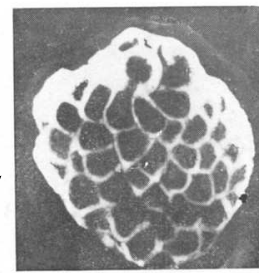
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78 RICH ET AL.

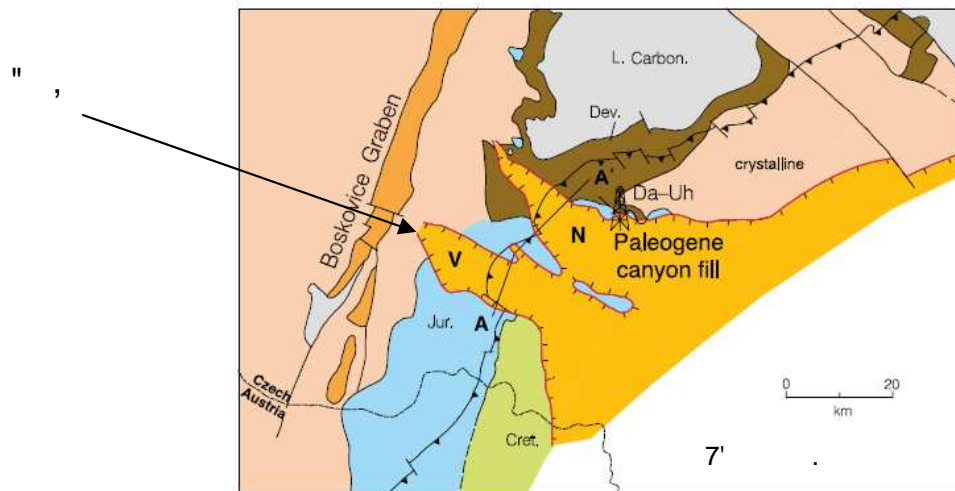


Figure 12. Pre-Neogene subcrop map showing the Nesvacilka (N) and Vranovice (V) paleovalleys cut into the European foreland plate, filled with Paleogene deposits, and later buried below the edges of the Western Carpathian thrust belt and the Neogene foredeep. Da-Uh marks the location of the Damborice and Uhrice oil and gas fields, respectively (Picha, 1996). Cross section of AA' shown in Figure 13.

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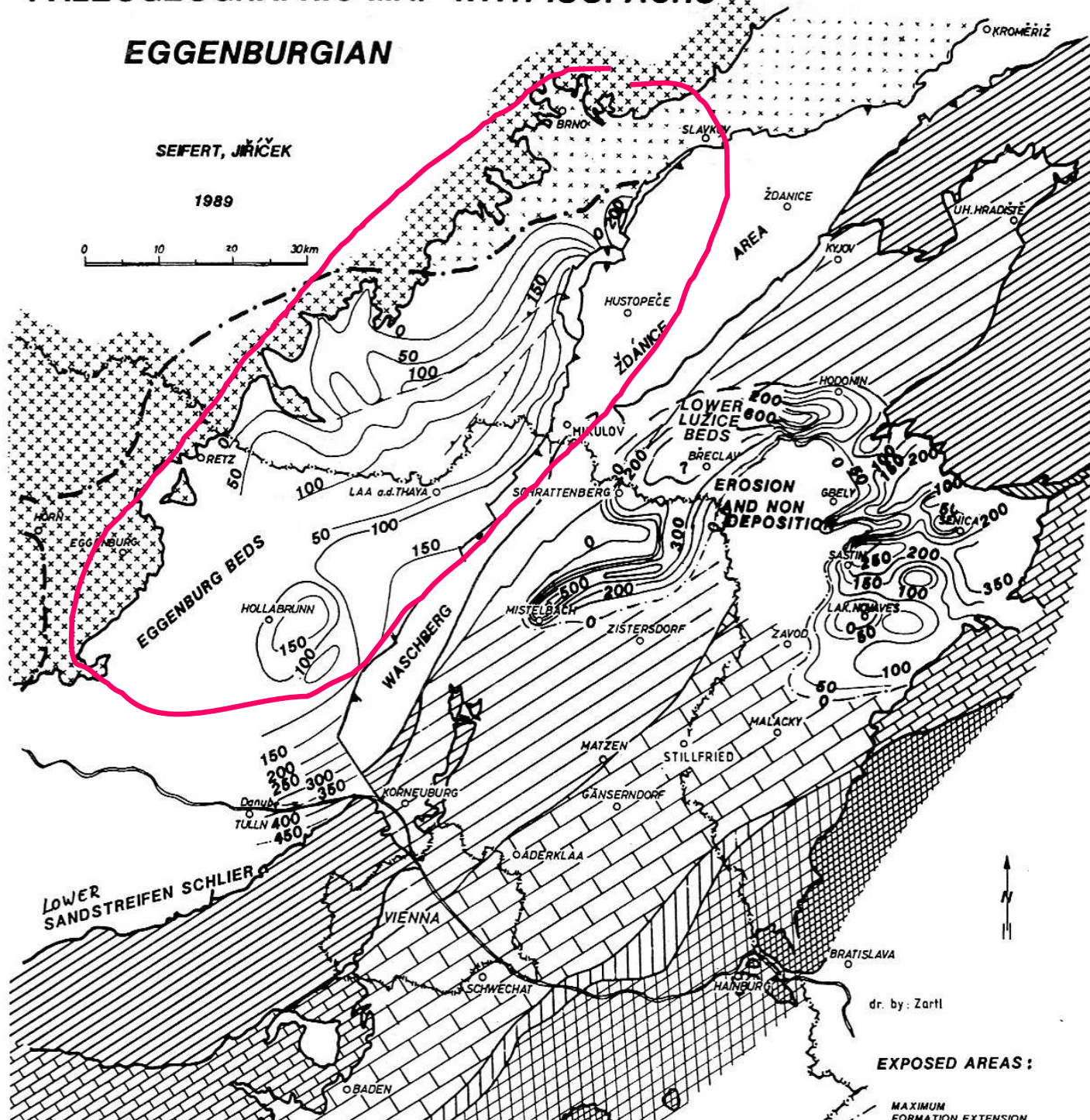
VIENNA BASIN AND MOLASSE FOREDEEP PALEOGEOGRAPHIC MAP WITH ISOPACHS

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SEIFERT, JŘIČEK

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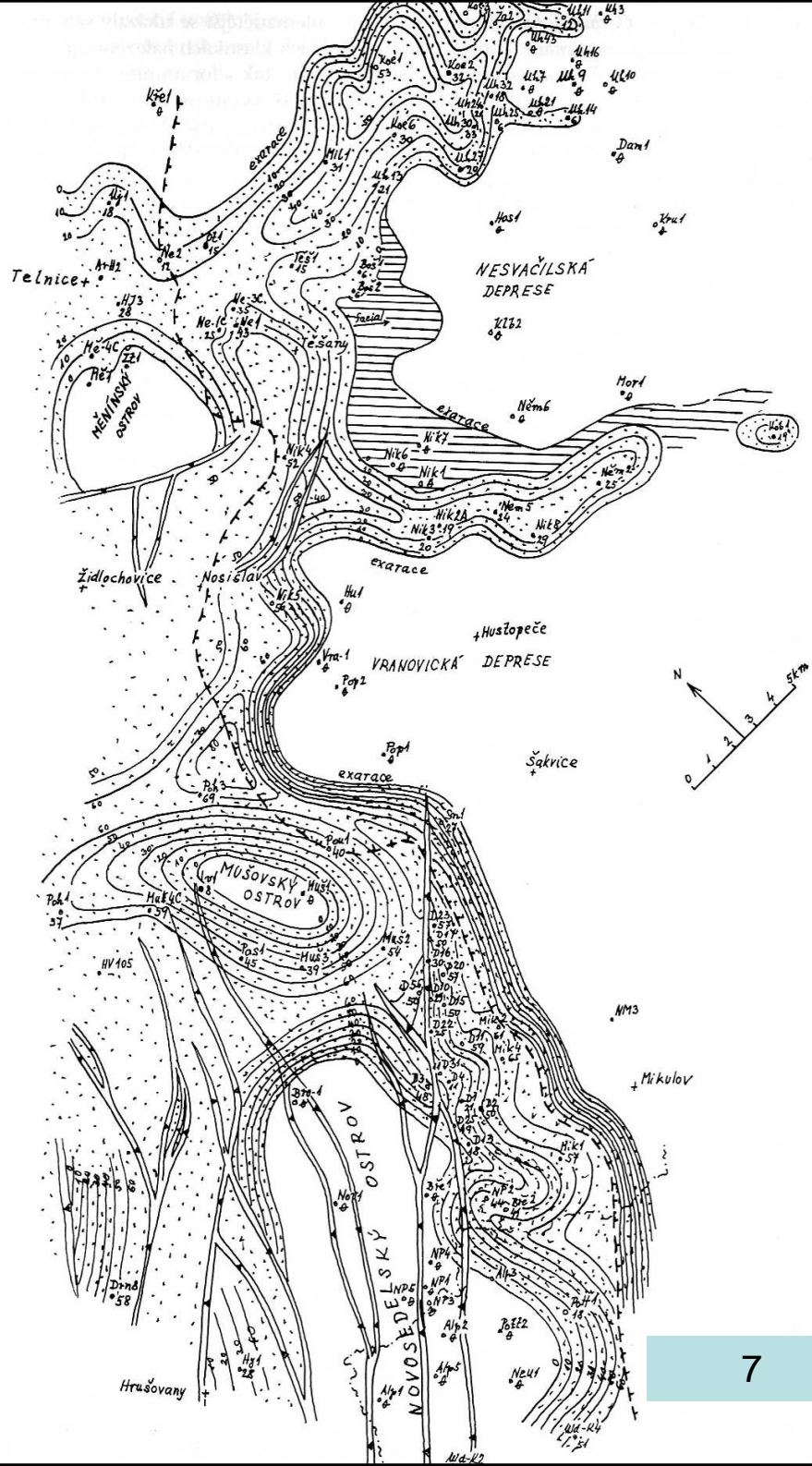


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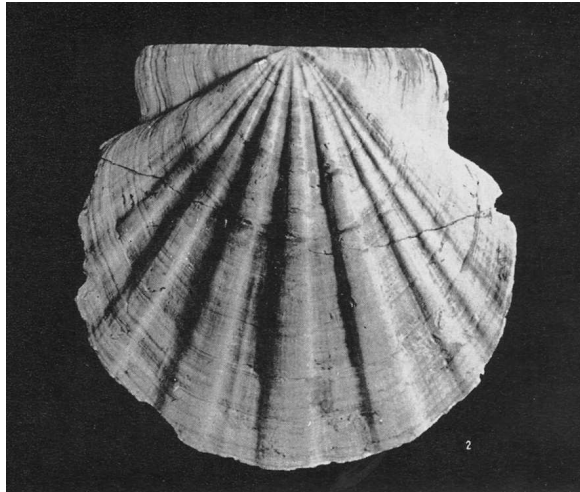
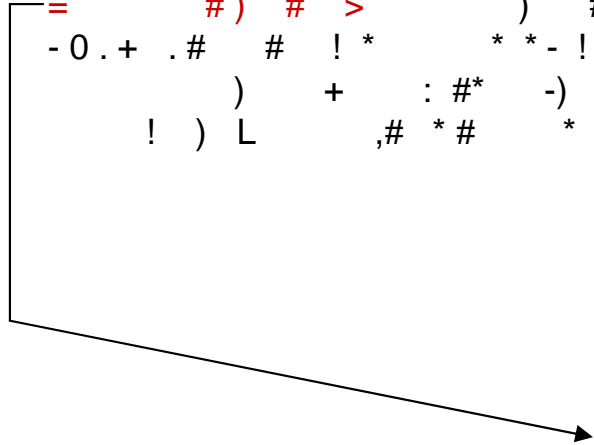
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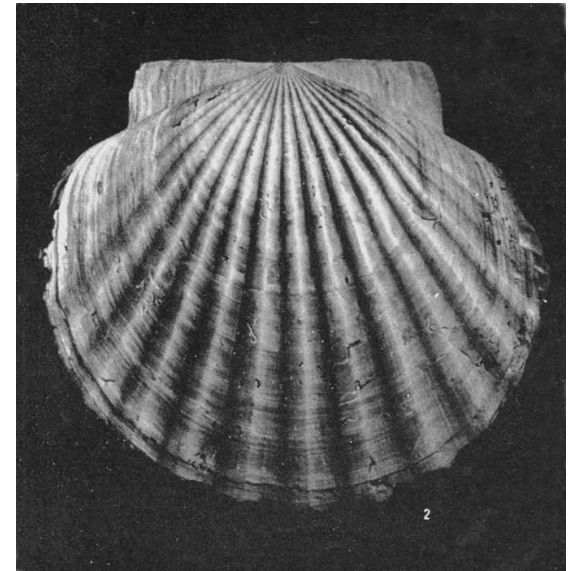


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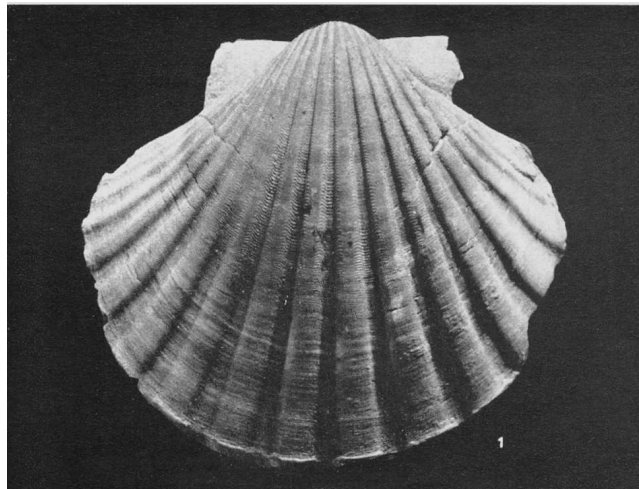
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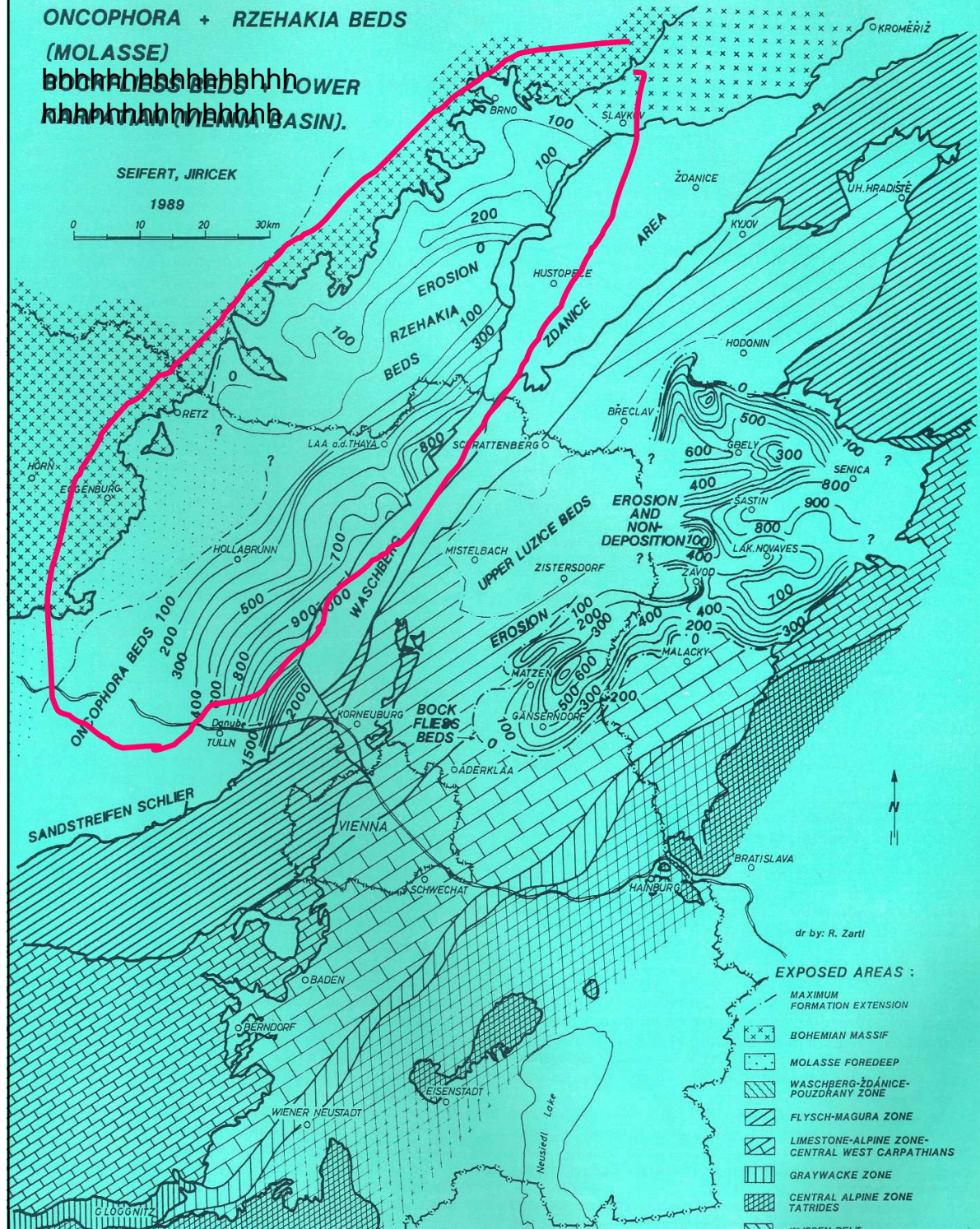


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VIENNA BASIN AND MOLASSE FOREDEEP PALEOGEOGRAPHIC MAP WITH ISOPACHS

ONCOPHORA + RZEHAKIA BEDS

(MOLASSE)
BOCKFLIESS BEDS (LOWER
BASIN).



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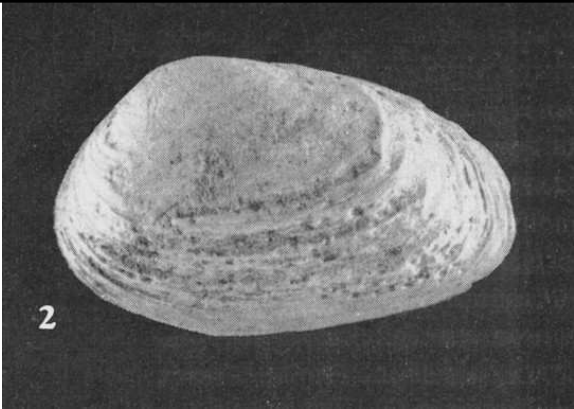
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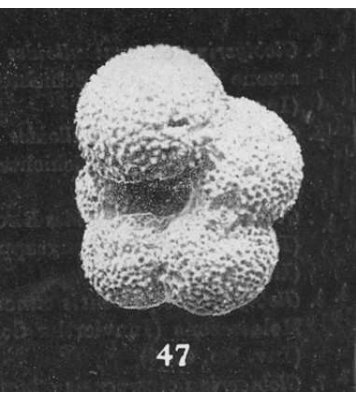
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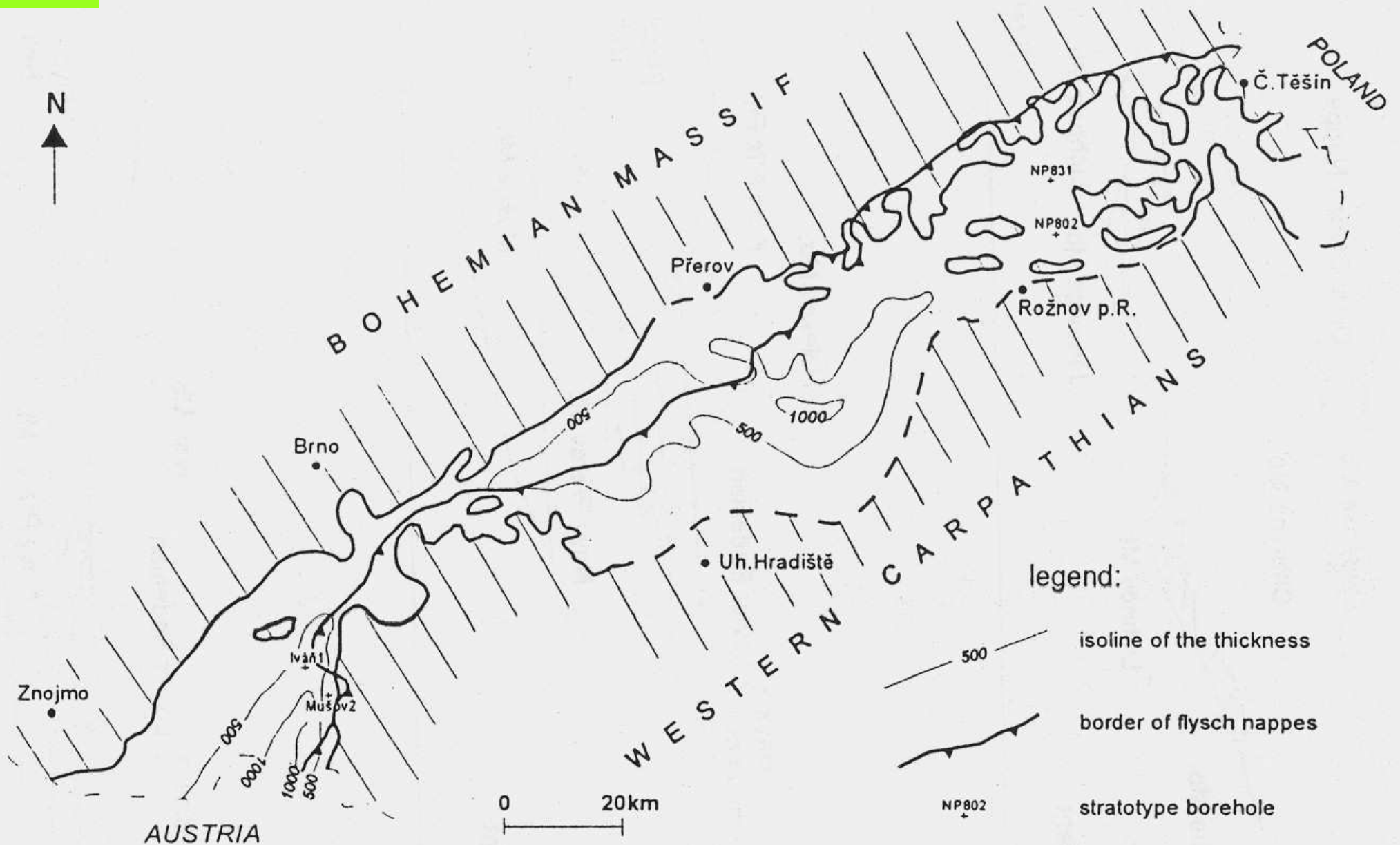
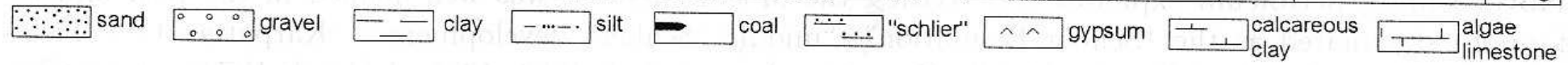
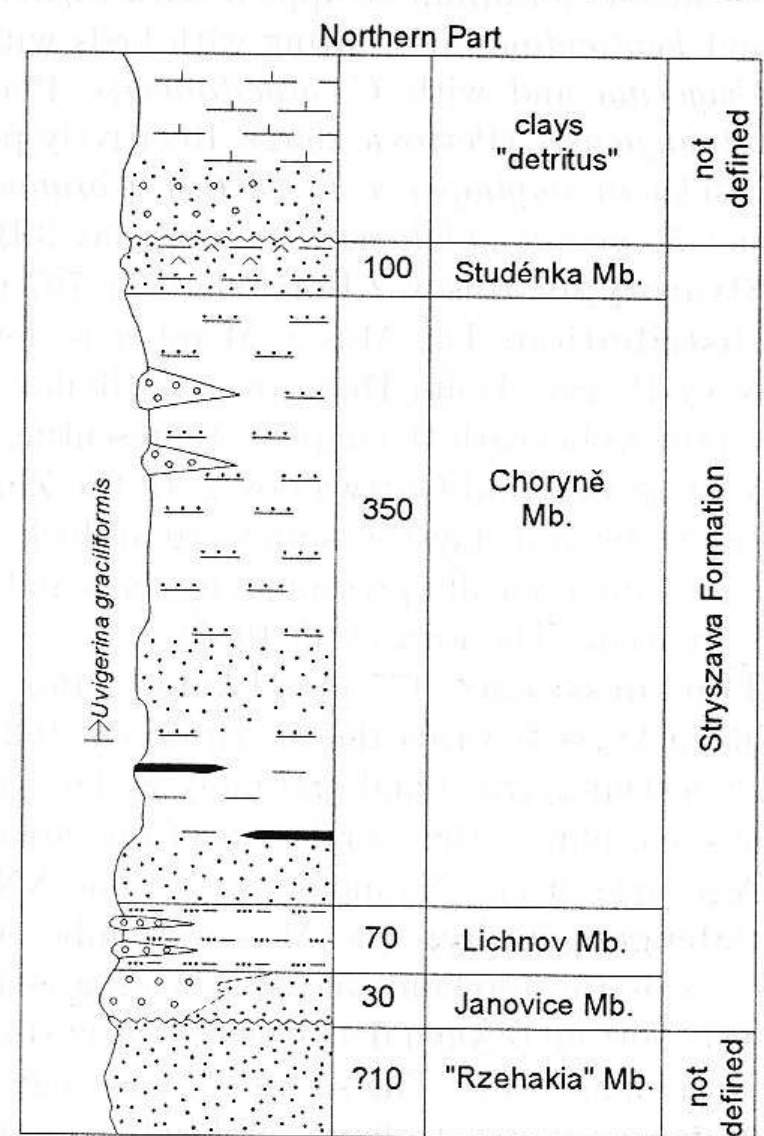
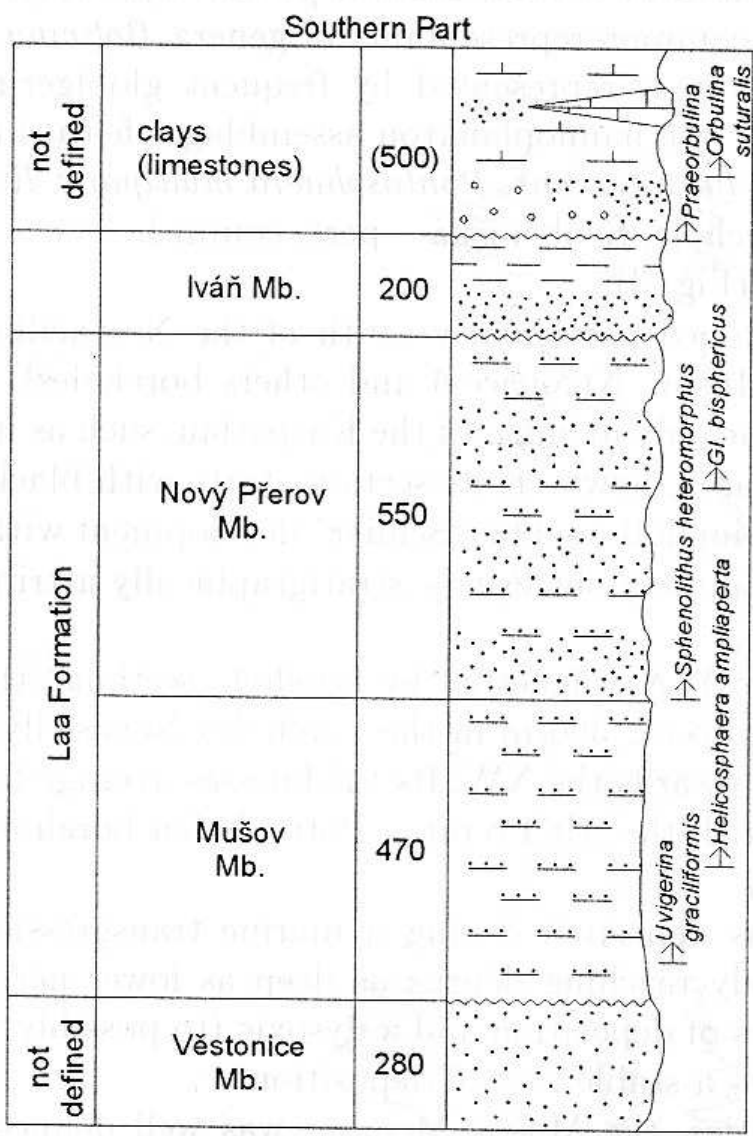


Figure 1: Thickness map of the Karpatian deposits of the Carpathian Foredeep (Moravia).

Time (Ma)	Chronostratigraphy		Biostratigraphy
	Mediterranean	Central Paratethys	
16,4	M. Miocene	Langhian	NN 5
		Lower Badenian	
	Lower Miocene	Burdigalian	NN 4
		Karpatian	
17,5		Ottnangian	

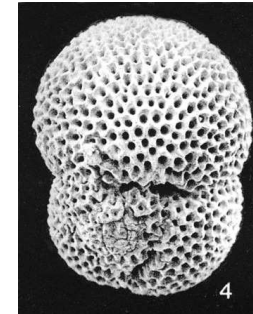
Rögl et al. (2002)

Lithostratigraphy - Lithology						
Formations	Members	Thickness	Lithology and occurrence of the most indicative species	Thickness	Members	Formations



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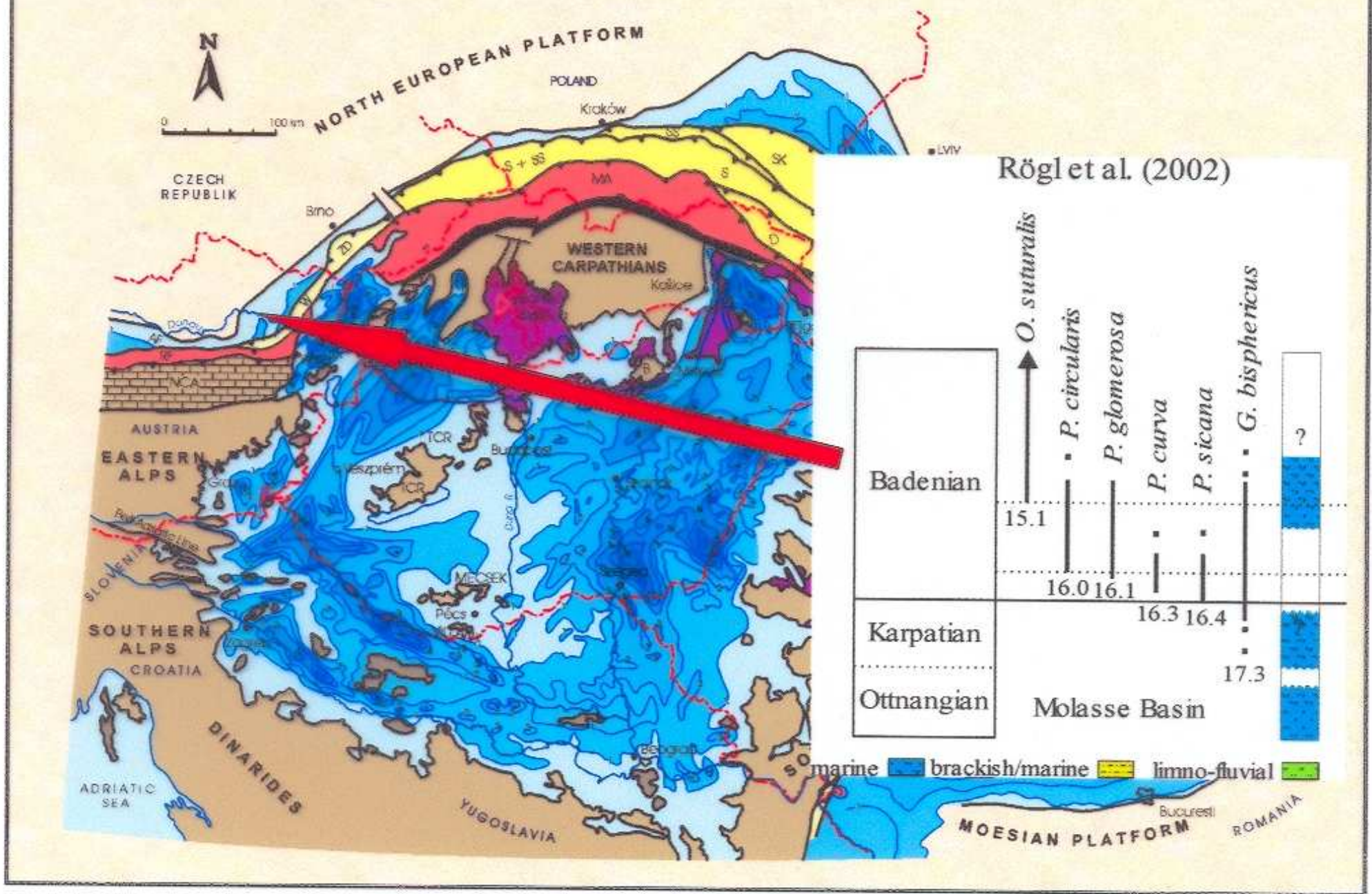


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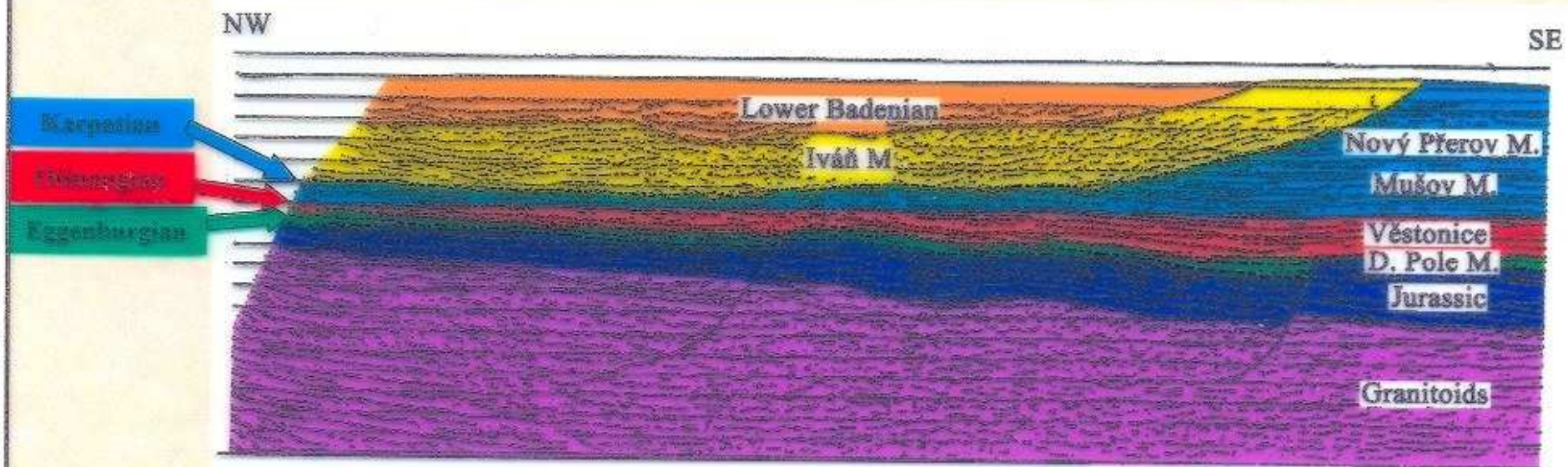
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LOWER AND UPPER BOUNDARY OF THE KARPATIAN AND SEDIMENTATION PROFILES IN SEVERAL BASINS OF THE CENTRAL PARATETHYS



SEISMIC PROFILE 317/84

(CARPATHIAN FOREDEEP, SOUTH MORAVIA)



Seismic profile 317/84 (Carpathian Foredeep, South Moravia: Jiříček 1995, compiled by Adámek 2002)

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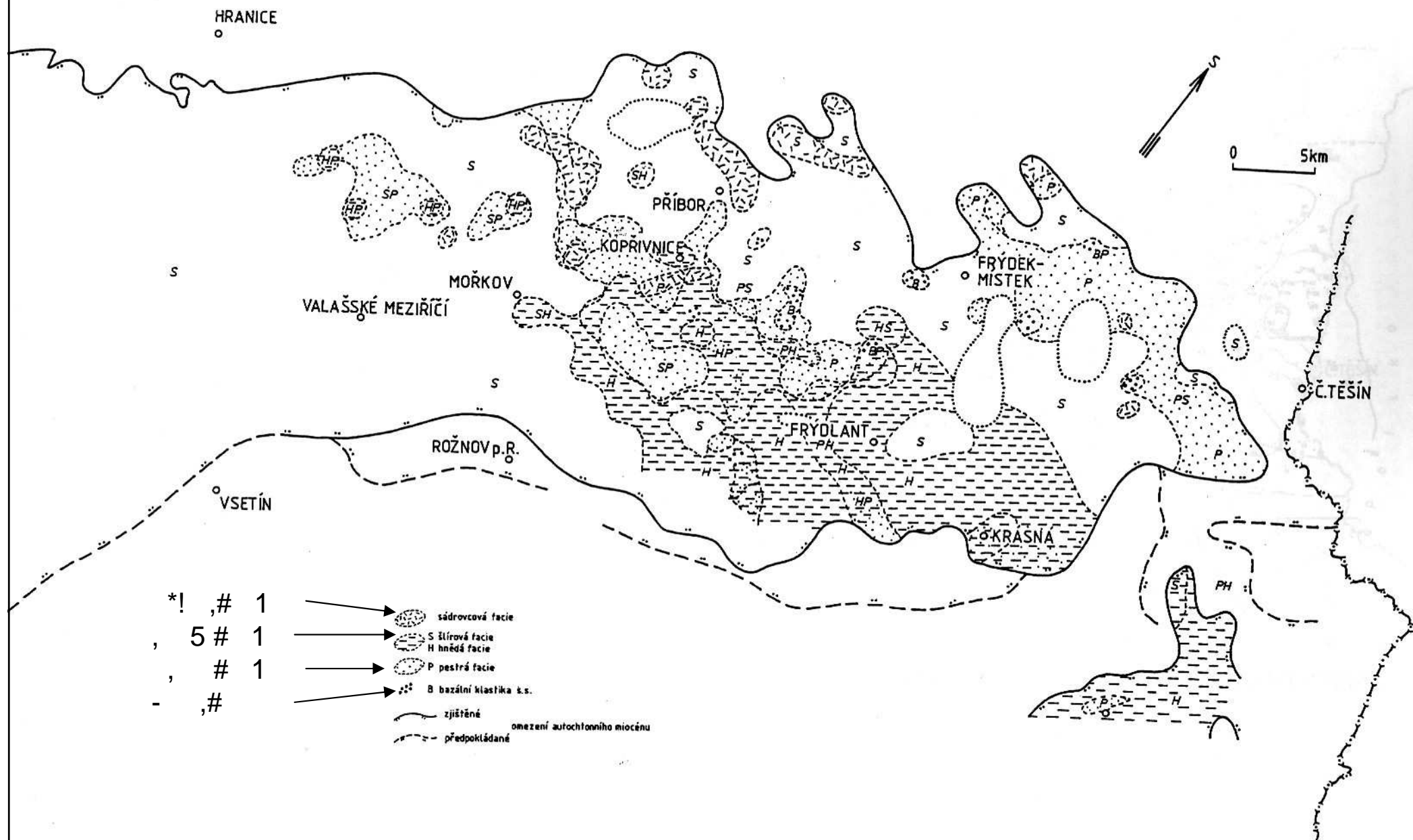


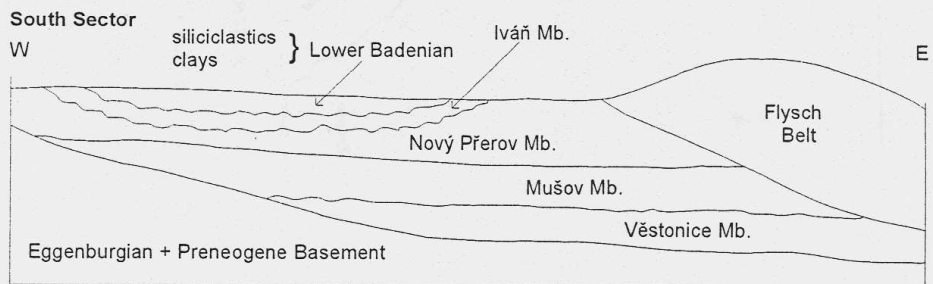
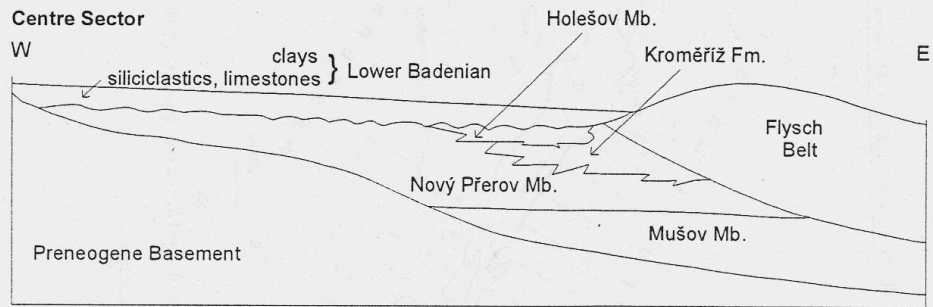
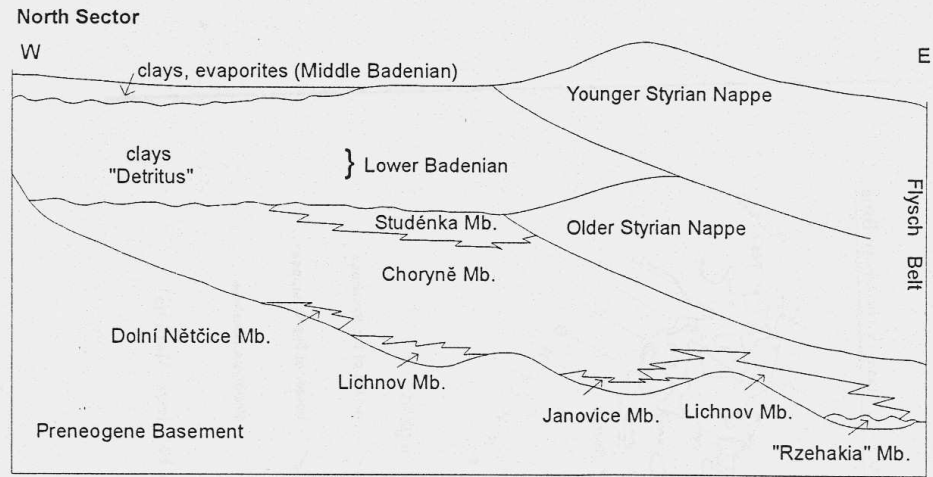
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LITOFACIÁLNÍ SCHÉMA AUTOCHTONNÍHO MIOCÉNU (KARPAT)

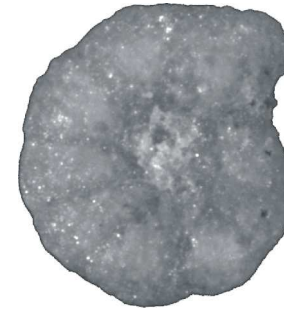
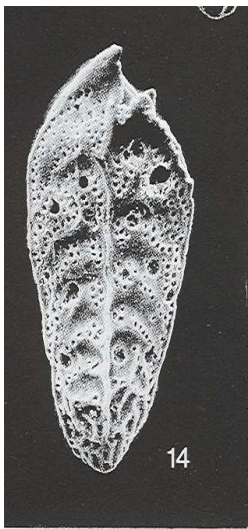
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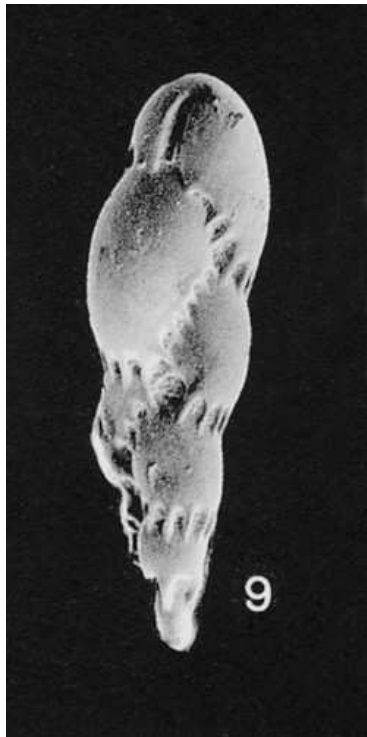
Figure 5: Model of the Carpathian Foredeep (Moravia) considering Karpatian lithostratigraphic units.



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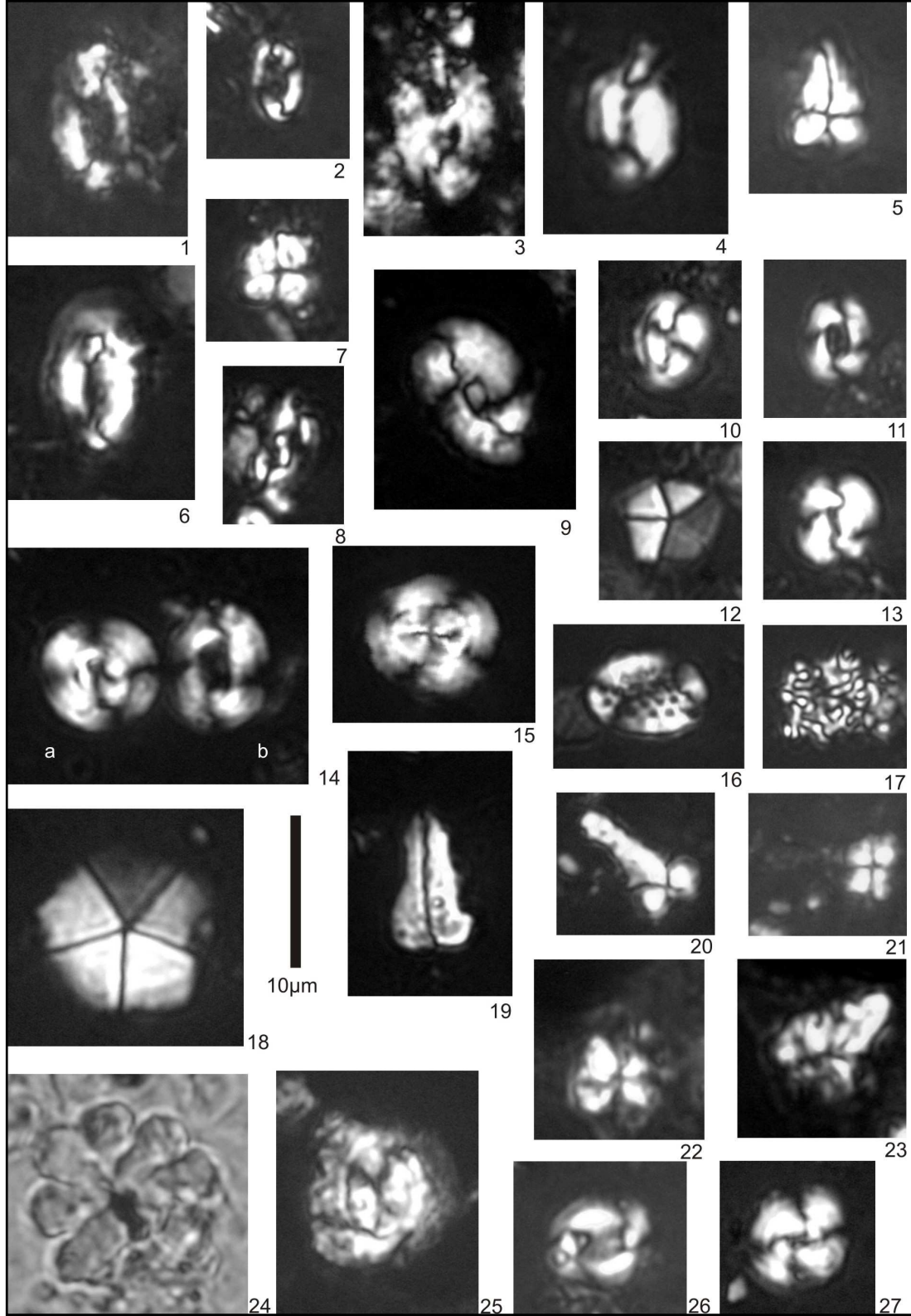
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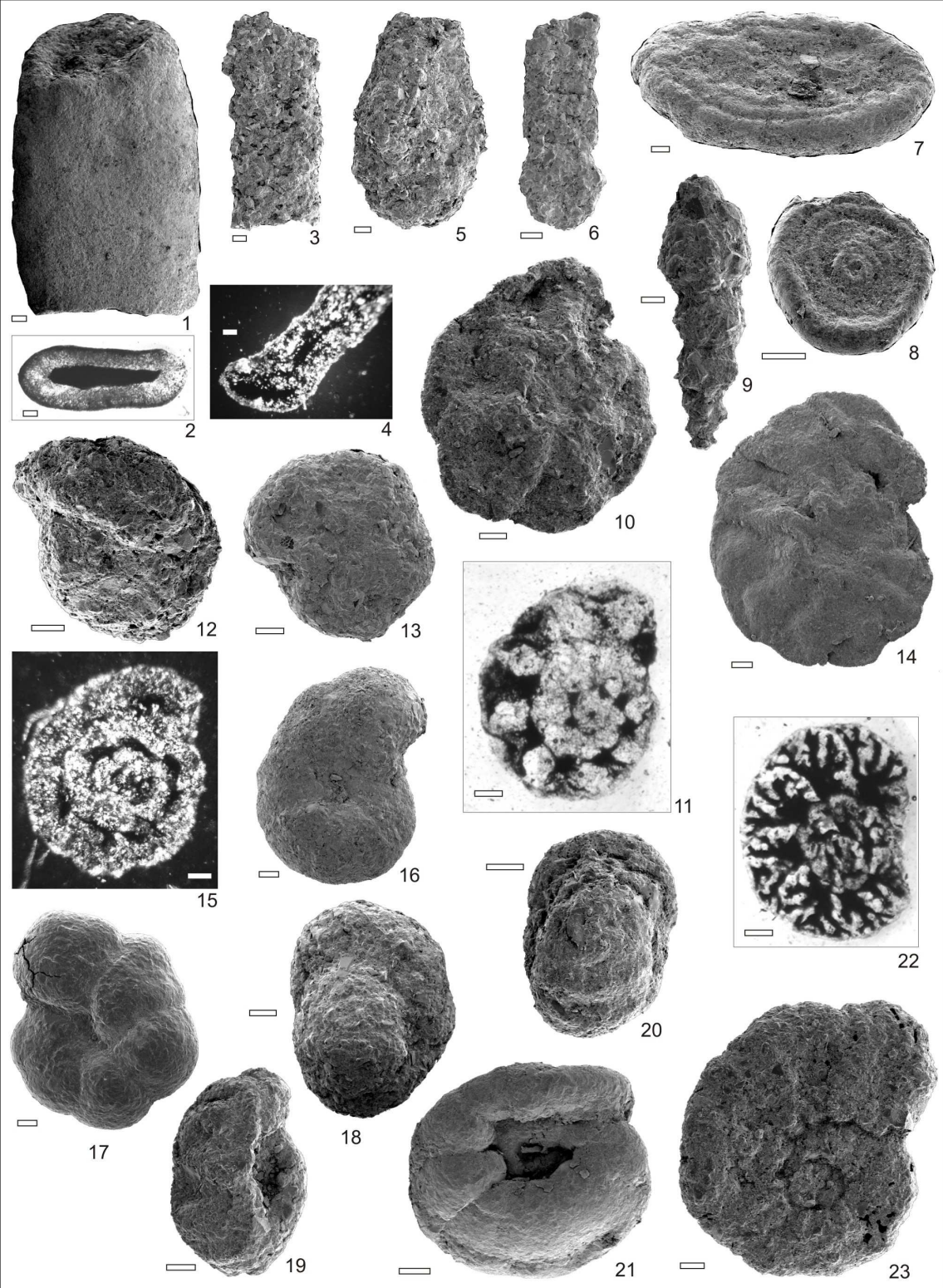
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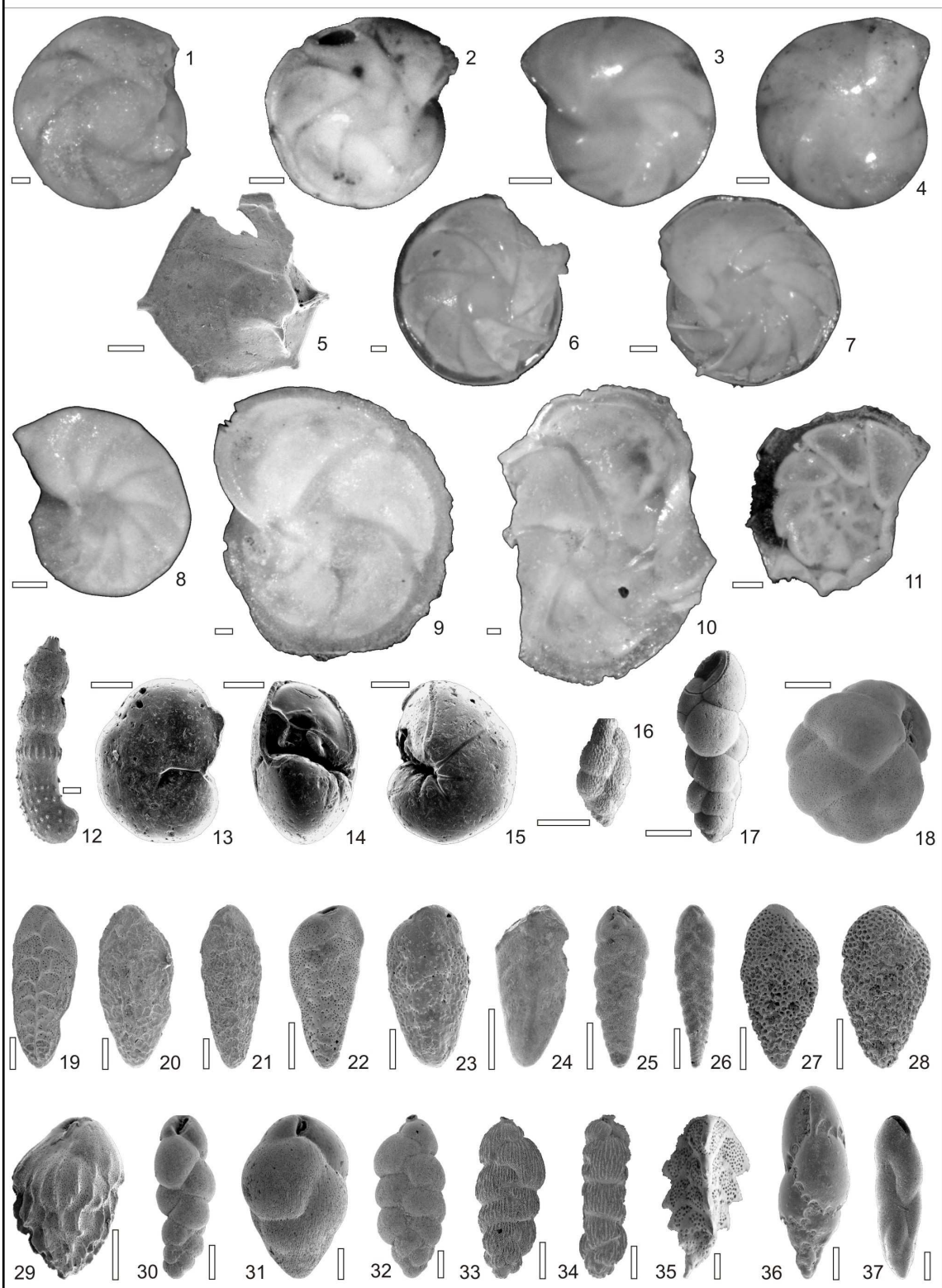
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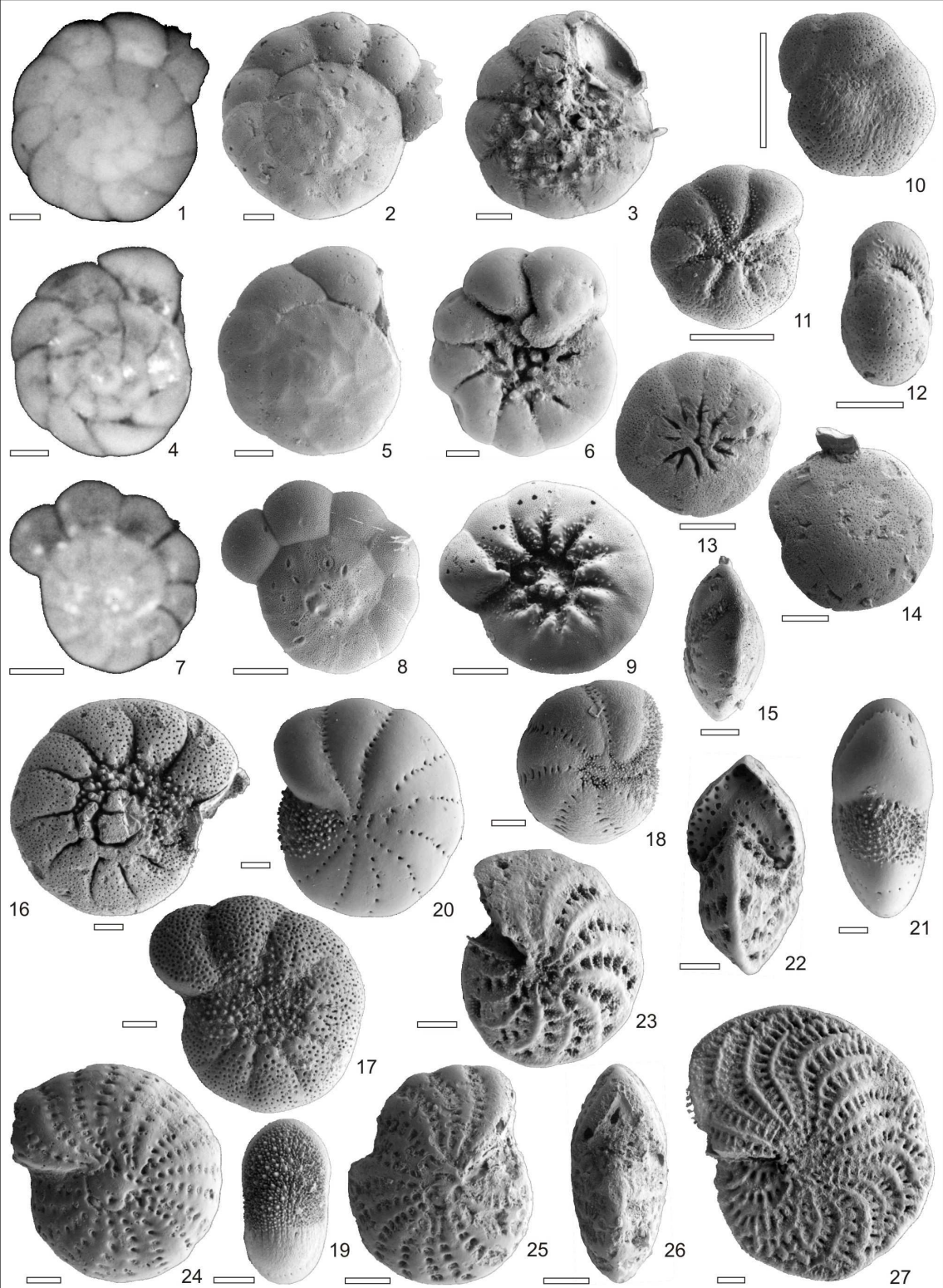
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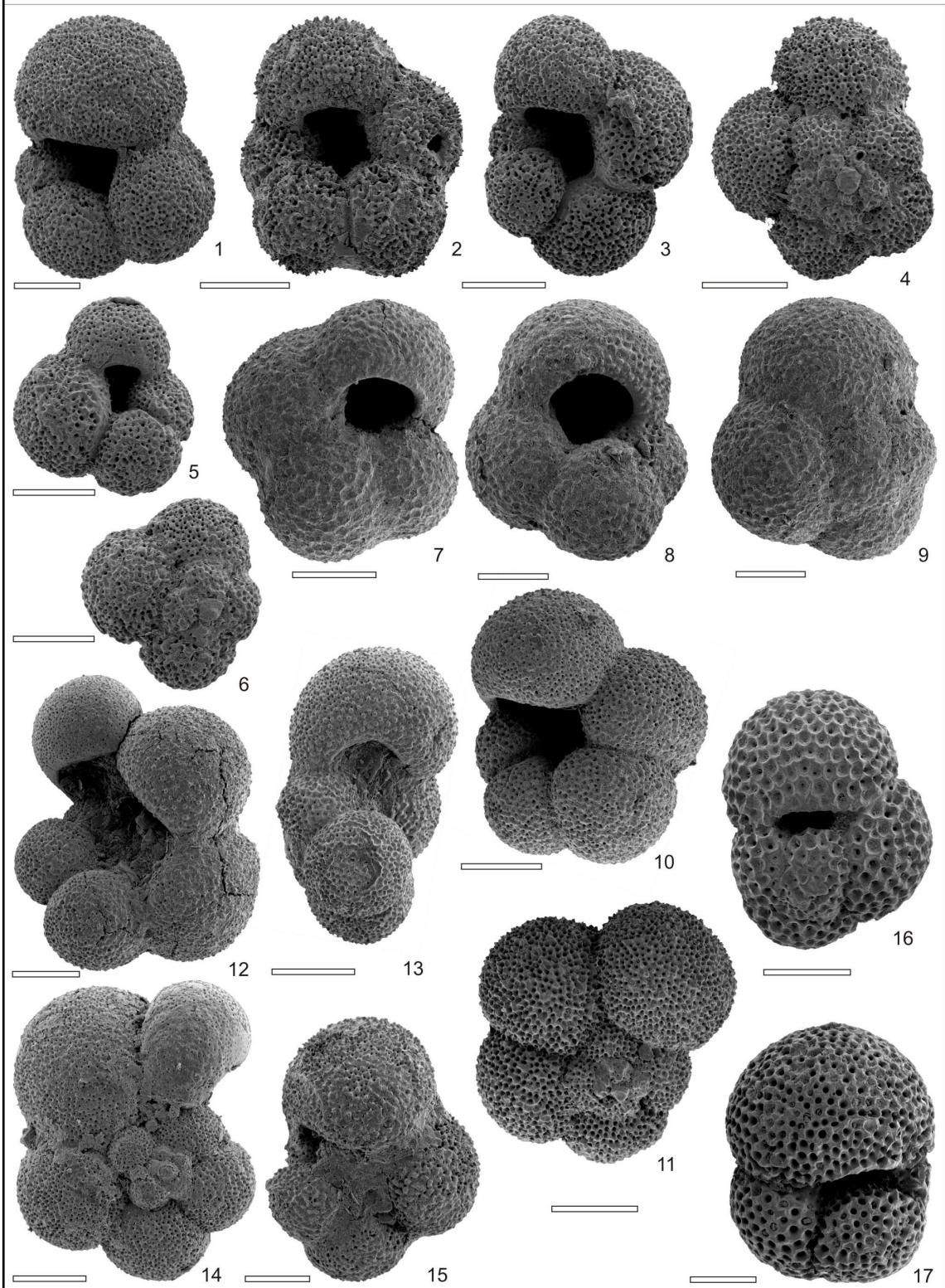
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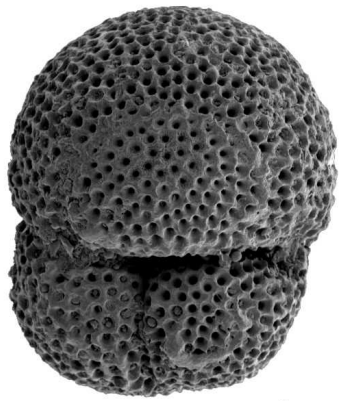
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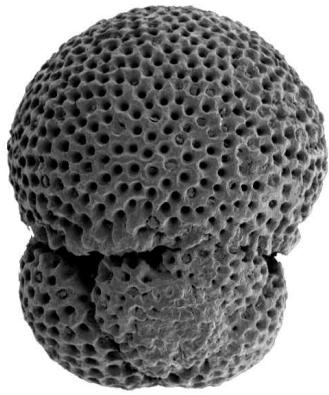


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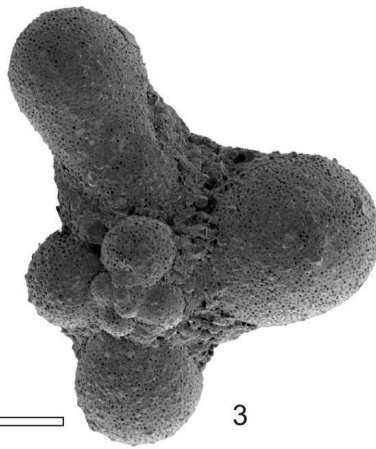
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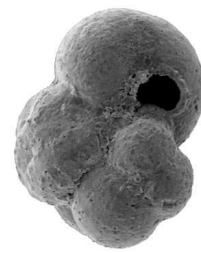
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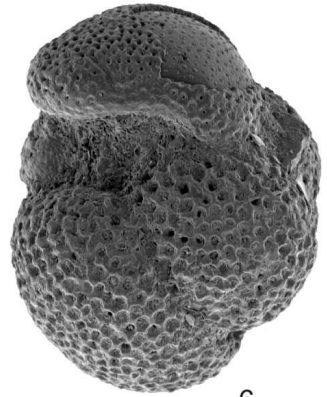
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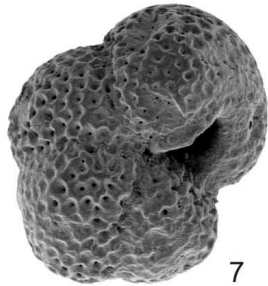
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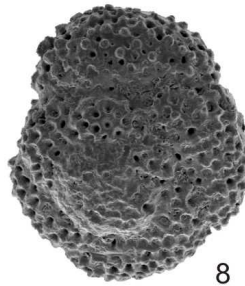
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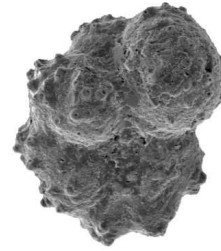
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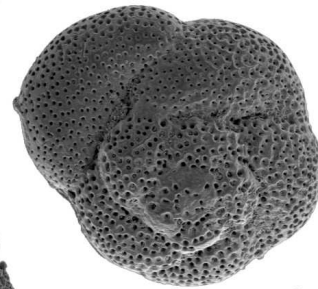
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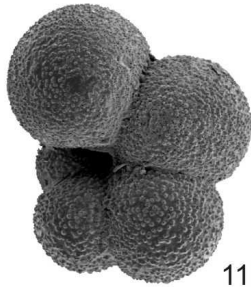
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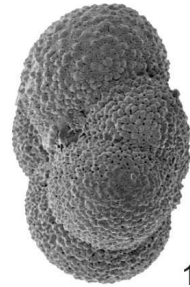
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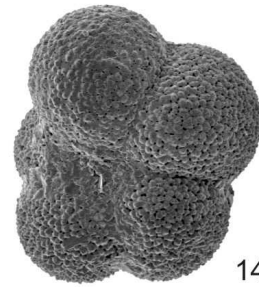
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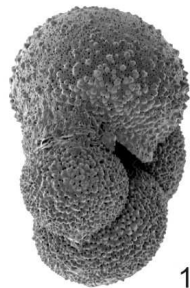
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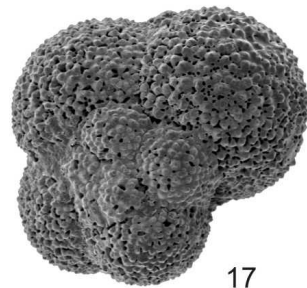
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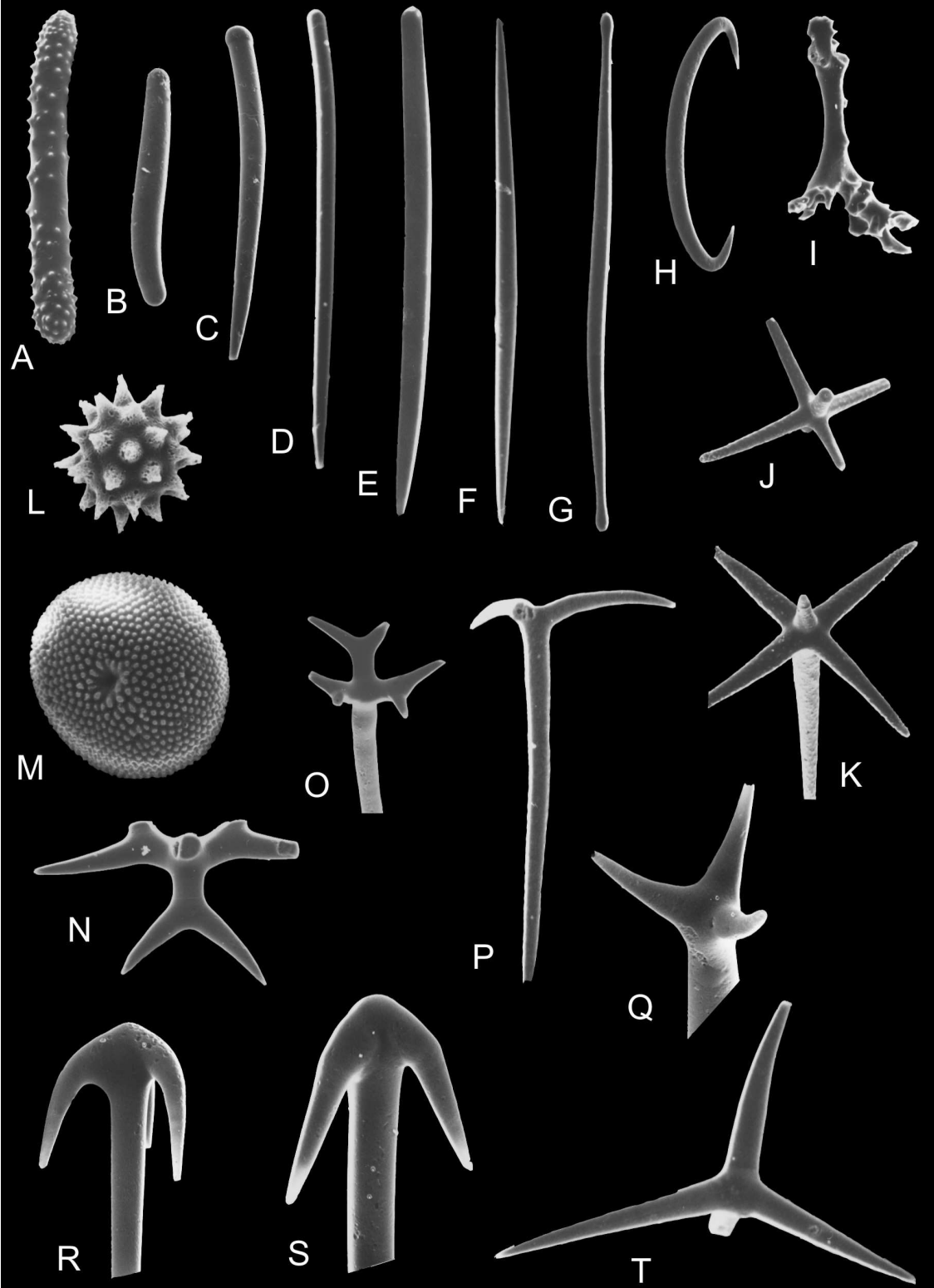
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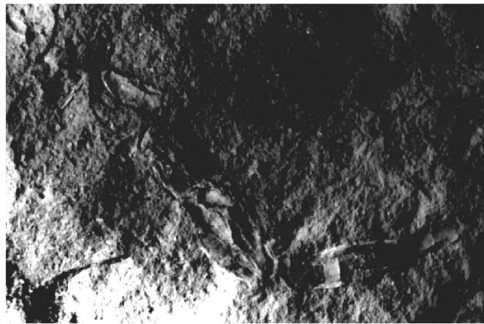
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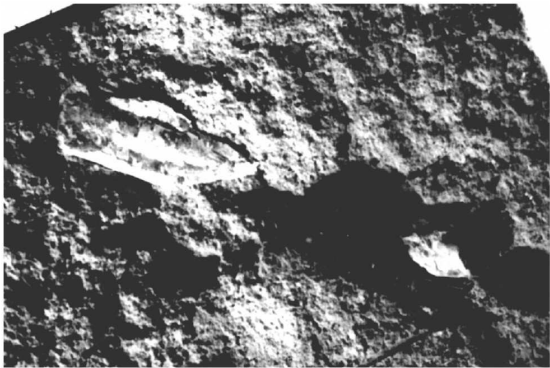
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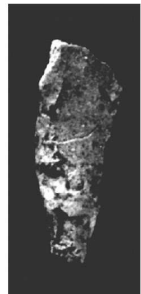
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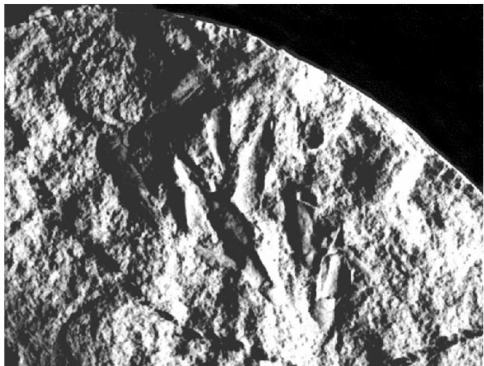
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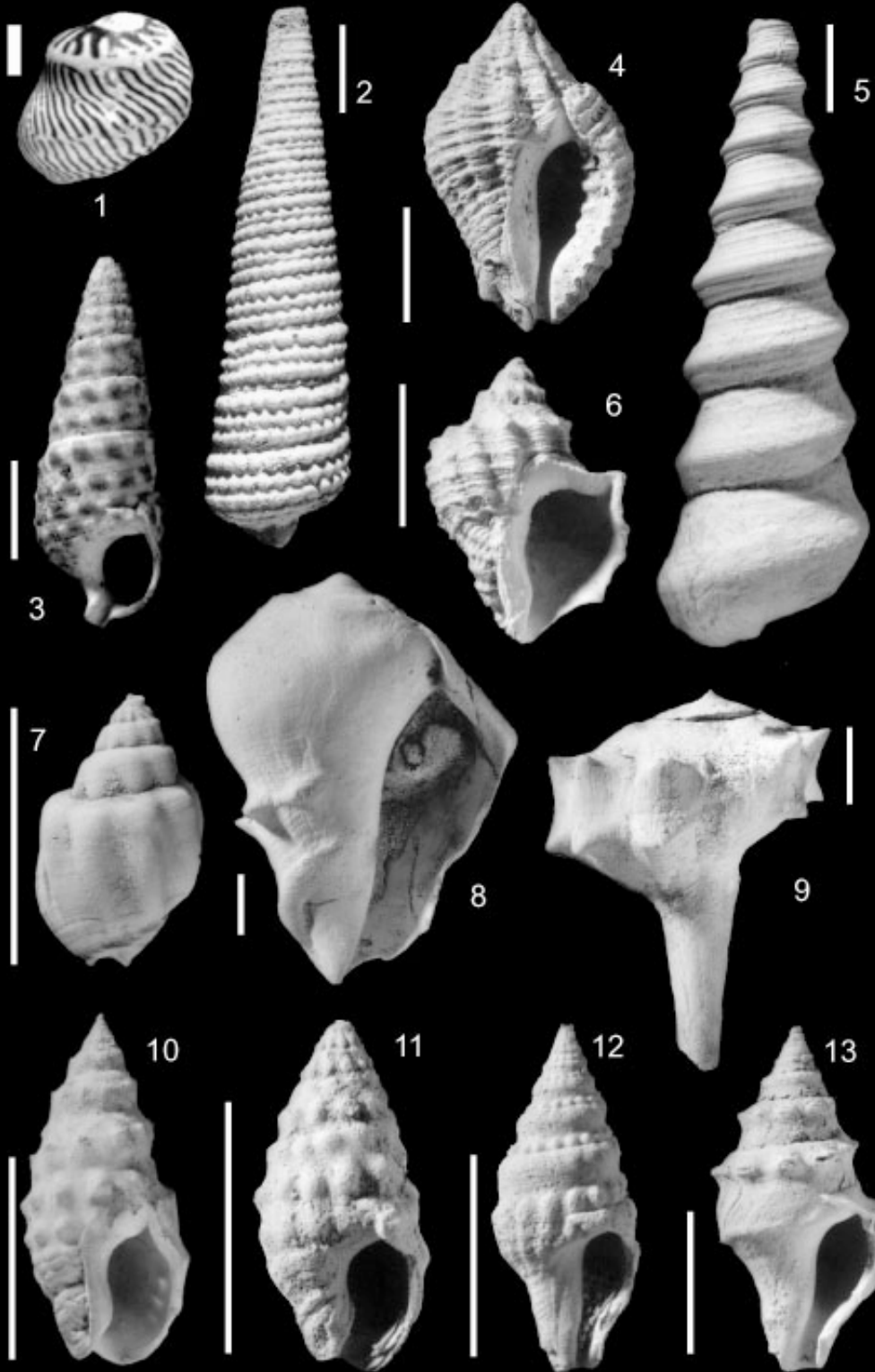


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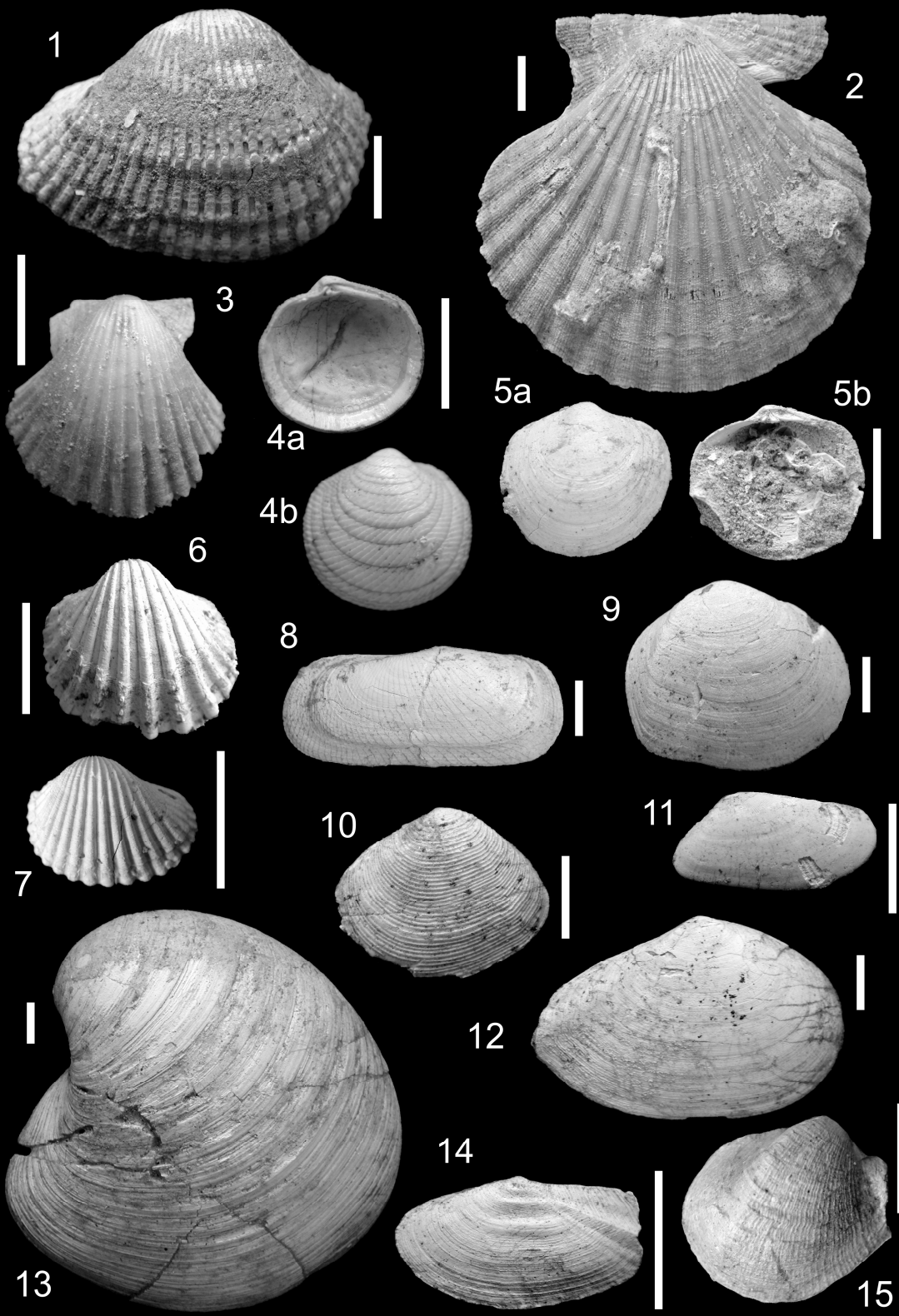
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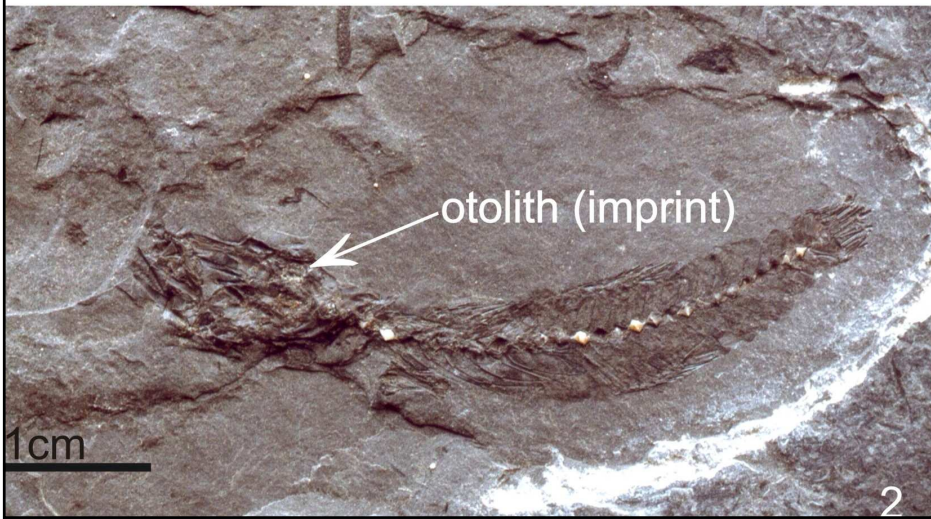
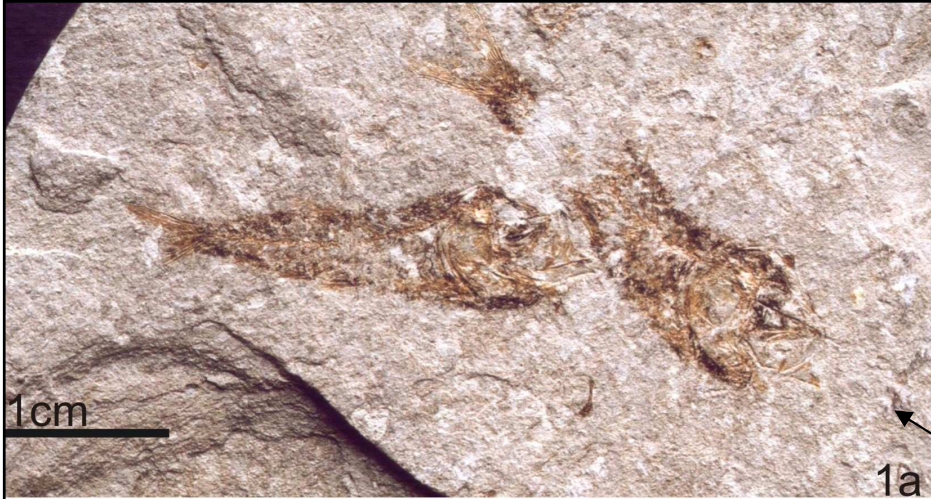
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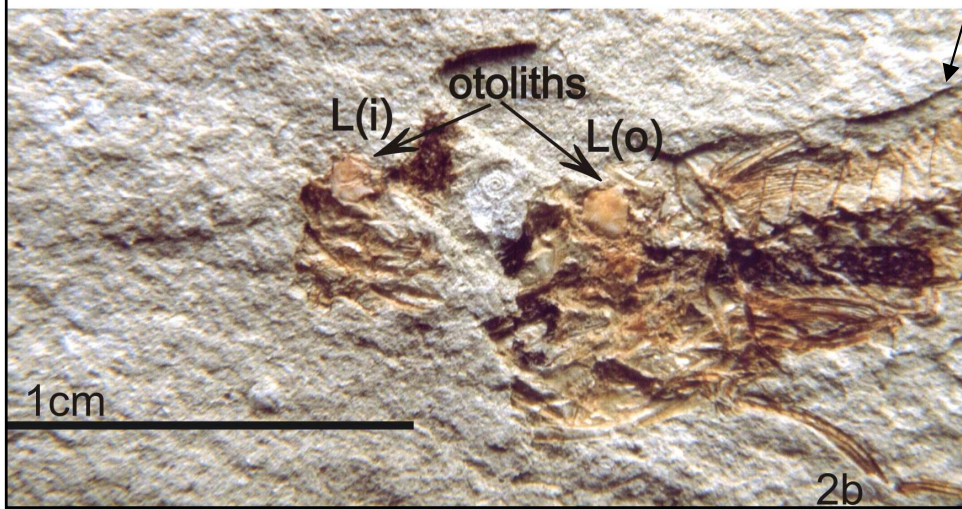
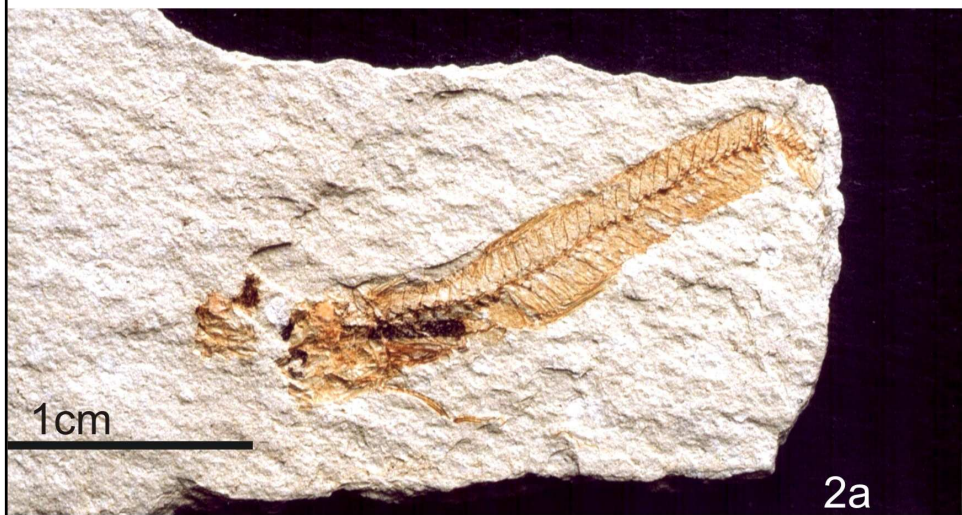
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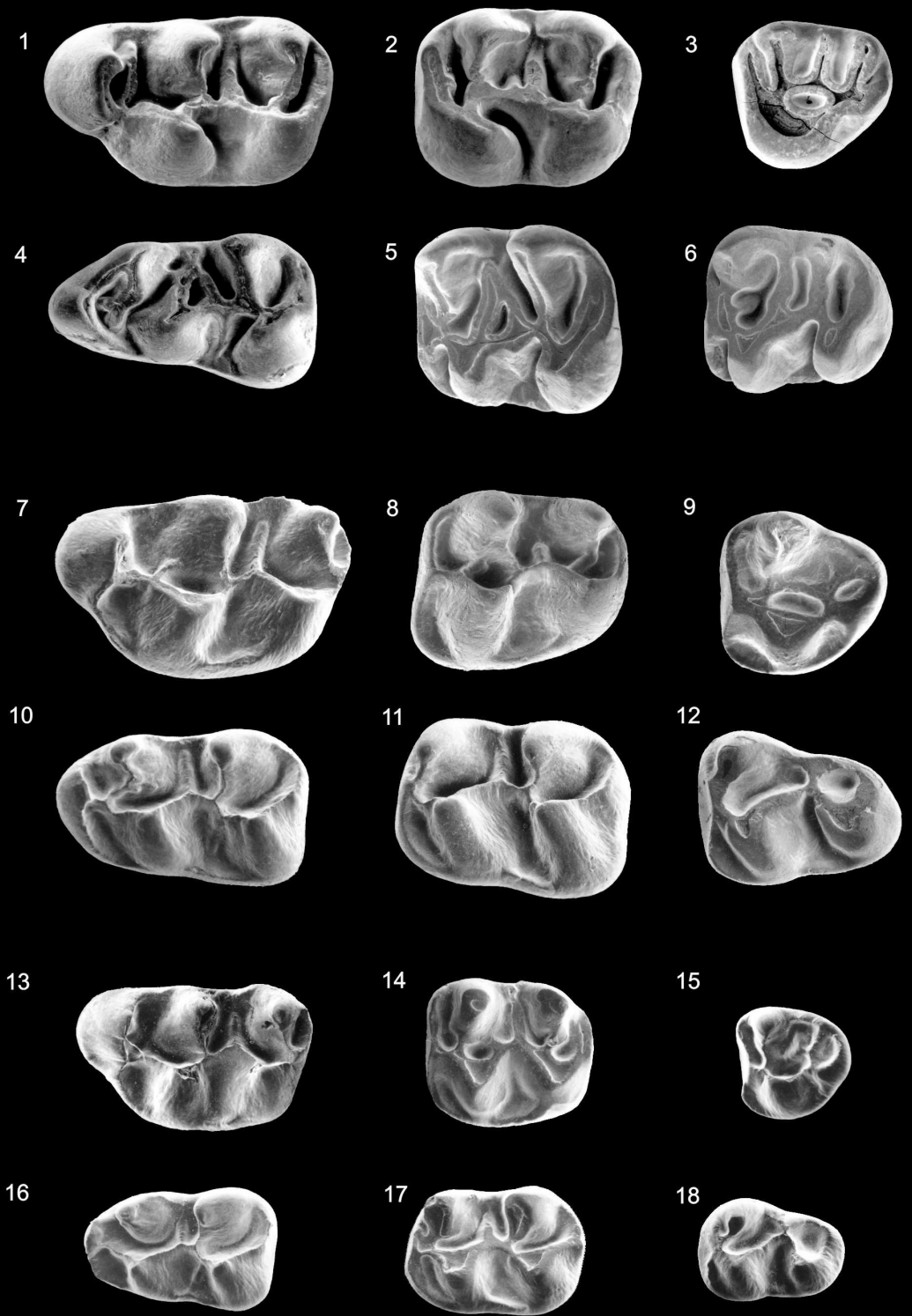
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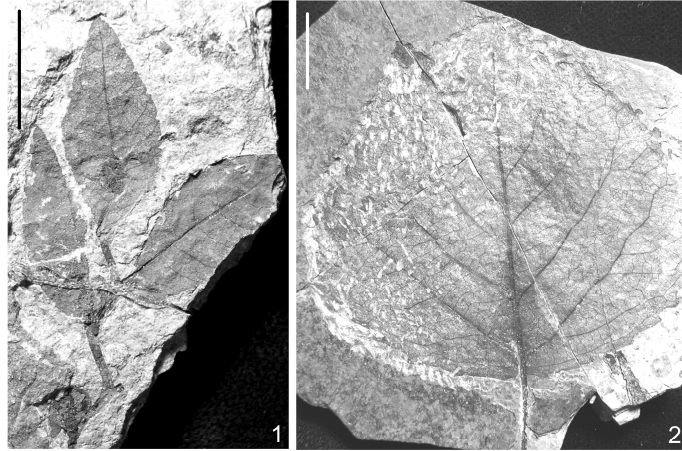


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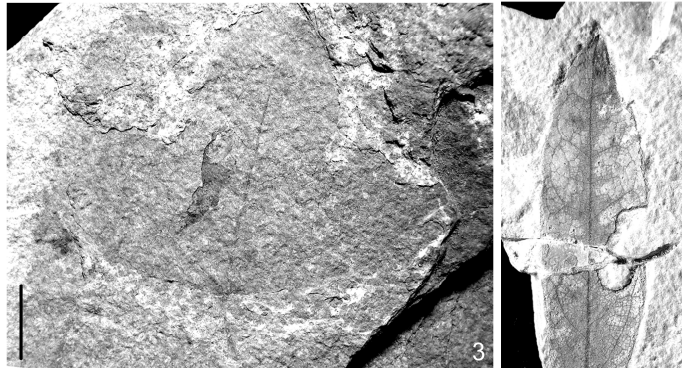
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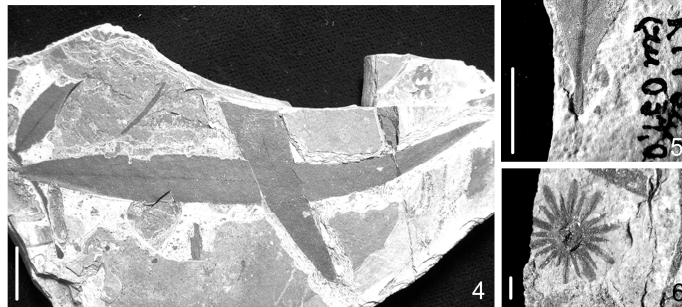
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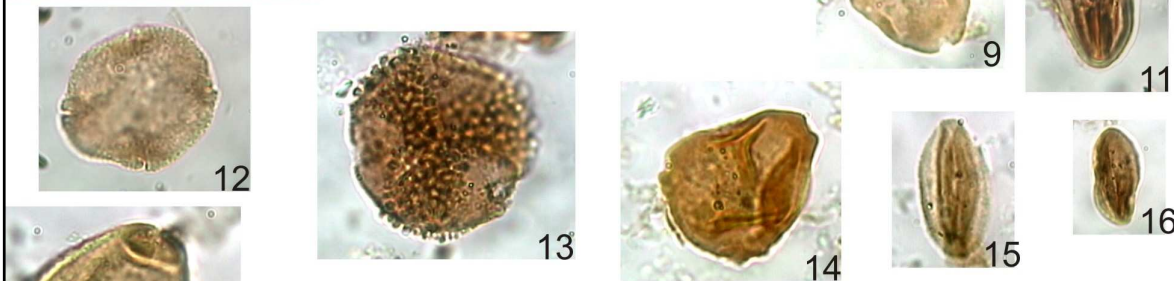
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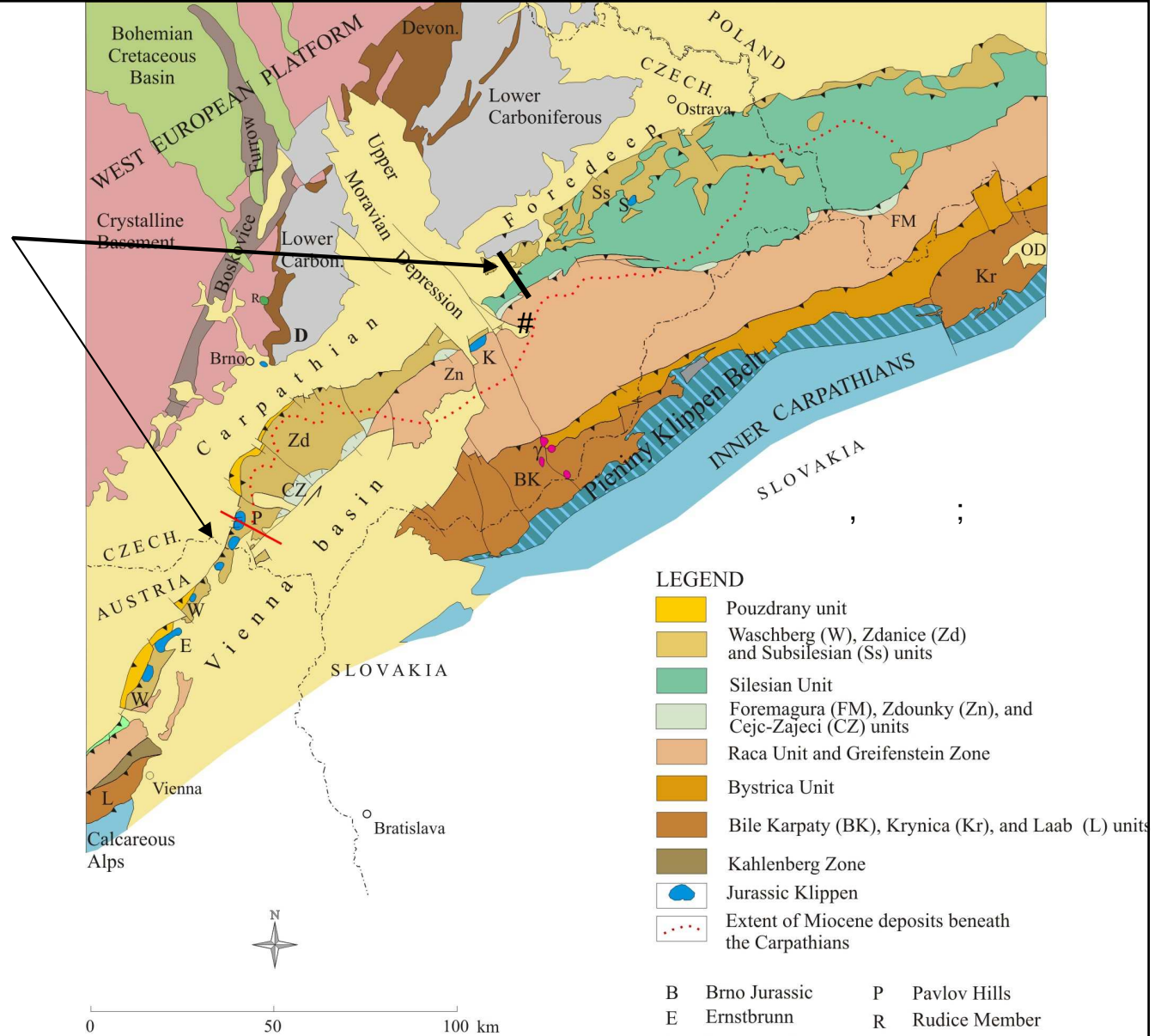
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FLEXURAL PLATE INVERSION (Cogan et al. 1993)₈₅

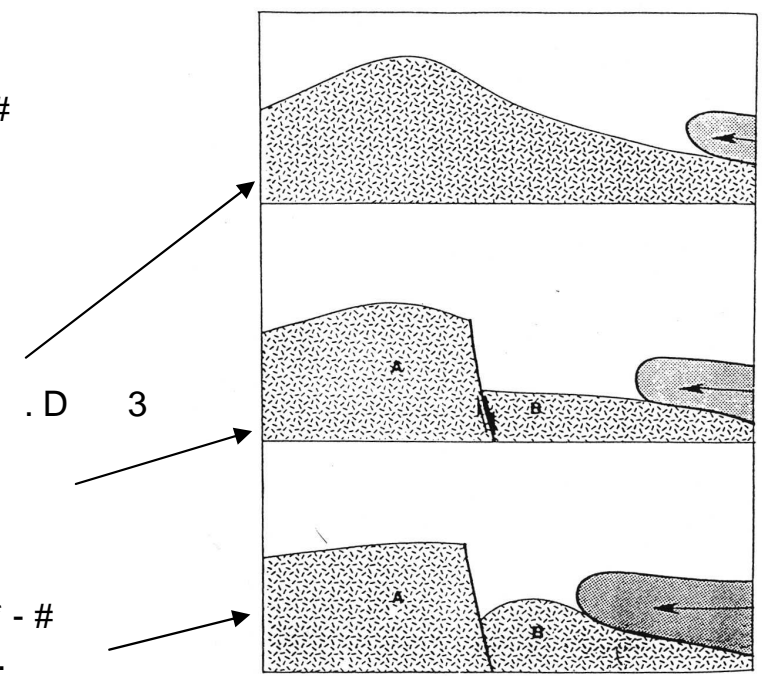


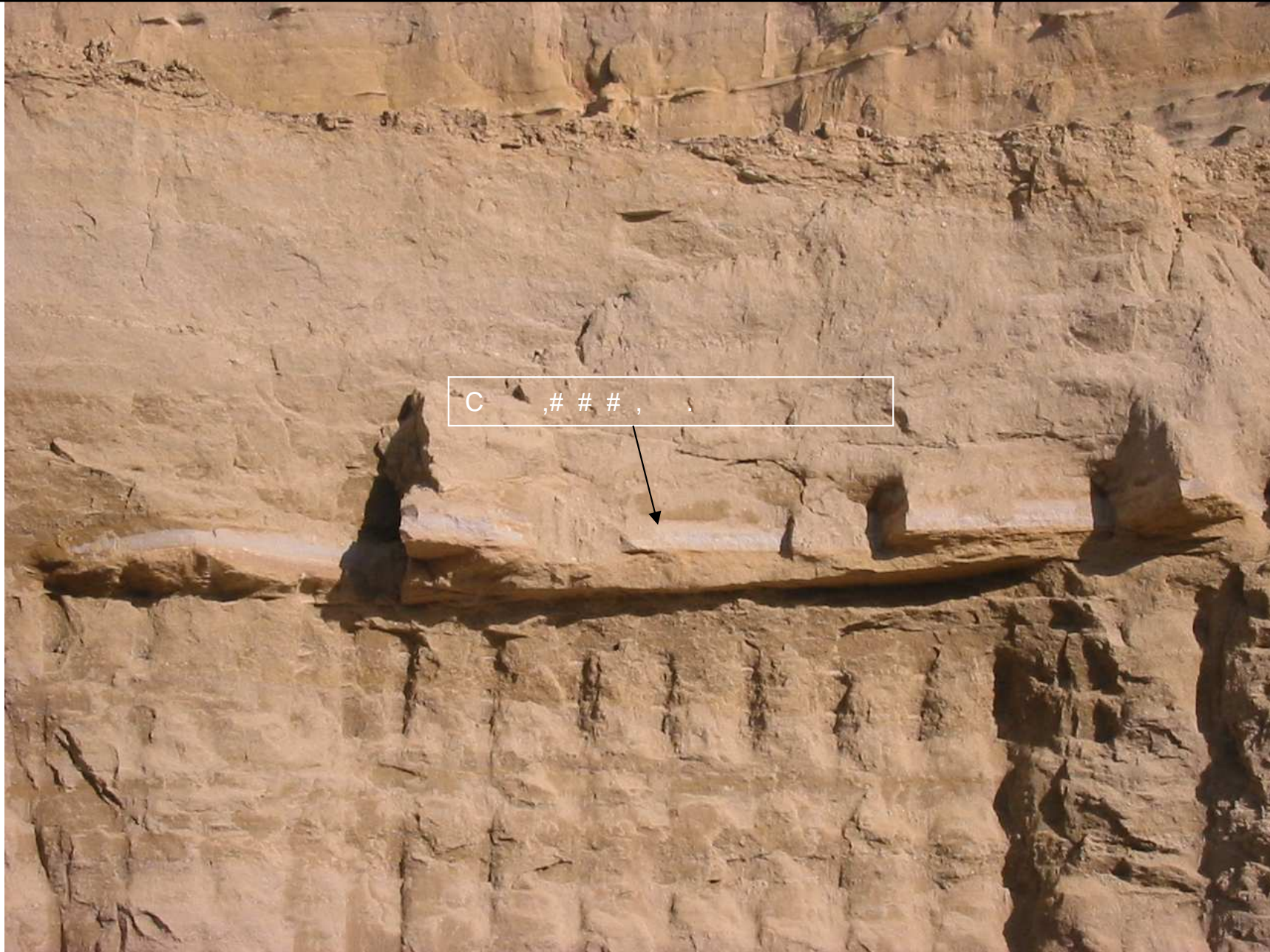
Figure 21 Conceptual model for the development of flexure in separate fault blocks. Detailed description given in text.

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