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NOVÉ POZNATKY O SULFOSOLOVÉ MINERALIZACI LOŽISKA HŮRKY V ČISTECKO-JESENICKÉM MASIVU (ČESKÁ REPUBLIKA)

NEW KNOWLEDGES ON SULFOSALT MINERALIZATION OF THE DEPOSIT HŮRKY,
ČISTÁ-JESENICE MASSIF (CZECH REPUBLIC)

JIŘÍ SEJKORA, PETR PAULIŠ, ZDENĚK DOLNÍČEK, JANA ULMANOVÁ

Abstract

Sejkora, J., Pauliš, P., Dolníček, Z., Ulmanová, J., 2022: Nové poznatky o sulfosolové mineralizaci ložiska Hůrky v čistecko-jesenickém masivu (Česká republika). - Acta Musei Moraviae, Scientiae geologicae, 107, 2, 127-143 (with English summary).

New knowledges on sulfosalt mineralization of the deposit Hůrky, Čistá-Jesenice Massif (Czech Republic)

New samples of hydrothermal sulfosalt mineralization were recently collected at the mine dump of the vein No. 1 of the abandoned small deposit Hůrky near Velká Chmelištná in the Čistá-Jesenice Massif, 14 km WSW of Rakovník, Central Bohemia Region, Czech Republic. Beside pyrite and sphalerite, galena and sulfosalts form grey to dark grey aggregates and crystals up to several mm in size, which are enclosed in quartz gangue. Gustavite forms abundant subhedral to euhedral elongated grains up to 100 μm in length in galena. It is usually associated with felbortalite, heyrovskýite and vikingite. The calculated value of N_{chem} for gustavite is ranging from 3.97 to 4.17 and the L% of lillianite substitution varies between 56.2-89.7. Minor contents of Cd (up to 0.04 *apfu*) and Te (up to 0.02 *apfu*) are interesting. Abundant vikingite occurs as subhedral to euhedral elongated crystals up to 400 μm in length in galena, in association with heyrovskýite, gustavite and felbortalite. Vikingite from Hůrky has calculated value of N_{chem} in the range 5.12-5.66 and 42.5-55.5 L% of lillianite substitution. Minor concentrations of Cd (up to 0.18 *apfu*) and Te (up to 0.10 *apfu*) were detected. The average (n=30) empirical formula of vikingite based on S+Te = 30 *apfu* is $(\text{Ag}_{3.40}\text{Cu}_{0.07})_{\Sigma 3.47}(\text{Pb}_{10.6}\text{Cd}_{0.11})_{\Sigma 10.71}\text{Bi}_{11.38}(\text{S}_{29.92}\text{Te}_{0.08})_{\Sigma 30.00}$. Heyrovskýite forms abundant anhedral to euhedral grains up to 0.5 mm in size in galena and intergrowths with felbortalite, gustavite and vikingite. The calculated value of N_{chem} for new samples of heyrovskýite from Hůrky varies from 6.55 to 7.32. The observed lillianite substitution in the range 29.9-47.8 L% is significantly higher than was found in the type material of heyrovskýite from this locality with values ranging from 8 to 19 L%. Rare felbortalite occurs as subhedral to euhedral elongated grains up to 150 μm in length in galena, usually in association with heyrovskýite, vikingite and gustavite. The Ag and Cu contents in felbortalite are 0.51-0.72 and 1.80-2.01 *apfu*, respectively, and minor concentrations of Cd (up to 0.06 *apfu*) and Te (up to 0.09 *apfu*) were also detected. The average (n=22) empirical formula of felbortalite based on sum of all atoms = 35 *apfu* is $\text{Cu}_{1.94}\text{Ag}_{0.59}(\text{Pb}_{4.81}\text{Cd}_{0.03})_{\Sigma 4.84}(\text{S}_{19.14}\text{Te}_{0.08})_{\Sigma 19.22}$. Very rare cosalite occurs as grains up to $30 \times 80 \mu\text{m}$ in size lined by felbortalite in galena aggregates. The Ag and Cu contents in cosalite are 0.91-1.16 and 1.49-1.62 *apfu*, respectively, and minor concentrations of Te (up to 0.09 *apfu*) and In (up to 0.02 *apfu*) were also detected. The average (n=19) empirical formula of cosalite based on S+Te = 20 *apfu* is $\text{Cu}_{1.58}\text{Ag}_{1.03}(\text{Pb}_{7.34}\text{In}_{0.01})_{\Sigma 7.35}\text{Bi}_{7.43}(\text{S}_{19.92}\text{Te}_{0.08})_{\Sigma 20.00}$.

Key words: sulfosalts, felbortalite, lillianite homologues, gustavite, vikingite, heyrovskýite, cosalite, chemical composition, Hůrky near Rakovník, Czech Republic

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NATRODUFRÉNIT Z VLASTKOVCE U SLAVONICE, MORAVA, ČESKÁ REPUBLIKA

NATRODUFRÉNITE FROM VLASTKOVEC NEAR SLAVONICE, MORAVIA, CZECH REPUBLIC

LUBOŠ VRTIŠKA, RADANA MALÍKOVÁ, ZDENĚK DOLNÍČEK, JIŘÍ SEJKORA

Abstract

Vrtiška, L., Malíková, R., Dolníček, Z., Sejkora, J., 2022: Natrodufrénit z Vlastkovce u Slavonic, Morava, Česká republika. – Acta Musei Moraviae, Scientiae geologicae, 107, 2, 145-154 (with English summary).

Natrodufrénite from Vlastkovec near Slavonice, Moravia, Czech Republic

Secondary phosphate, natrodufrénite, was found on historical samples from Stříbrný vrch near Vlastkovec, Moravia (Czech Republic). Natrodufrénite forms crusts of dark green to blue-green radial aggregates up to 0.3 mm in size with silky lustre on fissures and in cavities of gangue quartz. Its chemical composition corresponds to empirical formula: $(\text{Na}_{0.92}\text{Ca}_{0.05}\square_{0.06})_{\Sigma 1.03}(\text{Fe}^{2+}_{0.86}\text{Zn}_{0.07}\text{Mg}_{0.01})_{\Sigma 0.94}(\text{Fe}^{3+}_{4.71}\text{Al}_{0.29})_{\Sigma 5.00}[(\text{PO}_4)_{3.99}(\text{AsO}_4)_{0.01}]_{\Sigma 4.00}(\text{OH})_{5.90} \cdot 2\text{H}_2\text{O}$. Natrodufrénite is monoclinic, space group $C2/c$, unit-cell parameters refined from X-ray powder diffraction data are a 25.88(6), b 5.138(6), c 13.785(3) Å, β 111.5(2)° and V 1704.7(6) Å³.

Key words: natrodufrénite, chemical composition, X-ray powder diffraction data, phosphate occurrence, Vlastkovec, Moravia, Czech Republic.

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1. ÚVOD

Chemické složení minerálů skupiny dufrénitu lze vyjádřit obecným vzorcem $ABC_5(\text{TO}_4)_4(\text{OH})_6 \cdot 2\text{H}_2\text{O}$, kde v A pozici se vedle Na, K a Ca významně uplatňují i vakance; B pozice je obsazována M^{2+} prvky jako Fe, Mn, Mg, a Zn a v C pozici je dominantní Fe^{3+} nebo Al^{3+} (FONTAN *et al.* 1982; SELWAY *et al.* 1997; ANTHONY *et al.* 2000). V tetraedrické T pozici minerálů této skupiny je dominantním prvkem vždy P. Jako platné druhy jsou dosud v této skupině vyčleněny natrodufrénit ($A = \text{Na}$, $B = \text{Fe}^{2+}$, $C = \text{Fe}^{3+}$), dufrénit ($A =$ vakance a Ca, $B = \text{Fe}^{2+}$, $C = \text{Fe}^{3+}$), burangait ($A = \text{Na}$, $B = \text{Fe}^{2+}$, $C = \text{Al}^{3+}$), matioliit ($A = \text{Na}$, $B = \text{Mg}$, $C = \text{Al}^{3+}$), gayit ($A = \text{Na}$, $B = \text{Mn}$, $C = \text{Fe}^{3+}$) a nově bimbowrieit ($A = \text{Na}$, $B = \text{Mg}$, $C = \text{Fe}^{3+}$; ELLIOTT a KAMPF 2020). V rámci České republiky byl vedle běžnějšího dufrénitu a natrodufrénitu zjištěn také velmi vzácný gayit z granitického pegmatitu u Cyrilova, kde tvoří mikroskopické krystaly na okraji Al-fosfátové nodule v asociaci s natrodufrénitem a mitridatitem

ILMENITIT Z KRUPNÍKOVÉHO TĚLESA NA SMRČINĚ U SOBOTÍNA

ILMENITITE FROM A SOAPSTONE BODY ON THE SMRČINA HILL NEAR SOBOTÍN

JIŘÍ ZIMÁK, LUKÁŠ HYSEK

Abstract

Zimák, J., Hysek, L., 2022: Ilmenitit z krupníkového tělesa na Smrčíně u Sobotína. - Acta Musei Moraviae, Scientiae geologicae, 107, 2, 155-164 (with English summary).

Ilmenitite from a soapstone body on the Smrčina Hill near Sobotín

One fragment of ilmenitite was found in heap material coming from a soapstone quarry on the Smrčina Hill near Sobotín in the Jeseníky Mts. The ilmenitite is composed predominately of ilmenite (approximately 70 to 80 % by volume), with magnetite, hematite, talc and clinocllore present in minor amounts. The origin of ilmenitite could be explained as the result of fractional crystallization and subsequent density segregation from a Fe-Ti rich magma. This hypothesis is supported by the distinctive higher magnesium content in ilmenite from the ilmenitite (4.4-4.7 wt.% MgO), whereas metamorphogenic ilmenite from soapstone body rocks quarried on the Smrčina Hill has the lower magnesium content (ca. 0.1 wt.% MgO). This is the first finding of ilmenitite in the Silesicum and probably in the entire Bohemian Massif.

Key words: Silesicum, Sobotín Amphibolite Massif, soapstone body, cumulate rock, ilmenite ore.

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1. ÚVOD

Krupníkové těleso, otevřené lomem zhruba 300 m v. od vrcholu Smrčiny (670 m) u Sobotína, je jedním z ložisek krupníku v prostoru sobotínského masivu (obr. 1), z nichž byla v 18. a 19. století tato maskem bohatá hornina využívána ke zhotovování vyzdívek pro železářny (nejen v Sobotíně) a na kamenické práce. Podle KRETSCHMERA (1911) byla lomem na Smrčíně zastížena dvě krupníková tělesa čočkovitého tvaru. Směrná délka větší čočky dosahuje ve výchozu 45 m, její nepravá mocnost je 8-10 m. Čočky mají výraznou zonální stavbu. Ve směru od centra k okrajům lze rozlišit čtyři hlavní typy hornin (ZIMÁK a JURÁNKOVÁ 2019): krupník (asociace masktek + magnezit) - maskková břidlice - tremolitická břidlice - chloritická břidlice (mezi uvedenými typy existují přechodné zóny). Chemické složení amfibolů odpovídá převážně tremolitu, někdy aktinolitu nebo magneziohornblendu. Tremolitická břidlice proto může přecházet do aktinolitické břidlice (a takto je břidlice s dominancí Ca-amfibolu často ve starší literatuře označována - např. KRETSCHMER 1911, ZIMÁK a NOVOTNÝ 2002). V případě chloritu jde vždy o klinochlor. Nejběžnějšími akcesoriemi hornin krupníkového tělesa jsou fluorapatit, magnetit (často s vysokou příměsí chromu), ilmenit, rutil a zirkon. Protolitem krupníkového tělesa by podle ZIMÁKA a JURÁNKOVÉ (2019) mohl být peridotit; zonální stavbu krupníkového tělesa lze podle citovaných autorů považovat za výsledek výměnných reakcí mezi ním a okolním horninovým prostředím, nejspíše během variské metamorfózy.

MINERÁLNE ZLOŽENIE LAMINOVANÝCH BAZALTOVÝCH METAPYROKLASTÍK A MRAMOROV NA LOKALITÁCH V OKOLÍ OCHTINEJ (SLOVENSKÁ REPUBLIKA)

MINERAL COMPOSITION OF LAMINATED BASALT METAPYROCLASTICS AND MARBLES
AT THE LOCALITIES NEAR OCHTINÁ (SLOVAK REPUBLIC)

PETER RUŽIČKA, PAVOL MYŠĽAN

Abstract

Ružička, P., Myšľan, P., 2022: Minerálne zloženie laminovaných bazaltových metapyroklastík a mramorov na lokalitách v okolí Ochtinej (Slovenská republika). – Acta Musei Moraviae, Scientiae geologicae, 107, 2, 165–185 (with English summary).

Mineral composition of laminated basalt metapyroclastics and marbles at the localities near Ochtiná (Slovak Republic).

Basalt metapyroclastics at the localities Ochtiná – Pod Vápnom and Ochtiná – Hrádok form laminated intercalations in marbles of the Bôrka nappe (Meliatic Unit), Western Carpathians. The mineral association consists of amphiboles (actinolite – tremolite), chlorites (clinocllore – chamosite), epidote and albite which occurs in the stripes. Accessory minerals are represented by titanite and fluorapatite, in the marbles hydrothermal pyrite was also identified. The amphiboles reveal dominant Mg (2.50–4.48 *apfu*) in *C* position. The content of Mg in clinocllore varies between 2.40–2.69 *apfu* and the content of Fe²⁺ in chamosite is up to 2.62 *apfu*. Epidote shows two slightly pronounced substitutions in the *M* positions and one in the *T* position. The most significant substitution is in *M3* position between Fe³⁺ (0.52–0.95 *apfu*), Al (0.03–0.45 *apfu*), negligible Fe²⁺ (up to 0.08 *apfu*), Cr (up to 0.01 *apfu*) and V (up to 0.02 *apfu*). Albite reaches a nearly pure end-member composition (Ab_{99–100}Or_{0.2}An_{0.7}). Titanite shows contents of Ca and Si close to the ideal composition, Ti content is slightly reduced (0.87–0.92 *apfu*) by (Al, Fe)³⁺ + (OH, F)⁻ ↔ Ti⁴⁺ + O²⁻ substitution and the F content is increased up to 0.6 wt. % and (OH)⁻ up to 0.08 *apfu*. Fluorapatite represents the end-member with a content of 0.83–1.00 *apfu* F without an increased concentration of REE elements. In pyrites, the Co content slightly increases from the center to the edge of some grains (up to 0.05 *apfu*). Marbles formed during the regional metamorphism of sedimentary limestones, which were locally enriched in pyroclastic material of basaltic composition. The recrystallized pyroclastic material was transformed into a laminar arrangement in the marbles. The calculated temperature interval for chlorites is in the range of 303–343 ± 9.5 °C.

Key words: mineral composition, basalt metapyroclastics, marbles, Ochtiná, Western Carpathians, Slovak Republic
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1. ÚVOD

Objektom nášho mineralogického výskumu boli svetlé mramory laminované zelenosivými bazaltovými metapyroklastikami vyskytujúce sa na lokalite Ochtiná – Pod Vápnom

INTERPRETACE DEPOZIČNÍHO PROSTŘEDÍ A PROVENIENCE SEDIMENTŮ V LOMU VÝKLEKY (MORAVICKÉ SOUVRSTVÍ, KULM NÍZKÉHO JESENÍKU)

INTERPRETATION OF DEPOSITIONAL ENVIRONMENT AND PROVENANCE OF SEDIMENTARY
ROCKS IN THE VÝKLEKY QUARRY (MORAVICE FORMATION, NÍZKÝ JESENÍK CULM BASIN)

DANIEL ŠIMIČEK, KAMIL KROPÁČ, TOMÁŠ LEHOTSKÝ, JAROSLAV KAPUSTA

Abstract

Šimiček, D., Kropáč, K., Lehotský, T., Kapusta, J., 2022: Interpretace depozičního prostředí a provenience sedimentů v lomu Výkleky (moravické souvrství, kulm Nizkého Jeseníku). – *Acta Musei Moraviae, Scientiae geologicae*, 107, 2, 187-201 (with English summary).

Interpretation of depositional environment and provenance of sedimentary rocks in the Výkleky Quarry (Moravice Formation, Nizký Jeseník Culm Basin)

The five cores were drilled out in the Výkleky Quarry, in which sedimentary rocks of the Moravice Formation of the Nizký Jeseník Culm Basin are quarried. Detailed lithological description and photodocumentation were performed and each drill-core was sampled for optical microscopic analysis. The studied sedimentary sequence includes various gravity flow deposits, including debris flow, grain flow or turbidity flow sediments. Hemipelagic sediments, representing basin floor environment and pebbly mudstone, representing deposition from the submarine slide, also occur. The vertical sequence reveals progradation of the submarine sand-rich fan onto the basin floor. The dominant part of the sedimentary sequence is represented by distributary channel and sandy lobe deposits of the middle part of the submarine fan system. The provenance analysis based on the Gazzi-Dickinson point-counting method allows interpreting the geotectonic position of the source area in the recycled orogen with the transition to the magmatic arc. Various types of metamorphic rocks predominate over sedimentary and plutonic rocks in the clast assemblage of petromictic conglomerates. This association is similar to the composition of the Račice conglomerates of the Drahany Culm Basin and corresponds to the expected dominant supply of clastic material to the Culm basin from a point source situated in the southern part of Drahany Upland. In contrast, the clast assemblage of pebbly mudstone indicates provenance from local source. The dominance of clasts of acid volcanic rocks corresponds to the intense terrestrial volcanic activity during deposition of the Cvilin and Brumovice Beds of the Moravice Formation. It also demonstrates the complex morphology and presence of temporary depocentres at the front of the Variscan accretion wedge, as can be observed in modern peripheral foreland basins.

Key words: gravity flow deposits, provenance, Moravice Formation, Nizký Jeseník Culm Basin.

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RADIOAKTIVITA SEDIMENTŮ OSTRAVSKÉHO SOUVRSTVÍ V ČESKÉ ČÁSTI HORNOSLEZSKÉ PÁNVE A MOŽNÁ ENVIRONMENTÁLNÍ RIZIKA

RADIOACTIVITY OF SEDIMENTARY ROCKS OF THE OSTRAVA FORMATION IN THE CZECH
PART OF THE UPPER SILESIAN BASIN AND POSSIBLE ENVIRONMENTAL RISKS

JIŘÍ ZIMÁK

Abstract

Zimák, J., 2022: Radioaktivita sedimentů ostravského souvrství v české části hornoslezské pánve a možná environmentální rizika. - Acta Musei Moraviae, Scientiae geologicae, 107, 2, 203-214 (with English summary).

Radioactivity of sedimentary rocks of the Ostrava Formation in the Czech part of the Upper Silesian Basin and possible environmental risks

The paper provides detailed information about natural radioactivity of sedimentary rocks of the Ostrava Formation in the Czech part of the Upper Silesian Basin. The Ostrava Formation consists of Carboniferous (Namurian) coal-bearing strata of paralic development. Lithologically, the formation is very heterogeneous, with alternating cyclically arranged marine, brackish and terrigenous sediments. These are predominantly siliciclastics with a psammitic, aleuritic or pelitic structure (predominantly fine- to medium-grained sandstones, arkose sandstone, siltstone and claystone), often with an increased content of organic matter, concentrating into coal seams. The coal seams mainly comprise high rank (bituminous) coal. Conglomerates are less abundant in the Ostrava Formation. Potassium, uranium and thorium contents were measured using a laboratory gamma-ray spectrometer in 226 rock samples. It is evident from the calculated values of mass activity of ^{226}Ra equivalent (a_m) that the natural radioactivity of conglomerates and psammites without a visible organic matter (on average 72 and 144 $\text{Bq}\cdot\text{kg}^{-1}$, respectively) is lower as the natural radioactivity of the average Earth crust (about 180 $\text{Bq}\cdot\text{kg}^{-1}$). Slightly higher average a_m values were found in siltstones and claystones with a low organic matter content (226 $\text{Bq}\cdot\text{kg}^{-1}$), coaly siltstones and coaly claystones (240 $\text{Bq}\cdot\text{kg}^{-1}$), coaly sandstones and arkose sandstones (232 $\text{Bq}\cdot\text{kg}^{-1}$), and in coal (202 $\text{Bq}\cdot\text{kg}^{-1}$). These values pose no health risk. However, high contents of uranium in coal and coaly sediments (on average around 8 ppm U) and consequently very high concentrations of uranium predicted in fly ash derived from the coal can be harmful to the environment and to human health.

Key words: Upper Silesian Basin, laboratory gamma-spectrometry, gamma dose rate, coal, uranium.

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1. ÚVOD

Převážná část ionizujícího záření, jemuž je vystavena naše populace, má terestrický původ a primárně souvisí s přítomností přirozených primordiálních radionuklidů v horninovém prostředí (např. BENCKO *et al.* 2011, BEAMISH 2014). Tento článek sumarizuje údaje o obsazích tří hlavních radioaktivních prvků (draslík, uran, thorium) v horninách ostravského souvrství, získané na základě laboratorních gamaspektrometrických analýz horninových vzorků odebraných jak na výchozech, tak montánních haldách v intravilá-

VULKANOKLASTICKÝ HORIZONT V KLADORUBECH U LETOVIC (BOSKOVICKÁ BRÁZDA)

VOCLANOCLASTIC HORIZON AT KLADORUBY NEAR LETOVICE (BOSKOVICE BASIN)

JAKUB JIRÁSEK, DALIBOR MATÝSEK, STANISLAV ŠTAMBERG, DANIEL ŠIMÍČEK

Abstract

Jirásek, J., Matýsek, D., Štamberg, S., Šimíček, D., 2022: Vulkanoklastický horizont v Kladorubech u Letovic (Boskovická brázda). – Acta Musei Moraviae, Scientiae geologicae, 107, 2, 215–225 (with English summary).

Volcanoclastic horizon at Kladoruby near Letovice (Boskovice Basin)

The occurrence of volcaniclastic rock was confirmed for the second time within the Letovice Formation (Asselian to Artinskian?) of the Boskovice Basin. Volcaniclastics are reported from the Kladoruby locality near Letovice, ca. 40 km N of Brno. Volcaniclastic layer was found in paleontological excavations in section Dolní Pepřík (GPS N 49° 33.080' E 016° 35.843') of Lubě Horizon. Locality is important for abundant Permian acanthodians, xenacanthid sharks, rare fossils of actinopterygian fish, discosauriscid amphibians, and very abundant plant remains. Three samples representing top, middle and bottom parts of the layer reaching 12 cm were taken. Mineralogical composition shows approximately the same portions of montmorillonite, albite, and kaolinite in all samples (each ca. 20–30 wt.%), with constant admixture of both idiomorphic and angular quartz not exceeding 6 wt.%. Calcite is also very common, assumed completely of secondary origin. Prismatic apatite crystals, well developed zircon crystals, cubic pyrite, *limonite*, and etched baryte were identified in heavy mineral fraction. Grain size of the rock equals to sandy silts, after the decalcification even to silts. There is a strong evidence for volcaniclastic origin reflected in the composition of clay components (montmorillonite is exceptional in the basin sediments) combined with the well-developed crystals of apatite and zircon. However, there is no credible way how to estimate the share of terrestrial component, and therefore distinguish between tuff and tuffite. TAS classification should not be used for this rock because very high loss on ignition (26%). According to the Zr/Ti vs. Nb/Y diagram the rocks belong to trachyandesites. Zircon saturation thermometry yielded crystallization temperature range 700–750 °C and rhyolite parent magma. It is intriguing that Kladoruby is second locality within the Boskovice Basin, where the deposition of volcanic ash is linked with presence of fossiliferous shales rich in organic matter. However, to link volcanic ash fertilization with organic-matter production leading to the bituminous shale horizons development in the basin needs further investigation. The volcaniclastic rock seems to be suitable for U-Pb dating of zircon and apatite.

Key words: volcaniclastic rock, Permian, mineralogy, petrology, geochemistry, Czech Republic

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FACIES DIVERSITY OF THE BRNO JURASSIC FROM MICROFACIES AND MICROFAUNA POINT OF VIEW

FACIÁLNÍ ROZMANITOST BRNĚNSKÉ JURY Z HLEDISKA MIKROFACIÍ A MIKROFAUNY

MIROSLAV BUBÍK

Abstract

Bubík, M., 2022: Facies diversity of the Brno Jurassic from microfacies and microfauna point of view. - *Acta Musei Moraviae, Scientiae geologicae*, 107, 2, 227-239 (with Czech summary).

Facies diversity of the Brno Jurassic from microfacies and microfauna point of view

Denudation remnants of Upper Jurassic carbonates in Brno area were originally part of vast carbonate platform on the eastern margin of the Bohemian Massif. High facies variability reflects original variable mosaic of shallow marine habitats. The prevailing microfacies type are biopelmicritic spiculites (packstones) with enclaves of biomicrite, intrabiomicrite and pelmicrite (packstones and wackestones). Locally bed of crinoidal biosparitic limestone (encrinite) and oosparitic limestone occurs. Microfaunal associations were studied in acid residues of limestone. Calcareous benthic foraminifera, sponge spicules and echinoderm ossicles prevail over other groups (bryozoans, bivalves, ostracods, brachiopods, stromatoporoids etc.). Comparative analysis of the microfacies from thin sections and quantitative analysis of microfauna from acid residues was applied for identification of original locality of pliosaur tooth from the collections of the Masaryk University, Brno, lacking the original label. Combined microfacial features and characteristic composition of microfossil assemblage from the limestone enclosing the tooth show that the find very probably came from lower part of Stránská skála section.

Key words: Bohemian Massif, Oxfordian, microfacies, micropalaeontology, Foraminifera.

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1. INTRODUCTION

Carbonate facies of the Jurassic in eastern Brno outskirts were originally part of carbonate platform encompassing south-eastern Moravia up to vicinity of Znojmo, Třebíč and Svitavy in the west, continuing to Vienna area to the south and connected with the Jurassic in Poland and Bavaria (UHLIG 1882, OPPENHEIMER 1926, KOUTEK 1927, ELIÁŠ 1981, ADÁMEK 2005). Towards the south and east, the Jurassic carbonates are buried under the sedimentary fill of the Vienna Basin and nappes of Outer Carpathians.

Jurassic limestones in „Latein“ near Brno (today's Brno-Slatina neighbourhood, where Stránská skála is situated) were mentioned already by Boué (1829). More detailed investigations of the Jurassic at localities Olomučany, Stránská skála, Bílá hora and Švédské šance performed UHLIG (1882). The first note on the Jurassic remnant at Hády Hill was published by MAKOWSKY (1893). KOUTEK (1926, 1927) provided results of early sedimentary-petrography studies based on thin sections. The microfacies of the Brno Jurassic were characterized first by ELIÁŠ (1981).

KENOZOICKÉ SEDIMENTY V OBOŘE HOLEDNÁ A JEJICH VÝZNAM PRO ARCHEOLOGII

THE CENOZOIC SEDIMENTS IN THE HOLEDNÁ GAME RESERVE
AND THEIR SIGNIFICANCE FOR ARCHAEOLOGY

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Abstract

Buriánek, D., Hubatka, F., Kirchner, K., Krejčí, O., Krejčí, V., Navrátil A., 2022: Kenozoické sedimenty v Oboře Holedná a jejich význam pro archeologii. – Acta Musei Moraviae, Scientiae geologicae, 107, 2, 241-254 (with English summary).

The Cenozoic sediments in the Holedná game reserve and their significance for archaeology

The Cenozoic sediments partially cover crystalline rocks in the area of Holedná game reserve (Brno town, South Moravia). Holocene to Pleistocene eluvial and/or slope sediments and relics of Otnangian (Lower Miocene) sediments fill the wide valley to a depth of up to 20 m on the western slope of the Holedná Hill (391 m.a.s.l.). Several landslides were documented in these sediments based on the movement of the fortification wall from the Late Bronze Age. Blocks of limonite-rich sediment situated on the western slope of Holedná Hill (391 m.a.s.l.) were spatially related to the Cenozoic sediments. Sand to silt fraction in the iron oxo-hydroxides matrix consists of quartz, feldspar and mica. According to the geochemistry, we interpret these sediments as a mixture of the material from at least two sources: products of Neogene lateritic weathering rich in iron oxo-hydroxides (Fe_2O_3 76.2 wt. %) and continental Otnangian sediments (sand- and silt-rich layers). In terms of their origin, the Otnangian sediments in the vicinity of Brno town remain a controversial problem. These sediments are predominantly continental, with clastic material originating from local sources (the transport distance from several kilometres up to tens of kilometres).

Key words: geochemistry, iron hydroxides, Otnangian sediments, Brno, South Moravia, Czech Republic.

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VÝJIMEČNÝ FOSILNÍ ZÁZNAM STŘEDNOMIOCENNÍCH SAVCŮ Z LOKALITY CZUJANOVA PÍSKOVNA (MIKULOV, ČESKÁ REPUBLIKA)

EXCEPTIONAL FOSSIL RECORD OF THE MIDDLE MIOCENE MAMMALS FROM THE CZUJAN'S
SANDPIT (MIKULOV, CZECH REPUBLIC)

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Abstract

Březina, J., 2022: Výjimečný fosilní záznam střednomiocenních savců z lokality Czujanova pískovna (Mikulov, Česká republika). – Acta Musei Moraviae, Scientiae geologicae, 107, 2, 255–267 (with English summary).

Exceptional fossil record of the middle miocene mammals from the Czujan's sandpit (Mikulov, Czech Republic)

Czujan's sandpit (Mikulov=Nikolsburg, Czech Republic) was an important fossil site of middle Miocene mammals and reptiles, whose remains were found in several sedimentary infills throughout the whole existence of the sandpit. The fossil record from Czujan's sandpit is unique in particular due to the abundance of rare species – i.e. the mammutid *Zygodon turicensis* and the bovid *Tethytragus stehlini*. The high-quality preservation allows the study of bones in great anatomical detail, but due to the absence of field documentation, the number and completeness of the skeletons were still unknown. In this work, 397 remains found in 1930s–1970s, stored in several scientific institutions and one private collection, were studied. By comparing of the date of finding, the identical type of fossilization, and the corresponding morphology and size, at least 61 individuals of mammals were recognized. The most complete species is *Zygodon turicensis* (30 %), represented by at least 24 individuals of different ages and sexes (recognized 7 females and 3 males by the epiphyseal fusion vs. size). It is followed by *Brachypotherium brachypus* (21 %) with at least 6 adult individuals, *Tethytragus stehlini* (15 %) with a minimum of 14 adult individuals, and then *Hoploacatherium* sp. (12 %), *Gomphotherium angustidens* (7 %), Palaeomerycidae indet. (7 %) and *Heteroprox larteti* (3 %) each with MNI = 3. Conversely, the taxa *Anchitherium* sp., *Amphicyon* cf. *major*, *Prodeinotherium* cf. *bavaricum*, cf. *Retroporcus matritensis* with only 1–3 skeletal elements represent at least one individual for each of them. These results represent the first comprehensive overview on the quality of the fossil record of the middle Miocene mammals from the Czujan's sandpit site, which will be especially important for subsequent studies focused on individual species. The relatively high anatomical completeness (30 %) of *Z. turicensis* (including almost complete permanent and deciduous dentition, tusks, and a large part of the postcranial skeleton), which represents the skeletons of several males and females of different ages, shifts Czujan's sandpit among the most important localities of this species worldwide.

Key words: Czujan's sandpit, Mikulov, Nikolsburg, Miocene, *Mammutidae*, *Zygodon*, *Tethytragus*.

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SEDIMENTY STŘEDNÍHO PLEISTOCÉNU V SEVEROZÁPADNÍ ČÁSTI VIDNAVSKÉ NÍŽINY (OKRAJ PACZKÓWSKÉ KOTLINY) - GEORADAROVÝ VÝZKUM

THE MIDDLE PLEISTOCENE SEDIMENTS IN NORTHWESTERN PART OF VIDNAVA LOWLAND
(PACZKÓW GRABEN MARGIN) - GROUND PENETRATING RADAR SURVEY

MARTIN HANÁČEK, BARBORA PROCHÁZKOVÁ, ZBYNĚK ENGEL

Abstract

Hanáček, M., Procházková, B., Engel, Z., 2022: Sedimenty středního pleistocénu v severozápadní části Vidnavské nížiny (okraj Paczkówské kotliny) - georadarový výzkum. - *Acta Musei Moraviae, Scientiae geologicae*, 107, 2, 269-285 (with English summary).

The middle pleistocene sediments in northwestern part of Vidnava lowland (Paczków graben margin) - ground penetrating radar survey

The Vidnava Lowland in the northern Sudetic Foreland is characterized by extensive alluvial and fluvial sediments deposited during the Weichselian. Pre-Weichselian deposits are very rare and occur as isolated relics only. The Písečník Hill (288 m a.s.l.) with adjacent plateau represents one of the largest relics in the western part of the lowland. It consists of Elsterian glacitectorites, infills of subglacial cavities, and melt-out tills, underlain by Neogene deposits. A ground penetrating radar (GPR) survey of the deposits was undertaken in order to identify buried sedimentary units. The GPR profiles revealed five facies and two subfacies: GPR1a (channel infill - large-scale bedsets of dunes, lateral-downstream accretion); GPR1b (mid-channel bar - bedload sheets, low relief dunes, vertical-downstream accretion); RF2 (channel infill: dunes and transverse bars, downstream-vertical accretion or upstream accretion on mid-channel bar-head); RF3 (scours infill or bar margin deposits, lateral-downstream accretion); RF4 (climbing dunes along channel outer bank); RF5 (coarse gravelly to bouldery sheet flow deposits). The sedimentary architecture of RF1-RF4 facies is interpreted as a part of braided river channel-belt with mid-channel bars and side bars separated by sinuous channels. The internal structure of the deposits and abundant erratics indicate the deposition in ice-marginal river or ice-marginal valley. The RF5 facies is interpreted as a Saalian alluvial fan in superposition above the glaciofluvial deposits.

Key words: subsurface sedimentary architecture, proglacial glaciofluvial bar and channels, Elsterian European Ice Sheet Complex, Elsterian-Saalian alluvial deposits, Rychleby Mts. Foreland, Eastern Sudetes, Czechia.

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1. ÚVOD

V javornické části Vidnavské nížiny existuje jediná lokalita odhalující reliktní sedimentárního archivu vývoje této nížiny ve středním pleistocénu. Jedná se o pahorek Písečník

TOADSTONES AND SNAKE EYES FROM THE CABINET OF CURIOSITIES OF THE STRAHOV MONASTERY IN PRAGUE AND FROM THE FORMER IMPERIAL COLLECTION IN VIENNA

ROPUŠÍ KAMENY A HADÍ OČI Z KABINETU KURIOZIT STRAHOVSKÉHO KLÁŠTERA V PRAZE
A PŮVODNÍ CÍSAŘSKÉ SBÍRKY VE VÍDNI

RŮŽENA GREGOROVÁ

Abstract

Gregorová, R., 2022: Toadstones and snake eyes from the Cabinet of Curiosities of the Strahov Monastery in Prague and from the former Imperial Collection in Vienna. - *Acta Musei Moraviae, Scientiae geologicae*, 107, 2, 287-299 (with Czech summary).

Toadstones and snake eyes from the Cabinet of Curiosities of the Strahov Monastery in Prague and from the former Imperial Collection in Vienna

Twelve button-like fossil teeth from the Cabinet of curiosities of Strahov Monastery in Prague and the former Imperial collection in Vienna are analysed. Teeth belong to different systematic groups of various geological ages. Some teeth are modified by grinding and polishing and they were probably used as raw material for an art object or jewellery. These teeth were thought to be so-called toadstones (*crapaudine*, *lapis bufonis*, *batrachites*) and snake eyes (*occhi di serpe*, *oculis serpentum*) in the pre-scientific history. The tradition of toadstones is associated above all with Western Europe (mainly England and France) and its origins can be traced back to the Middle Ages. Snake eyes are only associated with the island of Malta and their tradition is most widespread only from the 16th-17th century. While there are many artefacts, especially toadstone rings, tangible evidence of snake eyes is relatively scarce. Fossil teeth (toadstones and snake eyes) from the Strahov Cabinet of curiosities and Vienna Imperial collection are important relics of the historical understanding of fossils.

Key words: toadstones, snake eyes, *Scheenstia maximus*, *Pagrus cinctus*, Strahov Monastery, Imperial Cabinet Vienna, Malta, History of palaeontology.

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1. INTRODUCTION

Historical sources show that fossils played an interesting and important role in human thought (mythology, philosophy, theology, art, history, medicine, folk culture and science). They were considered as results of the forces *vis plastica* or *vis lapidifica*, as an evidence of the deluge, as relicts of Saints, remains of dragons, unicorns and giants. A large number of fossils have been used medicinally and therapeutically from classical to modern times (ammonites, belemnites, sea urchins, amber, shark and fish teeth and many others), (e.g. DUFFIN 2008).

Direct evidences of this phenomenon are deposited in museums, universities, castles, cabinets of curiosities and historical pharmacies that carefully preserve this tangible evidence of human thought. Among these fossils, shark and fish teeth played a signifi-

OHLÉDNUTÍ ZA PROFESOREM RUDOLFEM MUSILEM

Nejenom odborná veřejnost, ale určitě i ta laická zajímaví se o přírodní prostředí a faunu v pravěku, s litostí zaznamenala, že dne 23. února 2022 zemřel prof. RNDr. Rudolf Musil, DrSc., významný kvartérní paleontolog a geolog. Rozsah vědeckých zájmů profesora Musila byl obdivuhodný. Jako paleontolog se věnoval výzkumu kvartérních obratlovců (ptáků a především savců). Zabýval se jejich systematikou a vnitrodruhovými změnami, věnoval se obecným zákonitostem evoluce i procesům vymírání ve vztahu ke klimatickým změnám a vývoji přírodního prostředí v kvartéru. Velmi úzce tak řešil otázky týkající se nejen systematické paleontologie, ale i paleoekologie, biostratigrafie a tafonomie. Jeho monografické práce zaměřené na systematiku a evoluci rodů *Equus* a *Ursus* jsou dodnes cenným zdrojem informací o generace mladších vědců. Profesor Musil se intenzivně zajímal o kvartérní geologii a stratigrafii, kde se jeho výzkum zaměřil na problematiku sprašových komplexů a fosilních půd, zabýval se vývojem fluvialní sedimentace včetně říčních teras a jako nadšený speleolog studoval vznik a vývoj jeskyní a jejich sedimentů, především v oblasti jím milovaného Moravského krasu.

Dlouhá životní pouť profesora Musila započala 5. 5. 1926 v Brně-Lišni. Po obecné škole vystudoval ve válečných letech 1937–1945 klasické gymnázium a v letech 1945–1949 pokračoval ve studiích na Přírodovědecké fakultě Masarykovy univerzity. Zde se věnoval zeměpisu a především přírodopisu, tedy kromě botaniky a zoologie také geologii, paleontologii, mineralogii a petrografii. Po vystudování univerzity R. Musil necelý rok učil na Chlapecké střední škole v Petřvaldě u Ostravy, na podzim 1950 nastoupil vojenskou základní službu. Po vojně se již do Petřvaldu nevrátil, začal pracovat na Geologicko-paleontologickém oddělení Moravského muzea v Brně, kde se už v roce 1952 stal doktorem přírodních věd (RNDr.). Moravskému muzeu zůstal Rudolf Musil věrný 24 let, a to až do konce roku 1976. V letech 1954–1971 byl vedoucím Geologicko-paleontologického oddělení, v letech 1972–1976 vedl z pozice ředitele celé muzeum. V průběhu služby v Moravském muzeu získal v roce 1960 hodnost kandidáta geologicko-mineralogických věd (CSc.), dále byl habilitován pro obor geologie kvartéru a paleontologie (v roce 1966) a stal se doktorem geologicko-mineralogických věd (DrSc.) v roce 1968. Na začátku roku 1977 se Rudolf Musil přesunul jako docent na Katedru geologie a paleontologie PřF UJEP (dnešní Ústav geologických věd PřF MU), kde na vedlejší pracovní poměr pracoval už v roce 1976. Řádným profesorem v oboru paleontologie byl jmenován v roce 1980 na Přírodovědecké fakultě Univerzity Komenského v Bratislavě. Až do odchodu do důchodu v roce 1991 působil R. Musil na Přírodovědecké fakultě MU (tehdejší UJEP), v letech 1978–1989 vedl Katedru geologie a paleontologie. Ani v důchodovém věku ovšem profesor Musil kvartérní paleontologii a geologii neopustil, na Ústavu geologických věd PřF MU pracoval na částečné úvazky, v roce 2000 se stal emeritním profesorem.

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