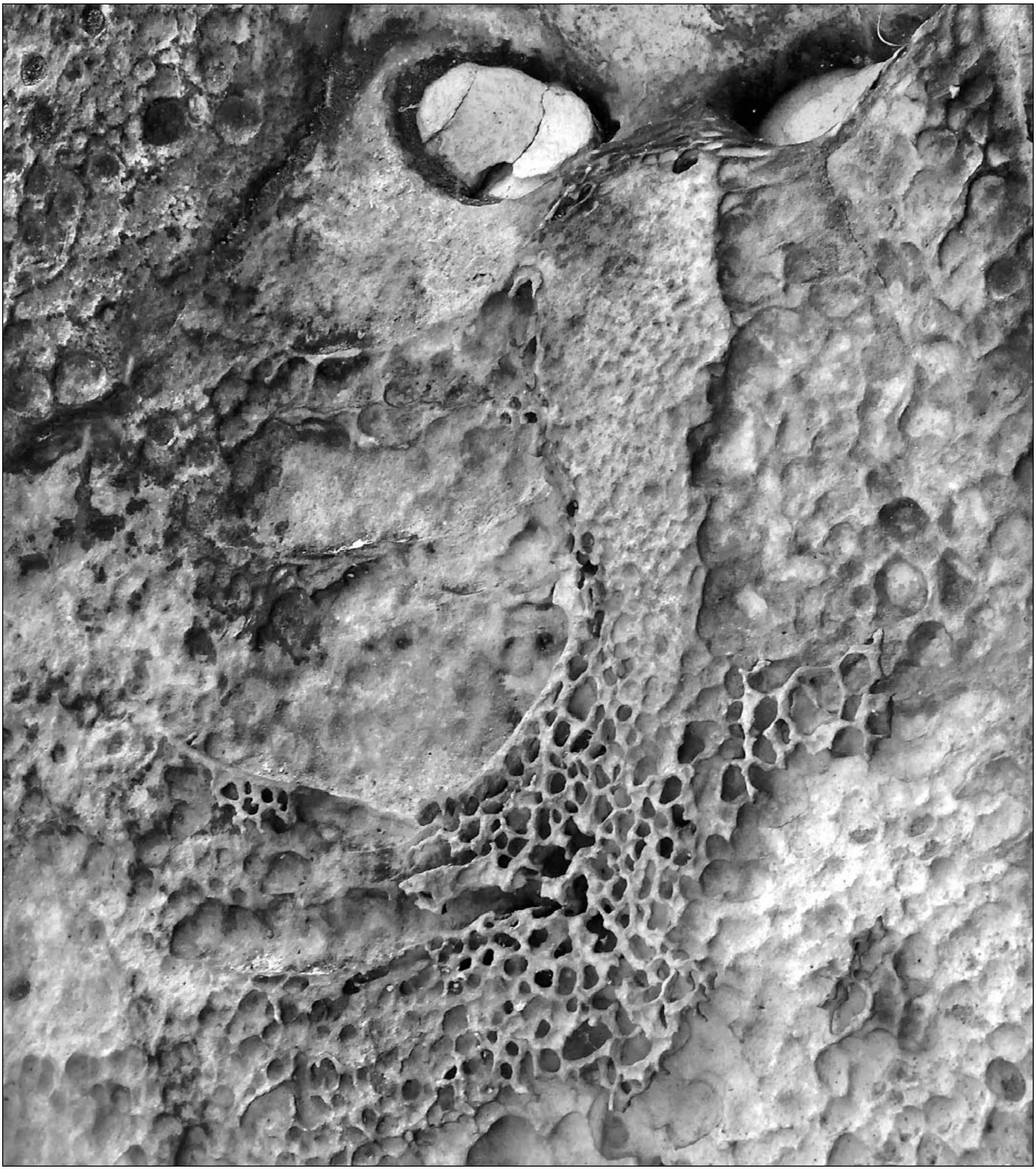
RESEARCH REPORTS 2007 & 2008

Institute of Geology AS CR, v. v. i.



Published by the Institute of Geology of the Academy of Sciences of the Czech Republic, v. v. i.

Praha, December 2010

Cover photo: Sandstone microrelief in the Klokočské skály Cliffs, Bohemian Cretaceous Basin. Photo by J. Adamovič.

2007
&
2008

Research Reports

The report was compiled and finally edited by P. Čejchan and P. Bosák.

The English version was revised by J. Adamovič.

published in Prague,

December 2010

by the Institute of Geology

Academy of Sciences of the Czech Republic, v.v.i.

Contents

1. Introduction

The year 2007 represented an important legislative milestone for the Academy of Sciences of the Czech Republic. Former state-controlled research institutes were transformed into so-called public research institutions (“veřejná výzkumná instituce“ in Czech, abbreviated as v. v. i.). According to the Act adopted by the Czech Parliament, such institutions should be dominantly financed from public resources, i. e. those coming through different ways from the state budget. It is expected that this legislative act permits a less restricted and less bureaucratic flow of the money, which is now covered by one budget and can be divided according to the needs of individual institutions (with some limitations, of course).

The legislation also modified the style of Institute management. Instead of a direct management by the Institute Director, Executive and Advisory (Supervisory) boards were established, and the Director is now the CEO of the Institute. The Institute Executive Board partly took the agenda of the former Scientific Council (which was cancelled), i. e. the approval of all scientific projects, international co-operation and agreements, and it partly deals with economic-management issues within the limits strictly stipulated by law (approval of budget and its changes, internal regulations, changes on top positions in the Institute structure, selection of the Director). The Board is elected by the Assembly of Institute Scientists and consists by at least ⅓ of non-institution employees. The Advisory Board has a control function and deals with financial, property, investment etc. issues. The Board is appointed by the Academy Head Office and it is composed of non-institution persons, except for one Institute representative.

The practical everyday life of the Institute of Geology has not changed much but all internal regulations had to be transformed, and a new financial code was established during 2007 and early 2008. The other important event was the completion of the construction project for a new institute building. The preparatory stage started already in mid-2001 but the lack of finance and the necessary administrative steps have delayed the construction that should be finalized during summer 2009. On November 2007, construction started by demolition of one of three existing buildings and excavation for new foundations. We had to move the whole library to be housed in the facilities of the Laboratory of Physical Rock Properties. During 2008, the building skeleton was completely erected. We believe that the new building will not only help Earth Science scholars to work in better condition but to a new consideration of geology as one of the traditional disciplines.

Scientific life of the Institute has continued in the same manner as during the last few years. The number of approved grant projects and international publications has slightly increased and this trend is continuing even this year. The mid-term evaluation of the Institute of Geology was highly positive and matched the best Czech research centers involved in Earth studies. The variety of the themes and results solved during 2007–2008 are presented in this volume.

The number of employees remained approximately the same as in previous years, in spite of minor fluctuations. We hope that the positive trends will continue in the next years, as concerns both the relatively favorable economic conditions and the scientific output.

We also decided to change the long-time published Annual Report to Research Reports with the aim to deal more with the results and achievements of the Institute staff rather than with administrative news. We hope that you, our readers, will welcome such change.

Pavel Bosák, Chairman of the Executive Board
Václav Cílek, Institute CEO

■ A – Demolition of building ”C”; B – Construction of the new building (July 28, 2008); C – Construction of the new building (August 13, 2008); D – Rough construction finished (September 25, 2008). Photos by J. Brožek.

2. General Information

Institute of Geology of the ASCR, v. v. i.
Rozvojová 269
165 00 Praha 6 - Lysolaje
Czech Republic
phone: +420-233087208 (secretary)
+420-233087209 (director)
fax: +420-220922670
e-mail: inst@gli.cas.cz

Institute of Geology of the ASCR, v. v. i.
Laboratory of Paleomagnetism
U Geofyzikálního ústavu 769
252 43 Průhonice
Czech Republic
phone/fax: +420-272690115
e-mail: inst@gli.cas.cz

Institute of Geology of the ASCR, v. v. i.
Laboratory of Physical Properties of Rocks
Puškinovo náměstí 9
160 00 Praha 6 - Dejvice
Czech Republic
phone: +420-224313520
fax: +420-224313572
e-mail: inst@gli.cas.cz

Information on the Institute is available on Internet:
http://www.gli.cas.cz

The Institute of Geology of the AS CR, v. v. i., is a research institute belonging to the Academy of Sciences of the Czech Republic (AS CR). It concentrates on the scientific study of the structure, composition and history of the Earth's lithosphere and the evolution of its biosphere. Although the Institute does not have the opportunity to cover all geological disciplines (in the widest sense) or regionally balanced geological studies, the methods of its activity span a relatively broad spectrum of problems in geology, geochemistry, paleontology, paleomagnetism and rock mechanics. The Institute takes part in the understanding of general rules governing evolutionary processes of the lithosphere and biosphere at regional as well as global scale; for this purpose, the Institute mostly employs acquisition and interpretation of relevant facts coming from the territory of the Czech Republic.

The Institute of Geology AS CR, v. v. i., is a wide-spectrum institute developing essential geological, paleontological, petrological, mineralogical and other disciplines, lately accentuating environmental geology and geochemistry. The major research areas covered by the Institute are:

- Petrology and geochemistry of igneous and metamorphic rocks
- Lithostratigraphy of crystalline complexes
- Volcanology and volcanostratigraphy
- Structural geology and tectonics
- Paleogeography
- Terrane identification
- Taxonomy and phylogeny of fossil organisms
- Paleobiogeography of Variscan Europe
- Paleoecology (incl. population dynamics, bioevents)
- Paleoclimatology as evidenced by fossil organisms and communities
- Biostratigraphy and high-resolution stratigraphy
- Basin analysis and sequence stratigraphy
- Exogenic geochemistry
- Exogenic geology, geomorphology
- Quaternary geology and landscape evolution
- Karstology and paleokarstology
- Paleomagnetism
- Magnetostratigraphy
- Petromagnetism
- Physical parameters of rocks

The Geological Institute of the Czechoslovak Academy of Sciences (ČSAV) was founded on July 1, 1960. Nevertheless its structure had developed in period of 1957 to 1961. During the period, several independent laboratories originated: Laboratory of Paleontology, Laboratory of Engineering Geology, Laboratory of Pedology and Laboratory of Geochemistry; Collegium for Geology and Geography of the ČSAV represented the cover organization. On July 1, 1960, also the Institute of Geochemistry and Raw Materials of the ČSAV was established. This Institute covered technical and organization affairs of adjoined geological workplaces until their unification into Geological Institute of the ČSAV on July 1960.

On August 1, 1964 the Institute of Geochemistry and Raw Materials of the ČSAV was integrated into the Geological Institute. On July 1, 1969 the Institute of Experimental Mineralogy and Geochemistry of the ČSAV, successor of the Geochemistry and Raw Materials was newly established. A part of the staff of the Geological Institute joined the new institute. On January 1, 1979 the Institute of Experimental Mineralogy and Geochemistry was integrated into the Geological Institute.

On March 1, 1979, the Geological Institute was united with the Mining Institute of the ČSAV under the Institute of Geology and Geotechnics of the ČSAV, and finally split from the latter on March 1, 1990 again.

On January 1, 1993 the Academy of Sciences of the Czech Republic was established by the transformation from the ČSAV, and the Geological Institute became a part of the ASCR. The Institute belongs to the I. Department of Mathematics, Physics and Earth Sciences and to the 3rd Section of Earth Sciences. On January 1, 2007 the Institute became a public research institution (v. v. i.) by the change of legislation on research and development.

The economic and scientific concept of the Institute of Geology AS CR, v. v. i., and the evaluation of its results lie within the responsibility of the Executive Board and Supervisory Board that include both the internal and external members. Institutional Research Plans are evaluated by the Committee for Evaluation of Institutional Research Plans of AS CR Institutes at the AS CR. Besides research, staff members of the Institute are involved in lecturing at universities and in the graduate/postgraduate education system. Special attention is also given to presentation of the most important scientific results in the public media.

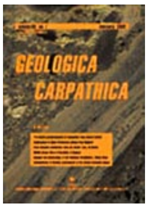
3. Publication activity of the Institute of Geology

3a. Journals

The Institute of Geology AS CR, v. v. i. has been printing the series of **GeoLines**. GeoLines (www.geolines.gli.cas.cz) is a series of papers and monothematic volumes of conference abstracts published by the Institute of Geology, Academy of Sciences of the Czech Republic. GeoLines publishes articles in English on primary research in many field of geology (geochemistry, geochronology, geophysics, petrology, stratigraphy, palaeontology, environmental geochemistry). Each issue of GeoLines journal is thematically consistent, containing several papers to a common topic. The journal accepts papers within their respective sectors of science without national limitations or preferences. However, in the case of extended abstracts, the conferences and workshops organized and/or co-organized by the Institute of Geology are preferred. The papers are subject to reviews. No volumes were published in 2007 and 2008, two volumes were under preparation.

Editorial Board:
Martin SVOJTKA, Editor-in-chief, (Academy of Sciences of the Czech Republic, Prague)
Jaroslav KADLEC (Academy of Sciences of the Czech Republic, Prague)
Radek MIKULÁŠ (Academy of Sciences of the Czech Republic, Prague)
Petr PRUNER (Academy of Sciences of the Czech Republic, Prague)
Petr ŠTORCH (Academy of Sciences of the Czech Republic, Prague)

Advisory Board:
George BUDA (Lorand Eötvös University, Budapest, Hungary)
Peter FLOYD (University of Keele, Great Britain)
Stephan JUNG (Max-Planck Institute, Mainz, Germany)
Marian KAZDA (University of Ulm, Germany)
Hans KERP (Wilhelm University, Münster, Germany)
Friedrich KOLLER (University of Wien, Austria)
Felicity Evelyn LLOYD (University of Reading, Great Britain)
David K. LOYDELL (University of Portsmouth, Great Britain)
Dirk MARHEINE (University of Montpellier, France)
Stanislav MAZUR (Wroclaw University, Poland)
Oto ORLICKÝ (Slovak Academy of Sciences, Bratislava, Slovakia)
Jiří OTAVA (Czech Geological Survey, branch Brno, Czech Republic)
Pavel UHER (Slovak Academy of Sciences, Bratislava, Slovakia)
Andrzej ŹELAZNIEWICZ (Polish Academy of Sciences, Wroclaw, Poland)



Since 2000, the Institute of Geology AS CR, v. v. i., has been a co-producer of the international journal **Geologica Carpathica** (www.geologicacarpathica.sk), registered by Thomson Reuters WoS database. The Institute is represented by one journal co-editor (usually the Institute Director) and several members of the Executive Committee (presently by P. Bosák and J. Hladil).

Geologica Carpathica publishes contributions to experimental petrology, petrology and mineralogy, geochemistry and isotope geology, applied geophysics, stratigraphy and paleontology, sedimentology, tectonics and structural geology, geology of deposits, etc. Geologica Carpathica is published six times a year. The distribution of the journal is performed by the Geological Institute, SAS. Online publishing is also provided through Versita on MetaPress platform with rich reference linking. Online ISSN 1336-8052 / Print ISSN 1335-0552.

In 2007, six issues (1 to 6) of Volume No. 58 were published with 43 scientific papers, and in 2008 six issues (1 to 6) of Volume No. 59 appeared with 38 scientific papers.

Address of editorial office:
Geological Institute, Slovak Academy of Sciences, Dúbravská cesta 9, P. O. BOX 106, 840 05 Bratislava 45, Slovak Republic, Phone: +421 (02) 5477 3961, Fax: +421 (02) 5477 7097, www.geol.sav.sk
Published by: Veda, Publishing House of the Slovak Academy of Sciences, Dúbravská cesta 9, 840 02 Bratislava 45, Slovak Republic, www.veda.sav.sk.
Co-publishers: Polish Geological Institute, Warszawa, Institute of Geology Academy of Sciences of the Czech Republic, Praha.
Chief Editor:
Jaroslav LEXA – Geological Institute SAS, Bratislava, Slovak Republic; igor.broska@savba.sk
Scientific Editor:
Jozef MICHALÍK – Geological Institute SAS, Bratislava, Slovak Republic; jozef.michalik@savba.sk
Electronic Version Editor:
Igor PETRÍK – Geological Institute SAS, Bratislava, Slovak Republic; igor.petrik@savba.sk
Associate Editors:
Georgios CHRISTOFIDES – President of CBGA, AU Thessaloniki, Greece; christof@geo.auth.gr
Václav CÍLEK – Institute of Geology AS CR, v. v. i., Prague, Czech Republic; cilek@gli.cas.cz
Jerzy NAWROCKI – Polish Geological Institute, Warsaw, Poland; jerzy.nawrocki@pgi.gov.pl

3b. Monographs, proceedings, etc.

The following titles were published in 2008.

RUDAJEV V. & **ŽIVOR R.** (Eds., 2008): Proceedings of 31st Czech – Polish – Slovak Symposium on Mining and Environmental Geophysics, Janov nad Nisou, September 24–27, 2007. Praha 2008, 72 p. ISBN 978-80-903511-8-9

The Proceedings contain full texts of six papers which were presented at the 31st Czech – Polish – Slovak Symposium on Mining and Environmental Geophysics. Besides these papers, the Proceedings contain abstracts and conclusions of all papers published in Acta geodynamica and geomaterialia, Vol. 5, No. 2 (150) and abstracts of only oral presentations from the Symposium. The papers are focused on the results obtained by geophysical research in mines and also deal with environmental problems.

ŠTORCH P. & KRAFT P. (Eds., 2008): Workshop on Graptolite volume of Treatise on Invertebrate Paleontology and GWG Meeting. Abstract book and excursion guide. Praha: Geologický ústav AV ČR, v. v. i., 51 p.

A series of 14 abstracts of oral presentations devoted to various aspects of modern graptolite research. Lectures were presented during international workshop and conference of graptolite workers at Svatý Jan pod Skalou. The abstract book is supplemented by a concise guide to two days of excursions across the most interesting Ordovician and Silurian localities of the Barrandian area of central Bohemia.

4. Research Reports

4a. Foreign Grants, Joint Projects and International Programs

MEIF-CT-2005-25605 MARIE CURIE CONTRACT under the Sixth Framework Programme: Geoarchaeology of European loess (*L. Lisá* & M. K. Jones, Department at Archaeology, Cambridge University, Great Britain)

The project was a part of the Specific Programme dedicated to structuring the European Research Area. Research was conducted at the Department at Archaeology, Cambridge University, Great Britain.

The principal aim of the research was to reconstruct the main geo-archaeological characteristics of the natural environment of Gravettian period recorded in loess deposits within Moravian valleys. The topography of European mountains and associated loess accumulations come together to render Moravia among the best locales to recover evidence of natural conditions and study the behavior of early modern humans. The natural corridor across the Moravian lowlands through the Moravian Gate serves as a chicane constraining the movement of humans and other species through the fluctuations of the Quaternary climate and environment. This corridor conserves deep loess deposits containing well studied Paleolithic sites, as well as buried soils and informative sediments.

Three main Gravettian localities within the Moravian corridor with sedimentological record of the last 30 ky were studied. The well known and the long-term studied Dolní Věstonice site (southern Moravia), the Předmostí site with the largest mammoth bone accumulations in Central Europe situated close to the Moravia/Silesia border, and the Hošťálkovice site on the southern edge of Silesia (northeastern Czech Republic). All three sites display different sedimentological and climatic records. Data based mainly on sedimentological, micromorphological and geochemical record show that during the Gravettian period, Dolní Věstonice had the most stable environment with good conditions for the preservation of short climate changes. Although the environment was quite stable, there were seasonal washouts and seasonal thawing and freezing cycles. Permafrost was obviously developed within the Last Glacial Maximum (LGM) above the cultural layer. The Předmostí site recorded a quite unstable environment including regular washout movements and landslides. Such environment depended mainly on elevated precipitation within this area. LGM is also recorded by the signs of permafrost, in this case displayed as frost edges. Hošťálkovice is a very poorly preserved locality with a lack of well developed cultural layers and sedimentological record. In general, Paleolithic hunters had to accept quite different and not only seasonal changes of environmental conditions during their migration within the Moravian corridor.

In the Middle and Upper Paleolithic sites of Dolní Věstonice, a 4.2 m thick loess sedimentary sequence of the Last Glacial exposed during excavations in 2006 was studied. This section is situated in the bottom slope of the Pavlovské vrchy Mountains, close to one of the anthropogenic terraces above an old brickyard. The landscape origin between the time and space is reflected mainly by the climatic changes within the end of the

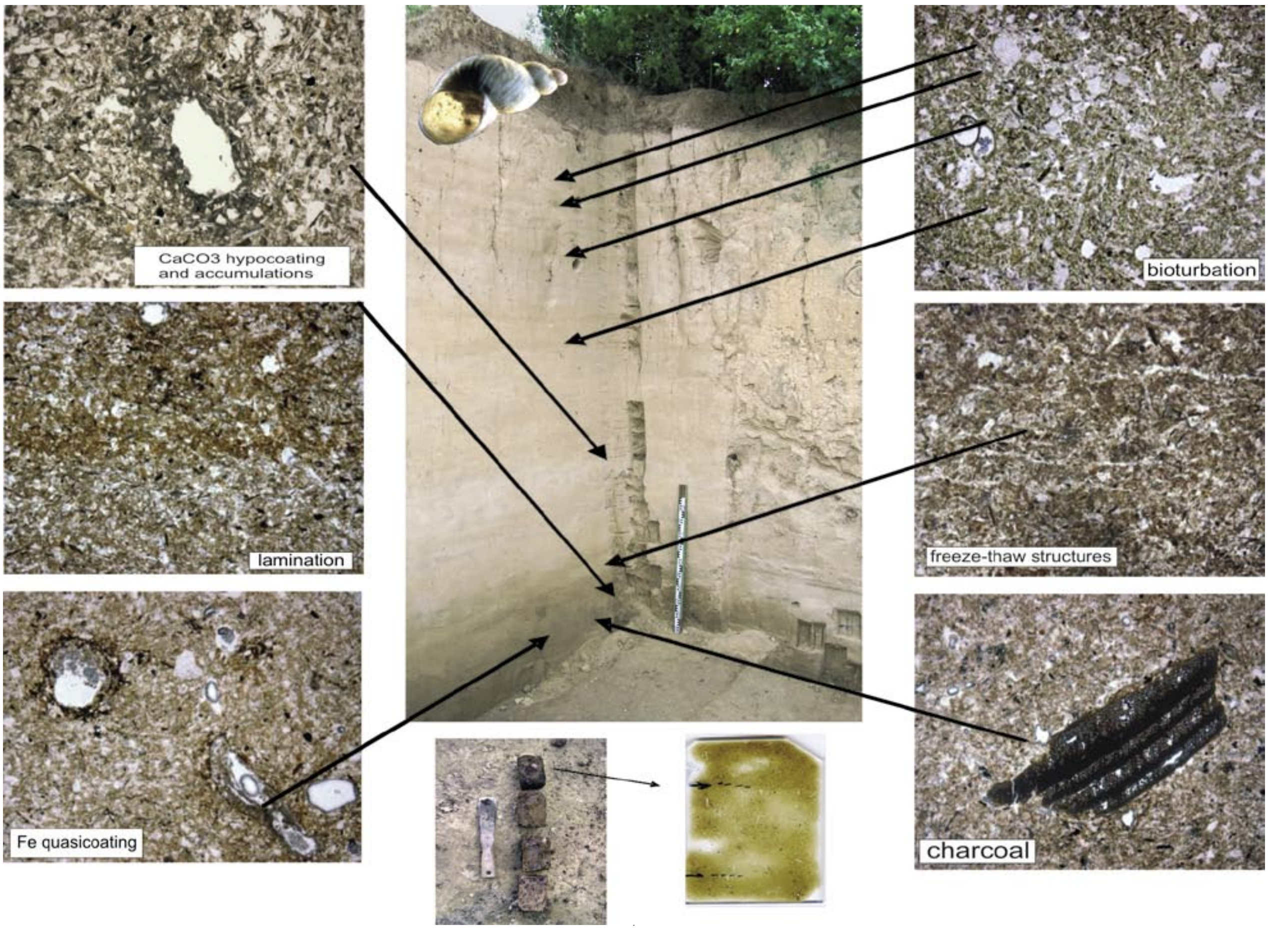
Last Interglacial and extreme climatic conditions of the LGM. These changes produced a system of sedimentological features now visible in the studied outcrop. The last 30 ky are represented by PK1 interstadial soil, Gravettian layers, calcium carbonate rich horizons and a complex of poorly developed soils. The interpretations of features are based on micromorphological studies, geochemistry, radiocarbon dating, magnetic properties and also on archaeological context.

The studied sequence contains A and B horizon of PK1 soil layer, a Gravettian cultural layer and several poorly developed soil horizons topped by the Holocene soil layer (Fig. 1). The entire profile was developed in loess sediments of an unchanging provenance. Geochemical and micromorphological methods together with magnetic properties were used for profile description. Three different parts were divided there according to field and laboratory observations.

The lower part, marked as **DVx1** is 1.6 m thick and contains A and B horizons of the PK1, laminated loess sediments with freezing and thawing structures, Gravetian occupational layer and a gley-like horizons. The ratio of Ca/Mg together with the Na amount in expandable clay minerals and magnetic susceptibility of sub-micrometer ferrimagnetic particles increase in B horizon of the PK1 soil layer that respond to a bit more intensive weathering but still under arid conditions (Brady 1990) and natural soil development (Shaw et al. 2001; Maher & Thompson 1999). The A horizon and loess above sediments together with occupational layer are interrupted by thin clayey and fine grain quartz layers. These layers respond to seasonal washout movements. Thawing and freezing structures are presented also there. The gley-like layers above are typical by increase in $CaCO_3$ on the base, but minimal changes are recorded in Ca/Mg ratio of expandable clay minerals. There is a lot of free voids due to the *in situ* oxidation. Such conditions could occur in water-saturated soil covered by vegetation. Some leaching structures are also present but not very intensive and, except the Ca movement, there is no proof of downward movements in the profile. The presence of permafrost possibly provided leak-proof layer and locked the underlying soil sediments. The presence of permafrost is documented by freezing and thawing structures and textures. PK1 soil marks the end of the last interstadial of MIS 3, and the soil layers above represent cold and wet conditions of the LGM. These conditions were evidently very important for Gravetian culture.

The second distinguished horizon, marked as **DVx2**, presents a rapid change in the precipitation. More than 1.5 m of dusty loess deposition is interrupted by poorly developed soils. There are minimal geochemical changes in this part, Ca/Mg ratio in expandable clay minerals has increasing trend, and soil carbonates are abundant due to weak leaching. These variations respond mostly to temperature changes. The climate generally becomes more arid and cold.

The upper part of the profile **DVx3** (1.1 m) is terminated by the Holocene pedogenesis. This part of the profile is typi-



■ **Fig. 1.** Section of Dolní Věstonice II. site together with the main examples of micromorphological features.

cal loess sediment with extremely poorly developed soil horizons. Only in the topmost part, there are some geochemical and magnetic variations, which respond to more intensive climatic changes in the very end of the Last Glacial Period (Maher & Thompson 1999; Anderson, Goudie & Parker 2007), when the climate becomes more humid and warmer.

ANDERSON D.E., GOUDIE A.S. & PARKER A.G. (2007): *Global Environments through the Quaternary*. – Oxford University Press: 1–359. Oxford.

BRADY N.C. (1990): The nature and properties of soils. – Macmillan Publishing Co.: 1– 621. New York.

MAHER B.A. & THOMPSON R. (1999): *Quaternary Climates, Environments and Magnetism*. – Cambridge University Press: 1– 390. Cambridge.

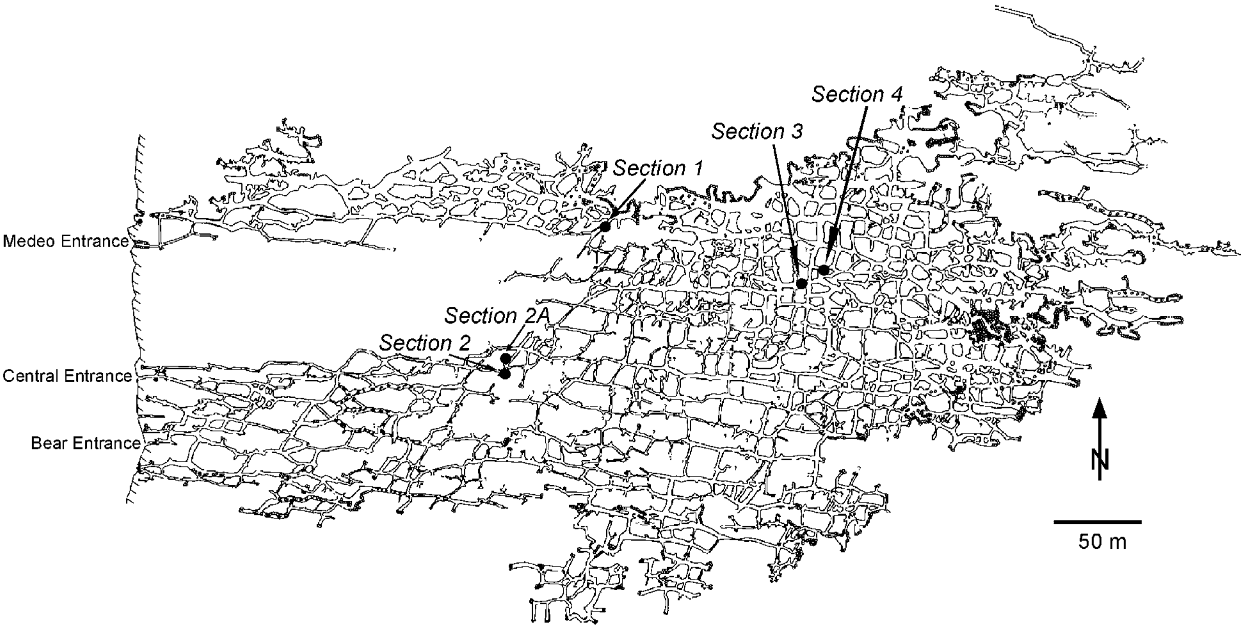
SHAW J. et. al. (2001): Ca-Mg ratios for evaluating pedogenesis in the piedmont province of the southeastern United States of America – *Canadian Journal of Soil Science*, 81: 415–421.

■ **Fig. 2.** View on the Angara–Lena Plateau formed by Lower Paleozoic sedimentary sequences. A white strip marked by arrow represents the limestone bed intercalated between sandstones probably containing undiscovered cave systems with potential length tens to hundreds of kilometers.

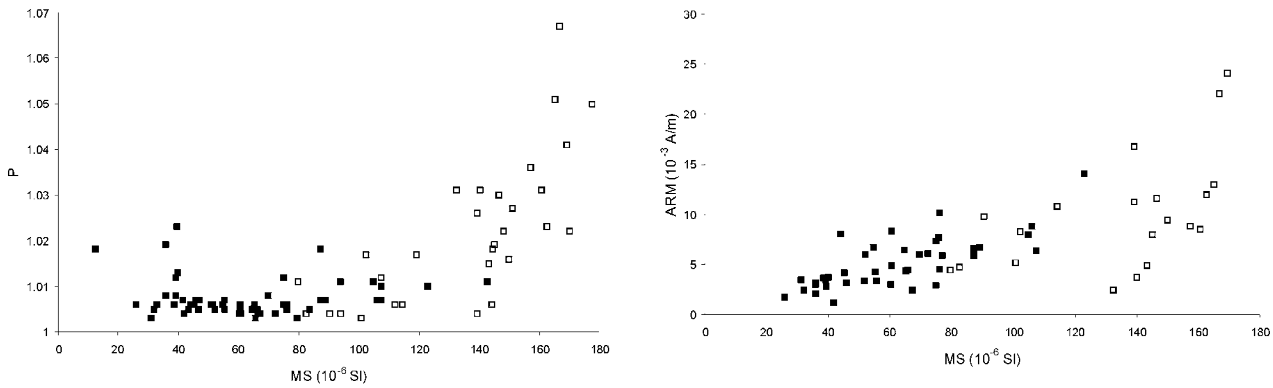
EU – INTAS Program, No. 03-51-4152: **Speleothems and other cave sediments from Siberia: an archive from the boreal climate zone with the potential for climate reconstruction on an annual to decadal basis (SPELEOARCH)** (*Project Leader:* H. Oberhänsli, GeoForschungsZentrum, Potsdam, Germany, S. Osintsev, Arabika Caving Club, Irkutsk, Russia, *J. Kadlec*, *M. Chadima* & *L. Lisá*)

The Botovskaya Cave is located on the Angara–Lena Plateau of the southern Siberian Craton ca 500 km N of Irkutsk City. The area reaching the altitudes of 1100 m a. s. l. belongs to the Zhigalovo District of the Irkutsk Area. The plateau was dissected by river valleys up to 400 m deep. Cave entrances lie at a relative elevation of 310 m above the Lena River level (Fig. 2). The cave system has developed in the Early Ordovician limestone formation with a thickness of 6 to 12 m. The limestone bed is underlain by Middle and Late Cambrian sandstone, siltstone, marl and gypsum and overlain by Middle Ordovician sandstone, limestone and argillite.

The studied sections of the cave deposits were documented with special reference to lithology, sedimentary structures and aggradation and erosion event records (Fig. 3). Mineral magnetic characteristics, i. e. low field bulk magnetic susceptibility (MS), anhysteretic remanent magnetization (ARM) together with anisotropy of magnetic susceptibility (AMS; Fig. 4) help to find source of the cave fills and estimate a mode of sediment transport to the cave passages. The character of quartz grain surfaces indicates transportation and post-depositional history of clastic sediments. Heavy minerals were separated and observed



■ **Fig. 3.** Botovskaya Cave (The Old World) map with indication of studied sections and dated flowstone (map after Göbel & Breitenbach 2003).



■ **Fig. 4.** Correlation between magnetic susceptibility (MS) and degree of magnetic anisotropy (P) – left; correlation between magnetic susceptibility (MS) and anhysteretic remanent magnetization (ARM) – right. Black squares – bottom sedimentary beds; empty squares – top sedimentary beds (after Kadlec et al. 2008).

in Canadian balsam. At least 300 grains of transparent heavy minerals were determined in each sample. The flowstone bed used for the paleomagnetic polarity measurements was dated by $^{230}Th/^{234}U$ radiometric method.

The sections in detrital cave sediments in the Botovskaya Cave evidence periodical sediment deposition. It cannot be excluded that the individual beds are separated by long hiatuses. Sediments of the cave fill are of two different types: the older, bottom sands are derived from weathered bedrock sandstones and were probably horizontally transported over a short distance. The overlying sediments dominated by clay and clay/sand were transported vertically with precipitation waters from the surface above the cave. The contrasting mineralogical and magnetic parameters of these top sediments indicate a different (more distant?) source. If the bottom sand was transported horizontally through the cave by flowing water, it must have taken place before the incision of the present deep valleys, probably in the Tertiary. Finer sediments were probably transported by wind and deposited on the surface above the cave. From there, they were removed by precipitation waters together with weathered surface products and deposited in cave passages. These processes, most probably of Quaternary age, were lacking any direct link to the local hydrographic network.

Morphologies of the passages in the Botovskaya Cave document two stages of cave system development: the older, phreatic stage was characterized by confined hydrological conditions in the artesian aquifer. Passages formed during this older stage were later partly remodeled by stagnant water corrosion. This younger stage affected the cave system probably in the Tertiary, before the deep river valleys were formed.

NSF Project No. EAR0418836: **Robust estimation of biodiversity dynamics: Global versus regional patterns in the end Ordovician mass extinction of graptolites.** (*Project Leaders: C.E. Mitchell, University at Buffalo NY, S.C.Finney, California State University Long Beach, M.J. Melchin,San Xavier University, New Scottia, Canada*)

Identified collaborator *P. Štorch* worked on subproject: **Graptolites of the pacificus through persculptus zones in the mountain ranges of north-central Nevada: a comparison of shelf-margin, continental rise and ocean basin faunas during the Late Ordovician mass extinction.**

The subproject focused on monographic description of the Late Ordovician (late Katian–early Hirnantian) graptolite fauna from reference sections in central Nevada. Four graptolite biozones (*Dicellograptus ornatus, Paraorthograptus pacificus, Normalograptus extraordinarius* and *Normalograptus persculptus*) defined by the first occurrences of their name giving taxa were recognized and successive graptolite assemblages comprising 46 taxa were reconstructed. Graptolite ranges encountered from Vinini and Martin Ridge sections have elucidated step-wise character of the Late Ordovician mass extiction of the graptolites and rapid but not immediate replacement of the late Katian DDO (dicellograptid–diplograptid–orthograptid) faunas by much impoverished normalograptid fauna in the course of the early Hirnantian. The maximum graptolite diversity – 26 taxa recorded in hot shales of the lower *pacificus* Biozone – subsequently dropped to 6 taxa in the *extraordinarius* Biozone. Several elements of DDO fauna survived the first cold spell of the latest Ordovician ice age in so far unidentified refugia and returned when climate temporarily ameliorated. Eventually, incoming glacial maximum wipped out all the remaining DDO *lazarus* taxa. Normalograptid fauna survived the glacial maximum and headed for late glacial recovery and subsequent post-glacial radiation which is not recorded in Nevadan sections due to prominent gap in sedimentation.

The Portugese Science and Technology Foundation No. SFHR/23787/2005: **Biostratigraphy of Paleozoic basins in W Portugal** (*Vavrdová M.* & G. Machado, Centro de Minerais Industriais e Argilas, Dep. Geociencias, Univ. Aveiro, Portugal)

The project is connected with the PhD. Thesis of Giles Machado. Organic-walled microfossils have been obtained with the help of standard palynological analysis from the strongly deformed and metamorphosed rocks from the Ossa Morena Zone (OMZ), W Portugal. The palynological analysis demonstrated that miospores and acritarchs can preserve their characteristics even under the high-grade metamorphic conditions.

Tectonostratigraphic units from the Western OMZ, Iberian Massif, crop out along the Porto–Coimbra–Tomar shear zone. Metasedimentary rocks were sampled from black shales interbedded with laminated siltstones in a monotonous pelitic succession heavily affected by the Variscan tectonic deformation. The Albergaria-a-Velha unit comprises Middle and Late Paleozoic sediments, which yielded cryptospores from the Silurian/Devonian boundary and Middle Devonian marine microplankton. Assemblages of unicellular marine microplankton show affinities to coeval paleocommunities described from La Vid Shales in Spain.

The possibilities of palynomorphs for a biostratigraphical assignment and a reconstruction of fossil environment within metasedimentary units are unexpectedly favorable. Additional samples yielded cryptospores such as *Scylaspora kozlica* (Dufka) Richardson et al. 2001 and *Scylaspora vetusta* (Rodriguez) Richardson et al., 2001. The Late Devonian dark shales contained 25 acritarchs and prasinophyte species. Recovered microfossils are currently identified and documented. Genera *Cymatiosphaera*, *Winwaloeusia* and *Villosacapsula* characterize the recovered assemblages. Cluster analysis (Jacard similarity measure) has been applied to the diversified Late Devonian palynomorphs. Initial qualitative results with the use of the Late Devonian acritarch associations recovered from the Albergaria-a-Velha tectonostratigraphic unit allow a biogeographical correlation of the W Portugal with the Late Devonian Laurussian marine Realm.

Several tectonostratigraphic units which occur along the Porto–Tomar Shear Zone in the W Portugal were investigated. Rock samples have been processes for their organic-walled microfossils. The Albergaria-a-Velha unit comprises several areas which are difficult to correlate in space and time due to the strong deformation and metamorphism. Nevertheless, randomly preserved short-sequences and their palynological content allow a general reconstruction of the original depositional setting in specific time periods and areas. The moderately preserved acid-resistant microfossils render possible correlations with neighboring terranes, less affected by metamorphic processes. Organic petrology, namely the vitrinite reflectance data suggest that at least a part of the unit was not subjected to extremely high temperatures. Sediments from such "metamorphic shade" were processed with HF, HCl and bleached. Recovered palynomorphs were scanned with the help of methods used for strongly carbonized organic debris (SEM observation, a reflected light microscope, a microscope with IS light source). Assemblages of Late Silurian-Early Devonian and Middle–Late Devonian age have been recognized. In some cases, palynomorphs reflect the effects of small-scale igneous intrusions. Thermal alteration varies between the 3–4+ TAI. SEM observation revealed the presence of unicellular cryptospores of genera *Artemopyra*, *Chelinohilates*, *Cymbohilates*, *Rugaletes*, and *Retialetes* in samples from the Silurian/Devonian transition. Well-diversified cryptospore morphotypes represent first predecessors of miospores derived from early land plants with vascular anatomy. A shallow sedimentation is indicated by fragments of plant debris and the presence of re-deposited specimens. In sequences of the late Middle Devonian age, the predominant palynomorphs are cysts of unicellular marine phytoplankton. Both groups of different botanical affinities reveal close ties to other Paleozoic peri-Gondwanan terranes, from Iberoarmorica to Perunica.

Subproject: **A Middle Devonian reef system in Western Ossa-Morena Zone: Refinement of stratigraphy and facies and comparison of Aletlejo and Sudetic tectonic facies models ("Odivelas limestones" with basalt underwater volcanoes and sea mounts)** (G. Machado, *J. Hladil*, *L. Koptíková*, *A. Galle*, *M. Vavrdová* in co-operation with P.E. Fonseca, Centre for Geology, University of Lisboa & F.T. Rocha, Department of Geosciences, University of Aveiro)

The described fauna allowed to constrain the age of the Odivelas limestones to an interval between the uppermost Eifelian and lowermost Givetian. The most frequently indicated ages of the sediments dominated the main body of the classical Odivelas Limestone seem to be centered roughly about stratigraphic equivalents of the Polygnathus hemiansatus Zone. However, it cannot be completely excluded that closely adjacent limestone occurrences would contain also some subordinate, stratigraphically condensed partial sequences (or lenses) of older (Eifelian) and younger (Givetian) ages. The magnetic susceptibility results do not clarify the stratigraphic positioning, and their correlation with the Kacak-Event lowest MS magnitudes and possible patterns is only tentative, having only slight supportive weight in comparison with biostratigraphical indications. It is mainly due to volcanic admixture in limestones and their slight metamorphism.

Field, petrographic and geochemical data indicate that volcanic and subvolcanic activity took place before, during and after the limestone deposition, and that at least a part of subvolcanic activity was syn- or post-deformational. The deposition of limestones most likely depended on the volcanic topography, with shallower areas supporting a bioherm–biostromal system with calciturbidite-type sedimentation on the flanks in the surrounding deeper areas. The described faunal assemblages dominated by crinoids, heliolitids, solitary rugose corals and brachiopods are suggestive of sedimentation on basalt seafloor highs developed along the inner side of the central Variscan facies-tectonic belts as recorded elsewhere in Europe and particularly in the Rhenish-facies areas. The relevant paleogeographical constraints are inferred, e. g., from the occurrences of *Cupressocrinites*, *Calceola* and a spectrum of possible tabulate coral taxa.

Palynology results. The Pedreira de Engenharia formation (Évora-Beja Domain, Ossa–Morena Zone), comprising calciturbidites and providing Eifelian conodonts, can tentatively be correlated with the Odivelas Limestone setting, but the paleogeography and paleoenvironmental conditions of the latter are unknown and contemporaneous volcanic activity in the area has not been recognized. Further work in the Pedreira de Engenharia area is needed to assess the relation between the two areas.

Project of the Universities of Málaga and Granada, Ministerio de Educación y Cultura del Reinado Español No. BTE 2000-1150: **Genesis of phyllosilicates in low-grade metamorphic conditions: Natural paragenesis (Intermediate units of the northern Rif) and experimental synthesis** (M.D. Ruiz Cruz, F. Franco, C. Sanz de Galdeano, Universities of Málaga and Granada, Spain & *J.K. Novák*)

The study of the diagenetic-to-metamorphic conditions evaluating an inner part of the Betic Cordilleras was shifted into the Rif Belt (northern margin of Marocco). The Betic and Rif Cordilleras as well as Alborán sea domain were formed by lithospheric collision as a consequence of the convergence between Euroasian and African plates and of the late extension. In spite of a wealth of accumulated geological-geophysical data in Spain, both the Rif–Alborán domain and the Gibraltar orocline are recently the subjects of much interest.

The intermediate units lying between the Ghomáride and Sébtide terranes in northern Morocco are compared with those located between the Maláguide and Alpujárride terranes in southern Spain (e. g., Cesares area).They are considered as a set of the thrust slices and as a result of tectonic emplacement during Tethyan rifting

The Ghomáride terrane in northern Marocco represents a stack of low-grade metamorphic units (Paleozoic metapelites and schists) and overlies the Sébtide terrane. The Sébtide terrane consists, in contrast, of a gneissic complex (Filali unit) with subordinate kyanite-bearing HP-granulite intercalations, e. g., at Beni Bousera late-metamorphic antiform. The highest Sébtide unit (Federico) is well exposed in the Beni Mezala window near Ceuta and shows Permian–Triassic phyllites and quartzites. The studied phyllosilicates in these rock types are rather uniform, being related to white mica and chlorite. Pumpellyite has been found for first time in phyllites and synformal veinlets in Permo-Triassic formations in the Beni Mezala 1 unit, forming part of the Federico units. This find of pumpellyite-bearing assemblage is useful because it permits the comparison of the p-T metamorphic conditions. The following assemblages were identified in different areas of the quartz veinlets: (1) pumpellyite + actinolite + epidote; (2) pumpellyite + muscovite + epidote, and (3) pumpellyite + vermiculite + epidote. In the p-T regime, these assemblages indicate pressures between ~1.5 and ~4.5 kbar for temperatures ranging from 200 °C to 300 °C. The aim is to integrate these results with structural and metamorphic history of the Betic-Rif orogen.

Czech-Flemish Joint Programme "KONTAKT", Ministry of Education, Youth and Sports of the Czech Republic, Project Code: MEB 1-06-05: **Origin and evolution of the anuran locomotion and its anatomical context** (*Z. Roček*, P. Aerts, A. Herrel, R. Van Damme, Laboratory for Functional Morphology, University of Antwerp, Antwerpen, Belgium & P. Havelková, Department of Zoology, University of South Bohemia, České Budějovice)

The most striking difference between anurans and their temnospondyl ancestors, which were probably permanent water-dwellers, is jumping. However, more important for considerations of evolutionary transitions between them is swimming and walking.

Swimming of caudate amphibians is caused by traveling lateral waves in the body axis which propel the animal, with no participation by the limbs. This can be considered a primitive type of swimming which appeared in the earliest vertebrates, such as *Pikaia*, whose body was compressed laterally and extending in dorsoventral fin rim. The mode of swimming caused by lateral undulation was undoubtedly persisting in Permo-Triassic temnospondyls exemplified by neotenic branchiosaurs and persists, although restricted only to their tail, also in anuran tadpoles.

In contrast, adult anurans use synchronous movements of their hindlimbs instead of flexions of the vertebrate column to generate propulsive forces for swimming. Attaining this capability is associated with the loss of tail in metamorphosis and profound changes in innervation. It is therefore improbable that such extensive changes would occur in water, just to change one type of swimming for another. Differences between swimming in ancestral temnospondyls and their anuran descendents rather suggest that these two types of swimming were separated by a certain period of time in which transitional forms used other type of locomotion than swimming. This stage could be represented by a proanuran amphibian *Triadobatrachus* (early Triassic) with still long presacral vertebral column but vestigial tail and iliac shafts suggesting shift of the pelvis posteriorly. Obviously, this animal could walk on dry land as well as to enter water for breeding, but already lost ability to swim by lateral undulations of the vertebral column. At the same time, however, it was not yet capable of jumping, which is evidenced by the structure and size of the hindlimbs and presence of free sacral ribs. However, elongated iliac shaft supports the view that transformation of the epaxial pelvic muscles and thigh flexors already begun but this process was not associated with swimming.

Triadobatrachus thus appears to be adapted more to terrestrial environment than to water dwelling. Jumping would then be a mode of locomotion which evolved in amphibians with shortened vertebral column, reduced tail, elongated ilia, and acetabulum shifted posteriorly from the sacral vertebra. All are necessary anatomical prerequisites for saltation, but in *Triadobatrachus* neither of them evolved to a degree that allows jumping. This is suggested by the fact that other important prerequisities for saltatory locomotion, such as transformation of the tail in urostyle, modification of the distal part of extremities, and elongation of the hindlibs are still lacking in *Triadobatrachus*.

Prosalirus is the earliest true anuran recorded from the early Jurassic. Although it is preserved by disarticulated bones, presence of the columella and narrow, cylidrical and posteriorly declined sacral diapophyses suggest that it was more terrestrial than aquatic. This is also supported by the radioulna which was already present in its ultimate anuran shape and the same could be supposed for the tibiofibula, although this element was not preserved. Fusion of the two parallel elements in the hindlimbs and forelimbs clearly indicates capability of jumping. It can thus be concluded that *Prosalirus* was a terrestrial, jumping frog.

Although there is a considerable time gap between *Triadobatrachus* and *Prosalirus* (Induan or Scynthian through Pliensbachian, i. e., approx. 65 Ma), it is very probable they both were predominantly terrestrial amphibians. However, whereas *Triadobatrachus* was not yet capable of jumping, *Prosalirus* was obviously a good jumper. Hence swimming, as a transitory mode of locomotion towards jumping, should be excluded. Rather, swimming in frogs should be considered a secondary mode of locomotion which evolved from jumping. This would explain the fact that swimming in adult frogs is profoundly different from swimming in their larvae, and also the fact that swimming in adult frogs is similar, although not identical, to their jumping. These differences are clearly caused by different environments – in other words, jumping on dry land will necessarily differ from "jumping" in water.

If jumping would have evolved in terrestrial environment, which is highly probable, then it remains to be explained how it evolved from walking gait. It is, however, inappropriate to use anuran walking as a guide for these considerations because it is profoundly different from walking of terrestrial caudates.

Whereas terrestrial caudates have triradiate pelvis with the ilium oriented vertically and their walking involves also epaxial muscles of the trunk, in anurans the important protractors of the femur insert onto the iliac shaft, presacral part of the vertebral column is relatively rigid, and their walking gait is enabled by horizontal gliding of the iliac shaft, which is an anuran apomorphy. Walking in the anurans is therefore different from walking of their ancestors, and most probably evolved secondarily from jumping, not vice versa.

Jumping could be therefore considered an effective escape mechanism which evolved in terrestrial environments, and swimming and walking of frogs should be considered its secondary locomotor derivatives.

Czech–USA Joint Program "KONTAKT", Ministry of Education, Youth and Sports of the Czech Republic, Project Code: ME08066: **Evolution of the anuran assemblages in the western part of North America during the Cretaceous: comparisons with the fossil record from Eurasia** (*Z. Roček*, *T. Přikryl* & J. Eaton, Weber State University, Ogden, Utah, USA)

This two-year project (2008–2009), although focused still on gathering material for final assessment in its first year, yielded some surprising preliminary results. One of them is the taxonomic re-evaluation of the peculiar anuran described earlier under the name *Nezpercius*. This anuran, which has no anatomical counterpart among recent taxa, is currently prepared for publication. By the end of the year, several hundreds anuran skeletal elements originating from about 20 excavation sites, covering the whole span of the Late Cretaceous, were catalogued and digitally documented.

Czech–Slovenian Joint Program "KONTAKT", Ministry of Education, Youth and Sports of the Czech Republic, No. MEB 090619: **Paleomagnetism of sediments in karst areas of Slovenia** (*P. Pruner*, *P. Bosák*, N. Zupan Hajna, A. Mihevc, F. Gabrovšek, Karst Research Institute, ZRC, SAZU, Postojna & I. Horáček, Faculty of Science, Charles University, Praha)

Paleomagnetic research is Slovenia was focused on the cave system of Postojnska Cave – Planinska Cave (Classical Karst, SW Slovenia). Several sedimentary sections were studied and evaluated in the Postojnska Cave (Biospeleološka postaja, section in front of Kristalni rov, Spodnji Tartarus (2 profiles), Pisani rov, Male jame, Umetni tunel and Kraški žep), in the Zguba Cave and in the Planinska Cave (Rudolfov rov). High-resolution sampling approach was adopted to obtain a complex magnetostratigraphic picture. Dense sampling contributed to the precision of detection of individual subchron boundaries. Field samples were oriented to the magnetic north. Samples from unconsolidated rocks were taken into the plastic boxes (2 × 2 × 2 cm). Hand samples of solid rocks (speleothems) were cut in a laboratory to cubes (2 × 2 × 2 cm). Samples were studied both by thermal demagnetization method (793 samples; 12 steps – 20 to 620 °C) and alternating field demagnetization method (28 samples; 14 steps – 1 to 100 mT).

Most sections showed only normal magnetization of the studied samples, sometimes with short individual magnetic excursions (e. g., Spodnji Tartarus). Reversed magnetic polarity was detected in the section of Umetni tunel (Postojnska jama) and in the second section in the Zguba Cave. Table 1 shows the preliminary age interpreted for depositional processes at the individual studied sites. Some paleomagnetic data nevertheless indicate that normal-polarity profiles can represent sediments of different ages. The oldest detected cave deposits in the whole cave system, which evolved in relation to the function of the Planinsko Polje, are older than the base of the Jaramillo subchron (Matuyama chron), i. e. more than 1069±12 ka. Presented data concern the last depositional stage within the studied sections and indicate nothing in relation to the origin of cave spaces themselves, which must be older.

Cave	Section	Sediment	Environment	Estimated age [Ma]	
				From	to
Planinska	Rudolfov rov	Clays to silts	Cave vadose: flood/lacustrine	>0.08	<0.78
Postojnska	Spodnji Tartarus North – red	Clays to silts	Cave vadose: flood/lacustrine		<0.78
	Spodnji Tartarus North – yellow	Clays to silts	Cave vadose: flood/lacustrine		<0.78
	Spodnji Tartarus South	Clays to silts	Cave vadose: flood/lacustrine	>0.122	<0.78
	Umetni tunel	Sands, top clays	Cave vadose: fluvial	<0.99	>2.15
	Kraški žep	Clays and sands	Cave vadose: fluvial	no data	
	Biospeleološka postaja	Scree covered by clays, flowstone at top	Cave vadose		<0.78
	Male jame	Upper: gravel and sand Lower: clays to silts	Cave vadose Upper: fluvial Lower: flood/lacustrine		<0.78
	Pisani rov	Clays to silts, top flowstone	Cave vadose: flood/lacustrine	>0.53	<0.78
	Kristalni rov	Top: clays with sands Middle: clays to silts Bottom: gravel	Cave vadose: fluvial to lacustrine		<0.78
Zguba	I	Sands, top clays and silts	Cave vadose: fluvial to lacustrine		<0.78
	II	Sands			>0.78

■ **Tab. 1.** A review of the studied sites, interpreted depositional environments and ages.

■ **Fig. 5.** Diversity of the anuran assemblage from the Turonian of Jimmy Canyon, Utah (modified from Roček et al. 2010).

Obtained data from sedimentological analyses, paleontological and numerical dating indicate that several depositional and erosion phases alternated in the Postojnska Cave. The general stabilization of the hydrological system of Pivka Basin – Postojnska Cave – Planinska Cave – Planinsko Polje for long time-span (presumably even about 2 Ma; Table) led to the formation of a long and complicated cave system. Ideas on very young history of Planinsko and Cerkniško poljes and related cave system in the last about 30–100 ky must be rejected as they are not in accordance with recently summarized data. This statement resulted from (1) all numerical- and correlate-ages (including archaeology); (2) morphology of the Planinsko and Cekniško poljes. The present geographical limits of flat bottom surface are far from faults limiting the Idrija Fault zone. If poljes along the Idrija Fault zone really represented a pull-apart basin, their enlargement by lateral corrosion up to the the present shape would need time longer than 100 ky, moreover, the karst water table should be stabilized, and (3) the knowledge of the dynamics of filling and erosion phases in the system of the Postojnska Cave.

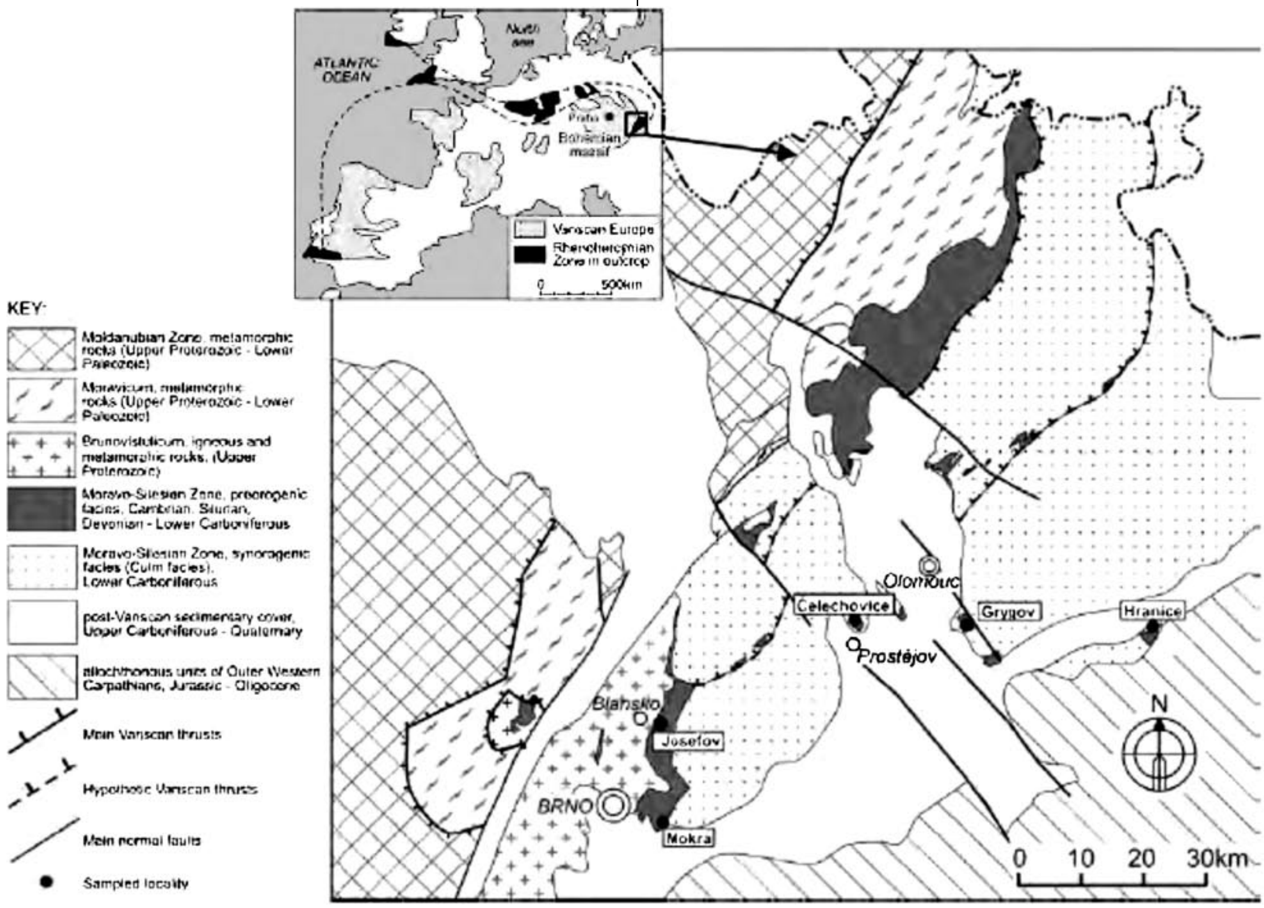
Interpreted data indicate that several depositional and erosion phases alternated in the cave system of the Postojnska Cave – Planinska Cave. It cannot be excluded that individual cave segments or passages were fully filled and exhumed several times during the cave evolution, as indicated, for example, by rests of cemented sediments on walls and ceiling in the main passage of the Stara jama (with cave train) or at other places. It can be expected that the deposition was not uniform in the whole cave at the same time, most likely erosion acted in one part of the cave while deposition took place in the other. Repeated reworking and re-deposition of the same sedimentary material can be also expected within the long, voluminous and complicated cave system. The alternation of depositional and erosion phases could be connected with conditions within the cave system, function of the resurgence area, collapses, climatic changes, tectonic movements and the intrinsic mechanisms of the contact karst. All collected data indicate quite prolonged development of the whole drainage system.

Czech–Polish Joint Program "KONTAKT", Ministry of Education, Youth and Sports of the Czech Republic, MEB CZ-39: **Paleomagnetism and tectonic rotations of Devonian carbonate rocks from the Holy Cross Mts (Poland) and Moravo-Silesian zone (Czech Republic)** (*P. Pruner*, *P. Schnabl*, J. Grabowski, J. Nawrocki & T. Sztyrak, Polish Geological Institute, Warsaw, Poland)

Within international cooperation, a joint paleomagnetic study was performed at Devonian sections in Poland (Holy Cross Mts.) and the Czech Republic (Moravo-Silesian Zone; MZS; Fig. 6). The results indicate a similar paleomagnetic record in the Devonian of the two regions.

New paleomagnetic data from the MSZ (Eastern Variscides, Czech Republic) confirmed the presence of a strong Late Variscan overprint. Data from Josefov, Hranice, Grygov and Mokra localities indicate syn-folding to post-folding age of remagnetization, which was acquired throughout a time span between a 335–288 Ma. This implies that the deformation in the area started as early as in the Visean (Lower Carboniferous) and continued to the lowermost Permian. Remagnetization was coeval with the same process reported from the Ardennes and partly also the Cantabrian arc. Paleomagnetic method is widely used for paleotectonic reconstructions of fold-and-thrust belts. Investigations performed in the MSZ more than 10 years ago proved a strong late Variscan remagnetization of the Devonian carbonate rocks. The remagnetization took place when the Variscan tectonic structures existed in their present shape. Secondary magnetizations of similar age were noted also in other parts of Variscan Europe, e. g., in northern Spain. This study presents new paleomagnetic results from the MSZ, focused on more detailed dating of Late Variscan remagnetization in relation to deformations and timing of magnetic overprint in some other parts of Variscan Europe.

Paleomagnetic data from five sites of Middle to Late Devonian carbonate rocks are presented in Table 2. Samples (total number of 96) were taken either from long, weakly deformed sections (Josefov, Celechovice) or well developed mesofolds of



■ **Fig. 6.** Geological sketch map of the Moravo–Silesian Zone with indicated sampling sites (modified from Grabowski et al. 2008).

Site	D/I	α95	k	Dc/Ic	α95	k	N/No
Mokra	210/-4	7.5	34.2	203/30	31.6	2.8	12/12
Josefov	223/-9	4.6	64.9	223/5	6.8	30.79	16/23
Celechovice	215/14	4.4	40.2	216/-2	5.0	31.4	27/28
Grygov	211/-1	8.5	43.1	224/0	22.9	6.8	8/8
Hranice	211/-17	7.5	42.3	214/2	5.3	82.9	10/10

■ **Tab. 2.** Characteristic mean locality directions from the Moravian Karst (new study). Explanations: D/I – *in situ* declination/inclination, Dc/Ic – declination/inclination after 100% tectonic correction, N/No – number of hand samples used for calculation of mean directions/number of hand samples collected. In bold – directions used for geological interpretations (using results of fold tests).

amplitude several meters (Grygov, Mokra, Hranice). The Devonian rocks in the MSZ rocks were moderately heated with CAI indexes from 3–3.5 in the Brno area through 4 in Josefov, to 5–6 in Hranice and Grygov.

Thermal demagnetization revealed the presence of two magnetization components at each site. A low unblocking temperature component is a recent viscous remanent magnetization of no geological importance. Second component, labeled A, is demagnetized between 200 and 500 °C. It is well clustered with SW declination and shallow positive (Čelechovice) or negative (other sites) inclination. It corresponds to the Late Variscan remagnetizations known from previous studies. The fold test was applied in order to determine the relative age of component A at the sampled tectonic structures. Component A is post-folding at Josefov and Grygov, late syn-folding (11% unfolding) at Mokra and early syn-folding (85% unfolding) at Hranice. At Čelechovice, component A is either post-folding or late synfolding (25% unfolding). We attempted to date the Late Variscan overprint in our study area in a more detailed way. It appears that component A at Josefov, Hranice, Grygov and Mokra is roughly of the same age and can be dated at 300–294 Ma, which corresponds to the latest Carboniferous/earliest Permian. It must be considered as true syn-folding remagnetization which took phase at various stages of fold development at each site. Component A at Čelechovice is apparently older and can be estimated at 330 Ma or even earlier. As component A at this locality is late syn-folding to post-folding, the conclusion must be drawn that deformations of the Devonian carbonates, at least in the Čelechovice area, started as early as in the late Early Carboniferous.

Joint project of the Joint Institute for Nuclear Research (Dubna, Russia) and Institute of Geology of the AS CR, v. v. i., No 07-4-1031-99/08: **Neutron investigation of the structure and dynamics of condensed materials** (A.N. Nikitin, T.I. Ivankina, Joint Institute for Nuclear Research, Dubna, Russia & *T. Lokajíček* & *V. Rudajev*)

Subproject 1: **Textures of deformed rocks and their importace for stress determinations**

Anisotropy of amphibolites from the Kola super-deep borehole (KSDB3) area was determined by both methods – ultrasound radiation and neutron diffraction. The changes in anisotropy were studied during heating of rocks up to 900 °C; temperature was found to highly influenc the values of anisotropy.

Bulk elastic anisotropy was investigated on foliated biotite gneiss from Outokumpu. The significance of oriented microcracks and crystallographic and shape preferred orientation on elastic anisotropy was analyzed.

Subproject 2: **Laboratory study of rock fracturing process under various p-T conditions by means of neutron diffraction and acoustic emission methods**

The response of rocks (marble and sandstone) to heating up to 250 °C was studied by ultrasonic sounding and seismo-acoustic emission monitoring. Decay of ultrasonic wave's velocity was observed at both types of rocks with heating and while the acoustic emission increases. The number of radiated of acoustic impulses at sandstones is considerably lesser than at marbles. On the other hand, the ultrasonic wave's velocity increases with temperature (250 °C) by about 50 % for marble and by only about 10 % for sandstone compared to values at laboratory temperature.

An anomalous increase in the thermal expansion coefficient was analyzed. The change of the Poisson ratio in the temperature interval below the polymorphic transition of polycrystalline quartz (524–573 °C) can lead to concentrators of mechanical stress arising at phase heterogeneities, grain boundaries, etc. Such processes initiate micro fractures in rocks that can propagate in an avalanche-like manner, resulting in the formation of a macroscopic rupture.

Czech-Finnish Joint Project: **Low-temperature magnetic properties of iron-bearing sulphides and chondritic meteorites** (*T. Kohout*, also at Department of Physics, University of Helsinki, Finland, *G. Kletetschka*, A. Kosterov, Center for Advanced Marine Core Research, Kochi University, Japan & M. Jackson, Institute for Rock Magnetism, University of Minnesota, USA)

The meteorites falling on the Earth represent the fragments of their parent bodies – asteroids. There are various types of meteorites, from those of relatively young age and composition comparable to terrestrial crustal rocks (basalts, anorthosites) to those representing the oldest primitive matter of our Solar System.

This study focuses mainly to the primitive old chondrites. The formation age of the chondrites is roughly 4.7 Ga. Such meteorites are a unique source of the material of the early Solar System. The chemical, mineralogical as well as physical properties of the meteorites can bring us deeper insight to the properties of the primitive material preserved in our Solar System.

During the low-temperature studies of the Neuschwanstein EL-6 chondrite an anomalous behavior was observed at ~150 K in magnetic susceptibility data. It was lately linked to the presence of the mineral daubreelite ($FeCr_2S_4$) within the meteorite. Following this discovery a more detailed study of various enstatite chondrites (EH and EL) as well as common meteorite iron bearing sulphides (alabandite MnS, daubreelite $FeCr_2S_4$ and troilite FeS) is currently ongoing. Preliminary results indicate that the sulfide minerals present within the enstatite meteorites have significantly different magnetic properties in the cold space environment than at terrestrial conditions. This conclusion opens us a new way of how to interpret their mineralogical properties of asteroids and meteorites in the space.

■ **Fig. 7.** Neuschwanstein meteorite. Photo by D. Heinlein.

Chinese–Czech Bilateral Co-operation: **Fossil frogs of China** (*Z. Roček*, *T. Přikryl* & Y. Wang, Key Laboratory of Evolutionary Systematics of Vertebrates, Institute of Vertebrate Paleontology and Paleoanthropology, Chinese Academy of Sciences, Beijing, China)

Currently available fossil record of anuran amphibians from various parts of the World represents a unique possibility to study evolution of this group in global scale. Of special importance in this respect are the Early Cretaceous anurans from Liaoning Province, China which may potentially represent a significant contribution to our knowledge of the early evolutionary history of these amphibians. The bilateral cooperation between the Academy of Sciences of the Czech Republic and Chinese Academy of Science provided an opportunity for preliminary investigation of this material which is deposited in the collections of the Institute of Vertebrate Paleontology and Paleoanthropology in Beijing, as well as to see the localities in the field. Besides that, we were invited to join a team which investigated Miocene frogs from the locality Shanwang (Shandong Province, E China). This material, which included a large number of fossil tadpoles, made it possible, for the first time, to study ontogenetic development of the Ranidae.

Polish–Czech Inter-Academy Co-operation: **Reflection of climate changes and human impact in the alluvia of the Elbe and Vistula rivers (comparison study)** (*L. Lisá*, *J. Kadlec*, T. Kalicki & A. Budek, Institute of Geography, Polish Academy of Sciences, Kraków)

The joint project was focused on the reconstruction of central European river system behaviour during the last 15 ka based on sedimentological, mineral magnetic and mineralogical approach. During a field trip to Nida and Visla (Vistula) river catchments floodplain (Fig. 8), fluvial deposits were studied using sedimetological tools and low-field magnetic susceptibility measurements. Obtained data allow an estimation of erosion changes and sediment input into the river systems. Morphometric analyses of meandering river system using GIS tools were applied to assess role of deforestation on river discharge and meander migration. Research in the Czech Republic territory was focused on the Morava River floodplain sediments deposited in the Lower Moravian Basin during the Holocene. Geomorphological analyses (based on Polish approach) of sedimentary sequences exposed in erosional banks of the Morava River help us to reconstruct natural and human impacts on the river activity. The interpretation was completed with results of geophysical survey and radiometric dating (radiocarbon, OSL). Obtained knowledge shows similarities in river behavior in both areas and increasing human impact especially during the last millennium.

■ **Fig. 8.** The unique section of niveoeolic loess deposits in the area of Visla River valley.

Czech–Hungarian Bilateral Project: **Comparative volcanostratigraphy of the Neoidic volcanics of the Bohemian Massif and the Pannonian Basin** (Project leaders K. Balogh, Institute of Nuclear Research, Hungarian Academy of Sciences, Debrecen, Hungary & *J. Ulrych*)

Subproject: **Late Cretaceous to Paleocene melilitic rocks of the Ohře/Eger Rift in northern Bohemia, Czech Republic: Insights into the initial stages of continental rifting** (*J. Ul-*

rych, J. Dostal, Saint Mary´s University, Halifax, Nova Scotia, Canada, E. Hegner, University of Munich, Munich, K. Balogh, Institute of Nuclear Research, Hungarian Academy of Sciences, Debrecen & *L. Ackerman*)

The results are included in the *Final Report of the Project No. IAA3013403* The character of mantle/lower crust beneath the Bohemian Massif was characterized based on geochemical signatures of (ultra)mafic xenoliths in Cenozoic volcanics (see p. 49).

Subproject: **Apatite fission-track implications for timing of hydrothermal fluid flow in Tertiary volcanics of the Bohemian Massif** (*J. Ulrych*, *J. Filip*, *J. Adamovič*, K. Balogh, Institute of Nuclear Research, Hungarian Academy of Sciences, Debrecen)

Late Cretaceous to Paleogene subvolcanic/volcanic rocks from the Bohemian Massif were subjected to apatite fission track (AFT) dating and K-Ar dating. Striking discrepancies between AFT ages and K-Ar ages encountered in most samples cannot be explained by slow cooling rates because of the small sizes and shallow emplacement depths of the subvolcanic bodies. Instead, apatites from these rocks are believed to have reentered the total annealing zone during episodes of hydrothermal fluid activation along major faults and dike contacts. The presence of two such episodes can be inferred from the available data: the Late Oligocene episode (28 to 26 Ma) and the Early Miocene episode (20 to 16 Ma). The older episode is manifested in the Ohře/Eger Rift region and in the Elbe Zone while the younger episode seems to be limited to the former. The presence of hydrothermal fluid flow is controlled by the distribution of crustal weaknesses, the distribution of magmatic activity centers and by the regional tectonic stress field.

Subproject: **New constraints on the origin of gabbroic rocks from the Moldanubicum around the Moravia–Austria border** (*J. Ulrych*, *L. Ackerman*, *A. Langrová*, J. Luna, Jihlava, E. Hegner, University of Munich, Munich, K. Balogh, Institute of Nuclear Research, Hungarian Academy of Sciences, Debrecen, F. Fediuk, Geohelp, Praha, *M. Lang* & *J. Filip*)

Gabbroic rocks from the Moldanubicum *s.s.* east of the Moldanubian Pluton form a heterogeneous association comprising: ±olivine (coronite) norite, gabbronorite, gabbro and hornblendite. The rocks are mostly primitive with high Mg# (61–83) and high compatible elements contents. The estimated temperatures of the rock equilibration derived from plagioclase–amphibole pairs and Ca-in-orthopyroxene calculated for pressures 5–10 kbar are similar for coronite (700–840 °C) and non-coronite gabbroic rocks (680–850 °C). The Mařížgabbroic rocks are distinctly different from the Korolupy–Nonndorf and Mešovice samples. They show high crust-like La/Nb ratios of 2.1–6.6 characteristic for subduction-related magmatic rocks coupled with a uniform low εNd values from -0.6 to 0.7. On the other hand, gabbroic rocks from compared localities have La/Nb ratios <1.7 and show negative correlations between La/Nb and εNd. Such decoupling between La/Nb and εNd should be attributed to the subduction-related parental magma contamination by crustal material with high La/Nb. The Uherčice rocks show two distinct geochemical patterns: (i) low Rb coupled with highly non-radiogenic Sr isotopic composition (M-3B) and (ii) lithophile element enrichment associated with highly radiogenic Sr isotopic composition (M-3A), probably inherited from assimilation of different crustal materials or, more likely, very old considerably recycled material. The trend of negative correlations between La/Nb and εNd for the Mešovice–Korolupy–Nonndorf–Uherčice rocks suggest that these rocks originated from one parent magma affected by various degrees of AFC process. Their Cadomian age is supposed on the basis of K-Ar ages (~560 Ma) of relict brown hornblende from the gabbroic rocks. These ages were fully or partly reset (biotite ~330 Ma) during the Variscan orogeny. The Maříž gabbroic suite probably represents underplated subduction-related material produced during the Cadomian plate subduction beneath the northern margin of Gondwana. The apparently chemically different gabbroic complexes from Korolupy–Nonndorf, Mešovice and Uherčice can be interpreted as underplated magmas produced during Cadomian rifting of the northern margin of Gondwana.

Bilateral cooperation between the Czech Geological Survey and Geologische Bundesanstalt Wien, No. 0051: **Biostratigraphy of Cretaceous deposits in Austrian Alps** (L. Hradecká, L. Švábenická, Czech Geological Survey, Praha, Czech Republic, *M. Svobodová,* J Kvaček, National Museum, Praha, Czech Republic & H. Lobitzer, Geologische Bundesanstalt Wien, Austria)

Subproject 1: **Microbiostratigraphical study of the Lower Cretaceous profiles in the Salzkammergut region** (L. Hradecká, L. Švábenická, *M. Svobodová* & H. Lobitzer)

Biostratigraphic and paleoenvironmental investigations were carried out on the samples of fossil-rich and dark gray marlstones with sandstones intercalations of the Gosau Formation from Russbach (RU1) near Pass Gschütt, Salzkammergut, Upper Austria. The nannofossil assotiation indicate the Upper Coniacian-?Santonian interval (*Watznaueria quadriradiata* – Zone UC11 sensu Burnett 1998). Biostratigraphically important sporomorphs of the Normapolles group – *Suemegipollis* cf. *triangularis* and *Hungaropollis* sp. first appear in the Santonian. Foraminifers did not contain any index species. Both nannofossil flora – *Lucianorhabdus maleformis*, *Braarudosphaera bigelowii,* foraminifers – *Spirillina cretacea, Ramulina globulifera, Nummofallotia cretacea* and dinoflagellate cysts – *Alisogymnium euclaense* evidenced shallow-marine depositional conditions. Gymnosperm pollen, i. e., *Lueckisporites* sp. and other conifers of the Permian age document the re-deposition from the Haselgebirge Mts.

Subproject 2: **Palynological evaluation of plant-bearing freshwater localities of Lower Gosau-Subgroup on map sheet 95 St. Wolfgang** (L. Hradecká, L. Švábenická, *M. Svobodová*, J Kvaček & H. Lobitzer)

Samples from the fossiliferous gray calcareous siltstones deposited on the limestones with rudists of the Gosau Subgroup (Süsswasser-Gosau, Neualm locality) provide a relatively poor and often corroded yellow, red-brown and black phytoclasts with palynomorphs, tracheids, cuticles. About 50 % of the assemblage consists of reworked Upper Permian–Triassic bisaccate striate/taeniate pollen and glossopterids, i. e., *Lunatisporites* sp. and *Taeniasporites* sp. Second part of the assemblage consists of Upper Turonian to Coniacian miospores. Angiosperm mostly triporate pollen *Oculopollis* spp. and *Complexiopollis* spp. prevail. Despite the fact that these sediments bear no marine influence, some chitinous foraminiferal linings, acritarchs and rests of dinocysts were found.

Macroflora of terrestrial origin, dominated by conifers of *Pagiophyllum* sp. and Taxodiaceae as well as common ferns *Hymenophyllites heterophyllus* Unger and dicotyledonous plants *Dicotylophyllum* sp. 1 and sp. 2. was determined by J. Kvaček.

Bilateral cooperation between the Institute of Geology AS CR, v. v. i., and Administration of Slovak Caves, Liptovský Mikuláš, Slovakia: **Dating of karst sediments in karst areas of Slovakia by paleomagnetic method** (*P. Bosák*, *P. Pruner* & P. Bella, Administration of Slovak Caves, Liptovský Mikuláš, Slovakia, Zdenko Hochmuth, Faculty of Science, University of J.P. Šafárika, Košice, Slovakia & H. Hercman, Institute of Geological Sciences, Polish Academy of Sciences, Warsaw, Poland)

Jasov and Moldava caves in the Medzev Upland in the western part of the Košice Basin were studied. The karst is fluvial-dissected allogenic-autogenic karst in tectonically subsided marginal part of the karst plateau. Caves are developed as a system of lateral levels following fragments of river terraces. The development of endokarst on the right side of the Bodva Valley is connected with stages of fluvial incision and also with the aggradation of alluvial plain by fluvial sediments during younger evolution stages. Cave levels were determined by shallow karstwater surface and originated in phreatic/epiphreatic conditions.

The morphology of the Moldava Cave indicates that its large parts developed in the phreatic zone in the slope of adjacent valley in the depth of several meters below the river bed (except for deeper the Sluka Well). The cave morphology was re-carved in the epiphreatic regime with the origin of flat ceilings and levelled wall notches, which are developed especially the lower parts of the Jasov Cave.

The evolution of tube passages and ceiling channels in the middle and upper parts of the Jasov Cave was connected with more intense water flows sinking from the Bodva River to the karst aquifer through adequately permeable conduits. During younger phases of cave development, the hydraulic conditions for penetration of allochtonous waters into karst aquifer were changed after entrenchment and aggradation of alluvial Bodva plain. Water penetration was restricted and limited by lower permeability of fine-grained clastic sediments. But cave parts in lower positions were repeatedly flooded and fluvial flood sediments were deposited.

The thickness of fluvial sediments deposited in the river bed between villages of Hatiny and Moldava nad Bodvou (tectonically sunken limestone block) increases from 8 to 18 m. The surface of recent alluvial Bodva plain is aggraded to a higher position than the lower cave parts and karstwater table (the vertical range of 6 m along the section of Jasov Village – Jasov Cave and 11 m along the section of Moldava nad Bodvou Town – Moldava Cave).

The accumulation of fine-grained allochthonous cave sediments reaching almost to rock surface of flat cave ceiling was dated on the basis of their paleomagnetic analysis and magnetostratigraphy. Sediments in the lower parts of Moldava and Jasov caves show normal paleomagnetic polarity and are younger than 0.78 Ma. They were deposited under slowly circulating or stagnant water conditions, also during repeated cave floods.

Since hydrographic conditions for the origin of flat ceilings and levelled wall notches correspond to conditions of accumulation of the analyzed fine-grained sediments, main large parts of the Moldava Cave and the lower parts of Jasov Cave situated below the present alluvial plane of the Bodva River originated before the Early Pleistocene.

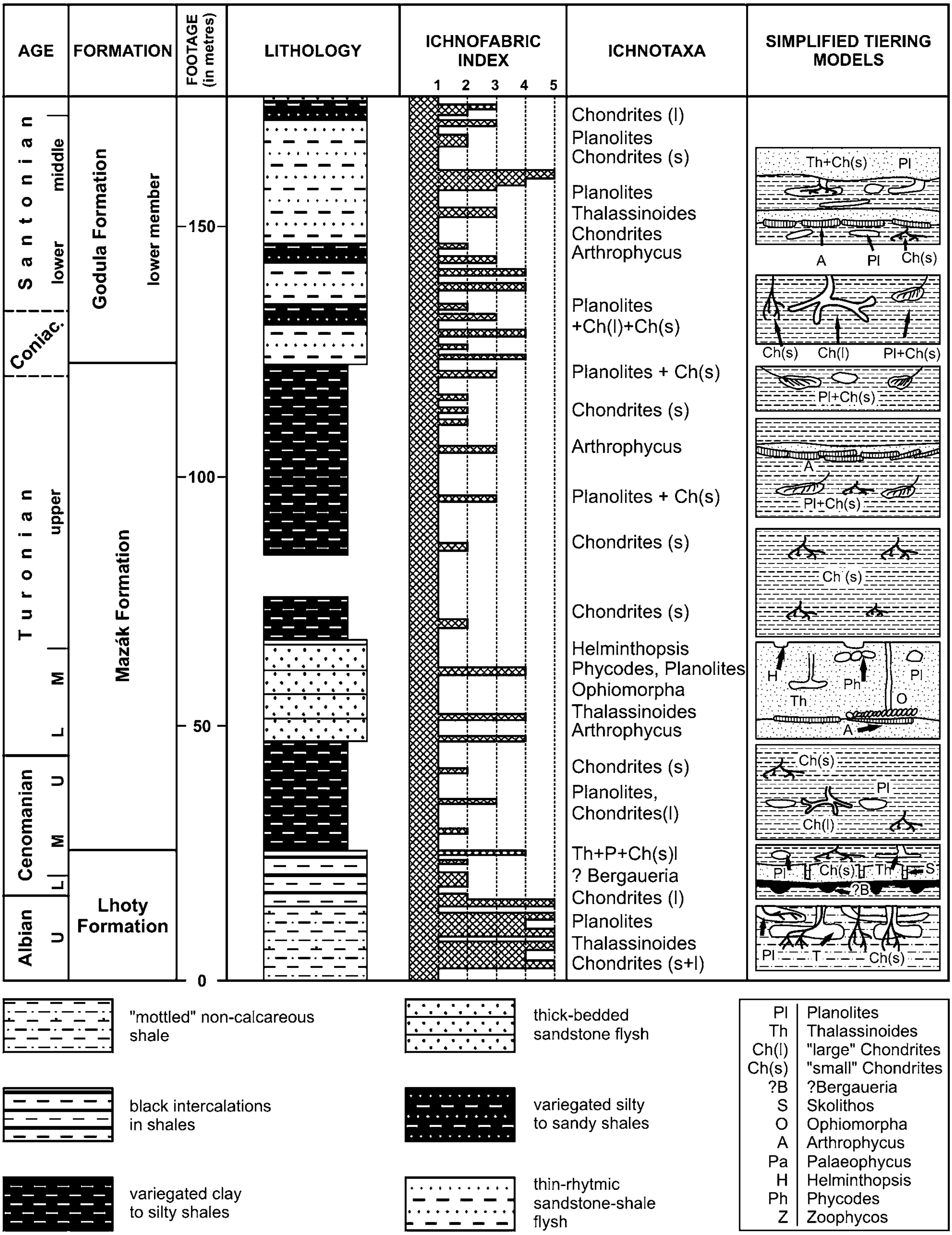
IGCP Project No 463: **Upper Cretaceous Oceanic Red Beds: Response to Ocean/Climate Global Change** (Project Leaders: C. Wang, Research Center for Tibetan Plateau Geology , China University of Geosciences , Beijing , China, M. Sarti, Department of Marine Science, Università Politecnica delle Marche, Ancona, Italy, R.W. Scott, University of Tulsa, Tulsa, U.S.A. & L.F. Jansa, Department of Earth Sciences, Dalhousie University, Halifax, Canada)

Subproject: **Ichnology of the Upper Cretaceous oceanic "red beds" of the Bohemian part of the Western Carpathians** (*R. Mikuláš*)

Ichnological study of the CORB from a larger area with high facies variability has not been carried out yet. A partial exception is the study of Lesczynski (1993) on Cretaceous and Tertiary turbidite sequences in Spain with generally very low-intensity or no bioturbation of red clays/claystones. A more general characteristic based on various small-scale studies and unpublished observations were provided by Wetzel & Uchman (1998). These authors stated that red to brown claystones accumulated in the oceans are usually characterized by complete bioturbation; the number of tiers is limited and the typical depth of bioturbation is several centimetres. An increase in the rate of sedimentation may result in a considerable increase in the food content, hence also in the depth of burrow penetration and in the diameter of tunnels and shafts.

The units studied recently in Eastern Carpathians, Moravia, provide examples confirming the validity of both the above cited studies. A very low degree of bioturbation is displayed by the CORB of the Godula facies of the Silesian Unit, by their equivalents (mostly not red) in the Kelč facies of the Silesian Unit, and by the CORB in non-calcareous sediments of the Rača Unit. In contrast, a high degree of bioturbation was observed in the CORB of the "calcareous" facies of the Rača Unit: this facies provides an almost complete list of ichnotaxa given for the CORB by Wetzel & Uchman (1998), namely *Chondrites*, *Zoophycos*, *Planolites*, *Thalassinoides*, *Paleophycus*, *Teichichnus* and *Phycosiphon*.

The above facts imply that the range of bioturbation of the CORB may be extremely broad, with the supply of food obviously acting as the controlling factor. The "calcareous" facies of the CORB of the Rača Unit has a considerably higher proportion of sand-dominated interbeds and also carbonates than the other de-



■ **Fig. 9.** The profile (lithology and ichnology included) of the upper part of the key section of the Upper Cretaceous Red Beds at Bystrý potok, Godula facies of the Silesian Unit, Moravia (after Mikuláš et al. 2009).

scribed facies. This (especially the presence of carbonates) suggests a relative proximity of food-rich environments and an easy transport of nutrition-rich substrate into the basin directly by turbidite currents, not only by periodical fall-out of dead plankton.

LESCZYŃSKI S. (1993): Ichnocoenosis versus sediment colour in Upper Albian to lower Eocene turbidites, Guipúzcoa province, northern Spain. – *Paleogeography, Paleoclimatolology, Paleoecology*, 100, 251–265.

WETZEL A. & UCHMAN A. (1998): Biogenic sedimentary structures in mudstones – an overview. – *In*: Schieber J., Zimmerle W. & Sethi P. (Eds): *Shales and mudstones I*: 351–369. E. Schweizerbart'sche Verlag (Nägele u. Obermiller). Stuttgart.

For more details, see Project of the Grant Agency of the Czech Republic No. 205/05/0917 (see p. 34).

IGCP Project No. 469: **Late Moscovian terrestrial biotas and paleoenvironments of Variscan Euramerica** (*J. Bek*, C. J. Cleal, National Museum of Wales, Cardiff, UK, S. Opluštil, Charles University, Praha, Czech Republic, B. A. Thomas, Institute of Rural Science, University of Wales, Aberystwyth, UK, Y. Tenchov, Geological Institute, Sofia, Bulgaria, O. Abbink, TNO, Utrecht, The Netherlands, T. Dimitrova, Geological Institute, Sofia, Bulgaria, J. Drábková, Czech Geological Survey, Praha, Czech Republic, Ch. Hartkopf-Fröder, Geologischer Diest NRW, Krefeld, Germany, T. van Hoof, TNO, Utrecht, The Netherlands, A. Kędzior, Geological Institute, Kraków, Poland, E. Jarzembowski, Maidstone Museum, Maidstone, UK, M. Libertin, National Museum, Praha, Czech Republic, D. McLean, MB Stratigraphy Ltd, Sheffield, UK,M. Oliwkiewicz-Miklasinska, Geological Institute, Kraków, Poland, J. Pšenička, West Bohemian Museum, Pilsen, Czech Republic, Z. Šimůnek, Czech Geological Survey, Praha, Czech Republic, I. van Waveren, Naturalis, Leiden, The Netherlands, E. L. Zodrow, Cape Breton University, Sydney NS, Canada)

Palynological research in this project concentrated on two main aspects. **Biostratigraphy**. The stratigraphically most important spore and pollen taxa in the various basins were studied: the smallest monoletes (excluding *Thymospora*), *Thymospora*, *Florinites, Endosporites, Triquitrites, Cadiospora, Westphalensisporites, Latensina, Schopfites, Dictyotriletes bireticulatus,* monosaccate pollen, bisaccate pollen and striate pollen. The reconstruction of plant assemblages and their environments was based on a comparison of the spore and pollen taxa that are ecologically significant, with a special focus on the Westphalian/Stephanian (W/S) boundary. This has drawn especially on our knowledge of *in situ* spores isolated directly from the reproductive organs of plants. Ecologically important spore taxa are *Lycospora, Vestispora, Endosporites, Densosporites, Cirratriradites, Crassispora, Cadiospora, Florinites, Cordaitina,* bisaccate pollen, taeniate bisaccate pollen, and monoletes ≤40 µm in diameter. Principal ecologically significant taxa represent the main plant groups, i. e. arborescent (lycospores, *Crassispora*, *Cadiospora*), subarborescent (*Densosporites* and *Endosporites*) and herbaceous lycopsids (*Cirratriradites*), sphenophylls (vestispores), ferns (smallest monoletes), cordaites (*Florinites* and some monosaccates) and conifers (probably some bisaccates). We still have no idea about the affinity of some of the other ecologically important taxa, i. e. most of bisaccate and striate pollen. Sphenophytes are represented by calamospores, which are long-ranging spores and globally wide-spread, and have no stratigraphical or ecological significance. Palynological data have been obtained from the following basins: Dobrodgea Basin, Bulgaria, Upper Silesian and Lublin basins, Poland, Intra-Sudetic, Kladno-Rakovník, Pilsen and Radnice basins, the Czech Republic, Ruhr and Saar basins, Germany, the Netherlands, UK, the Sydney Coalfield, Canada and the North Sea area.

Westphalian/Stephanian boundary is not developed in all countries studied but, where it is, the Duckmantian–Cantabrian spore assemblages have many features in common. Few of the selected spore taxa occur only in the Westphalian or only in the Stephanian in any of the *IGCP 469 Final Report* 50 countries. The composition of the palynofloras changes step by step from the Bolsovian, through the Asturian to the Cantabrian, and there is no evidence of a marked biological event at the Westphalian/Stephanian boundary. The observed gradual palynological changes at the boundary are indicative of ecological and not evolutionary trends. **Bulgaria**. The end of the Asturian is characterized by the last occurrences of *Westphalensisporites* and *Schopfites*. Another important genus, *Vestispora*, occurs for the last time within lower Asturian strata. Striate pollen appears in the Cantabrian. The appearance of *Thymospora* and *Cadiospora* in Asturian strata here iundicates a very late Asturian age. **Poland**. The Asturian/Cantabrian boundary appears not to be preserved. The characters of the assemblages in both Upper Silesia and Lublin basins are comparable. Some taxa appear for the first time within the upper part of the Carboniferouis succession here, including *Cadiospora* and *Thymospora*, which are mainly characteristic for the Stephanian Stage, although also typical for uppermost Asturian. **Czech Republic**. The Westphalian/Stephanian boundary in central and western Bohemia is characterised by the last occurrences of vestispores, *Westphalensisporites* and *Endosporites* in the Asturian. The genus *Cadiospora* appears rarely in the upper Asturian, but is more common and typical for Cantabrian strata. **Germany**. Cantabrian strata are not preserved in Germany. The genera *Schopfites*, *Thymospora* and *Cadiospora*, which are more typical for Stephanian assemblages, occur for the first time in the Bolsovian or Asturian. **The Netherlands**. A similar situation occurs in the Netherlands. The only important palynological event is probably the last occurrence of vestispores in the Asturian. *Cadiospora* and *Thymospora* make their first appearances in Bolsovian strata. **North Sea**. It seems that it is not possible to recognize the Westphalian/Stephanian boundary palynologically in the North Sea area because several taxa occur in Asturian as well as in Cantabrian strata. Some taxa including *Latensina*, *Thymospora* and *Cadiospora* occur in the upper Bolsovian or Asturian for the first time. **British Isles**. Important here is the first occurrence of *Westphalensisporites* in the Cantabrian, and the appearances of *Latensina*, *Cadiospora*, *Schopfites*, *Thymospora* and bisaccate pollen within Bolsovian and Asturian strata. **Canada**. Asturian and Cantabrian palynological assemblages are uniform and similar each other here. All stratigraphically important taxa occur together in both Asturian and Cantabrian assemblages.

Generally there are some qualitative as well as quantitative changes. Spores of lycopsids generally declined from the Westphalian to the Stephanian, especially arborescent forms producing *Lycospora* and *Cappasporites* that were of the *Lepidodendron*- and *Lepidophloios*-type. These trees, which preferred wetter environments, are generally less common and only some of them survived to Stephanian times. Exceptions among arborescent lycopsids are sigillarians, which produced spores of the *Crassispora* and *Cadiospora*-types, and which occur in Westphalian as well as Stephanian assemplages. *Cadiospora* is especially typical mainly for strata of Stephanian age, although they first appear in the Bolsovian Substage. However, their Bolsovian and Asturian records are sporadic and not as common as in Stephanian assemblages. Representatives of sub-arborescent lycopsids produced densospores and spores of the *Endosporites* and *Spencerisporites*-types. Producers of these spores (fossil plant genera *Omphalophloios*, *Polysporia/Chaloneria* and *Spencerites*) survived the exctintion of the arborescent lycopsid forms and are their remains are found in Stephanian as well as Westphalian strata, although their records in the upper Westphalian are more common. Interesting is that some *Polysporia/Chaloneria* species grew in Westphalian times based on the palynological record and some others in Stephanian times. Herbaceous lycopsids of the *Selaginella*-type which produced miospores of the *Cirratriradites* and *Lundbladispora*-types are typical mainly for Westphalian strata. It is possible to divide sphenopsid spores and plants into two main groups. The first group of spores is represented by calamospores, which are long-ranging spores with a globally widespread distribution. *Calamospora*-producers were mainly species of the genus *Calamites*. The second group consists of sphenophyllalean spores, produced by plants with reproductive organs like *Bowmanites* and *Sentisporites/Peltastrobus*, include especially *Vestispora*, *Pteroretis, Dictyotriletes muricatus, Columinisporites* and *Punctatisporites obesus*-types. Both the spores in this second group and their parent plants are good biostratigraphical markers. Most of sphenophylls are typical for the Westphalian (*Vestispora, Dictyotriletes muricatus, Pteroretis* and *Punctatisporites obesus*-producers). Only a few sphenophylls survived through to the Stephanian or even Permian, and these produced laevigate monoletes of the *Laevigatosporites* and *Latosporites*-types (more than 40 μm in diameter) and striate monoletes of the *Columinisporites*-type. Some spores produced by various types of ferns are long-ranging, such as *Granulatisporites*, *Leiotriletes*, *Apiculatisporis, Punctatisporites, Cyclogranisporites* and *Raistrickia*. Some others, especially those produced by certain marattialeans, occur within Bolsovian and Asturian strata but their maximum occurrence is typically in the Stephanian stage where they are often dominant or subdominant. Typical representatives of these marattialeans are the smallest monoletes *Punctatosporites, Torispora, Thymospora*, *Speciososporites*, and the smallest species of genera *Laevigatosporites* and *Latosporites*. The number of monosaccate pollen of the *Florinites*-type produced by cordaites increases towards to the Stephanian. *Florinites* occurs regularly in Westphalian strata but its maximum is within the Stephanian. Monosaccate pollen consists of several genera. Some bisaccate and striates pollen were probably produced by conifers and their occurrences are more typical for Stephanian strata, although their first occurrences are within the upper Westphalian. In conclusion, the Westphalian plant assemblages (without pteridosperms because usually we have no planyological evidence about them) were characterized by a prevalence of arborescent and sub-arborescent lycopsids, and the common occurrence of sigillarians, calamites, sphenophylls and some ferns. Cordaites and conifers also occurred but in low numbers. Stephanian plant assemblages, in contrast, probably were dominated by marattialens and some other types of ferns, with sub-dominant conifers and cordaites. Some new species of sigillarians and sub-arborescent lycopsids (*Polysporia*-type) occurred in high numbers. This probably does not reflect evolutionary change, but was probably influenced by different ecological conditions; a change to a drier climate is in particular indicated by an increased representation of cordaites and conifers in the Stephanian, whose spores occurred in higher proportions in clastics of Westphalian age.

IGCP Project no. 479: **Sustainable Use of Platinum Group Elements** (J. E. Mungall, University of Toronto, Canada, M. Iljina, Geological Survey of Finland, C. Ferreira-Filho, Universidade de Brasilia, Brasil, contribution by I. Knésl, Czech Geological Survey & *L. Ackerman*)

The Czech team compiled a database of promising localities of the PGE resources in the Bohemian Massif and the Czech part of the Western Carpathians. The most prosperous sites are as follows: the Kdyne massif, the Bor massif, peridotites near Holubov and historical deposits of Staré Ransko and Tisová.

Activities were focused on the study of PGE fractionation in basic-ultrabasic rocks of the Svitavy anomaly. Interesting lithological types (peridotites, amphibolites) of the neighboring Letovice metaophiolite complex were also sampled and studied, which belongs to one of prosperous localities for PGE geochemistry in the Bohemian Massif.

Samples from the HSV-1 structural borehole at Svitavy show anomalous concentrations of platinum-group elements (PGE) Pd – up to 281 ppb, Pt – up to 110 ppb, Ir – up to 7.4 ppb, Ru – up to 19.8 ppb, Rh – up to 8.4 ppb and Au (up to 18.5 ppb) have been detected in low Ni-Cu (Cr) mineralized pyroxenite and serpentinite. Based on geological and geotectonic position and geochemical data, these rocks hidden under Cretaceous sediments represent most likely a continuation of the Letovice ophiolite complex. Maximum Ni, Cu and Cr values reach 0.67, 0.11 and 0.35 wt. %, respectively and abundant spinel (Cr-spinel, magnesiumchromite, chromite) and magnetite with minor sulfides (millerite and chalcopyrite) were identified as major ore bearing minerals in the most richest PGE sample. No discrete PGE phases were identified.

The non-mineralized mafic rocks from several localities of the Letovice crystalline complex were studied. Concentrations of PGE were detected (Ir up to 4.38 ppb, Ru up to 7.29 ppb, Rh up to 0.91 ppb, Pd up to 1.81 ppb, Pt up to 12.41 ppb), Ni (up to 2,240 ppm), Cu (up to 497 ppm) and Cr (up to 5,479 ppm) and compared with results from non-mineralized rocks of the HSV-1 structural borehole at Svitavy and other ophiolites. Various metal ratios in the Letovice samples indicate geochemistry close to that of other world ophiolite complexes.

Project IGCP 491: **Middle Paleozoic Vertebrate Biogeography, Paleogeography and Climate** (*J. Zajíc*, Czech Representative & S. Štamberg, Muzeum východních Čech, Hradec Králové)
The comparative collections of fossil non-marine Upper Carboniferous and Lower Permian vertebrates were studied in the

Geologisches Institut, Bergakademie Freiberg, Germany in the Naturhistorische Museum Schloss Bertholdsburg in Schleusingen, Geologische Bundesanstalt Wien, Austria, Museum für Naturkunde der Humboldt Universität Berlin, Germany, West Bohemian Museum Plzeň and in the National Museum Praha, Czech Republic.

Both the "*Acanthodian web*" (www.gli.cas.cz/acanthodians) and the acanthodian world database are gradually filled with data. The new extensive and wide-ranging list of all non-marine Permo-Carboniferous fauna of the Czech Republic (apart from the paralic Upper Silesian Basin) was finished and presented by Stanislav Štamberg and Jaroslav Zajíc in the form of a book.

The oral communications were presented at the *8th Paleontological Conference (Czech–Slovak–Polish)* in Bratislava, Slovakia, 2007 (S. Štamberg: Carboniferous fauna of the Krkonoše Piedmont Basin), at the *40th Anniversary Symposium on Early Vertebrates/Lower Vertebrates* in Uppsala, Sweden, 2007 (J. Zajíc: Upper Carboniferous non-marine Euselachiids of the Czech Republic), at the *11th Coal Geology Conference Prague 2004* in Praha (Z. Šimůnek, J. Zajíc & J. Drábková: Biota of the Líně Formation (Stephanian C), mode of preservation and its paleoecological interpretation), at the *5th Symposium on Permo-Carboniferous Faunas* in Hradec Králové, 2008 (R. Lojka, J. Drábková, J. Zajíc, J. Franců, I. Sýkorová & T. Grygar: Environmental response to climatically driven lake-level fluctuations: record from Stephanian B freshwater reservoir of eastern tropical Pangea (Mšec Member, Kladno–Rakovník Basin, Central Bohemia); S. Štamberg & J. Zajíc: Carboniferous and Permian faunas and their occurrence in the limnic basins of the Czech Republic; J. Zajíc: The main Late Carboniferous and Early Permian lake fish communities of the Czech Republic; J. Zajíc: The limnic origin of majority of the Permo-Carboniferous basins of the Bohemian Massif; J. Zajíc: Czech and Moravian Permian acanthodians).

The subsequent project IGCP 491 conference *5th Symposium on Permo-Carboniferous Faunas* was organized by Stanislav Štamberg and Jaroslav Zajíc in Hradec Králové (July 7 to 11, 2008). A one-day workshop *Interpretation of Marine and Freshwater Environments in Carboniferous and Permian Deposits* was included. A two-day field excursion was conducted in the Krkonoše Piedmont Basin and the Boskovice Basin. In total, 26 talks and 5 posters (34 abstracts) were presented. 32 participants from 8 countries (Australia, Canada, Czech Republic, France, Germany, Italy, Slovakia, and United Kingdom) attended. Proceedings with an excursion guide and abstracts were published (S. Štamberg & J. Zajíc, Eds.: Faunas and paleoenvironments of the Late Paleozoic, Hradec Králové). Two identical official web pages of the symposium were built (*www.gli.cas.cz/shk/SymposiumHK.htm* and *www.gli.cas.cz/shk/SymposiumHK.htm*).

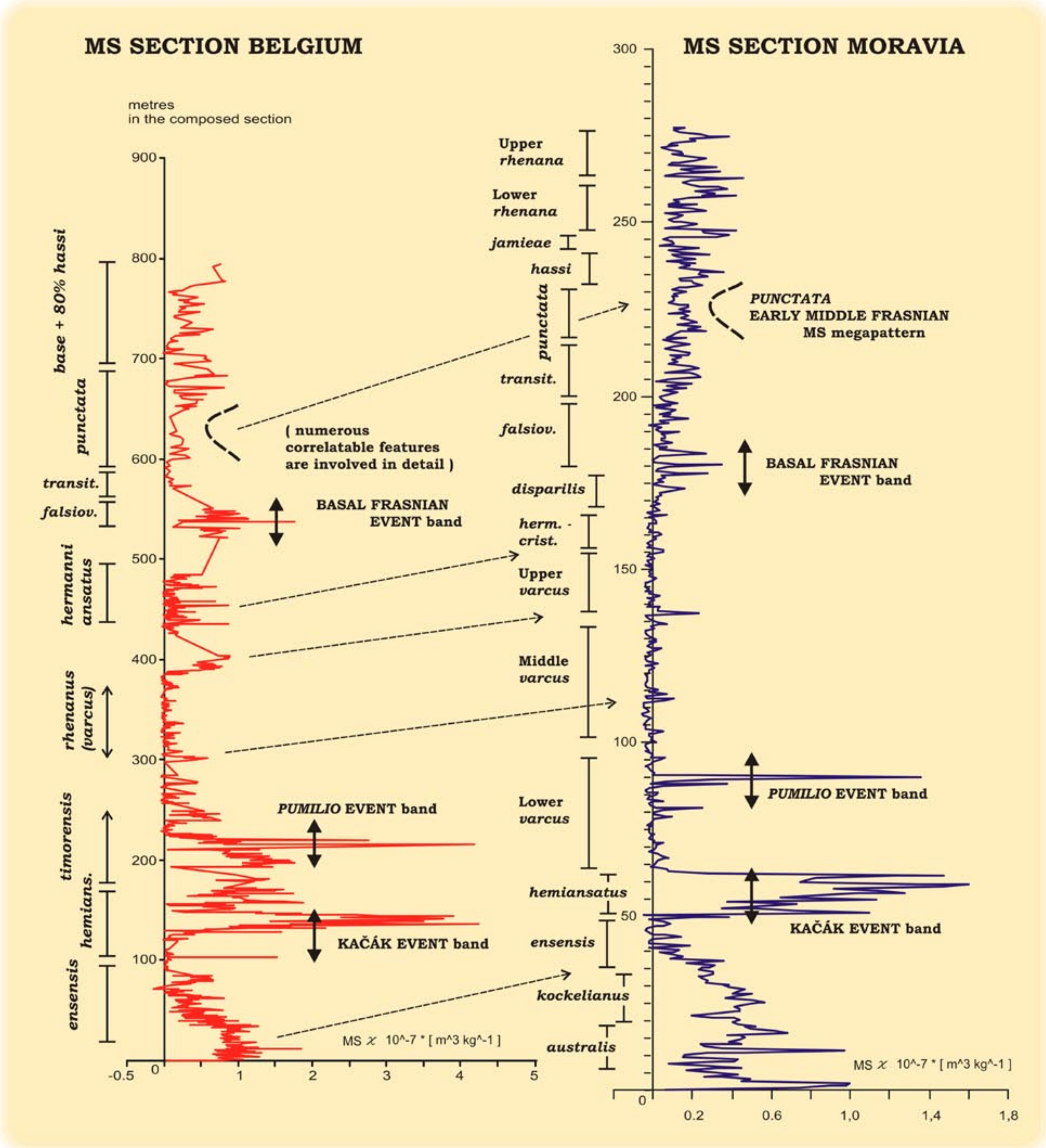
IGCP Project No. 499: **Devonian land-sea interaction: evolution of ecosystems and climate – DEVEC** (*J. Hladil*, *L. Slavík*, *L. Koptíková*, *A. Galle*, *M. Chadima*, *P. Pruner*, *M. Geršl*, *P. Čejchan*, *L. Lisá* & *P. Lisý* in co-operation with O. Bábek, Faculty of Science, Masaryk University in Brno, J. Frána, Institute of Nuclear Physics AS CR, v. v. i., Řež near Praha & J. Otava, Czech Geological Survey in Praha, Brno office. National coordinator: O. Fatka, Charles Univesity, Praha. International project leaders: P. Königshof & E. Schindler, Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt a. M., Germany; J. Lazauskiene, Geological Survey of Lithuania, Vilnius, Lithuania & N. Yalçin, Istanbul University, Engineering Faculty, Avcilar-Istanbul, Turkey)

A considerable amount of correlation work has been devoted to the development, testing, empirical and theoretical improvement and application of magnetic susceptibility stratigraphic methods. It was found that the vertical successions of the patterns which were found in long, composed stratigraphic sections in appropriate limestone facies can provide an important information source for detailed stratigraphic correlation and, no less important, paleoenvironmental or paleoclimate reconstruction. Grasping the complexity and often-unique characteristics of these patterns is based on combination of quasi-periodical and singular elements in the unstable weathering products' dispersal system, particularly related to qualitative and quantitative variations in the flux, i. e., circulation, delivery, sedimentation and further transformation (and embedding) of the atmospheric dust and aerosols.

Subproject: **Inter-regional magnetic susceptibility correlation across the Devonian facies and basins, the approach based on MS patterns, their structures and successions – Czech Republic and Belgium** (*J. Hladil*, M. Geršl, *L. Koptíková*, *P. Schnabl*, F. Boulvain, A.-C. da Silva, C. Mabille & G. Poulain, Department of Sedimentary Petrology, University of Liége, Belgium; Institute of Geological Sciences, Masaryk University of Brno, and Czech Geological Survey, branch Brno, Czech Republic)

For the first time in almost 20 years long history of MS stratigraphy in limestones, the high-resolution correlation potential of magnetic susceptibility complex-pattern stratigraphy has been documented using two large composed sections from Moravia (Czech Republic) and Dinant Basin (Belgium), in a time window from the Eifelian to Frasnian. The MS curves from these two sections are almost identical, showing a higher than theoretically expected degree of similarity (Fig. 10). They provide many details of event, micro-event and high-frequency structures from the latent environmental control. This correlation bridges two dissimilar environments, where the first corresponds to pure limestones of shallow carbonate platforms and mostly eolian impurity material (Moravia) and the second one is characterized by carbonate ramps and, in addition, argillaceous material of fluvial origin (Dinant).

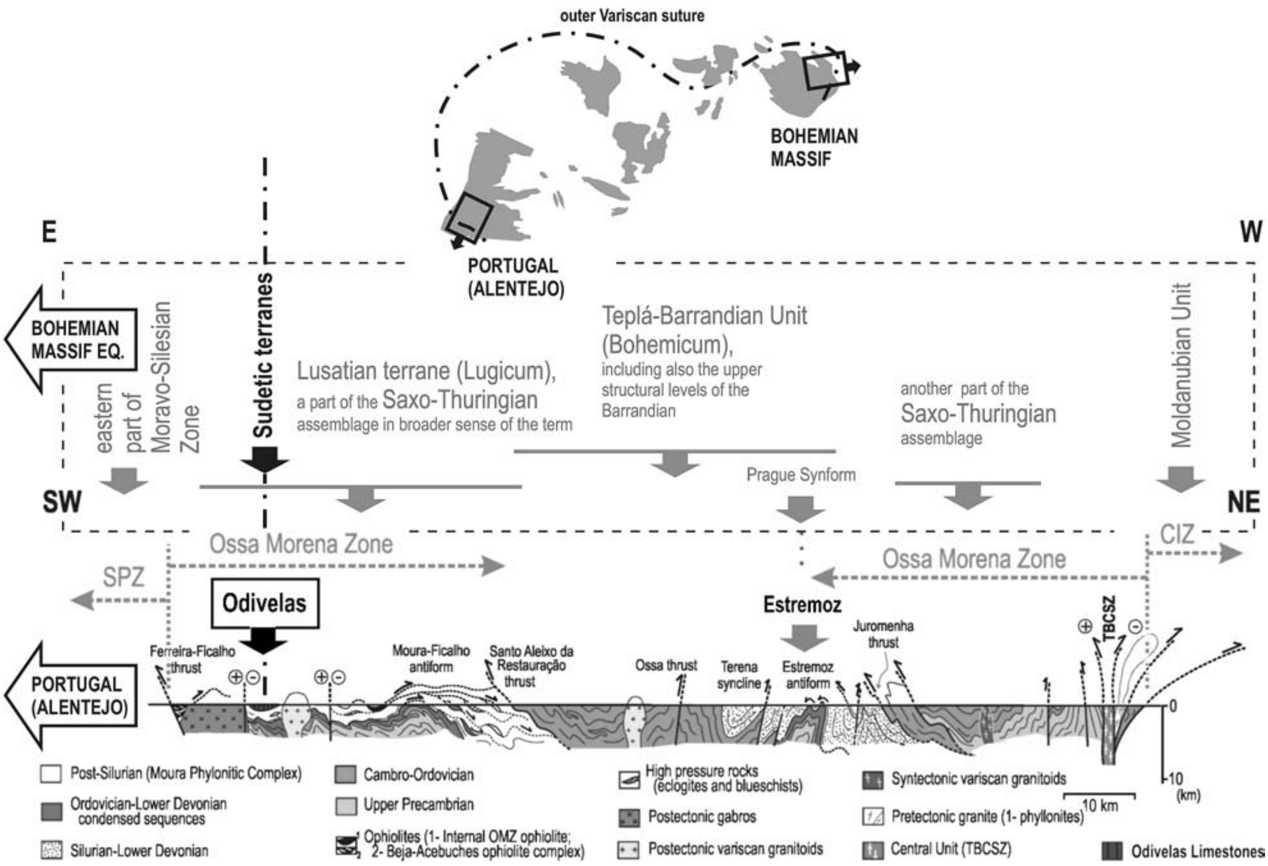
The Belgian sections start with an Upper Eifelian mixed detrital-carbonate outer ramp, followed by a well-developed Givetian carbonate platform with environments ranging from external platform (crinoidal facies) to stromatoporoid-dominated biostromes and to the lagoonal facies of the internal platform (*Amphipora* floatstone, algal packstone, intertidal mudstone and laminated peloidal packstone and paleosols). After the demise of the carbonate factory at the beginning of the Frasnian and the generalization of argillaceous sedimentation, the Middle Frasnian is characterized by the succession of three carbonate mound levels, starting in quiet aphotic water and ending in shallow subtidal zone.



■ **Fig. 10.** A comparison of long composed magnetic susceptibility stratigraphic sections between the Dinant Basin and Moravian Platform Reefs (Devonian, Eifelian to Frasnian).

Moravian section encompasses very pure carbonate facies of a large reef-rimmed carbonate platform complex. Inside this the stratal successions are dominated by dark-gray, thin bedded and rhythmically deposited *Amphipora* banks which alternate with thicker and lighter intervals built by stromatoporoid–coral banks. The concentrations of non-carbonate impurities do not exceed 3 wt. % (often much less). Almost all this material was originally eolian dust, and was delivered to a hundreds kilometers wide, very shallow platform–lagoonal areas from distant sources over the ocean channels. Inputs of clayey sediments are absent, and detrital rims at few and gradually covered cliffs of crystalline basement rocks are rare. A major vertical accretion marked by biohermal shoals developed during the Frasnian.

As sedimentary environments are different in the two areas, an external basin-scale forcing parameter must be involved in MS variations. This work proposes a first comparison of the Eifelian–Frasnian MS curves with different proxies like global sea-level curve, oceanic temperatures and others.



■ **Fig. 11.** A geological section across the structures from the boundary between the South Portugal Zone and Ossa Morena Zone, and the occurrence of the Odivelas Limestone with coeval basalts. A comparison with terrane arrangement in Bohemian Massif has been suggested.

Subproject: **The comparison of the tectono-sedimentary development of SW borders of the Ossa Morena zone in Portugal (Alentejo) and E borders of Lugicum (Sudetes and Moravia)** (*J. Hladil*, G. Machado, R. Melichar, P. Fonseca, *L. Koptíková*, *L. Slavík*, F.T. Rocha; GeoBioTec, University of Aveiro, Portugal, Dept. of Geological Sciences; Masaryk University in Brno, Czech Republic; Centre for Geosciences, University of Lisbon, Portugal).

The most recent research was focused on the revision of Middle Devonian reefs with calciturbidite slopes and fans which rimmed the marine basalt volcanoes in the paleobasins which are related to the SW borders of the Ossa Morena Zone (OMZ) in Portugal (Alentejo) and, in parallel, also the E borders of Lugicum (Sudetes and Moravia). It is due to the fact that these Portuguese and Sudetic structures show a significant degree of similarity, and this similarity is in agreement with a concept of wide-ranging tectono-sedimentary belts in the Variscan orogen which is, however, slightly disregarded in present days in spite of plenty of geological detail which was produced in past two decades. Both the above mentioned locations lie remarkably close to the occurrences of metamorphosed Cambrian limestones and dolomites which are principally indicative of the terrane compositions of Ossa Morena type in the west and Lusatian type in the east of the Variscan orogenic belts. In addition, remarkable parallels were documented between the facies, time and deformational arrangement of the terrane complex successions which propagated both in the areas outwards and inwards against the alignment of these structures (Fig. 11).

The nature of the problem that was originally seen in the Portuguese part was that the scarcity of Middle Devonian sediments in the OMZ has long been considered to be strong evidence for a generalized uplift of the area during the first pulses of the Hercynian or eo-Variscan orogeny. However, a not-negligible number of outcrops of the Middle Devonian carbonate rocks exist in the western OMZ, particularly in the southern border. These comprise deformed exotic terranes with signatures of oceanic nature, and carbonate deposits are usually associated with old and coeval basaltic volcanic rocks (although the main mass of the Beja Igneous Complex is considerably younger, Carboniferous in age). These fragmentary sedimentary sequences consist of calciturbidites and, more rarely, they contain also small bioherms and biostromes which are indicative of volcanic highs or seamounts reaching the ocean surface.

In spite of tectonic slicing and boudinage, the classical localities near Odivelas, Ferreira do Alentejo, provided sufficient area and length of outcrops for the reinvestigation and reinterpretation of both the shallow-water and calciturbiditic facies. These carbonate and volcanic rocks were subjected to low grade metamorphic conditions (pumpellyite-chlorite or pumpellyite-prehnite facies). Nevertheless, a varied reef fauna was collected comprising faunal elements important for the determination of ages, environments and paleogeographic relationships.

The locally rock-forming cupressocrinitid (and gasterocomid) columnals and brachials are significant indicators of the biostratigraphic age. Also the benthic faunas, both *in situ* and re-deposited on steep slopes, provided a documents related to the age of these rocks – this relates to tabulatomorphic groups, e. g., from the genera *Heliolites, Thamnopora, Caliapora, Squameoalveolites, Spongioalveolites* and *Scoliopora*, or rugose corals *Pseudamplexus, Cystiphylloides, Mesophyllum, Disphyllum, Thamnophyllum, Peneckiella, Pseudodigonophyllum, Holmophyllum* and *Calceola*. These faunas, together with revised indications about stromatoporoid, amphiporid and brachiopod faunulae, suggest that the carbonate reef and upper slope factories associated with basalt volcanoes and old basalt basements were productive in the Eifelian and Eifelian–Givetian times. The data based on conodonts are in stage of assessment, and they give particular evidence of the Eifelian ages of calciturbidites. On the other hand, the Eifelian–Givetian conodonts are poorly represented, and stratigraphic evidence is based rather on shallow water faunal elements. Additional data, having the same stratigraphic significance but coarser resolution, relate to marine plankton and miospores.

The age and structural separation of these basalts and oceanic limestone deposits attached to the Beja Complex is a very new and essential geological finding, and these structures are interesting counterparts to SE Ještěd Ridge (Bohemia), Mały Bożków (Kłodzko area, Polish Central Sudetes), and potentially (?) also Leskovec and Horní Benešov (N Moravia) allochthonous structures.

IGCP Project No. 510: **A-granites and related rocks through time** (Leader: Roberto Dall'Agnol, Federal University of Pará, Brazil, contribution by *K. Breiter*)

The Erzgebirge – Krušné Hory Variscan magmatic province differs from other parts of the Bohemian Massif in the coexistence of two contrasting types of granite plutons: (1) a strongly peraluminous P-rich type (S-type) and (2) mildly peraluminous P-poor granites (A-type). Both types are similar in age, about 320–310 Ma, and the style of Sn–W mineralization, but the relative abundance of trace elements and accessory minerals differs significantly in the two groups of plutons. Volcanic equivalents of S- and A-type granites erupted particularly in the easternmost Erzgebirge forming the Altenberg-Teplice, the largest outcropping Carboniferous volcanic suite of the Bohemian Massif.

The A-type granitoids are, in comparison to common S-type granites, characterized by a higher content of SiO_2, Zr, Th, and HREE, lower content of Al, Ca, and P, and higher Fe/Mg-ratio. Mineralogically, A-type granites and rhyolites are enriched in thorite, xenotime, and transition phases among zircon, thorite, and xenotime.

An actual study is focused on accessory minerals of ABO_4-type (zircon, thorite, uraninite, monazite, xenotime) from (1) A-type granites from Cínovec and Krupka (Czech Republic); (2) subvolcanic dike granitoids from Schneckenstein (Vogtland, Germany), and (3) 1 km thick vertical profile through rhyolites and dacites of the Teplice caldera (Czech Republic), and its comparison with accessory minerals from peraluminous granites.

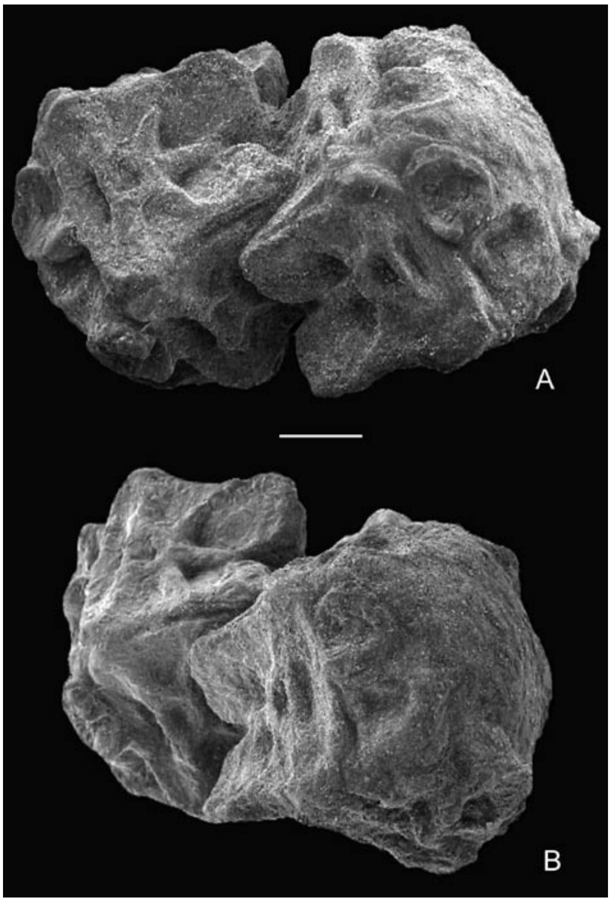
4b. Grant Agency of the Czech Republic

Completed projects

No. 205/06/0842: **Taphocoenoses with echinoderms in the Upper Turonian of the Bohemian Cretaceous Basin: taphonomy, taxonomy, paleoecology, biostratigraphy** (*J. Žítt, Project leader; co-investigators: S. Čech, Czech Geological Survey, Praha; M. Košťák, Faculty of Science, Charles University, Praha & J. Sklenář, National Museum, Praha*)

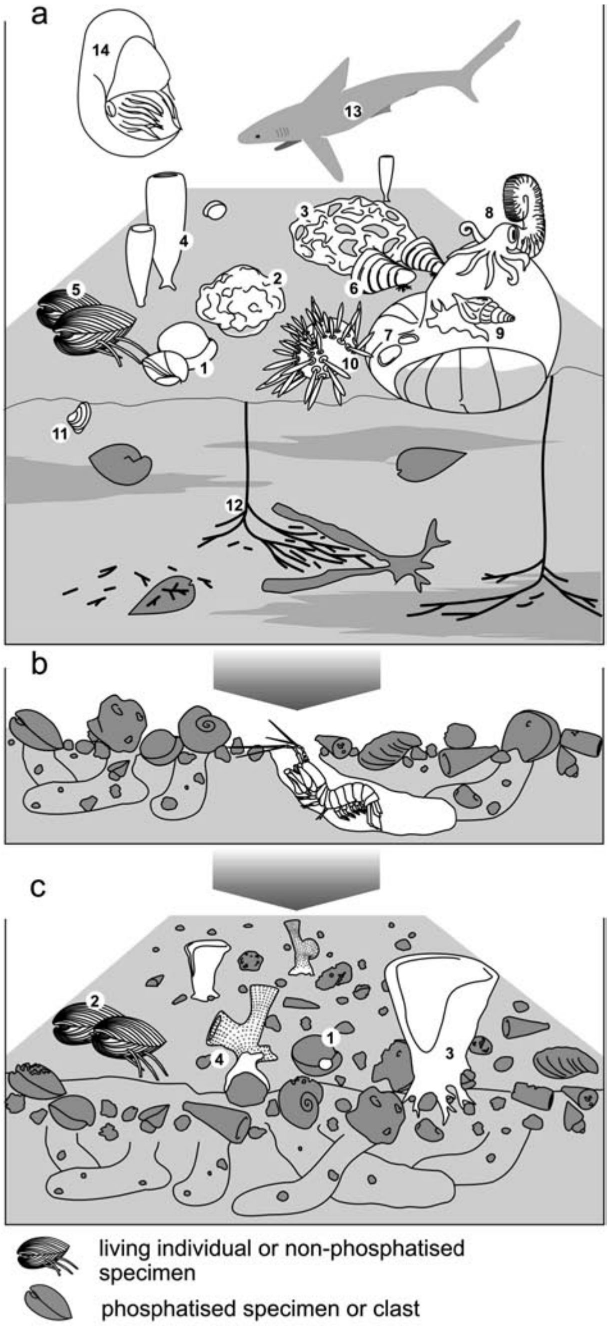
Taphocoenoses with echinoderms abundant in two regions of the Bohemian Cretaceous Basin were studied. The first region is represented by hemipelagic strata of the Late Turonian age uncovered near Lovosice, the second one, well known by coeval coarser siliciclastic sediments, lies near Jičín. Paleontological studies were based both on rich sets of macrofossils collected in these areas and on older museum collections (localities Úpohlavy near Lovosice, Kněžnice and Těšín near Jičín, a. o.). Besides the key locality of Úpohlavy, several other localities and boreholes situated in hemipelagic strata were utilized (e. g., Koštice, Kystra, Býčkovice, Nučničky, Lahošť, boreholes Ko–1 Koštice, Lb–1 Třebenice and Úd–2 Sedlec). The detailed investigations of brachiopods, echinoderms, fish-like vertebrates, cephalopods, bivalves, sponges, ichnofossils, foraminifers and palynomorphs were carried out. In siliciclastic deposits (Kněžnice, Železnice), the cephalopds and echinoids were most important.

Asteroid studies of the Úpohlavy section (Xbα-β) supplemented by older collections (e. g., from Uhlířská Lhota, Opočnice a. o.), mostly of similar age, revealed interesting communities with several forms new for the Bohemian Cretaceous Basin (*Arthraster* sp.n., *Chrispaulia* Gale). Ophiuroidea are represented by at least 13 species, with one species new (*Stegophiura*? *nekvasilovae* gen. et sp. nov.). Chemical preparations of micrasterid echinoids and *Gauthieria* and following studies have shown taxonomically important details of skeletal structures. New finds of disarticulated skeletal parts of *Bourgueticrinus* cf. *fischeri* (Millericrinida) and very rare isocrinids (*Isocrinus* sp.) and comatulids (*Placometra* cf. *laticirra*, Fig. 12, comatulid sp.) from Úpohlavy illustrate well the diversified echinoderm community and very interesting taphonomy and distributional pattern of their remains in scour depressions and infaunal burrows in Xbα-β. Based on these data, a model of sedimentary environment was suggested for this time interval. Studies of irregular echinoids confirmed that *Micraster leskei* occurs in two successive size morphs with larger form following the smaller one in the lower part of Xbβ. This distributional pattern of size morphs known also from the West Europe and Spain still has not been fully explained, though there were much more specimens available for study than in Bohemia. Comparative studies of rich English collections have shown extreme variation of still not revised species (*M. leskei*, *corbovis*, *cortestudinarium*, *normanniae*, *decipiens*) with many transition forms. Expected recent revision and cladistic analysis of spatangoids (A.B. Smith, Nat. Hist. Museum, London) will probably facilitate even the taxonomic orientation in the Bohemian *Micraster* species complex.



■ **Fig. 12.** *Placometra* ex. gr. *laticirra*, two adjoined cups in different lateral views (A, B). Úpohlavy near Lovosice, Teplice Formation, Upper Turonian. Scale bar equals 500 µm (after Žítt & Vodrážka 2008).

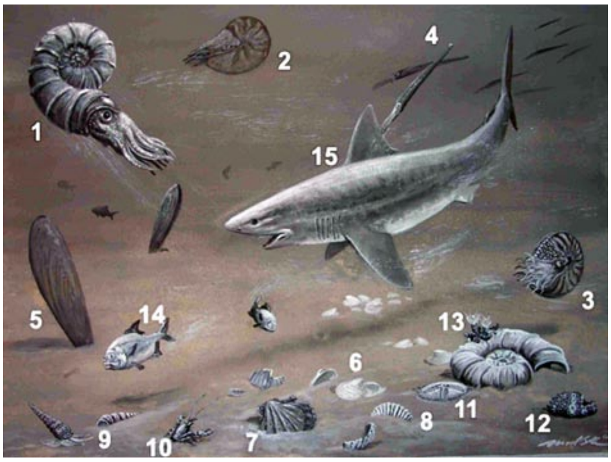
The studies of paleogeography, paleoecology, skeletal structures and taxonomy of sponges (*Guettardiscyphia* (*Hillendia*), *Eurete, Laocoetis, Ventriculites*, a. o.), brachiopods (*Woodwardirhynchia, Cretirhynchia, Gibbithyris*), gastropods (*Avellana, Gyrodes, Ascensovoluta*) and bivalves (*Nucula, Cardita, Crassatella, Mytiloides*, a.o.) from Úpohlavy, Kystra, Koštice and, mainly, from Býčkovice, provided us with new data connected also with sedimentary condensation and phosphates in the phosphatic lag (Fig. 13). Succession of environmental processes recorded in this lag (sponge-dominated community on soft bottom, polyphase phosphatization and sediment reworking, new sponge-dominated community and resumption of sedimentation; Fig. 14) and its stratigraphy enabled correlation of this interval from Úpohlavy to the North. Moreover, the absolute duration of the condensed sedimentation could be estimated (ca 350 ka). Important results have been achieved in comparisons of hemipelagic and siliciclastic facies of northern Bohemia (Lužice and Jizera regions) based on sequence stratigraphy. Inoceramid bivalves were used here for biostratigraphical control of Turonian sequences. Brachiopod *Gyrosoria lata* was taxonomically revised and its stratigraphical span over the whole Bohemian Cretaceous Basin precised. Abroad materials (e. g., from English Chalk) were also considered and revised. Evolu-



■ **Fig. 13.** A simplified scenario of the development of the phosphatic lag at Býčkovice. A – a diversified assemblage with prevailing softground adaptations; B – sediment reworking and exhumation of phosphatic intraclasts; the consolidated sediment beneath the intraclast accumulation is inhabited by burrowing decapods (*Thalassinoides* burrows); C – colonization of the bottom by a new assemblage. 1 – *Gibbithyris semiglobosa*; 2 – *Pyrospongia vrbaei*; 3 – *Tremabolites megastoma*; 4 – *Ventriculites alcyonoides*; 5 – *Spondylus spinosus*; 6 – *Mytiloides costellatus*; 7 – *Pycnodonte vesicularis*; 8 – *Scaphites geinitzi*; 9 – ?*Ascensovoluta* sp.; 10 – "*Cidaris*" *reussi*; 11 – *Nucula striata*; 12 – *Chondrites* isp.; 13 – *Paranomotodon angustidens*; 14 – *Eutrephoceras sublaevigatum*; 15 – partly phosphatized mould; 16 – partly phosphatized sponge skeleton (after Vodrážka et al. 2009).

tionary line from *G. lata* (Middle/Upper Turonian–?Coniacian) to *G. gracilis* (Maastrichtian) was suggested. Unknown spicular skeletal parts were found in the Bohemian *G. lata*. The studies of unique articulated Teleostei (fishes, Halecidae, Dercetidae, Trachichthyidae), both of the old museum and new specimens revealed and confirmed relationships to the Boreal Late Cretaceous taxa. Ichnofossil and ichnofabric studies provided us with new data on the substrate type and consistency, formation of firmgrounds and evolution of communities of the trace producers (16 taxa) in sequences of the Úpohlavy area.

Studies of jaw-apparatuses of nautiloid cephalopods and revision of aberrant ammonites (*Hyphantoceras, Eubostrychoceras*) were also realized. Revisions of belemnite faunas (*Praeactinocamax, Goniocamax*) of the Bohemian and Russian Cretaceous contributed highly to knowledge of faunal migrations. Cephalopod studies enabled even the correlation of hemipelagic strata of Ohře region (Úpohlavy) with the siliciclastic facies of the Jičín region (Železnice and Kněžnice sections), the macrofauna of which is rather different in many aspects. However, the biostratigraphic examinations of ammonites together with inoceramids resulted in that these deposits are coeval (upper part of *Subprionocyclus neptuni* Zone). Taphocoenoses of siliciclastic facies are known by striking dominance of hemiasterids (unknown or extremely rare in hemipelagic facies) and micrasterids (*Micraster michelini*, *M.* sp.). The "primitive" characters of micrasterid species contrast markedly with coeval *M. leskei* of hemipelagic strata. The different substrate composition and consistence (reflected in burrow depth), as well as different bathymetry, may well be responsible for such a strict separation of species. Transition lithofacies were not probably found so far.



■ Fig. 14. A reconstruction of the living environment during the Late Turonian based on faunal remains found in the area of Jičín (e. g., Kněžnice locality). 1–4 cephalopods: 1 – *Lewesiceras mantelli*; 2, 3 – *Eutrephoceras sublaevigatum*; 4 – baculites (*Baculites* sp.); 5–8 bivalves: 5 – *Pinna decussata*; 6 – *Rhynchostreon suborbiculatum*; 7 – *Vola quinquecostata*; 8 – *Neithea* sp.; 9 – gastropod (*Turritella sexlineata*); 10 – crustacean (*Protocallianassa antiqua*); 11–12 echinoids: 11 – ? *Holaster* sp.; 12 – *Gauthieria radiata*; 13 – serpulid (*Glomerula gordialis*); 14–15 vertebrates: 14 – *Hoplopteryx lewesiensis*; 15 – *Squalicorax falcatus* (Orig. Petr Modlitba).

New preparation and extraction technique of calcitic macrofossils from calcareous rocks using the sulphuric acid was discovered, successfully verified and later even patented. This method was used mainly for detailed studies of sponge skeletons.

Continued projects

No. 205/05/0105: **Peat swamp ecosystems of the Radnice Member (Westphalian) from Late Paleozoic basins of the central and western Bohemia** (*J. Bek*, *J. Dašková*, Project Leader: S. Opluštil, Faculty of Science, Charles University, Praha, Czech Republic, M. Libertín, National Museum, Praha, J. Drábková & Z. Šimůnek, Czech Geological Survey, Praha & J. Pšenička, West Bohemian Museum, Plzeň)

Coal-bearing strata of the Radnice Member fill incised or tectonically formed river valleys. They were deposited during a short interval approximately coinciding with the Lower Bolsovian. Besides local tectonics, compaction and pre-sedimentary paleotopography the deposition was controlled by regional tectonic subsidence described in terms of base-level changes. It was responsible for the formation of basin-wide isochronous horizons (Radnice Group of Seams and its equivalent) and changing facies pattern. Periods of significant base-level rise are marked by development of extensive peat bogs occasionally grading upward into lake during the maximum base-level rise. The most important base-level fall led to a short-term hiatus and varying depth of erosion of previously deposited sediments. The resulting erosional surface with significant relief of max. 20 m divides the Radnice Member into two units corresponding to its formal subdivision into the Lower and Upper Radnice members. Lower unit (Lower Radnice Member) is marked by the upward transition from colluvial and fluvial deposition at or near the base to peat deposition (Radnice Group of Seams) terminated by lacustrine transgression, reflecting the period of maximum base-level rise. Filling of the lake was followed by a short-term hiatus and varying depth of erosion of previously deposited lacustrine sediments and coal due to a rapid base-level fall. Upper unit (Upper Radnice Member) is characterized by base-level fluctuations, which resulted in predominance of coarse-grained clastics while flood-plain deposits are poorly developed (?preserved). The periods of maximum base-level rise are marked by the presence of overbank deposits locally passing into coal seams of the Lubná Group. Extractable coal seams are developed only in minor depressions with low rate of clastic input due to paleotopography configuration (so-called "sedimentary shadows"). The proposed scheme is valid for incised valleys of the SE part of the Kladno–Rakovník Basin where the regional tectonic subsidence was the main mechanism controlling the deposition of this unit. Its validity in valleys with similar tectonic setting outside the study area has to be proved yet. However, this model is not applicable to the NNE-trending grabens driven by local tectonics, which occur in the axial part of the Plzeň Basin and Rakovník part of the Kladno–Rakovník Basin.

The studied coal seams were formed in rheotrophic mires with open water table or with water table corresponding to the peat surface and with high to limited clastic input. Due to permanently favorable edaphic conditions in mires (medium to high-ash coals), the vegetation changes (documented by changes in dispersed spore assemblages or petrographic composition) are mainly related to base-level changes induced by water-ta-

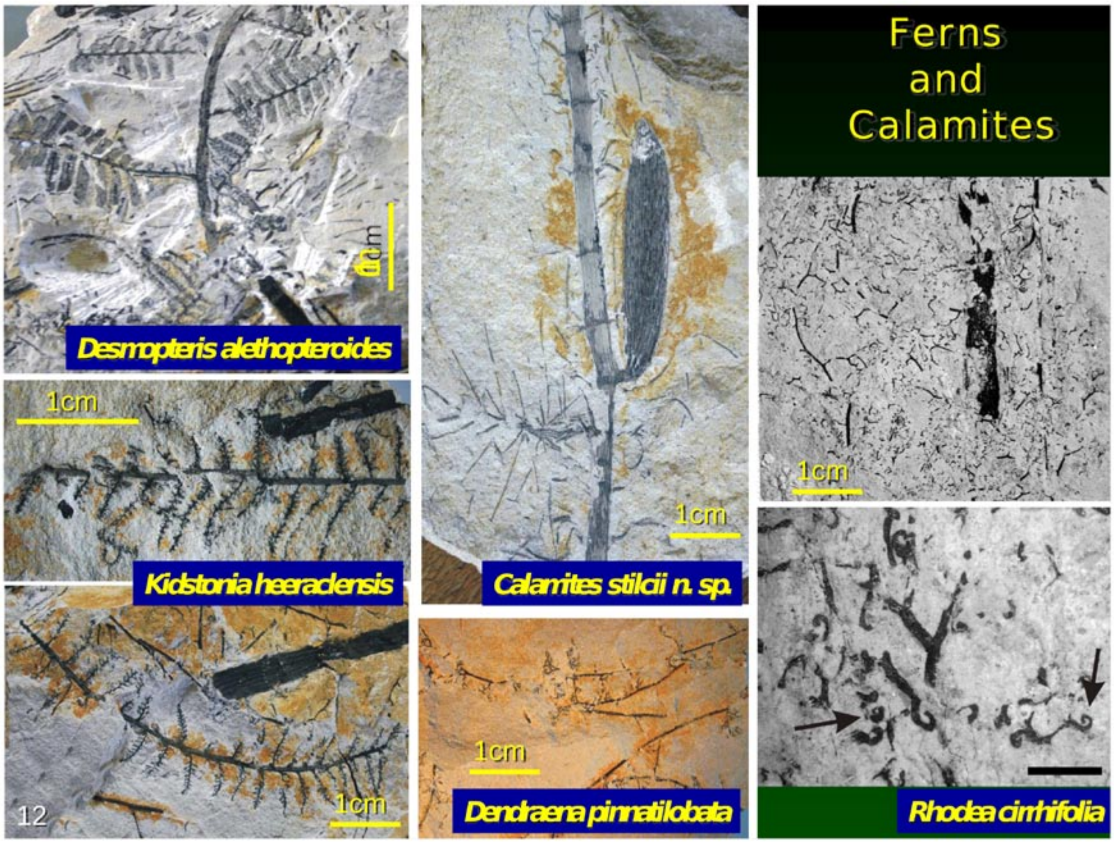


Fig. 15. Selected ferns and calamites from the Radnice Basin.

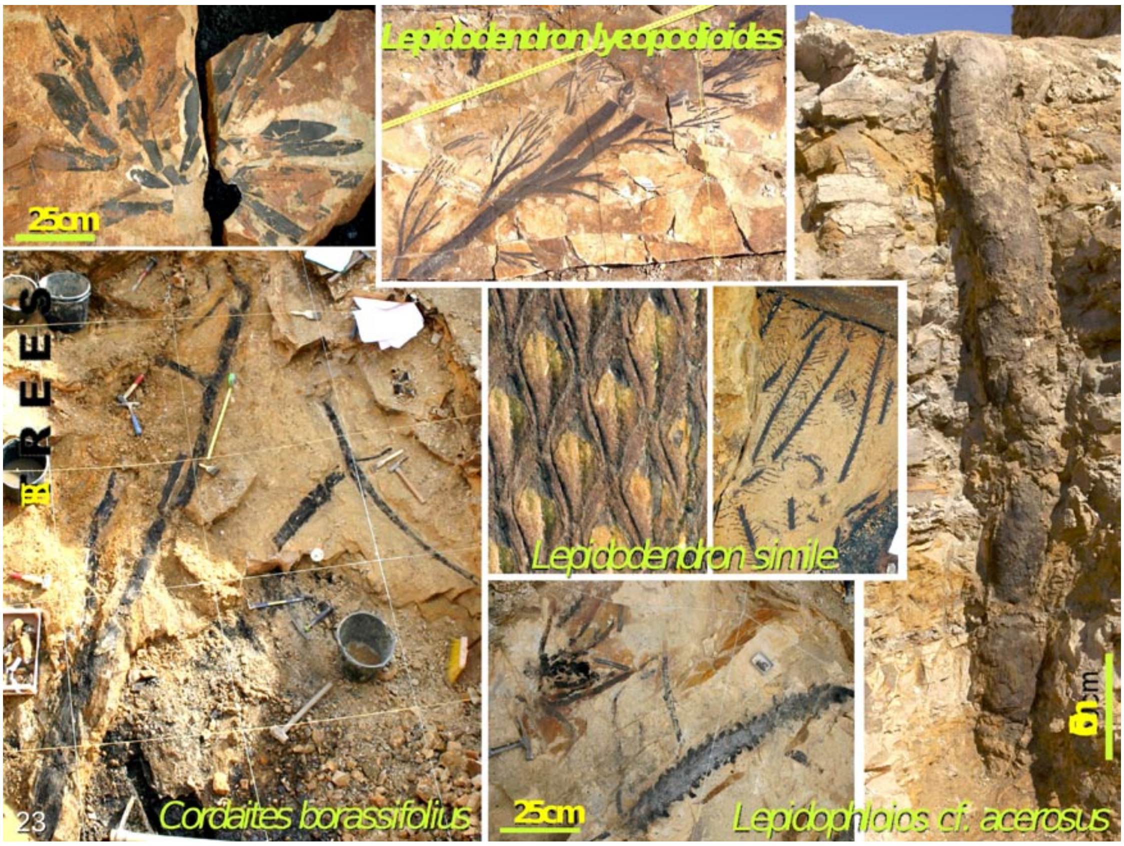
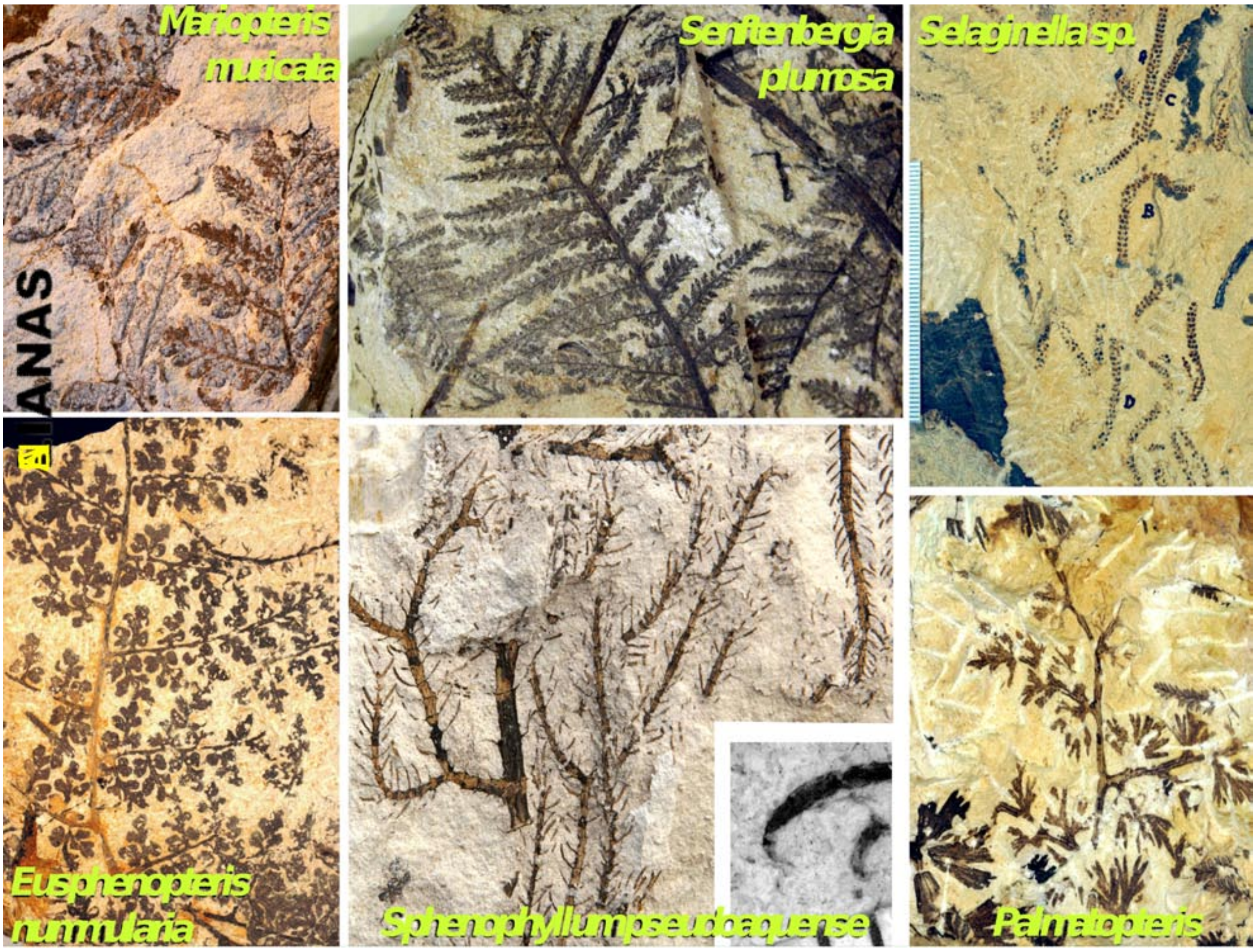


Fig. 16. Selected specimens of arborescent lycopsids and cordaites from excavations in the Ovčín locality.



■ **Fig. 17.** Selected specimens of ferns and sphenophylls from the Ovčín locality.

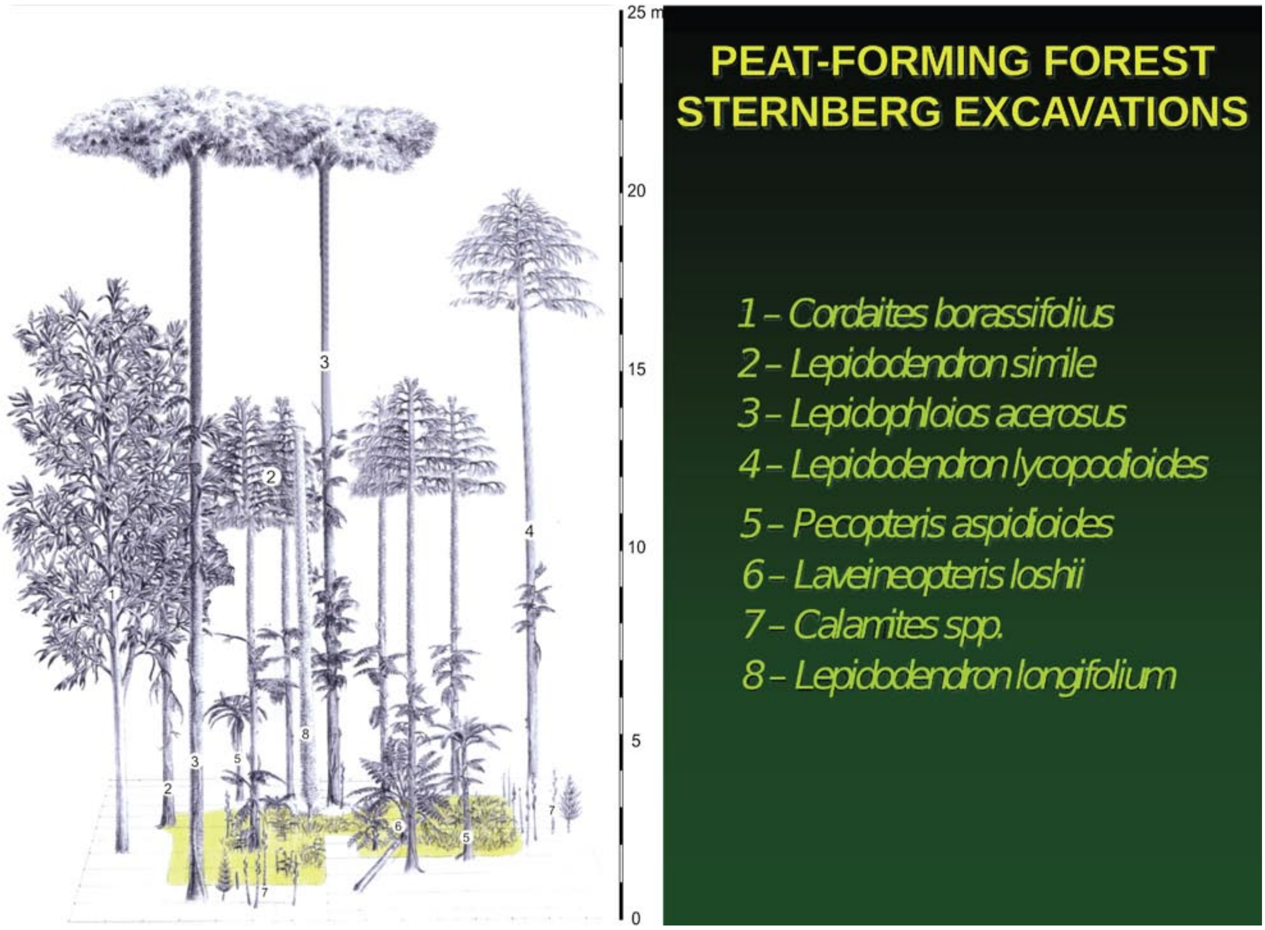
ble fluctuations. Only minor changes in vegetation composition are related to the ash-fall event. They are characterized by alternation of the assemblage dominated by arborescent lycophytes (genera *Lepidodendron* and *Lepidofloyos*; Fig. 16) with the assemblage of sub-arborescent lycophyte plants of the genus *Omphalophloios*. The absence of ombrotrophic mires may have been related to seasonally drier climate within the Variscan hinterland. Dispersed spores are divided into few groups according to their parent plants. The number of parent plants species is estimated. The reconstruction of paleoecological conditions is supported by the graph of relative abundances of miospores of the *Densosporites*-type and the genus *Lycospora*.

Coal-forming flora cannot normally be directly studied from the coal due to intensive decomposition and diagenetic processes, which transformed original plant tissues into coal matter. Except for dispersed spore spectra analysis, the only direct insight is possible only where early diagenetic permineralized peat concretions (coal balls) occur. Another alternative way, which provides high-quality data on structure and composition of plant assemblages, is the study of plant remains (mostly compressions, locally petrifactions) buried *in situ* by volcanic ash-fall.

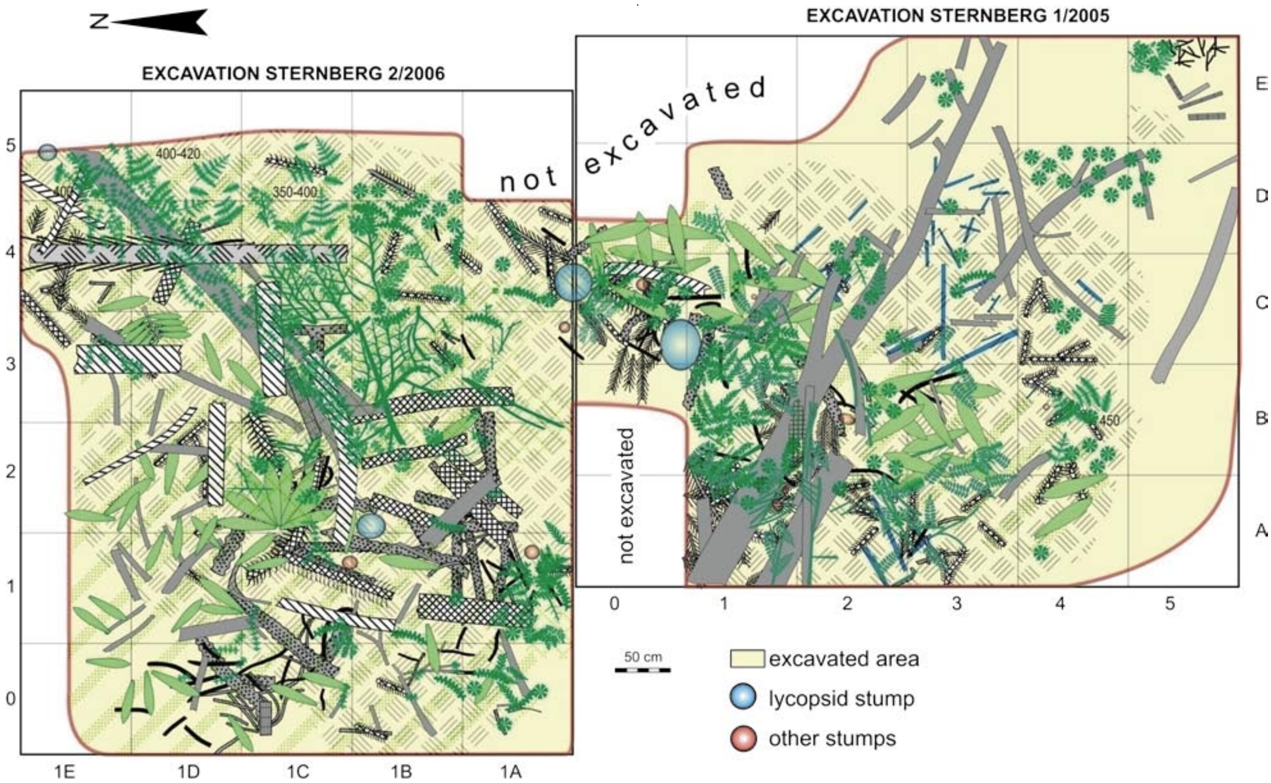
Results of this multidisciplinary project, focused on qualitative/quantitative reconstruction of the Westphalian peat-forming ecosystems preserved *in situ* in volcanic ash bed (Fig. 18) of coal basins in the central and western Bohemia, provided unique data on species composition and structure of plant taphocoenoses in detail which can be hardly obtained from any other type of fossil record. Data from several excavations (Fig. 19) provided information on species composition of taphocoenoses, distribution patterns of populations, density of vegetation cover of species and in particular storeys.

The locality of Ovčín provided species-rich forest assemblage with dominancy of lepidodendrid lycopsids and cordaites and a rich understorey. Monotonous herbaceous plant assemblage of small ferns and sphenopsids (Figs. 15 and 17), which colonized the bottom of a shallow lake filled by clastic sediments was described from the locality of Štilec (Fig. 20).

Such unique type of assemblage has not been known to the Carboniferous paleobotanists. Unusually complete plant remains found in some excavations significantly contribute to the whole-plant reconstruction of some species (e. g., *Lepidophloios acerosus*). Unique are also results of comparison of the plant assemblages (Fig. 21) with their palynological record obtained from coal just below the tuff bed. The most unique complete specimens were lycopsids of genera *Lepidophloios* and *Lepidodendron* and gymnospermous genus *Cordaites*. Very imporant is also a specimen of gigantic dragonfly with the length of the wings 55 cm, i. e. the second largest dragonfly of the World.

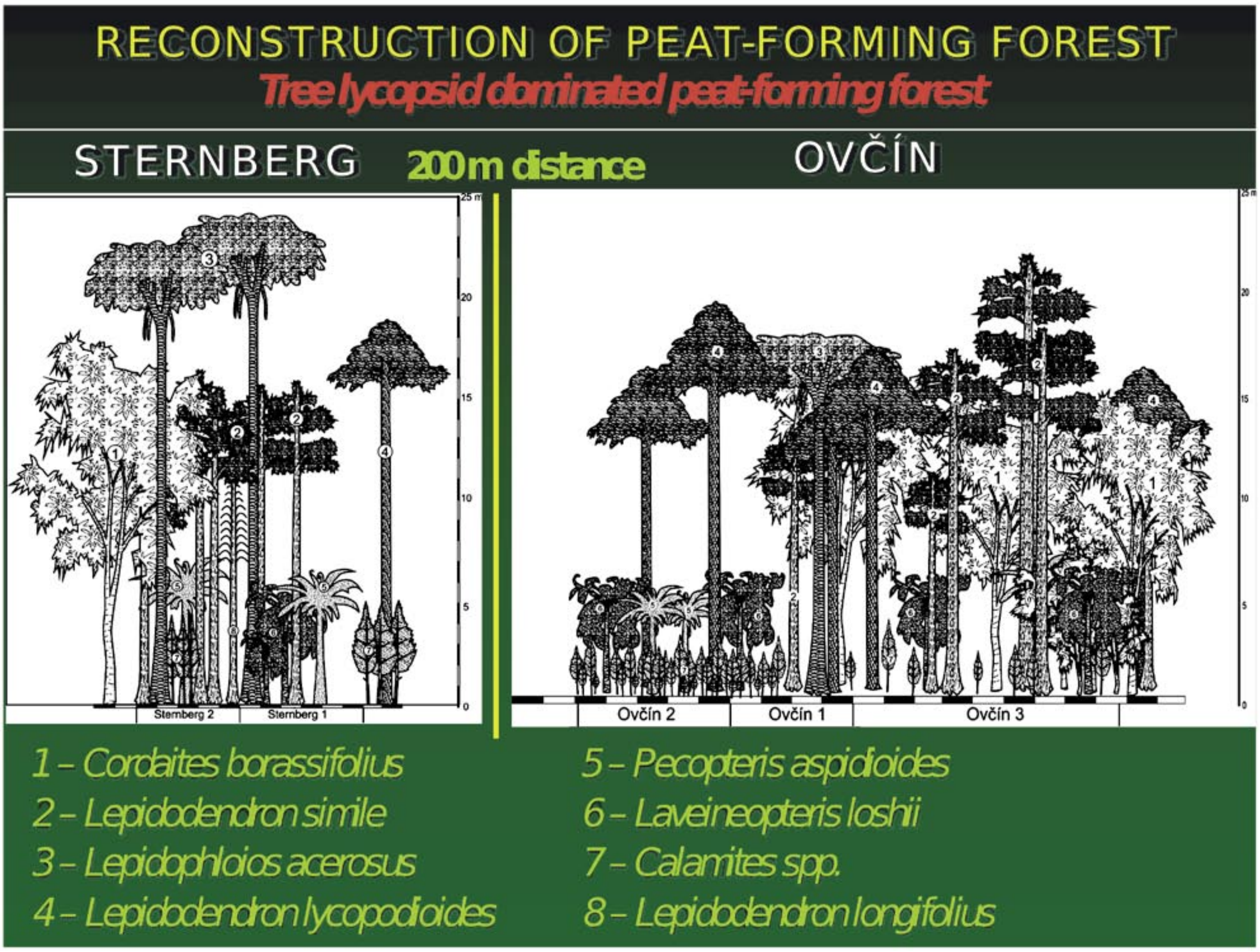


■ **Fig. 18.** Reconstruction of peat forest excavations at the Ovčín locality (drawing by J. Svoboda; after Opluštil et al. 2009).



■ **Fig. 19.** A detailed evaluation of all specimens in excavated area.

■ **Fig. 20.** Reconstruction of pioneer assemblages (drawing by J. Svoboda; after Libertín et al. 2009).



■ **Fig. 21.** A comparison of the reconstruction from two sites at the Ovčín locality (after Opluštil et al. 2009).

No. 205/05/0917: Subproject: **Ichnology of the Upper Cretaceous oceanic "red beds" of the Bohemian part of the Western Carpathians** (*R. Mikuláš*, Project Leader: P. Skupien, Mining–Technical University, Ostrava, Czech Republic)

Red-colored rocks displaying all signs of deep marine sedimentation (turbidites, hemipelagites) are called Oceanic Red Beds. This relatively rare facies is associated with specific environmental parameters. Although their presence in the geological record is not exclusively restricted to the Cretaceous period, these sediments are common in Late Cretaceous oceanic basins, where they are referred to as Cretaceous Oceanic Red Beds (CORB see Hu et al. 2005). In the last 15 years, their significance in reconstruction of paleoenvironmental conditions in Late Cretaceous oceans has been acknowledged (*cf.* Skupien et al. 2009 and references therein).

Late Cretaceous CORB are present in several tectonic units in the Outer Western Carpathians. Identification of more or less complete sections as well as mutual correlation between isolated outcrops are complicated by the nappe structure, minor tectonic deformations and locally also by the high thicknesses of the red beds. The correlation is also hampered by the considerable lateral diversity of the CORBs and the existence of transitional facies (Skupien et al. 2009). Field and laboratory studies were conducted in years 2005–2007 with the aim to solve the persisting correlation problems and to lay basis for a more detailed interpretation. These studies were focused on integrated biostratigraphy (foraminifers, dinoflagellates, calcareous nannoplankton), sedimentology, mineralogy and ichnology (Skupien et al. 2009).

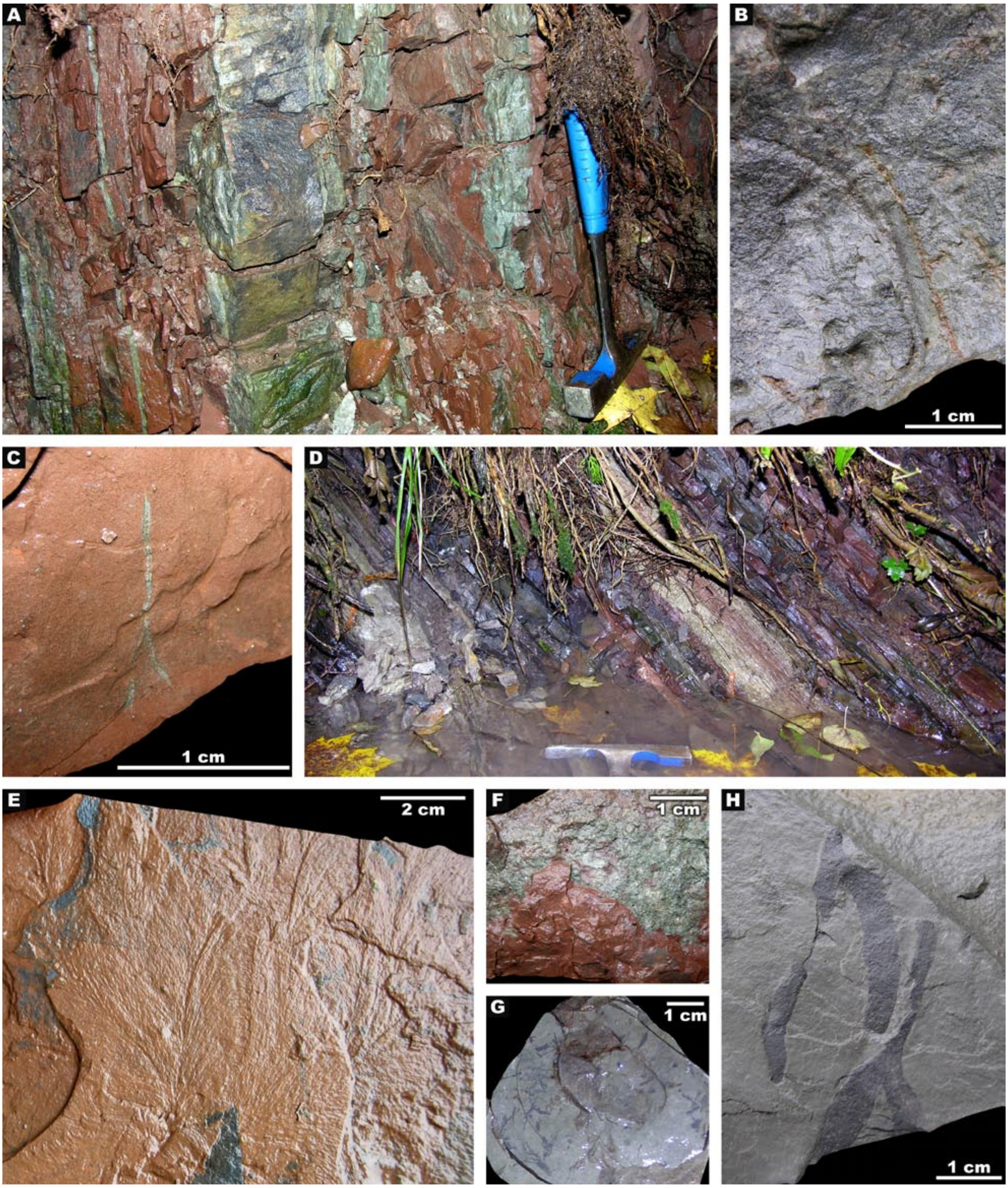
Ichnological characteristics of sequences containing CORB and some transitional facies is the subject of the present study. The following aims were outlined: (1) provide information on substrate colonization and its fluctuations, and on feeding strategies of the benthos (thus contribute to regional paleoenvironmental and paleogeographic conclusions); (2) define the Oceanic Red Beds phenomenon against the transitional facies; (3) provide comparative information for other areas with occurrences of the Oceanic Red Beds, notably CORB.

Material and methods. Ichnological study at all documented sections followed after previous lithological description and integrated biostratigraphic study (Skupien et al. 2009). The thickness of the sections from tens of meters to 300 m at Bystrý potok Stream did not allow a detailed, layer-by-layer ichnofabric documentation using an abrasive paper (in mm-resolution). The essential resolution was on the order of tens of centimeters, with particular attention given to lithological boundaries and colonization horizons: here, documentation works were designed to achieve cm-resolution. Despite all effort, it can be assumed that some of the weak colonization horizons have not been encountered. Information on their typical vertical spacing in the section and their overall character is, however, well substantiated. A principal problem in the study of ichnofabrics of lithologically monotonous pelitic sediments is the differentiation between completely bioturbated facies and facies with no bioturbation. The absence of lamination is usually taken as evidence for total sediment reworking. Nevertheless, no distinct laminae may be visible in pelites with very low proportion of detrital mica or other material subject to planar arrangement during the deposition. The most effective tool for a correct solution of this dilemma is an approximation by lithological boundaries. Such approximation should, however, always involve a consideration on the origin of the respective boundary: it may be connected with previous sea-floor erosion or a swing in environmental parameters potentially affecting the benthic biocoenosis. In any case, we are aware of the fact that the ichnofabric index (Droser & Bottjer 1986) itself in some portions of the studied sediments is a matter of interpretation rather than a mere mechanical determination.

The field observations. At the **Godula facies of the Silesian Unit**, four types of strongly bioturbated sediments were repeatedly identified: (1) gray hemipelagic to pelagic mudstones completely bioturbated at levels of the colonization horizons, with two well-defined tiers of biogenic activity; (2) red claystones with sporadic presence of well visible colonization horizons mostly represented solely by *Chondrites* with low density of individuals, more rarely by the *Planolites–Chondrites* succession with low density of individuals. The presence of additional colonization horizons (probably outnumbering those clearly identifiable by several times, probably a shallower tier) can be assumed on the basis of an analogy with occasional beds with higher silt content in the studied sequence; (3) moderately to coarsely rhythmic sand-dominated flysch with *Thalassinoides*/*Ophiomorpha*, *Arthrophycus*, *Phycodes* and others, which roughly corresponds to a modification of the "seilacherian" Cruziana ichnofacies; (4) moderately to coarsely rhythmic sand-dominated flysch with *Zoophycos*, *Megagrapton* and *Treptichnus* referring to the "seilacherian" Zoophycos ichnofacies with elements of the Nereites ichnofacies. Finely to coarsely rhythmic flysch with regular alternation of pelites, siltstones and sandstones and with a suite of the Nereites ichnofacies is missing (*Palaeodictyon*, *Nereites*, *Urohelminthoida*, *Glockerichus*, *Lorenzinia* and other graphoglyptids).

In the **Kelč facies of the Sileasian Unit**, the CORB are underlain by gray and greenish-gray "mottled", usually calcareous shales with variable sand content. These are placed to the Jasenice Formation (Eliáš 1979), which is roughly analogous in age and character of sediments to the Lhoty Formation of the Silesian Unit (Skupien et al. 2009). In the Kelč facies, the CORB occur in the Němetice Formation, which was defined by Eliáš (1979) as green-gray and gray shale with sporadic red and brown-red beds; recently, several black-gray shale horizons, gray marlstones to clayey limestones, gray-green siltstones, and thin banks and lenses of fine-grained calcareous subgraywackes were also encountered in the type area near Němetice (Skupien et al. 2009). The overlying Milotice Formation (Eliáš 1979) consists of gray clays with variable content of carbonate, silt and sand admixture. Red-brown intercalations occur rarely. Sandstones are also rare and occur in thin isolated beds. To summarize, the onset of CORB or their equivalents in the Kelč facies resulted in considerably restricted conditions for the development of benthic organisms. Colonization horizons with *Chondrites* isp., *Planolites / Ophiomorpha* and *Phycosiphon* indicate short incursions of conditions favourable for infauna. Lower bedding planes of rare sandstone intercalations yielded more complex assemblage of trace fossils (*Gyrophyllites*, *Palaeophycus*, *Phycodes*, *Ophiomorpha*) showing less restricted conditions and more diversified feeding strategies.

Rača Unit. Non-calcareous sediments of the Rača Unit display a very low degree of bioturbation. The CORB facies of



■ **Fig. 22.** Trace fossils from the Rača Unit, Kaumberg Formation at the Buškový potok section (after Mikuláš et al. 2009). A – outcrop in the right stream bank ca. 50 m below the base of the Soláň Formation. Red beds intercalated with sandstones bearing *Thalassiniodes* and *Planolites* in hyporeliefs; B – lower bedding plane of one of the sandstone beds with *Planolites* isp. (upper) and *Helminthopsis* isp. (middle and lower); C – *Chondrites* isp., ca. 40 m below the base of the Soláň Formation; D – two calcareous layers ca. 10 m below the base of the Soláň Formation, left bank; E – *Zoophycos* isp. in calcareous CORBs, top of the Kaumberg Formation; F – "mottled" fine-grained sandstones and shales; outcrop in the right stream bank ca 45 m below the base of the Soláň Formation; G – Soláň Formation of the Rača Unit, Buškový potok section, several meters above the base of the formation. *Chondrites* – *Planolites* ichnofabric on a completely bioturbated background; H – large *Chondrites* isp. in a carbonatic layer ca. 14 m below the base of the Soláň Formation.

the Rača Unit, containing calcareous intercalations (Bučkový Stream site; see Fig. 22), displays a very high degree of bioturbation as expressed by high ichnofabric index. They contain trace fossils *Chondrites*, *Zoophycos*, *Planolites*, *Thalassinoides*, *Palaeophycus*, *Teichichnus* and *Phycosiphon.*

Discussion. Ichnological study of the CORB and the Tertiary oceanic red beds from a larger area with high facies variability has not been carried out yet. A partial exception is the study of Lesczyński (1993) on Cretaceous and Tertiary turbidite sequences in Spain with generally very low-intensity or no bioturbation of red clays/claystones. Other studies (i. e. Lesczyński & Uchman 1991; Bak 1995) focus on less variable geologic units. A more general characteristic based on various small-scale studies and unpublished observations was provided by Wetzel & Uchman (1998). These authors stated that red to brown claystones accumulated in the oceans are usually characterized by complete bioturbation; the number of tiers is limited and the typical depth of bioturbation is several centimetres. An increase in the rate of sedimentation may result in a considerable increase in the food content, hence also in the depth of burrows penetration and in the diameter of tunnels and shafts.

The studied units provide examples confirming the validity of both the above cited studies. A very low degree of bioturbation is displayed by the CORB of the Godula facies of the Silesian Unit, by their equivalents (mostly not red) in the Kelč facies of the Silesian Unit, and by the CORB in non-calcareous sediments of the Rača Unit. In contrast, a high degree of bioturbation was observed in the CORB with calcareous intercalations in the Rača Unit: this facies provides an almost complete list of ichnotaxa given for the CORB by Wetzel and Uchman (1998), namely *Chondrites*, *Zoophycos*, *Planolites*, *Thalassinoides*, *Palaeophycus*, *Teichichnus* and *Phycosiphon*.

The above facts imply that the range of bioturbation of the CORB may be extremely broad, with the supply of food obviously acting as the controlling factor. The "carbonate-rich" portion of the CORB of the Rača Unit has a considerably higher proportion of sand-dominated interbeds and also carbonates than the other described facies. This suggests a relative easy transport of nutrition-rich substrate into the basin directly by turbidite currents, not only by periodical fall-out of dead plankton.

The correlation between high diversity of ichnotaxa/strong bioturbation/food rich environments, however, cannot work out of narrow limits of parameters. In general, eutrophy favours opportunistic strategies; trace fossils resulting from them tend to be present with low diversity and high abundance. Higher productivity, however, may increase the amount of organic particles on an in the sediment but also lower oxygen contents. Considering these relations, we have to conclude that the nutrition richness of the "carbonate-rich" CORB was only relative in comparison with the "carbonate-poor" CORB facies.

BAK K. (1995): Trace fossils and ichnofabrics in the Upper Cretaceous red deep-water marly deposits of the Pieniny Klippen Belt, Polish Carpathians. – *Annales Societatis Geologorum Poloniae*, 64, 1–4, 81–97.

DROSER M.L. & BOTTJER D.J. (1986): A semiquantitative field classification of ichnofabric. – *Journal of Sedimentary Petrology*, 56, 558-559.

ELIÁŠ M. (1979): Facies and paleogeography of the Silesian unit in the western part of the Czechoslovak flysch Carpathians. – *Věstník Ústředního ústavu geologického*, 54, 6, 327–339.

HU X., JANSA L., WANG C., SARTI M., BAK K., WAGREICH M., MICHALÍK J. & SOTÁK J. (2005): Upper Cretaceous oceanic red beds (CORB) in the Tethys: occurrences, lithofacies, age and environments. – *Cretaceous Research*, 26, 3–20.

LESCZYŃSKI S. (1993): Ichnocoenosis versus sediment colour in Upper Albian to lower Eocene turbidites, Guipúzcoa province, northern Spain. – *Palaeogeography, Palaeoclimatolology, Palaeoecology*, 100, 251–265.

LESCZYŃSKI S. & UCHMAN A. (1991): To the origin of variegated shales. – *Geologica Carpathica*, 42, 5, 279–289.

SKUPIEN P., BUBÍK M., ŠVÁBENICKÁ L., MIKULÁŠ R., VAŠÍČEK Z. & MATÝSEK, D. (2009): Cretaceous Oceanic Red Beds in the Outer Western Carpathians of Czech Republic. – *In:* HU X. et al. (eds): *Cretaceous Oceanic Red Beds: Stratigraphy, Composition, Origins, and Palaeoceanographic and Palaeoclimatic Significance.* SEPM Special Publication, 91: 99–110. Tulsa.

WETZEL A. & UCHMAN A. (1998): Biogenic sedimentary structures in mudstones – an overview. – *In*: SCHIEBER J., ZIMMERLE W. & SETHI P. (Eds): *Shales and mudstones I*: 351–369. E. Schweizerbart'sche Verlag (Nägele u. Obermiller). Stuttgart.

No. 205/06/0395: **Paleoecology and trophic structure of selected Cambrian and Ordovician fossil assemblages in the Barrandian area** (Project Leader: O. Fatka, Faculty of Science, Charles University, Praha, Czech Republic)

Subproject: **Paleoecological significance of selected Cambrian and Ordovician trace fossils in the Barrandian area** (*R. Mikuláš*)

The Cambrian of the Barrandian area (Czech Republic) yielded numerous finds of a straightforward paleoecologic value, e. g., assemblages of consumers of microbial mats feeding *in situ*, hidings of small trilobites under carcasses of large species, and several kinds of ichnologic evidence.

In the Barrandian area, Cambrian fossils are known in two separate areas: in the Příbram–Jince Basin and in the much smaller Skryje–Týřovice Basin. The only richly fossiliferous rocks (graywackes and shales with local intercalations of sandstones to fine conglomerates) have been assigned to the Jince Formation. Its age corresponds to older levels of the third unnamed series of the Cambrian System, namely to the Drumian Stage and partly also to the immediately underlying fifth unnamed stage.

Skeletal macrofossils of the Jince Formation in the Příbram-Jince Basin have been used to define three bathymetrically dependent assemblages (Fatka 2000). The oldest and the youngest levels of the Jince Formation are characterized shallow-water *Lingulella*-dominated assemblage containing rare ellipsocephalid and conocoryphid trilobites associated with rare paradoxidids. A comparatively deeper assemblage is dominated by the polymeroid trilobites (ellipsocephalids, paradoxidids, ptychoparioids, and solenopleurids), usually associated with common miomeroid trilobites (*Peronopsis* and *Phalagnostus*), locally common edrioasteroid, eocrinoid and ctenocystoid echinoderms, rare articulate brachiopods, bradoriid ”ostracods”, bivalved crustaceans and hyolithids. Shales representing the deepest-water environment are dominated by miomeroid trilobites (e. g., *Onymagnostus* and *Hypagnostus*) associated with rare polymeroids (paradoxidids and conocoryphids), foraminifers, and paragastropod molluscs.

Predation and scavenging traces on trilobite exoskeletons. Other examples of partly "consumed" exoskeletons can be attributed to a scavenging, as the missing parts of exoskeletons are directly joined with corresponding ichnofabric features in the surrounding substrate (Fig. 23). Notably, active backfill of trace fossils joined directly with the consumed carcasses, as well as presumable oval- or tubular-shaped coprolites found at the same localities and stratigraphic levels, contain small, uniformly sized particles of skeletal elements (*cf.* Mikuláš et al. 2008).

The ichnogenus *Arachnostega*. Burrow systems formed of straight, curved or angular tunnels on the surface (or, less frequently, slightly below the surface) of internal moulds of skeletal fossils (trilobites, hyolithids) are attributable to the ichotaxon *Arachnostega gastrochaenae* Bertling, 1992. Forms considered to be initial ones show a simple branching, mostly at an angle of 45–50°, or they may contain loop-like components. At the top phase, the burrows form irregular polygonal meshes. The tunnels are oval to circular in cross-section (or semi-oval to semicircular, when fully pressed to a wall of subsequently dissolved skeletons). Each system shows a roughly constant diameter of tunnels, usually 0.3 to 0.5 mm. However, two systems, varying in the diameter of tunnels, and showing individual patterns of branching, may be present at one mould. The largest systems occupy an area of several square centimetres (derived strongly form the area of the moulds). However, not all the systems found cover the whole mould surface – it concerns both the initial stages, and the top network systems. Intervals of ramifying of initial forms usually are 0.5–5 mm. Diameter of meshes in the network forms depends upon the diameter of tunnels; the diameter of meshes is mostly three- to ten times higher than that of the tunnels. Most of the systems (both initial and top forms) are fully pressed to the inner wall of a shell and, therefore, they are fully visible on the surface, only very small portion of the tunnels is developed below the mould surface.

The specimens of *Arachnostega* from the Bohemian Cambrian show (similarly as many other ichnotaxa), despite the limited amount of material, a morphologically continuous spectrum. The irregular networks are the most common form of the trace. Bertling (1992), on the basis of the Late Jurassic material, stated in his original diagnosis of the ichnogenus: "Irregular elongate and net-like burrows...". However, some specimens show burrow systems that do not form the nets, but ramify analogically to *Chondrites* von Sternberg, 1833 or even show winding features. Therefore, these burrows do not agree with the Bertling's diagnosis even in the ichnogenric level, nevertheless they are joined with typical networks of *Arachnostega* by morphologically transitional forms. A similar situation is, e. g., in the ichnogenus *Entobia* Bronn, 1839 (sponge borings in carbonate substrates).

■ **Fig. 23.** Scavenging trace fossil with an active, meniscate backfill. Note the clearly defined margin of a consumed part of a trilobite carapace *Conocoryphe sulzeri* (Schlotheim, 1823). Middle Cambrian of the Barrandian area, Felbabka locality.

Boring systems of *Entobia* are typical domichnia bounding the living space of their tracemakers. Their unusual morphological variability is given, a. o., by the existence of several (five at maximum) considerably differing growth phases. First of them is represented by "exploratory threads"; later the system thickens and usually forms chambers. The individual growth phases are not considered to be different ichnotaxa (though they represent distinguishable kinds of the animal's activity - "exploratory phase", "growth phase"...). Besides this case of morphological variability, there exist also transitional forms among numerous individual entobian ichnospecies well distinguishable in their typical forms. In our opinion, the "*Chondrites*-like" or waving forms of *Arachnostega* are rather analogies of growth phases of entobians, and their ichnotaxonomical subdivision would not be useful.

In contrast with the material described by Bertling (1992), the described specimens of *Arachnostega* come from clastic rocks, most often graywackes, in places with carbonate admixture. We agree with Bertling (1992), that the burrows were made in a somewhat coherent substrate (consolidated softground to firmground); otherwise, the tunnels would collapse.

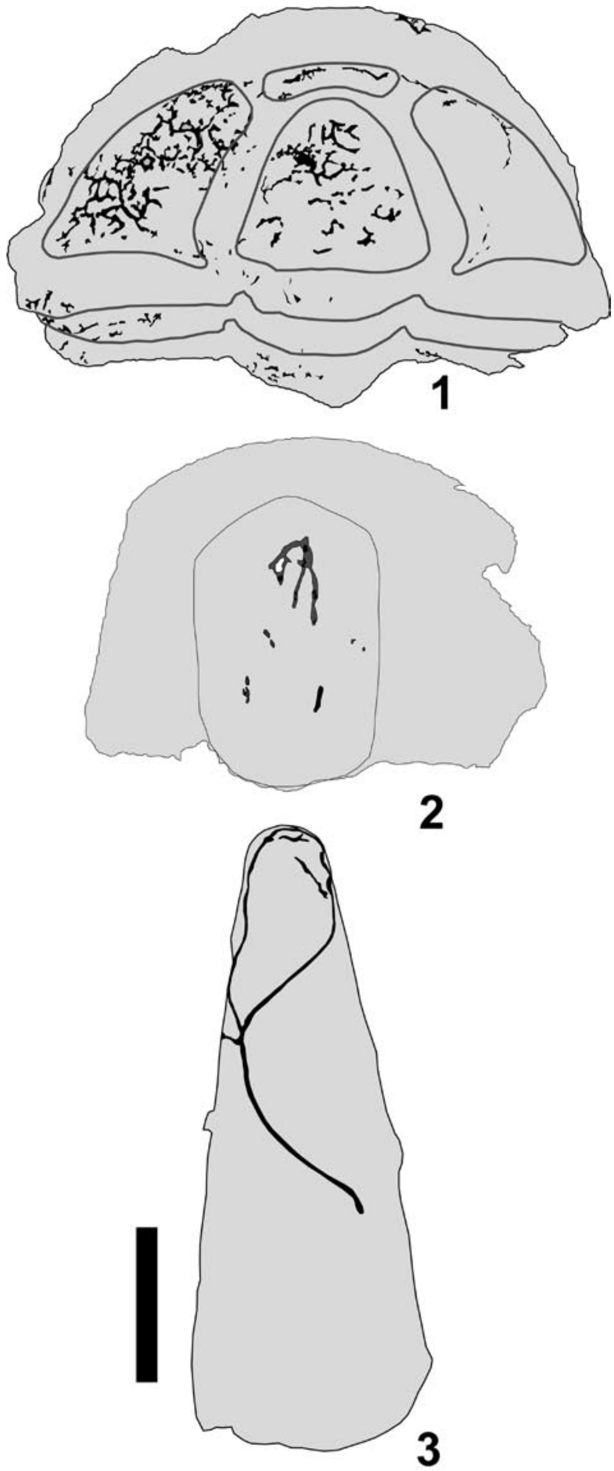
Ethological sense of traces and biology of burrowers can be concluded from the way of preservation of traces, that the skeletal parts were attacked by tracemakers after being covered and filled with the sediment. Studies of the recent *Arachnostega*-like traces show that only specimens which had been exhumed after filling with mud were infested with tracemakers; unexposed specimens in the sediment were not colonized. As we cannot expect a deep bioturbation in the dark siltstones and shales in the Cambrian, we can presume that most bioturbated shells were in contact with the sediment surface.

Concerning *Arachnostega*, the shape of the burrows and the knowledge of morphologically similar traces gives two possible explanations of the ethological sense. First, we can consider *Arachnostega* to be an analogy of idiomorphic, homogenous-substrate burrows as *Chondrites* or *Protopalaeodictyon*. These can be classified as fodinichnia or chemichnia. This explanation is supported by the uniform size of tunnels in the framework of each network. Therefore, the network appears to be a result of a single event (probably a feeding event). However, the possibility that a dwelling burrow is concerned cannot be excluded with certainty. The net-like form is characteristic, e. g., also for some domichnia. In this case, it is more probable that the tracemaker formed a new burrow system always when an existing one was too small, rather than it re-burrowed the old network.

Bertling (1992) presumed a feeding origin of Arachnostega; in his opinion, the internal sediments may have been richer in nutritional particles because of the decayed mollusc. The considered the tracemakers to be r-strategists whose did not actively search for the correct substrate. In our opinion, the tracemaker probably changed the "host shell" several times or even many times, hence, we presume its active searching for food.

The appearance of *Arachnostega* in the geologic time can be related to the appearance of large, frequent skeletons on the shallow sea bottoms of the Cambrian sea (Fig. 24). The role of the "Cambrian substrate revolution" in the appearance of the behaviour is less clear and probably its is not important.

Concluding remarks. (1) The Cambrian strata of the Barrandian region (Czech Republic) yielded very probably predation traces (healed injuries and marks of lethal attacks) especially on exoskeletons of small trilobites; (2) partly "consumed" exoskeletons can be attributed to a scavenging, as the missing parts of exoskeletons are directly joined with corresponding ichnofabric features in the surrounding substrate; (3) content of coprolites corresponds to the above-outlined conclusions; (4) because of the generally low ichnofabric in the Cambrian, the



■ **Fig. 24.** Examples of *Arachnostega* on various skeletal remains form the Middle Cambrian of the Barrandian area. Photo by O. Fatka. 1 – *Conocoryphe sulzeri* (Schlotheim 1823); 2 – *Ellipsocephalus hoffi*; 3. *Maxilites maximus* (Barrande 1867). Scale bar = 1 cm.

preservation potential of the finds of direct paleobiological value is much higher than in the rest of Phanerozoic, and (5) the appearance of *Arachnostega* in the geologic time can be related to the appearance of large skeletons.

BERTLING M. (1992): *Arachnostega* n. ichnog.- burrowing traces in internal moulds of boring bivalves (Late Jurassic, Northern Germany). – *Paläontologische Zeitschrift*, 66, 1–2: 177–185.

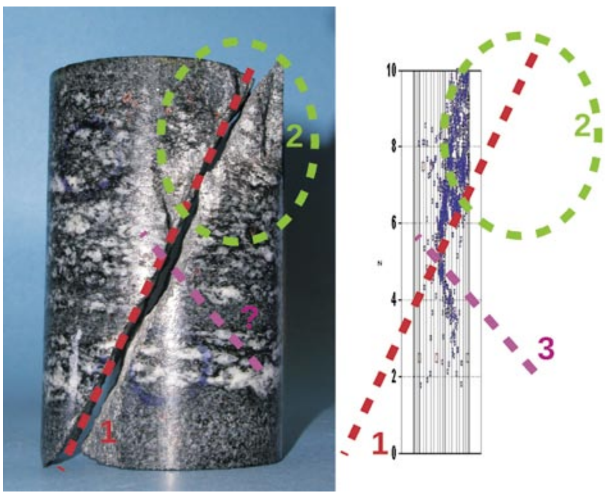
FATKA O. (2000): Das Mittlere Kambrium bei Jince, Tschechische Republik (Middle Cambrian at Jince, Czech Republic). – *In*: G. PINNA & D. MEISCHNER (Eds.): *Europäische Fossillagerstäten*: 21–23, 49–50, 244. Springer. Berlin.

MIKULÁŠ R., FATKA O. & SZABAD M. (2008): Predation and scavenging traces on trilobite exoskeletons, Middle Cambrian, Czech Republic. – *6th International Bioerosion Workshop, July 13–20, 2008, Salt Lake City, Utah. Abstract Book*: 13.

No. 205/06/0906: **Laboratory study of rock sample failure under long-term loading with stress and strain control** (*V. Rudajev*, Project Leader: J. Vilhelm, Faculty of Science, Charles University, Praha, Czech Republic)

The project was focused on the investigation of physical parameters changes of deep rocks during their brittle fracturing. The rock samples from Ivrea (North Italy) and Ronda (South Spain) were examined under action of controlled force/deformation. Experiments were realized in mid-term (several hours) and long-term (several days) regimes, respectively. Samples were loaded parallel and perpendicular to maximum velocity propagation direction of elastic waves. The elastic part of stress-strain diagram was found to be independent on the action force or deformation. Various mode of loading is observed only in the final phase of stress-strain dependence, when pronounced rock structure disruption is observed. Action of controlled deformation enables to study post-failure rock behavior and parameters of acoustic emission.

During the rock loading, the acoustic emission and ultrasonic sounding were carried out. For the purpose of research of changes of seismoacoustic foci space distribution during rock loading the new automatic method of P-wave arrival time determination was developed. This method enables to process several thousand of acoustic signals that were monitored on net of 8 geophones in the course of loading. Example of emitted acoustic foci distribution and optical observed rupture plane is shown on the following figure.



■ **Fig. 25.** Correlation of selected acoustic signals set space distribution and observed disruption of rock sample.

The new method of P-waves anisotropy velocity determination was developed and tested by ellipsoid anisotropy. The input data for this approach are obtained by ultrasonic radiation, which is carried out during the whole loading up to final fracture. The new anisotropy velocity model is flexible with loading level and its application improved the accuracy of location of micro-fractures (foci of acoustic signals) in the course of the whole experiment with comparison with up to now used kinematic method location which presumed only isotropic velocity model.

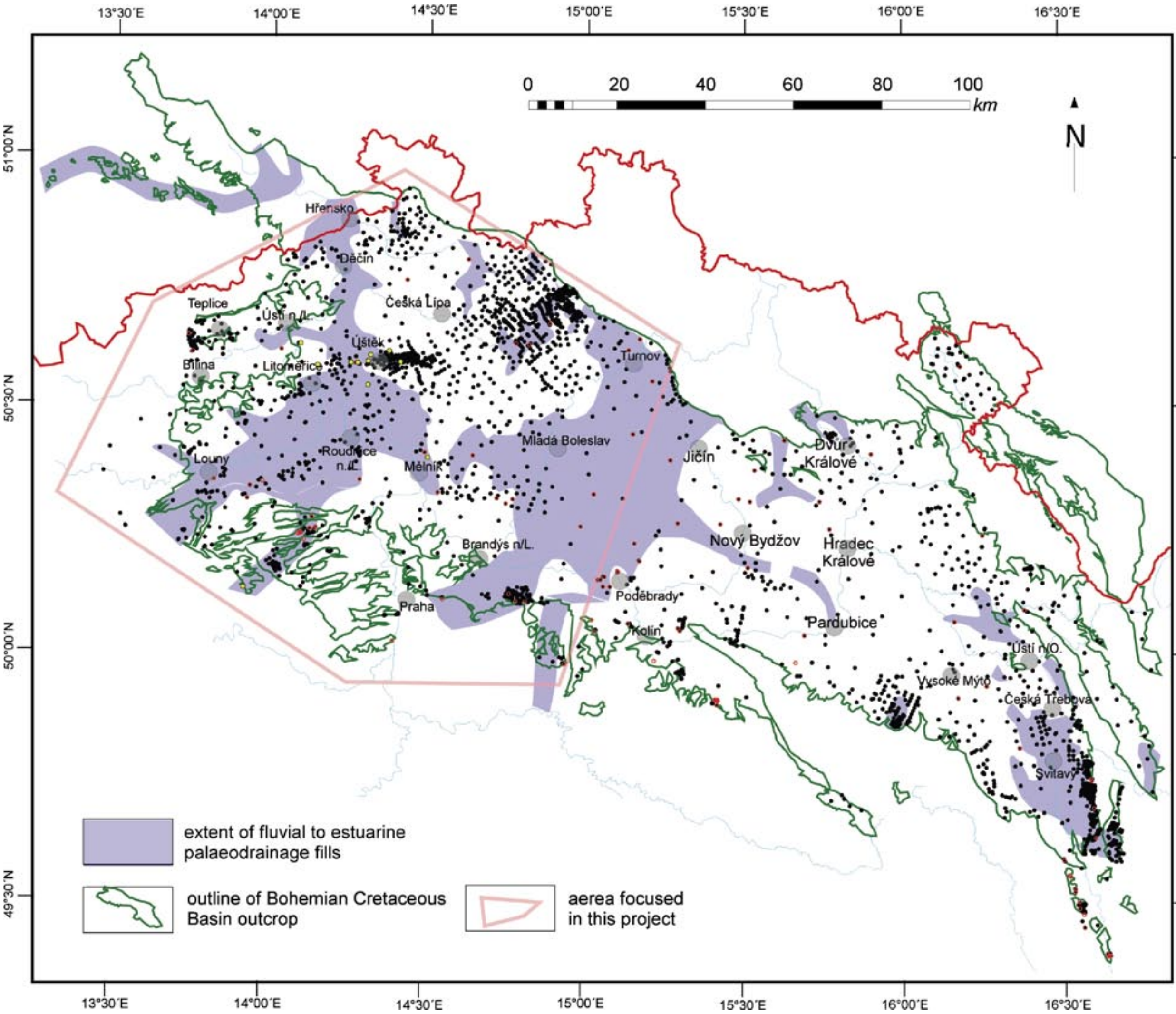
Statistical methods (neural networks, fractal analysis) were applied for acoustic emission processing and acoustic emission was found to conclude significant parameters of final total rupture prognoses. Laboratory experiments simulate nature processes of rock massif fracturing. Obtained laboratory results brought important results for induced and natural local seismicity investigation.

The difference between laboratory velocity P-wave determination and field values was analyzed. The evaluation of laboratory velocities applicability was analyzed. Anisotropy of P-wave velocity and its detected changes with stress level bring information about rock fracturing and cracks tightness, which are significant data not only for evaluation of underground openings stability but even for assessment of possibility of hydrocarbon extraction from fracture collectors.

No. 205/06/1823: **Record of tectonic processes and sea-level change during inception of an intracontinental basin: Cenomanian of the Bohemian Cretaceous Basin** (*M. Svobodová*; Project Leader: L. Špičáková, Geophysical Institute of the Academy of Sciences, Praha, Czech Republic)

A multi-disciplinary approach was applied to study the relative roles of tectonics and eustasy during the initial phase of the evolution of an intracontinental basin (Uličný et al. 2009). The Bohemian Cretaceous Basin (BCB) began to form on the reactivated basement faults of the Elbe Zone, a major crustal weakness of Central Europe during the Cenomanian time (mid-Cretaceous).

The initial phase of basin filling by fluvial, estuarine and shallow marine sediments thus reflects an interplay of reactivation of inherited basement fault zones and the long-term global sea-level rise. The recent study was focused on the western part of the BCB (Fig. 26) and on the synthesis of data from the entire basin, utilizing results of previous research carried out in the other parts of the basin. A broad range of methods included genetic sequence stratigraphy based on well-log, core and outcrop data, biostratigraphy, paleontological analysis, evaluation of regional gravity maps, structural maps, digital elevation models, and structural analysis. A grid of 2D stratigraphic correlation sections was used for construction of isopach maps for

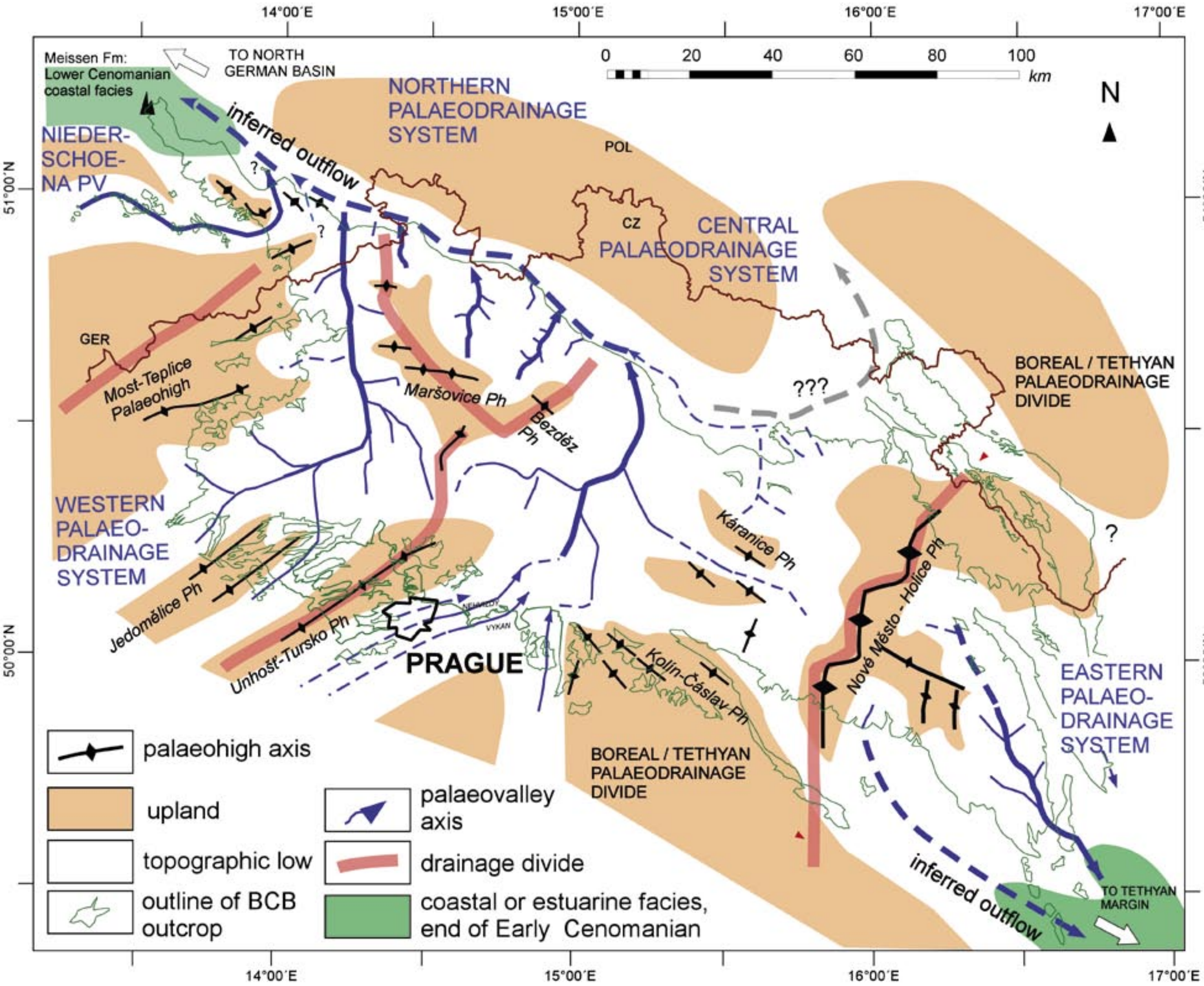


■ **Fig. 26.** Coverage of the Bohemian Cretaceous Basin by borehole data. All 2,630 boreholes (black dots) reached the basement; red circles – samples palynologically evaluated; extent of fluvial to estuarine fills of the paleodrainage systems is marked in blue (modified from Uličný et al. 2009).

newly defined genetic stratigraphic units (sequences CEN 1–6), and the comparison of these data with the structural framework of the basin allowed the paleodrainage systems to be reconstructed and the role of syn-depositional activity and eustasy to be interpreted.

The research conducted at the Institute of Geology AS CR, v. v. i., involved palynological analysis based on selection of samples aimed to elucidate the paleoenvironments in the basin during deposition of individual genetic sequences. The sampling was focused on the western part of the basin, but evaluation of palynological assemblages involved also previously sampled material from other parts of the basin, in order to provide a complete picture of evolving paleogeography on basinal scale. Combination of sedimentological and palynological approaches proved useful especially in samples from tide-influenced fluvial to estuarine facies and helped to constrain the paleogeographical situation, including the direction of the outflow from part of the basin to the Boreal realm, during the earliest phase of filling of paleodrainage systems. During the study of boreholes from southestern tip of the Bohemian Cretaceous Basin, a new genus and species of *Spesovicornea pacltovae* with the interesting relationships to the Tethyan realm, was described (Svobodová & Vavrdová 2008).

One of the outcomes of the project is a revised interpretation of the position and extent of paleodrainage systems that existed in the basin area prior to the onset of deposition (Fig. 27). The locations and directions of individual paleovalleys were strongly controlled by inherited Variscan basement fault zones. The intrabasinal part of the paleodrainage network followed the slopes toward the Elbe system faults and was strongly dominated by the conjugate, NNE-trending, Jizera system faults and fractures. Outlet streams – ultimate trunk streams that drained the basin area – are interpreted to have followed the Lužice Fault Zone toward the Boreal province to the Northwest, and the Železné Hory Fault Zone toward the Tethyan province to the southeast. Stepwise flooding of the paleodrainage systems occurred primarily due to a global sea-level rise between the Early and Middle Cenomanian. The earliest recognizable syn-depositional faulting within the basin occurred in the late Middle



■ **Fig. 27.** A schematic map of tectonic and paleogeographic setting of the Bohemian Cretaceous Basin before the beginning of deposition on the base-Cretaceous unconformity. Main topographic paleohighs (PH) and lows with generalized paleodrainage axes are illustrated together with proven occurrences of Early Cenomanian coastal facies in the northwest (Meissen area) and tide-influenced to estuarine facies southeast (Blansko Graben; modified from Uličný et al. 2009).

Cenomanian, and subsiding depocentres became well-defined in the Late Cenomanian.

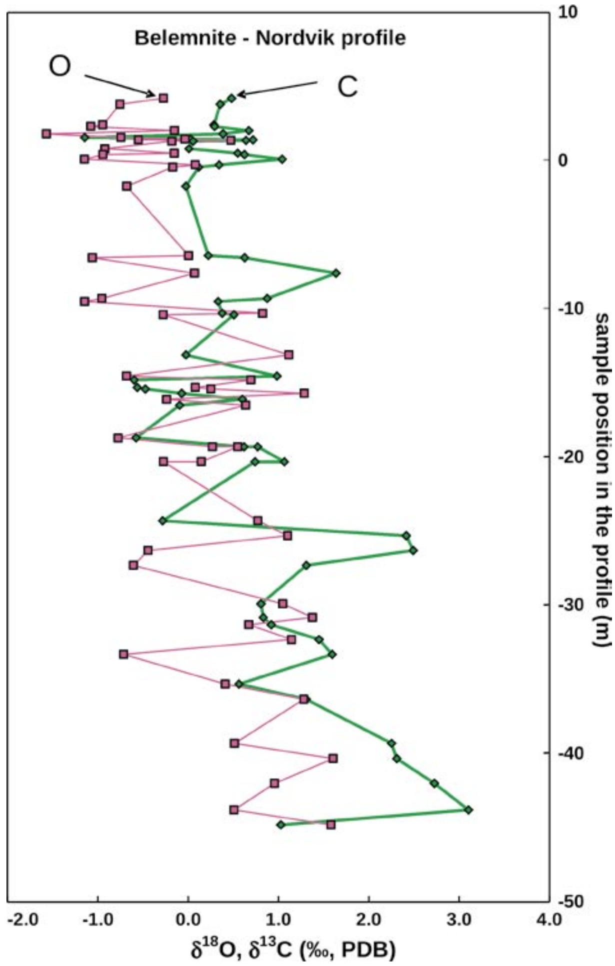
SVOBODOVÁ M. & VAVRDOVÁ M. (2008): *Spesovicornea pacltovae* gen.nov. et sp.nov., a new elateroid sporomorph from the Bohemian Cenomanian (Czech Republic). – *Acta Musei Nationalis Pragae, Ser.B-Historia Naturalis*, 64, 2–4: 133–138.

ULIČNÝ D., ŠPIČÁKOVÁ L., GRYGAR R., SVOBODOVÁ M., ČECH S. & LAURIN J. (2009): Palaeodrainage systems at the basal unconformity of the Bohemian Cretaceous Basin: roles of structural inheritance, basement lithology, and palaeostress regime. – *Bulletin of Geosciences*, 84, 4: 577–610.

No. 205/07/1365: **Integrated stratigraphy and geochemistry of the Jurassic/Cretaceous boundary strata in the Tethyan and Boreal Realms** (*P. Pruner*, *K. Žák*, *M. Chadima*, *O. Man*, *D. Venhodová*, *S. Šlechta*, *P. Schnabl*, M. Košťák, J. Jedlička, M. Mazuch, L. Strnad Faculty of Science, Charles University, Praha, Czech Republic, J. Mizera, Z. Řanda, Nuclear Physics Institute of the AS CR v. v. i., Řež, Czech Republic & P. Skupien, Mining–Technical University, Ostrava, Czech Republic)

Subproject: **High-resolution magnetostratigraphy and geochemistry of the Jurassic/Cretaceous boundary strata in the Tethyan and Boreal Realms** (*P. Pruner*, *K. Žák*, *M. Chadima*, *O. Man*, *D. Venhodová*, *S. Šlechta* & *P. Schnabl*; *V. Houša†*)

According to present knowledge, the actually used provisional Boreal and the Tethyan J/K boundaries are heterochronous. All attempts to correlate the boundary J/K beds between the Boreal and the Tethyan realms by biostratigraphic methods failed. The aim of the project is to make a detailed and precise correlation of the J/K boundary interval in the Tethyan and Boreal region on the paleomagnetic (localization of reversed subzones) and geochemical base (included the isotope geochemistry and neutron activated analyses). On several pilot localities in the Tethyan region (e. g., Bosso – Italy, Brodno – Slovakia, Puerto Escaño – Spain) was already successfully used for correlation



■ **Fig. 28.** The carbonate ^{13}C and ^{18}O isotopic analysis (bulk rock data) from Nordvik Peninsula, Russia.

the high resolution magnetostratigraphy together with detailed microbiozonation. On the only known J/K boundary section without hiatuses in the Boreal realm – Nordvik Peninsula in Russia – was successfully elaborated by high resolution magnetostratigraphy together with ammonite biostratigraphy (Houša et al. 2007a, b, c; Pruner et al. 2007; Zakharov et al. 2007). The study used the methods of high-resolution magnetostratigraphy, geochemistry, sequence stratigraphy and evento-stratigraphy for the correlation the elaborated pilot sections and to try to found suitable isochrones events for a proposal of definitive J/K boundary.

New geochemical data, including C and O stable isotope data on carbonates, were obtained for the Brodno section and for the Nordvik section (Fig. 28). In the case of the Brodno site, an extensive stable isotope profile throughout the studied section already exists. These data were obtained by O. Lintnerova (Faculty of Science, Comenius University, Bratislava, Slovakia), based on point-samples. These data were supplemented by a detailed study of diagenetic and epigenetic changes of the primary stable isotope record in short profiles perpendicular to layer boundaries and to epigenetic veinlets. It was found that diagenetic and epigenetic changes in C and O stable isotope composition of these micritic limestones are very small, and the isotopic data are rather uniform within individual layers. The stable isotope record can therefore be considered as primary and can be used for inter-section comparisons.

Alogether 58 new samples of belemnite rostra were carefully selected from 49 m thick segment of the Nordvik section. Rostra parts with any visible diagenetic changes (pyrite presence, etc.) were avoided during sampling. The undisturbed character of the rostra was further checked based on carbonate Mg/Ca, Mn/Ca and Sr/Ca ratios (Mizera et al. 2007). The obtained stable isotope record (see Fig. 29) will again be used for inter-section comparison. Geochemical evolution during the formation of the Nordvik section was further studied based on the content of carbonate and organic carbon in clastic sediments. Section segments with condensed sedimentation and high content of organic carbon, and segments rich in carbonate were clearly identified (Skupien 2007).

The accurate stratigraphic position was made on the basis of ammonites and belemnites for the Nordvik section. The extensity of abundance ammonite diversity (taxones in the Oxfordian – Berriasian) was specified and newly determined the belemnite biozonation (Košťák & Wiese 2007). The Jurassic/Cretaceous boundary strata in the Nordvik section stay in the upper part of ammonite zone *Craspedites taimyrensis* and in the lower part of belemnite zone *Cylindroteuthis gustomesovi/porrectiformis*. In the case of the Nordvik section, 6 ammonite zones (*variabilis, exoticus, okensis, taimyrensis, chetae* and *sibiricus*) and 3 belemnite zones (*expalnata, napaensis* and *gustomesovi/porrectiformis*; Fig. 32) were specified in the upper Volgian – lower Berriasian.

HOUŠA V., PRUNER P., CHADIMA M., ŠLECHTA S., ZAKHAROV V.A., ROGOV M.A., KOŠŤÁK M. & MAZUCH M. (2007a): Rezultaty magnitostratigrafičeskoj Borealno–Tetičeskoj korreljaciji pograničnogo jursko–mělovogo intervala i ich interpretacija. – *Materialy LIII sessiji Palaeontologičekovo obščestva*: 133–135. Sankt Petěrburg.

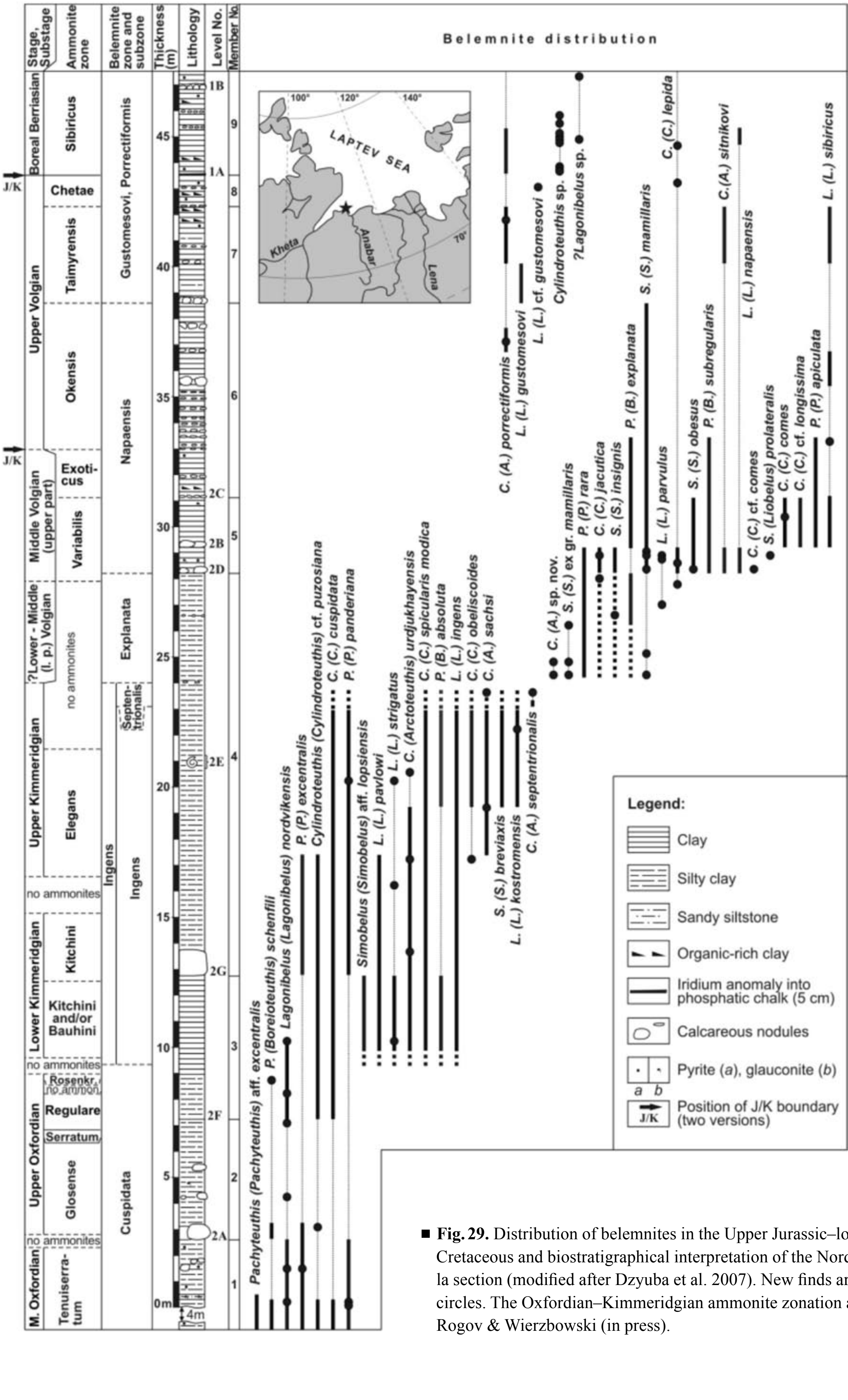
HOUŠA V., PRUNER P., ZAKHAROV V.A., KOŠŤÁK M., CHADIMA M., ROGOV M.A., ŠLECHTA S. & MAZUCH M. (2007b): Boreal–Tethyan Correlation of the Jurassic–Cretaceous Boundary Interval by Magneto- and Biostratigraphy. – *Stratigraphy and Geological Correlation*, 15, 3: 297–309.

HOUŠA V., PRUNER P., ZAKHAROV V.A., KOŠŤÁK M., CHADIMA M., ROGOV M.A., ŠLECHTA S. & MAZUCH M. (2007c): Borealno–teticheskaya korrelacia pogranichnogo jursko–melovogo intervala po magnitno- i biostratigraficheskim dannym. – *Stratigrafia. Geologicheskaya korrelacia*, 15, 3: 63–75. Moskva.

KOŠŤÁK M. & WIESE F. (2007): Remarks to geografic distribution and phylogeny of the upper cretaceous belemnite genus Praeactinocamax Naidin. – *Acta Universitatis Carolinae, Geologica*, 49: 97–102. Praha.

MIZERA J., ŘANDA Z. & KUČERA J. (2007): Multimode instrumental neutron and photon activation analysis of Jurassic–Cretaceous sediments from Nordvik Peninsula. – *12th International Conference on Modern Trends in Activation Analysis, Tokyo. Program and Abstracts*: 91.

PRUNER P., HOUŠA V., ZAKHAROV V.A., KOŠŤÁK M., CHADIMA M., ROGOV M., ŠLECHTA S. & MAZUCH M. (2007): The First Boreal-Tethyan Correlation of the Jurassic-Cretaceous Boundary Interval by the Magnetostratigraphy. –



■ **Fig. 29.** Distribution of belemnites in the Upper Jurassic–lowermost Cretaceous and biostratigraphical interpretation of the Nordvik Peninsula section (modified after Dzyuba et al. 2007). New finds are shown by circles. The Oxfordian–Kimmeridgian ammonite zonation according to Rogov & Wierzbowski (in press).

2007 Joint Assembly, American Geophysical Union, Acapulco, Mexico, May 22–25, Eos Trans. AGU, 88(23), Jt. Assem. Suppl., Abstract: GP 52A-05. Acapulco.

SKUPIEN P. (2007): Biostratigraphy and facies of Uppermost Jurassic–Lower Cretaceous pelagic sediments in the Northern Calcareous Alps and Outer Western Carpathians. – *EUG General Assembly, Geophysical Research Abstracts*, *Vol 9*, EGU2007-A-02353, SSP21-1TH5P-0517, Wiena.

ROGOV M.A. & WIERZBOWSKI A. (2009): The succession of the ammonites genus *Amoeboceras* in the Upper Oxfordian – Kimmeridgian of the Nordvik section in northern Siberia. – *Volumina Jurassica*. VI.

ZAKHAROV V.A., PRUNER P. & ROGOV M.A. (2007): New correlation chart of the Jurassic-Cretaceous Boundary beds of Arctic and South Europe based on magnetostratigraphy and status of the Volgian Stage. – *4th Symposium International Geological Correlation Programe Project 506 – Jurassic marine: non-marine correlation, Bristol, United Kingdom, July 4–8, Abstracts*: 1–3. Bristol.

Subproject: **Magnetostratigraphy and magnetic mineralogy in the Nutzhof, Austria** (*P. Pruner* & *P. Schnabl*)

A high-resolution study focusing on the detailed biostratigraphy of the limestone, marly limestone and marl succession was carried out at a new outcrop at Nutzhof in the Pieniny Klippen Belt of Lower Austria (Fig. 30). The fact that the Jurassic/Cretaceous boundary is detected in this outcrop, and the detailed biostratigraphy, make the magnetostratigraphic study reasonable. Remanent magnetization was investigated to study the magnetic polarity for magnetostratigraphic purposes. Progressive stepwise alternating field (AF) demagnetization up to a maximum field of 150 mT was performed with a 2G Enterprises degausser system or thermal demagnetization employing the MAVACS demagnetizer in 12–13 thermal fields up to the unblocking temperatures of minerals – carriers of paleomagnetization. Low-field magnetic susceptibility ranges from –5.9 to 94.9×10^{-6} SI and the intensity of the natural remanent magnetization varies between 0.31 and 6.15×10^{-4} A.m^{-1}.

The samples display a two- to three-component remanence. Isothermal remanent magnetization (IRM) to saturation was measured to identify coercivity spectra of the magnetically active minerals. The whole rock samples were magnetized on the Pulse Magnetizer MMPM 10, demagnetized on LDA-3 AF Demagnetizer and measured on JR6 a magnetometer. The used field range was 10 to 2900 mT. IRM curves demonstrated in Figure 31 show two different magnetic minerals. The diagram (Fig. 34) (a) demonstrates magnetically soft magnetite and graph, and (b) shows samples with magnetically hard goethite and negligible amount of magnetite (Schnabl et al. 2008a, b).

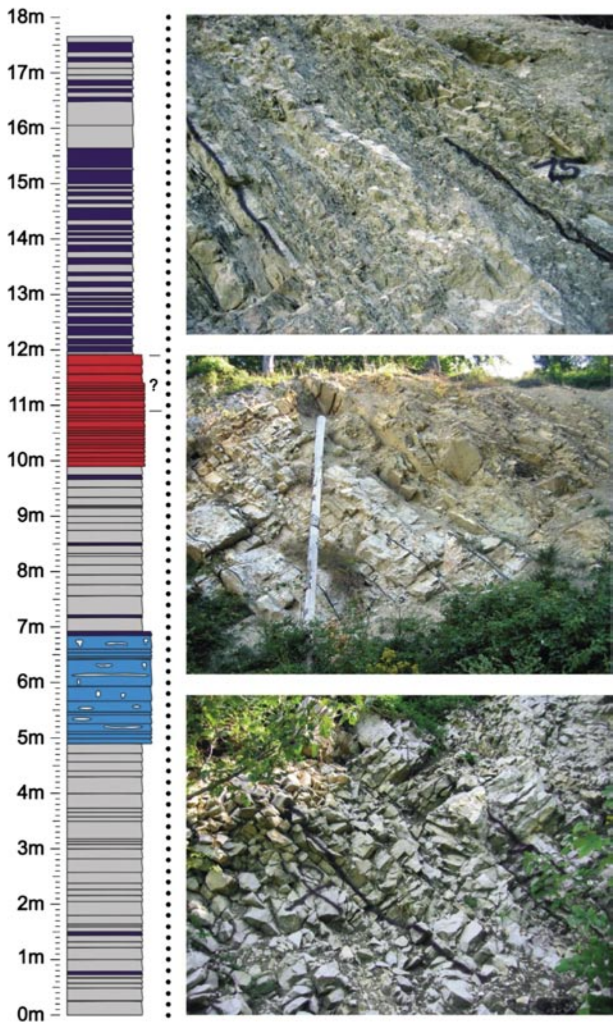
Our study concentrated on the investigation of the basal 18-m thick portion of the section, on the limestone strata around the Jurassic/Cretaceous boundary, to preliminary determine the boundaries of magnetozones M17R to M22R (six reverse and six normal zones). The average sampling density for the whole section was around two samples per 1 m of true thickness of limestone strata. Although both magnetic polarities are present, the directions are highly scattered. Consequently, the mean direction for samples with normal polarity is D=314.7°, I=32.0°, α_{95}=12.5°. For reverse polarity we obtained two groups, the first (R1) is D=76.1°, I=-39.3°, α_{95} =8.4° and the second (R2) is D=192.8°, I=-45.2°, α_{95} =14.5°. This normal polarity direction is in agreement with the magnetic field for the J/K, but the reverse polarity presents high difference of declination (Man 2008).

The next step of magnetostratigrafic investigation will be to determine the boundaries of submagnetozones M19 and M20; the average sampling density for the whole section must be around 5 to 8 samples per 1 m and 20 and even higher in critical portions of the section (Pruner et al. 2008a, b).

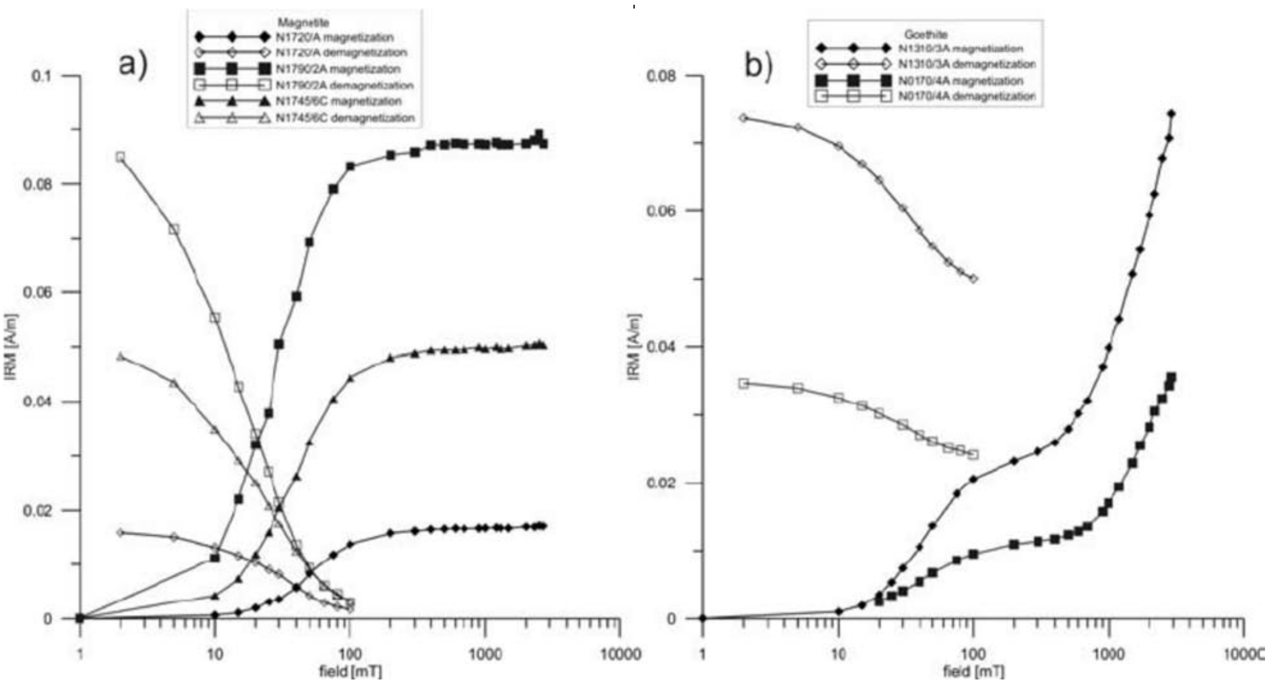
MAN O. (2008): On the identification of magnetostratigraphic polarity zones. – *Studia Geophysica et Geodaetica*, 52, 2: 173–186.

PRUNER P., SCHNABL P. & LUKENEDER A. (2008a): Magnetostratigraphy across the Jurassic/Cretaceous boundary strata in the Nutzhof, Austria – preliminary results. – *Contribution to Geophysics and Geology 2008, Special issue.* 38: 105–106. Bratislava.

PRUNER P., SCHNABL P. & LUKENEDER A. (2008b): Preliminary results of magnetostratigraphic investigations across the Jurassic/Cretaceous boundary strata in the Nut-



■ **Fig. 30.** The Jurassic/Cretaceous boundary strata at the Nutzhof site, Austria (after Lukeneder et al. 2010).



■ **Fig. 31.** Examples of IRM acquisition and AF demagnetization curves, limestone samples: (a) samples with magnetically soft magnetite, and (b) samples with magnetically hard goethite and negligible amount of magnetite (after Lukeneder et al. 2010).

zhof, Austria. – *Berichte der Geologischen Bundesanstalt,* 74: 83–84. Wien.

SCHNABL P., LUKENEDER A. & PRUNER P. (2008a): Preliminary results of magnetic mineralogy investigations of Upper Jurassic and Lower Cretaceous sediments from Nutzhof, Austria. – *Berichte der Geologischen Bundesanstalt,* 74: 98–99. Wien.

SCHNABL P., PRUNER P. & LUKENEDER A. (2008b): Rock-magnetic investigation of upper Jurassic and lower Cretaceous sediments from Nutzhof, Austria. *Contribution to Geophysics and Geodesy. Specal issue,* 38: 121–122. Bratislava.

No. 205/08/0676: **Three-dimensional fabric of pore space in sedimentary rocks: correlation to the physical and mechanical properties** (*T. Lokajíček*, Project Leader: R. Přikryl, Faculty of Science, Charles University, Praha, Czech Republic)

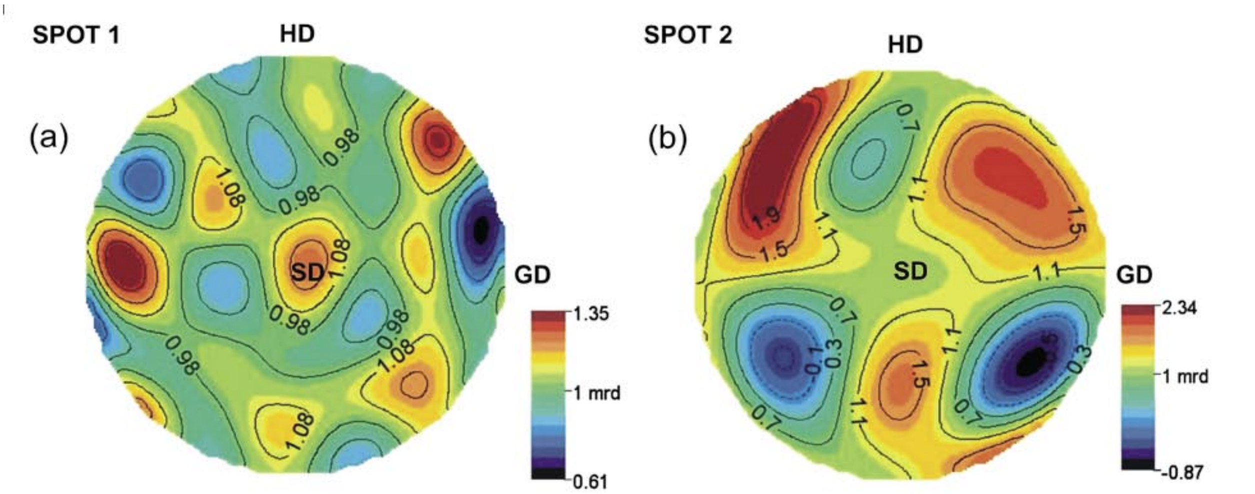
Methodology of the study of porous sedimentary fabric rocks was verified using high pressure ultrasonic apparatus which enables propagation of elastic waves measurement. The experiments are realized on spherical rock samples in 132 independent rays under various hydrostatic stress levels. Mathematical processing of experimental data allows to deduce the symmetry of rock inner fabric and partially to separate the contribution of solid phase and free porous space.

No. 205/08/0767: **Neutron texture analysis of carbonates and gabbros** (Project Leader L. Kalvoda, Czech Technical University in Praha, Czech Republic).

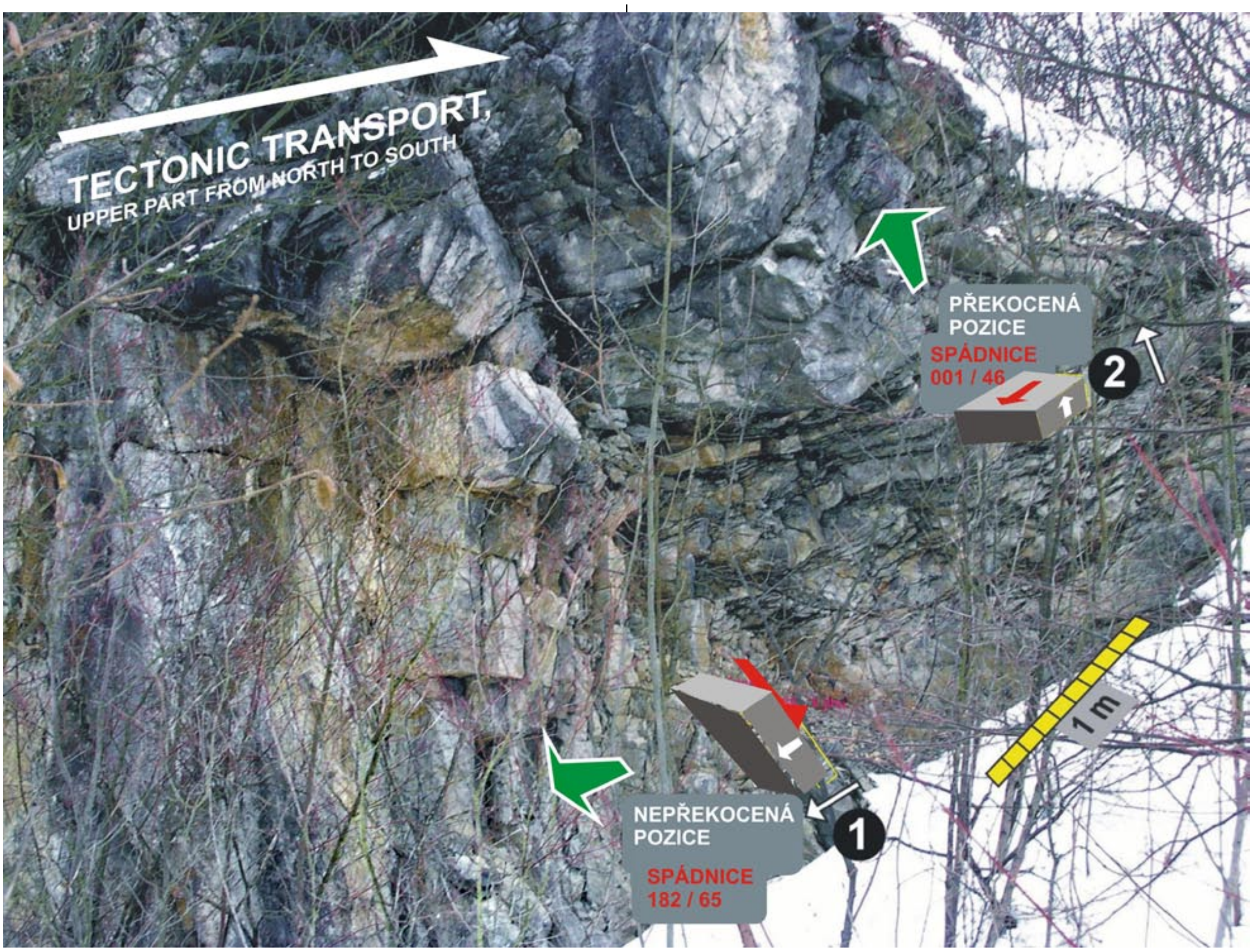
Subproject: **Microstructural anistropy in strongly folded and thrusted rhythmites – Choteč structures in the Tachlovice–Černošice section (Praha Synform, Barrandian area)** (*J. Hladil*, *M. Chadima*, *S. Šlechta*, *D. Venhodová*, *L. Koptíková*, *J. Janečka*, *L. Kalvoda*, M. Dlouhá, S. Vratislav, M. Dráb, J. Drahokoupil, A. Grishin, J. Marek & P. Sedlák, Czech Technical University in Praha, W. Kockelmann, Rutherford Appleton Laboratory, Didcot, Oxfordshire, United Kingdom)

The crystallographic preferred orientation (CPO) of limestone has been primarily characterized by means of neutron diffraction (ND). The composition, crystalline structure and microstructural anisotropy of folded limestone bed was investigated by means of instrumental neutron activation analysis (INAA), X-ray diffraction (XRD), and measurement of anisotropy of magnetic susceptibility (AMS) and anisotropy of resonant ultrasound spectroscopy (ARUS).

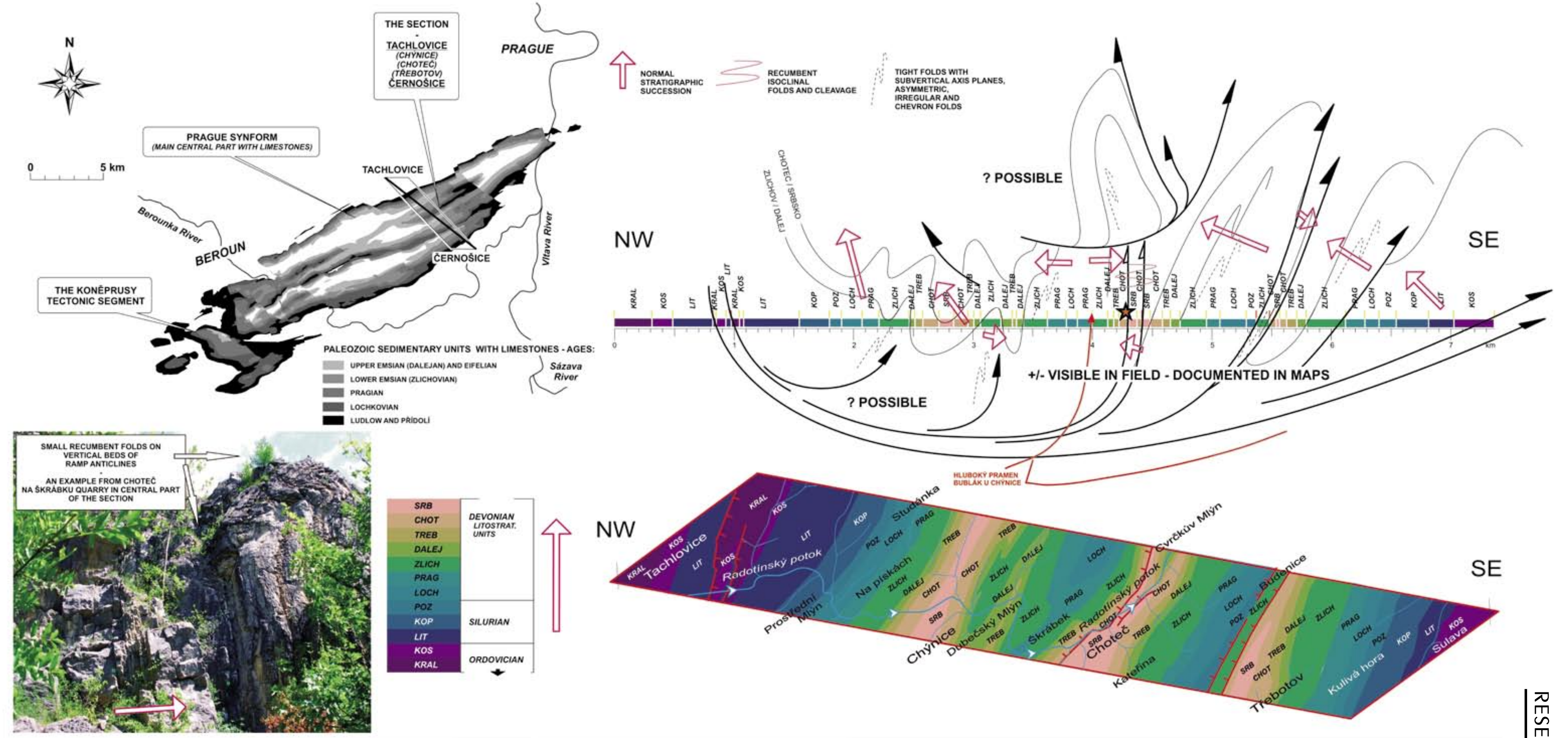
The reported detail relates to two large limestone samples which were collected at Choteč, Na Škrábku Quarry, belonging to one bed within a single overturned-recumbent fold, in southeastern corner of this quarry, at coordinates 49°59′19.57″ N, 14°16′44.16″ E. The limestone is dominated by Ca (~35 %), Mg (0.5 %), Fe (2253 ppm), K (1967 ppm) and Al (1185 ppm); traces of another 33 elements are present having concentration higher than 1 ppm. Total organic carbon concentration is only 0.15 %. Calcite (> 97 %), and quartz (1.5 %) were identified by XRD phase analysis as the prevailing mineral phases. The pyrite–pyrrhotite framboids, hematite and illite-mica and polymineral, fine interlaced mixtures were found in accessory amounts, by means of SEM-EMP probing of insoluble residues. This bed consists of homogeneous, fine calcarenitic sedimentary rock (calciturbidite, cementite) which was, after its Middle Devonian



■ **Fig. 32.** The PF <0001> characterizing the CPO of the samples taken at the spot 1 (a) and 2 (b). The measured ODF represented by harmonic series; the applied expansion level is l = 8 and l = 4 for the picture (a) and (b), respectively. Illustration to GA CR Project No. 205/08/0767 (2008).



■ **Fig. 33.** A close-up view of folded strata with places where the large-volume oriented samples were taken (1, 2). Location: the quarry Na Škrábku, northeastern corner. For sampling, a massive calcarenitic cementite bed was selected. The green arrows indicate, in a very approximate way, a considerable relationship of the CPO patterns to SD directions (perpendicularly to the surface of a bed or sheet). These directions do reflect neither the direction of overall tectonic transport nor the locally visible cleavage and bedding parallel shear in general, but they rather correspond to low anisotropy tangential compression in the compressed fold core that behaved independently. Illustration to GA CR Project No. 205/08/0767 (2008).



■ **Fig. 34.** The Tachlovice – (Choteč) – Černošice section cuts the central segment of the Praha Synform. An alternative, highly plastic deformation model has been proposed to match the map data and structural measurements and rheological behavior of well-layered rhythmites in a more realistic way. The Choteč locality analyzed by means of ND and other physical methods is marked by an orange asterisk. Illustration to GA CR Project No. 205/08/0767 (2008).

(early Eifelian) date of deposition, recrystallized in several diagenetic and deformation stages. The main deformation stage has to correspond to Late Devonian: Frasnian– (?Famennian) age.

The neutron diffraction patterns were recorded on the neutron diffractometer KSN–2 allocated at the Laboratory of Neutron Diffraction (LND) of the Faculty of Nuclear Science and Physical Engineering of the Czech Technical University in Praha. The CPO of the calcite phase dominating the samples composition can be mathematically described by a three-dimensional orientation distribution function (ODF) defined in the space of Eulerian angles. ODF maxima then relate to the most frequent orientations of calcite crystallites with respect to the three distinguished directions: the fold gradient direction (GD), horizontal direction (HD), and the original sedimentation direction (SD). In the case of calcite which is featuring one dominant crystallographic direction – the hexagonal axis <0001> – it is convenient to represent the CPO by the pole figure (PF) <0001> calculated from the ODF data (Fig. 32). The PF <0001> statistically represents an orientation distribution of <0001> crystallite poles in reference to the sample directions GD, HD and SD. The result obtained for the two sampling spots is given in the diagram. Several aspects are worthy of mention: (1) it is apparent that the CPO of both samples is weak; (2) in spite of very different positions (spots), where lower bedding plane at the spot 1 faces the overall direction of the tectonic transport and that of the spot 2 is sub-parallel to this direction, also that the positions of maxima in the distributions obtained for the sampling point 1 and 2 are only slightly different – compare the graphs which were rotated to have SD in the centre; (3) hence the fabrics which may correspond to locally observed cleavage and bedding parallel shear evidence are considerably suppressed; (4) on the other hand, the strength of calcite, c-axis related CPO around SD is considerable, although less pronounced in the second spot; (5) to certain degree, the three-points' and slightly visible zone arrangements seem to be symmetrical if referred to the fold axis; (6) such sort of microstructures can be interpreted as combined effects of polymodal recrystallization of these very complex aggregates. These were not totally disorganized but rather followed the first matrices from the deformation in this partial fold, and (7) in addition, it can be reasonably assumed that the ND documented CPO patterns relate the main deformation phase in this fold, and they are particularly related to crystal lattice directions of calcite. This method is considerably low sensitive to contacts and interstices between various crystallites, as well as to orientation of mineral- and fluid-inclusion smears (see Figs. 32 and 33 for oriented data and relationship to the folded bed in the field).

Small positive values of the mean magnetic susceptibility (κ) were obtained by KLY–2 bridge measurement: $\kappa = 3–8 \times 10^{-9}\ m^3 kg^{-1}$. It is apparent that the intrinsic diamagnetic contribution of calcite is balanced by an extrinsic para-/ferro-magnetic contribution. Noisy AMS results caused only the direction of the pole to the magnetic foliation (MF) could be identified. The observed mean MF deflection from SD varies in accord with the textural Beta-value, but there are also differences which are determined by other phases than diamagnetic calcite is.

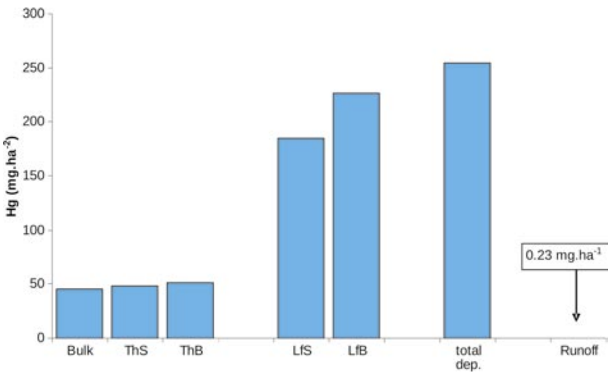
Evolution of ND based CPO are indicative of partial strain domains in individualized folds and beds, which are much diverted from the most general scheme. These findings may corroborate somewhat uncommon concepts of plastic fold shapes in shallow burial conditions (not more than ~2–3 km), which may act mainly with a high degree of separation of layers and folds – compare the illustration to the Tachlovice–(Choteč)–Černošice geological section (Fig. 34).

No. 526/07/P170: **Biogeochemistry of mercury in the forest ecosystems** (*T. Navrátil*)

Fluxes of total mercury (Hg) were studied at the Lesní potok (LP) catchment in central Czech Republic. The concentrations of Hg in bulk precipitation and throughfall were very low in range from 0.1 to 200 $ng.l^{-1}$. The annual Hg flux in bulk precipitation amounted 4.5 $\mu g.m^{-2}$ while Hg fluxes in spruce and beech throughfall reached 4.8 and 5.1 $\mu g.m^{-2}$, respectively. The greatest Hg fluxes to the forest floor at LP occurred in form of litterfall in beech stands 22.6 $\mu g.m^{-2}$, and in spruce 18.5 $\mu g.m^{-2}$. Total flux of Hg to the forest floor at LP catchment was calculated as sum of throughfall flux and litterfall flux and it amounted 255 $\mu g.m^{-2}$ per year (Fig. 35).

The Hg concentrations throughout the soil profiles at the LP catchment were typical with the highest concentrations in the upper organic rich layers (112–664 $\mu g.kg^{-1}$). The Hg concentrations in the mineral layers were usually order of magnitude smaller in range from 14–88 $\mu g.kg^{-1}$. Pools of Hg in the soil at the LP catchment were calculated using soil horizon thickness, density of soil and appropriate Hg concentration. Contrary to the concentrations of Hg in soil, mean pool of Hg in organic soil horizons at LP catchment amounted 149 $g.ha^{-1}$ while mean mineral soil Hg pool reached 392 $g.ha^{-1}$.

Due to the trivial concentrations of Hg in the stream water the output of Hg from forest ecosystem at LP has been the smallest studied flux of Hg. Although the data on possible degassing of the ecosystem are missing, the results of this research indicate accumulation of Hg in the forest ecosystem in the central Czech Republic.



■ **Fig. 35.** Fluxes of mercury (Hg) at the LP catchment, ThS = throughfall spruce, ThB = throughfall beech, total dep. = total deposition (calculated as 0.5*ThS+0.5*ThB + 0.5*LfS+0.5*LfB).

No. 526/08/0434: **Impact of soil structure on character of water flow and solute transport in soil environment** (Project Leader: R. Kodešová, Czech University of Life Sciences, Praha, Faculty of Agrobiology, Food and Natural Resources, Project Co-leadrer *A. Žigová*)

Good knowledge of soil hydraulic properties is required for a successful solution of pollutant transport, hydrological modeling of catchments and prediction of the plant production in soil. The project is aimed at experimental, analytical and numerical investigation of theory that multimodal character of soil pore size distribution and hierarchical pore composition influence not only the shape of soil hydraulic properties, but also total character of water flow and solute transport in soil porous media. Another objective is evaluation of agricultural managment impact of soil properties and consequently on water flow and contaminant transport.

Preliminary results showed that soil aggregate stability depend on stage of the root zone development, soil management and climatic condition. Aggregate stability reflected aggregate structure and soil pore system development, which was documented on micromorphological images and evaluated using the ratio of gravitational and capillary pores measured on undisturbed soil samples.

4c. Grant Agency of the Academy of Sciences of the Czech Republic

Completed projects

No. IAA3013403: **The character of mantle/lower crust beneath the Bohemian Massif based on geochemical signatures of (ultra)mafic xenoliths in Cenozoic volcanics** (*J. Ulrych*, *J.K. Novák*, *M. Lang*, *J. Adamovič*, *V. Cajz*, *M. Filippi*, *L. Ackerman*, E. Jelínek & M. Mihaljevič, Faculty of Science, Charles University, Praha)

Subproject: **Petrogenesis of melilites and associated alkaline silica-understurated rocks of the W–Bohemia/Vogtland (Germany/Czech Republic)** (M. Abratis, L. Viereck-Goette, Friedrich-Schiller University, Jena, *J. Ulrych* & D. Munsel, Fredericiana University, Karlsruhe)

West Bohemia with the neighboring Vogtland is a part of the Cenozoic Central European Volcanic Province and currently one of the most seismically active areas in Central Europe: The region is characterized by periodic occurrences of earthquakes swarms, abundant CO_2-rich mineral springs and massive gas emanations with mantle isotopic signatures of C, O and He, all of which indicate magma migration from depth. Miocene to Quaternary volcanism documents the persistent magmatic potential.

The area is marked by the intersection of the NNW–SSE trending Cheb–Domažlice Graben with the SW–NE trending Ohře (Eger) Rift. Quaternary volcanism is restricted to the Cheb Basin. However, Miocene volcanism contemporaneous with the formation of the graben extends further to the N along the trace of the Marianské Lázně Fault zone into the Vogtland.

Strongly silica-undersaturated alkaline volcanics including olivine melilitites, melilite-bearing and melilite-free olivine nephelinites are characteristic for the W Bohemian/Vogtland areas and built up volcanic necks, dikes, diatremes and scoria cones, respectively. The typical mineralogy of the present rocks comprises abundant olivine, diopside, nepheline and melilite as well as minerals such as perovskite, nosean, hauyne, phlogopite, amphibole that are rich in incompatible and volatile elements. Whole rock geochemistry shows that the rocks are highly enriched in incompatible elements such as HFSE (Zr: 280–450 ppm, Nb: 90–170 ppm, TiO_2: 2.6–3.3 wt. %, P_2O_5: 0.9–1.3 wt. %), LREE (La: 65–110 ppm, Ce 150–220 ppm) and other LILE (Ba: 700–1400 ppm, Sr: 900–1600 ppm). All rock types are uniform in their Sr- and Nd- isotopic signature exhibiting the typical European subcontinental mantle composition (European Asthenospheric Reservoir – EAR/Low Velocity Component – LVC) with only minor effects by assimilation: $^{87}Sr/^{86}Sr$ = 0.7032–0.7036, $^{143}Nd/^{144}Nd$ = 0.51282–0.51287. Rocks enriched in Sr are macroscopically characterized by crustal xenoliths (schists and granites). Trace element ratios (Gd/Yb: 4.6–5.9) suggest small degrees of melting at rather deep levels >80 km in a mantle source enriched in fluids and LILE.

Many of the rocks give evidence of hydrothermal alteration, though others still contain fresh glass. The degree of alteration is determined by the proximity to geodynamically active zones. Carbonate often occurs as a secondary mineral, but seems to be present as a primary phase (carbonate melt droplets) in some of the rock as well.

The abundance of silica-undersaturated melilite-rich rocks in the Vogtland/W Bohemia area may give evidence for carbonate metasomatism of the subcontinental mantle in the area where the Mariánské Lázně Fault zone deeply dissects the lithosphere.

Based on a revision of a set of 115 occurrences of (ultra)mafic mantle xenoliths from the Czech part of the Bohemian Massif, the following results were achieved (Ulrych & Adamovič 2004). Xenoliths occur mostly in lava flows, less commonly in vents. Their host rocks correspond mostly to nepheline basanites to olivine nephelinites. Olivine-bearing xenoiths (harzburgites > spinel lherzolites and peridotites) prevail over pyroxene-bearing xenoliths (clinopyroxenites >> wehrlites). Minerals are dominated by magnesian olivine (Fo_{89-91}) and orthopyroxene (En_{88-91}) chromian diopside (0.9–1.4 wt% Cr_2O_3,), and (Cr, Al)-spinels (l00 Cr/Cr+Al = 15–54). The rise of volcanic rocks carrying the xenoliths occurred especially along faults of E–W and ESE–WNW course, always in the times of their normal extension, probably independently on the structures typical for the Ohře Rift graben limitation; structures rather striking NW–SE were involved in the Pliocene and Pleistocene. The structures used were formed (and partly reactivated) in the Subhercynian and Laramide phases of the Alpine orogeny in the latest Cretaceous, Paleocene and earliest Eocene.

The classical xenoliths of the supposed lower crust origin include alkali pyroxenite and ijolite xenoliths occurring in ca 37–30 Ma nephelinite of the Loučná–Oberwiesenthal Volcanic Centre in Krušné hory/Erzgebirge region (Ulrych et al. 2005). The latter is located on the uplifted shoulder of the Ohře/Eger Rift within the Variscan basement of central Europe. The alkali pyroxenites and transitional xenoliths are abundant whereas ijolite xenoliths are rare. The host nephelinite is chemically evolved (Mg# = 47–46), and the entrained alkali c1inopyroxenite xenoliths (Mg# = 64–47) and transitional to ijolite xenoliths (Mg# = 69–25) show a range of compositions from little to highly evolved. The alkali pyroxenite xenoliths probably represent fragments of an intracrustal, possibly layered alkaline complex, overprinted by a late magmatic pegmatoid phase of ijolite composition. This late stage metasomatic process may account for a spectrum of rocks ranging from alkali pyroxenite to ijolite. Initial ε Nd values of +2.3 in clinopyroxene samples from the host nephelinite and +3.1 to +3.0 in clinopyroxene from the xenoliths indicate similar, yet different sources. The initial $^{87}Sr/^{86}Sr$ ratios of 0.70361 to 0.70365 and initial ε_{Nd} values of +3.0 and +3.1 for the alkali pyroxenite xenoliths are consistent with mantle sources of HIMU-affinity. A similar source may be inferred from the isotopic composition of the host nephelinite yielding an initial $^{87}Sr/^{86}Sr$ of 0.70368 and initial ε_{Nd} value of +2.3.

The crystal structure of diopside from an alkali pyroxenite xenolith from the Loučná–Oberwiesenthal Volcanic Centre with the formula $(Ca_{0.95}\,Na_{0.04})(Mg_{0.65}\,Fe_{0.13}{}^{2+}Fe_{0.10}{}^{3+}Ti_{0.10}Al_{0.01})\,(Si_{1.69}\,Al_{0.31})\,O_6$ and the lattice parameters a = 9.773 (2), b = 8.886 (2), c = 5.308 (1) [A] and β = 105.89 (3) [°] was refined to an R-value of 0.025 for 1174 reflections (Ulrych et al. 2006). The mean interatomic distances are: within the Mel-O6 octahedron <2.067>A, within the Me2–O8 polyhedron <2.498>A. The last value reflects the occupation of this atomic position by significant amounts of Fe^{2+} and Ti^{4+}. The enlargement determined for the <T–O> band length to 1.657 Å is in accordance with the site population for this position: $(Si_{1.69}Al_{0.31})$ The molar ratio Fe^{2+}/Fe^{3} determined by Mössbauer spectroscopy is equal to 0.786. The Al^{IV} deficiency in T-sites of clinopyroxene of rims is negligible (up to 0.019 a. p. f. u.) restricted to sporadic local electron microprobe analyses. The presence of Fe^{3+} in the T-position of Si- and Al-poor clinopyroxenes was not confirmed by X-ray structural analyses because of its low quantity. Nevertheless, the Mössbauer spectroscopy measurements (isomer shift of 0.36 mm.s^{-1}) imply that Fe^{3+} is present only in the Me1–O6 positions.

Neogene basanite lavas of Kozákov volcano, located along the Lusatian Fault in the northeastern Czech Republic, contain abundant anhydrous spinel lherzolite xenoliths that provide an exceptionally continuous sampling of the upper two-thirds of central European lithospheric mantle. The xenoliths yield a range of two-pyroxene equilibration temperatures from 680 °C to 1070 °C, and are estimated to originate from depths of 32–70 km, based on a tectonothermal model for basaltic underplating associated with Neogene rifting (Ackerman et al. 2007). The sub-Kozákov mantle is layered, consisting of an equigranular upper layer (32–43 km), a protogranular intermediate layer that contains spinel-pyroxene symplectites after garnet (43–67km), and an equigranular lower layer (67–70km). Negative correlations of wt. % TiO_2, Al_2O_3, and CaO with MgO and clinopyroxene mode with Cr-number in the lherzolites record the effects of partial fusion and melt extraction; Y and Rb contents of clinopyroxene and the Cr-number in spinel indicate 5 to 15% partial melting. Subsequent metasomatism of a depleted lherzolite protolith, probably by a silicate melt, produced enrichments in the large ion lithophile elements, light rare earth elements and high field strength elements, and positive anomalies in primitive mantle normalized trace element patterns for P, Zr, and Hf. Although there are slight geochemical discontinuities at the boundaries between the three textural layers of mantle, there tends to be an overall decrease in the degree of depletion with depth, accompanied by a decrease in the magnitude of metasomatism. Clinopyroxene separates from the intermediate protogranular layer and the lower equigranular layer yield $^{143}Nd/^{144}Nd$ values of 0.51287–0.51307 (ε_{Nd} = +4.6 to +8.4) and $^{87}Sr/^{86}Sr$ values of 0.70328–0.70339. Such values are intermediate with respect to the Nd-Sr isotopic array defined by anhydrous spinel peridotite xenoliths from central Europe and are similar to those associated with the present-day low-velocity anomaly in the upper mantle beneath Europe. The geochemical characteristics of the central European lithospheric mantle reflect a complex evolution related to Devonian to Early Carboniferous plate convergence, accretion, and crustal thickening, Late Carboniferous to Permian extension and gravitational collapse, and Neogene rifting, lithospheric thinning, and magmatism.

According to Konečný et al. (2006) the studied samples of xenoliths of spinel lherzolite composition from the Kozákov volcano come from the depth of about 50–75 km. Their mineral assemblage preserved subsolidus temperatures of 1165–1052 °C from the time of xenolith entrapment. Oxygen fugacity varies from +0.14 to +0.93 log unit relative to fayalite-magnetite-quartz (FMQ) buffer. Major bulk-rock oxides and variations in mineral chemistry indicate a continual depletion trend mainly associated with extraction of basaltic melt from the mantle. Mineralogical features and the absence of highly oxidized lherzolites suggest a negligible degree of modal metasomatic overprint. On the contrary, the LREE upward patterns and U-shaped REE patterns of clinopyroxenes, as well as of the bulk lherzolite compositions are indicators of cryptic metasomatic event(s) in the upper mantle. The U-shape REE patterns corroborates to enrichment mechanisms in the mantle by reactive porous flow and chromatographic fractionation. A possible cryptic metasomatic event(s) could have occurred in pre-Cenozoic times, probably during the Variscan orogeny.

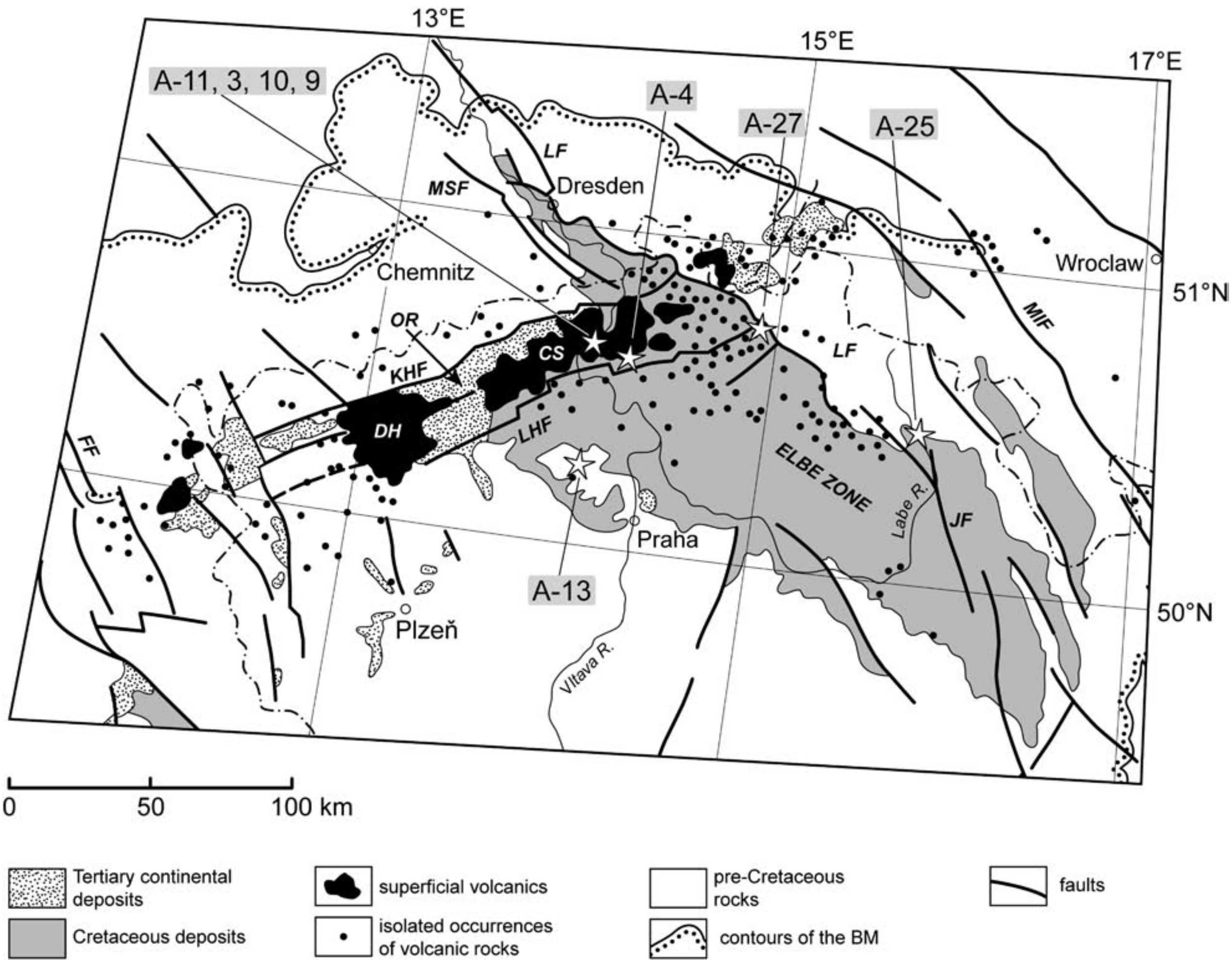
The effects of melt percolation on highly siderophile element (HSE) concentrations and Re-Os isotopic systematics of subcontinental lithospheric mantle are examined for a suite of spinel peridotite xenoliths from the 4 Ma Kozákov volcano (Ackerman et al. 2009).The xenoliths have previously been estimated to originate from depths ranging from ~32 to 70 km and represent a layered upper mantle profile. Prior petrographic and lithophile trace element data for the xenoliths indicate that they were variably modified via metasomatism resulting from the percolation of basaltic melt derived from the asthenosphere. Chemical and isotopic data suggest that lower sections of the upper mantle profile interacted with melt characterized by a primitive, S-undersaturated composition at high melt/rock ratios. The middle and upper layers of the profile were modified by more evolved melt at moderate to low melt/rock ratios. This profile permits an unusual opportunity to examine the effects of variable melt percolation on HSE abundances and Os isotopes.

Most HSE concentrations in the studied rocks are significantly depleted compared to estimates for the primitive upper mantle. The depletions, which are the most pronounced for Os, Ir and Ru in the lower sections of the mantle profile, are coupled with strong HSE fractionations (e. g., OsN/IrN ratios ranging from 0.3 to 2.4). Platinum appears to have been removed from some rocks, and enriched in others. This enrichment is coupled with lithophile element evidence for the degree of percolating melt fractionation (i. e. Ce/Tb ratio).

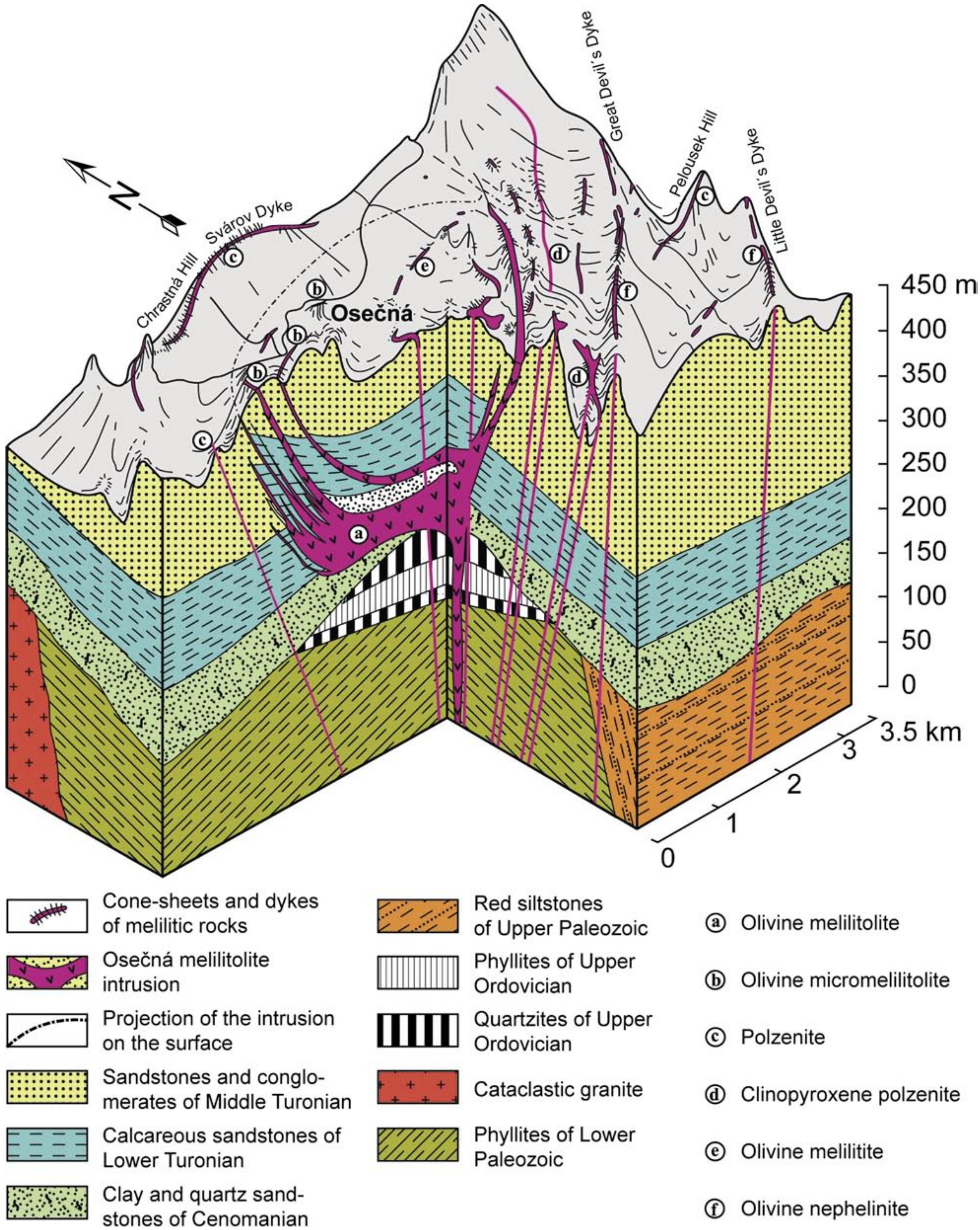
Osmium isotopic compositions vary considerably from subchondritic to approximately chondritic (γ_{Os} at 5 Ma from -6.9 to +2.1). The absence of correlations between $^{187}Os/^{188}Os$ and indicators of fertility, as is common in many lithospheric mantle suites, may suggest significant perturbation of the Os isotopic compositions of some of these rocks, but more likely reflect the normal range of isotopic compositions found in the modern convecting mantle. Osmium isotopic compositions correspondingly yield model Re-depletion (TRD) ages that range from essentially modern to ~1.3 Ga.

Our data provide evidence for large-scale incompatible behavior of HSE during melt percolation as a result of sulfide dissolution, consistent with observations of prior studies. The degree of incompatibility evidently depended on melt/rock ratios and the degree of S-saturation of the percolating melt. The high Pt contents of some of these rocks suggest that the Pt present in this pervasively metasomatized mantle was controlled by a phase unique to the other HSE. Further, high Os concentrations in several samples suggest deposition of Os in a minority of the samples by melt percolation. In these rocks, the mobilized Os was characterized by similar to the $^{187}Os/^{188}Os$ ratios in the ambient rocks. There is no evidence for either the addition of Os with a strongly depleted isotopic composition, or Os with suprachondritic isotopic composition, as is commonly observed under such circumstances.

Late Cretaceous to Paleogene subvolcanic/volcanic rocks and their xenoliths of hornblendite composition from the Bohemian Massif (Fig. 36) were subjected to apatite fission track (AFT) and K-Ar dating (Filip et al. 2007). Striking discrepancies between the AFT and K-Ar ages encountered in most samples cannot be explained by slow cooling rates because of the small sizes and shallow emplacement depths of the subvolcanic bodies. Instead, apatites from these rocks are believed to have re-entered the total annealing zone during episodes of hydrothermal fluid activation along major faults and dike contacts. The presence of two such thermal disturbances can be inferred from the available data in the Late Oligocene (28 to 26 Ma) and the Early Miocene (20 to 16 Ma) times. The older episode is manifested in the Ohře/Eger Rift region and in the Elbe Zone, while the younger seems to be limited to the former area only. The distribution of the regions with the increased hydrothermal fluid flow



■ **Fig. 36.** A simplified geological map of the northern Bohemian Massif with sampling sites. FF – Franconian Fault; KHF – Krušné hory Fault; LDF – Litoměřice Deep Fault; MSF – Mid-Saxonian Fault; LF – Lusatian Fault; MIF – Main Intrasudetic Fault; JF – Jivina Fault; DH – Doupovské hory Mts.; CS – České středohoří Mts (after Filip et al. 2007).



■ **Fig. 37.** A block diagram of the Osečná Complex (after Ulrych et al. 2008).

was controlled by the crustal weaknesses, the presence of magmatic centers and by the regional tectonic stress field.

The volcanic rocks of the Ohře/Eger Rift, the easternmost part of the Cenozoic Volcanic Province of western and central Europe, include rare occurrences of Late Cretaceous to Paleocene (68 to 59 Ma) ultramafic melilitic rocks, e. g., in the Osečná Complex and associated Devil's Dike swarm (Ulrych et al. 2008). The complex and dikes are located at the intersection of the Ohře Rift with the Lužice Fault in N Bohemia. These melilitic suites, related to the initial stage of rifting, occur in the outer parts of the rift zone. Magmatism during the main stage of the rifting is represented by a voluminous Eocene to Miocene (40 to 18 Ma) bimodal suite of basanites and phonolites which is present in the inner part of the Ohře Rift zone. The Osečná Complex is a lopolith-like subvolcanic intrusion (Fig. 37), composed mainly of olivine melilitolite with rare pegmatoids, ijolites and glimmerites, accompanied by numerous cone-sheets and dikes of olivine micro-melilitolite and melilitic lamprophyre. The NNE–SSW-trending Devil's Dike swarm consists predominantly of melilite-bearing olivine nephelinite. The primitive melilitic rocks have a primary olivine + melilite + spinel ± clinopyroxene association and are characterized by low contents of SiO_2, Al_2O_3 and total alkalis but high CaO, MgO, Cr, Ni, CO_2 and strongly incompatible trace elements including light REE. High initial ε_{Nd} values of +3.2 to +5.2 accompanied by variable $^{87}Sr/^{86}Sr$ ratios of 0.7033 to 0.7049 are interpreted as evidence for melting of a heterogeneous veined mantle. A portion of a depleted mantle source was overprinted by carbonate-rich fluids with enriched Sr isotopic composition. Mantle metasomatism was probably related to carbonatitic magmatism associated with incipient rifting of the Bohemian Massif lithosphere.

Diatremes (and maars?) filled with pelletal lapilli-ash tuff of olivine melilitite composition predate the formation of the Osečná Complex (olivine melilitolite – polzenite – melilite-bearing olivine nephelinite). Xenoliths of upper mantle origin occur in both the massive rocks and pelletal lapilli–ash tuff of diatreme filling (Ulrych et al. 2000). Dunite to harzburgite in melilite-bearing olivine nephelinites represent depleted mantle. Glimmerite to mica clinopyroxenite in polzenites is possibly a representative of metasomatised upper mantle products. Garnet serpentinite, eclogite(?), norite and ferro-dunite xenoliths are entrained from the local crystalline basement and occur in the diatreme filling auly. They come from rocks of primary upper-mantle origin. The upper mantle-xenolith suite indicates the presence of both depleted and enriched (metasomatized) upper mantle beneath the northern part of the Bohemian Massif. The associated ultramafic xenoliths of upper mantle-derived rocks that intrude the local crystalline basement are indicative for a lithospheric plate boundary.

ACKERMAN L., MAHLEN N., JELÍNEK E., MEDARIS G. JR., ULRYCH J., STRNAD L. & MIHALJEVIČ M. (2007): Geochemistry and evolution of subcontinental lithospheric mantle in Central Europe: evidence from peridotite xenoliths of the Kozákov volcano, Czech Republic. – *Journal of Petrology*, 48, 12: 2235–2260.

ACKERMAN L., WALKER R.J., PUCHTEL I.S., PITCHER L., JELÍNEK E. & STRNAD L. (2009): Effects of melt percolation on highly siderophile elements and Os isotopes in subcontinental lithospheric mantle: a study of the upper mantle profile beneath Central Europe. – *Geochimica et Cosmochimica Acta*, 73, 8: 2400–2414.

FILIP J., ULRYCH J., ADAMOVIČ J. & BALOGH K. (2007): Apatite fission track implication for timing of hydrothermal fluid flow in Tertiary volcanics of the Bohemian Massif. – *Journal of the Czech Geological Society*, 52, 3–4: 211–220.

KONEČNÝ P., ULRYCH J., SCHOVÁNEK P., HURAIOVÁ M. & ŘANDA Z. (2006): Upper mantle xenoliths from the Pliocene Kozákov volcano (NE Bohemia): P–T–fO2 and geochemical constraints. – *Geologica Carpathica*, 57, 5: 379–396. Bratislava.

ULRYCH J. & ADAMOVIČ J. (2004): (Ultra)mafic mantle xenoliths in Cenozoic alkaline volcanics of the Bohemian Massif (Czech Republic). – *Mineralia Slovaca*, 36: 205–215.

ULRYCH J., DOSTAL J., HEGNER E., BALOGH K. & ACKERMAN L. (2008): Late Cretaceous to Paleocene melilitic rocks of the Ohře/Eger Rift in northern Bohemia, Czech Republic: insights into the initial stages of continental rifting. – *Lithos*, 101, 1–2: 141–161.

ULRYCH J., LLOYD F.E., BALOGH K., HEGNER E., LANGROVÁ A., LANG M., NOVÁK J.K. & ŘANDA Z. (2005): Petrogenesis of alkali pyroxenite and ijolite xenoliths from the Tertiary Loučná–Oberwiesenthal Volcanic Centre, Bohemian Massif in the light of new mineralogical, geochemical and isotopic data. – *Neues Jahrbuch für Mineralogie, Abhandlungen*, 182, 1: 57–79.

ULRYCH J., NIŽŇANSKÝ D., PERTLIK F., GIESTER G., ERTL A. & BRANDSTÄTTER F. (2006): Clinopyroxene from alkali pyroxenite xenolith, Loučná–Oberwiesenthal Volcanic Centre, Bohemian Massif: crystal chemistry and structure. – *Geological Quarterly*, 50, 2: 257–264.

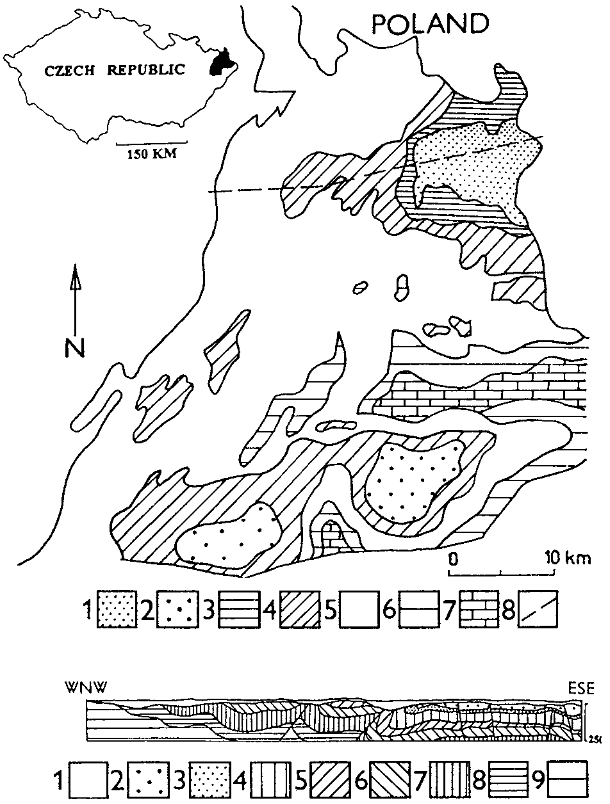
ULRYCH J., PIVEC E., POVONDRA P. & RUTŠEK J. (2000): Upper mantle xenoliths in melilitic rocks of the Osečná Complex, North Bohemia. – *Journal of the Czech Geological Society*, 45, 1: 79–93.

No. IAA300130503: **Carboniferous fructifications and their spores from the Upper Silesian Basin (Namurian–Westphalian D), Czech Republic and Poland** (*J. Bek*, Project Leader: Z. Kvaček, Faculty of Science, Charles University, Praha, Czech Republic, J. Pšenička, West Bohemian Museum, Plzeň, Milan Libertín, National Museum, Praha, Jana Drábková, Czech Geological Survey, Praha)

The first palynological results summarizing spore assemblages from the Czech part of the Upper Silesian Basin (Fig. 38) were prepared. Palynological samples from 21 boreholes drilled in the eastern part of the Upper Silesian Basin in the Czech Republic during more than the last fifty years were examined. Coal samples from the Jaklovec, Poruba, Saddle, Lower and Upper Suchá members of Namurian (Arnsbergian) to Westphalian (Langsettian) age were palynologically studied. A brief review of the history of geological, paleobotanical and palynological research is given.

Increasing diversity of the spore assemblages and the changes in the dominance of the two principal miospore groups, lycospores and densospores, are the most significant criteria for the determination and characterization of dispersed miospore assemblages (Fig. 39). The reconstruction of coal-forming vegetation is suggested.

Lycospores and densopores are two major miospore groups in the Czech part of the Upper Silesian Basin and made up almost 80 % of all specimens here. Lycospores and their parent plants, arborescent lycopsids of genera *Lepidodendron* and *Lepidofloyos* Sternberg were the principal contributors to biomass. The general decline of arborescent lycopsids during the sedi-



■ **Fig. 38.** Geological map of the Czech part of the Upper Silesian Basin (after Bek 2008). 1 – Doubrava and Suchá members; 2 – Suchá and Saddle members including the Prokop seams; 3 – Saddle Member and the Prokop seams; 4 – Poruba and Jaklovec members; 5 – The Hrušov and Petřkovice members; 6 – Lower Carboniferous sandstones; 7 – Lower Carboniferous flysch rocks; 8 – Geological section; Geological section: 1 – Neogene sediments; 2 – Doubrava and Suchá members; 3 – Saddle Member and the Prokop seams; 4 – Poruba Member; 5 – Jaklovice Member; 6 – Hrušov Member; 7 – Petřkovice Member; 8 – Lower Carboniferous sandstones. 9 – Lower Carboniferous flysch rocks.

mentation of the Saddle Member corresponds with relatively drier intervals favourable for dominance of densospores and higher occurrence of their parent plant sub-arborescent lycopsids of the genus *Omphalophloios*.

The general character of spore assemblages is the same in both parts of the basin, and some differences concern mainly different stratigraphical ranges of selected spore taxa. These differences were probably influenced by lateral development in various parts of the basin, i. e. they probably were ecologically controlled. Some significant spore taxa occurred in the Czech part for a longer time than in the Polish one (e. g., *Tripartites* and *Rotaspora knoxi*) and some others appeared earlier in the Polish part (*Florinites*, *Schulzospora*, *Bellispores*, *Tripartites*, *Dictyotriletes bireticulatus*, *Crassispora*; Fig. 40).

The most important are longer stratigraphical ranges of index species *Rotaspora knoxi* and important genus *Tripartites* in the Czech part and the earlier appearance of *Florinites*, *Crassispora* and *Schulzospora* in the Polish part.

A number of palynozones have been proposed for the Carboniferous in Western Europe, but only a few of them are used for comparison and correlation by most palynologists.

The stratigraphic ranges and occurrences of miospores from the Czech part of the Upper Silesian Basin and Western Europe can be roughly comparable although both regions were at the same paleolatitude on the same paleo-continent. This emphasizes the need to integrate all available independent biostratigraphic data in the definition of palynological zonal units. In general terms, the broad (continental) changes which appear to be reflected in the composition of the assemblages appear to mirror similar changes in Western Europe. On the other hand, it is difficult whether the ages applied to any of the biozones are supported independently by biostratigraphic evidence. Some miospore taxa important in Western Europe are not recorded in the Czech and/or Polish parts of the Upper Silesian Basin, some others have different stratigraphic ranges. It is difficult to establish whether these are real differences between the two regions or merely reflect different approaches to nomenclature and taxonomy and different preservation. Another reason of these differences maybe that sometimes authors mixed palynological data from coal seams and clastics together while data from both parts of the Upper Silesian Basin are only from coal seams.

Palynological assemblages of the Czech part of the Upper Silesian Basin (Fig. 41) are not comparable with any assemblage of the same age in the Czech Republic.

■ **Fig. 39.** Selected miospores from the Upper Silesian Basin (after Bek 2008). All photomicrographs ×500. 1 – *Leiotriletes gulaferus* Potonié and Kremp (1954). NP-893 borehole, 998.60 m; 2 – *Granulatisporites granulatus* Ibrahim (1933). NP-893, 847.30 m; 3 – *Granulatisporites granulatus* Ibrahim (1933). NP-909, 1,121.85 m; 4 – *Punctatisporites sinuatus* (Artűz, 1957) Neves (1961). NP-893, 998.60 m; 5 – *Calamospora breviradiata* Kosanke (1950). NP-893. 988.60 m; 6 – *Granulatisporites piroformis* Loose (1932). NP-893, 857.30 m; 7 – *Cyclogranisporites leopoldi* (Kremp, 1952) Potonié and Kremp (1954). NP-893, 998.60 m; 8 – *Lophotriletes gibbosus* (Ibrahim, 1933) Potonié and Kremp (1955). NP-909, 1,121.85 m; 9–10 – *Verrucosisporites microtuberosus* (Loose, 1932) Smith and Butterworth (1967). NP-893, 998.60 m; 11 – *Apiculatisporis aculeatus* (Ibrahim, 1933) Smith and Butterworth (1967). NP-909, 1,121.85 m; 12 – *Apiculatisporis abditus* (Loose, 1932) Potonié and Kremp (1955). NP-893, 847.30 m; 13 – *Apiculatasporites spinulistratus* (Loose, 1932) Ibrahim (1933). NP-909, 1,121.85 m; 14 – *Apiculatisporis* cf. *spinososaetosus*. NP-909, 1,121.85 m; 15 – *Raistrickia saetosa* (Loose, 1932) Schopf et al. (1944). NP-909, 1,121.85 m; 16 – *Raistrickia* cf. *saetosa*. NP-909, 1,121.85 m; 17 – Raistrickia cf. fulva. NP-893, 847.30 m; 18 – *Convolutispora tessellata* Hoffmeister et al. (1955a). NP-909, 1,121.85 m; 19 – *Convolutispora usitata* Playford (1962). NP-893, 988.60 m; 20 – *Convolutispora jugosa* Smith and Butterworth (1967). NP-893, 986.30 m; 21 – *Microreticulatisporites concavus* Butterworth and Williams (1958). NP-901, 1,407.00–1,407.10 m; 22 – *Dictyotriletes mediareticulatus* (Ibrahim, 1933) Smith and Butterworth (1967). NP-901, 847.30 m; 23 – *Triquitrites tribullatus* (Ibrahim, 1933) Schopf et al. (1944). NP-893, 847.30 m.

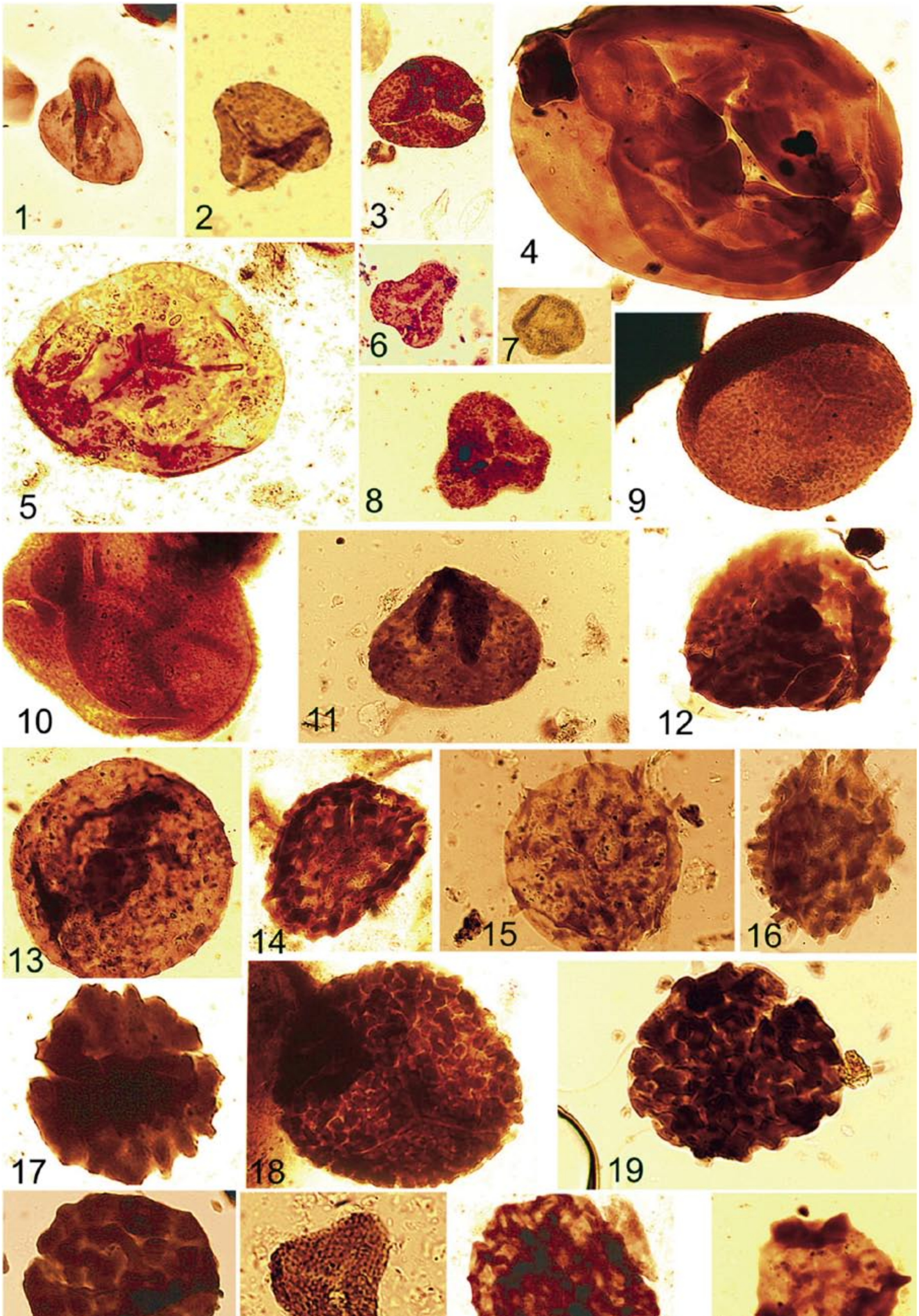
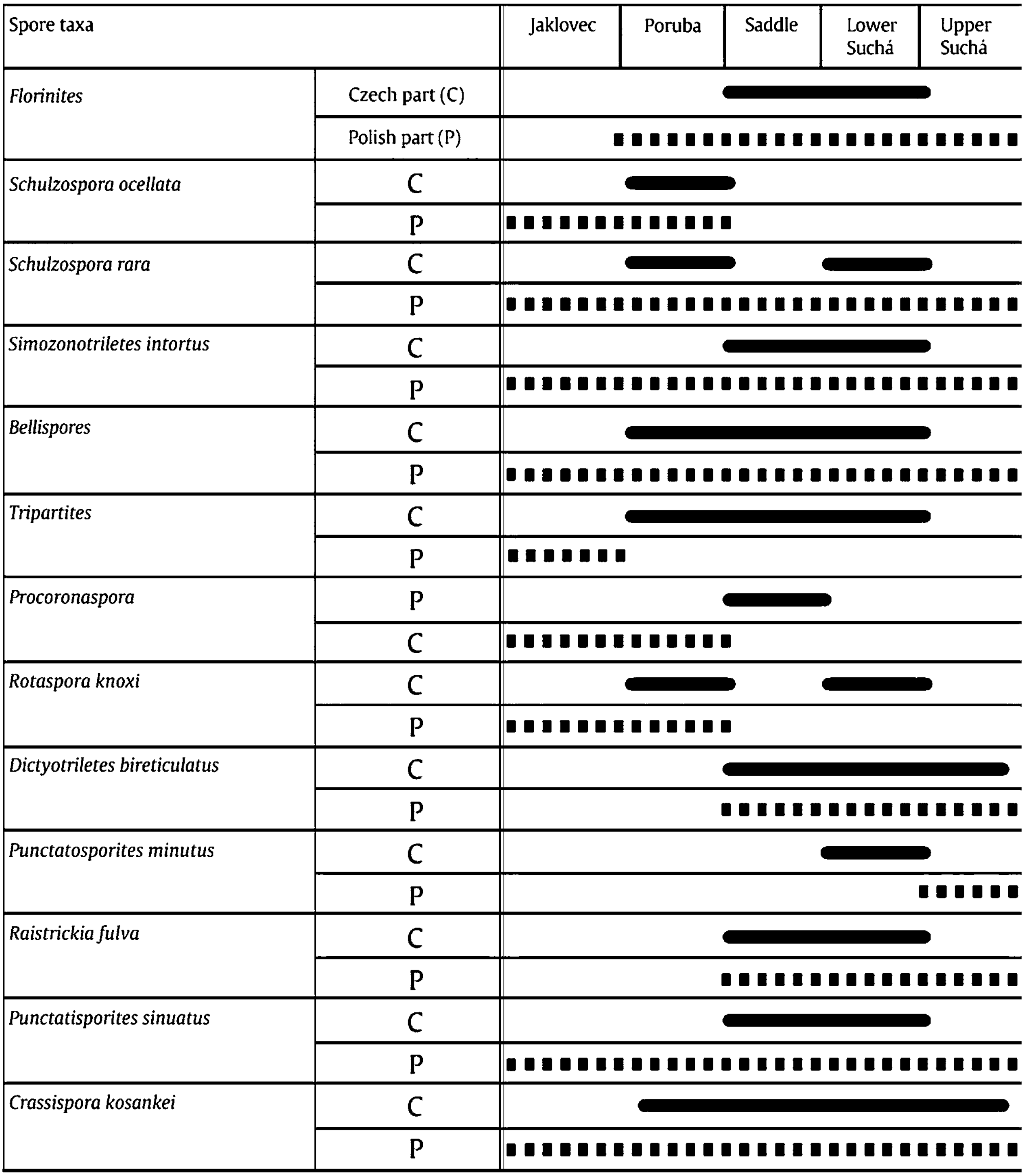
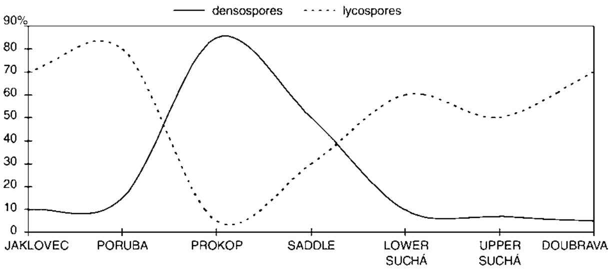


Figure caption – see previous page.



■ **Fig. 40.** Comparison of occurrence of the most important miospore taxa described from Czech and Polish parts of the Upper Silesian Basin (after Bek 2008).

Spore assemblages from the Upper Silesian Basin are well comparable with those of the same age described from France and by Artüz from Turkey while the assemblages published from Bulgaria, Germany, USA and those reported from the UK are more different and cannot be compared. Also the differences among Western European zonation and spore assemblages from the Upper Silesian Basin suggested spore and plant assemblages with different stratigraphic occurrences of several significant taxa. The correlation may be difficult also due to floral provincialism, resulting in major compositional differences among the



■ **Fig. 41.** Proportions of two main spore groups in dispersed spore assemblages of the Czech part of the Upper Silesian Basin, Czech Republic (dashed line represents lycospores and continuous line densospores with the maximum within the Prokop Seam; after Bek 2008).

various regions on the Northern Hemisphere during the latest Mississippian–earliest Pennsylvanian.

It is evident that the Western European zonation is functional in several countries in Western Europe but cannot be generally applied to some countries of Central Europe such as Poland, the Czech Republic and maybe a part of the former East Germany. The need of an independent Central European palynozonation for this area is therefore considered.

No. IAA300130505: **The erosional, accumulational and postdepositional processes in floodplain after great flood of 2002** (*V. Cílek*, *J. Hlaváč*, *J. Kadlec*, *L. Lisá*, *V. Ložek*, *R. Mikuláš*, *T. Navrátil* & *K. Žák*)

Comparison of the 2002 flood magnitude with some other historical floods is an important topic. Such detailed comparisons have been already drawn for the Vltava and Labe Rivers, but not in such a detail for the Berounka River. A section of the Berounka River between Beroun and Karlštejn was selected for a detailed study. Precise altitude data of almost 50 historical flood marks and water levels were obtained during this task. The main focus of the study was a comparison of culmination water levels during large summer floods of 1872, 1890, 1981 and 2002, a comparison of the published peak flow data, and a study of the influence of the Berounka River canalization (1906–1913) on the floods.

Sedimentation in the floodplain of the Vltava River and its tributaries, and geochemistry of sediments. The great flood of August 2002 possibly represents the biggest flooding event on the Vltava River of the last 500 years. The culmination of the Vltava River north of Praha reached 758 cm, but the lower part of the Labe River witnessed some 1035–1230 cm rise of the river level. Overbank sedimentation was characterized by the basic types as follows: (1) pelitic overbank sedimentation led to the formation of surprisingly durable sediment crusts 10–20 cm thick that evolved by slow oriented planparallel sedimentation of clay minerals; (2) sandy sedimentation led to the formation of sheet deposits, aggradation rims and sand dunes sometimes up to 2 m high; (3) gravel accumulated as bars and benches. The erosional processes were surprisingly variable. Due to the changing morphology, weak sandy sedimentation could change within few meters into a boulder field, where individual blocks up to 80 cm in diameter could be transported. The parallel river channels developed at some places behind aggradation rims.

The geochemistry task focused on fine-grained overbank sediments deposited along the lower reaches of the Berounka and Vltava Rivers during the catastrophic 2002 flood. It was found that these sediments are not highly contaminated with heavy metals and other toxic elements. This is a result of dominantly mineral character of the sediments (C_{tot} in the range 3.97 to 5.01 %, relatively low content of clay minerals), and of very high degree of contamination dilution by eroded pre-industrial non-contaminated floodplain sediments. A majority of the heavy metals contained in sediments can be readily leached by diluted acids, and to a much smaller degree by rainwater.

As a part of this task, geochemical properties of the 2002 sediments were studied also in vertical profiles of the deposited mud layer. It was found that the sediments from this major flood event show poor vertical chemical zoning, except for some components enriched in the uppermost layer by precipitation from evaporated pore-water contained in the mud, i. e. secondary carbonate. The content of C_{carb} of the sediments (0.05 to 0.15 %) is partly represented by this secondary carbonate, which is later leached by rainwater, and partly by fragments of river mollusk shells.

Sampling of floodplain sediments of the Berounka River above and below its confluence with the Litavka River showed that this small river, draining the historical Pb–Zn–Ag Příbram Ore Region, is an important source of Pb and Zn contamination. Fluxes of heavy metals during minor flood events of the Litavka River were quantified by direct sampling of transported suspended particulate matter. It was found that even during small flood events the quantity of transported Pb and Zn is on the order of several tons during a few days of the flood duration. This present-day dispersion of heavy metals was induced by erosion of strongly contaminated floodplain sediments of the Litavka River in an area located immediately below the Příbram Ore Region, deposited there since the 13th century (Fig. 42).

■ **Fig. 42.** Sampling of contaminated floodplain sediments of the Litavka River below the Příbram Ore Region. Photo by J. Brožek.

Morava River floodplain sediments. Floodplain sediments exposed in up to 6 m high erosional river banks in the Strážnické Pomoraví region were analyzed using mineral magnetic, geochemical, and chemical approaches to describe the alluviation history. The resulting stratigraphic pattern reveals the increased alluviation of the currently meandering river system since the end of the 1st millennium AD. The oldest discontinuity appears in fine overbank clayey sediments at the depth of 200 cm, where the content of the clayey fraction starts to decrease, and magnetic parameters have their first distinct maximum, possibly attributable to the 12th Century colonization in the central Europe, connected with large deforestation which could accelerate an erosion and transportation of larger amount of material, including magnetic minerals. These overbank sediments deposited during the Medieval Warm Period are overlain by coarser floodplain deposits of the Little Ice Age indicating a change in the sediment source since 16th Century AD, and accelerated sediment load in the second half of 20th Century connected with an extensive agriculture land use. The Strážnické Pomoraví floodplain deposits represent a valuable paleoenvironmental archive of the last millennium containing record of river processes driven by climate, and considerably altered by human activities.

Ichnofabric of the Holocene and modern floodplain deposits. The increasing probability of catastrophic flood events in the central Europe gave the reason for the study of ichnofabrics of floodplain sediments of rivers in the Czech Republic. The ichnologic study should – analogously to numerous paleoichnologic studies – help to understand the record of past flood events. Besides the standard ichnologic study of the Holocene floodplain deposits, two basic attitudes were applied: (1) observation of colonization and gradual bioturbation of sediments deposited during the contemporary floods; (2) the study of relationships between the rate of river erosion and the ichnofabric of the eroded substrate. Several years lasting observation of silty to clayey sediments deposited by the September 2002 flood in the urban area of Praha shows that the rate of mixing of these deposits is directly proportional to the pre-flood biogenic activity in the underlying substrates, e. g., fragmentation and disintegration of the desiccated mud deposited on active soil was completed during nine months; the same process on playing grounds covered with scoria, sand or clay is still continuing after several years. Factors as the thickness of the sediment and the proximity of undisturbed vegetation are less important; it shows that the colonization of the flood sediments "from the above" and subsequent mixing are very slow. The difference in the intensity of bioturbation also affirms that certain part of soil in-fauna is capable to survive several weeks of submergence.

Another set of observations was completed after spring (snow-melting) floods of the little Blanice River (central Bohemia) in March 2005 and March 2006. Both of the events submerged most area of the present floodplain, leaving a mosaic of virtually undisturbed vegetation, newly accumulated sediments, and eroded areas on the sandy to silty floodplain terrace. The larger of the couple of floods (2006), bringing the short-time hundredfold flow volume in comparison to the average flow, deposited much less volumes of sediments in the observed section of the river than the previous (2005) flood.

However, the quantity of material eroded during the two events did not differ considerably. In both the cases, mixing of the new sediments in the floodplain terrace lasted form one month to approximately six months; the longer time applied for the three following situations: (1) thicker (ca. 0.5 m) sandy levee deposits; (2) fine-grained material deposited on a gravel "patch"; (3) muddy sediments left on previously eroded places, where the animated part of the soil profile was replaced. In certain areas, the erosion stopped on the tier of a dense network of rodent burrows, morphologically determinable as incipient *Thalassinoides* isp. (Fig. 43). Areas not attacked by rodents proved to be much more resistant to this deterioration. Side erosion of the geologic profile of the floodplain terrace augmented an otherwise hidden boxwork of old rodent burrows: fill of the tunnels was somewhat more vulnerable in comparison to the substrate untouched by rodents. Observations of runoff from the floodplain testified empirically the influence of density of vertical tubes made by earthworms on the permeability of the soil, hence on its water-bearing capacity.

■ **Fig. 43.** Blanice River, Central Bohemia. The erosion stopped on the tier of a dense network of rodent burrows. Photo by R. Mikuláš.

Besides the profiles on the present floodplain terrace of the Blanice River, attention was paid to the bioturbation of present floodplain sediments of the central Bohemian streams of Chotýšanka and Litavka. In bluish clays deposited by Chotýšanka, ichnofabric is represented solely by horizontal root canals, while the overlying, chiefly homogeneous/homogenized clayey sands have a vertical root ichnofabric. The studied section of the floodplain of the Litavka River has a prominent layer (more than 1 m thick) of chiefly bluish, reducing clays just several decimeters below the present floodplain surface. The clays are usually free of bioturbation, only in places with patches showing different styles of root ichnofabric, often visualized by iron oxyhydroxides.

Sediments of the Holocene floodplain of the Labe River (central Bohemia) provided also bioerosive wood traces: an accumulation of oak trunks (*Quercus* sp.) bears relatively rich and diverse assemblages of borings, but only on a minority of the studied trunks. Among the recognized morphotypes of borings, four of them can be attributed to the insect feeding, one resulted probably from an enzymatic fungal activity, and the last one is a mammal (most probably human) "scratch". The borings appeared in three phases: (1) on living trees; (2) on dead trees before their burial by sediment; (3) on re-buried trunks (i. e., during several last years). Generally, the wood mass comes mostly from live, "healthy" floodplain forests, which shows that these were affected by extremely large floods during certain Holocene intervals.

Yet another possibility to study large outcrops in sediments of the present floodplain of the Vltava River resulted from the archaeological research at the northern margin of Praha (the Roztoky site). Besides the documentation of rodent burrows and different suite of root traces (the differences consist in the way of preservation, intensity, prevailing size, affinities to archeological objects etc.), the locality provided valuable methodological experience, i. e. ink coloration to visualize the ichnofabric) and the unique data for interpretation of the rate of subsidence of rock blocks lying on the profile of unconsolidated sediments. Due to the activity of earthworms, creating burrow networks below the rock pieces (morphologically analogous to the ichnogenus *Arachnostega*), the solitary large blocks subsided up to 30–40 cm from the time of their lodgment to the surface (ca. 550–600 AD). On the other hand, antropogenic accumulations of rock fragments, which are in mutual contact (e. g., partially broken stoves made of ca 100 pieces of rock), show much less subsidence in the profile.

Conclusions. The large geomorphological changes after 2002 flood became almost invisible in 2009 due to the anthropogenic activities, bioturbation and erosion of sand and fine grained particles by smaller floods. The Holocene river system can be characterized as a "self healing phenomenon" where, e. g., the formation of new channels takes place, but the whole river system tends to reach a new equilibrium quickly. From the ecological point of view, any large flood can be seen as major disturbance that is necessary for the river function, because it cleans old river courses and creates new ecological niches such as overhanging banks and diverse subaquatic environments.

No. IAA304130601: **The biodiversity of the Šárka Formation (Ordovician of the Praha Basin): faunal analysis, paleoecologic, biogeographic, and stratigraphic aspects** (*Project Leader: P. Kraft, Faculty of Science, Charles University, Praha, Czech Republic*)

Subproject: **Ichnofossils and strophomenid brachiopods of the Šárka Formationan and their descendants in the Middle and Upper Ordovician of the Praha Basin** (*R. Mikuláš*)

The Šárka Formation (low Middle Ordovician, Praha Basin, Czech Republic) represents the time interval crucial for understanding the Ordovician Radiation, i. e. an event of diversification of fauna important and unique in the realm of the whole Phanerozoic. Being richly fossiliferous and a subject of extensive fossil collection since the 19th century, the Šárka Formation represents a desirable topic for modern, detailed and multidisciplinary faunal studies.

Overall bioturbation. The intensity of bioturbation and diversity of in-fauna in the Šárka Formation are relatively high but the preservation potential of most ichnofabric features was low. Considering the ichnologic features on early diagenetic nodules, the ichnofabric index varies mostly between 2–3 and the depth of bioturbation reached in places several decimeters below the sea floor.

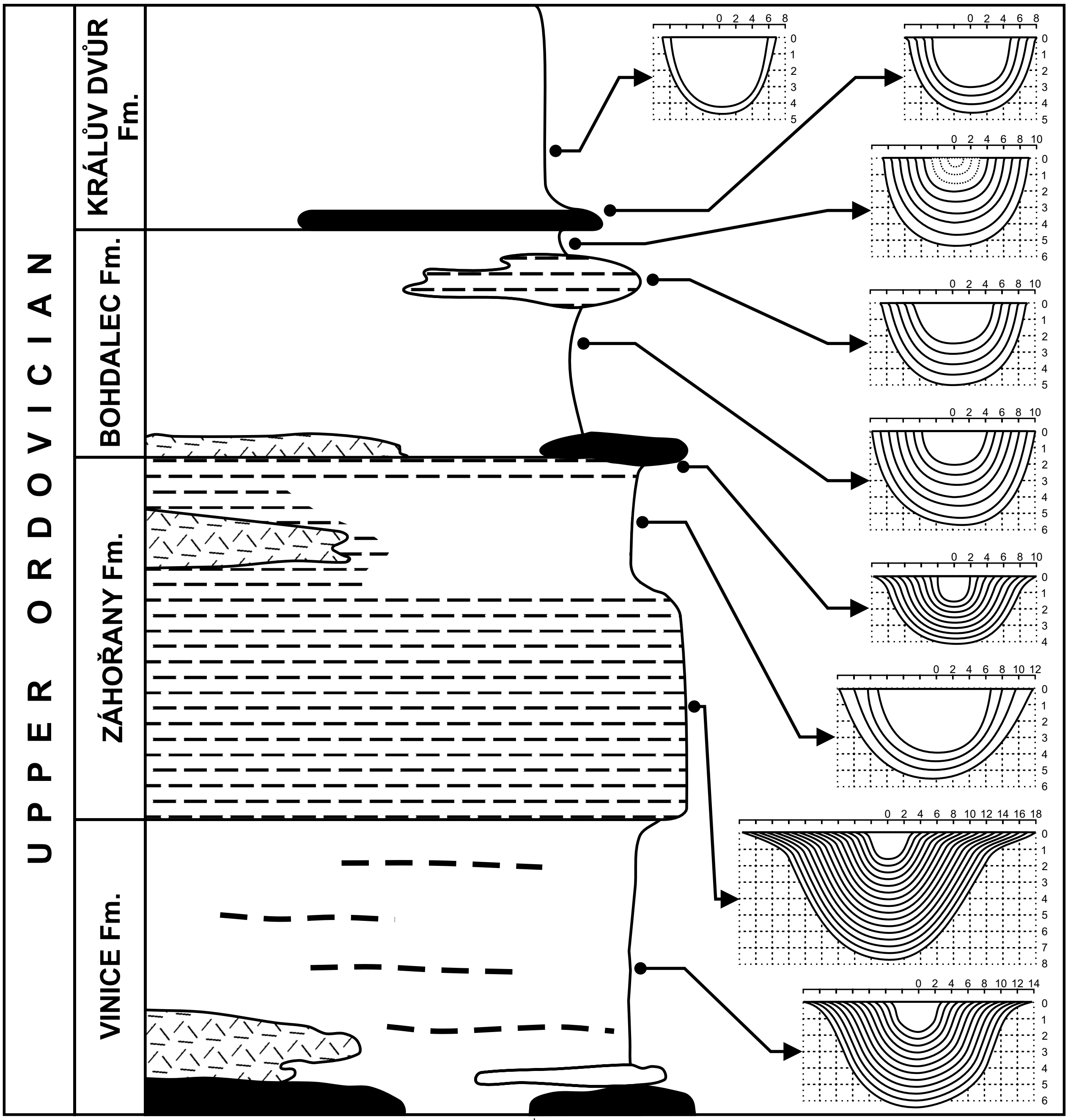
The ichnogenus *Arachnostega*: *Arachnostega gastrochaenae* Bertling, 1992 is a burrowing trace frequently recorded on internal moulds of molluscs and trilobites (and less commonly also brachiopods and echinoderms) preserved in argilite and marly sediments. It occurs over a large part of north Gondwanan platform, within the range from the Early to Late Ordovician beds. Bibliographical revisions of papers on body fossils demonstrated many undescribed Ordovician records of *A. gastrochaenae* from France, Italy, Portugal, Czech Republic (especially the Šárka Formation), Morocco and from other peri-Gondwanan places of South America. *Arachnostega* represents and example of spreading a life strategy (probably joined with a particular user) during the Ordovician Radiation; notably, the strategy appeared already in the Middle Cambrian, being then limited to few localities with particular benthic environments.

Evolution of the brachiopod genus *Aegiromena.* The theory of frozen evolution (Flegr 1998, 2008) assumes that a sexually reproducing biological species loses relatively quickly (in terms of geologic time) the ability to respond to selection forces produced by the environment, because "centripetal" tendencies unifying the population became stronger than the tendencies increasing the population variability (e. g., natural selection). The "centripetal" effect is similar no matter whether we consider the (Darwinian) selection between individuals or the Neodarwinian (intra-allelic) competition.

The aim of the particular study on the genus *Aegiromena* is (besides the introduction of a case study) to initiate the discussion on how paleontological data can be used to test the theory of frozen evolution: which requirements are to be applied to a set of enter data; which limitations are to be held in mind anyway, and which approach is to be adopted for the testing of the whole theory – not only its particular resources (e. g., the punctuated equilibrium).

Character of the fossil record. It is evident that not each presumed evolutionary line preserved (always *incompletely* preserved) in the fossil record is suitable for testing evolutionary theories. Moreover, a yet smaller proportion of evolutionary lines can yield information relevant to the theory of the frozen evolution. The restraints are as follows: (1) incompleteness of the fossil record, or, more precisely, excessive duration between well-recorded "windows to the past". For instance, if a set of strata representing a 20-Ma time interval contains only four highly fossiliferous beds, the "sampling time" was too long for recording high-frequency changes of an evolutionary line; (2) a statistically insufficient number of specimens suitable for study; (3) the impossibility to substantiate convincingly the causation of the morphological change whose "plasticity" is to be tested. For instance, we may not be able to infer whether the reduction of eyes was caused by a shift of the populations to dysphotic zones, or by a turn to a chiefly infaunal (intra-sediment) habitat. In this case, we do not know which environmental changes are to be monitored to recognize "plastic" or "frozen" response of the population to these changes.Thereby, the study material (1) should be obtained from non-condensed, richly fossiliferous sedimentary sequences, ideally from a paleogeographically well-understood region, (2) should be abundant, and (3) should display a character whose presence/absence/variability can be assigned (by deduction or by a recent analogy) to a single parameter of the environment, and (4) this parameter itself has to be well-recorded and unequivocally recognizable in the set of strata.

Brachiopods of the genus *Aegiromena*. Collections of the brachiopod genus *Aegiromena* Havlíček, 1961 from the Upper Ordovician of the Praha Basin (Barrandian area, Czech Republic) represent paleontological material which seems to meet the above outlined criteria. *Aegiromena* is a small strophomenid brachiopod; the width of adults reaches 8–20 mm; usual length is 5–10 mm. Pedicle valve is slightly convex and brachial valve is concave; therefore, the internal volume of the shell is very



■ **Fig. 44.** Left – A simplified geological section of the mid-Upper Ordovician of the Praha Basin (modified after Havlíček 1977). Not to exact scale; the overall thickness of the section varies from few hundred metres to nearly 1000 metres. Dashed area – siltstones; white area – claystones; black lenses – ferritic and carbonatic oolites; multiform bars – volcanic products. Right – An "average" outline of shells of *Aegiromena* sp. during their growth in various horizons. Scale in millimetres. The measured characters involve the valve width, length, the angle between the front margin and the cardinal margin, and (if appropriate) the length of the "ear". Except the youngest occurrence, the average outline was constructed form data obtained from dozens of individuals.

low. *Aegiromena* is known from the Upper Ordovician of the peri-Gondwanan region, with most representatives found in the Praha Basin (e. g., Havlíček 1967). In the case of *Aegiromena*, the length/prolongation of the cardinal margin by sharp marginal "ears" can be regarded an "understandable character" which can be observed and interpreted in terms of evolutionary plasticity/rigidity. The prolonged cardinal margin was selectively advantageous on silty to carbonate/silty bottoms (classical softgrounds passing rather to firmgrounds than to "soupgrounds"), where it functioned as an anchor of the valve keeping it in an appropriate orientation towards waves and currents. On the contrary, on very soft (clayey) substrates, the prolonged cardinal margin could not work as an anchor; it probably even increased the probability that the specimen will appear at a wrong position in the sediment. The character of the bottom can be reconstructed from the petrographical composition of the rock. The paleogeographical aspect cannot be discussed herein at large. In brief, *Aegiromena* is rather a highly provincial form, and it cannot be expected that the changes of its populations during the geological time were highly influenced by faunal migrations or by paleogeographic changes (e. g., the principle of geodispersal). For the classification of *Aegiromena* on a specific level (however complex and sometimes subjective) see Havlíček (1967) and Mikuláš (1996).

The results are summarized in Figure 44. A simplified geological section (Fig. 44, left) shows that during the time of existence of the studied evolutionary line the marine basin was filled chiefly with clay or silt material, with three incursions of carbonatic/ferritic oolites. Silts and oolites represented firmer bottoms, whereas the clayey bottoms may have been close to "soupgrounds".In the study area, representatives of *Aegiromena* first appeared on silty or even silty/sandy substrates of the Letná Formation (underlying the Vinice Fm. shown in Fig. 44), already bearing a prolonged cardinal margin and sharp (but not "prominent", "long") ears. The Vinice Formation is composed chiefly clayey shales with silty admixture; its degree of mixing by in-fauna is usually low, and, therefore, it can be understood as "average" substrate from the "point of view" of *Aegiromena*. Silts of the overlying Zahořany Formation hosted the best-developed "long-margin" populations. The first prominent incursion of fine clays (on top of the Zahořany Formation) corresponded to a shortening of the cardinal margin. The subsequent return to the relatively firm bottom (base of the Bohdalec Fm.) was marked by the return of rather long-margin, sharp-ear forms of *Aegiromena*. In the history of the evolutionary line, it was, however, the last return to this shell shape. Further incursions of firmer bottoms induced only a negligible prolongation of the cardinal line and sharpness of the ears. *Aegiromena* disappeared from the fossil record before the end of the Ordovician, prior to the dramatic paleogeographical and climatic changes leading to the end-Ordovician mass extinction.

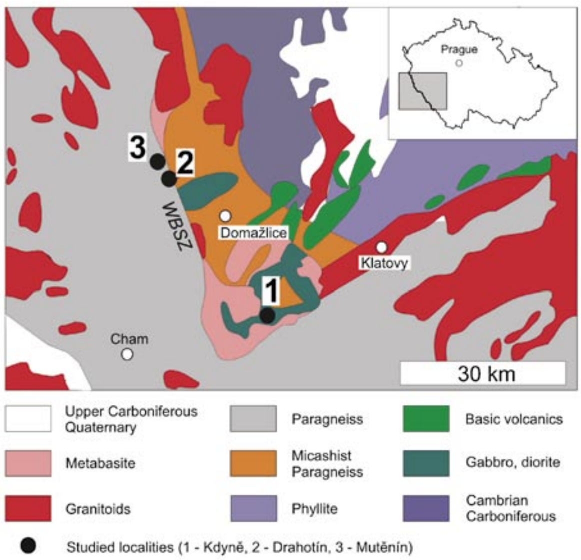
The presented results are in a good agreement with the idea of a "frozen evolution" of the genus *Aegiromena*, or, more precisely, it illustrates a gradual disappearance of the ability to respond to the environmental change by a selectively advantageous change in its morphology. Further evolution of *Aegiromena* (after its "freezing") brings very little news; only subtle changes in the size of adults, subtle and variable changes in the width/length ratio, and a changing variability of muscular imprints can be noted.

FLEGR J. (1998): On the "origin" of natural selection by means of speciation. – *Rivista di Biologia*, 91: 291–304.
FLEGR J. (2008): Frozen Evolution: Or, that's not the way it is, Mr. Darwin – Farewell to selfish gene. – BookSurge Publishing: 1–226. Praha.
HAVLÍČEK V. (1967): Brachiopoda of the Suborder Strophomenida in Czechoslovakia. – *Rozpravy Ústředního ústavu geologického*, 33: 1–226. Praha.
HAVLÍČEK V. (1977): Brachiopods of the order Orthida in Czechoslovakia. – *Rozpravy Ústředního ústavu geologického*, 44: 1–327. Praha.
MIKULÁŠ R. (1996): Upřesnění stratigrafického rozpětí některých zástupců rodu Aegiromena (Strophomenidina, Brachiopoda) v ordoviku Barrandienu. – *Zprávy o geologických výzkumech v roce 1995*: 128–130. Praha.

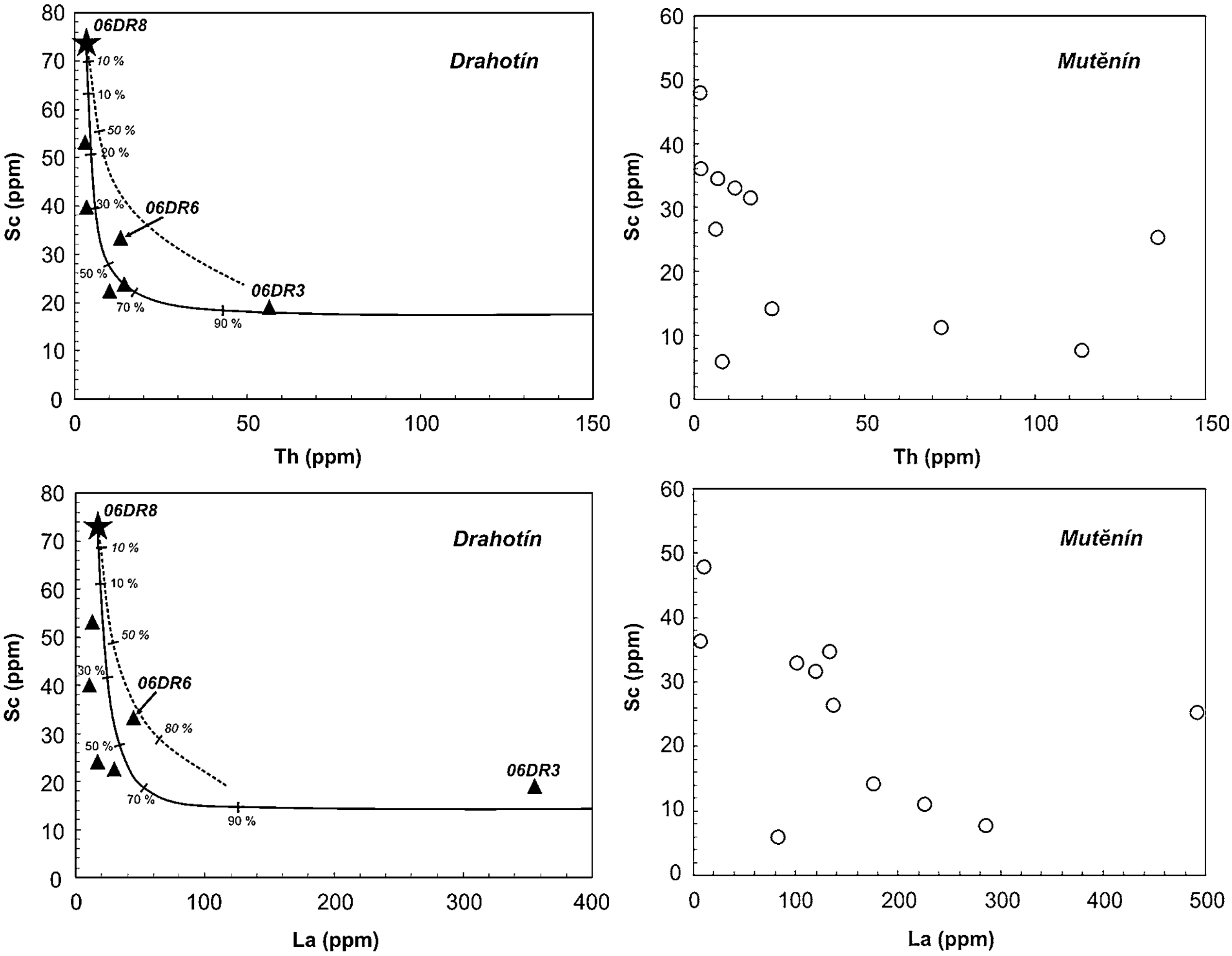
No. KJB300130612: **Platinum-group element geochemistry of strongly differentiated magmatic complexes: examples from the Bohemian Massif** (*L. Ackerman*)

The project was focused on complex geochemical study of highly fractionated magmatic complexes from Western Bohemia – Kdyně, Drahotín and Mutěnín intrusions (Fig. 45). Kdyně and Drahotín intrusions are formed by gabbroes, gabronorites and diorites (some of them are Fe-Ti-rich) and show layered structure. In contrast, Mutěnín intrusion has concentric shape comprised of Fe-Ti-rich alkaline diorites–syenites. Forty two samples in total were studied by means of optical microscopy, major and trace element geochemistry, Sr-Nd isotopic geochemistry and platinum-group element (PGE) geochemistry.

Major/trace element data and Sr-Nd isotopic geochemistry point to some similar signs between Mutěnín and Drahotín intrusions (trace element anomalies etc.) and, on the other hand, different position of the Kdyně intrusion. Trace element modelling using Th–Sc–La of most Drahotín rocks can be explain by assimilation-fractional crystallization process (AFC), where the



■ **Fig. 45.** Geological map of the studied area (Western Bohemia; modified after Cháb et al. 2007).

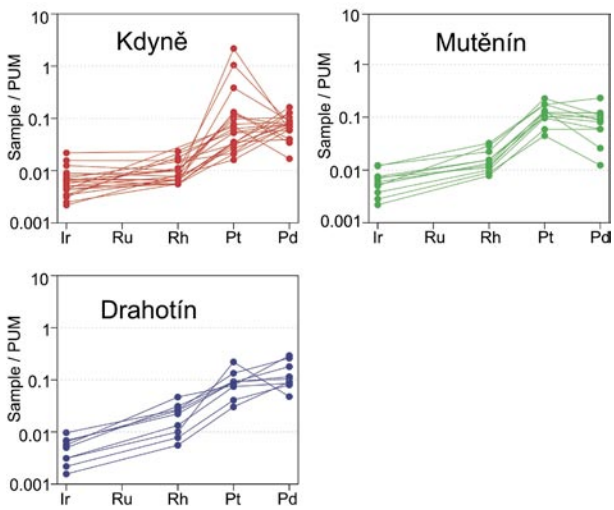


■ **Fig. 46.** Th and La vs Sc variations diagrams (after Ackerman et al. 2010). The fractional crystallization (FC; dashed line) and assimilation-fractional crystallization (AFC; solid line) trends are constructed for the Drahotín intrusion using the most primitive rock (06DR8; black star) as a parent composition and bulk continental crust (Rudnick & Gao 2003) as an assimilant.

most primitive gabbronorites represent parent magmas and continental crust represents the assimilant (Fig. 46).

In contrast, the Mutěnín intrusion is composed of two distinct rocks series which most likely represent two different parent magmas. Gabbronorites were formed from mantle-derived melts of basaltic composition with OIB-like signature whereas alkaline rocks (e. g., diorites, syenites) were derived from continental crust or enriched mantle. The Kdyně intrusion has a different age, and previously studies suggested also its different tectonic position. This was confirmed by our study and we suggest that most of the rocks were affected to different degrees by AFC process.

The PGE represent a powerful tool for magma fractionation mainly due to their high sulfide/silicate distribution coefficients. In spite of numerous PGE data from sulfur-saturated systems and upper mantle rocks, there is only a limited dataset from basaltic rocks and their plutonic equivalents (e. g., gabbros, diorites). Such data are necessary to explain the behavior of the PGE during sulfur-undersaturated magma differentiation. All rocks have very low PGE contents (∑ PGE < 8 ppb) and show I-PGE (Ir, Ru) mantle-normalized depleted PGE patterns ($Pd/Ir_N = 3.9–58.7$) with positive Pt anomalies (Fig. 47).



■ **Fig. 47.** PGE patterns of the Kdyně, Drahotín and Mutěnín rocks normalized to primitive upper mantle.

This is most probably due to low sulfur contents of these intrusions. If we exclude samples with very high Pt contents, gabbro-diorite rocks from Kdyně and Drahotín have lower average Pt/Pd ratios (1.9–2.1) comparing to Mutěnín intrusion (3.4), but similar very high Cu/Pd ratios (21,000–278,000). PGE do not correlate between each other, but general correlation between Ir and Pt exists in the Mutěnín and Drahotín intrusions.

All the above described features most probably point to sulfur-undersaturated conditions during which magma was emplaced and fractionated (i. e., sulfides retain in the source) and/or early sulfide fractionation. This is also supported by the negative correlation between Pt/Pt* and Pd/Ir. It can be seen from our data that during fractionation of sulfur-undersaturated magma, P–PGE (Pd, Pt) behave incompatibly, whereas I-PGE (Ir, Ru) behave compatibly. The PGE show uniform and depleted distribution in all studied rocks from the Drahotín, Mutěnín and Kdyně intrusions. However, concentrations of platinum show large differences most likely reflecting the presence of Pt-nanonuggets in the studied rocks. Unique Re–Os isotopic analyses of the massive sulphides from Ransko ultrabasic-basic massif and other ultramafic rocks were accomplished. The Os-model ages (TMA) of the Ransko massif range from 485 to 646 Ma, suggesting Proterozoic to Early Paleozoic formation of the Ni–Cu–PGE mineralization.

RUDNICK R.L. & GAO S. (2003): Composition of continental crust. – In: RUDNICK R.L. (Ed.): *Treatise in Geochemistry*, 3 – The Crust: 1–64. Elsevier Pergamon.

No. KJB300130613: **Integrated biostratigraphy of the Lower Devonian of Central Bohemia matched against magnetic susceptibility and gamma-ray logs in outcrops** (Project Leader: *L. Slavík*)

Subproject: **Towards the correlation of the Lochkovian of the Požáry section** (*L. Slavík*, P. Carls, Institut für Umweltgeologie, Technische Universität Braunschweig, Germany, *J. Hladil*, *L. Koptíková* & *M. Chadima*)

We present conodont data from the late Lochkovian in the sections of Požáry Quarries, GPS location: N 50°01.720; E 14°19.449) supplemented with the GRS and MS logs. In total, 70 conodont samples were taken in Požár 3 (active quarry), where 77 m of Lochkovian beds provide a succession of undisturbed continuity, with good conditions for current MS–GRS–CH studies. The lower boundary of the Lochkov Formation is, however, covered. The combination of obtained conodont data from the upper Lochkovian in two parallel sections at Požáry quarries (Požár 1–2 and Požár 3), supplemented with MS–GRS curves is shown in Figure 48.

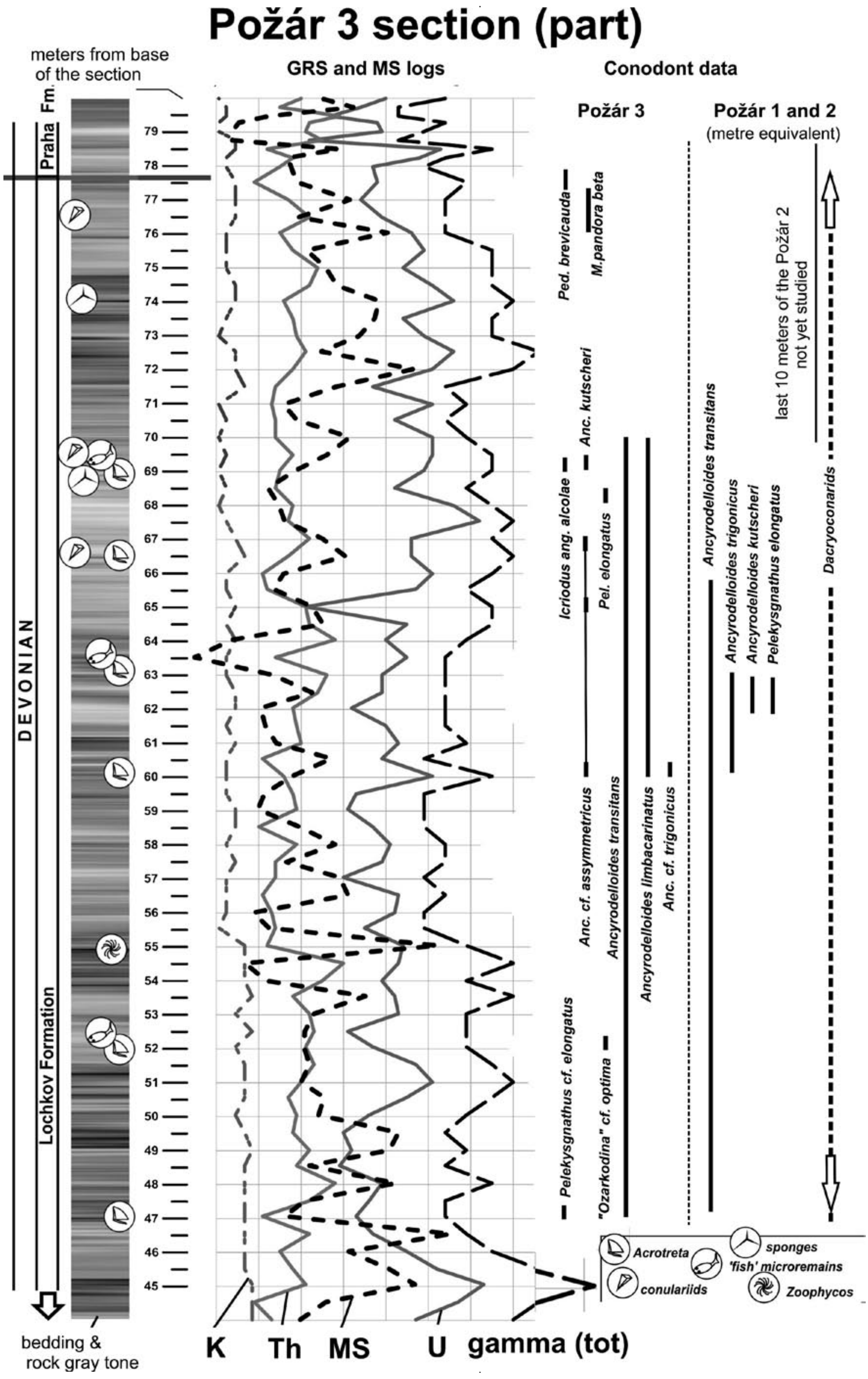
Detailed biostratigraphic study and comparison of the MS–GRS logs revealed that the Lochkovian section in Požár 3 is not entire but starts approximately 5 m above the Silurian/Devonian boundary; the boundary is well exposed in neighborhood section (Požár 1). In the Požár 3, *Ancyrodelloides transitans* was recorded at 47 m, and it well corresponds to its entry in the neighboring section Požár 1. At 60 m, *Anc. limbacarinatus* enters together with *Anc. assymmetricus* and *Ancyrodelloides* cf. *trigonicus*. The entry of the latter concurs with the appearance of *Anc. trigonicus* in Požár 1. A small discrepancy between both sections is seen only in entries of the *Ancyrodelloides kutscheri*; it may be caused by relatively scarce occurrence of this “experimental taxon”. A typical end-Lochkovian *Mas. pandora* beta occurs at the very end of the Požár 3 section. Among stratigraphically important taxa also occur *Icriodus ang. alcolae*, *Pelekysgnathus elongatus*, *Wurmiella tuma* and *Pedavis brevicauda*.

The conodont faunas from the Požáry Quarries include a number of index taxa and other important guiding conodonts supporting the global Lochkovian correlation suggested by Valenzuela-Ríos & Murphy (1997). They indicate, however, a large proportional discrepancy between suggested global zonation and the conodont record in the latest Lochkovian in the Barrandian area. The unusually high occurrence of the supposedly ‘middle Lochkovian’ *Ancyrodelloides* group thus substantially reduces space for the definition of the upper Lochkovian in the stratotype area.

Final report: **Integrated biostratigraphy of the Lower Devonian of Central Bohemia matched against magnetic susceptibility and gamma-ray logs in outcrops** (*L. Slavík*, *J. Hladil* & *L. Koptíková*, in cooperation with P. Carls, Institut für Umweltgeologie, Technische Universität Braunschweig, Germany)

A detailed stratigraphic correlation scheme of the Lower Devonian was developed for the Barrandian. Lochkovian and Pragian are now among the best elaborated Stages regarding stratigraphy in global scale; they provide a valuable source of complex data.

Aims of the project and problem setting. In 2006 we launched a 3-year project 'Integrated stratigraphy of the Lower Devonian in the Barrandian area'. Its initial aim was to fill ‘blank spots’ in the early Devonian stratigraphy of the stratotype area of traditional stages (Lochkovian, Pragian) and regional substages (Zlichovian and Dalejan). The major stimulus was a great demand for 'fresh' stratigraphic data in the Devonian, because of many pending problems in stratigraphic correlation: The major complications were in coverage and processing (quality) of data and resulting stratigraphic information in many regions (e. g., poor elaboration of biozonations and insufficiency of additional underpinning stratigraphic tools – as high-resolution geophysical and geochemical records from the entire thicknesses of Devonian sedimentary sequences worldwide). The same troubles also apply to numerical early Devonian calibration where discrepancies between relative duration of Devonian stages based on successive evolutionary steps (e. g., Carls 1999) and known radiometric ages (e. g., Kaufmann 2006) are extensive. The proposed time-spans for stages vary enormously in different concepts and the placement of the GSSP for the Pragian/Emsian boundary reduces Pragian so drastically that it precludes reliable early Devonian calibration. Furthermore, radiometric data in most cases lack reliable biostratigraphic information from the vicinity of respective K-bentonite layers and therefore corresponding deviation in floating biostratigraphic framework can be even up to 5 Ma. In these conditions, for better orientation in time is necessary to use guiding fossils with wide inter-regional occurrence (cosmopolitan taxa at the best) as relative time marks and correlate them across world areas using multiple controll from other faunas and geochemical records. Because, using only a single



■ **Fig. 48.** Conodont data from the upper part of the Lochkovian of the sections Požár 1, 2 and Požár 3 quarries supplemented with GRS and MS logs, the MS values averaged to 0.5 m steps of the field gamma-ray spectrometric measurements. A gray scale transformation using linear sealing in a range of gray tones from 0 to 255 was applied to rock-tone log (normalization; modified after Slavík et al. 2007).

data source for stratigraphic correlation, a possibility of distortion of information (e. g., perturbation in physical data processing, different taxonomical approach and possible human factor failure, etc.) cannot be neglected. Accordingly, employment of multiple tools for time correlation was necessary.

In order to enhance the capacity of the key region for the global stratigraphic correlation and to increase the prospective robustness of high-resolution correlation methods we worked in two main directions: (1) refinement of biostratigraphic framework and (2) acquisition of data from magnetic-susceptibility, gamma-ray spectrometric and geochemical (MS–GRS-CH) 'logging of outcrops' and interpretation of these geochemical and geophysical records.

The main objective of the project was the arrangement of biostratigraphic data in combination with these records into the main composite section through the Lower Devonian of the Barrandian in terms of integrated stratigraphy.

Biostratigraphical refinements. In the frame of the project a detailed biostratigraphic subdivision of the Lochkovian and Pragian in the Barrandian area was developed, and charts of correlation for the Lochkovian and Pragian with integration of all available data were established.

The Lochkovian in the Praha Synform (PS) is subdivided into three parts: the lower, the middle and the upper, which are further refined and subdivided into (three or four) small-scale units using the binominal system (it is not a ancestor-descendent sequence). The boundaries between units of both orders well correspond to the boundaries between distinct parts of depositional sequences in the Požáry sections (Požár 1–2 and 3 is a standard for biostratigraphic correlation of the Lochkovian in the Praha Synform).

We chiefly follow the initial three-fold subdivision of the Lochkovian proposed by Valenzuela-Rios & Murphy (1997) that was subsequently improved by Murphy & Valenzuela-Rios (1999). The proportional discrepancy is seen in the upper parts of the proposed scale. The upper interval, characterized by the entry of *Masaraella pandora* beta, is proportionally very short and forms less than 10 % of the Lochkovian succession. The same situation can be observed also in other sections (e. g., Čertovy schody, Branžovy quarries), where the last taxa of *Ancyrodelloides* disappear close below the base of the Praha Fm.

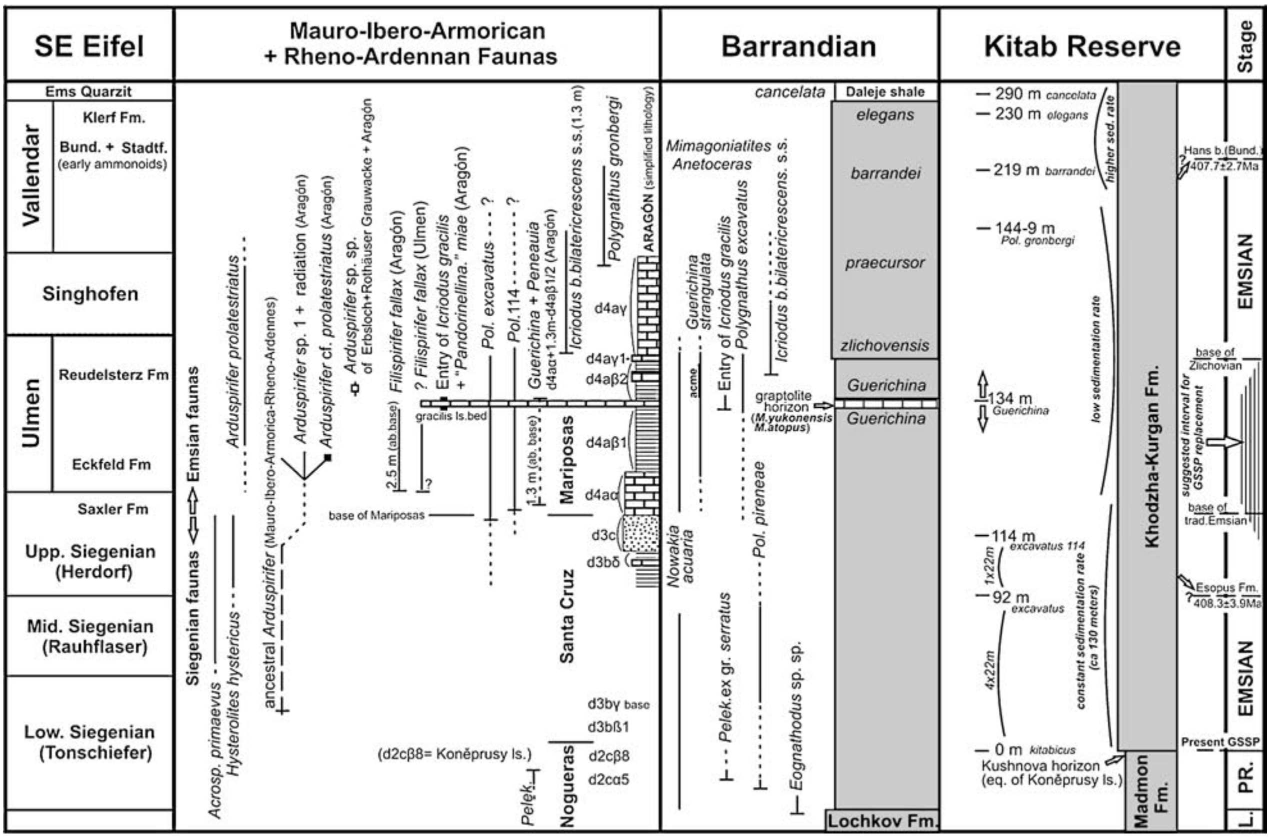
The lower part of the Lochkovian is characterized by the presence of substantial taxa that allow further subdivision in the PS: *Icriodus hesperius*, "*Ozarkodina*" *optima* and *Pedavis breviramus*. Slightly above the middle part (origin of *Lanea*) appears *A. carlsi* which entry correlates with unit d1c-gamma in Celtiberia; within the range of *A. carlsi* is traced the origin of dacryoconarids. In the middle part also enters *L. eoeleanorae*, followed by *A. transitans* and *A. trigonicus*. Due to relative scarcity of *Lanea*, *L. eleanorae* has not yet been found in the PS. The upper Lochkovian in the PS represents a very short interval already without *Ancyrodelloides*; it is characterized by the entry of *M. pandora* beta and the uppermost Lochkovian unit starts with the appearance of *Pedavis brevicauda*, close below the base of the Praha Fm (see Fig. 51).

Conodonts in the Praha Fm. are relatively scarce and most species are largely confined to peri-Gondwana. The Pragian in the original sense (= Praha Formation) in the PS is subdivided into three parts (the lower, the middle and the upper), that are characterized by conodont biozones (*steinachensis beta – brunsvicensis, brunsvicensis – celtibericus and celtibericus – gracilis*).

The complication between GSSP-concept of the Pragian and the original Pragian in its type area based on Praha Fm. lead us to detailed stratigraphic correlation of the traditional Lower Emsian boundary, that was based on Mauro–Ibero–Armorican and Rheno–Ardennan benthic and pelagic faunas (Fig. 49). This study revealed remarkable time discrepancy between the level of the present international standard and the real position of the traditional boundary. The time difference estimated is between 4 to 5 Ma and it causes serious problems in stratigraphic correlation with negative effect on precision of the Geological time Scale (GTS). As a consequence, underlying Pragian Stage is so drastically reduced, so that it hardly qualifies as a stage; duration of the Emsian is inadequately long. Accordingly, international team of stratigraphers submitted proposal addressed to the International Subcommission on Devonian Stratigraphy (SDS/IUGS) for redefinition of the global stratotype and delimited interval in the stratotype section (Zinzilban section, Kitab State Reserve, Uzbekistan). This interval is more suitable for the new boundary after redefinition that would comply with traditional concept and meaning of the Devonian stages. At the international meeting of the Subcommission on Devonian Stratigraphy, the international team succeeded in convincing a wide community of specialists and a general consensus has been achieved that the redefinition of the GSSP is inevitable.

Conodont stratigraphy of the Zlichovian is still very complicated due to difficulties with the Pragian/Emsian GSSP and different taxonomical concepts of index taxa; it is a subject of further studies and international discussion. The upper Emsian (Dalejan) conodont biozonation in the sense of Klapper (1977) remains unchanged.

Main result from geochemical, geophysical and mineralogical studies. The Lochkovian is dominated by blackish-gray rhythmites with silica, phosphate and organic matter. On the other hand, the Pragian limestones are variegated (ammonitico-rosso type), with frequent hiatuses and occurrences of "white" reefs. Fine-bedded (amalgamated) yellowish-gray, pinkish and purple deposits contain recycled and submarine-weathered material. Cements are much reduced with increasing depth and distance from islands; the typical highly polydisperse particle/grain-size distributions are tri- to tetramodal. Abundances of graptolites, marine plankton, siliceous sponges and conodonts dropped down (opposite to cephalopods and tentaculitoids). The partial restoration of "fresh-bioclast/lithoclast-fed" turbidite systems occurred in Zlichovian (dark gray, shale band rhythmites, with channelized breccia flows above the base, silica, organic matter and phosphate). The remarkable difference of the classical Pragian from the underlying and overlying sequences was confirmed by results of high-resolution outcrop logging: high Th/U ratios (4.0 – GRS, 2.5 – INAA) (x10, x5, compared to Lochkovian) and high magnetic susceptibility values (x4). K, Al, and almost all lithofile element concentrations are elevated by 200–300 %. Hematite and iron oxyhydroxides occur instead of pyrrhotite–pyrite. Concentrations of LREE are apparently more increased than those of HREE (remineralization effects). These



■ **Fig. 49.** Simplified inter-regional correlation scheme showing the distribution of cosmopolitan taxa and vertical arrangement of lithostratigraphic units. The relative position of important levels in relation to the present basal Emsian GSSP is marked on the right. The vertical extensions of lithostratigraphic units and taxon ranges are not to scale, but are "zoomed up" near the traditional base of the Emsian. The measured radiometric ages from the basal Esopus and from Bundenbach Hans Bed are too close to each other; they should differ by about 2.5 to 3 Ma (after Carls et al. 2008).

overall characteristics of the Pragian are far more important – similar hiatuses occur in the Appalachian basin or E Australia, and analogous facies features occur worldwide (e. g., Carnic Alps, Asturia).

The environmental synthesis strongly suggests that the Pragian was a period of extremely low sea level and quite effective mixing/oxygenation of ocean water. Considering the intense chemical weathering, the terrestrial climates should be interpreted as "hot and humid", at least in comparison with Lochkovian and Early Emsian conditions. Such a "hot climate" concept may also fit the slow deposition of "red dacryoconarid (pteropod-like) oozes", rapid increase of faunal diversity in shallow subtidal habitats and boom of bioeroders. The long-term sea-level low (emerged land) is consistent with increased terrigenous flux.

CARLS P. (1999): El Devónico de Celtiberia y sus fósiles. – *In*: J.A. GÓMEZ VINTANED & E. LIÑÁN (Eds.): *VI Jornadas Aragonesas de Paleontología*: 101–164. Institución Fernando el Católico, Zaragoza.

KAUFMANN B. (2006): Calibrating the Devonian Time Scale: A synthesis of U-Pb ID-TMS ages and conodont stratigraphy. – *Earth-Science Reviews*, 76, 175–190.

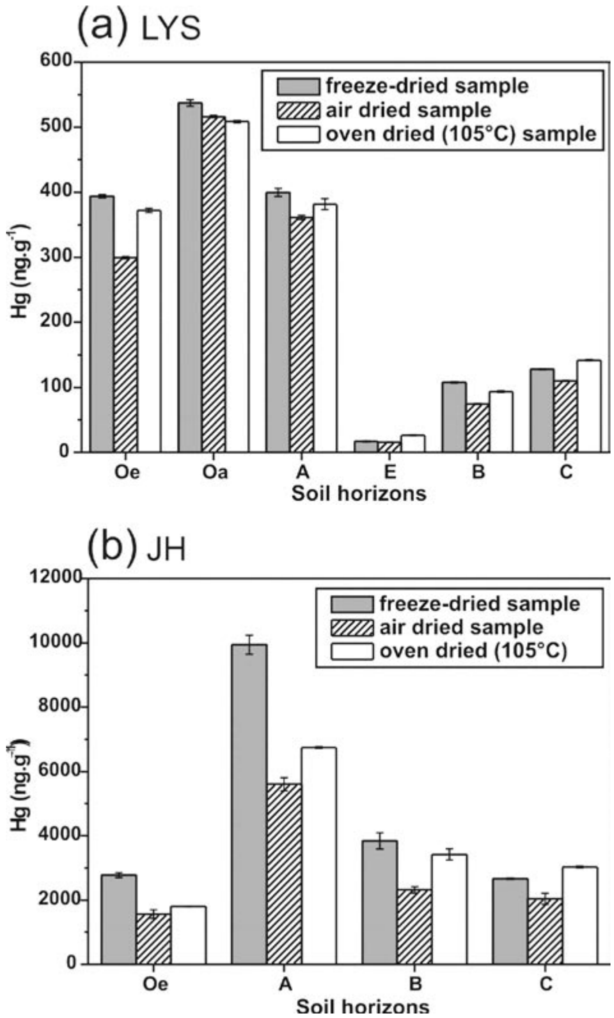
KLAPPER G. (1977): Lower and Middle Devonian conodont sequence in central Nevada; with contributions by Johnson, D.B. – *In*: MURPHY M.A., BERRY W.B.N. & SANDBERG C.A. (Eds.) Western North America Devonian. *University of California, Riverside Campus Museum Contributions*, 4: 33–54. Riverside.

MURPHY M.A. & VALENZUELA-RIOS J.I. (1999): *Lanea* new genus, lineage of Early Devonian conodonts. – *Bolletino della Società Paleontologica Italiana*, 37, 2/3: 321–334.

VALENZUELA-RIOS J.I. & MURPHY M.A. (1997): A new zonation of middle Lochkovian (Lower Devonian) conodonts and evolution of *Flajsella* n. gen. (Conodonta). – *In*: KLAPPER G., MURPHY M.A. & TALENT J.A. (Eds.): Paleozoic Sequence Stratigraphy, Biostratigrphy and Biogeography, Studies in Honor of J. Granville ("Jess") Johnson. Boulder, Colorado, *Geological Society of America, Special Paper*, 321: 131–144.

No. KJB300130615: **Mercury distribution and speciation in soils at three contrasting sites: a comparative study** (*M. Hojdová*, *T. Navrátil*, *J. Rohovec*, *J. Špičková* & *I. Dobešová*)

Within the scope of the grant project, soils from sites with different levels of Hg pollution in topsoil horizons were analyzed. Waste materials from historic Hg mining area were studied as well. Analysis of total Hg was performed by the



■ **Fig. 50.** Mercury concentrations in soils treated with different drying methods.

CV–AAS (AMA–254), Hg speciation by means of thermo-desorption analysis (TDA).

Mercury concentrations in soil of the Lesní potok catchment (LP), situated in the region with the elevated Hg concentration in litter horizons, were compared with the reference catchment Na Lizu (LIZ). The highest total Hg concentrations were found in the topsoil horizons at both sites. The concentrations in topsoil horizons of reference catchment were significantly lower than these at LP catchment (558 $ng.g^{-1}$ and 679 $ng.g^{-1}$, respectively). In mineral horizons of reference catchment the concentrations were higher. This could by related to higher content of organic carbon or higher pH in mineral horizons at the reference catchment. Thermo-desorption analysis revealed that majority of the Hg in forest soils was bound to organic matter, which was decomposed at ~400 °C. Minor part of Hg was bound to clay minerals and/or Fe-oxyhydroxides.

The studied mine wastes collected near the Hg mines were highly elevated in total Hg concentration (up to 120 $\mu g.g^{-1}$). The waste material contained mostly cinnabar (>80 %), that is relatively stable in soils and thus resistant to the formation of highly toxic methyl-Hg. Nevertheless minor part (<14 %) of total Hg was identified as mineral surface bound Hg, which might undergo methylation processes and thus it represents potential long-term environmental risk.

Soils contaminated by mercury mining were studied in detail in the final stage of the project. Higher Hg concentrations in subsurface (Ah) horizons relative to those in organic horizons were found in all studied soils. This may evidence recent declines in Hg deposition, although other matrix effects could contribute to these results. In comparison to waste material, the proportion of HgS in soils was smaller (60–80 %). In the soils low impacted by mining, HgS occurred only in the Ah horizon, which may reflect cinnabar fine particles spread at the site during historical mining or ore processing.

Moreover, different drying methods (freeze-drying, air- and 105 °C oven-drying) were applied on soil samples and reference materials to assess the influence of sample pretreatment on total Hg concentration. Soils contaminated by mercury mining showed higher Hg concentrations in freeze-dried samples in organic horizons. Nevertheless different drying showed only little influence on the total Hg concentrations in solid samples (Fig. 50). Thus any one of these three comparable methods can be used.

The project has extended the present knowledge of mercury contamination of soils in the Czech Republic. Method of thermo-desorption analysis in combination with ICP-OES was used to identify Hg species in solid samples.

No. KJB307020602: **The effect of the Basal Chotec Event on faunistic communities of the Praha Basin** (Project Leader: S. Berkyová & J. Frýda, Czech Geological Survey, Praha, Czech Republic; L. Koptíková, L. Slavík & J. Hladil)

Processing of data from combined magnetic-susceptibility (MS) and gamma-ray spectrometric logs (GRS) continue on three localities – Prastav Quarry near Praha-Holyně, Na Škrábku Quarry near Choteč and Červený Quarry near Suchomasty. Raw plotted data and patterns from the Prastav and Červený quarries (published in 2006) show very good relation to the Lower/Middle Devonian GSSP in Schönecken-Wetteldorf in Germany. This pattern consists of depression on both MS and GRS magnitudes and amplitudes close to the base of the first event related beds. This drop of these values is followed by a long elevation on the MS values. The point of reversal of GRS Th/U ratio is the second important well correlative marker (from values >>1 in the underlying Třebotov Limestone and their stratigraphic equivalents Suchomasty Limestone to those which are <<1 in the overlying Choteč Limestone as well as in the Acanthopyge Limestone). This change most likely reflected the reduced delivery of atmospheric dust and the change from deeply oxygenated water to stratified seawater (on slopes of these semi-closed oceanic basins). Also joint Th & U GRS maxima mark the event level and the position of GRS–U-peak is significant because it appears not only in thin bedded blackish Basal Choteč event beds in relatively deeper sections (Prastav Quarry, Na Škrábku Quarry) but also in shallow water section (Červený Quarry) where these sharp lithological changes and features are missing. Forty-element INAA analysis of selected samples from each section were carried out. REE distribution was track to recognize the source of input of impurities in sea water. The PAAS–Lu-normalized plots fit mainly to the aeolian type which was delivered subconstantly. Only sea water solution affects and modifies these patterns. Třebotov and Choteč as well as Suchomasty and Acanthopyge Limestone also show very similar ranges of all minor and trace elements and K/Al ratio stays significantly constant both through the syncline and sections (0.37).

The Basal Choteč event belongs to a group of significant extinction events in the Devonian period which is the period of great extinctions and radiations in geological history. Carbonate stratal succession in the Praha Basin (Synform) provide unique possibilities to study the environmental changes connected with this event interval. The results both on biotic and abiotic changes as synthesis of paleontological (conodont biostratigraphy), geochemical (carbonate and oxygen isotopic data, data on whole rock instrumental neutron activation analyses), lithological (data on microfacies carbonate analyses) and geophysical methods (magnetic susceptibility and gamma-ray spectrometric data) that have never been done before during more than 150 years of Praha Synform continuous investigation reveal understanding of the anatomy, possible causes and implications of this geological event (Koptíková et al. 2007, 2008; Berkyová et al. 2008; Berkyová S. & Frýda J. 2008).

The first event-related beds of the Basal Choteč event in the Praha Synform lies close above the Lower-Middle Devonian boundary (defined here by the first occurrence of the *Polygnathus costatus partitus*) and fall in the *Polygnathus costatus conodont* Zone (close to the base). Studied sections were selected considering the coverage facies changes both in shallow-water and deeper-water environments. Formal lithostratigraphic units also follow facies distribution and deeper-water facies in the southestern limb of the Praha Synform are represented by the transition of Třebotov Limestone to the Choteč Limestone whereas facies in the Koněprusy area far more to the southwest by transition between the Suchomasty Limestone and Acanthopyge Limestone as their shallow-water equivalents. Similar facies as in the Praha Synform and generally deposition of this event-related "dark-colored sediments" rich in planctonic and nektonic faunal forms suggesting suboxic or anoxic condition in bottom sediment has been world-widely documented from Germany (Thuringia, Rhenish Massif, Harz), France (Armorican Massif), Spain, Russia (Ural Mountains), Morocco or United States of America (Nevada). In total eight sections (Prastav Quarry near Praha–Holyně, Holyně, Na Škrábku Quarry near Choteč, Hostim–Na vyhlídce, Karlštejn–U Němců, Barrandov road cut, Jelínkův mlýn near Choteč and Červený Quarry near Suchomasty were examined.

Results on sedimentological characteristics (microfacies analysis). Lithological change at the event datum in deeper-water sections represents the onset of the Choteč Limestone as dark gray platy peloidal grainstones/packstones. The material of the Choteč Limestone consists of recycled calcisiltitic material delivered from shallow water environment (upper-slope and shallow subtidal environments) by gravity flows. The number of lithic and altered carbonate grains rapidly increased in comparison to the underlying Třebotov Limestone. The dark gray platy beds of grainstones/packstones (mostly crinoidal with scarce fragments of brachiopod or ostracod shells) interleaved the gray nodular limestones and 'shaly' sediments of bottom-current or hemipelagic origin. The beds with visible turbiditic Bouma sequences quasi-regularly alternate with compactites represented by the typical background pelagic sediments and drifted or washed sediments. The underlying Třebotov Limestone is represented by light gray highly bioturbated skeletal wackestones/packestones with high abundance of hemipelagic/pelagic material and high diversified faunas. These limesotnes were deposited below the storm wave base. In shallow-water equivalents the lithological change is not so sharp but also evident. Sedimentation of red and pale pink packstones/floatstones of the Suchomasty Limestones is replaced by the sedimentation of grayish floatstones/grainstones of the Acanthopyge Limestone. This increase in the activity of gravity flows is interpreted as the environmental change due to the rise of sea level but also local tectonics cannot be exluded because of beginningof tectonic movements connected with the Variscan orogeny.

Results on biostratigraphy (conodont stratigraphy). Biostratigraphic conodont zonation was established, updated or refined at all studied sections. Great attention was paid to the establishing of *Polygnathus costatus partitus* and *Polygnathus costatus costatus* conodont zones because of the importance of index species concerning the Lower–Middle Devonian boundary and the onset of event-related beds close to the *Polygnathus costatus costatus* zone. Taxonomic studies of conodonts have approved the presence of new faunistic features that have never been documented yet from these geological settings. The manuscript on new species description is in progress now. General decrease in the benthic forms diversity is documented e. g. more than 50 % of trilobite taxons become extinct at the the event base and paleoyzgopleurid gastropod become extinct completely (see also Frýda et al. 2008; Frýda & Blodgett 2008; Frýda et al. (2008); Frýda & Berkyová 2008).

In cooperation with the University of Graz, a comparison was made of the Lower–Middle Devonian boundary beds and the Basal Choteč event-related beds in the Praha Synform and in Graz Paleozoic Window in Carnic Alps based on the biostratigraphic, lithological, geochemical as well as geophysical parameters (see Suttner et al. 2008*)*.

Results on geochemical parametres (instrumental neutron activation analyses, C and O isotopic analyses and organic C analyses). Instrumental neutron activation analyses (INAA) at three sections (Prastav Quarry, Na Škrábku Quarry and Červený Quarry) were used to track the general trends in the contents of Fe, Al, K, minor and trace elements as well as rare earth elements (REE) separately. An increasing trend in the K and Fe content (0.32. and 0.24 wt. % K, 0.42 and 0.32 wt. % Fe) is visible according to the relative depth of limestones in the deeper-water sections (Prastav Quarry represents the relatively deeper-water section and has higher contents both in K and Fe than the Na Škrábku Quarry). Shallow-water section (Červený Quarry) has lower concentrations (0.10 wt. % K and 0.22 wt. % Fe). Relative proportions of contents of trace and minor elements including REE through the Basal Choteč event interval (the transition between the Třebotov Limestone to the Choteč Limestone and their shallow-water equivalents) keep on the same rate. REE distribution of PAAS–Lu-normalized data were used to determine the source of impurities in carbonates. Pattern for the atmospheric source of input as an aolian dust is the most fitting for all these studied sections. Sea water solutes and re-mineralization patterns also occur and the riverine type of input is negligible.

From material of all eight sections carbon isotope curves were outlined and data were correlated to each other. The significant negative excursion was revealed and it coincides with the first occurrence of *Polygnathus costatus partitus* species. This has potential to be become a tool for interregional or correlation in global scale.

At two sections, O isotopes in conodont elements apatite were investigated. Negative excursion in isotopic content at the base of *Polygnathus costatus costatus* zone supports the hypothesis of transgressive character of the basal Choteč event and the position of maximum flood at this level.

At three sections, organic carbon (TOC) analyses provided the information on the carbon content in the studied Choteč Limestone which is very low. Palynomorphic analysis revealed the presence of intervals rich in marine phytoplankton especially in large prasinophytae algae with thick walls. These levels represent the eutrophication levels which caused the massive depletion in oxygen in water column and bottom dysoxia, and which consequently affected benthic faunas.

Results in geophysical parametres (magnetic susceptibility and gamma-ray spectrometric logs). The interval close before the main event level is marked by a clearly visible drop in magnetic susceptibility (MS) values, which is abruptly replaced by high and highly oscillating MS values (Fig. 51; Koptíková et al. 2007). This pattern is common to all studied sections. The drop before the event datum in the log from the shallow-water section in the Červený Quarry is missing due to obvious partial gaps in sedimentation.

During the stay in the U.S.A. in Nevada (SDS and IGCP 499 joint field meeting in 2007), two sections in Central Great Basin were sampled through the Lower–Middle Devonian boundary and also the basal Choteč event interval (Lone Mountain and Northern Antelope Range). The critical interval in the Lone Mountain section is represented by the transition between the McColley Canyon Formation (Pragian and Emsian with the Lower-Middle Devonian boundary) and the overlying Denay Limestone (Eifelian to Givetian). There is a correlative potential (at Lone Mountain section there is an analogous trend both in MS log shape and log segmentation) of the Praha Synform and the studied Nevada sections (Koptíková et al. 2008).

The measurements of natural remanent magnetization (NRM) of selected samples are indicative of the fact that the presence and distribution of ferromagnetic minerals fits the basic trends governing the MS curves. The structure of the MS markers (drop of MS values just before the event datum and increase above the event datum) as well as lithological or sequence markers of the Basal Choteč event seems to parallel to the others significant events in the Devonian period (e. g., the *otomari*-Kačák Event at the Eifelian/Givetian boundary or Frasnian/Famennian boundary in the Upper Devonian), where many authors suggest a visible deepening trend.

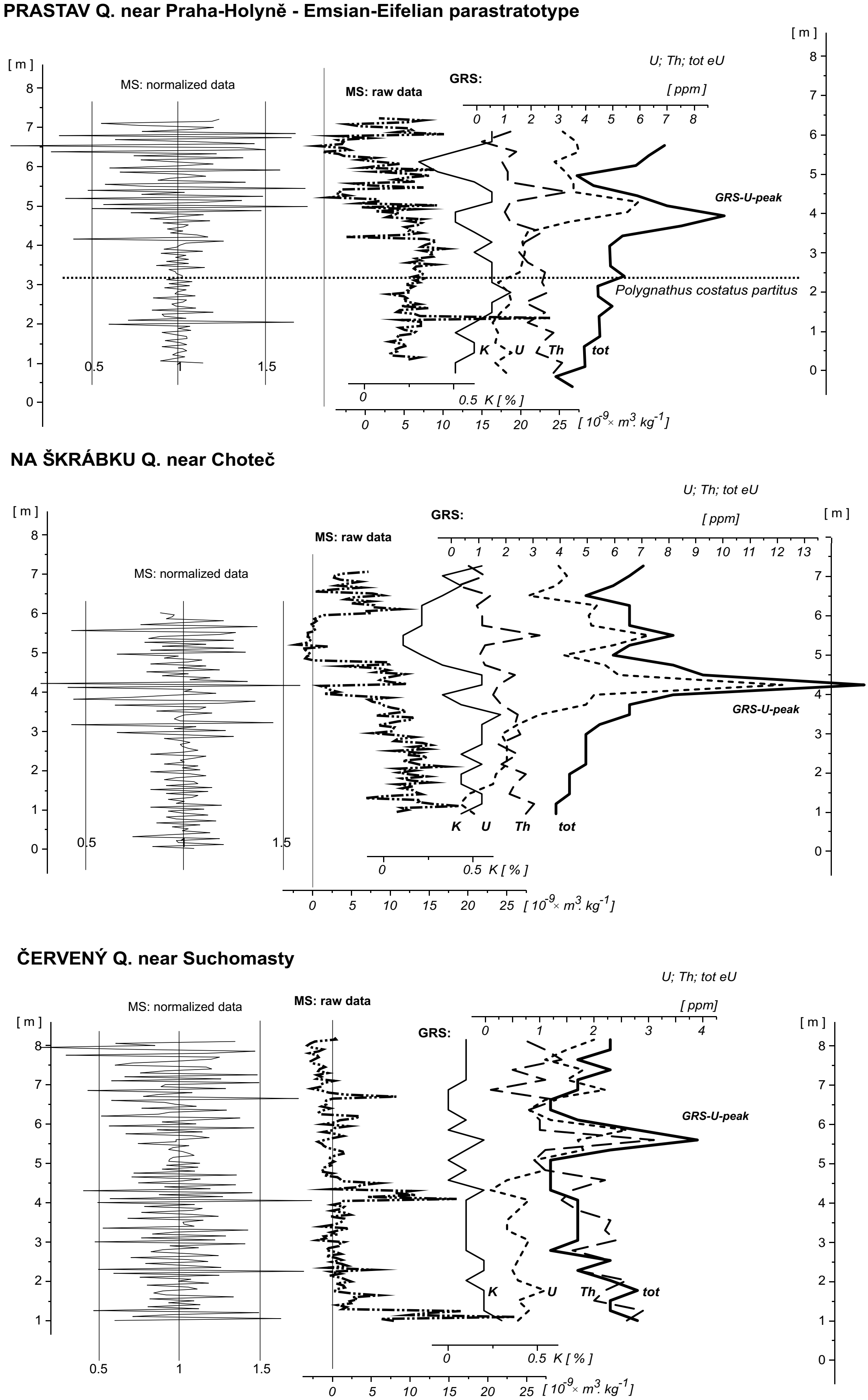
The very event-related beds are marked by an obvious change in the Th/U ratio (from Th/U>>1 to Th/U <<1; see Fig. 51; Koptikova et al. 2007). A significant GRS–U-peak at various distances from the event base (from 0.25 to 1.5 m above the event base) occurs in the Choteč Limestone

During the stay in Uzbekistan in the Kitab State Geological Reserve (SDS and IGCP 499 field meeting in 2008 and additional working time for Czech group of scientists), the Lower–Middle Devonian boundary and the Basal Choteč event interval were sampled for MS measurements. The results are in progress now.

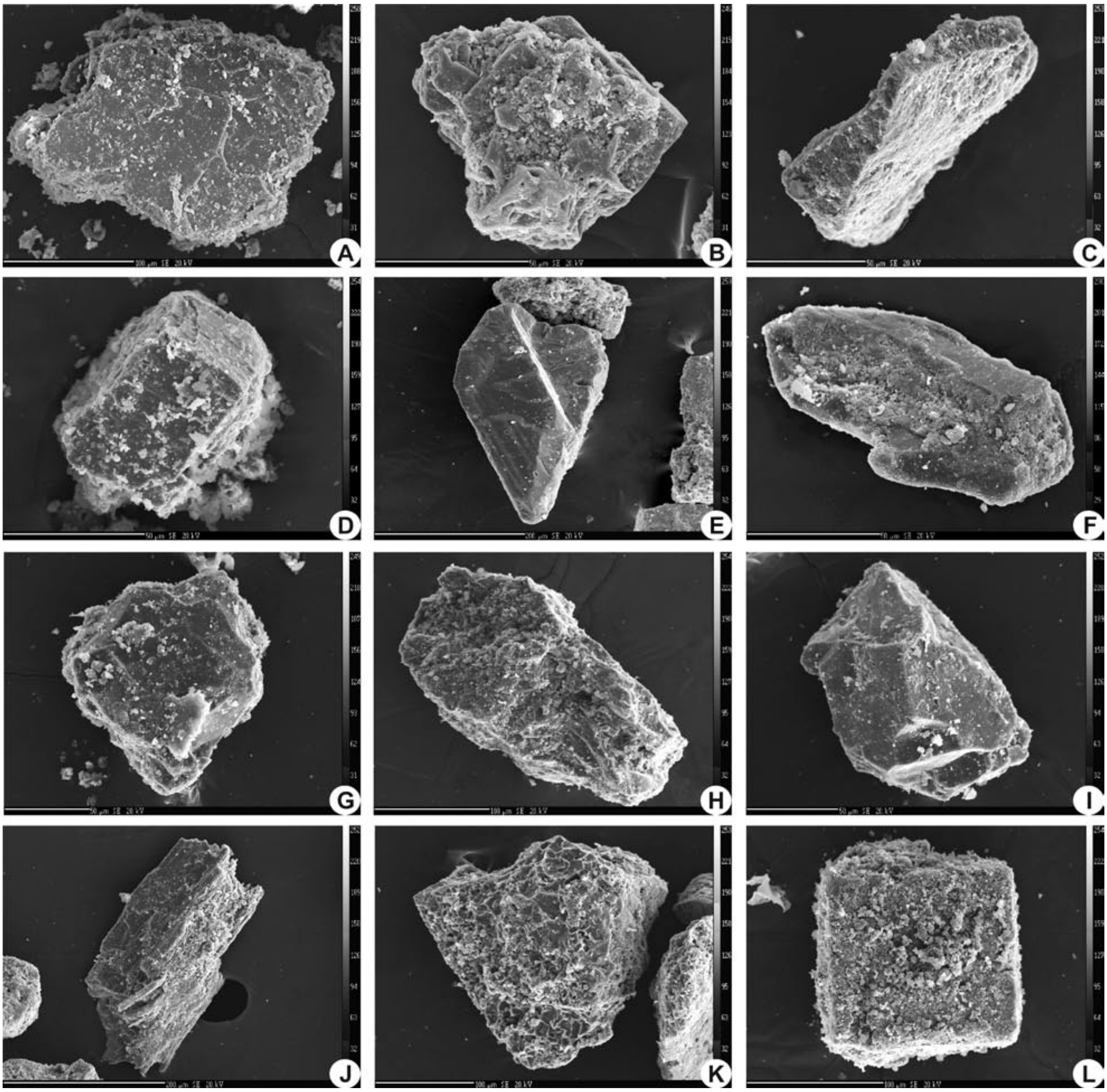
Results in mineralogical characteristics (mineral assemblages of insoluble residues). Data on insoluble residues from three sections (Prastav Quarry, Na Škrábku Quarry and Červený Quarry) were obtained from samples dissolved in acetic acid. The light and heavy mineral fractions (2.83 g.cm^{-3} limit) were analysed by means of EDX, X-ray diffraction and EMP techniques. The light fractions from all samples, i. e. also below and above the event datum or "dark beds and their equivalents", consist of crystalline–subcrystalline ultra-fine mineral mixtures, where aggregates of micrometer-sized particles, crystals and highly disordered precipitates or residues show an almost uniform elemental composition. This matrix of low-carbonate and non-carbonate, randomly distributed and aggregated phases occurs together with larger detrital particles/grains and crystals of diamagnetic, paramagnetic and ferromagnetic characteristics – e. g. quartz, muscovite, feldspars, clay minerals, chlorite etc (examples are given in Fig. 55). Elevated amounts of crystals and grains of authigenic barite, apatite and albite were regularly detected in a short interval above the Basal Choteč event datum together with the above mentioned GRS–U-peak. Apparently authigenic prismatic quartz crystals occur in this GRS–U-peak level. Fragments of apatite-rich diagenetic precipitates are very frequent at the level of the GRS–U-peak in the Prastav Quarry. A synchronous level from relatively shallower slope limestones in the Na Škrábku Quarry shows no presence of this diagenetic apatite, whereas the amounts of undetermined Fe oxides or oxyhydroxides are high (up to 80 wt. %). The lateral facies relationships are, however, far more complex. For example, beds overlying the main event-related dark beds in the Prastav Quarry (2.75 m above the event base) yielded higher amounts of barite than relatively shallower beds in the Na Škrábku Quarry, dominated by more proximal material. The heavy mineral assemblages are often dominated by pyrite (bipyramidal forms; often oxidized). Mineral grains of rutile and pyroxene (or amphibole) elemental compositions are present in several samples from the two above mentioned Barrandian sections (Fig. 52).

BERKYOVÁ S., FRÝDA J. & KOPTÍKOVÁ L. (2008): Environmental and biotic changes close to the Emsian/Eifelian boundary in the Praha Basin, Czech Republic: paleontological, geochemical and sedimentological approach. – *Global Alignments of Lower Devonian Carbonate and Clastic Sequences (IGCP 499 project/SDS joint field meeting): Contributions of International Conference. August 25 – September 3, 2008, Kitab State Geological Reserve, Uzbekistan (Eds. Kim A.I., Salimova F.A. & Meshchankina N.A.)*: 18-19. SealMag Press, Taskhent.

BERKYOVÁ S. & FRÝDA J. (2008): The Basal Choteč event in the Praha Basin, Czech Republic: paleontological, geochemical and sedimentological approach. – *Abstracts to the*



■ **Fig. 51.** MS and GRS logs through the Emsian/Eifelian boundary and the overlying stratal succession affected by the Basal Choteč event in three sections in Praha Synform: Prastav Quarry near Praha-Holyně (parastratotype to the Emsian/Eifelian stratotype in Eifel Hills in Schönecken–Wetteldorf, Germany), Na Škrábku Quarry near Choteč (type locality of the Eifelian Choteč Limestone) and Červený Quarry near Suchomasty in Koněprusy area (shallow-water stratigraphic equivalents to the stratal successions in the Prastav and Na Škrábku quarries).
The Basal Choteč Event interval is marked by a drop in MS values followed by high-amplitude and high-magnitude oscillations. GRS log at the event datum shows an abrupt reverse in Th/U ratio: from Th/U<<1 below the event base to the Th/U>>1 above the event base. At a distance of 0.25 to 1.25 m above the event base, note a significant GRS-U-peak which marks the maximum U content and can be interpreted as maximum flood during this transgressive event.



■ **Fig. 52.** SEM images of mineral assemblages in insoluble residues from the Basal Choteč Event interval at three Emsian–Eifelian sections in the Praha Synform (Prastav Quarry near Praha–Holyně, Na Škrábku Quarry near Choteč and Červený Quarry near Suchomasty). A–F – diamagnetic minerals; G–L – paramagnetic and undetermined Fe-oxides or oxyhydroxides as carriers of magnetic susceptibility. A – albite (Třebotov Limestone, Prastav Q.); B–C –apatite (Choteč Limestone, Prastav Q., from GRS–U-peak interval); D – barite (Choteč Limestone, Prastav Q.); E – quartz (Choteč Limestone, Na Škrábku Q., from GRS–U-peak interval); F – quartz (Červený Q., Acanthopyge Limestone, from GRS–U-peak interval); G–H – amphibole–pyroxene grain (Choteč Limestone, Prastav Q., from GRS–U-peak interval); I –amphibole–pyroxene grain (Třebotov Limestone, Na Škrábku Q.); J – amphibole–pyroxene grain (Choteč Limestone, Na Škrábku Q., from GRS–U-peak interval); K – Fe-oxide-oxyhydroxide (Choteč Limestone, Na Škrábku Q., from GRS–U-peak interval); L – Fe-oxide–oxyhydroxide (Choteč Limestone, Prastav Q.).

Palaeontological workshop held in honour of Doc. RNDr. Jaroslav Kraft, CSc.: 23–24. University opf West Bohemia. Plzeň).

FRÝDA J. & BERKYOVÁ S. (2008): Did planktotrophic strategy of modern gastropods originate in Devonian? – *Field workshop 2008 IGCP 499-UNESCO "Devonian Land-Sea Interaction, Evolution of Ecosystems and Climate" (DEVEC), 23.4.–30.4. 2008, Libyan Petroleum Institute, Abstracts*: 34–36. Tripoli.

FRÝDA J., FERROVÁ L., BERKYOVÁ S. & FRÝDOVÁ B. (2008): A new Early Devonian palaeozygopleurid gastropod from the Praha Basin (Bohemia) with notes on the phylogeny of the Loxonematoidea. – *Bulletin of Geosciences*, 83, 1: 93–100.

FRÝDA J. & BLODGETT R.B. (2008): Paleobiogeographic affinities of Emsian (late Early Devonian) gastropods from Farewell terrane (west-central Alaska). – *Geological Society of America, Special Paper*, 442 (The Terrane Puzzle: New Perspectives on Paleontology and Stratigraphy from the North American Cordillera): 107–120

FRÝDA J., BLODGETT R., LENZ A. & MANDA Š. (2008): New Porcellioidean gastropods from Early Devonian of Royal Creek area, Yukon Territory, Canada, with notes no their early phylogeny. – *Journal of Paleontology*, 82, 3: 595–603.

KOPTÍKOVÁ L., HLADIL, J., SLAVÍK L., FRÁNA J. (2007): The precise position and structure of the Basal Chotec Event: lithological, MS-and-GRS and geochemical characterisation of the Emsian-Eifelian carbonate stratal successions in the Praha Syncline (Tepla-Barrandian unit, central Europe). – In: OVER, D.J., MORROW, J. (Eds.) *Subcommission on Devonian Stratigraphy and IGCP 499 Devonian Land Sea Interaction, Eureka NV 9-17 Sep 2007, Program and Abstracts*: 55–57. State University of New York, Geneseo.

KOPTÍKOVÁ L., BERKYOVÁ S., HLADIL J., SLAVÍK L., SCHNABL P., FRÁNA J. & BÖHMOVÁ V. (2008): Long-distance correlation of Basal Choteč Event sections using magnetic susceptibility (Barrandian –vs– Nevada) and lateral and vertical variations in fine-grained non-carbonate mineral phases. – *Global Alignments of Lower Devonian Carbonate and Clastic Sequences (IGCP 499 project/SDS joint field meeting): Contributions of International Conference. August 25 – September 3, 2008, Kitab State Geological Reserve, Uzbekistan (Eds. Kim A.I., Salimova F.A. & Meshchankina N.A.)*: 60-62. SealMag Press, Taskhent.

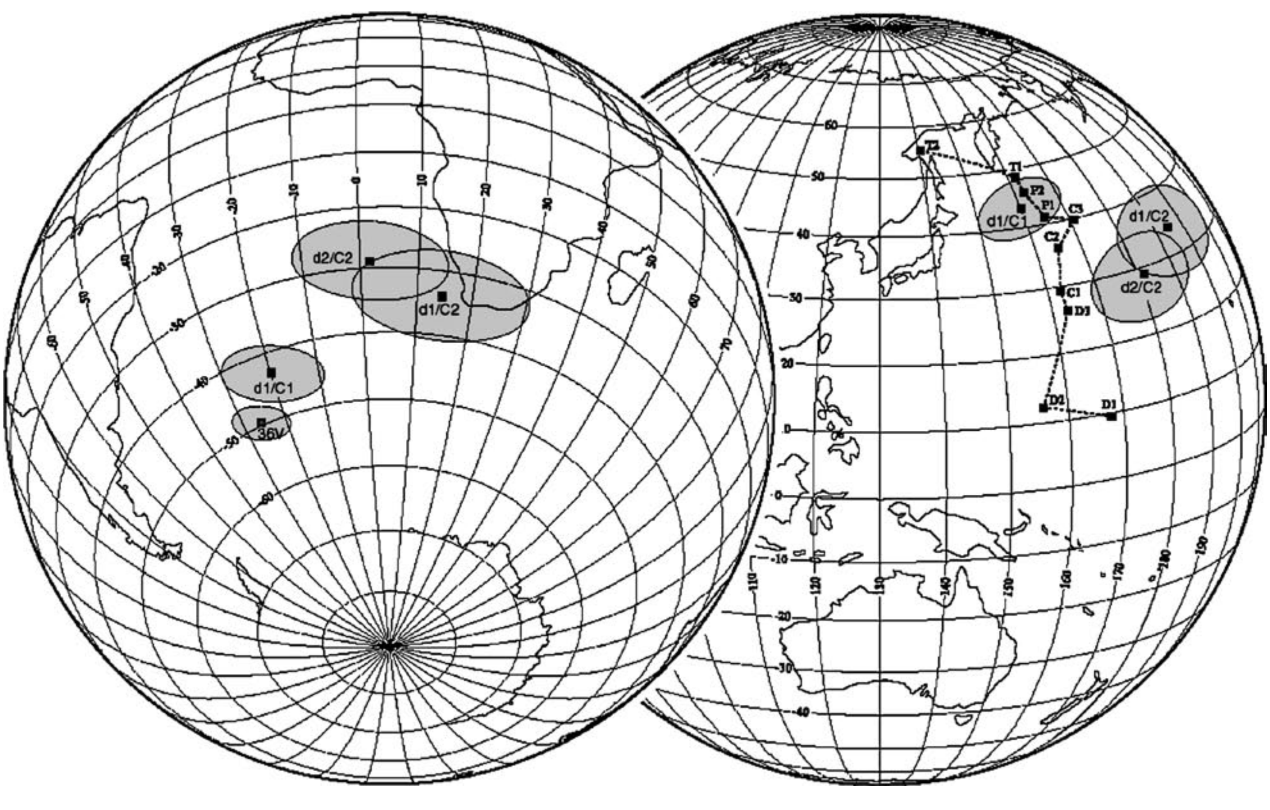
Continued projects

No. IAA3013406: **Structural and paleotectonic development of the Barrandian Praha Basin** (Project Leader: I, project co-leaders: R. Melichar, Faculty of Science, Masaryk University in Brno & P. Kraft, Faculty of Science, Charles University, Praha, *J. Hladil*, *P. Štorch*, *G. Kletetschka*, *O. Man*, *L. Koptíková*, *L. Slavík*, *P. Schnabl*, M. Slobodník & J. Janečka, Faculty of Science, Masaryk University, Brno)

The Praha Synform (PS) which is preserved in the central part of the Barrandian area (Bohemian Massif = BM) comprises a pile of Ordovician, Silurian and Devonian rocks more than 2.5 km thick. Unmetamorphosed sediments, moderately deformed by the Variscan orogeny and famous for their fossils and their detailed stratigraphy, outcrop in the PS. The sedimentation was associated and temporarily disturbed by a rather intensive and largely submarine basaltic volcanism. Silurian effusive basalts and volcaniclastics compose the Svatý Jan Volcanic Center which is located in the northwestern limb of the Praha Synform, where three major volcanic phases have been recognized: the first one of early to mid-Wenlock and the last one of mid-Ludlow age. Two alkaline basalt dikes of late Wenlock to mid-Ludlow age, respectively tilted to the West and to the North-East as observed in a 100-m thick tuff sequence which represents the second volcanic phase, have been extensively sampled. Anisotropy of the magnetic susceptibility study on specimens, taken from a 5-m thick dike 1 and from 3.5 m thick dike 2, shows two different fabrics, carried mainly by Ti-magnetite and/or magnetite, which are considered to be related to the transtensional opening phase of the dikes. Four components of magnetization, attributed to Middle–Late Silurian (C1), Middle–Late Carboniferous (C2), Cretaceous (B) and Paleocene (D), in agreement with already published directions for the Bohemian Massif, have been isolated. They are carried by Ti-magnetite for components C1 and C2, hematite and goethite for components B and D.

Two preliminary conclusions can be drawn: (1) Fitting the Middle to Late Silurian directions if we compare with the results obtained on black shales from the Kosov Quarry near Karlštejn, BM (D = 205°, I = –28°), with a paleorotation of 175–185°. The distribution of virtual geomagnetic pole (VGP) fits remarkably the apparent polar wander path (APWP) of the BM and the poles are located very close to the Silurian pole of the BM, and (2) the magnetization measured in Silurian dikes is likely to be early Permian to late Carboniferous overprint. The distribution of the VGP fits remarkably the APWP of the BM and the poles are located very close to the Carboniferous poles of Bohemian Massif. The distribution of the VGPs after (tilt) bedding correction for dike1 and dike2 are documented in Figure 53. Calculation between directions of the two different stresses based on the AMS data show that the regional stress suffered a counter-clockwise rotation of around 40° between the emplacement of dike1 and that of dike2. This result explains why these dikes display a different inclination. Our data do not provide any evidence as whether the Rheic Ocean existed or not, but we can observe that the counter-clockwise rotation of the stress as a function of time, was also almost necessarily responsible for a modification of the direction of the displacement of the napes. This counter-clockwise rotation of the napes emplacement strongly suggests that the Rheic Ocean, if really supported by other data, should have changed its azimuth of subduction between the emplacement of the two dikes or closed following a sinistral shearing. If we follow this interpretation, the Praha Synform shows, in the Silurian, some affinities with the convergence episode which affected Baltica, Avalonia and Laurentia than with the rifting which is supposed to affect the Armorican–Bohemian plates at that time. However, if we accept to follow the general idea that the Bohemian and Armorican Massifs correspond with pieces detached from Gondwanaland and thus located south of the Rheic Ocean (and not north of it), we must admit that some tightening may have existed between some of these pieces when they were rifting away from Gondwanaland. This suggestion would reconcile the apparent compression we evidenced, the slow sedimentation which existed during the Silurian in the Synform and the Gondwana faunas which characterize this area.

The PS represents remains of Ordovician to middle Devonian sedimentary units folded into a large synclinorium corrupted by several faults. These faults strikes in WSW–ENE direction and are parallel with the synform axis. Praha fault is subvertical, the Tachlovice Fault was found during iron ore exploration drill. Svoboda and Prantl (1948) suggested that the Tachlovice fault is a reverse fault. Horný (1965) traced this fault from the surroundings of Beroun through Tachlovice to Praha. The Koda



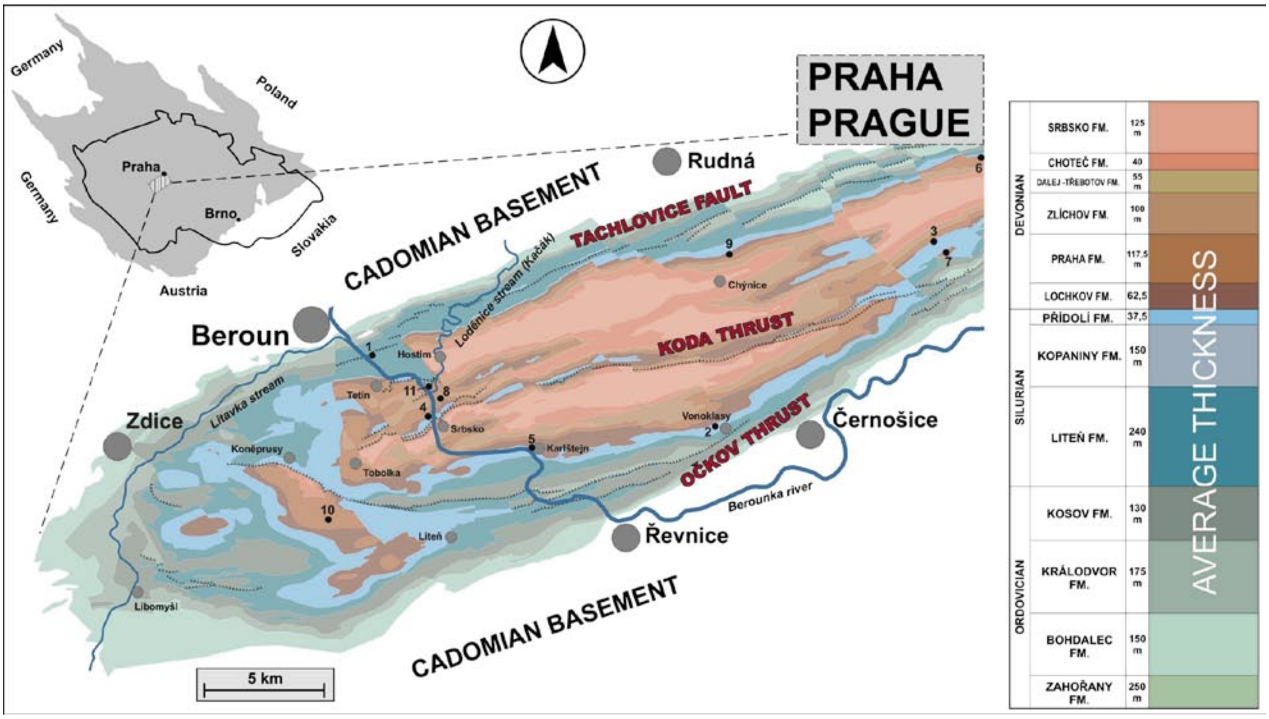
■ **Fig. 53.** Virtual pole positions after (tilt) bedding correction for dike 1 (d1) and dike 2 (d2), Cp is name of the component. The virtual pole position 36V is of the Barrandian, Karlštejn, Middle Silurian, contact aureole of basalt sill. Apparent Polar Wandering Path inferred from East European Craton for Early Devonian to Middle Triassic time span, is presented by a thick dashed line (modified after Aifa et al. 2007).

fault is parallel with the America anticline. This fault thrust a volcanic Silurian over the Devonian. The Očkov Thrust is next important fault. This fault thrusts Upper Ordovician over the Silurian. The Očkov Thrust is about 45 km long but of varying strike due to its curved shape. The Závist fault is steep and faults the Ordovician rocks against the Proterozoic. The Tachlovice fault outcrop is at the Lištice near the city of Beroun. We found that bedding is dipping 40° to the SE here and the Tachlovice fault is subparallel with bedding. Using stratigraphic separation diagram (SSD) revealed, that the Tachlovice Fault is overthrust with flat-and-ramp geometry with large bedding-paralell flats reoriented due to folding to a “normal” fault position. We described a small-scale fault-propagation fold in the hanging wall of the Tachlovice fault indicating top-to-the southeast movement. Axis of this fold is striking to the NE, ramp angle is about 27° with shortening about 0.5 m. Next structure is located near the Tetín village. There is the volcanic Silurian thrusted over the Devonian, reverse component of up-to-the-southeast. Here, on the right side of Berounka River valley is cliff with visible detachment fold. In the mouth of the Kačák stream there is again thrust structure with S–C fabric indicating up-to-the-south movement. Isoclinal fold crops out at the Srbsko village with axis to the NE. Unified trend of folds with SE vergence and brittle kinking along with thrusting top-to-the-southeast suggest post-sedimentary tectonics and overthrusting of upper units to the southeast (Fig. 54).

A new type of paleokarst filling was found in the Únorová Chasm in the Bohemian Karst, a small karst region in the centre of Barrandian composed of Silurian and Devonian limestones located SW of Praha. These sedimentary rocks are notably different from both usual cave sinters and abundant Late Cretaceous to Cenozoic clastic sediments typical within this karstic region. They also differ from Devonian neptunian dikes of the area. To clarify the age as well as genetic and geomorphologic relationships, the paleokarst sedimentary rocks were studied using field observation, and in the laboratory on collected samples, including petrological, paleomagnetic, micropaleontological, and stable isotopic geochemical methods.

The described carbonate paleokarst sedimentary rocks, which represent a new sedimentary rock type for the Bohemian Karst region, were discovered at two sites. The first locality is represented by the Únorová Chasm (UP) NW of Mořina and the second by the Kruhový Quarry (KL) between Tetín and Srbsko.

Laboratory procedures were selected in order to allow the separation of the characteristic components of remanent magnetization and to determine their geologic origin. For each sample the natural remanent magnetization, magnetization after alternating field (AF) and thermal demagnetization (TD), as well as volume magnetic susceptibility were measured using JR–5A or JR–6A spinner magnetometers and a KLF–4A Automatic Magnetic Susceptibility Meter. A LDA–3 demagnetizer was used for the AF demagnetization of several pilot samples with



■ **Fig. 54.** Position of the studied area and simplified geological map of the Praha Synform (based on previous 1: 50,000 mapping). Numbers in the map correspond to sampling sites: 1 – Lištice – abandoned quarry near the sewerage plant, SW of village, sigmoidal calcite veins from lower Silurian basaltic tuff (Liteň Fm.); 2 – Vonoklasy – abandoned quarry near the water-station, W of village, fibrous calcite veins from finely bioclastic limestones and black shales (Přídolí Fm.); 3 – Velká Chuchle – Žákův Quarry, WNW of village, syntectonic veins within bioclastic limestones and shales (upper Přídolí/lower Lochkov Fm.); 4 – Srbsko – Berounka river, outcrops allong the right bank, NW of village, syntectonic veins within the bioclastic limestones (upper Přídolí/lower Lochkov Fm.); 5 – Budňany Rock at Karlštejn, international parastratotype of the Silurian/Devonian boundary allong the left bank of Berounka river, calcite veins parallel and perpendicular to bedding planes of finely laminated platy limestones (upper Přídolí/lower Lochkov Fm.); 6 – Barrande Rock in Praha, syntectonic veins within dark gray finely bioclastic limestones (lowermost Lochkov Fm.); 7 – Velká Chuchle – outcrops on the Homolka Hill, sigmoidal calcite veins from bioclastic platy limestones (Lochkov Fm.); 8 – Srbsko – Na Chlumu Quarry, N of village, irregular calcite veins and younger narrow reddish calcite veins from biodetritic limestones (Praha Fm.); 9 – Chýnice – Mramorka Quarry, NNE of village, sigmoidal calcite vein arranged into en echelon arrays within the micritic limestones called "Zbuzany Marble" (Praha Fm.); 10 – Koněprusy – Homolák Quarry, SE of village, syntectonic veins within reef limestones (Praha Fm.); 11 – Hostim – Alkazar Quarry, SSW of village, irregular calcite veins within massive bioclastic limestones (Praha Fm.).

a peak demagnetization field of 100 mT. Progressive thermal demagnetization employed the MAVACS demagnetizer.

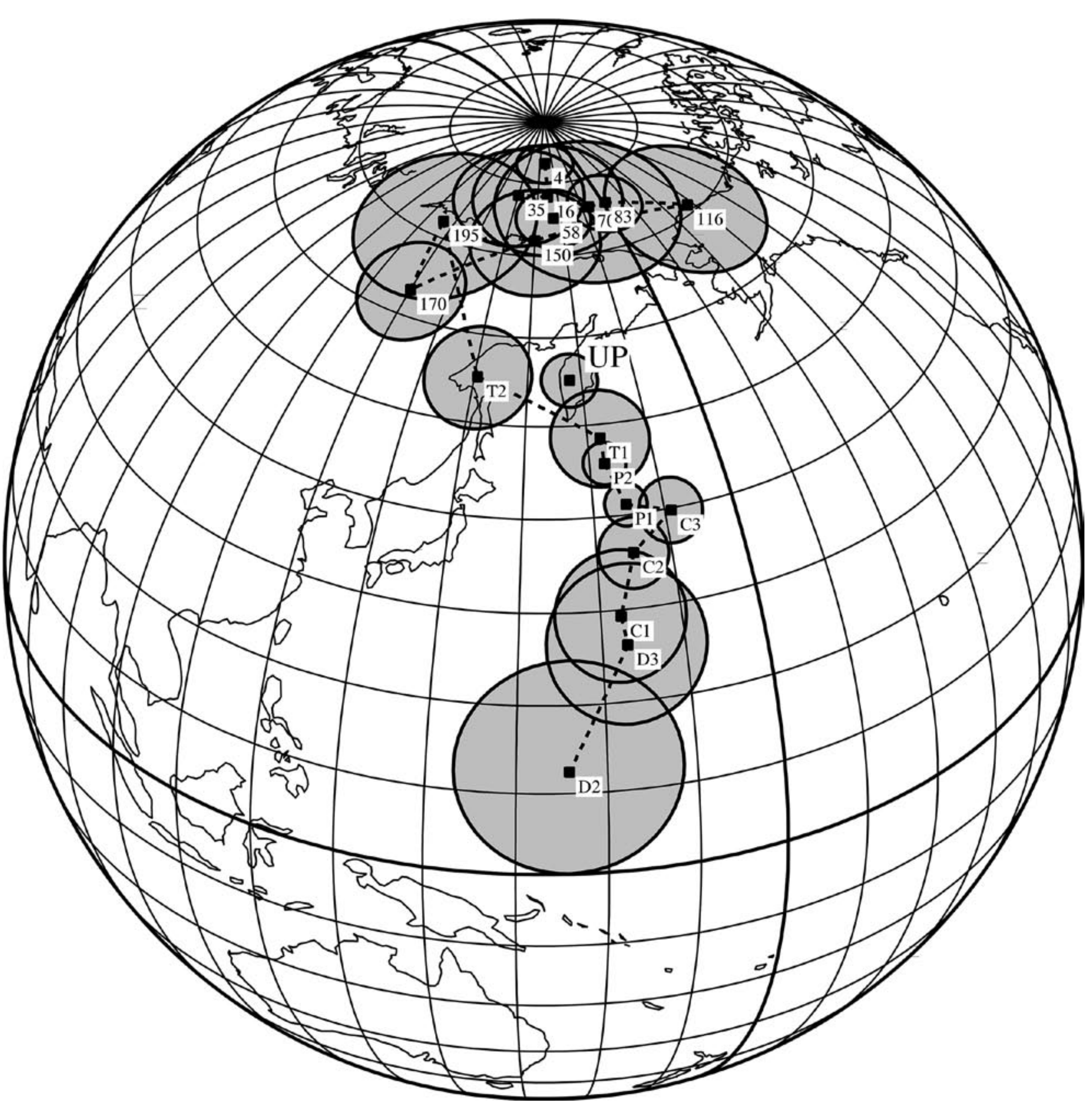
Paleokarst sedimentary rocks display uniform horizontal bedding-plane orientation, all paleomagnetic data including the mean directions of remanence components are the same (corrected and in situ). The mean paleomagnetic directions and virtual pole positions calculated for sample groups displaying normal and reverse polarities. Paleomagnetic (virtual) pole position was calculated for all samples from the UP where reverse paleomagnetic directions were converted into normal directions. The difference between the mean normal (I = 32.1°) and reversed (I = –35.6°) inclinations is smaller than the semi angle of confidence. Paleomagnetic pole position for the UP (54.8°N, 157.8°E) is very close to pole positions for the Middle or Early Triassic and the calculated paleolatitude also corresponds to a paleolatitudinal drift of 30.2° (±3°) north from Triassic times to the present (Fig. 55).

BESSE J. & COURTILLOT V. (1991): Revised and Synthetic Apparent Polar Wander Paths of the African, Eurasian, North American and Indian Plates, and True Polar Wander Since 200 Ma. – *Journal of Geophysical Research, Solid Earth*, 96: 4029–4050.

HORNÝ R. (1965): Tektonická stavba a vývoj siluru mezi Berounem a Tachlovicemi. – *Časopis pro mineralogii a geologii*, 10: 147–155.

KRS M. & PRUNER P. (1995): Paleomagnetism and paleogeography of the Variscan formations of the Bohemian Massif. – *Journal of the Czech Geological Society*, 40 (1–2): 3–45.

SVOBODA J. & PRANTL F. (1948): O stratigrafii a tektonice staršího paleozoika v okolí Chýnice. – *Sborník Státního geologického ústavu Československé republiky, oddíl geologický*, 15: 1–39.



■ **Fig. 55.** Paleomagnetic (virtual) pole position of the Bohemian Karst, Únorová propast (UP; modified after Žák et al. 2007). The Apparent Polar Wander Paths for a stable Europe is based on data from Besse & Courtillot (1991) for the period of 4 to 195 Ma, and from Krs & Pruner (1995) for the Middle Triassic to Middle Devonian period. Mean pole positions: T2, T1 – Middle, Early Triassic; P2, P1 – Late, Early Permian; C3, C2, C1 – Late, Middle, Early Carboniferous; D3, D2 – Late, Middle Devonian.

No. IAA300130504: **Soil cover of the protected areas of Praha as an indicator of environmental changes** (*A. Žigová*, *V. Ložek*, M. Šťastný & V. Šrein, Institute of Rock Structure and Mechanics AS CR, v. v. i.)

The structure of soil cover in Praha and its changes are defined on the basis of the study of soils in protected areas and localities with different types of anthropogenic load. The principles of the structure of soil cover in the area of the capital of Praha are controlled by the variability of parent materials, topographic relief and anthropogenic influence in the area. In protected areas with karstic relief on limestones, Rendzic Leptosol is found on slope positions and Terra Fusca on platforms.

Pedogenesis on loess proceeded under a variety of different conditions, producing Chernozem, Luvisol and Albeluvisol. Cambisol develop on different type of parent materials, such as basalts and spongilitic marlstones (opokas). Cambisols on spongilitic marlstones with different type use are shown in Figures 56 (Nebušice – agricultural area) and 57 (Purkrabský háj–Šárka–Lysolaje Nature Park). Calcaric Leptosol on spongi-

■ **Fig. 56.** Cambisol on spongilitic marlstone Nebušice: agricultural area.

litic marlstones are typical for sites with steeper slopes. Haplic Leptosol is situated on extremely sloping relief, predominantly on schists, wackes and acidic rocks of Proterozoic age.

Soil cover affected by agricultural activity in Praha is found chiefly in areas with loess deposits. Most affected is the uppermost 30 cm layer of soil. The results suggest a degradation of physical and chemical properties of soils and disruption of natural pedogenesis. A weaker influence of anthropogenic factor on soil development was encoutered in cases of soil profiles buried beneath a landfill layer.

■ **Fig. 57.** Cambisol on spongilitic marlstone: Purkrabský háj–Šárka–Lysolaje Nature Park.

A specific pedogenic process of humification is present in all soils. The determination of hot-water extractable carbon and micromorphological analysis are suitable for a qualitative statement of this process. This is probably the first time that data on hot-water extractable carbon distribution in a soil profile were obtained from the territory of Praha.

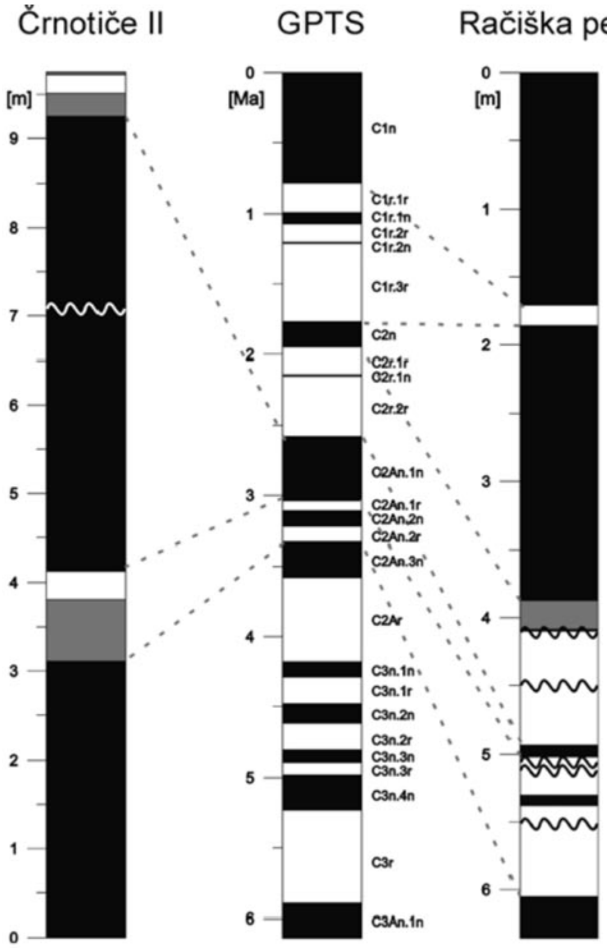
The structure of the soil cover and the factors controlling its development in Praha were characterized by a set of soil analyses (determination of pH, cation exchange capacity, exchangeable cations, soil organic matter, particle-size distribution) macromorphology, micromorphology and by methods used in clay mineralogy, geology and geomorphology. The state of the soil organic matter was used as an indicator of environmental changes.

No. IAA300130701: **Paleomagnetic research of karst sediments: paleotectonic and geomorphological implications** (*P. Bosák*, *P. Pruner*, *S. Šlechta*, *P. Schnabl*, N. Zupan Hajna, A. Mihevc, Karst Research Institute, SRC SASU, Postojna, Slovenia & I. Horáček, J. Wagner, S. Čermák, Faculty of Science, Charles University, Praha, Czech Republic)

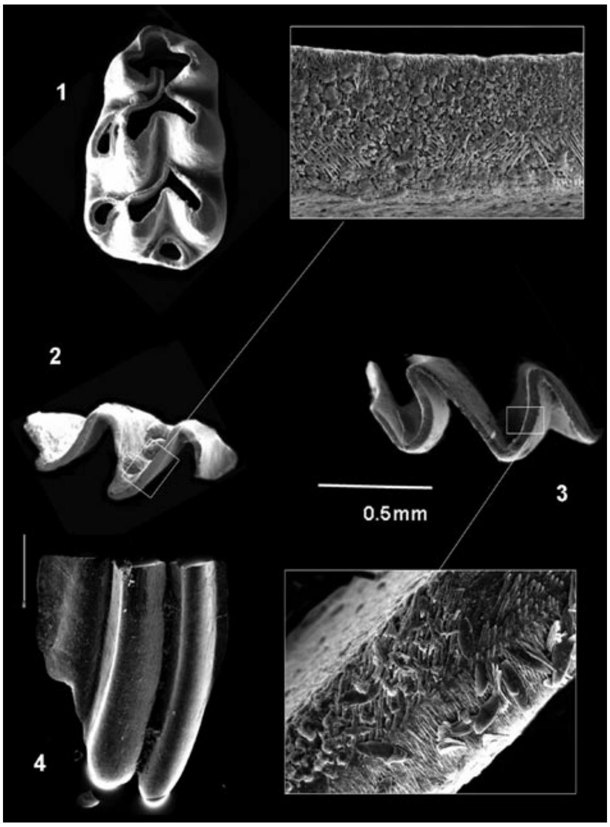
For the first time in the Classical Karst (SW Slovenia), paleontological data enabled to match the magnetostratigraphic record precisely with the geomagnetic polarity timescale in two studied sites: (i) a series of speleothems alternating with red clays in Račiška pečina Cave (Matarsko podolje), and (ii) an unroofed cave of the Črnotiče II site (Podgorski kras Plateau) completely fossilized by siliciclastic sequence covered by collapsed speleothems and limestone roof. The later site is also characterized by a rich appearance of fossil tubes of autochthonous stygobiont serpulid *Marifugia cavatica.*

In the Račiška pečina (Fig. 58), the boundary of normal and reverse polarized magnetozone within the layer with fauna is identified with the bottom of C2n Olduvai subchron (1.770 to 1.950 Ma). The geometry of obtained magnetozones is deformed as compared with subchrons on the GPTS due to numerous principal breaks in deposition in the lower part of the profile. Break can last more than 250 ka. Therefore, we correlate this part with the lower part of the Matuyama Chron (2.150–2.581 Ma) and individual subchrons of the Gauss Chron (2.581–3.58 Ma). The profile above Olduvai subchron records short part of Matuyama Chron (some of reverse polarized subchrons C1r.3r, C1r.2r, or C1r.1r within the time span of 1.770–0.780 Ma) and Brunhes Chron (C1n; younger than 0.780 Ma).

The arrangements of obtained magnetozones in the Črnotiče II site (Fig. 58) was originally interpreted as older than 1.770 Ma, most probably belonging to the Gauss Chron (2.581–3.580 Ma) or the normal subchrons within the Gilbert Chron (4.180–5.230 Ma). The long normal paleomagnetic polarity zone in the lower segment of the fill therefore corresponds to basal normal polarized subchron C2An.3n (3.330–3.580 Ma) within the Gauss Chron and the normal polarized upper segment can be compared to some of higher normal subchrons of the Gauss Chron (C2An.1n subchron = 2.581–3.040 Ma or C2An.2n subchron = 3.110–3.220 Ma). The combination of paleontological and paleomagnetic data indicates, that the fauna cannot be older than about 3.6 Ma, due to reverse polarized magnetozone at top of Gilbert Chron terminating at 4.180 Ma.



■ **Fig. 58.** Correlation of magnetostratigraphic logs of the Črnotiče II site (left) and the Račiška pečina (right; simplified) with the GPTS (center; Horáček et al. 2007). Black – normal polarity; gray – transient polarity; white – reverse polarity; ~~~ – principal hiatus.



■ **Fig. 59.** Mammalian fossils from the Račiška pečina (Horáček et al. 2007). 1 – *Apodemus (Sylvaemus)* cf. *atavus* Heller, 1936, left M/1; 2 – Arvicolidae g.sp. indet., fragment of a lingual? wall of M/1, cf. *Borsodia* spp.; 3 – Arvicolidae g. sp. indet., fragment of a palatal wall of an upper molar (M1/ or M2/), cf. *Mimomys (Cseria)* sp.; 4 – Arvicolidae, g. sp. indet., lingual wall of the right M3/, cf. *Borsodia* sp. (Photo by Ivan Horáček).

This level represents approximately also the base of the MN15 mammalian biozone.

The vertebrate record is composed mostly of enamel fragments of rodents and soricomorphs. Absence of rootless arvicolids as well as taxonomic composition of the mammalian fauna suggest the Pliocene age of both the sites. For (1) Račiška pečina (with *Apodemus*, cf. *Borsodia*; Fig. 59) it was estimated to middle to late MN17 (ca 1.8–2.4 Ma), while (2) the assemblage from Črnotice II (with *Deinsdorfia* sp., *Beremedia fissidens*, *Apodemus* cf. *atavus, Rhagapodemus* cf. *frequens, Glirulus* sp.*, Cseria* sp.) is obviously quite older: MN15–MN16 (ca 3.0–4.1 Ma).

For the first time, the combination of vertebrate fossil records and magnetostratigraphy proved expected antiquity of the cave fossilization in the region of the Classical Karst. A good agreement of biostratigraphic and magnetostratigraphic inferences suggest autochtonous synsedimentary origin of the faunal remains and sediments and supports strongly expected relevance of the dating effort and its applicability in karstogenetic reconstructions. Worth mentioning is that the important paleotectonic movements recently interpreted in Dinarides and Southern Alps, which could be related to the uplift in the Classical Karst and rearrangements of its hydrological systems resulting in increased fossilization rate, correspond in age to MN15 zone. The fossilization during MN15–MN17 terminated one of important older phases of speleogenesis in the region.

HORÁČEK I., MIHEVC A., ZUPAN HAJNA N., PRUNER P. & BOSÁK P. (2007): Fossil vertebrates and paleomagnetism update of one of the earlier stages of cave evolution in the Classical karst, Slovenia: Pliocene of Črnotiče II site and Račiška pečina Cave. – *Acta carsologica*, 36, 3: 453–468.

No. IAA300130702: **Growth rhythms as an indicator of the Earths rotation and climate changes in the geological past** (Project Leader *A. Galle*; *J. Hladil*, *P. Čejchan*, *L. Koptíková*, *L. Slavík*, *J. Filip*, C. Ron, J. Vondrák, Astronomical Institute AS CR, v. v. i., Ondřejov, Czech Republic, D. Novotná, Institute of Atmospheric Physics AS CR, v. v. i., Praha, Czech Republic, L. Strnad, V. Drábková, Faculty of Science, Charles University, Praha, Czech Republic, B. Berkowski, Adam Mickiewicz University, Poznań, Poland & G. Young, The Manitoba Museum, Winnipeg, Canada)

Growth rhythms at Scoliopora are studied from the viewpoint of both the accretion layers optical density and of microanalytics (LA–ICP–MS, PIXE). Preliminary outputs show that the interesting records are obtainable also within yearly accretions.

A unique specimen of Givetian stromatoporoid *Actinostroma* (Fig. 60) registered three accretion regimes: (1) two zones of the growth deceleration within one-year cycle, corresponding to Recent rhythms in the monsoonal realms, (2) regime with the single growth deceleration within the years cycle, known for instance on the west coast of Atlantic, and (3) extremely varying regime, analogous to that in the realms of frequent storms, as known for instance from the neighborhood of present Japan. Detailed studies have been started.

Further promising group of organisms are amphiporas. Growth environments, biologic determination, and the growth ratios were defined (see Hladil 2007).

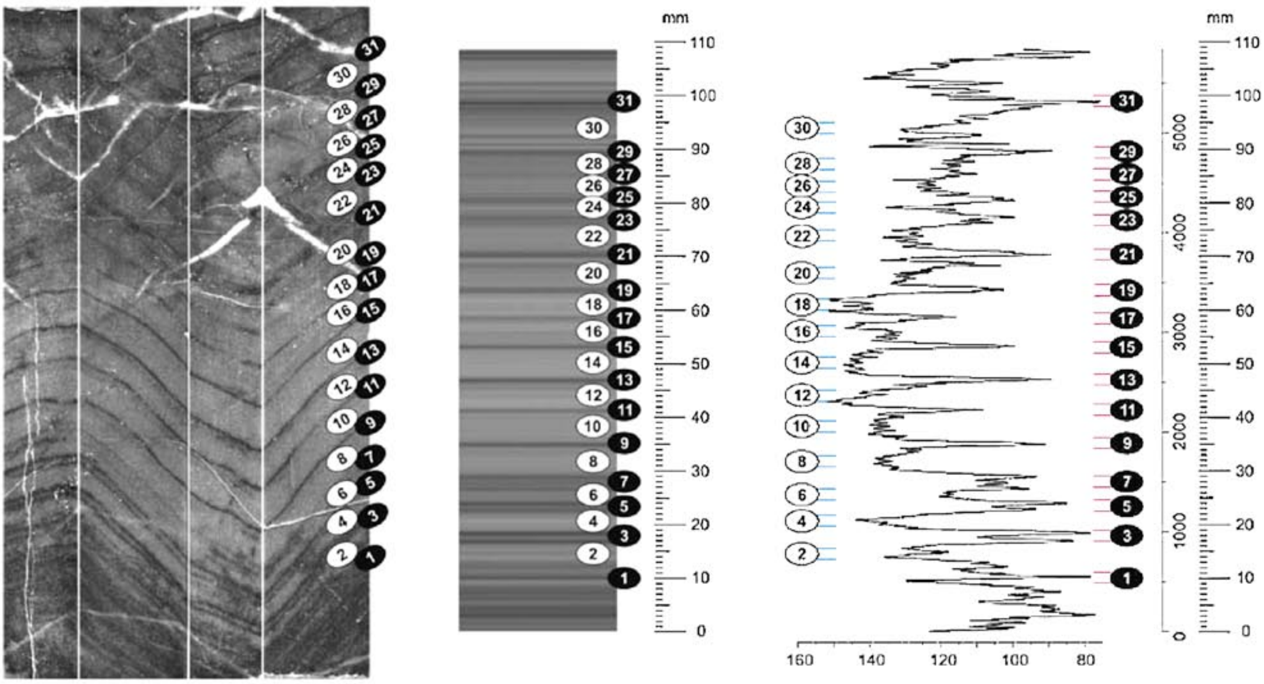
Rugose corals of the genus *Spinophyllum*: changes of the periodic growth rate are almost unascertainable, although they occur together with banded organisms in Moravian Devonian. On the other hand, material from the Koněprusy area displays a dark zone which can be interpreted as unfavorable period (winter). Bohemia and Moravia were placed on different continental plates but they already were geographically close in Givetian (see Galle 2007).

From the viewpoint of annual patterns, relatively well-defined and manifested rhythm with 5–7(6) growth changes of the coral skeleton, acceleration and deceleration. Meanwhile, it is known from the restricted area of Moravian Devonian in Lower Givetian. Profoundly different ternary rhythms with multiple fine subdivisions were found in the Frasnian of the same area. We consider these patterns the manifest of the circulation in the neighboring oceanic basin.

Similarly interesting results exist also among multiple-year records. They show both one-year modulations, and two modulations per year: we provisionally call them "monsoonal". Furthermore, there exist recurrent growth crises, for instance 7–9 (8) years in Middle Frasnian of Poland. Numerous data on Givetian tabulate coral *Caliapora battersbyi* show 3- and 7-years growth decelerations. Critical destructions of the coral communities appear after 19–22 years, as shown on the longest stems of *Amphipora ramosa*.

Conversion of the natural records within Devonian skeletons into digital data were tested using many methods: ultrasonic, neutron and X-ray depiction and tomography, LA–ICP–MS, PIXE, SIMS/TIMS a INAA ultra-trace analysis of the element and isotope contents, spectrophotometric profiling, zeta in the confocal microscope, and optical density of polished- and thin-sections. Despite of the exactness and attractivity of abovementioned methods, they are employable only marginally because of their costs, technical problems, and mainly because of an age and diagenesis of studied samples, while last-mentioned methods, zeta and optical density, show the largest possibilities to obtain an appropriate data collection for further evaluation.

Fourier transforms, harmonic analysis with or without data cleaning, segment shifting and size modifications (logging comparison and sample patterns together with the sequence of the rhythmicities), method of wavelets, and eventually attempts to obtain the robust tool with complex reading and comparing patterns showed the practical employability of the procedures mentioned. It seems that the use of wavelets and, sometimes, also the circumspect use of the intuitive graphic appreciation of patterns and their sequences are the most useful computing methods. It is caused by the fact that even the best records show more irregularities that the previous authors were willing to admit. Different records within the same colony are often visible, on its eventual sides, i. e. in different microenvironments around the same organism.



■ **Fig. 60.** Three different accretional regimes in *Actinostroma* sp., Býčí skála, Moravian Karst (Givetian, Middle Devonian).

Another branch pursued was geochemical analysis of the concentrations of trace elements in the logged skeletons. It was mainly ultra-trace analysis with use of INAA, and LA–ICP–MS. We studied the test materials with regard to the dust mineral input, its forms altered in the seawater, through mineralization, and to prepare suitable standards for fine-crystallized or re-crystallized carbonates containing impurities. Applicable technical level was reached in standards for carbonates, oxide and oxyhydroxide components, and for submicrometric objects of alteration-resistant silicate mineral phases.

Placement of the studied objects of sclerochronology into paleoenvironment mosaics within space and time seems more important than generally contemplated in the literature. Relations among both terrestric or extra-terrestric rhythmicities and common background oscillations changed in time, and it still changes. The main question was whether we could pursue the climatic patterns in intervals of 1 to 10 ky also across continents, in the respective sedimentation basins. Outstanding climate indicator is the volume and quality of inter-regionally transported dust. We tested it comparing two longest known magnetosusceptibility sections in the limestone and mixed carbonate-siliciclastic sedimentary systems (Eifelian to Frasnian, min. 16 My). The sections were measured and compared between Belgium and Moravia, i. e., between the ramp with reefs and with filling with terrigenous detrite from the nearby continent, and extremely pure shallow isolated reef carbonate platform. Despite of different deposition systems and of large geographic distance of both basins, large anomaly patterns and the climatic change oscillations were ascertained; they exceed our present conception of variation of Devonian paleoenvironment in time on one hand, on the other hand they also prove large measure of correlation possibilities and, in some places, an identity of the time intervals of 1 to 10 ky.

GALLE A. (2007): Spinophyllum Wedekind, 1922 (Anthozoa, Rugosa), in the Lower Givetian (Devonian) of the Bohemian Massif. – *Bulletin of Geosciences*, 82: 133–144.

HLADIL J. (2007): The earliest growth stages of Amphipora. In HUBMANN, B., PILLER, W.E. (Eds.) *Fossil Corals and Sponges, Proceedings of the 9th International Symposium on Fossil Cnidaria and Porifera. Österreichische Akademie der Wissenschaften, Schriftenreihe der Erdwissenschaftlichen Kommissionen, Vienna*, 17: 51–65.

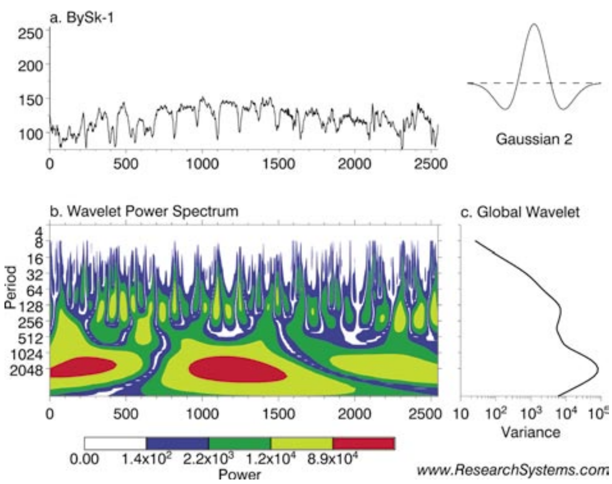
HLADIL J. (2007): Eifelian-Frasnian Amphipora limestones, biostromes and bioherms, Moravian Karst, Czech Republic. – In: VENNIN E., ARETZ M., BOULVAIN F. & MUNNECKE A. (Eds.): *Facies from Palaeozoic reefs and bioaccumulations: 187–189. Publications scientifiques du Museum, Mem. Mus. Nat. Hist.*, 195: 1–341. Paris.

Subproject 1: **Stromatoporoid growth periodicity investigated** (*P. Čejchan*, *J. Hladil*, *A. Galle* & P. Łuczyński, Institute of Geology, University of Warsaw).

Several dozens of cut and polished sections of stromatoporoid colonies ranging from Pragian to Frasnian with obvious growth rings considered to be yearly skeleton accumulations, were investigated for larger-scale periodical growth patterns. Polished radial sections of stromatoporoid colonies were photographed to obtain digital images. Subsequently, each cross section image was processed in an image editor so that a synthetic linear profile devoid of deformations, impurities, calcite veins, styloliths and other secondary intervening features was obtained for every cross section. From these profiles a signal of mean gray level was obtained by averaging the columns of pixels subsequently turned to numerical values. Indeed, such profiles do not represent growth rate *vs.* time, but rather the abscissa is just a monotonic function of time. Further, we applied a continuous weavelet transform using the Gaussian wavelet (the commonly used Morlet wavelet is inappropriate due to its complex form to unveil simple growth periodicities; Fig. 61).

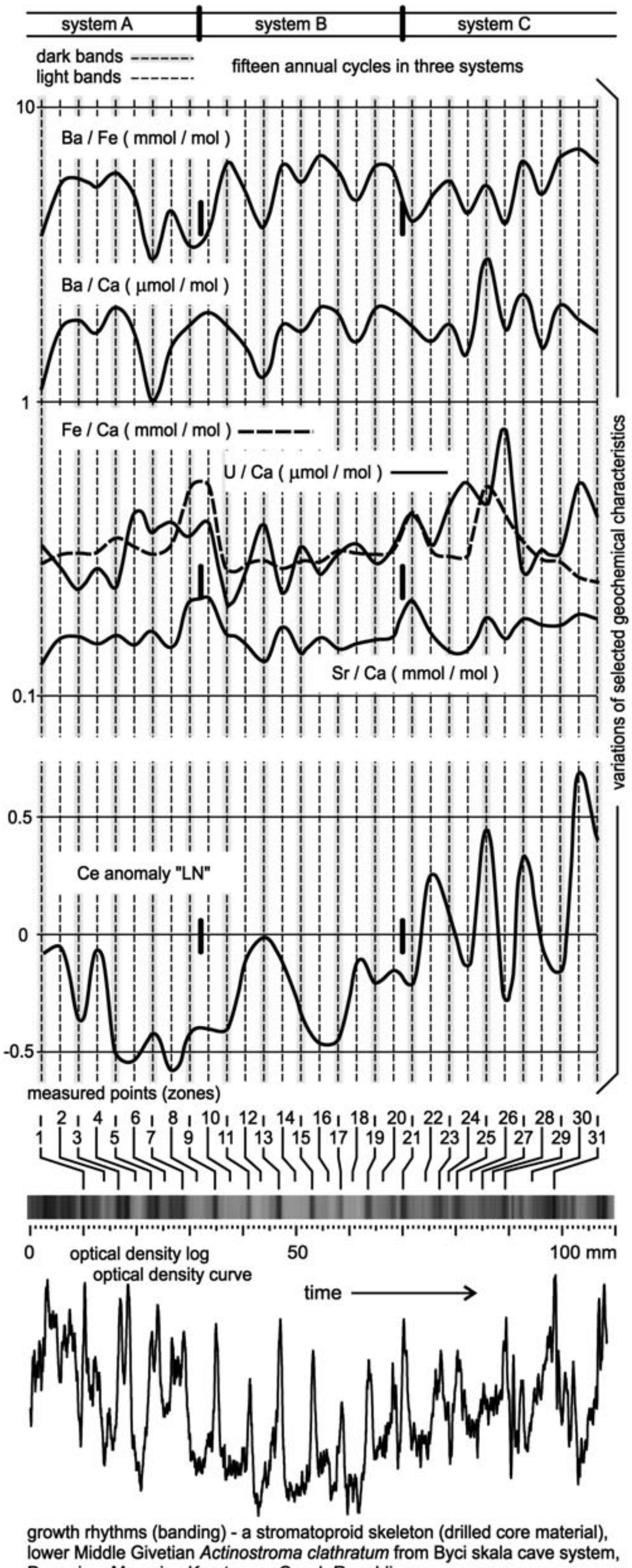
Devonian stromatoporoid skeletons from different basins and environments were involved, for example *Actinostroma* from the Emsian of Nevada, Givetian and Frasnian of Moravia and Frasnian of Holy Cross Mts. in Poland, *Actinostroma*, *Atopostroma* and *Parallelopora* from the Pragian limestones of the Barrandian area, *Stictostroma* from Emsian of the same area or *Trupetostroma* from the Frasnian reefs in German Brilon area. The preliminary results of these studies suggested that the yearly bands represent a diverse range of inter-annual growth rhythmicity patterns that are indicative of 4 and 8 year's repetitions, or in other cases, also 3, 7, 21 years' subdivisions. In stromatoporoid and coral skeletons were found also intra-annual growth variations with quite uncommon, or formerly overlooked, subdivisions into 6 or 9 parts. Even these preliminary results give a clear warning that separation of direct astronomical control can be more complicated than it was assumed according to previous state-of-the-art in the discipline. On the other hand, these intra- and inter-annual rhythms have a considerable emerging potential for definition of atmospheric-ocean circulation domains, and they may contribute to paleogeographical knowledge.

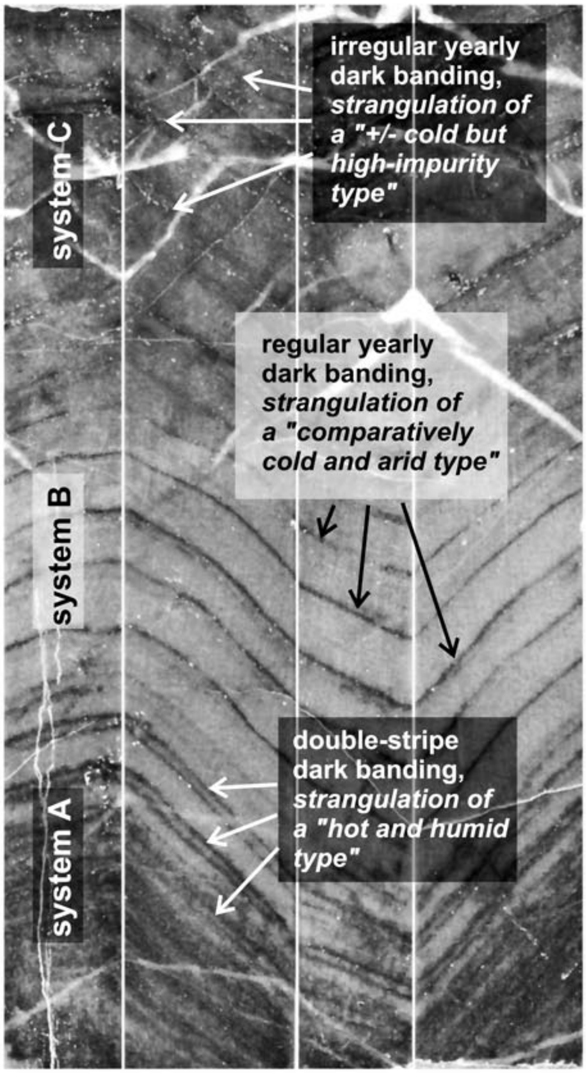
The results obtained in the field of formation of growth bands both in the sclerochronological and stratigraphical scales suggest that the principally astronomical and evironmental-feedback control factors have a very changeable effect on the real incremental fabrics. These diachronous changes took effect



■ **Fig. 61.** Býčí skála, Moravian Karst. A drill core from the Devonian, early middle Givetian, stromatoporoid skeleton growth bands explored by wavelet analysis. The scaleogram shows a hierarchy of overlain cyclities in skeleton growth. Illustration to project GA AS CR Project No. IAA300130702 (2008).

across sedimentary basins and ecological niches, and correspond to evolution of unstable environmental mosaics, in ranges from the detailed areas to major regional domains given by the atmospheric-ocean circulation systems.





■ **Fig. 62.** Býčí skála, Moravian Karst. A drill core from the Devonian, early middle Givetian, stromatoporoid skeleton provided an evidence of three different climatic systems where the relevant domains were just at a triple point and fluctuated with several years periodicity. Illustration to project GA AS CR Project No. IAA300130702 (2008).

Subproject 2: **A triple junction of fluctuating climate domains as recorded by the Middle Devonian stromatoporoid skeletons** (*J. Hladil*, *P. Čejchan*, *A. Galle*, L. Strnad & V. Drábková, Faculty of Science, Charles University, Praha, Czech Republic).

The Devonian stromatoporoid *Actinostroma clathratum* (early Middle Givetian, Moravian Karst area, Býčí skála Cave; Fig. 62) provided the growth band series which fluctuated among three climatic systems. Particularly the origin of dark and light bands, DBs and LBs, is different. Although the optical density of the incremental series on this stromatoporid provided significant proxies to the assessment of the climatic control, the LA–ICP–MS in situ measurements contained significant geochemical keys to understanding these diverse climatic systems.

Three systems alternated, and the individual systems prevailed with a very short recurrence period of only several years or, in maximum, several few decades.

System A is introduced as "hot, humid, of monsoon type, with double-stripe dark bands". Ce is anomalously depleted. The DBs are significantly enriched by Sr, but not by Fe. Proportions of Ba are high and follow the DB. The DB marks the periods of decelerated growth with highest yearly temperatures, before two rain seasons.

System B is extremely regular, having a unimodal yearly rhythm. The DB strangulations are marked by low Sr values and are attributable to cold season of a year. The influences of an arid climate domain were recorded for a limited time period. The relative excess of Ba is in LB, being related to "summer" upwelling effects rather than to delivery of terrigenous weathering products.

System C corresponds to periods with wild and strong atmospheric-ocean circulation patterns, Ba contents increase regularly with the DBs, Sr concentrations are distributed chaotically, and Ce contents are highly oscillating but, in average, Ce is depleted to lesser degree. It suggests, together with the highest Fe anomalies, that irregular but strong eolian and riverine fluxes were combined.

In general, it can be suggested that the geochemical fluctuations on DBs and LBs are less strictly modulated by quasi-regular yearly patterns than it would be inferrable from the optical density records. The results give us also a warning that hot and cold, as well as yearly and multiple DBs structures can take effect alternatively, and in extreme so fast as during several years or in a decadal scale.

Further, the yearly fluctuation of iron concentrations in skeleton and earliest cements is smaller than it would be assumed, particularly if compositions of DBs and LBs are compared.

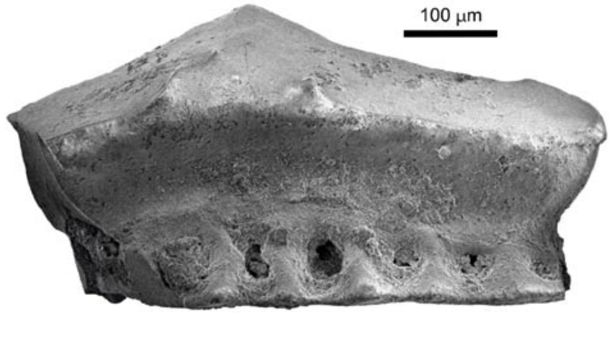
No. IAA300130703: **Paleoecology, Paleogeography, Stratigraphy and Climatic Changes of the Upper Stephanian (Gzhelian) of the Central and Western Bohemian Basins** (*J. Zajíc*, *P. Bosák*, *P. Čejchan*, *R. Mikuláš*, K. Martínek, S. Opluštil, Faculty of Science, Charles University, Praha, Z. Šimůnek, J. Drábková, T. Sidorinová & Z. Táborský, Czech Geological Survey, Praha)

The youngest, over 1000 m thick sequence of the Central and Western Bohemian Basins is represented by the Líně Formation. It contains as many as 10 often fossiliferous lacustrine horizons and the Horizon of Conglomerates with carbonate pebbles. Comparison of the interpreted facies with ichnologic and paleontologic data enable to assign the corresponding paleoenvironments and paleoclimates near the Carboniferous/Permian boundary. The paleocurrent, facies, and fossil comunity analyses can clarify paleogeographic situation of the tropical zone of Pangea. Provenance of the unique marine carbonate Paleozoic pebbles will be solved with help of micropaleontology. Large-scale tectonic elements will be studied with help of GIS analysis of remote sensing data and digital elevation model. The Ichnofabric Index will be determined in continuous profiles and drill cores. The vertebrate assemblages (obtained also by chemical way) integrated with correlation of well logs can solve stratigraphy.

The field reconnaissance of the Klobuky Horizon of the Líně Formation outcrops was done in the neighbourhood of the village of Klobuky. Three outcrops (Klobuky – sugar rafinery, Klobuky – slope, Klobuky – east) were documented from the sedimentological, ichnological, palynological and paleontological points of view (2007). Field research continued to excavate four new outcrops (A, B, C, and D) with the help of an excavator at Klobuky in 2008. The fossiliferous sequence of the Klobuky Horizon includes the coal seam and the overlying carbonate rock. Detailed sedimentological sections were drawn, and facies analysis is in progress. Samples for heavy mineral analyses (including detrital garnets) were collected. Well log curves (130) and lithological sections (15) were prepared for the construction of the first two correlation sections of the Kladno and Mělník regions. A total of 65 well logs through the Líně Formation were correlated. A convenient location of drilling and excavating was specified for the next year.

A rare collection of carbonate pebbles from boreholes of the Líně Formation is studied (thin sections and dissolution for the micropaleontological analyses). Identification of the source area of the pebbles is the aim.

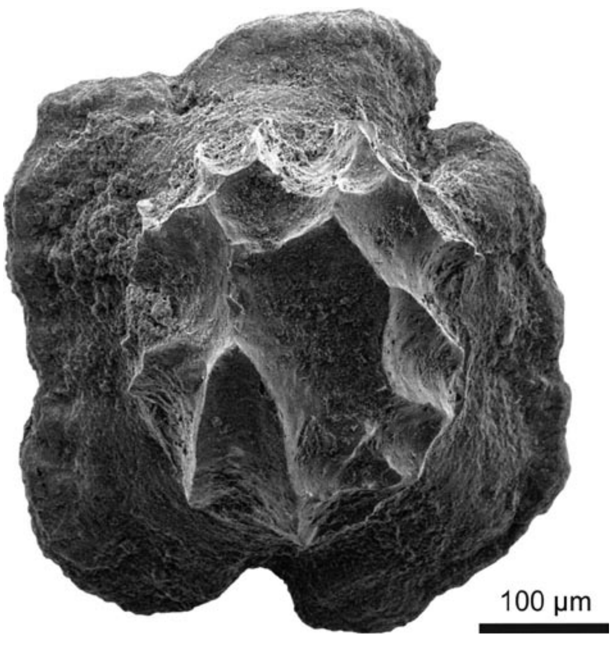
All known faunal remains of the Líně Formation come from the Zdětín Horizon (15 boreholes; Stephanian C; bio/eco subzone *Sphaerolepis*), the Klobuky Horizon (7 outcrops and 2 boreholes; Stephanian C; bio/eco subzone *Sphaerolepis*), the Stránka Horizon (one borehole; ?lowermost Autunian), and from various levels outside the horizons (3 boreholes; Stephanian C; bio/eco subzone *Sphaerolepis*). The most important are



■ **Fig. 63.** *Lissodus lacustris* Gebhardt, 1988 – incomplete tooth, lingual view, Líně Formation, Klobuky Horizon, Stephanian C, Klobuky – slope.

vertebrate microremains which were separated by the chemical way. Microremains rich carbonate (marlstone, above the coal seam) of all above mentioned Klobuky localities were dissolved with help of approximately 10 % acetic acid. Microvertebrate community consists of acanthodians, sharks, actinopterygians, crossopterygians, dipnoans, and tetrapods. Acanthodians (*Acanthodes fritschi*, *Acanthodes* sp.) are represented by scales, gill rakers and fin spine fragments. Xenacanthid sharks (*Orthacanthus* sp., *Plicatodus plicatus*, *and Xenacanthus* sp.) are represented by teeth, scales, and scraps of calcified cartilage. Two euselachiid shark genera (*Sphenacanthus carbonarius*, *Lissodus lacustris*; Figs. 63 and 64) are represented by scales, denticles, and rare teeth. The most abundant finds yielded actinopterygian fishes (*Sphaerolepis kounoviensis*, *Progyrolepis speciosus*, *Elonichthys* sp., *Spinarichthys dispersus*, and many unidentified remains). They are represented by teeth, scales, fulcra, segments of lepidotrichia, bone fragments (jaws, cleithra, toothed elements and others). Rare fragments of crossopterygian scales were also found. Dipnoans (*Sagenodus* sp.) are represented by fragments of scales, hyoid arc, and elements of postcranial skeleton. Some jaw fragments probably belong to indeterminable amphibians. Moreover, bivalves *Anthracosia stegocephalum* and ostracods *Carbonita* sp. were identified among macroremains. All vertebrates are disarticulated but without an indication of longer transport.

Flora comes not only from the same strata as fauna but also from the siltstones under the coal seam. The list of known species from the Líně Formation increased from 36 up to 41. Newly identified species belong to ferns and pecopterids (*Pecopteris candilleana*, *P. hemitelioides* a *P. pseudobucklandii*). Specific identification of calamites (*Calamites* cf. *cistii*) and cordaites (*Cordaites* cf. *palmaeformis*) is not quite sure because larger specimens could be necessary.



■ **Fig. 64.** *Sphenacanthus carbonarius* (Giebel, 1848) – monocuspid scale, coronal view, Líně Formation, Klobuky Horizon, Stephanian C, Klobuky – slope.

Palynocommunities of the Líně Formation were poorly known. Altogether 25 samples from the underlying siltstones contain rather sporadic and poorly preserved spores, dominated by ferns. Spores of pteridosperms, calamites, cordaites and upland flora are present. Lycophyte spores are rare. Samples from the coal seam are sterile.

Two colonization horizons were recognized in the siltstone bed. Several kinds of colonization types were found out inside the carbonate rock (e. g., *Palaeophycus* isp., cf. *Phycodes* isp.). The sequence of claystones, siltstones and fine-grained sandstones above the carbonate bed contains trace fossils characteristic for paleosols.

The web presentation of the project *http://www.gli.cas.cz/IAA300130703/Projekt 20IAA300130703.htm* was created and partial results are continuously supplemented there.

No. IAA300130801: **Chemical evolution of contrasting types of highly fractionated granitic melt using melt inclusions study** (Project Leader: *K. Breiter*, J. Leichmann, Faculty of Science, Masaryk University, Brno, M. Drábek, Czech Geological Survey Praha)

The aim of this project is a detailed study of MI in quartz from subsequent evolutionary stages from three typical, geologically well documented magmatic systems in Bohemian Massif: highly peraluminous tin-bearing granite, mildly peraluminous subvolcanic granite, and a complex pegmatite. Study of MI from early to late quartz generations enables to interpret the enrichment/depletion of water and volatiles during complex history of evolution of granite system. Comparison of MI-chemistry from strongly peraluminous and mildly peraluminous granite systems give new insights into evolution of these nearly contemporaneous, but chemically contrasting types of granite plutons. Comparison of both shallow-seated granite systems with relatively deep-seated pegmatite may demonstrate influence of pressure on the fractionation of evolved granitic melt. The accuracy of microprobe analyses was tested at glasses prepared by laboratory re-melting of the most fractionated granite facies from both studied localities.

No. IAA300130806: **The concept of micro- to mesoscale sandstone morphofacies in the temperate zone** (*J. Adamovič*, *R. Mikuláš*, *R. Živor*, *A. Langrová*, *V. Böhmová*, J. Schweigstillová & M. Šťastný, Institute of Rock Structure and Mechanics of the ASCR, v. v. i., Praha, Czech Republic)

Field documentation of sandstone outcrops in the Czech Republic and Slovakia revealed close similarity of micro- and meso-scale relief forms in rocks with similar sedimentary structures and textures, thus providing a set of definite morphofacies. Each morphofacies comprises typical relief forms, such as ledges, karren and mushroom rocks, or honeycomb pits. In terms of relief-forming processes, separate morphofacies are characterized by grain-by-grain disintegration, salt weathering, (bio)chemical solution and mechanical abrasion in various proportions.

Samples of salt crusts taken from the surface of sandstone cliffs in the area of Kokořínsko and Bohemian Paradise, Czech

Republic, comprise common gypsum, frequent brushite, and local potassium and ammonium alum salts. Pairs of samples were taken from the crust and the underlying sandstone. The main pore-diameter population of 10 to 30 μm is unchanged in the crusts, pore volume in the crusts is also unchanged or even larger due to the crystallization pressure of salts. On the other hand, the volume of micropores becomes reduced in the crusts by as much as 29 % as these get filled with salt crystals. Salt efflorescences are typically combined with atmospheric deposition of human origin, pollen grains, mushroom fibres and biologically mediated iron oxyhydroxide precipitation.

No. IAA300460602: **Upper crustal model of the Ohře Rift and its vicinity** (Project Leader: J. Málek, Institute of Rock Structure and Mechanics of the AS CR, v. v. i., Praha, Czech Republic)

Subproject: **Fault tectonics in the sedimentary and volcanic fill of the Ohře Rift graben** (*V. Cajz* & *J. Adamovič*)

Some of the youngest tectonic deformations along the northern margin of the Ohře Rift graben were studied in the area of Děčín and Teplice. The Krušné hory Fault combines structures striking NE–SW and structures striking WNW–ESE. These were exposed to an older N–S tensional stress field (?Oligocene to Middle Miocene), postadated by N–S compressional stress field (Middle to Upper Miocene) and a younger stage (?Pliocene to Pleistocene) of NW–SE tensional stress. Faulting was preceded by a ductile deformation, which is responsible for southerly dips of tectonic blocks within the fault zone. This results in the faulting pattern in the area between Děčín and Teplice. First, NW-dipping faults were activated by oblique normal faulting and the graben fill was relatively uplifted. Right-lateral movements on WNW–ESE-striking faults produced wrench faulting with a total displacement magnitude exceeding 1 km in Děčín. Lastly, SE-dipping faults were activated by normal faulting, with the total vertical displacement increasing towards the west (200 m in Děčín, ca. 600 m in Teplice).

No. IAA301110701: **Reproductive organs and their spores from the Carboniferous coal basis of the North America** (*J. Bek*)

The reproductive organs of *Polysporia* are often reported several times than fragments of its vegetative parts. Some species (*Polysporia rothwellii* Bek et. al, *P. drabekii* Bek et. al) are known only from a single sporangium. Their classification is therefore based only on the palynological study of *in situ* spores. *In situ* megaspores isolated from *Polysporia/Chaloneria* plants are assigned to dispersed megaspore genera *Valvisisporites*, *Expansisporites* Loboziak and *Triletisporites* while all *in situ* microspores belong to one dispersed miospore genus *Endosporites*.

The megasporangia and miospores from Upper Devonian (Famennian) Huron/Cleveland shales of Ohio are assigned to the genus *Polysporia*, based only on the palynological characteristics. The miospores assigned to *Endosporites globiformis* are the same as described from *Chaloneria periodica* Pigg and Rothwell, *Polysporia mirabilis*, *P. rothwellii* and *P. doubingeri*. *In situ* megaspores are the same as isolated from *Chaloneria cormosa* Pigg and Rothwell, *Ch. periodica*, *Polysporia doubingeri*, *P. radvanicensis* Bek et al. and *P. drabekii*.

The general organization of the exospore of megaspores including the absence of special ultrastructural changes in the innermost part of the apertural area, clearly indicate the lycopsid origin of megaspores from Upper Devonian of Ohio. The more or less elongated, tangentially arranged overlapping elements, abundant in the inner part of the exospore, strongly suggest relationships with isoetalean lycopsids.

Presence of an apparently homogeneous coating against the laminated inner layer suggests that, in fact, the inner layer comprises, in addition to the laminated system, an innermost part that might include a number of very thin laminas, while appearing structureless, and is not quite resistant to the fossilization. Such a combination is possible, since an exospore inner layer partly structured-partly amorphous exists in some types of spores.

Polysporia/Chaloneria plants are reconstructed as unbranched sub-arborescent lycopsids, because no branched specimen has been found. The whole specimens probably could be less than 2 m high. It is supposed that the distal laminas dropped off from the fertile zones, since all specimens with preserved axes lack any of their fragments.

Polysporia/Chaloneria is the oldest known member of the direct phylogenetic lineage *Polysporia – Viatscheslavia – Pleuromeia – Annalepis – Isoetes* begining within the Upper Devonian and continues to the recent. All these taxa share several morphological and palynological (especially TEM) features and characteristics. The morphological similarities among recent *Isoetes* Linnaeus, and Triassic *Pleuromeia* Corda, *Viatscheslavia* Zalessky, *Annalepis* Fliche and Devonian and Carboniferous *Polysporia* are concerning alone with their rhizomorphs, growth habit and reproductive organs. Palynological similarities are based on the morphology of spores and mainly ultrastructural features of the exines of the micro- and megaspores.

Palynology of *in situ* spores is the main criterion for classification of compression specimens of *Polysporia* plants. We had supposed that phylogenetic lineage of these Paleozoic–Mesozoic–Cenozoic isoetaleans began within Pennsylvanian. However, the importance of *Polysporia lugardonii* lies in the fact, that it was growing in the Famenian Period, suggesting, it to be the oldest lineage, both genus and species-wise, of the present day isoetalean lycopsid.

No. IAA304070701: **Cretaceous fossil flowers and inflorescences bearing pollen** *in situ* (J. Kvaček, National Museum, Praha, Czech Republic & *J. Dašková*)

New fossil material was collected at the Pecínov and Zliv localities. The investigation was focused on the genus: *Myricanthium*, *Pseudoasterophyllites* and *Nathorstia*. *Nathorstia angustifolia* Heer (Fig. 65) from the Lower Cretaceous of Greenland has been revised and the true status of the genus *Nathorstia* has been verified. *Nathorstia* Heer was redefined as a morphogenus of fern foliage recalling the family Matoniaceae, but lacking diagnostic characters of this family: sori consisting of radially arranged sporangia having Matoniaceaeporites spores in situ. Further, a new

■ **Fig. 65.** *Nathorstia angustifolia* Heer, Pattorfik. Lectotype (S112130), fragment of pinnule (from Kvaček & Dašková 2007).

genus *Konijnenburgia* was introduced for accommodation of fertile well preserved ferns of the family Matoniaceae, which were previously assigned to the genus *Nathorstia* Heer. It is based on *Konijnenburgia latifolia* (Nathorst) comb. nov. from the Upper Cretaceous of Greenland. The lectotype of *Konijnenburgia latifolia* is suggested and its status is discussed. *Konijnenburgia bohemica* is described from the Upper Cretaceous, Cenomanian of the Czech Republic and compared to *K. latifolia* and other Cretaceous members of the family (Kvaček & Dašková 2007).

KVAČEK J. & DAŠKOVÁ J. (2007): Nové výsledky výzkumu křídových kapradin z čeledi Matoniaceae. – *In:* ZLINSKÁ A. (Ed): *8. Paleontologická konferencia, Bratislava, June 14–15, Book of Conference Abstracts*: 60. Bratislava.

No. IAAX00130702: **Hydrodynamic concept of stromatactis formation in geology** (Project Leader: *J. Hladil*; *L. Koptíková*, *L. Lisá*, *P. Čejchan*, *J. Adamovič*, *J. Janečka*, *P. Kubínová*, M. Růžička, J. Drahoš, L. Kulaviak, M. Večeř, J. Havlica, J. Vejražka, M. Plzáková, M. Zedníková, S. Orvalho-Kordačová, Institute of Chemical Process Fundamentals of the ASCR, v. v. i., Praha, Czech Republic)

The purpose of the studies was to examine the effect of the gapped grain-size modes of particulate suspensions on the development of lateral inhomogeneities during the sedimentation and resultant hole pattern structures in the deposited bed which are related to sealed and overpressured domains in combination with partial fluid escape. In the next steps, a special emphasis was placed on the analyses of the systems with admixtured, porous coarse grains of given shapes, as well as viscosity of the fluid and role of the accessory surface active agents (both related to salinity of water and content of dissolved organic compounds). The experimental results were compared with the structures which were identified in the sedimentary beds of natural, geological sedimentary systems and vice-versa. In relation to natural systems, the studies on Devonian stromatactis-containing limestones of the Barrandian area were particularly advantageous.

Subproject 1: **Stromatactis-stromatactum systems – main constraints from rheology.**

The term stromatactis (introduced by Dupont in 1892, and redefined by Bathurst in 1982) is used as a traditional name for cavity-filling spar network in limestones whose elements have flat to slightly undulose smooth lower surfaces and digitate upper surfaces. The meaning of this term was quite misunderstood, and often related to additional diagenetic fabrics, but the kernel of the problem is that these structures are related to event deposition of rapid-energy-dissipation particulate mixtures. The experiments unveiled the relationships to original holes in the sediments which were termed stromatactum pattern formation (Hladil & Růžička 2007). The most general and simplified conclusions from the relevant, wide ranging and innovative studies are as follows.

The capability of the system to work requires. (1) delivery/generation of a medium-dense well-mixed particulate suspension (slurry) of specific composition; (2) i. e. containing 3 (to 5, rarely more) extremely various modes of grains (in size, shape and density; effective differences between equivalent diameters graded by coefficients between 1.5 and 2.5); (3) a considerable 'frequency' separation of these modes to discrete distribution with gaps between them; (4) the presence of bizarre-shaped grains with porous/rugged-surface or mucus-coatings (this generally increases yield stress, adhesion and friction; further, the tendency of such slurry to form a layer with lateral inhomogeneities/ patchy pattern formations; and subsequently, e. g., the arching –vs– Boycott effects acting in the earliest consolidation processes); (5) sufficient amounts of certain fine-grained fractions (silt to finest sand categories) and unusually coarse-grained ones (sand to finest gravel sizes); 15–25 % contents

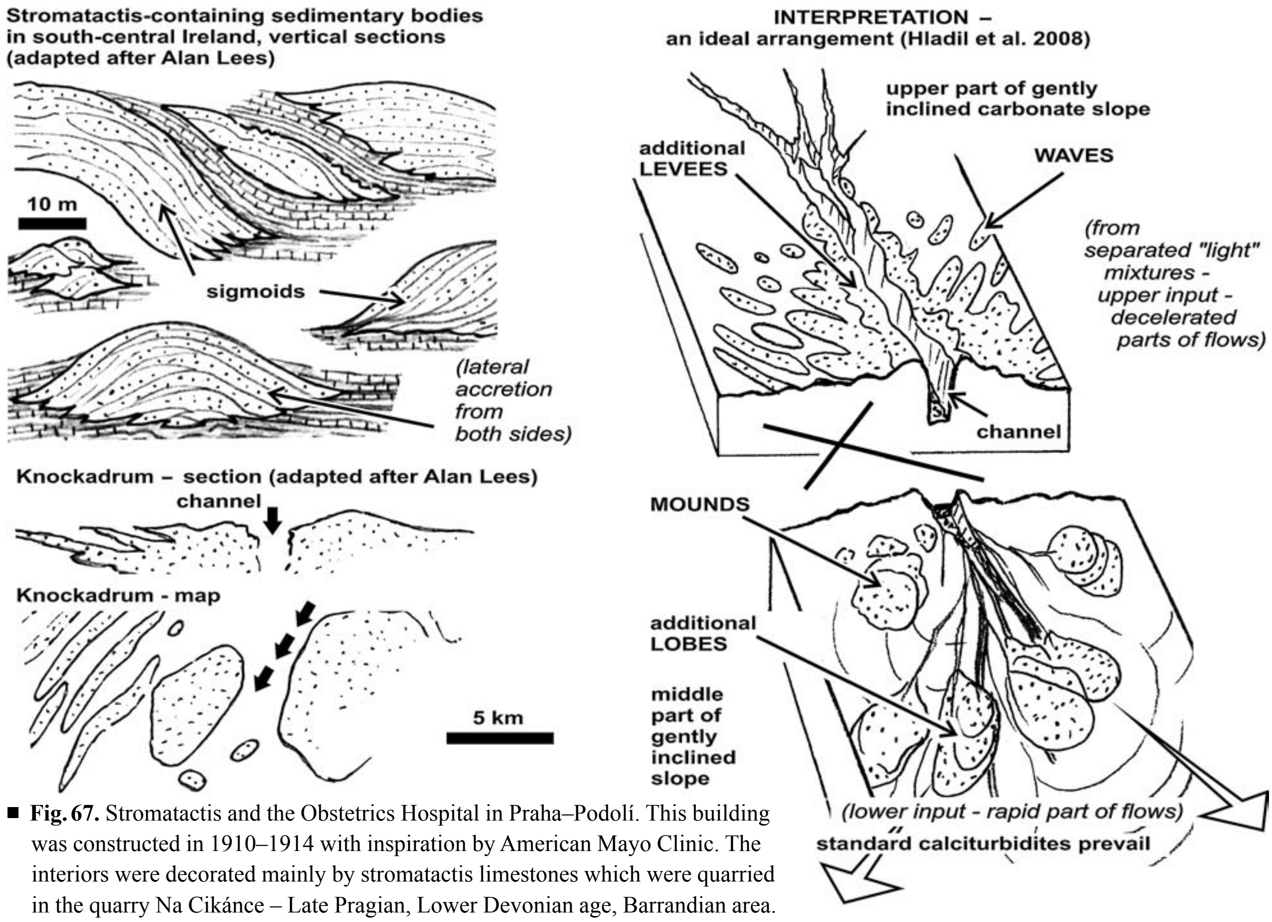
■ **Fig. 66.** Stromatactis and Obecní dům palace in downtown of Praha. Decorative stones on several palaces and important buildings in Praha are limestones with stromatactis pattern fabrics which developed in rapidly sedimented mud-bioclastic lobes and banks under the storm wave base. These limestones were quarried close to Praha, in Barrandian area, particularly in quarries Na Cikánce a Červený lom u Suchomast. The depicted examples originate from the interiors of the Obecní dům (Czech Art Nouveau architecture from years 1905–1912). Figures A and B show bedding-parallel sections of these structures that were controlled by combination of water escape, sealing and high internal stress/friction in these materials, and figures C and D illustrate their vertical sections. The arrows show direction of sedimentation (down). Illustration to GA AS CR Project No. IAAX00130702 (2007).

are effective; (6) the deceleration of slurry plume (or their part) above the substrate/floor, rapid energy dissipation and vertical to slightly oblique sedimentation; (7) i. e., generation of the lower slurry/sediment layer of the bulk/heavy, sub-randomly 'catapulted down' grains, middle layer with lateral inhomogeneities /patchy pattern formations and upper (sealing) layer of (quasi)homogeneous finest material; (8) lightly increased salinity and contents of organic surfactants.

The system can particularly be inhibited by: (1) higher dilution of turbulent particle-laden flows; (2) rapid lateral movement over the substrate/floor, and high horizontal component of the movement of 'catapulted down' – sedimented/accumulated grains (shear stress); (3) other conditions governed by shear stress, such as strong differential movements between the lower, middle and upper slurry/sediment layer, to sliding during consolidation of the sediment; (4) low separation of grain-size (or also shape and density) modes in the involved particulate material; (5) strong predominance of only one or two fractions in such types of relevant mixtures; (6) presence of subrounded and uniformly sized grains, i. e., many types of 'normal' silts and sands and particularly their well-sorted and rounded varieties which become very fluid; (7) extremely high salinity and contents of organic surfactants.

Selected accompanying or similar (but different) voids-in-sediment are: (1) the intergranular megapores and shelter cavities, classical or passing to 'stromatactum' pattern formation; (2) the voids formed by additional microbubble-driven flows and/or secondary 'eruption' of the overpressured fluids which escape from a porous 'stromatactum' layer – the diffuse, conical or pipe-shaped canals end in a secondarily opened subhorizontal crevices that often follow the contacts between beds; (3) secondary voids after the collapse of the original 'stromatactum' voids – irregular voids may be preserved in new, quasi-randomly distributed locations; (4) voids with obtuse or umbrella-type ends – separate or modified objects that originate due to pressure of large coalescent bubbles (mostly related to decay of organic matter); (5) solution cavities developed either on network of patchy pattern formation or separately (related to migration of 'first aggressive brines' if these were available); (6) collapse or sinking structures roofed by the arching-effect or early cemented roofs, and so forth.

The interdisciplinary research project on fluid mechanics of multiphase systems with particle-laden flows made progress in areas targeted for both the experimental and theoretical work, see the list of outputs on *http://home.gli.cas.cz/hladil/www/strmtc1.htm*, where besides the technical studies jointly developed in both the geoscience and chemical engineering also the traditionally most problematic relevant geological issues were addressed. The latter principally concerns origin and sedimentary forms of carbonate sediments with stromatactis-shaped cavities as they



■ **Fig. 67.** Stromatactis and the Obstetrics Hospital in Praha–Podolí. This building was constructed in 1910–1914 with inspiration by American Mayo Clinic. The interiors were decorated mainly by stromatactis limestones which were quarried in the quarry Na Cikánce – Late Pragian, Lower Devonian age, Barrandian area. The stromatactis structures in vertical section (left) contain both the preserved, subsequently cemented holes (white in the picture), and collapsed openings (dark brown ones). Very typical are eruptions of over-pressure chambers (upper left). Dark blue arrows mark the direction down, and the yellow ones point up, indicating the above mentioned eruptions. The polished limestone surfaces contain also a nice bedding-parallel section (right column). Illustration to GA AS CR Project No. IAAX00130702 (2007).

are recorded in major relevant sedimentary systems in the Earth history. Such systems are, for example, greatly represented in the Irish Waulsortian where they extend over distances of several hundreds of kilometres. However, also our country provides nice examples of these structures, e. g., in the Devonian of the Barrandian area, and lots of these structures can easily be observed by every people, because the stromatactis-containg limestone is often used as a decorative-stone material (Figs. 66 and 67).

Subproject 2: **Stromatactis-containing mounds are not "classical *in situ* mudmounds" but rapidly sedimented levees, waves, mounds and lobes related to allochthonous sediment input.**

In this context, even the basic interpretation of sedimentary architecture has to be revised to be consistent with the observed facts. The classical concept of the deep-water stromatactis-containing mudmounds related to in-situ accumulation with remarkably strong organomineralized-cementstone and biotic-bafflestone growth mechanisms appears to be impaired by several factors, particularly by the presence of cyclic and event stratification (discrete portions of rapidly deposited sediment), occurrence of inclined beds (sigmoids and/or accretion on both sides) and well-founded deceleration of lateral movement which transformed into stacking and thickening of extremely polydisperse and multimodal suspensions and was continued by a rapid collapse and sedimentation (an hydraulic jump).

The most apparent sedimentary forms are thick, additional proximal levee deposits of leveed-channel systems which relate to laterally far more extended forms of waves, mounds and lobes. In spite of the fact that stromatactis-containing sediments are rich in mud fraction, they regularly contain also a very substantial, though disregarded by many previous authors, amount of bizarre shaped, light and porous bioclasts and lithoclasts of several and usually gapped modes of size, texture and shape variations, where the involved objects are often of millimeter to centimeter width (Fig. 68). In the Irish Waulsortian, the most common original stromatactum-forming mixtures consisted predominantly of very fine silt, medium silt, very fine sand and very coarse sand sized carbonate particles (gapped fractions) where the inhomogeneity triggering particles are several millimetres large semi-lithified lumps and pieces of fenestellid bryozoan meshworks of widths of up to several tens of millimeters (Fig. 69). The crinoid and shelly fauna skeletal remains are present, but their amount and overall effects on the origin of "stromatactum lateral inhomogeneity and water escape" fenestral fabrics are slight compared to the above mentioned lumps and fenestellid meshworks. This high-disperse, multimodal and comparatively light material was derived from storm-induced turbulent gravity flows, being separated from the more or less standard calciturbiditic material along the trajectory of these flows. What is very typical for these separately deposited materials is the presence of numerous, allochthonous crinoidal, algal, bacterial, bryozoan and sponge remains that were collected on various places of the ramp and slope. The field documentation gives also remarkable data about vertically to subvertically embedded convolute and orthoconic cephalopod shells that were rapidly "snowed up" by the collapsing stromatactum-forming material.

The distinctively shaped levees, waves, mounds and lobes of periodically but rapidly and massively deposited sediments with stromatactis bands and swarms are cementites with alternation of formerly high and low porous levels, but they are regularly embedded in compactites, particularly subhorizontally bedded lenticular limestones or laminated calciturbidites.
The main conclusion is that this originally, not secondarily, organized sediment with stromatactis does not correspond to slowly *in situ* accreted mud mounds and polymuds which grew being surrounded by the comparatively more clastic environments, but just the opposite. Hence, these specific sediments correspond rather to coarsely (bio)clastic architectural elements which developed together or in addition to standard storm-induced calciturbidite deposits. The latter have lower grain-size ranges, and deposition characteristics of these two subsystems of gravitational particle-laden turbulent flows relate to quite deep water systems which were mostly below the storm wave base.

The further studies on natural, primarily megaporosity stromatactum-stromatactis fabrics suggest that there is no strict limitation to limestones only, as the collapsed swarms of the stromatactum patchy pattern formations were found also in siliciclastic slurry beds, and quite similar structures were most recently documented also in mounds and lobes of subvertically to obliquely dumped polydisperse pyroclastic materials in aquatic environments. The obtained results show that the basic constraints are those which are related to particulate material parameters and mode of sedimentation, and nothing more.

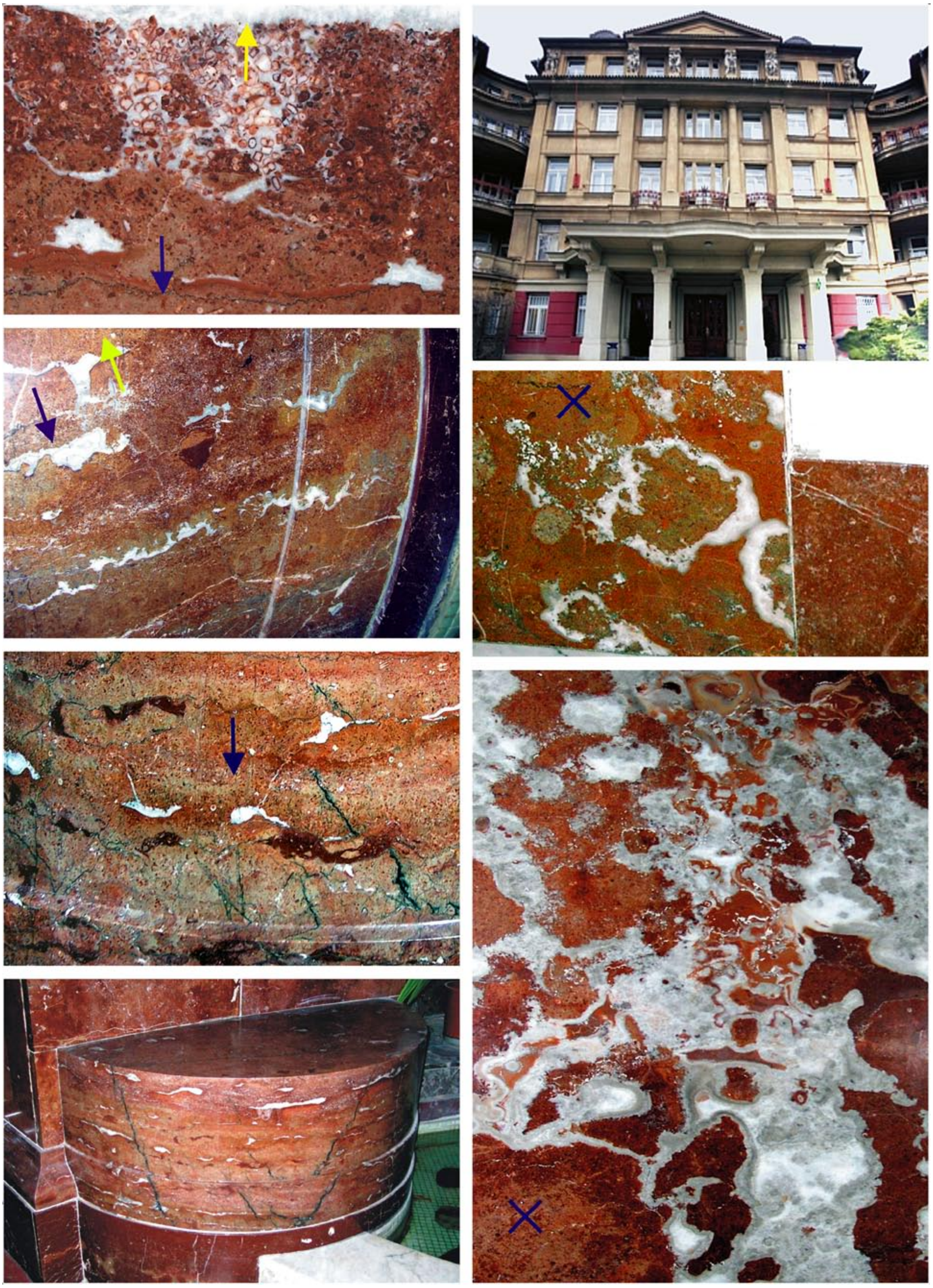
However, the above mentioned carbonate materials have a great advantage that they were capable to preserve these "hole" pattern structures due to effective cementation and rapid overall lithification of the rock. Another advantage is that the related bacterial–sponge–bryozoan–crinoidal– (and similar) carbonate factories, if combined with occurrence of hardgrounds-firmgrounds, calciturbidites, hydrodynamic separation, hydraulic jumps, and other favourable conditions, can produce these wild particulate mixtures sedimenting with mid-layer or periodically occurring holes more easily than any other sedimentary materials and systems can match.

The 2008 theoretical and field support provided by G. Sevastopulo, The Trinity College of Dublin, is deeply appreciated in helping us to understand the system and verify our experimental results which were achieved and published in this direction.

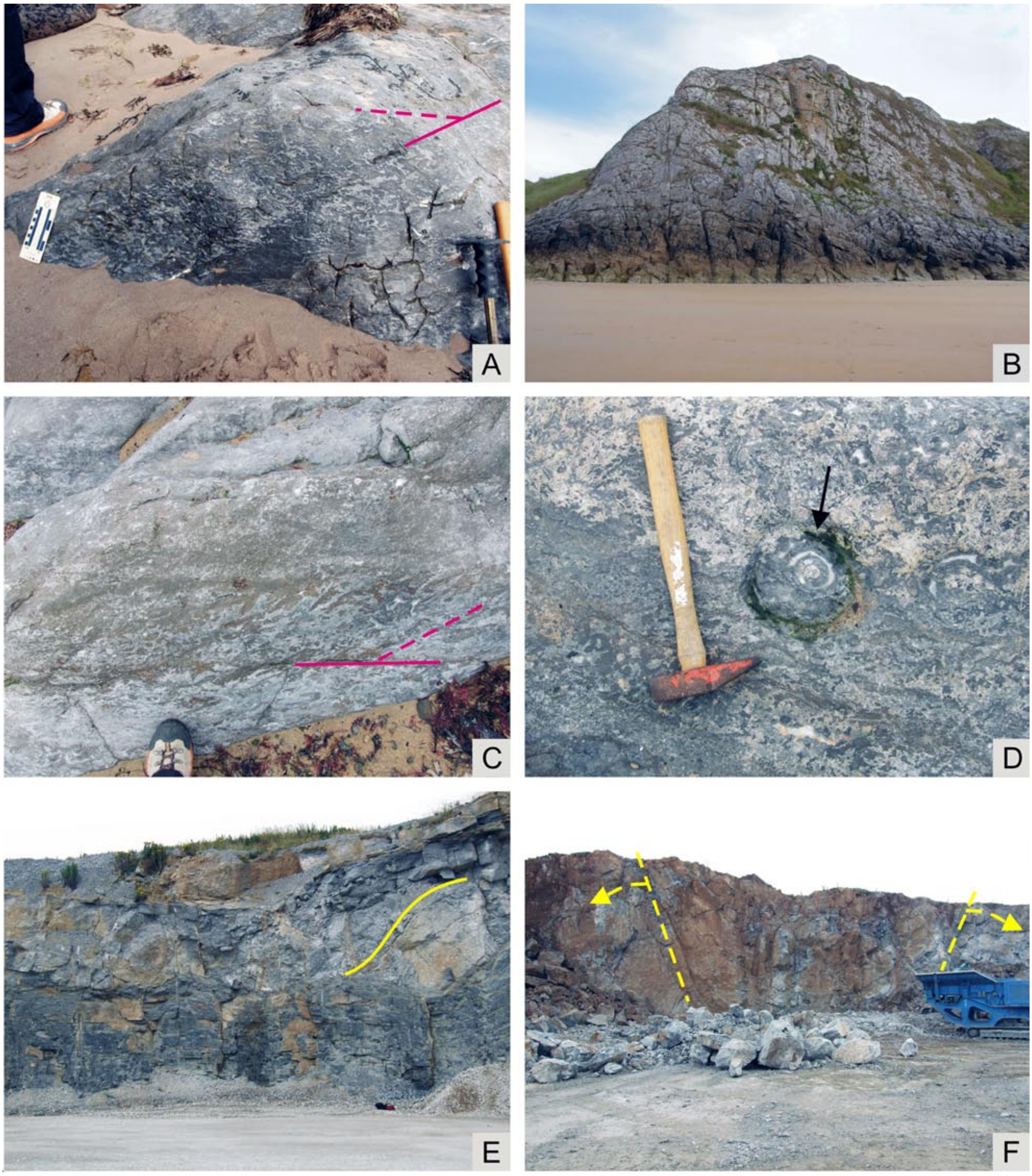
BATHURST R.G.C. (1982): Genesis of stromatactis cavities between submarine crusts in Palaeozoic carbonate mud buildups. – *Journal of the Geological Society, London*, 139: 165–181.

DUPONT E. (1882): Sur l'origine des calcaires dévoniens de la Belgique. – *Bulletin Académie Royal des Sciences de la Belgique, Lettres et Beaux-Arts de Belgique 3°série*, II, 1881(9–10): 264–280.

HLADIL J. & RUŽIČKA M. (2007): Stromatactic patterns formation in geological sediments: field observations versus experiments. – In: GEURTS B.J., CLERCX H. & UIJTTEWAAL W. (Eds.): *Particle-Laden Flow - From Geophysical to Kolmogorov Scales*, ERCOFTAC Series (European Research Community on Flow, Turbulence and Combustion Series), 11, I - Dispersion in environmental flows: 85–94. Springer. Dordrecht.



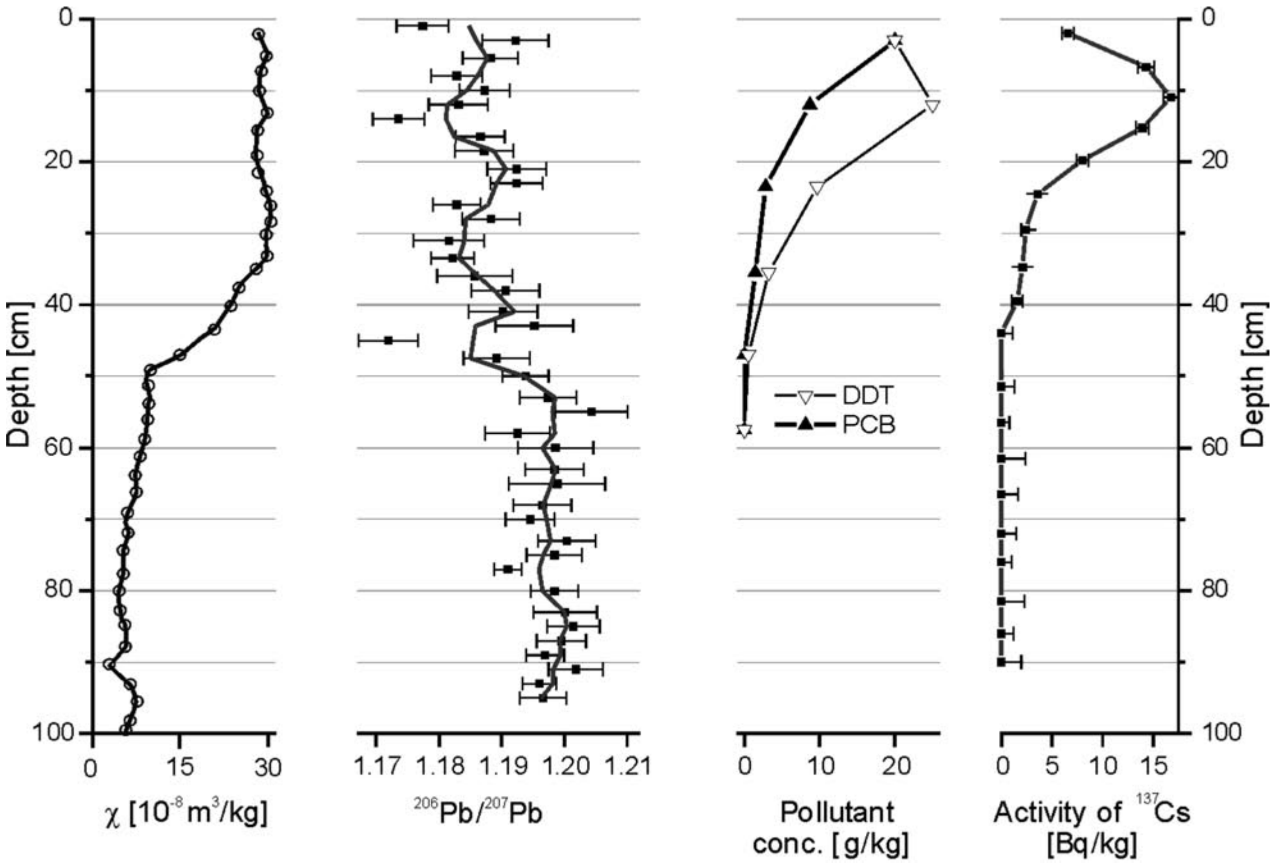
■ **Fig. 68.** The major systems with stromatactis-containing levees, waves, mounds and lobes deposited, most likely, differently than described in present-day papers and textbooks. Illustration to GA AS CR Project No. IAAX00130702 (2008).



■ **Fig. 69.** Irish Waulsortian (Tournaisian, Lower Carboniferous) stromatactis-containing sedimentary structures; A, B – Barrow, south-western Ireland, 15 km WNW of Tralee, under the Tralee Golf Course. Swarms of stromatactis formed oblique to bed contacts (A), and these partial structures compose several tens of meters thick calcilutite and bioclastic (mainly bryozoans) lobes (B); C, D – Ballybunnion, western-central Ireland. The stromatactis swarms are thicker with increased grain-size polymodality and amounts of bryozoan and crinoidal fragments (C). Coiled cephalopod shells, with ballast mud fill and open space in the upper part, were in vertical position when covered by rapidly sedimented material (D). The black arrow marks a cephalopod shell and points downward; E, F – Knockadrum, south-central Ireland. Sigmoids, the shape of lateral accretion on additionally leveed channel margins and waves that spread on sides (E), and buried channel between two sides with these stromatactis-containing additional levees (F). Illustration to GA AS CR Project No. IAAX00130702 (2008).

No. IAAX00130801: **Interplay of climate, human impact, and land erosion recorded in the natural archives of Strážnické Pomoraví CR)** (*J. Kadlec*, *F. Stehlík*, *S. Šlechta*, *O. Man*, H. Svitavská-Svobodová, Institute of Botany AS CR, v. v. i., Průhonice, Czech Republic, T. Grygar, Institute of Inorganic Chemistry AS CR, v. v. i., Praha, CzechRepublic, I. Světlík, Nuclear Physics Institute AS CR, v. v. i., Řež, Czech Republic, R. Brázdil, Institute of Geography, Faculty of Science, Masaryk University, Brno, Czech Republic & V. Beneš, D-Impuls Praha, Ltd., Czech Republic)

Behavior of the Morava River in the Strážnické Pomoraví is reconstructed based on multidisciplinary study of both fluvial and eolian natural archives. Fluvial sediments exposed in erosional river banks record processes operating mainly during last millennium based on radiocarbon and AMS datings. We found older Holocene and Late Pleistocene organic sediments using pollen, diatom and AMS dating analyses only at the edge of the Morava River flood plain. The river followed an anastomosing fluvial style during last millennium as shown from analyses of historical maps and air-borne images. The river style has been changed continuously to meandering style with dominating lateral erosion. An aggradation rate was increased due to accelerated anthropogenically induced erosion (deforestation, agriculture). Maximum erosional and following aggradational rates have started around 1950. The values of magnetic susceptibility, magnetite concentration and magnetic grain size have significantly increased since that time. Also organic and inorganic pollutant concentration (DDT, PCB, Pb, ^{137}C) is increasing. The mean sedimentation rate has increased to 0.8 cm per year in comparison with 0.2 at the last millennium beginning. Lateral erosion has increased up to several meters during last flood events.



■ **Fig. 70.** Anthropogenic pollution (from 45 cm upward) coresponding with the last ca. 60 years recorded in the flood-plain sediments of the Morava River. Mass specific magnetic susceptibility, Pb isotope ratio, concentration of DDT, PCB, and specific activity of ^{137}Cs. The line in the panel with Pb isotope composition is a 3-pt running average.

No. KJB300130701: **Zircon growth and its modification during polyphase granulite-facies metamorphism – case study in the Moldanubian Zone of the southern Bohemian Massif** (*J. Sláma* & *M. Svojtka*)

Samples of granulites were obtained from Blanský les and Prachatice granulite massifs and from the Gföhl Unit of the Moldanubian and heavy minerals were separated. Zircons were mounted in epoxy resin and prepared for another analyses on microprobe, EBSD and LA–ICP–MS. Internal textures of zircon crystals were studied using the Cameca microprobe, and suitable grains with older zircon population and obviously younger overgrowth were chosen for another study. These were investigated at the LAREM department of the Czech Geological Survey using the novel EBSD analytical technique to reveal any change in crystallographic orientation of zircon lattice that can supposedly be caused by different chemical-physical properties during the growth of zircon or mechanical disturbance of the lattice. It appeared that most of the observed misorientations were caused by insignificant chemical inhomogeneities in the zircon crystals, by the cracks or by uneven surface of the prepared sample. Some of the larger misfit orientations can be caused by other process as these changes do not correlate with either chemical zoning or mechanical state of the observed zircons. These are the potential zircons where the change of the lattice orientation depending on the crystallization environment can be successfully studied. Currently, Hf separation is being set up in the labs of the University of Bergen. The isotopic composition of zircons and other minerals will be measured on the multi-collector ICP–MS linked with the laser ablation system. The new low-volume ablation cell will allow to decrease the volume of the material necessary while achieving more accurate and precise isotopic analysis of Hf in zircon. As a part of the project there were carried out the final works on the paper describing the new natural zircon reference material for U–Pb and Hf isotopic analysis by laser ablation ICP–MS. Data obtained by different techniques (ID–TIMS, SIMS and LA–ICP–MS) in several laboratories suggest that the Plešovice zircon has a concordant U-Pb age with a weighted mean $^{206}Pb/^{238}U$ date of 336.9 ± 0.2 Ma (ID–TIMS, 95% confidence limits) and U–Pb age homogeneity on the scale used in LA–ICP–MS dating. Solution and laser ablation multi-collector (MC)–ICP–MS analyses of a multigrain sample of the Plešovice zircon (>0.9 wt% Hf) suggest a homogenous Hf isotopic composition within and between the grains. The mean $^{176}Hf/^{177}Hf$ value of 0.282481 ± 0.000013 (2SD) is considered as the best estimate of the Hf isotopic composition in the Plešovice zircon. At this stage of characterization, the homogeneity of Hf isotopic composition in the Plešovice zircon is superior to other natural zircon standards used for laser ablation ICP–MS analysis. Raman spectroscopy, optical and BSE imaging and trace element analysis revealed the presence of strongly radiation-damaged domains in ca 10 % of studied Plešovice zircon grains. These domains are rich in actinides (up to ~3,000 ppm of U and up to ~520 ppm of Th) and appear as bright patches on BSE images that can be easily avoided during the laser ablation ICP–MS analysis. Despite the significant variations in trace element contents that preclude the use of the Plešovice zircon as a standard/reference material for in-situ trace elements analyses, the age and Hf isotopic homogeneity of the Plešovice zircon together with its relatively high U and radiogenic Pb contents makes it an ideal calibration and reference material for laser ablation ICP–MS measurements, especially when using low laser energies and/or small diameters of laser beam required for improved spatial resolution.

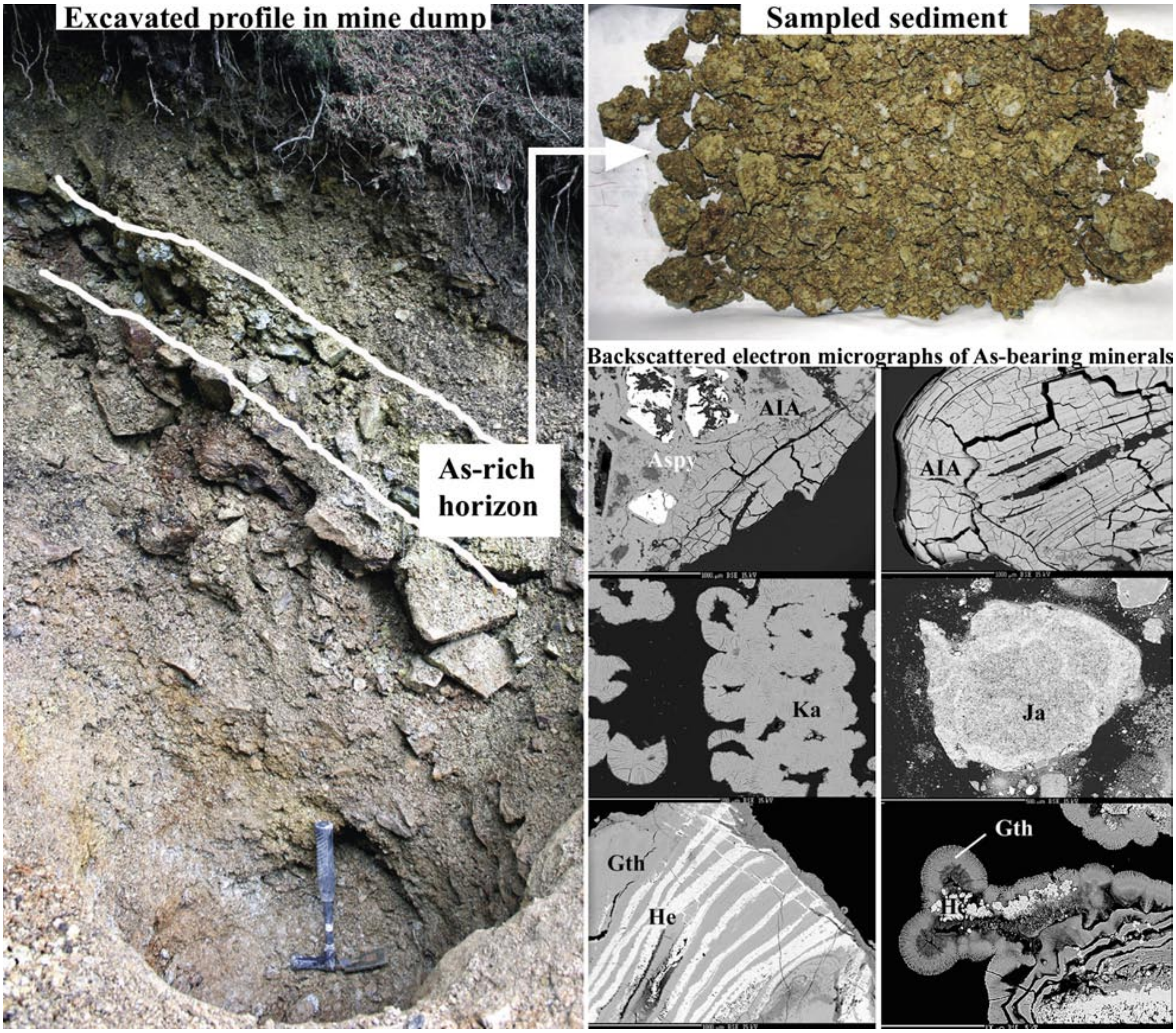
The Raman spectroscopy of more than 2000 SiO_2 inclusions in zircon separates from Gföhl migmatitic gneisses in the Nové Dvory area shows that most of the SiO_2 inclusions are composed of quartz with clear and intense peaks at 464, 393, 266, 207 and 125 cm($^{-1}$). It also reveals that a few SiO_2 inclusions have a weak but clear peak at 521 cm($^{-1}$), which is the most fundamental vibration of coesite, along with typical quartz vibrations mentioned above. The Raman spectrum is composed of the intense vibrations of quartz at 464, 393 and 266 cm($^{-1}$) of quartz and the weak vibration of coesite at 521 cm($^{-1}$) is obtained from the quartz proximal to the relict coesite inclusion in the pyrope of ultra-high-pressure (UHP) rocks in Dora Maira Massif.

A similar Raman spectrum was obtained for quartz transformed from coesite in UHP rocks recovered from the CCSD drillhole of the Sulu belt, eastern China. Therefore, we propose that the SiO_2 phase whose Raman spectrum shows a weak vibration at 521 cm($^{-1}$) existed as coesite in the past.

No. KJB300130702: **Speciation and mobility of arsenic in the soil-water system in locality affected by historical mining** (*M. Filippi* & *P. Drahota*)

Mineralogical and geochemical speciation of As was studied in 2 medieval waste dump profiles and in 4 soil profiles situated at various distances from the dump during the first and the second year of the project. The highest concentration of As was detected in the waste dump (up to 13 wt. %). The concentration of As in the soil (up to 0.6 wt. %) was almost similar in three sites closed to the dump. The mineralogical study of As-bearing coumpounds in the dump indicated predominance of secondary ferric arsenates, scorodite, kaňkite, pitticite, over other As-bearing minerals, such as primary sulphides (arsenopyrite), jarosite, Fe oxyhydroxides (goethite, hematite, lepidocrocite) and rare metal arsenates (beudantite, zeunerite, etc.; Fig. 71). Three single chemical extractions were performed in parallel on bulk samples of waste and soil samples. The most soluble concentrations were determined using a weak diluted sulphate. Although the desorption yields were less than 1 %, dissolved concentrations of As in a weak saline solutions yielded up to 175 mg.l^{-1} in the dump and 10 mg.l^{-1} in the soil. In terms of desorption yield in phosphate extraction, higher values of As were leached from the soil samples (up to 28 %) than from the waste (up to 8 %). This fact indicated higher potential to mobilize As from the specifically adsorbed fraction. The oxalate extraction provided an indication of As: (1) desorbed from poorly crystalline oxyhydroxides in soil desorption yield from 17 to 62 % and (2) dissolved from pitticite, kaňkite and partially scorodite (desorption yield from 45 to 85 %). The latter statement resulted from the dissolution kinetics of ferric arsenates in the oxalate that has been experimentally studied using separated pure compounds from the studied waste dump.

Speciation study of the arsenic in the water-soil system is an important part of the planned research. Thus we constructed and tested (with great contribution of Dr. J. Rohovec, GLI AS CR) a specialized equipment HG–CT–ICP–OES (hydride generation-cryogenic trapping-optical emission spectrometry) for determination of dissolved As species.

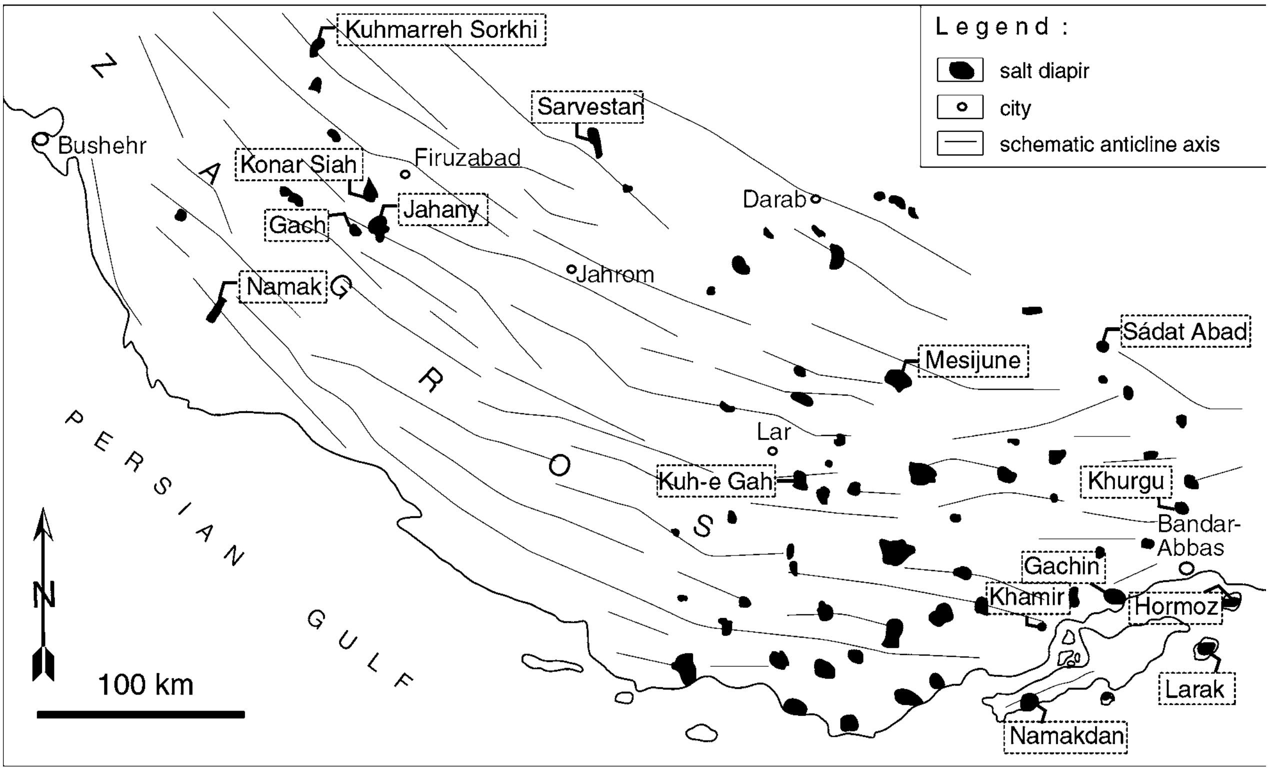


■ **Fig. 71.** Example of the studied profile enriched by arsenic and photos of minerals detected. Abbreviations: AIA – amorphous iron arsenate, ASPY – arsenopyrite, GTH – goethite, HE – hematite, JA – jarosite, Ka – kankite.

No. KJB301110501: **Evolution and dynamics of the salt karst in Zagros Mts., Iran: Denudation rates, age of karst forms, governing factors** (*Filippi M*., *P. Bosák*; Leader of Project: J. Bruthans, Department of Hydrogeology, Engineering Geology and Applied Geophysics, Faculty of Science, Charles University, Praha, Czech Republic)

Eleven salt diapirs in the Zagros Mountains and Persian Gulf Platform with different climate, geology and morphology conditions were studied during the three years of the project (Fig. 72). The obtained results significantly extend knowledge about the development of salt karst in Iran but also of salt karst areas around the world. Some results could be useful also for researches from other fields like salt tectonic or geological development of the Persian Gulf in the Holocene. Besides the below mentioned scientific results, our discoveries and research contributed to the declaration of part of the Qeshm Island as the National Geopark registered by the UNESCO network. Especially the discovery and documentation of the world's longest salt cave (The 3N Cave, 6,580 m) met a wide public response. The following scientific findings are the most important outputs of the grant project.

The age and depositional history of the Holocene marine terraces covering parts of the Hormoz and Namakdan salt diapirs in the Persian Gulf were studied. Their relative altitudes above recent sea level result from a combination of general marine transgression/regression affecting the whole area, and of local uplift related to salt diapirism. Differential uplift rate of the studied diapirs in center-to-rim profiles was calculated from: (1) radiocarbon ages of skeletal remains of benthic faunas, which originally grew mostly close to sea level; (2) original altitude of samples, estimated from general sea-level oscillation curves for the last 10 ka, and (3) present sample altitude measured in the field. The calculated uplift rates on both diapirs increase from rim to center in the range from: 2 mm.ka^{-1} at the rim to 5–6 mm.ka^{-1} in the interior of Hormoz, and 1–3 mm.ka^{-1} on the rim to



■ **Fig. 72.** Generalized map of the visited salt diapirs in Iran.

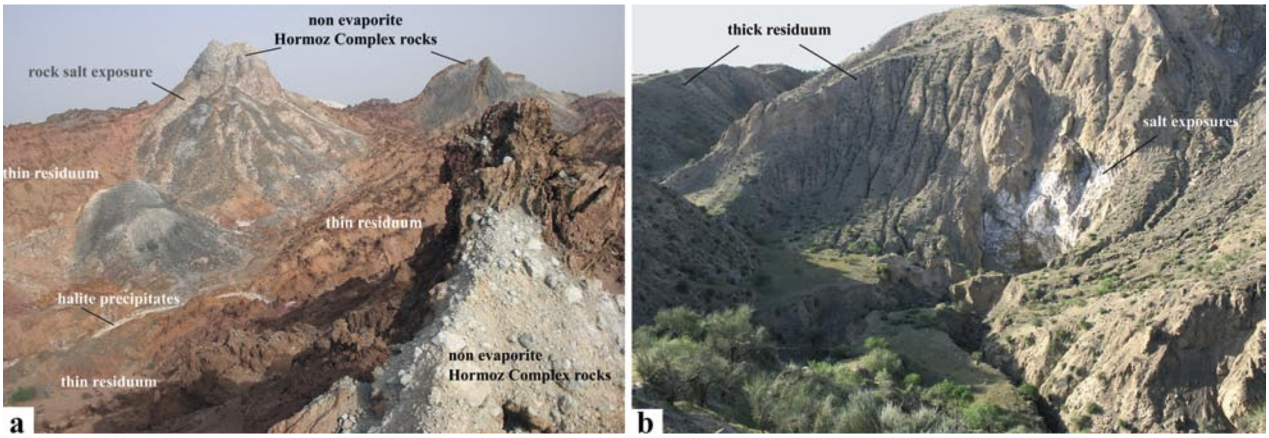
3–5 mm.ka^{-1} in the interior of Namakdan. The depositional history on both salt diapirs is similar. Marine sedimentation started at about 9.3 ka BP on Hormoz and at 8.6 ka BP on Namakdan. Owing to rapid transgression, the sea partially truncated both salt diapirs, rapidly deepened, and carbonate mud was deposited on the peripheries of both salt diapirs. Between 7 and 5 kyr BP, beach deposition replaced carbonate mud. Soon after 5 ka BP, the sea retreated from most of the marine terraces on both salt diapirs.

Salt exposures and weathering residua on several salt diapirs located at different geographic/climatic settings were studied. Anhydrite, gypsum, hematite, calcite, dolomite, quartz, and clay minerals are the main constituents of the weathering residuum covering the salt diapirs in various thicknesses. Erosion rates of the residuum as well as of salt exposures were measured at selected sites for the period of 5 years by plastic pegs as benchmarks. Recorded data were standartized to a horizontal surface and to long-term mean precipitation. For the salt exposures, long-term denudation rates were determined at 30–40 mm.a^{-1} for coastal diapirs and up to 120 mm.a^{-1} for mountain salt diapirs. Long-term mean superficial denudation rate measured on weathering residua of low thickness reached 3.5 mm.a^{-1} on coastal diapirs. The total denudation rate estimated for the thin residuum is close to 4–7 mm.a^{-1} based on apparent correlation with the uplift rate on Hormoz and Namakdan diapirs. Denudation of salt exposures is much faster compared to parts of diapirs covered by weathering residua. The extent of salt exposures is an important factor in the morphological evolution of salt diapirs as it can inhibit further expansion of the diapir. Salt exposures produce huge amounts of dissolved and clastic load, thus affecting the surroundings of the diapir.

Surficial deposits covering salt diapirs (Fig. 73) were studied from the mineralogical and chemical point of view. Subaerial residuum formed from admixtures dissolved from rock salt is by far the most abundant material on the studied diapirs. Fluvial sediments derived from this residuum are the second most frequent type of deposit. Submarine residuum and marine sediments were found on diapirs on islands in the Persian Gulf. The chemical compositions vary among three selected end-members: evaporite minerals (gypsum and anhydrite), carbonates (dolomite and calcite) and silicates-oxides (mostly quartz, phyllosilicates, and hematite). Compared to the original rock salt composition, the surficial deposits can be enriched either in gypsum (deeper part of the residuum) or in silicates-oxides (upper part of residuum) in a semi-arid environment or with carbonates (mainly in submarine environment). Halite is mostly leached out from surficial deposits even in arid climates.

A model of water flow, mineral redistribution in subaerial residuum and landscape evolution was established. Based on infiltration tests on various types of surficial deposits, most of the rainwater will infiltrate, while overland flow predominates at rock salt exposures. The source material and climatic conditions and vegetation cover and relief dynamics are the main factors affecting the residuum development and erosion. The recharge concentration and thick fine sediments support relatively rich vegetation cover and even agricultural practices in some places.

There is a difference in the residuum type and landscape morphology between the relatively humid NW part of the studied area and the arid SE part and the Persian Gulf coast, in the NW the medium and thick residuum seems to be stable under the current climatic conditions and very thin and thin residuum tends to



■ **Fig. 73.** Examples of different salt diapir surface morphologies connected to various thicknesses of the surficial deposits: (a) very thin residuum with Hormoz Complex blocks in central part of Hormoz diapir ~ no vegetation, karst phenomena of small extent; (b) deep valley developed in moderate to very thick residuum. Salt exposures are only at the place of the ponor wall ~ relatively rich vegetation, karst phenomena of large extent. The Jahani diapir. Photos: a) modified from Bruthans et al. (2009), b) by M. Filippi.

evolve into thick residuum over time even on steep slopes. Large sinkholes and blind valleys with sinking streams are formed on thick residuum. Rock salt exposures and thin residuum are scarce. At the Gach, Mesijune, Namak and Saadat Abad diapirs, on the contrary, areas covered in the past by thick residuum are being eroded and replaced by very thin or thin residuum.

Badland-like landscape or fields of small sinkholes are evolving there. Steep slopes are commonly formed by rock salt exposures. At these diapirs, very thin and thin residuum seems to be stable in the current climate on gentle slopes and salt exposures on steep slopes. The thick residuum type can support relatively rich vegetation cover. If covered by vegetation it has very low erosion rates. On the contrary salt exposures and thin residuum are rapidly eroded. The triggering factor for change in the residuum type seems to be vegetation destruction on diapirs, probably caused by climate transition from wet to arid around 6 ka BP. During the wet period, the diapirs rose and salt glaciers expanded as the influx of the salt mass was much faster compared to the erosion. After the onset of an arid climate, the thick residuum (protecting cover) started to be eroded; erosion rates increased considerably on the new surfaces, and the rise in the diapir surface rise decreased or even reversed (retreating salt glaciers at the Namak diapir).

BRUTHANS J., ASADI N., FILIPPI M., VILHELM Z. & ZARE M. (2008): Erosion rates of salt diapirs surfaces: An important factor for development of morphology of salt diapirs and environmental consequences (Zagros Mts., SE Iran). – *Environmental Geology*, 53, 5: 1091–1098.

No. IAA300130612: **Combined magnetostratigraphic studies of Cenozoic volcanics, Bohemian Massif** (Project Leader: *V. Cajz*; *J. Dašková*, *M. Chadima*, *M. Konzalová*, *P. Pruner*, *P. Schnabl*, *S. Šlechta*, *J. Ulrych*, *D. Venhodová*, F. Holub, F. Hrouda & V. Tolar, Faculty of Science, Charles University, Praha, Czech Republic)

Volcanological research in the area of Bohemian Paradise resulted in a description of the Jičín Volcanic Field and an interpretation of its activity. Relics of solitary volcanic edifices represent products and vents of scattered Strombolian eruptions of basanitic magmas mostly ascending along E–W-striking faults. Nearly all studied volcanoes erupted in a similar style, mostly not producing larger lava flows. Some of them were slightly influenced by phreatic component. This volcanic activity took place mainly during the Miocene (24.6–16.5 Ma). The lavas on Kozákov Hill were produced by much younger volcanic activity (6.7–3.5 Ma) and one of the studied locations is supposed to represent their feeder. Based on the interpretation of the exposed facies with the use of radiometric data, a new insight in relief evolution of this area was introduced. Erosion of Cretaceous marine deposits was very intensive during Oligocene, whereas only some 70 m of weak sediments were eroded during the last 17 My. Young strike-slip movement (less than 5 Ma) was detected in the lavas.

Magnetomineralogical research discovered titanomagnetite with a variable amount of Ti in the structural lattice as the main carrier of magnetic properties of lavas. The maximum content of TiO_2 in lattice reaches up to 18 %. The samples with Ti-rich titanomagnetites have magnetic susceptibility in the high field of the inducting coil 20 % higher than in the low field. The Ti-low titanomagnetites show high-field susceptibility similar to the low-field one. The dependence of magnetic susceptibility on temperature on these samples had shown variable Curie temperature: between 200–250 °C for the first group and 500–580 °C for the second group. Magnetic declination for samples from the Krušné hory Mts. with normal paleomagnetic polarity shows 54° and inclination 66°. For reversed polarity samples declination reaches 204° and inclination –68°. The angle of declination between normal polarity and reversed polarity samples should be 180°, but the data differ. The area of the Krušné hory Mts. is characterized by 150°, the České středohoří Mts. by 170°. This anomaly is supposed to be caused by secular variation and we are collecting evidence for its explanation. Some sampled rocks are so magnetic that their magnetic field is affecting the measurement by magnetic compass. Therefore, we had designed a new sampling apparatus for measurement from greater distance and a new sun compass that is not affected at all.

Magnetic fabric (anisotropy of magnetic susceptibility) of selected volcanic dikes associated with the Eger Graben was studied in order to determine magma flow direction. In all dikes, titanomagnetite with variable Ti-content was identified as well. The degree of magnetic anisotropy is relatively low, usually less that 10 %, and lithology-dependent. The differences in the degree of anisotropy may reflect the differences in viscosities of the respective magmas; consequently, different mechanisms orienting magnetic minerals should be expected. According to rock type both so-called normal (bostonite and trachybasalt) and inverse (camptonite) magnetic fabrics were found. Inverse fabric may be caused either by geological (perpendicular orientation of magnetic minerals with respect to dike margins) or physical reasons (presence of single-domain magnetic particles). Anisotropy of magnetic remanence indicates that the observed inverse magnetic fabric is caused by the presence of single-domain grains. Software for anisotropy data evaluation was developed.

No. IAA300130706: **Geochemistry, petrography and rock magnetic properties of the high- and low-Ti alkaline basalts from intra-plate riftogenic setting** (*J.K. Novák*, *J. Ulrych*, *L. Ackerman*, *P. Pruner*, *P. Schnabl*, *R. Skála*, *G. Kletetschka*, *M. Lang*, Z. Řanda, J. Kučera, Institute of Nuclear Physics, Řež, E. Jelínek & M. Mihaljevič, Faculty of Science, Charles University)

The high-Ti basaltic rocks are obviously recognized as flood tholeiite lavas in the large igneous provinces (LIP), those as the Caroo/southern Africa or Paraná/Brazil, but the generation of high-Ti basaltic magma types has been rarely reported in an intra-continental rift setting. Such basaltic rock association was found in the uplifted shoulder of the Ohře (Eger) Rift, providing an extraordinary example for Cenozoic Volcanic Province of central and western Europe. Specific high-Ti (mela)nephelinite types (3.5–5.2 wt. % TiO_2) and medium-Ti tephrite–phonotephrite series (2.5–3.5 wt. % TiO_2) occur as solitary bodies around the Loučná- Oberwiesenthal Volcanic Centre (LOVC) in the Krušné hory/Erzgebirge Mts. which is essentially built by low-Ti olivine-poor nephelinites.

Geochronological K/Ar data indicate that there are at liest two volcanic suites: (1) Late Eocene–Middle Oligocene (33–28.5 Ma) suite, nephelinitic to phonolitic in composition, is represented by remnants of the LOVC; the solitary high-Ti melanephelinite bodies at Rudná Hill near Potůčky and Vysoký Špičák Hill near Kovářská are associated, and (2) Late Oligocene to Middle Miocene (25.8–11.9 Ma) suite, melanephelinitic, tephritic to phonotephritic, and basanitic in composition, is crucial for understanding the volcanic development. Short volcanicity gap between both suites could be related to sedimentation of siltstone, tuffite, and lake limestone within the maar structure at Hammer-Unterwiesenthal and České Hamry. Solitary bodies are emplaced in the vicinity of Kovářská, Boží Dar, Jáchymov, Abertamy, and in several places in Saxony.

The olivine-poor nephelinite lavas of the LOVC are classified as low-Ti (LT) types, with 1.8–2.5 wt. % TiO_2 and lower Mg# (37–53). Local enrichment in TiO_2 is related to the effects of mixing/mingling with the alkali pyroxenite–ijolite xenoliths and/or their disintegred remnants (e. g., at Loučná-Vyhlídka).

Most of the high-Ti mafic lavas possess melanephelinitic, rarely olivine nephelinitic composition and belong to the younger volcanic suite. On the basis of major- and trace element ratios as well as Sr-Nd isotopic ratios $^{87}Sr/^{86}Sr(t)$ = 0.70347–0.70397 and $^{143}Nd/^{144}Nd(t)$ = 0.5128–0.5127) they are characterized by highest TiO_2 contents (in the range of 3.5–5.2 wt. % TiO_2), relatively high Mg# (55–69), and high values of Ti/Y ratios (1,156–891). The Al_2O_3/TiO_2 ratios (3.03–4.3) at 13.37–17.38 wt. % Al_2O_3 indicate a marked difference to the medium-Ti compositional group. The REE patterns show highly fractinated LREEs (with $[La/Yb]_N$=35.5–44) and flat HREE patterns (with $[Tb/Yb]_N$ = 2.9–3.2). The principal hosts for the titanium and REEs are zoned $Ti\text{-}Fe^3$ diopside and titanomagnetite. Kaersutite, Ba-Ti phlogopite, perovskite, titanite, and Cr-spinel (mantled by titanomagnetite) occur in an accessory amount. The Sr-Nd isotopic data are consistent with mantle sources of HIMU-affinity.

The medium-Ti compositional group of tephrite and tephriphonolite is divided on the variation in Mg#, Ti/Y, Sm/Yb and Al_2O_3/TiO_2 ratios. The Ti/Y ratios range from 383 to 543 at 2.41–2.70 wt. % TiO_2. A most significant feature of this group is (a) stronger fractioned LREE pattern, (b) weak Eu-anomaly (Eu/Eu* = 0.86–0.94), and (c) high Al_2O_3/TiO_2 ratios.

All geochemical data are based on the results of instrumental neutron and photon analyses (INAA and IPAA, respectively). INAA included short and long-time irradiation by neutron-pile neutrons (ST-INAA and LT-INAA, respectively), and also short-time irradiation by epithermal/fast neutrons (ENAA) under a Cd shielding. ST-INAA enabled determination of Na, Mg, Al, K, Ca, Ti, V, Mn, Co, Ba. Dy, and U, while ENAA allows determination of Si, V, and U. The LT-INAA is useful determination of Na, K, Rb, Sr, Ba, Cs, Ca, Sc, Cr, Fe, Co, Zn, As, La, Ce, Nd, Sm, Eu, Gd, Tb, Tm, Yb, Lu, Hf, Ta, U, Th, and U. The IPAA utilizing bremsstrahlung produced in amicrotron was used as a complementary method.

New magnetomineralogal data of (a) the high-Ti melanephelinite s.s and olivine nephelinite as well as (b) medium-Ti tephrite to phonotephrite and low-Ti basanite were combined with rock-magnetic experiments. It is evident that rock magnetic properties are mainly controlled by modal abundances and variations in titanomagnetite composition. The influence of dusty titanian magnetite, which was generated by breakdown of minor olivine (e. g., that in basanite and olivine nephelinite) seems to be negligible. Two distinct compositions and populations of titanomagnetite can be generally recognized: (i) titanomagnetite composed of dominating ulvöspinel, magnetite and (magnesioferrite), and (ii) that composed of dominating ulvöspinel, magnesioferrite and magnetite end-members. As an exception, Cr-rich spinel with a variable proportion of oxides, such as Cr_2O_3 (19.4–34.5 wt. %), Al_2O_3 (12.8–18.5 wt. %), MgO (6.7 – 9.9 wt. %), and TiO_2 (0.12 -8.2 wt. %), is mantled by titanomagnetite in some samples.

Magnetic susceptibility variations of Ti-rich titanomagnetite (12.7–20.1 wt. % TiO_2) are reflected in the Curie temperature (*Tc*) which was measured in the heating/cooling cycles. Representative χ- T curves for almost all samples are relatively similar and irreversible in their course, showing two prominent humps (Tc_1= at 200–320 °C and Tc_2 = 500–580 °C). Some samples possess lower Curie temperature *Tc* after heating; this result might be associated with relict of unoxidized titanomagnetite.

Field dependence parameter k_{HD} of the studied rocks ranges from 5.3 to 18.6 %, corresponding with increasing TiO_2 content in titanomagnetite lattice, while that for one sample is exceptionally low (k_{HD} = 0.86 %), indicating titanian magnetite composition. Magnetic hysteresis data document that most samples have pseudo-single domain (PSD) and multi-domain state.

No. IAAX00020701: **Long-term development of cultural landscape of Central Bohemia as a co-evolution of human impacts and natural processes** (Project Leader: P. Pokorný, Institute of Archeology of the AS CR, v. v. i., Praha, Czech Republic)

Subproject: **Molluscan thanatocoenoses as paleoenvironmental indicators in archaeological context** (*J. Hlaváč*)

Paleomalacological research resulted from the study of molluscan thanatocoenoses from the archaeological site at Kněževes (Praha) with recognized Knovíz and Štítary cultures – the Middle and Late Bronze Age. Thanatocoenoses are composed of gastropod and bivalve species with different microclimatic requirements. Beside the freshwater species such as middle-sized bivalves *Unio crassus*, *U. tumidus* and *U. pictorum*, and dwarf gastropod *Gyraulus albus* that they are considered as of allochthonous origin, coming from surrounding waters (Únětický Brook, Vltava River), many terrestrial species were found. The thanatocoenoses of terrestrial species are characterized by the presence predominantly of steppe species and species of open habitats, such as *Chondrula tridens*, *Pupilla muscorum*, species of genus *Vallonia* and *Vertigo pygmaea*, accompanied by species of shrubby and semi-covered habitats (*Helix pomatia*, *Cepaea hortensis*, *Fruticicola fruticum*). The thanatocoenoses of hygrophilous species were found with the presence of typical indicators such as *Vallonia enniensis* and *Vertigo angustior*, the species fixed to the open wetlands with stable hydrological conditions.

On the basis of molluscan thanatocoenoses it can be stated that the paleoenvironmental conditions at the archaeological site of Kněževes and its surroundings are characterized as predominantly open to semi-open habitats with the presence of sporadic shrubby cover as the result of human impact during the settlement activity.

4d. Grants of the State Departments

Ministry of Economics and Trade of the CR, Project No.1H-PK/31: **Methods and tools for evaluation of effect of engineered barriers on the distant interactions in the environment of deep repository facility** (Project Leader: M. Vaněček, Isatech Ltd., Praha, Czech Republic)

Subproject **Methods and tools for evaluation of effect of engineered barriers on the distant interactions in the environment of deep repository facility** (M. Vaněček, Isatech Ltd., Praha, Czech Republic, M. Milický, Progeo Ltd., Roztoky, Czech Republic, J. Záruba, Stavební geologie – Geotechnika, a. s., Praha, Czech Republic, *T. Navrátil* & *J. Rohovec*)

The borehole pattern at village of Panské Dubenky (located near Horní Cerekev, at Českomoravská vysočina Highland) was laid out on the basis of geological and geophysical survey. Primarily two test boreholes were used for calibration of the geophysical survey. The area of interest was than characterized on basis of hydrogeological measurements and calculated hydroisohypse. During the field work in the Panské Duběnky quarry it was necessary to screen just a particular section of the hydrodynamic flowpath. Single-cell obturator was developed and constructed by the project team in order to secure the screening of the model fracture in the laboratory. The laboratory tests were successful but it was concluded that double-cell obturator is needed for the work in field conditions. The double-cell obturator had to meet a number of criteria such as light weight, easy operation, low financial cost, non-metallic material etc.

Ministry of Environment of the CR, Project No. ISPROFIN č. 215124-1: **Slope movement hazards in the České středohoří Mts.** (Project Leader: O. Krejčí, Czech Geological Survey, Brno, Czech Republic)

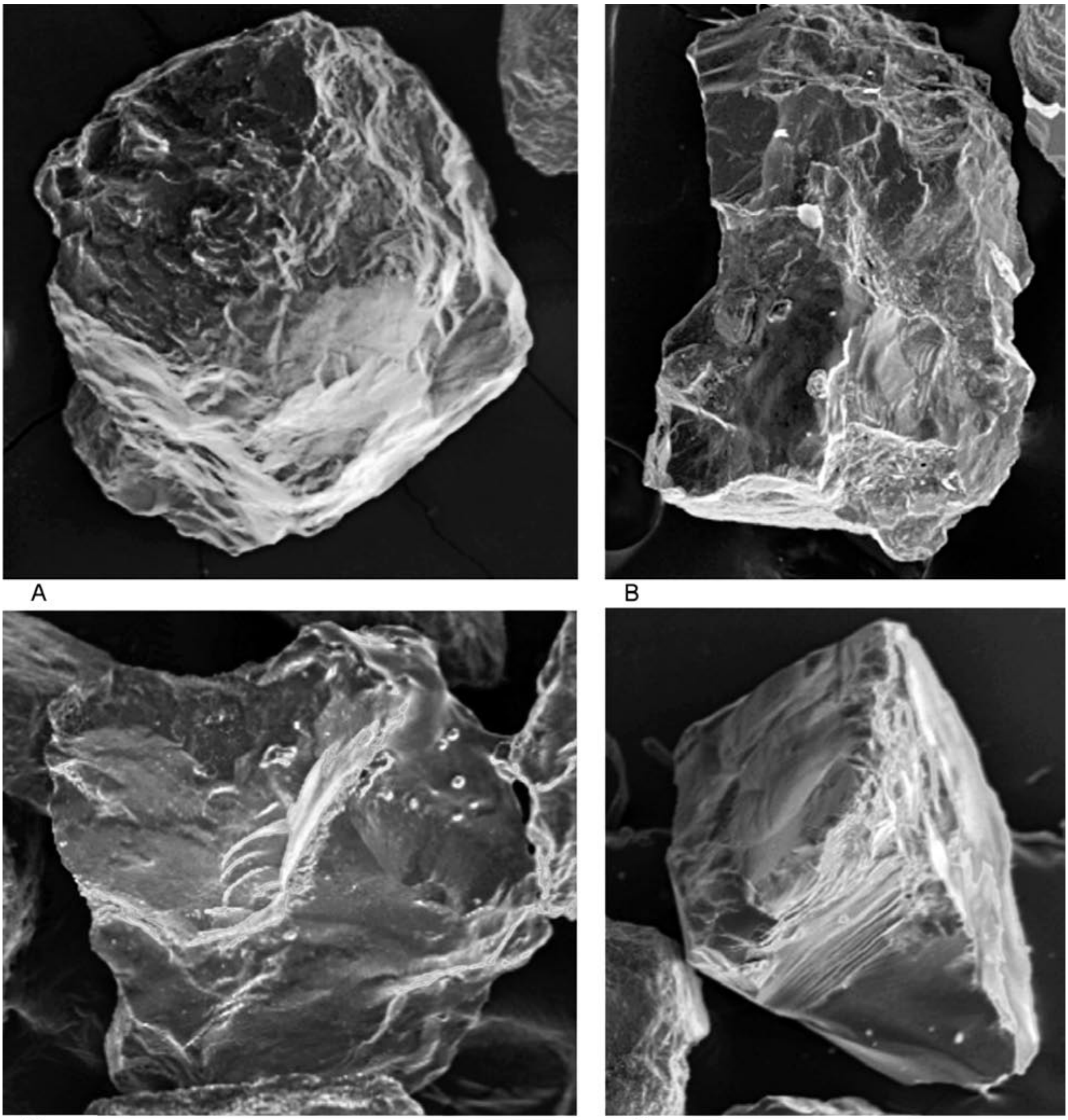
Subproject: **Scientific research of neovolcanics** (*V. Cajz*)

The research in the area of the towns of Žandov–Česká Lípa–Volfartice completed the northern margin of the České středohoří Mts. Volcanic Complex by specialized investigation for slope movement hazards ability. It is connected with areas in the west and south, investigated during previous years. Volcanic rocks were subjected to a new detailed geological survey. Results of this basic research are a basis for the specialized maps of hazards. These maps are prepared to be used by the local authorities and by the Ministry of the Environment CR. Volcanic rocks participate in the slope movement hazards directly by rock-falls and together with the other non-volcanic rock types by yielding the material for landslides. The slope movement hazards are more frequent at the areas where the base of the Tertiary volcanic complex is exposed. The primary jointing, tectonic imprint and the morphology of volcanic rocks as a result of selective erosion, are one of the most important controls on the generation of slope movement activities. Volcaniclastics at the base of the complex, which are mostly incoherent and primarily argillic (fine-grained hyaloclastites), are highly prone to landsliding. The combination of solid volcanics with argilized volcaniclastics at the base of the complex with Cretaceous marlstones in their footwall is very frequent and very dangerous. Moreover, solitary volcanics outside the area of the complex are involved in the slope movement hazards, too.

4e. Industrial Grants and Projects

Charles University, Faculty of Science, Praha, Project No. 7070: **Micromorphological evaluatlion of Labský důl lake deposits** (*L. Lisá*)

The core section of lake deposits from the area of Labský Důl (Krkonoše Mountains) was studied by the method of the quartz grains micromorphology. The principal aim of the study was the identification of the glacial transport intensity within the studied area. It is obvious that, according to quartz grain micromorphology, just two samples should be described as probably transported by the small mountain glacier. This methodology is unfortunately limited by the transport intensity and by the fact that the necessary amount of the glacier ice needed for the development of the typical glacial microstructures usually exceeds parameters of small mountain glaciers. The rest of the studied deposits reflect different intensities of colluvial type of transport. A small amount of each sample contains grains with typical aeolian transport history. Simultaneously with the study of quartz grain microstructures, micromorphological links between different layers were also studied. Based on the described features, different types of deposition were identified.



■ **Fig. 74.** Micromorphology of different sand-sized quartz grains.

GET, Ltd., Prague, Project No. 7100: **Selected igneous rocks from the Benbow Inlier-West proposed as crushed rock aggregates, Jamaica** (*J.K. Novák*, *P. Bosák*, *Z. Korbelová* & *J. Pavková*)

The study is focused on the identification of the felsic welded tuffs of rhyodacitic and trachydacitic composition and on Mg-rich tholeiite from the southwestern corner of the Benbow Inlier, central Jamaica. The rhyodacitic and trachydacite welded tuffs can be classified as relatively intact rocks, with high compressive strength, high resistance to abrasive wear and to polishing action of traffic, which can be utilizable as common aggregate for a road construction. The adhesion to bituminous binders is, however, relatively poor, particularly in the presence of moisture (the detachment of quartz-feldspathic intergrowths frequently occurs). Among best type of felsic pyroclastic rock, which is acceptable for a particular purpose, belongs the polymictic rhyodacitic welded tuff with lithic fragments; the contrasting hardness of the lithic and the porphyroclastic fragments is evident.

In addition to previously studied (i) spilitized trachyandesite, (ii) high-alumina basalt, and (iii) acid andesite, the Mg-rich porphyritic tholeiite can be a further possible candidate displaying some sort of roughness and resistance to abrasion. A balanced proportion of the hard and soft minerals (orthopyroxene, broken olivine, epidote, and minor quartz vs. pyknochlorite and kaolinite) resulted in the desirable differential hardness. Epidote pseudomorphs after dark constituents and fine-grained saussuritized plagioclase grains rather behave in similar manner to primary rock-forming minerals. Concerning the ability to maintain adhesion to bituminous binders, the mafic igneous rocks are better in their quality than acid pyroclastic rocks. The softening and swelling by water action and mechanical-chemical degradation is mostly negligible.

The rhyodacitic and trachydacite welded tuffs can be classified as relatively fresh rocks, with a high compressive strength, resistance to abrasive wear and to polishing action of traffic, if glassy particles remain intact. The adhesion to bituminous binders for these rock types is, however, relatively poor (due to the detachment of quartz-feldspathic intergrowths), particularly in the presence of moisture. Therefore, they can be utilizable as manufactured aggregate for a road base construction only.

Because the resistance of concretes by vehicle tires to abrasion has become critical, the search for skid-resistant materials continues in other places of Jamaica, e. g. east of Kingston.

Velkolom Čertovy schody, Inc., Project No. 7102: **Documentation of reclamation activities on the Koněprusy deposit** (*P. Bosák*)

Reclamation activities in the Velkolom Čertovy schody Quarry (Koněprusy Devonian, Barrandian, Bohemian Karst) uncovered other important and interesting geological features, which delineated the extent of talus facies within the Koněprusy Limestone (Pragian, Devonian) on the foot of cliffs of the Lochkovian Kotýs Limestone. Former cliffs developed along a dextral transpression tectonic zone (present Očkov Reverse Fault). They are dissected by a system of normal faults (W–E to NW–SE trends) with sunken southern blocks. Karst forms uncovered by mining in deeper parts of the deposits (both Eastern and Western quarries) originated most probably due to Cretaceous/Tertiary hydrothermal activity (hypogenic karst): free chimneys and small caves with no delineation to fissure system or bedding planes, intergranular disintegration of grainstones.

Highly irregular geological structure was observed on the bottom of the Eastern Quarry, where Kotýs and Koněprusy limestones alternate due to overthrust tectonics in a highly irregular pattern (thrust slices), complicated by younger normal faults.

Centrum výzkumu Řež, s. r. o. Project No. 7103: **Petrographic expertise of building stones taken from the Khmer temple complex Angkor, Cambodia** (*J.K. Novák*, *P. Bosák*, *Z. Korbelová*, *M. Lang* & *J. Pavková*)

The Angkor monuments located close to Siem Reap (western Cambodia) are famous examples of Old Khmer civilization, which were assigned on the World Cultural Heritage List in 1992. Apart from laterite and bricks, construction blocks were made mainly from quartzo-feldspathic sandstones and were found in the construction of some 40 major temples. The use of red-coloured quartzose sandstone is limited to the Banteay Srei and North and South Khleangs temples and that of feldspathic graywacke to the Sancturies of the Ta Keo temple. Bricks were also utilized in sancturies of the relatively old monuments, such as Bakong, Lolei, Presat Kravan, etc., and laterite for enclosing walls, platforms, and pavements.

Because the monuments restoration is urgent, the search for old quarries is necessary and the provenance of construction materials was studied with the help of comparative microscopic examination as well as with major- and trace element geochemistry. Provenance studies on clastic sediments commonly apply the classical approach based on modal analysis. Instead this, we have inferred the quantitative mineralogy from whole-rock chemical analysis, normative calculation, and microprobe analysis of detrital minerals; the immobile element geochemistry would make it possible to harvest a wealth of additional data, particularly for pelitic matrices. The abundances and ratios of relatively immobile elements reflect the nature of their source rocks and are generally unmodified post-depositionally by diagenesis and low-grade metamophism. Petrographic and electron microprobe analyses were performed on polished thin sections from cored samples (up to 7 cm long), because biodeterioration and salt weathering processes of stone material are apparent. The core sections selected for INNA chemical analysis were crushed, ground and homogenized is agate ball mill.

All sandstone and graywacke types have presumably been formed in the Khorat Plateau Basin, Late Triassic to Early Cretaceous in age, and at Mt. Kulen, Mt. Krom, Mt. Bakheng, and Mt. Boc, but the exact location of the quarried material remains unkown.

GEKON, Ltd. Prague, Project No. 7106: **Kaolinitic sandstones. Nekmíř – Horní Bělá** (*J.K. Novák*, *J. Bek*, *P. Bosák*, *J. Pavková*, *J. Straková* & *J. Dobrovolný*)

The upper Carboniferous kaolinitic sandstones with a different proportion of clayey-silty and quartzose clasts were studied to show the grain-size distribution as well as chemical and mineralogical compositions of the following grain-size fractions: (i) smaller than 25 μm (clayey silt), and (ii) 25–63 μm (silt). Clay minerals and micas of those fractions include dominant kaolinite, mostly well ordered, besides muscovite/illite and minor biotite flakes. Unlike at the Kaznějov kaolin deposit, kaolinite pseudomorphs after feldspar clastic grains are mostly absent in sandstones studied and the post-sedimentary kaolinization process *in situ* is improbable. Rather, attention was paid to the relationship between abundance and mineralogical composition of the clayey-silty clasts and to petrographical properties of the matrix. Sometimes, secondary alteration of clasts involves the precipitation of released silica. In general, these kaolinitic sandstones can be considered an example of redeposited saprolite from the Upper Carboniferous regoliths outside the Plzeň Basin.

Micropaleontological examination of one sample from siltstone intercalation indicates a close relationship to the Nýřany Member of the Kladno Formation (Bolsovian to Westphalian D). The miospore assemblage is composed of the genus *Verrucosisporites* (dominant one) as well as genera of *Savitrisporites, Lundbladispora, and Latensina*. This assemblage bears a close relation to the lowermost level of the Nýřany Member of the Kladno Formation. Further identified spores, such as *Granulatisporites, Cyclogranisporittes* sp., *Calamospora, Leiotriletes, and Laevigatosporites*, appear to show a wider extent, from Westphalian to Lower Stephanian. In comparison with them, the genera of *Punctatosporites, Laevigatisporites, Latosporites,* and species *Raistrickia crinita* display a relatively great richness in one sample. It means that they represent the assemblage of the uppermost Westphalian D – Cantabrian, i. e. to Nevřeň Coal Seams. Because of the presence of xylofilous floras and that of tree-ferns *(Marattiales)*, a remarkable change in dry climatic condition and in miospore assemblage is suggested.

It is difficult to decide whether or not the sample with spore genera of *Potoniesisporites a Florinites* represents the Týnec Fm. (Lower Stephanian). Less plentiful are, however, genera such as *Laevigatosporites and Leiotriletes.*

GEKON, Ltd. Prague, Project No.7107: **Kaolinitic sandstones of Krašovice–Trnová** (*J.K. Novák*, *P. Bosák*, *R. Živor* & *J. Pavková*)

Two major facies of kaolinitic sandstones (channel and levee facies) were distinguished in the Krašovice-Trnová tectonic block, each of which was deposited in high-constructive fluvial setting of Westphallian age. Because of common presence of the silty-clayey pebbles (1–5 cm in diameter), the medium to coarse-grained quartzose sandstone and conglomerate (referring to channel fill deposit) are considered more productive raw materials for raw kaolin than well-sorted quartzose sandstones (levee-facies deposit). The particle-size distribution, recoverable amount, brightness, and rheological properties of the kaolin matter do not permit the expectation of an effective dressing. On the other hand, the utilization of calcinated kaolin, in the form of metakaolin product, will be useful as a pozzolanic material for hydrated concrete and for the geopolymer manufacturing.

GET, Ltd., Prague, Project No. 7108: **Main geological features of Lara State, NW Venezuela** (*J.K. Novák*)

The northwestern Venezuela represents an amalgamation of the Caribbean-affinity terranes in northern South America and it is sutured approximately to the cratonic Venezuelan Guyana Shield (Early Proterozoic in age) in the Boconó–San Sebastián–El Pilar fault zone. The Falcón and Lara States lie in the rather simple interaction zone between South Caribbean Deformed Belt and South American craton, but both are not related to direct interactions with the craton margin.

The oceanic crust was previously known as the Amaime Fm., the Lara Nappes, Villa de Cura Klippe, etc., which crops out on the northern border of *Barquisimeto Basin*. Pebbles and ks of mafic volcanic blocks of various dimensions are rather mixed in the *allochtonous Matatere Fm.* than emplaced in original setting. This turbidite formation also includes (i) serpentinized peridotite, spilitic basalts, tuffs, gabbros at Siquisique and Río Tocuyo, and (ii) pebbles of chert, limestones, shales, and phyllites. The successive allochtonous slabs inverted the original sequences and caused low-grade metamorphism. It is suggested that the larger blocks of slightly altered peridotite and basaltic rocks could be investigated for the use as rock aggregates.

The northeastern segment of the Venezuelan Andes between towns of El Tocuyo and Quibor hosts the Caribbean (Lara) nappes (i) with Upper Cretaceous *Barquisimeto Fm.* (clay, clayey schist, marl, dark-gray and black limestone, and phtanite), (ii) with Paleocene *Matatere Fm.* (sandy turbidites with conglomerate intercalations), and (iii) with strongly deformed Eocene *Morón Fm*. (clastic sediments*)*. All are juxtaposed to Andean autochtonous units consisting of Precambrian, Paleozoic and Jurassic rocks. There are no known metallic deposits.

Severočeské doly, Inc., Doly Bílina. Project No. 7109: **Evaluation of geochemical and mineralogical data of carbonate concretions and of hard carbonate-cemented layers in the Miocene sediments of the Bílina Quarry, Northern Bohemia** (*K. Žák*)

Abundant carbonate concretions and carbonate-cemented beds occur in the coal-bearing freshwater Miocene sedimentary fill of the Most Basin, northern part of Bohemia. Most of these carbonates were formed during diagenetic processes. Primary syngenetic carbonates are rare and are represented only by shells of mollusks and by rare occurrences of freshwater carbonates and clays with calcite content. These syngenetic carbonate types occur at several rare sites in the sedimentary sequence below the main coal seam.

Interpretation of geochemical and mineralogical data from the prevailing diagenetic carbonate types requires very detailed approach, since even within a single siderite concretion an evolution of diagenetic conditions and processes from early to late diagenesis can be recorded. Concretion centre-to-rim profiles in carbonate C and O isotope composition, carbonate chemistry and in carbonate/clay ratio showed that centers of some concretions are characterized by the highest Mn content, high carbonate/clay ratio and by high carbonate $\delta^{13}C$ values. These carbonate types were formed during early diagenesis and very shallow burial, in the zone of bacterial fermentation (methanogenesis). Outer concretion zones frequently reflect conditions of deeper burial, higher compaction of the hosting sediment, and higher temperatures, with dominance of thermal decomposition of the organic matter as a source of CO_2 for the carbonate growth. In between the diagenetic carbonates the dolomitic sandstone cements represent the latest diagenetic phase. Calculations based on carbonate $\delta^{18}O$ data of these cements indicate diagenetic temperatures up to 50 °C.

Based on the evaluation of an extensive set of $\delta^{18}O$ data of syngenetic and early diagenetic carbonate types it was confirmed that the Miocene lake of the area of the Most Basin was not significantly influenced by water evaporation, which had a minor importance only in the westernmost part of the basin (area of the present-day Doly Nástup Tušimice). In contrast, intensive water evaporation was confirmed for the Cheb and Sokolov basins.

Czech Geological Survey, Project No. 7115: **Scientific research of neovolcanics** (*V. Cajz*)

The research in the area demarcated approximately by the Bílina River in the west, villages Libčeves–Milá–Bečov in the south and Teplice city in the north was finished. It is connected with areas in the east and southeast investigated during previous years. Volcanic rocks were subjected to a new detailed geological survey and to a basic research oriented to their ability to help or stabilize the slope movement activities. Results of this basic research are ground for the specialized maps of hazards. These maps are prepared to be used by the local authorities and by the Ministry of the Environment CR. The volcanic rocks participate in the slope movement hazards directly by rock-falls and together with the other non-volcanic rock types by yielding the material for landslides. The slope movement hazards are more frequent at the areas where the base of the Tertiary volcanic complex is exposed. In this area, however, solitary volcanics prevail. Nevertheless, volcanics are one of the main rocks causing the slope movement hazards. Their primary jointing, tectonic imprint and their morphology as a result of selective erosion, are one of the most important controls on the generation of slope movement activities.

Czech–Moravian Cement, Inc., Project No. 7116, 7201: **Mineral magnetic research of the Ochozská Cave deposits** (*S. Šlechta* & *J. Kadlec*)

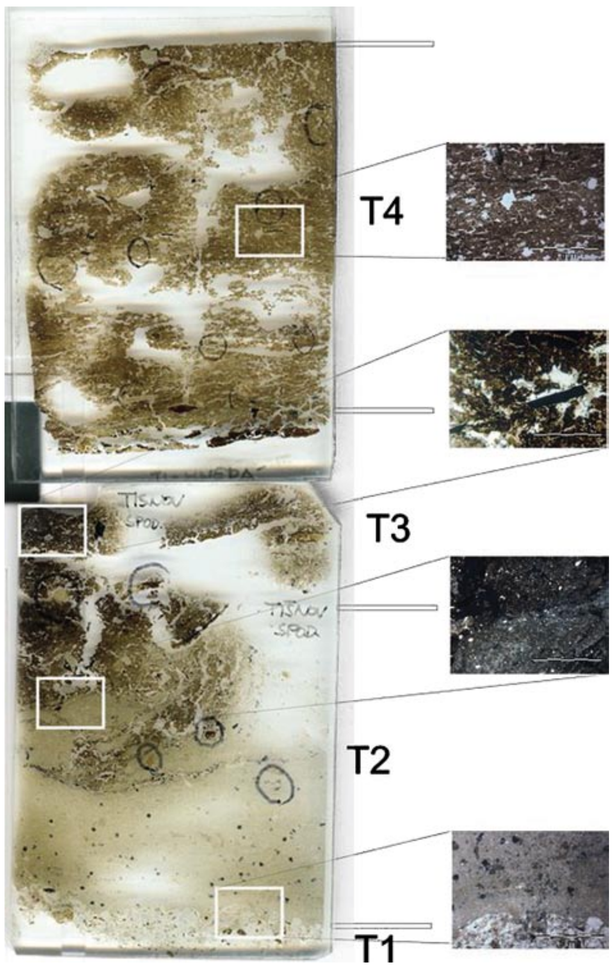
Mineral magnetic knowledge concerning the clastic cave deposits exposed in the Ochozska Cave were extended using advanced magnetic measurements (NRM, ARM, SIRM) and interparametric ratios (S-ratio, ARM/SIRM). Variation of these parameters reflects changes in magnetite or goethite concentration and the changes in magnetic grain size. Magnetic parameters reveal in both sedimentary sections a basal layer containing SD magnetic grains indicating more intense weathering of source material connected with pedogenic processes before re-deposition into the cave. The MD magnetic grains of detrital origin dominate in the above lying sediments.

Czech Geological Survey, Prague, Project No. 7117: **Biogeochemical monitoring in model catchment areas** (*I. Dobešová* & *P. Skřivan*)

Bulk precipitation, throughfall (both beech- and spruce-) and surface water were sampled on a monthly basis in the Lesní potok catchment (situated in the Voděradské bučiny National Nature Reserve near the town of Kostelec nad Černými lesy) within the contract with the Czech Geological Survey, Prague (CGS). Main characteristics of the collected samples were determined: volume of all types of precipitation, instant discharge of the surface water, and conductivity and pH value of all liquid samples. Data concerning the monthly precipitation were also collected at the nearby breeding station (Truba) of the Czech Agricultural University. Collected liquid samples were transferred in a laboratory of the Institute of Geology AS CR, v. v. i., into storage vessels, stabilized with diluted nitric acid (Merck, Suprapur) and stored in a cooler until their transport to the analytical laboratory of the CGS. The contract also involved maintenance and innovation of sets of collectors and of other field equipment. The contractor was also provided with the obtained field- and laboratory data concerning the monitored samples.

Archaia Brno, o. p. s., Project 7120: **The origin of Brno relief, Stage IV** (*L. Lisá*)

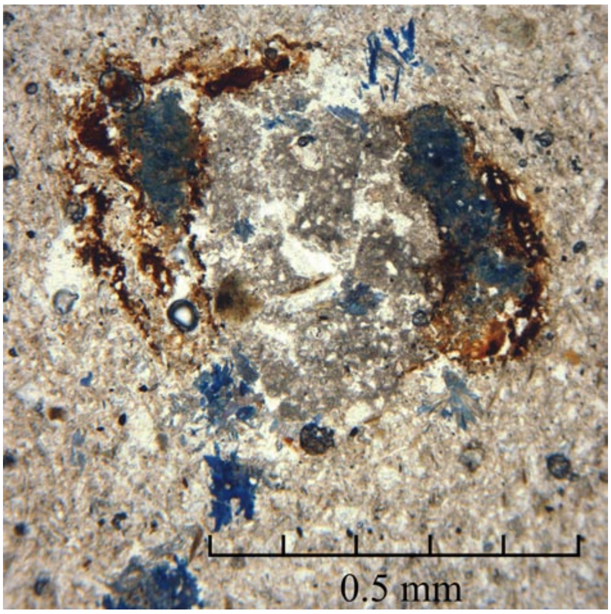
Seven localities were excavated (Božetěchova III., křižovatka Břízová-Spálená, Dvořákova, Tišnov Municipal Authority, Šilingrovo náměstí, Solníční Rašínova and the Svatá Anna Hospital). All these sites are located within the Brno centre area except the Tišnov locality. The localities within the Brno centre are



■ **Fig. 75.** A thin section photograph from the Tišnov locality and additional microphotographs of individual micromorphological features.

connected with building works and most of them are located in alluvial zone of the Svratka or Ponávka rivers.

In Tišnov, the site at No. 148 Brněnská Street, no. 148 was archeologically and geoarcheologically investigated. It was dated approximately to the 15th–16th century (Fig. 75). This object was interpreted as an underground chamber of the house, which was probably oriented in the direction to the Brněnská Street. Rocks at this site are Miocene marine calcareous clays overlying the Svratka Crystaline Complex. The house construction was made by these crystalline rocks of the regional provenance, at least up to the ground surface level. Clays are not permeable which usually brings a lot of problems with omnipresent moisture in cellars. So, the house basement was carefully prepared because of moisture, from four genetically different types of material, to stop the moisture (Fig. 76). There was drainage layer compounded mainly by fluvial sands, which were sealed by dusty clay layer made from loess material. Dusty clay layer was mixed with ash and the surface of this layer was covered by organic matter (grass; Fig. 77). The ash and organic matter were probably added in order to stop the moisture and the smell. Above these preparation levels, a classical trampled floor level was described. The examined chamber was probably a food store room, perfectly safeguarded from humidity and frost.

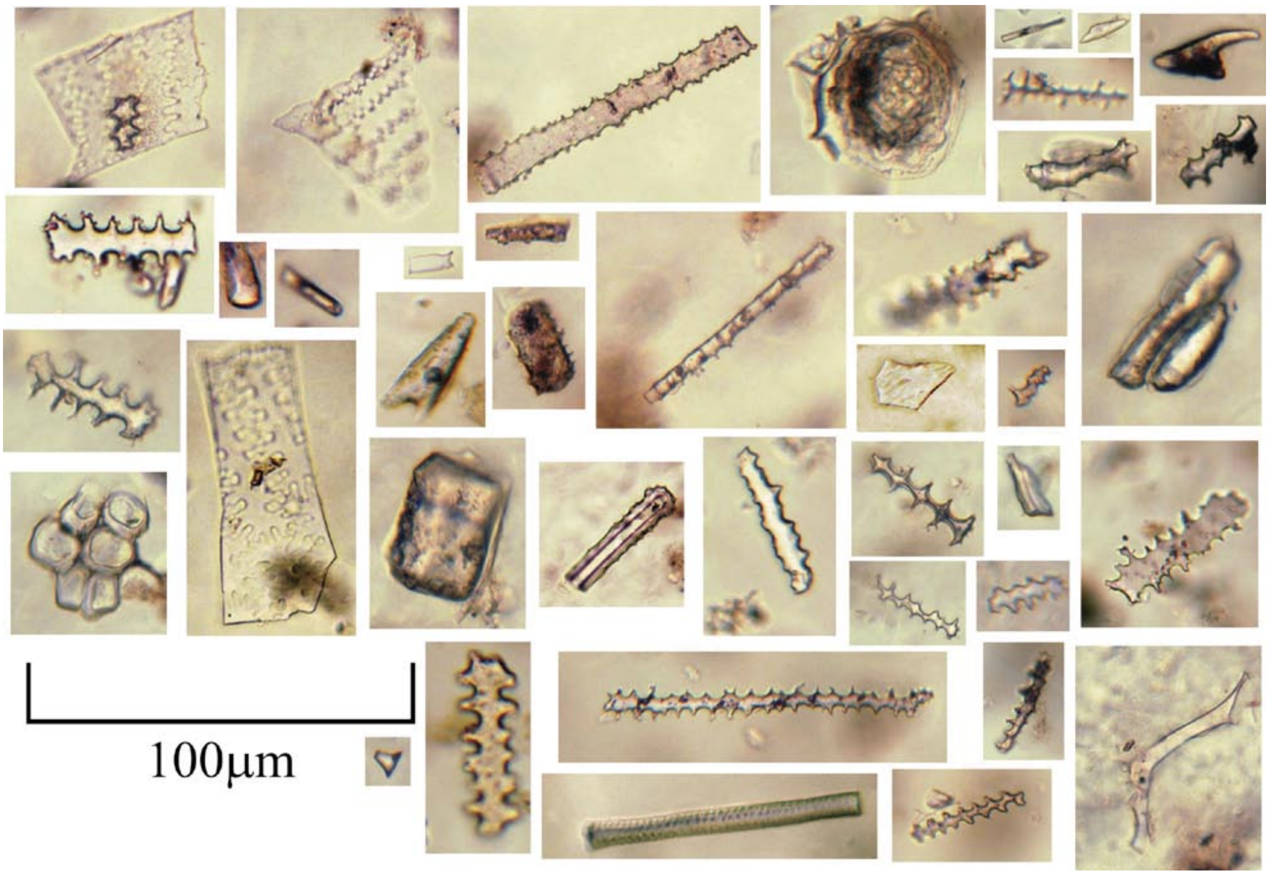


■ **Fig. 76.** Crystals of vivianite together with ash crystals and decomposed organic matter (Tišnov locality).

EKOS Beroun, Ltd., Project No. 7122: **Open-air rock exhibition Všeradice. Report 1: Proposal of the scientific scope** (*K. Žák*, *P. Bosák*, *V. Cílek* & *R. Mikuláš*).

Report 2: **Selection of rock block in the field, and proposal for their distribution within the exhibition** (*K. Žák*)

In the Všeradice village, located at the southwestern limit of the Protected Landscape Area of the Bohemian Karst, an open-



■ **Fig. 77.** Phytoliths described from the Tišnov locality. These phytoliths indicate the presence of grasses and millets.

air permanent exhibition of blocks of typical local rock types is planned. Evaluation of the plan to construct such exhibition, the potential number of visitors, and proposal of the general characteristics of the exhibition were contained in the first report. The exhibition will contain blocks of typical local Neoproterozoic, Cambrian, Ordovician, Silurian, Devonian, Carboniferous and Tertiary rocks. Both sediments and volcanic rocks will be included in blocks sized up to 2 m^2. The second report contained a detailed description and location of the selected blocks in the field. Since the exhibition will be constructed on a slope, a system of terraces was proposed, each appropriate for one geological period.

GET, Ltd., Prague, Projects No. 7124 and 7203: **High-grade limestones from the Santa Cruz Mts., Jamaica** (*J.K. Novák & P. Bosák*)

Progress reports 1, 2: **Pure calcarenite and calcirudite from the Santa Cruz Mts., Jamaica as cementitious raw materials.**

The well-lithified calcirudite and calcarenite types from the Newport Formation, which are Late Oligocene to early Miocene in age, are typical peri-platform carbonate rocks evolving from a continuous, shallow-marine carbonate megabanks.The middle Miocene time is a critical interval in Jamaican paleoclimate, when the generally warm period was shifted to global cooling and coastal depositional environment was influenced by sea-level fluctuation and by accretionary-erosional processes.

The results of petrographical investigation show that bioclastic carbonates from the Santa Cruz Mts. localities are free of siliciclastic admixtures. Some exceptional chemical purity and brightness remain preserved, because the shallow water limestone fragments are cemented repeatedly by pure calcite mud. The majority of limestone fragments consist of (1) biomicrosparite with algal and foraminiferal bioclasts, (2) biomicrite, and (3) oosparite. From the chemical point of view, the average content of CaO is 55.5 wt. % (representing 98.9–99 wt.% low-Mg calcite) in nearly all samples, satisfying specific requirements for industrial applications, e. g., as white cement mix with silica sand and kaolin as well as finely ground limestone filler for the Portland limestone cement. The use of both products seems to have many benefits, mainly positive effect of limestone filler on the water demand in concrete.

Faculty of Science, Charles University, Prague, Projects Nos. 7136 and 7222: **Strength and deformational properties of rocks** (*R. Živor*)

Preparation of rock specimens and strength and deformational tests were carried out. Simple compressive strength and cross-tensile strength (by Brazilian test) were found out and stress–strain diagrams were constructed from results of deformational measurements under uniaxial loading.

Volcanic rocks – basalts, melaphyre, phonolite, spilite, porphyry, and diabase – from various localities of the Bohemian Massif were investigated. Basalts from Měrunice, Smrčí and Všechlapy show the best quality of the strength properties. Their values of the simple compressive strength oscillate about 350 MPa and values of cross-tensile strength range from 14 to 17 MPa. On the contrary, basalts from locality of Dolánky, melaphyre, spilite, porphyry, and diabase have the smallest values of the strength properties – up to 160 MPa for simple compressive strength and 6–13 MPa for cross-tensile strength, respectively. Only diabase revealed a very high value of cross-tensile strength – 19 Mpa. The obtained results serve for consequential research at the Faculty of Science.

Cave Administration of the Czech Republic, Prague, Project No. 7138: **Update of the cave cadastre of the Bohemian Karst** (*K. Žák*)

Together 676 caves with a total length of almost 22 km are known to date in the Bohemian Karst, a small karst area formed in Silurian and Devonian limestones of the Prague Basin. Since the caves and the karst evolution of this area are frequently subject to research within projects of Institute of Geology of the AS CR, v. v. i., a digital cave cadastre is managed and kept updated in the Institute. Within this project, the cave cadastre was updated as of October 1, 2007, and data in digital form were transferred to the Cave Administration of the Czech Republic. Another part of the project also included updating of the list of references related to the caves in this region.

ČEZ, Inc. Prague, Project No. 7140: **Supervising of seismic hazard of Temelín nuclear power station site** (*V. Rudajev*, J. Švancara, P. Špaček, R. Hanžlová et al., Masaryk University, Brno)

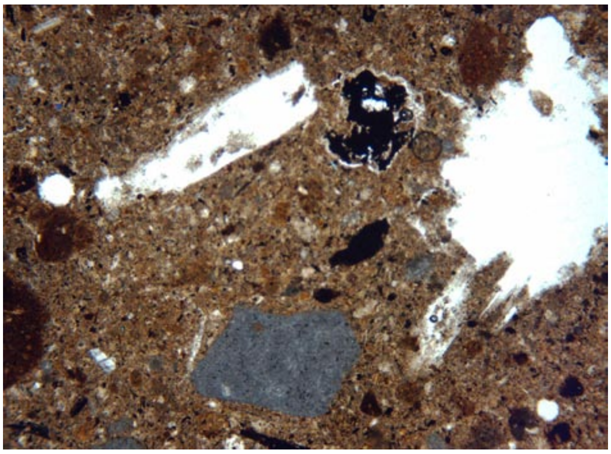
Project: **Evaluation of seismic hazard on the basis of polynomial approximation of distribution function of acceleration vibrations on the nuclear power plant Temelín site.**

A new method for the determination of seismic hazard was developed. This method is based on the extrapolation of regression polynomial distribution function of seismic vibration acceleration in the NPP Temelín site. Developed method is non-zonal and its input data are only values of seismic vibration acceleration in NPP Temelín site. Method yet demands fulfilment series of conditions for input data, namely their stacionarity and allocation of earthquakes zones. The obtained results by new method were compared with yet results obtained by various previous methods. Up to now accepted values were confirm also by new simple method.

The new method based on the extrapolation of regression polynomial distribution function of seismic vibration acceleration was applied for NPP Temelin site. Developed method is non-zonal and its input data are only values of seismic vibration acceleration in NPP Temelín site. The obtained results by new method were compared with yet results obtained by various previous methods. Up to now accepted values were confirm also by new simple method.

Masaryk University, Faculty of Science, Brno, Project 7144: **Micromorphology of samples from locality Tel Abrid, SE Syria** (*L. Lisá*)

Micromorphological descriptions and interpretations of eight samples from Tel Abrid 2007 season were elaborated. Two samples are made from mudbricks, three samples from plaster, one sample was described macroscopically as a typical floor deposit, sample from the layer below described macroscopically as probably buried soil, sample macroscopically described as "virgin soil", and residuum of mudbrick found in upper layer disturbed by ploughing. Additional analyses are loss of ignition (LOI) (carbonates and organic matter).



■ **Fig. 78.** The structure of mudbrick, the lower edge of the picture is 500 µm. Gray clast is composed of micritic carbonate which originated within soil development, black clasts are organic matter (XPL), white spaces are voids.

The mudbrick samples show slight differences (Fig. 78); one sample contains material with different color and is moderately sorted while the other one is well sorted. Both samples contain added organic matter. The basic matrix stays the same, the differences are probably only in the general inhomogenity and by unsorting of samples. Another sample shows significant differences represented for example by anthropogenetically influenced material (partly burned piece of matrix, a piece of bone), the different porosity and more intensive corrosion of pedogenetically originated carbonates. One sample was macroscopically interpreted as a typical floor, but microscopically is visible just increase of coarse fraction, decomposed organic matter and a piece of bone. There were no features typical for floor deposits identified. The sample below floor layer is probably an example of primary material not influenced by man or by erosion. The typical layering can be interpreted as storm events connected with increased humidity. The primary structure was probably preserved by human activity (building works). One sample was macroscopically described as a virgin soil and as the only one shows the features typical for pedological process (moderately developed A horizon). One sample was macroscopically described as a residuum of mudbrick in a layer influenced by ploughing. It was micromorphologically interpreted as a mix of material of different composition and provenance.

GET, Ltd., Prague, Projects No. 7204: **Sedimentary kaolin and sand of the Black River Bay, Jamaica, as supplementary raw materials** (*J.K. Novák* & *P. Bosák*)

A promising area of prospection for the potential resources of supplementary cementitious raw materials (SCMs) – sandy clay and silica sand – is the Black River Bay, parish of St. Elizabeth. Sedimentation is a result of wave-tidal processes in the flood-tidal delta environment, with tidal sand bar, salt marches, and mud-containing tidal flat. Tidal energy in tide-dominated estuaries is derived from a central channel and decreases towards the estuarine margins. Sandy clay occurs at village of Holland and within Fresman´s Island, and sedimentation of silica sand originated close to inner bay (around Hodges). Based on the petrographic examination, the XRF chemical analysis, and X-ray diffraction, the sandy kaolinitic clay is greenish white in color and composed of equidimensional kaolinite flocks (about 0.10 mm in diameter) and of quartzose clasts. Because of iron coatings, it can be suitable for manufacturing the gray Portland cement only. Coaser-grained quartzite-like fragments and argillized tuffaceous lithics occur rarely and could be separated with screening. Sand is ochreous in color and transparent quartz clasts are cemented by impure kaolinite. Both the silica sand and sandy clay, from the standpoint of their geographic distribution and source area, were probably transported from the westernmost part of the Central Inlier. The need to investigate the SCMs is and will continue to be, a major stimulation for further searching.

GET Ltd, Project No. 7205: **Diverse rock types from Jamaica: Perspectives from petrography and whole-rock chemistry** (*J.K. Novák* & *P. Bosák*)

Because of exhaustion and closure of alluvial sand deposits for current extraction, the shift to alternative sources and to partial replacement of natural sands by manufactured sand and rock aggregates is necessary. A preliminary petrographical evaluation of graywacke-like sandstone and weakly cemented calcite-bearing quartzose conglomerate from strata, which crop out in a northern part of the Wagwater Graben (Nutfield and Port Maria region), is the primary focus of this report.

The graywacke-like sandstone is slightly affected by weathering and remains sufficiently strong and durable in Jamaican tropical climate. Aggregate characteristics, particularly angular shape of grits and grading of processed rocks, should be improved in artificial aggregates.

Weakly cemented quartzose conglomerate with calcite clasts is considered as the appropriate raw material for manufacturing coarse sand. The potential deficiencies are consistent with a gap-grading, a reduced strength (due to variation in calcite content and low percentage of argillized lithoclast). For satisfactory particle size distribution this material should be mixed with alluvial silica sand.

A series of the XRF chemical analysis was performed in order to clarify the chemical composition of calcarenite and biosilica-bearing limestone from new localities within the Santa Cruz Mts. and Northern Coastal belt. Vein barite from the Benbow Inlier is particularly well suited for barium chemicals and as white pigment, because it is clean.

Bohemian Switzerland National Park Administration, Krásná Lípa, Project No. 7214: **Monitoring of Atmospheric Precipitation at Bohemian Switzerland National Park** (*T. Navrátil*, *I. Dobešová*, *J. Rohovec* & *T. Nováková*)

Systematic monitoring of atmospheric deposition of selected main and trace elements at the National Park Bohemian Switzerland (NPBS) has been previously carried out in period 2002–2006. New stage of monitoring has begun at the beginning of May 2008. Monitoring of atmospheric precipitation is aimed on assessing of the chemistry and its changes at the NPBS. It is currently performed at four sites. Analysis of the incomplete data gathered in year 2008 suggests that current level of monthly deposition averaged at 0.5 $kg.ha^{-1}$ of S and a 0.7 $kg.ha^{-1}$ of N. Monitoring of atmospheric precipitation aims to assess the current state and changes in chemical composition of precipitation over area of NPBS. It is currently performed on four individual sites.

Among the main monitored parameters in atmospheric precipitation belongs pH values and fluxes of the main acidificants such as S and N. In this chapter we evaluated the fluxes at site DM before all due to existing data from 90ties of the past century. Comparing the values from 90ties of the previous century with the current pH values it is remarkable that in 21^{st} century samples with pH < 4.2 are exceptional, while samples with pH > 5.0 became very common. This is a result of desulphurization of coal heated powerplants that has been completed in the Czech Republic in year 2002.

On the other hand, deposition fluxes of nitrogen in form of NO_3 did not change as dramatically but still high monthly deposition fluxes over 3.0 $kg.ha^{-1}$ were not detected either. The decrease of NO_x emissions from the burning of fossil fuels was compensated by increasing vehicular emissions.

Czech Geological Survey, branch Brno, Projects Nos. 7217, 7245: **Triaxial strengths of selected types of rocks** (*R. Živor*)

Triaxial strengths of andesite, claystone and two types of limestones were measured and compared using by a conventional triaxial test. Ten various levels of confining pressures up to 50 MPa were used during the tests. In the case of one type of limestone the effect of water saturation of sample on the triaxial strength was also studied. Triaxial strengths of limestones and claystone were found to markedly increase under lower values of confining pressure. The increase is not so strong under higher confining pressures (25–35 MPa approximately). This trend is very distinct in the case of claystone when the triaxial strength value reached under confining pressure of 25 MPa has not almost changed by the growing confining pressure. On the other hand, the triaxial strengths of andesite shows a contrary trend. The strength accrual is very slowly under lower values of the confining pressure while a marked triaxial strength accrual comes up after transcendence of confining pressure value of 25 MPa.

The trends of triaxial strength accruals of limestone with natural moisture and fully water-saturated limestone are very similar. However, saturated limestone shows about 20 % lower triaxial strength values on average than limestone with natural moisture.

GET, Ltd. Prague: Project No. 7220: **Volcanic and pyroclastic rocks from the Bito and Ramble area, Jamaica: Petrography and whole-rock chemistry** (*J.K. Novák*, *J. Pavková J.* & *P. Bosák*)

The search for sound rock aggregates for special purposes and for potential pozzolanic rocks in the area east of capital Kingston is supported by petrographical – chemical examination. The low-K trachydacite samples are interpreted to have originated in the volcanic conduit region, as a product of both the magmatic fragmentation and additional mixing between trachydacite, dacite, and rhyodacite. A conspicuous feature of all collected samples is that the porphyritic dacitic fragments, with fritted plagioclase phenocrysts, are well solidified by the interstitital rhyodacitic liquid. The rock is, therefore, classified as of high strength (210 $MN.m^{-2}$). We are of the opinion that strong trachydacite type seems to be the suitable as skid-resistant aggregate, because of differential hardness and mechanical strength. We have also draw attention to a low degree of weathering effects in Jamaican tropical climate, although sensible glassy particles are included, to desired gradation, to testing the resistance to abrasion, and to the nature of the intergranular bond. The quality of processed rock aggregate depends, however, upon further requirements that are difficult to met in a petrographical description. Because of grain opening by crushing, the soundness and durability of processed rock aggregate may be affected by alkali-aggregate expansive reactions in Portland cement concrete.

Of special interest is the recognition of hyaloclastite-rich lapilli tuff and some of the spilitic glassy tuffs which may serve as pozzolanic admixture for both the production of blended Portland cement and pozzolanic concrete/mortar. Pozzolans are not cementitious by themselves, but form a hydraulic alumosiliceous compounds when mixed with lime hydrates. The active pozzolanic components in studied rocks refer to authigenic zeolites (analcime or gismondite), basic glass, and smectite. The pozzolanic activity is also enhanced due to the high microporosity and specific surface area of hyaloclasts.

Labrys, s. r. o., Project No. 7221: **The Evaluation of Linear Depression (Path) on the Locality Praha-Zličín** (*L. Lisá*)

The aim of the research was the evaluation of linear depression in clastic deposits within the archaeological excavation. The main question was to determine if the depression has natural or anthropogenic origin (path). The conclusions were primarily based on field geomorphology, slope degree and the configuration of depression. The first hypothesis based on field observation was concluded as a "path" and lately this hypothesis was also confirmed micromorphologically. According to additional micromorphological study, it was possible to identify three different horizons. These horizons are not based on pedological features. Anthropogenically influences A horizon on the base, 4 cm deep B horizon influenced by compaction and horizon C which reflects low surface stabilization.

Faculty of Science, Charles University, Prague, Project No. 7222: **Strength and deformational properties of rocks** (*R. Živor*)

Preparation of rock specimens and strength and deformational tests were carried out. Simple compressive strength, cross-tensile strength (by Brazilian test) and deformational properties were found out for various types of magmatic rocks from Bohemian Massif.

GEKON Ltd., Prague, Project No. 7224: **Glass- and foundry sands from the area between Zahrádky and Srní: Detrital mineral assemblages** (*J. K. Novák*, *P. Bosák* & *I. Erdingerová*)
Microscopic and textural approach to assess the purity of sand-sized grains complements the information inferred from geological exploration using several boreholes. Importance of the sand grading (in the range of 0.1–0.6 mm) and of high chemical purity of quartz and recycled quartzose clasts is consistent with glass sand. Examination of the detrital mineral fractions under binocular microscope reveals the following quartz types: transparent to gray, milky white, and pink in color ones. The polycrystaline metaquartzite and lydite lithics (both gray in color) occur rarely.

The essential requirements of foundry sand for casting is that those sand-sized grains are stable in bituminous mixtures, and resistant to stripping, i. e., that they maintain adhesion to binder agents. Certain aggregate properties, such as grain macroporosity, resistance to periferial grain alteration, and workability of mixtures have greater significance in some context than chemical aggregate purity.

University of West Bohemia, No. 7229: **Mineral magnetic study of the Lake Švarcenberk sediments** (*J. Kadlec*)

Mineral magnetic study of the Lake Švarcenberk deposits allows us to reconstruct paleoenvironmental changes in a detailed resolution. Magnetic approach is a suitable tool for reconstruction of erosion and weathering processes in the lake catchment area. These processes were controlled especially by vegetation density which is connected with climatic conditions. Record obtained from magnetic data can be therefore used as a proxy of local climatic changes.

Czech Geological Survey Praha, Project No. 7233: **Project VaV: Geological record of global changes – processes in Antarctica from Paleozoic to Recent. Subproject: reconstruction of oldest geological units** (*M. Svojtka* & *J. Filip*)

Zircon and apatite fission-track (AFT) thermochronology was applied to the James Ross Basin sedimentary rocks from James Ross and Seymour islands. The probable sources of these sediments were generated in Carboniferous to Early Paleogene times (~315 to 60 Ma).The FT data suggest that the sedimentary rocks of northwestern James Ross Island were buried to different maximum depths. Based on biostratigraphic and fission-track data, the Gustav Group sedimentary rocks were buried to 1 to 3 km with maximum temperatures of ~50–100 °C. Sedimentary rocks of the Marambio Group were buried to 0.4–1.1 km only (with maximum temperatures ~25–45 °C) during the Early Maastrichtian (~70 Ma), when the basin fill was segmented by a large-scale NE–SW reverse fault. Northwestern James Ross Island strata experienced denudation after that time, the most rapid denudation occurring during the Paleogene with average rates of ~50–70 m/Ma with a progressive reduction in denudation rate in the Neogene and Quaternary. The Seymour Island samples were possibly buried to variable maximum depths during the latest Eocene (~35 Ma), after the end of sediment deposition. Consequently, the Marambio Group samples from the Seymour Island were buried to a depth between 1 and 2 km and could have reached a temperature of ~30 to >60 °C. The maximum burial of the Seymour Island Group sedimentary rocks was on the order of first hundreds of a few meters with only negligible burial temperatures.

University of Hradec Králové, Project No. 7235: **The evaluation of two samples from Roman oven, Tuněchody** (*L. Lisá*)

The sunken parts of two ovens from the Roman period were studied. The method of X-ray and thin section analyses were applied. Fragments of sparitic carbonate, evidence of the use of the kilns for the firing of lime, were identified through the analysis of the ashy layers from the fill of the feature. The temperature in the oven was estimated to 550–850 °C. The analysis of the daub enabled the formulation of a testable hypothesis on the construction of the kiln and the applied technological procedures. Provenance of material used for the oven construction is from the near surroundings and composed mainly of fluvial conglomerates.

Faculty of Science, Charles University, Praha, Project No. 7242: **Geomorphological processes and uplift of the rocks from Hunza Karakoram** (*M. Svojtka*, J. Filip & J. Kalvoda, Faculty of Science, Charles University, Praha, Czech Republic).

Landforms in the Himalaya and the Karakoram provide evidence for the nature of very dynamic landscape evolution. The Himalaya and the Karakoram are in the collision zone of the Indian and Asian plates, where the orogenic movements are still active. We have prepared 12 previously collected samples from Hunza Karakoram area for fission-track (FT) dating. Apatite and zircon concentrates were prepared using a conventional crushing and separation technique. Analytical FT procedures follow the technique outlined separately for zircons and apatites. Apatite grains were mounted in EPOFIX® resin, while zircons in a PFA Teflon® sheets. To reveal internal surfaces, both apatite and zircon mounts were ground and polished in diamond pastes and then chemically etched. In the case of zircons, the grains mounted in the PFA Teflon® sheets were repeatedly ground and polished with grains arranged in the same direction, parallel to the c-axis. After finishing grinding and polishing, the spontaneous tracks in the apatites were etched in 2.5% HNO_3 for 70 seconds at room temperature and zircons in a molten NaOH-KOH eutectic etchant at 225 ± 1 °C.

The apatite fission-track data documenting a rapid decrease in temperature from 120 °C (PAZ) to 20 °C in the gneisses already between 3.0–2.0 Ma suggest the existence of dissected mountain relief at that time which probably developed (in a substantially lower elevation above the sea level) during the Pliocene. The rapid decrease in temperature of the exhumed crystalline rocks can evidence one of the substantial periods of rapid erosion and denudation of the paleorelief of the High Himalayan nappe which were stimulated by the integration of its tectonic uplift with the increasing of intensity and range of exogenous geomorphological processes as a consequence of global climatic change.

Institute of Rock Structure and Mechanics AS CR, v. v. i., Prague, Project No. 7246: **Physical and mechanical properties of gneisses** (*R. Živor*)

A set of physical properties (bulk density), mechanical properties (simple compressive strength, tensile strength, shear strength, angle of shear resistance) and deformational characteristics (Young's modulus, deformation modulus, Poisson's ratio) was found for gneisses from Moldanubicum. Every mechanical and deformational properties were determined in three various directions relative to foliation of rock, i. e. parallel and upright to the foliation and under angle of 25° to the foliation.

Gneisses have the highest value of the simple compressive strength in parallel direction to foliation surprisingly (265 MPa). Simple compressive strength found in direction of 25° to the foliation is the lowest (178 MPa) when a foliation angle is closed to the future fracturing surface. The simple tensile strength was the highest in the parallel direction to the foliation and the lowest in the perpendicular direction to the foliation (11 MPa and 9 MPa, respectively). On the other hand, the shear strength determined by a punch test method was the highest in the perpendicular direction to the foliation and the lowest in the parallel direction to the foliation (32 MPa and 29 MPa, respectively). Parameters of the shear properties – angle of shear resistance and shear strength – were also determined by calculation from compressive and tensile strength values by Mohr envelope method. By this way determined shear strength value varies from 21 MPa (in the sideways direction to the foliation) to 27 MPa (in the parallel direction to the foliation). The angle of shear resistance oscillates about 66°. The deformational characteristics – Young's and deformation moduli are significantly higher in the parallel direction to the foliation (45 GPa and 51 GPa, respectively) then ones determined in the parallel direction to the foliation (22 GPa and 30 GPa, respectively).

Deutscher Alpenverein, Höhlengruppe Frankfurt/Main: **Feasibility of karst hydro- geological research in the Loferer Schacht area, Loferer Steinberge, Austria** (*K. Žák*)

The main purpose of this report was to make a feasibility study for a detailed karst hydrogeological project in the Loferer Schacht cave system and adjacent area, Loferer Steinberge, Austria. From a hydrogeological point of view, the known part of this extensive cave system (vertical extent from the entrance +9.8/-796.7 m, mapped cave length 7800 m) occurs within the unsaturated (vadose) zone, which has a vertical extent of more than 800 m here. Based on a pilot field survey, evaluation of the geological structure, and a preliminary study of groundwater residence time using oxygen stable isotopes it can be concluded that the area is not suitable for a detailed project. The most principal obstacles for such a study are: i. the character of the discharge sites located in talus accumulation, which do not allow precise measurement of the discharge; ii. the long storage of precipitation in the recharge area as perennial snowfields and ice plugs in swallow holes; and iii. the problematic use of artificial water tracers because the springs are used as drinking water.

4f. Programmes of Institutional Research Plan

Project No. 9100: **Complex insight on the development of the environment in period from Neogene until the youngest geological history with a special respect on present era (interactions and development of processes)** (Co-ordinator: *M. Filippi*, contributions: *M. Burian*, *I. Dobešová*, *P. Kubínová, L. Lisá*, *T. Navrátil*, *J. Rohovec*, *P. Skřivan*, *S. Šlechta*, *J. Špičková*, *M. Vach*, *K. Žák*, *A. Žigová* & *R. Živor*)

Main focus of geochemical part of the research lies in the speciation study and exogenous cycles of selected elements in small catchments. Monitoring of inputs, outputs and internal fluxes of H^+, Na, Ca, K, Mg, Mn, Fe, Zn, Al, Cu, Pb, Be, As, Cd, Sr, Ba, Rb, Ni, Co, SO_4^{2-}, NO_3^-, NH_4^+, Cl^- and F^- continued at the Lesni potok catchment in Central Bohemia. Fluxes expressed in mg (μg) of the element/ion per m^2 and day, were calculated on the basis of analytical data. Annual fluxes, obtained by summarization of daily values were compared with the data of previous years. The long-lasting monitoring (with parameters gathered for more than 15 years) enabled to record pronounced decrease of deposition between 1989 and 1999. The decrease is ascribed to the restructuring of Czech industry and gradual desulphurization of important coal fired power plants, in case of Pb to the sales decrease of leaded gasoline. After 1999, the stagnation of majority of indices is observed. Moderate decrease is recorded in the deposition of H^+, Pb and SO_4^{2-}, whereas the deposition of Cd increases as a result of growing vehicular emissions (mostly from diesel engines). The continuing input of strong (anthropogenic) acidifiers results in further output of base cations from soils and regolith, and in low pH values of the surface water discharge. These findings are discussed in the prepared paper cited below. Here is also stressed the fact that continuing acidification of the Earth's surface is an important factor affecting the content of CO_2 in the global atmosphere.

Hydrochemistry of Ni and Co was carried out in a special detail. Relative mobility of the elements was estimated from their mass balance and through their proportional index (PI_{Me}) related to Fe as the most common element. Increased concentrations of the elements in humic soil layer indicate their origin in the litterfall and throughfall. The atmospheric inputs of the elements are affected by forest vegetation. The outputs through surface and subsurface discharge document the relative mobility of the elements that decreases in the order Mn>Ni>Co>Fe.

Other detailed study was aimed at the speciation, mobility and content of Hg in soils. In a set of selected samples of soils affected by mining an absolute Hg content was estimated using CV technique implemented on AMA 254 instrument. Mercury speciation in the samples was studied by TD- ICP EOS and the mobility and environmental risks were assessed upon binding of Hg in the solid matrix.

Other important activity of this subproject was an initiation of the study of newly discovered locality of cryogenic cave carbonates in the Studeného vetra Cave in Low Tatra Mts., Slovakia. This occurrence of cryogenic carbonates was dated by the $^{230}Th/^{234}U$ method in cooperation with Polish Academy of Sciences later during the year. The age of 79.7 ± 2.3 ka BP corresponds to older half of the last Glacial.

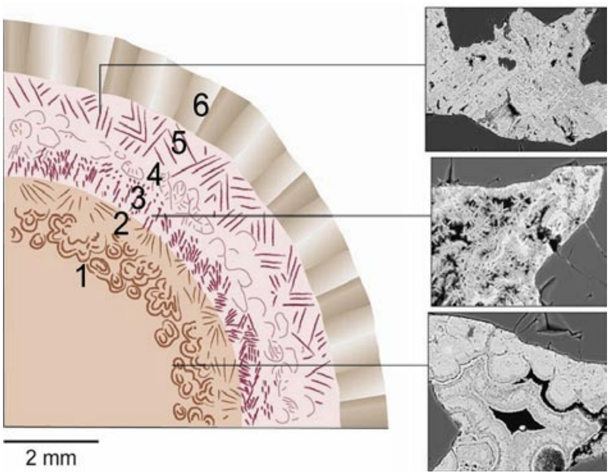
Reconstruction of the Šumava Mts. glaciation continues based on the micro-morphological study of quartz grains. New samples were sampled also from the glacial sediments in Krkonoše Mts. where the same type of glaciation is assumed.

Different part of the research included in this subproject is focused on measuring of the elastic anisotropy of rock samples under hydrostatic stress up to 200 MPa.

Project No. 9200: **History of the Bohemian Massif before and after its consolidation** (Co-ordinator *V. Cajz*, contributions: *J. Adamovič*, *K. Breiter*, *J. Fiala*, *J. Filip*, *M. Chadima*, *M. Lang*, *O. Man*, *P. Schnabl* & *M. Svojtka*)

Basic research within this project covered a wide range of problems solved:

Hydrothermal ferruginization effects were produced in areas of Tertiary alkaline volcanism of the Bohemian Massif based on the interaction between volcanic rocks and the ambient porous sedimentary rocks. Spherical goethite-hematite concretions (Fig. 79) in the Czech sandstones are analogous in many respects to those found by the Spirit and Opportunity rovers on the surface of Mars. Magnetic properties of the terrestrial concretions also revealed a minor proportion of magnetite. Field geomagnetic measurements confirmed their spatial association with basaltic bodies, and XRD and microprobe analyses showed their layered internal structure with colloform cement rich in phosphorus. The obtained data support the idea of bacterially-mediated concretion growth within the reach of iron-laden hydrothermal fluids, and contribute to the discussion on the presence of water and microbial life on Mars.



■ **Fig. 79.** A schematic profile across a hematite-goethite concretion from the Slunečná site near Česká Lípa, Bohemian Cretaceous Basin (after Adamovič et al. 2010). Zones: P-rich colloform goethite (1) passing to crystalline goethite (2), zone with acicular hematite crystals (3), cloudy hematite aggregates (4) and large hematite crystals intergrown in tile-like pattern (5); the outermost massive goethite±hematite (6).

Volcanic rocks with high content of titanium in the titanomagnetite lattice (up to 18 %) were studied, using the dependence of magnetic susceptibility (MS) on the field in the inducting coil, to show the relative Ti content. The samples with titanium rich titanomagnetites have MS in the high field 20 % higher than in the low field. The samples with low amount of titanium in the lattice have high-field MS similar to low-field one. The dependence of magnetic susceptibility on temperature on these samples had shown variable Curie temperature – 500–580 °C for high-Ti content and 200–250 °C for low-Ti content. These results are crucial for magnetostratigraphic interpretations.

Magnetostratigraphic data obtained in the paleomagnetic laboratory of our institute and those known from world literature were used to prove the possibility of the identification of sequences of polarity zones without complementary information. These zones represent the imprint of alternating polarity of geomagnetic field on the forming sediments. The possibility of their identification will improve the dating of sections formed by continuous sedimentation in some parts of the last 166 Ma of the geological history. Following a common trend, we are planning close connection between magnetostratigraphy and cyclostratigraphy, which is another method of dating young sediments.

The anisotropy of magnetic susceptibility (AMS) was recognized as a highly sensitive indicator of rock fabric and widely employed in the field of structural geology. Several methods were developed in order to separate paramagnetic and ferrimagnetic sub-fabrics, such as exploiting the field or temperature dependence of magnetic susceptibility or the measurement of anisotropy of anhysteretic remanence. The combination of rock magnetic measurements with nonmagnetic analysis demonstrates that magnetic minerals distribution has an important control on magnetic anisotropy.

U-Pb dating of detrital zircons separated from paragneiss of eastern Crete yielded peaks in $^{207}Pb/^{206}Pb$ ages at 0.6, 0.8, 1.0, 2.0, and 2.5 Ga with Mesoproterozoic age gap between 1.1 and 1.6 Ga. These data are compatible with U-Pb zircon ages of surrounding crystalline complexes of the Cyclades, the Menderes Massif, Egypt and the Levant. Possible provenances are the Sahara metacraton, the Arabian-Nubian Shield, and the Kibaran belt of central Africa. The age spectra of the studied East-Mediterranean crystalline complexes differ significantly from those of the Cadomian-Avalonian type terranes. They are, therefore, regarded as a separate collection of peri-Gondwanan terranes referred to as Minoan terranes. In late Neoproterozoic to ?Cambrian times, the latter underwent Andean-type orogeny at the northern border of East Gondwana. There is no evidence that the Minoan terranes traveled for a long distances in Phanerozoic times.

Based on the limited available deglaciated outcrops in the James Ross and Seymour Islands (Antarctica), the detrital zircons and apatites were dated using fission-track analysis. FT provenance age of individual zircons and apatites from studied area varies in wide spread of Carboniferous to Early Paleogene ages (~315 to 60 Ma). It is probable that the FT dating and shortening of individual zircons and apatites from the samples taken at the northwest James Ross Island and Seymour Island reveal pre-depositional history of individual rocks before entering into the James Ross Basin.

Krušné hory / Erzgebirge Mts. granite samples from the Nejdek pluton and adjacent small intrusions were investigated using apatite fission-track (AFTA) dating method. The samples raised from total annealing zone during time interval from 140 Ma to 245 Ma. Preliminary interpretation revealed that the unit situated at south of the Sokolov Basin was uplifted significantly earlier (approx. 245 Ma) than the Krušné hory Mts. unit (140 to 185 Ma). Preliminary results demonstrate similarly earlier uplift of Saxothuringicum in comparison with results published for Bavaricum (from 44 Ma to 69 Ma) till now.

Geochemical and mineralogical study of a small granite body near Hory Sv. Kateřiny (same area) revealed its subvolcanic origin and strong enrichment in F, Rb, Sn, Nb, W, Th, Zr, HREE, and Be. Fast decrease in temperature and pressure during the intrusion resulted in crystallisation of quartz layers in form of unidirectional solidification textures. The contents of trace elements in quartz were analyzed using LA–ICP–MS. The most important result is that Al-entry in quartz lattice is not correlated with Al-activity in melt, but with concentration of water and fluorine. Monazite, xenotime, thorite and zircon are common accessories in studied granite. These minerals are generally not able to form mixtures among each other. But, in condition of water- and fluorine-rich granite melt, we found unlimited miscibility among slightly hydrated varieties of xenotime, thorite and zircon.

Analyses of the rock-forming minerals of phonolite, xenoliths of phonolite and trachyte were processed by MINPET 2 program to crystalochemical formulas of pyroxene, amphibole, apatite, sphene, glimmers, feldspars and nepheline. The bulk of crystalochemical data was processed graphically in classification diagrams.

A new information was obtained by apatite fission-track analysis (AFTA) from hydrocarbon impregnations and blackening of the Koněprusy Limestone (Pragian). The AFTA was undertaken to determine the thermal history of the sediments that occur stratigraphically immediately above the "black limestones". The external detector method was used for fission track analysis. Our data demonstrate that the „black limestones" were actually formed as a result of a complex sequence of several diagenetic events, both early and late diagenetic, that were punctuated by repeated episodes of petroleum migration.

Metamorphic grade, paleothermal history and the influence of tectonic strain on clay minerals and organic matter transformation were studied in the eastern part of the Teplá–Barrandian Unit. The metamorphic grade of pelitic sediments ranges from the lower anchizone (IC ~0.30–0.36$\Delta°2\theta$) to the lowemost epizone (IC ~0.24–0.26$\Delta°2\theta$). Maximum metamorphic temperatures within the Neoproterozoic sequence in the range of 250–350°C were attained during the Cadomian orogeny at 540–550 Ma. Apatite fission track analysis (AFTA) revealed a subsequent decrease in rock temperature from 340–350 Ma that persisted throughout the Late Paleozoic. The most recent episode of accelerated cooling has occurred between 40–20 Ma, corresponding to the regional uplift of the Bohemian Massif due to the Alpine orogeny.

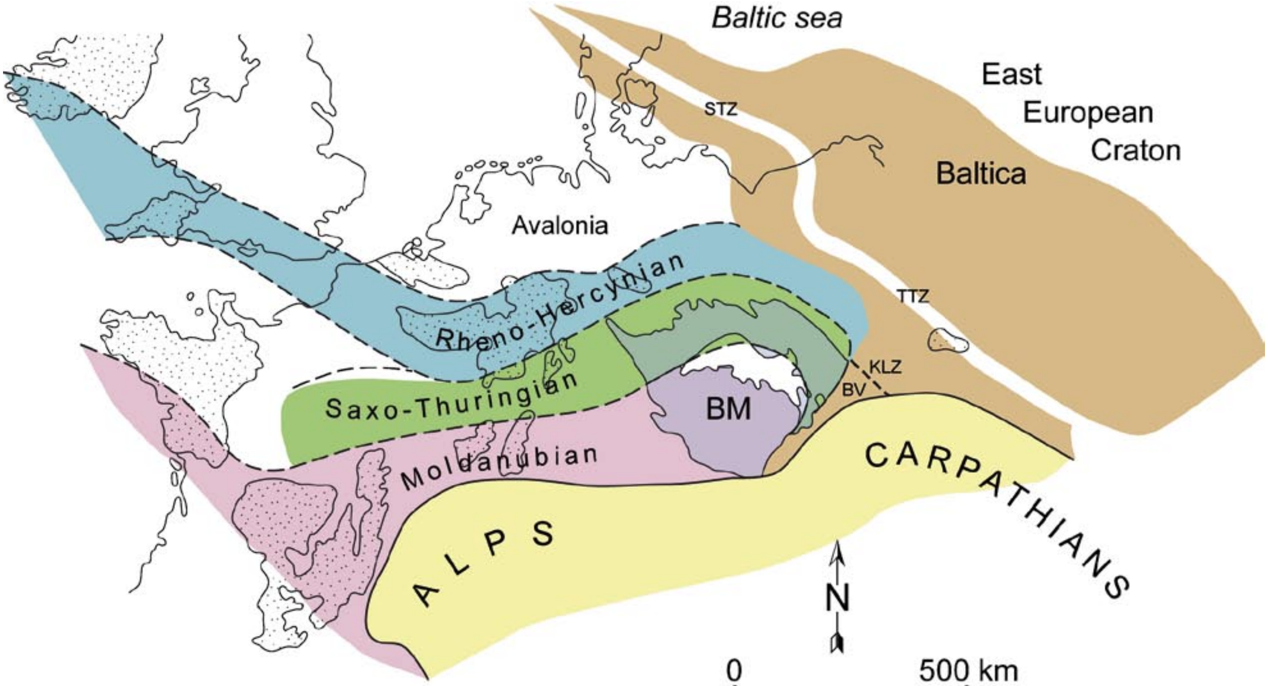
Project No. 9300: **Study of fossil ecosystems and their dependence on global climatic and paleogeographic changes (interaction and development of processes)** (Co-ordinator: *M. Svobodová*; contributions: *M. Vavrdová*, *P. Štorch*, *M. Siblík*, *T. Přikryl*, *S. Čermák* & J. Wagner; M. Stárková, Czech Geological Survey, Praha)

Palynomorphs from the Proterozoic of the Teplá-Barrandian Zone and from the Basal Clastic Series in southern Moravia can be utilized for a reconstruction of the paleoenvironment (M. Vavrdová; Fig. 80). Acritarchs isolated from the Měnín-1 borehole revealed a presence of the Ediacaran marine sedimentation in southern Moravia. Acritarch associations indicate a close affinity of the Brunovistulicum with the neighboring terranes at the East European Craton. Organic-walled marine microplankton from the Měnín-1 borehole yielded so far 50 species of acritarchs of the Ediacaran age together with 6 species of the Early Cambrian age. Recovered assemblages are predominantly derived from the ancient cyanobacterial near-shore vegetation.

Close similarities with Arctic Canada (Baffin Island, Northern Territories corresponds with the presumed position of the Brunovistulicum in similar paleolatitudes. A presence of the index Ediacaran species *Ceratosphaeridium glaberosum* (Fig. 81) and *Schizofusa risoria* (Ti/Cg/Mp palynozone), described from the Karlaya limestone in the Officer basin, western Australia together with species *Sagatum aff. priscum* and *Skiagia ornata*, limited to the deposits of the Cambrian age, indicate re-depositional processes, which complicate the biostratigrapical assessment. Apparently, large colonies of cyanobacterial organic remains have been transported in pellets of partially lithified sediment and in this way even the most fragile filaments could survive the transport. The preservation of Ediacaran palynomorphs is excellent, not affected by metamorphic processes connected with the Cadomian orogenesis. In this way, an affinity of the Brunovistulicum with the Fennosarmatian shield is corroborated.

Organic-walled microfossils and organo-sedimentary structures and textures observed at three localities of dark silicites near the SE margin of the Landscape Protected Area of Křivoklátsko are characteristic of the benthic, coastal paleoenvironment connected with stromatolites and evaporites (large aggregates of unicells, filamentous cyanobacterial trichomes, sinusoid veinlets etc). Observed features have an impact on a debate on origin of the Proterozoic silicites from the Blovice Formation (localities Na Čihadle, Vraní skála, Hudlická skála). The investigation was carried out together with M. Stárková (Czech Geological Survey, Praha).

Systematic description, biostratigraphic and palaeobiogeographic evaluation of the lowermost Silurian (Rhuddanian) graptolites of Montagne Noire in southwestern France (Štorch & Feist 2008). Diversified faunas, composed by 27 species and acquired from bed-by-bed sampling of two new sections and supplemented from museum collections, were assigned to *ascensus-acuminatus* and *vesiculosus* biozones. Four new graptolite taxa have been erected. High-resolution – intrazonal biostratigraphic correlation with other parts of peri-Gondwanan and Avalonian Europe have been underpinned by close graptolite faunal links among the respective regions. Up to155 taxa of planktic graptolites were found in the Silurian pelagic succession of southern Sardinia, and 24 graptolite assemblage biozones were recognized and briefly described. The *Cyrtograptus insectus, Monograptus riccartonensis*, *Pristiograptus dubius* and *Cyrtograptus ramosus – Cyrtograptus ellesae* biozones

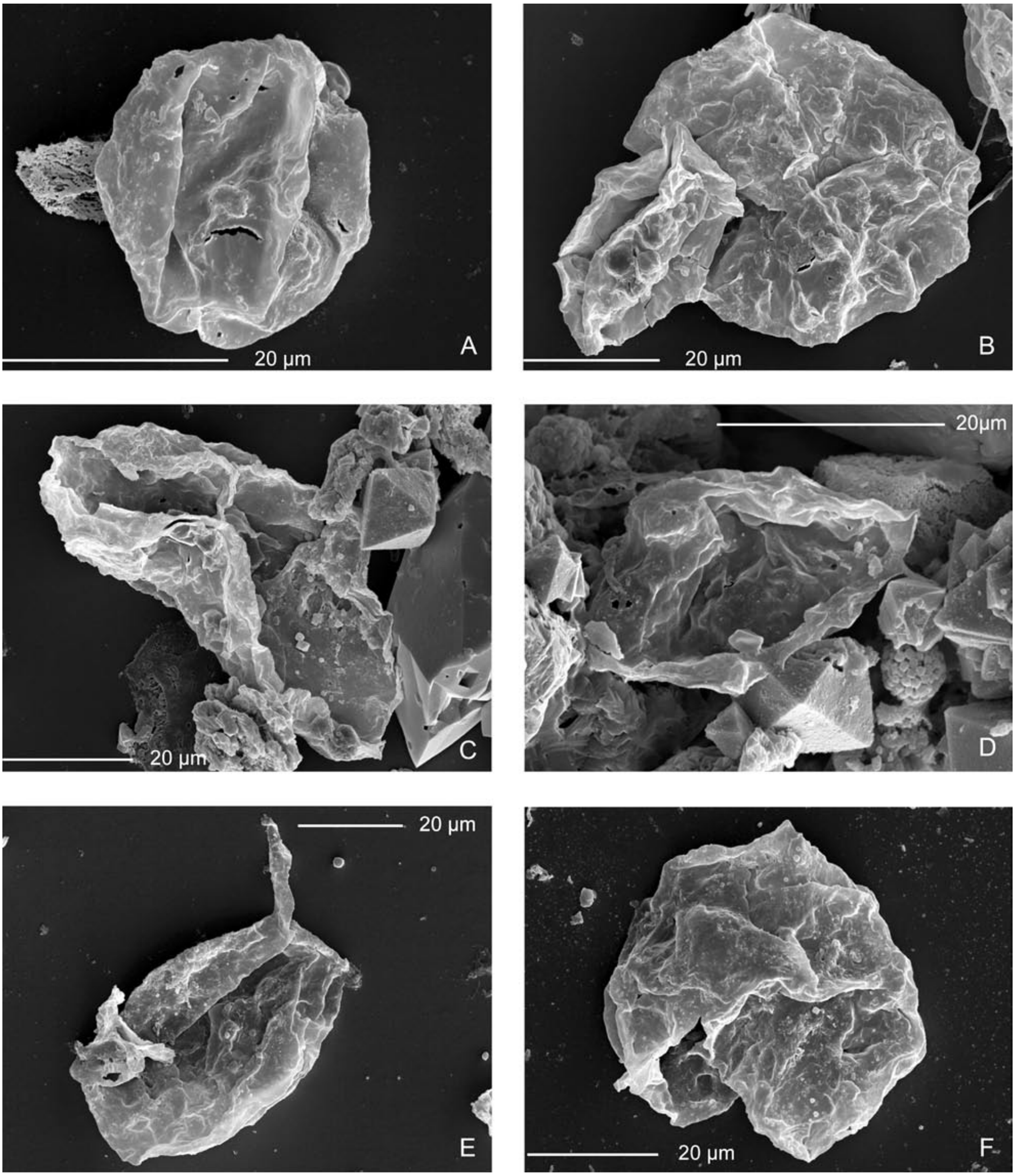


■ **Fig. 80.** Geological position of Brunovistulicum (BV) in central Europe: BM – Bohemian Massif; TTZ – Tornquist-Teysseyre Zone; STZ – Sorgenfrei-Tornquist Zone; KLZ – Kraków-Lubliniec zone.

were recorded for the first time in Sardinia; most other biozones have been redefined (Štorch & Piras, in press). This was the first compilation on Sardinian graptolites that comprised critically assessed published data combined with new records.

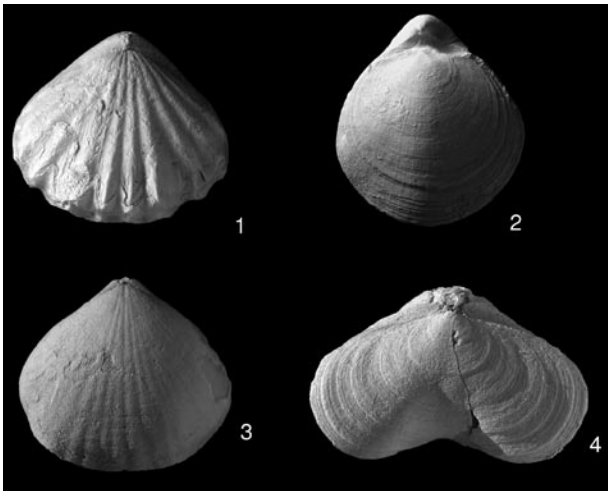
The material of brachiopods sampled (by M. Siblík) in the previous years in the vicinity of Hallstatt city (Austria) was completed and together with H. Lobitzer the manuscript on Jurassic brachiopod fauna from the Mitterwand area near Hallstatt was finished and submitted for publication. The studied material yielded 52 Lower Jurassic and 12 Middle Jurassic brachiopod species in total. The Lower Jurassic brachiopods show considerable resemblances to the Sinemurian fauna of the type-locality of the Hierlatz Limestone at Feuerkogel on the Dachstein Plateau. The field works in the Totes Gebirge Mts. (Austria) together with small groups of specialists from Hungary and Slovakia continued under guidance by G. Mandl (Geological Survey, Vienna, Austria) and the new material was preliminary determined (Fig. 82). Most localities in the area of Plankerau and Flodring contain shelf and seamounts assemblages of Sinemurian brachiopods (most probably Upper Sinemurian). The most common genera are *Prionorhynchia, Cuneirhynchia, Calcirhynchia, Liospiriferina, Bakonyithyris, Lobothyris* and *Zeilleria*. One point is promising for the more detailed study, containing very variable brachiopod and ammonite fauna pointing to the Pliensbachian age. It is thus the only Middle Liassic locality in the till now visited part of the Totes Gebirge area with rich brachiopod and ammonite fauna..The Pliensbachian age is documented by leading species *Viallithyris gozzanensis, Pisirhynchia pisoides* (Zittel), *Apringia paolii* (Canavari), and by already in 2005 ascertained *Securithyris adnethensïs.* The continued field work in the southern parts of the Totes Gebirge Mts. (Styria, Austria) and study of the new sampled material could help to establish 2 brachiopod assemblages: the lower one of Upper Sinemurian age and the upper one of Pliensbachian age. The characteristic members of the Sinemurian assemblage (Hierlatz limestone) are *Prionorhynchia greppini* (OPP.), *Prionorhynchia fraasi* (OPP.), *Prionorhynchia polyptycha* (OPP.), *Calcirhynchia zugmayeri* (GEMM.), *Liospiriferina obtusa* (OPP.), *Liospiriferina brevirostris* (OPP.), *Liospiriferina alpina* (OPP.), *Zeilleria alpina* (GEYER), *Zeilleria mutabilis* (OPP.), *Bakonyithyris ewaldi* (OPP.), *Zeilleria venusta* (UHLIG) and *Securina partschi* (OPP.). Pliensbachian level (mostly red micrites) is characterized by following species: *Apringia paolii* (CAN*.), Apringia atlaeformis* (BÖSE), *Prionorhynchia flabellum* (MENEGH. in GEMM.), *Prionorhynchia* (?) *hagaviensis* (BÖSE), *Cuneirhynchia retusifrons* (OPP.), *Liospiriferina alpina* (OPP.), *Viallithyris gozzanensis* (PAR.), *Bakonyithyris apenninica* (ZITT.) and *Bakonyithyris ovimontana* (BÖSE).

The presence of fish remains from the Paleogene sediments in the Czech Republic has been well known since the early 19th century. Research (by T. Přikryl) was focused mainly on the taxonomic position of the fossil forms and their relationships to recent relatives, although the type of preservation allows to study remarkable details, such preserved soft part of bodies or food remains in the body cavities. The current research is focused on paleoecological aspects of Paleogene fish assemblages, mainly feeding habits of selected taxonomical groups (Stomiiformes and Perciformes), fish biostratigraphy and morphological revision of choice taxa. The studied specimens are compared with material from other localities in Europe.



■ **Fig. 81.** Acrythars in Měnín-1 borehole, core no. 27A, depth 1299–1300.2 m. A – *Leiosphaeridia asperata* (Naumova) Lindgren 1982; B – *Arctacellularia ellipsoidea* Herman in Timofeev et al., 1976; C – *Brevitrichoides bashkiricus* Jankauskas 1980; D – *Leiosphaeridia tenuissima* Eisenack 1958; E – *Ceratosphaeridium glaberosum* Grey 2005; F – *Valeria granulata* (Vidal) Fensome et al., 1990.

Environmental changes during the Pliocene and Pleistocene period apparently impacted the mammalian evolution, both in extensive rearrangements of community and faunal structures, including the large scale migrations. The research (by J. Wagner & S. Čermák) of this topic was focused particularly on two main areas of interest: (1) an excavation of the new Pliocene localities Měňany and Vitošov including careful reexamination of their lithological specificities, sampling of sediments,



■ **Fig. 82.** Brachiopods of the western part of the Totes Gebirge Mts., Lower Liassic. 1 – *Cirpa fronto* (Quenst.); 2 – *Liospiriferina brevirostris* (Oppel); 3 – *Apringia paolii* (Canavari); 4 – *Linguithyris aspasia* (Zittel).

and washing and mechanical extraction of fossils; (2) a detailed morphometric analysis of selected model taxa (namely *Hypolagus* and *Ursus*), including comparisons with relevant populations from the Pliocene and Early Pleistocene of Central Europe. From localities of the Czech and Slovak Republics, the all currently available dental and cranial material of *Hypolagus* (i. e. the important and dominant genus of Leporidae in the Pliocene and Early Pleistocene of Central and Southeastern Europe) was revised and analyzed in detail. The complete nomenclatural revision and synonymy of the genus were provided. The very important find of the Pliocene *Ursus minimus* from Rębielice Królewskie – "Kamieniołom przy cmentarzu" (Poland) was described. It represents the only the 5th positive record of this species in Central Europe. The results concerning the above taxa and sites will be published in a form of journal articles and contributions to international conferences.

ŠTORCH P. & FEIST R. (2008): Lowermost Silurian graptolites of Montagne Noire, France. – *Journal of Paleontology*, 82, 5: 938–956.

4g. Defended dissertations

ACKERMAN L. (2008): **Geochemistry of upper mantle rocks from Kozákov and Horní Bory, Bohemian Massif**. The dissertation presents an extensive geochemical dataset including major and trace elements, mineral chemistry and radiogenic isotopes for two upper mantle suites located in the Bohemian Massif: (1) mantle xenoliths from the Kozákov volcano and (2) peridotite-pyroxenite boudins from the Horní Bory granulite massif.

The Kozákov xenolith suite represents mostly lherzolites (Fig. 83) which sample a layered mantle profile, consisting of an equigranular upper layer at depths from 32 to 43 km, a protogranular symplectite-bearing intermediate layer from 43 to 67 km, and an equigranular lower layer from 67 to 70 km.

Whole-rock and mineral major elements variations point to different partial melting degrees from ~5 % for the lower equigranular to ~15 % for the upper equigranular layers, suggesting a progressive increase in partial melting degrees with decreasing depth. Subsequent metasomatism, most probably by a transient silicate melt, affecting the whole mantle profile beneath the Kozákov volcano resulted in enrichment in the large ion lithophile elements (LILE), light rare earth elements (LREE), and high field strength elements (HFSE). Trace element patterns and ratios (e. g., Nb/La, Hf/Sm) show that the lower equigranular layer interacted with percolating melt at high melt/rock ratios. As a result of melt-peridotite interaction, small melt fractions were formed and upward-migrated, causing large-scale metasomatism at low to moderate melt/rock ratios.

■ **Fig. 83.** Ultramafic xenoliths from the Kozákov volcano, Czech Republic.

Such mantle evolution makes Kozákov xenoliths ideal targets for the study of behaviour of highly siderophile elements (HSE) and osmium isotopes during mantle depletion and metasomatism. The HSE concentrations in a suite of these xenoliths indicate that most of these elements behaved incompatibly during melt percolation, most probably due to removal of sulphides. The depletion is the most extensive in the lowermost part of the profile, which experienced the highest melt/rock ratios. In contrast, rocks from shallower depths show smaller and more variable HSE depletions. A few xenoliths have much higher I-PGE (Os, Ir, Ru) contents than estimated for the primitive upper mantle, suggesting that in some cases, the I-PGE were transported into the mantle rocks via the percolating melt, but strong depletions in Pd point to the S-undersaturated character of the percolating melt. Therefore, the I-PGE enrichments are not associated with sulphide addition as has been suggested in other studies (e. g., Büchl et al. 2002; Luguet et al. 2004). Moreover, in contrast to other studies on mantle peridotites (e. g., Chesley et al. 1999; van Acken et al. 2008), the transport and deposition of some HSE was evidently not accompanied by transport and deposition of Re and radiogenic Os.

The timing of the depletion can be estimated by the Re–Os system. Model Os depletion ages (T_{RD}) cluster around 0.8 Ga and even this age probably represent a rather minimal age estimation; this indicates that the subcontinental lithospheric mantle underlying the Bohemian Massif does not represent the orogenic root of the overlying Variscan (280–360 Ma) crust. Rather, crustal terranes may have been thrust onto the mantle lithosphere during the Cadomian and Variscan orogenies. The age of cryptic metasomatism in the Kozákov lithospheric mantle remains uncertain. However, the regular variation in trace elements with depth across the three mantle layers suggests that metasomatism occurred after the assembly of the layered mantle structure beneath Kozákov (i. e. post-Variscan). Moreover, likely influence of the low-velocity component on the Sr-Nd isotopic evolution of the Kozákov lithospheric mantle implies that the metasomatism may have been associated with Neogene rifting and magmatism.

The ultramafic suite found at Horní Bory show a completely different story than Kozákov xenoliths. The Horní Bory mantle-derived rocks form boudins in Gföhl Unit granulites consisting of lherzolites and dunite-wehrlites associated with pyroxenites, which show very common composite layered texture (Fig 84). Whereas lherzolites (Mg-Cr-peridotite) show a composition similar to other mantle-derived rocks elsewhere (Mg # = 89.1–90.9, $^{87}Sr/^{86}Sr < 0.7068$, $^{143}Nd/^{144}Nd > 0.512729$), the dunite-wehrlite series (Fe-rich peridotite) is characterized by much lower Mg # (83.2–88.2) and different Sr-Nd isotopic compositions ($^{87}Sr/^{86}Sr > 0.7079$, $^{143}Nd/^{144}Nd < 0.512432$).

Numerous studies have shown that lherzolite has been converted to harzburgite by reaction with silica-rich (subduction-related) transient melt (e. g., Zanetti et al. 1999). On the other hand, lherzolite-dunite-wehrlite series can be produced during an infiltration into, and reaction with mantle peridotite, by fractionated SiO_2-undersaturated melt of basaltic composition (e. g., Kelemen et al. 1990, 1998; Ionov et al. 2005). Nevertheless, both reactions lead to partial/complete dissolution of mantle minerals (opx, cpx) with respect to SiO_2-saturation of infiltrated melt.

Modelling of Mg–Fe exchange between Mg-pd and Fe-rich melts coupled with Sr-Nd isotopic modelling revealed that modal and chemical compositions of dunite-wehrlites from Horní Bory can be produced by melt-rock reactions between lherzolites and SiO_2-undesaturated melts of basaltic composition at variable melt/rock ratios. In such model, pyroxenites represent crystalline product (± trapped liquid) of melt migrating along conduits in the peridotite. Thus, Mg-lherzolite from Horní Bory has been transformed to Fe-dunite-wehrlite, similar in many respects to the modification of lherzolite to Fe-rich lherzolite-wehrlite series found in several mantle xenolith localities sampled subcontinental lithospheric mantle (Lee & Rudnick 1999; Peslier et al. 2002; Ionov et al. 2005). However, in contrast to these studies, the calculated trace element compositions of melts equilibrated with pyroxenites and Sr-Nd composition of Horní Bory peridotites point to a significant contribution of crustal material in interacted melts. Therefore, melt-rock reactions were probably associated with melt percolation in a mantle wedge above the subduction zone, which could be driven by the infiltration of subduction-related melts/fluids, if the melt/fluid flux was high enough to enhance partial melting in the mantle wedge.

■ **Fig. 84.** Example of interlayered Fe-dunite/wehrlite and pyroxenite structure from Horní Bory, Czech Republic. Photo by G. L. Medaris.

The differences between the Kozákov and Horní Bory upper mantle suites revealed complex heterogeneity of upper mantle beneath the Bohemian Massif. Different types of metasomatism (melt-rock reactions) which reflect sources of metasomatic agents (subcontinental *vs.* subduction-related) at these two localities suggest different evolutions of mantle beneath the Bohemian Massif. In turn, this means that upper mantle beneath the Bohemian Massif should comprise mantle domains with different evolution histories (i. e. ancient partial melting) which survived even the Cadomian/Variscan orogeny. This is supported by Re–Os data from Kozákov (see above) as well as by the different orientation of anisotropy (Babuška & Plomerová 2006). On the other hand, the geochemical study on Kozákov and Horní Bory suggests that secondary processes (metasomatism, melt-rock reactions) are probably associated with Variscan orogeny and Neogene magmatism.

The highly siderophile element (HSE) and Re–Os isotopic study on pervasively metasomatized mantle xenoliths from Kozákov provide insights into the behaviour of these elements and Os isotopes during melt percolation. In agreement with other studies, it has been shown that HSE systematics is highly dependent on removal/addition of sulphides (represents their principal hosts) and S-saturation of percolating melt. On the other hand, we reported addition of I-PGE from a S-undersaturated percolating melt, suggesting a possibility of precipitation of I-PGE-bearing alloys during melt percolation. In the case of Kozákov, this was not coupled with an import of radiogenic Os, but is of high importance due to the possible I-PGE enrichment in the upper mantle and its possible effect on Re-Os isotopic geochemistry.

BABUŠKA V. & PLOMEROVÁ J. (2006): European mantle lithosphere assembled from rigid microplates with inherited seismic anisotropy. – *Physics of the Earth and Planetary Interiors*, 158, 2–4: 264–280.

BÜCHL A., BRÜGMANN G., BATANOVA V. G., MÜNKER C. & HOFMANN A.W. (2002): Melt percolation monitored by Os isotopes and PGE abundances: a case study from the mantle section of the Troodos Ophiolite. – *Earth and Planetary Science Letters*, 204, 3–4: 385–402.

CHESLEY J. T., RUDNICK R. L. & LEE C. T. (1999): Re-Os systematics of mantle xenoliths from the East African Rift; age, structure and history of the Tanzanian Craton. – *Geochimica et Cosmochimica Acta*, 63, 7–8: 1203–1217.

IONOV D. A., CHANEFO I. & BODINIER J.-L. (2005): Origin of Fe-rich lherzolites and wehrlites from Tok, SE Siberia by reactive melt percolation in refractory mantle peridotites. – *Contributions to Mineralogy and Petrology*, 150, 3: 335–353.

KELEMEN P. B. (1990): Reaction between ultramafic rock and fractionating basaltic magma I. Phase relations, the origin of calc-alkaline magma Series, and the formation of discordant dunite. – *Journal of Petrology*, 31, 1: 51–98.

KELEMEN P. B., HART S. R. & BERNSTEIN S. (1998): Silica enrichment in the continental upper mantle via melt-rock reaction. – *Earth and Planetary Science Letters*, 164, 1–2: 387–406.

LEE C.-T. & RUDNICK R. L. (1999): Compositionally stratified cratonic lithosphere: petrology and geochemistry of peridotite xenoliths the Labait volcano, Tanzania. – In: GURNEY J.J., GURNEY J.L., PASCOE M.D. & RICHARDSON S. H. (Eds.): *Proceedings of the 7th International Kimberlite Conference*, *vol 1*.: 503–521. RedRoof Design, Cape Town.

LUGUET A., LORAND J. -P., ALARD O. & COTTIN J. Y. (2004): A multi-technique study of platinum group element systematic in some Ligurian ophiolitic peridotites, Italy. – *Chemical Geology*, 208, 1–4: 175–194.

PESLIER A. H., FRANCIS D. & LUDDEN J. (2002): The lithospheric mantle beneath continental margins: melting and melt-rock reactions in Canadian Cordillera xenoliths. – *Journal of Petrology*, 43, 11: 2013–2047.

van ACKEN D., BECKER H. & WALKER R. J. (2008): Refertilization of Jurassic oceanic peridotites from the Tethys Ocean-implications for the Re-Os systematics of the upper mantle. – *Earth and Planetary Science Letters*, 268, 1–2: 171–181.

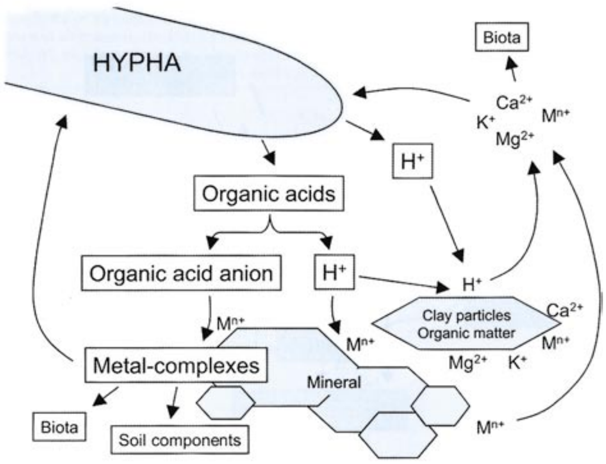
ZANETTI A., MAZZUCCHELLI M., RIVALENTI G. & VANNUCCI R. (1999): The Finero phlogopite-peridotite massif: an example of subduction-related metasomatism. – *Contributions to Mineralogy and Petrology*, 134, 2–3: 107–122.

BOROVIČKA J. (2008): **Geochemical and ecological aspects of trace elements content in macrofungi**.

Fungi have important biogeochemical roles in the biosphere and are intimately involved in the cycling of elements and transformations of both organic and inorganic substrates (Fig. 85). The research area of geomycology is focused on the interactions of fungi with geological environment.

Many macrofungal species (macromycetes, mushrooms) are capable of accumulating high concentrations of certain trace elements (including heavy metals, noble metals and metalloids) in fruit-bodies and thereby affect elemental geochemical cycling. Many studies focused on trace elements content in macrofungal fruit-bodies have been published to date. Most of them deal with heavy metals (Hg, Pb, Cd), essential elements (Fe, Co, Se, Zn) or radionuclides (^{137}Cs) and consider environmental aspects (biomonitoring of artificial pollution) and/or health risks for mushroom consumers. Detailed data on chemical form of arsenic in macrofungal fruit-bodies are available and preliminary results on some other elements have been published. Factors that influence the trace element content in fruit-bodies and the biological importance of the accumulation process itself are poorly known. However, many elements attain elevated concentrations in polluted areas.

My PhD study has focused on several aspects that have not been considered to date (ecological strategy of macrofungi, antimony pollution) and, moreover, some interesting results on noble metals – gold and silver – content in macrofungi are presented and discussed.



■ **Fig. 85.** Proton- and organic acid ligand-mediated dissolution of metals of soils componets and minerals (Gadd 2004, Mycologist 18: 60–70). Proton release results in cation exchange with sorbed metal ions on clay particles, colloids etc. and metal displacement from mineral surfaces. Released metals can interact with biomass and also be taken up by other biota, and react with other environmental components. Organic acids anions, e. g., citrate, may cause mineral dissolution or removal by complex formation. Metal complexes can interact with biota as well as environmental constituents. In some circumstances, complex formation may be followed by crystalization, e. g., metal oxalate formation.

Gold. Uptake of any element in fungal biomass is possible in soils where the element is biologically available (i. e. present in ionic form in soil solution, in colloidal form, or present in minerals that can be partially solubilized by microorganisms). In the case of gold, several papers have recently demonstrated a surprisingly high mobility of gold in Ah soil horizon in the auriferous area of the Tomakin Park Gold Mine, Australia. Its mobility may indicate that gold is easily bioavailable.

My data indicating high gold concentrations in fungal fruit-bodies from both auriferous and non-auriferous areas suggest that macrofungi might play a significant role in gold cycling in the environment. The reported gold contents in macrofungi are the highest ever recorded among eukaryotic organisms under natural conditions. Recent studies have shown an important role of microbiota in gold mobilization in rocks and soils. According to several authors, gold tends to be enriched in organic soil layers; gold accumulation in fungal mycelia might represent a retention factor of gold in organic soil horizons.

Hyperaccumulation of silver. The ability of macrofungi to accumulate silver has been known since the 1970's. A literature search conducted by the author revealed that saprobic macrofungi usually have a higher Ag content (median 3.61 $mg.kg^{-1}$ Ag) than ectomycorrhizal fungi (median 0.65 $mg.kg^{-1}$).

Two ectomycorrhizal macrofungal *Amanita* species of the section *Lepidella – Amanita strobiliformis* (Fig. 86) and *A. solitaria* were found to hyperaccumulate silver. The silver contents of both *Amanita* species that were collected in non-argentiferous areas with background silver content in soils (0.07 to 1.01 $mg.kg^{-1}$ Ag) were mostly in the range of 200–700 $mg.kg^{-1}$ with the highest content of 1,253 mg kg^{-1} in one sample of *A. strobiliformis*. Silver concentrations in macrofungal fruit-bodies were commonly 800–2,500 times higher than in underlying soils. *A. strobiliformis* and *A. solitaria* are the first eukaryotic organisms known to hyperaccumulate silver.

Antimony content in macrofungi from clean and polluted areas. Not a great deal is known about the biogeochemistry, environmental speciation and toxicity of antimony. Macrofungi are well-known accumulators of arsenic. In *Sarcosphaera coronaria*, hyperaccumulation of arsenic was found. However, despite the chemical similarity between arsenic and antimony, antimony contents in macrofungi are very low.

In general, antimony contents of ectomycorrhizal and saprobic macrofungi from clean areas are mostly below 100 $\mu g.kg^{-1}$.

■ **Fig. 86.** *Amanita strobiliformis*. Photo by J. Borovička.

No appreciable difference between saprobic and ectomycorrhizal fungi was found. Antimony contents of macrofungi from polluted areas are approx. 100 timěs higher than those from the clean areas.

The highest ability to concentrate antimony was found in the ectomycorrhizal genera *Chalciporus* and *Suillus*. In samples from the clean areas, antimony content was in the range of 0.5–12 $\mu g.kg^{-1}$. In samples from polluted areas, antimony concentrations commonly reached hundreds of $mg.kg^{-1}$. An extremely high level was measured in a single collection of *Chalciporus piperatus* (1,423 $mg.kg^{-1}$).

Distribution of trace elements in ectomycorrhizal and saprobic macrofungi. The ecological strategy of macrofungi may also play an important role in accumulation of specific elements. Different ability of ectomycorrhizal and saprobic species to accumulate gold, selenium and silver has been reported. No differences have been observed in case of antimony, cobalt, iron and zinc. It is likely that saprobic species are releasing elements and taking them up during the decomposition of organic matter containing this element in bound or adsorbed form. In contrast, ectomycorrhizal fungi receive nutrition largely from host plants, and, therefore, their accumulation ability might be lower.

Conclusions. It is obvious that macrofungi play a significant role in weathering processes and trace element cycling in the environment. Available data indicate that macrofungi are an important factor influencing silver and gold mobilization and redistribution in top-soils; they might represent a retention factor of these elements in organic soil horizons. The differences in element uptake between ectomycorrhizal and saprobic species might result from their different ecological strategy. The ability of several macrofungal species to hyperaccumulate silver and arsenic has been clearly demonstrated, but the mechanism and biological importance of the process itself are unknown. However, some recent studies have revealed that hyperaccumulation in plants might be attributed to the „defense hypothesis"; in case of macrofungi, such importance is questionable. Investigation of the accumulation mechanisms and trace elements speciation in fruit-bodies might result in useful applications in biotechnologies (bioremediation, phytomining).

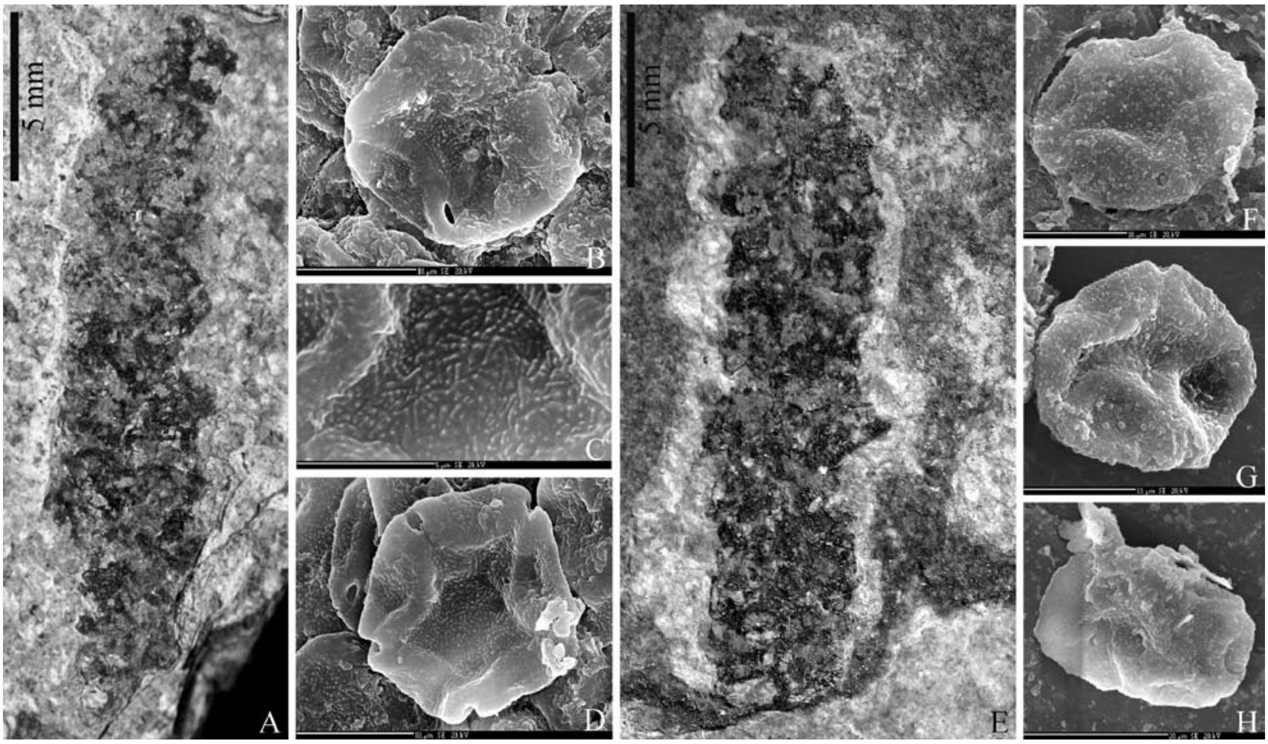
DAŠKOVÁ J. (2008): **Pollen and spores in situ**.
This PhD thesis is a compilation of published or accepted papers, which concern reproductive organs of plants and their pollen and spores *in situ*. Thirteen taxa of Cenozoic, Cretaceous, and Carboniferous flora have been analyzed. Eight species, two genera, and one family have been established and described. Palynological studies focused on pollen and spores *in situ* are important not only for comparison between macrofloristic remains and dispersed spore-pollen associations but also for accurate evaluation of fossil assemblages. Main approaches and aims of this study may be summarized as follows: (i) "whole plant concept" (reconstruction of fossil plants), (ii) paleoecological significance of complex fossil associations, and (iii): quantitative classification of palynological associations. Summaries of the main results are given below.

KVAČEK Z., *DAŠKOVÁ J.* & ZETTER R. (2004): A re-examination of Cenozoic *Polypodium* in North America. – *Review* *of Palaeobotany and Palynology*, 128: 219–227. The sterile holotype of *Polypodium fertile* MacGinitie 1937 was re-examined together with other fertile type specimens from the Miocene Weaverville Formation at Redding Creek (California, western USA). In its leaf morphology, venation and *in situ* spores *Polypodium fertile* MacGinitie 1937 matches the extant *Polypodium vulgare* Linnaeus 1753 complex. The spores belong to the verrucose type. In view of discrepancies between the original description and the real morphology of the sterile frond of '*Polypodium*' *alternatum* Pabst 1968 from the Chuckanut Formation of northwestern Washington (Eocene), this fern must be excluded from the record of *Polypodium* Linnaeus 1753.

DAŠKOVÁ J. (2000): *Nyssa* – pollen *in situ* (Most Basin, Lower Miocene). – *Scripta Fac. Sci. Nat. Univ. Masaryk. Brun., Geology*, 30: 119–122. Brno. Such a research has been carried out on recent and fossil pollen of the genus *Nyssa* Linnaeus 1753; the fossil male inflorescence originates from the so called "Horizon No 30" in the roof of the main lignite seam in the Bílina Mine (Most Basin) of the Early Miocene age. The so far obtained data from the comparison of the fossil and extend species allow too much the fossil pollen grains with those of *Nyssa sinensis* Oliver 1891 (Eastern Asia) and *Nyssa ogeche* W. Bartram ex Marshall 1785 (Eastern North America). Both extends species differ in other respect (leaf anatomy, fruits, male inflorescence) from the fossil representatives. There for our example is similar to some others Tertiary Europe's plants in which characters of extend representatives are combine. This investigation is a part of the complex study focused on the genus *Nyssa* Linnaeus 1753 from the Mine Bílina. The goal of this study is to try to combine information on all organs occurring in the same assemblage, in optimal case, coming from the same plant (in progress).

DAŠKOVÁ J. (2008): *In situ* pollen of *Alnus kefersteinii* (Goeppert) Unger (Bechlejovice, Tertiary, Czech Republic). – *Journal of the National Museum (Prague), Natural History Series*, 177, 2: 27–31. The male catkins *Alnus kefersteinii* (Goeppert 1838) Unger 1847 contain pentaporate pollen grains of *Alnipollenites verus* (Potonié 1931) Potonié 1960. Isolated pollen grains verify the taxonomical classification of catkins assigned to *Alnus kefersteinii* (Goeppert 1838) Unger 1847 occurring in Bechlejovice locality. This conclusion is in agreement with previous determinations based on gross morphology.

KVAČEK J., *DAŠKOVÁ J.* & PÁTOVÁ R. (2006): A new schizaeaceous fern, *Schizaeopsis ekrtii* sp. nov., and its *in situ* spores from the Upper Cretaceous (Cenomanian) of the Czech Republic. – *Review of Palaeobotany and Palynology*, 140 (1–2): 51–60. A new fern, *Schizaeopsis ekrtii* sp. nov., is described from the Peruc-Korycany Formation (Cretaceous, Cenomanian) of the Czech Republic based on the morphology of its leaves and reproductive structures. It is compared to the similar, previously published fossil taxa. It is characterized by finely segmented, 4–5 times divided fronds. Each terminal segment bears one fertile tip. The tip is entire-margined, containing a single row of sporangia. *Schizaeopsis ekrtii* sp. nov. is very similar to the extant genus *Schizaea* Smith 1973 in grossmorphology, but differs in its spore morphology. Extant *Schizaea* Smith 1973 has monolete spores, whereas the *Schizaeopsis* Berry 1911 has trilete spores. The spores of *Schizaeopsis ekrtii* sp. nov. are



■ **Fig. 87.** Pollen/spores and reproductive organs. A: *Alnus kefersteinii* (Goeppert) Unger, male catkin; B–D: *Alnipollenites verus* (Potonié) Potonié, 5 porate pollen grains; E: *Alnus kefersteinii* (Goeppert) Unger, male catkin; F–H: *Alnipollenites verus* (Potonié) Potonié, 5 porate pollen grains (from Dašková 2008).

assigned to the *Appendicisporites* Weyland *et* Krieger 1953 – *Plicatella* Malyavkina 1949 complex.

KVAČEK J. & *DAŠKOVÁ J.* (2007): Revision of the type material in the genus *Nathorstia* Heer (Filicales). – *Journal of the National Museum (Prague), Natural History Series*, 176 (7): 117–123. *Nathorstia angustifolia* Heer 1880 from the Lower Cretaceous of Greenland has been revised and the true status of the genus *Nathorstia* Heer 1880 has been verified. *Nathorstia* Heer 1880 is redefined here as a morphogenus of fern foliage recalling the family Matoniaceae, but lacking diagnostic characters of this family: sori consisting of radially arranged sporangia having *Matoniaceaeporites* spores *in situ*. All the type material has been restudied and documented, including unsuccessful attempts in sampling for spores *in situ*. The lectotype of *Nathorstia angustifolia* Heer 1880 is designed and its status is discussed.

KVAČEK J., FALCON-LANG H. & *DAŠKOVÁ J.* (2005): A new Late Cretaceous ginkgoalean reproductive structure *Nehvizdyella* gen. nov. from the Czech Republic and its whole-plant reconstruction. – *American Journal of Botany*, 92, 12: 1958–1969. During the Mesozoic Era, gingkoaleans comprised a diverse and widespread group. Here we describe ginkgoalean fossils in their facies context from the Late Cretaceous (Cenomanian) Peruc–Korycany Formation of the Czech Republic and present a reconstruction of tree architecture and ecology. Newly described in this study is the ovuliferous reproductive structure, *Nehvizdyella bipartita* gen. et sp. nov. (Ginkgoales). Monosulcate pollen grains of *Cycadopites* Wodehouse 1933 are found adhering to the seeds. Facies analysis of plant assemblages indicates that our Cretaceous tree occupied a water-stressed coastal salt marsh environment. It therefore represents the first unequivocal halophyte among the Ginkgoales.

LIBERTÍN M., BEK J. & *DAŠKOVÁ J.* (2005): Two new species of *Kladnostrobus* nov. gen. and their spores from the Pennsylvanian of the Kladno-Rakovník Basin (Bolsovian, Czech Republic). – *Geobios*, 38: 467–476. A new lycopsid family Kladnostrobaceae is proposed, based on the type of sporangia, their attachment by a pedicel and the type of reticulate spores enclosed. All these characteristics distinguish the Kladnostrobaceae from all other lycopsid families. A new lycopsid genus *Kladnostrobus* nov. gen., consisting of two new species *Kladnostrobus clealii* nov. sp. and *Kladnostrobus psendae* nov. sp., is described from the Kladno–Rakovník Basin (Lower Bolsovian) of the central and western Carboniferous continental basins of the Czech Republic. Helically arranged distal laminae and pedicels are relatively primitive, suggesting that *Kladnostrobus* may represent a new, primitive type of lycopsid cone produced by some unknown, probably arborescent lycopsid parent plant. Spores of *Kladnostrobus* are about 90–100 µm in diameter, and possess reticulate sculpture. The proximal contact area of spores is laevigate. In situ spores can resemble some dispersed species.

BEK J., DRÁBKOVÁ J., *DAŠKOVÁ J.* & LIBERTÍN M. (2008): The sub-arborescent lycopsid of the genus *Polysporia* Newberry and its spores from the Pennsylvanian (Bolsovian-Stephanian B) continental basins of the Czech Republic – *Review of Palaeobotany and Palynology*, 152: 176–199. About fifty compression specimens belonging to four species of *Polysporia* (Newberry 1873) DiMichele, Mahafy *et* Phillips 1979 from the Kladno–Rakovník Basin of the central and western Bohemian Carboniferous continental basins and Intra-Sudetic Basin of the Czech Republic were studied macromorphologically and for *in situ* spores. Their stratigraphic range is from the Bolsovian to the Stephanian B. *Polysporia rothwellii* sp. nov., *P. drabekii* sp. nov. and *P. radvanicensis* sp. nov. are proposed as new species. *Polysporia* (Newberry 1873) DiMichele, Mahafy *et* Phillips 1979 is reconstructed as a sub-arborescent plant with a principal axis with sterile and fertile apical portions. *P. rothwellii* sp. nov. and *P. drabekii* sp. nov. are preserved only as clusters of micro- and megasporophylls on specimens not in connection to an axis, and their identification and classification is based mainly on *in situ* spores.

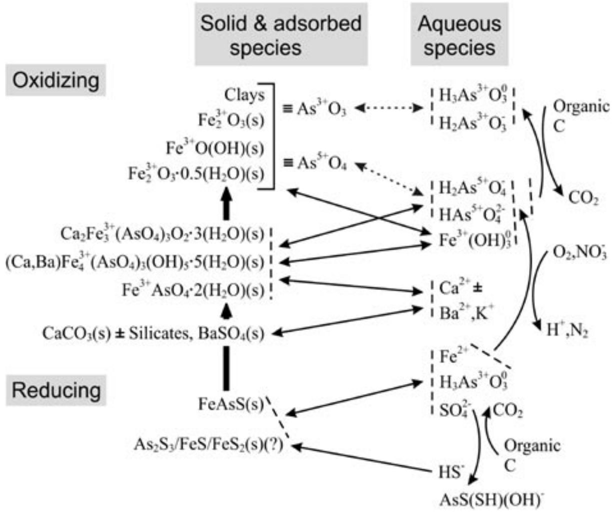
DRAHOTA P. (2008): **Geochemical model of arsenic at the Mokrsko gold deposit**.

In addition to As contamination of shallow aquifers in the areas such as mentioned above, highly localized sources of As can present health hazards to individuals and local communities. Contamination from natural sources or former industrial sites is of serious concern, and as seen in many articles published in this subject, a fundamental understanding of how As moves through soils and watercourses is critical to assessing the environmental risks.

Relevant As contamination in the Czech Republic is restricted only to the highly localised sources. These mainly include As concentrations related to historical mining operations, where mine wastes or wastes from mineral processing are the sources. A specific feature associated with high As contamination is represented by natural sources in mineralised rocks or sediments. Arsenic in the biogeochemical systems is usually in stationary state with different sensitivity to change of external conditions, and may thus represent possible environmental risk for the surroundings. The study of quantitative biogeochemical cycles and explanation of the possible As mobility at such sites are for these reasons very challenging and important from many practical aspects.

The dissertation contributes to the As mobility at the naturally contaminated site of Mokrsko gold deposit in central Czech Republic that has been studied by many authors in many publications during the last decade. We have attempted to fill some gaps in previous research in order to complete the quantitative biogeochemical model of As at this site. The particular main objectives included: (1) a brief summary of previous environmental As-related research at the study site; (2) a description of biogeochemical processes controlling precipitation and dissolution of As-bearing secondary minerals in soils and sediments under different redox conditions at the study site; (3) a description of hydrobiogeochemical processes controlling seasonal variations of dissolved As and metal concentrations in stream waters at the study site, and (4) a quantification of the role of bedrock weathering in mass budget of As in two watersheds located within the study site.

Conclusions and environmental implications of the paper "Mineralogical and geochemical controls on arsenic mo-



■ **Fig. 88.** Biogeochemical model of As under oxidizing and reducing conditions, summarizing the main precipitation/dissolution and adsorption/desorption reactions controlling the mobility of As at the Mokrsko-West deposit. The bold filled arrows denote incongruent dissolution reactions, the thin filled arrows denote congruent precipitation/dissolution reactions, the dashed arrows denote adsorption/desorption reactions and the curved arrows denote oxidation/reduction reactions, which can be catalyzed by microbiological activity (oxidation of organic matter, denitrification reactions).

bility under different redox conditions of soil and sediment, Mokrsko gold deposit, Czech Republic". Natural As contamination of soils and waters in the vicinity of the MWD is substantially affected by a set of biogeochemical processes, which determine the consequent mobility and speciation of As and thus its toxicity for living organisms. These processes are described by the schematic model in the figure, characterized by relatively low contents of reactive Fe and S in the system. This leads to specific secondary mineralization of As, which is not common in soils contaminated by As. Weathering of calcite, which buffer the pH of the system around neutral conditions, also substantially affects the formation of this mineralization and its stability.

The highest concentrations of dissolved As in the MWD occur in redox transition zone, where As is released by reductive dissolution of scorodite, pharmacosiderite, arseniosiderite and Fe oxyhydroxides with adsorbed/co-precipitated As. The dissolution is probably related to the spatial and/or temporal variations of redox state in this zone due to groundwater level elevation and/or variations of microbial activity. The positive correlation of the DOC in waters with high As(III)/As(V) ratios may be an indication of the microbial activity in the MWD. In surface waters, the As(III)/As(V) ratios are the highest in muddy sites rich in organic matter and especially in Mokrsko Fishpond. It is thus probable that organic substances are the most important electron donor in the dissimilation processes in the MWD. The further fate of the dissolved As species depends on where it is transported and on the biochemical conditions in the particular environment. Under reducing conditions with high microbial activity, it probably forms stable dissolved thioarsenite complexes and is bonded to newly formed sulphides. Reduced As(III) is evidently released from anoxic soils under the groundwater level and from stream sediments in the hyporheic zone into the oxidative surface waters, and is slowly oxidized into the thermodynamically stable As(V). Consequently, there are high concentrations of dissolved As(III) under the oxidative conditions in the Mokrsko stream which, however, gradually decrease downstream as As(III) is oxidized and total As is adsorbed on the solid stream sediments.

Conclusions of the paper "Seasonal variations in Zn, Pb, Cu, As, Mo and Sb chemistry in two small watersheds at the Mokrsko-Čelina gold deposits, Czech Republic". Seasonal fluctuations in dissolved Zn, Pb, Cu, As, Mo and Sb concentrations (<0.45 µm) as well as other physico-chemical parameters were documented in two successive years in stream waters of two watersheds located in Mokrsko and Čelina gold deposits in central Czech Republic. While the watersheds differ in the level of metals and metalloids contamination in soil and stream sediments and mineralogical speciation, the seasonal variations of solute concentrations displayed similar trends in both watersheds. The increase of metal cations (Zn, Pb, Cu) between 150 % and 330 % at winter-spring was synchronous with the pH and temperature decreases. Seasonal variations of oxyanions (As, Mo, Sb) were smaller (between 120 % and 190 %) and displayed opposite patterns to those of metal cations. Our data suggest that one or more in-stream biogeochemical processes rather than primary hydrologic changes probably control these variations in both watersheds. Some mechanisms, such as microbially mediated Mn and/or Fe redox reactions rather than adsorption likely could be important for dissolved As, Sb and Mo oxyanion concentrations. In contrast, adsorption is the only mechanism that can explain seasonal variations of the divalent metal cations (Zn, Pb, Cu). Respiration-induced pH changes were supposed to be the major cause of the seasonal variations in dissolved Zn, Pb and Cu in both watersheds, while the temperature oscillation had rather minor effect on the metal concentration. The results of mineralogical study indicated the abundance of inorganic substrates such as Mn and Fe oxyhydroxides that undoubtedly play an important role in the adsorption and coprecipitation processes. This observation is related to our single extraction results that exhibited high bonding of metals and metalloids to reducible fraction with decreasing order As>Cu>Sb>Zn>Mo and Pb.

Conclusions of the paper "Weathering and erosion fluxes of arsenic in watershed mass budgets". The MW and CW small watersheds within the Čelina-Mokrsko gold district provide a natural laboratory for studying the rates of As weathering and erosion fluxes because the field characteristics of these watersheds (insignificant anthropogenic impact, high content of As in the bedrock, etc.) are suitable for the application of mass balance method.

The method used for calculating the weathering rates of As from the bedrock assumes that As is weathered at the same rate as the bedrock. The present results, however, indicate that in estimating mechanical and chemical weathering fluxes of As, attention should be paid to the relative solubility of As-bearing mineral phases in the bedrock. The annual weathering rates of As in the studied watersheds are found to be by far the greatest As input to the soil in comparison to the annual atmospheric deposition and application of agrochemicals. The input of

As due to the total weathering of bedrock was estimated to be 1,369 g $ha^{-1}.yr^{-1}$ in MW and 81 g $ha^{-1}.yr^{-1}$ in CW, which represent 99.7 % and 95.3 % of the total As input to the soil, respectively. The differences in the weathering fluxes of As between the watersheds are related to the different weathering rates of granodiorite and volcano-sedimentary bedrock and to the different As concentration in the bedrock in the watersheds. The method is also useful for indicating mass balance of As in the soil. The accumulation of As represents 23 % and 85 % of As released from bedrock weathering in MW and CW, respectively.

The model focuses on the role of weathering and erosion in As biogeochemistry on a watershed scale. The model is too simple to represent exact As behaviour in the ecosystem of watershed. However, it can serve successfully as an estimation of inputs and outputs, which control the mass balance of As in soils.

Environmental issues and open questions. A striking feature of As occurrence in waters at the Mokrsko gold deposit is its variability over hydrologically small spatial intervals (cm to m). Temporal variations may be similarly erratic but are not known for the pore-water and groundwater. This variability is a reflection of the interplay among changes in the chemical composition and redox state of groundwater, microbial activity, and adsorption and precipitation processes in subsurface that are established and evolved within the overall hydrologic framework. Our mineralogical-geochemical evidence and modelling point out the importance of the goechemical regime where redox potential is intermediate between the stability fields for oxidised Fe(III) oxyhydroxides and secondary arsenate minerals, and the field where Fe and/or As sulphides are stable. In this intermediate redox state at circumneutral pH, conditions generally favour partitioning of As to solution. Dissolved As concentrations remain difficult to predict quantitatively because they are controlled by rates of dissolution and precipitation of Fe(III), arsenate and sulphide minerals and their solubilities, and by competing pH-dependent adsorption reactions. Within this general framework, however, we can predict that the hydrogeochemical states at the Mokrsko gold deposit are at high risk for contamination by naturally occurring As. These conditions include high content of organic matter and nitrogen, high rates of microbial reduction creating anoxic conditions and the limited amount of reactive iron and/or sulphur. In areas with large groundwater recharge such as those around the Mokrsko village, oxygen is rapidly depleted in the subsurface. In anoxic conditions, other electron acceptors such as nitrate, sulphate, ferric iron, and arsenate become important for microbial respiration. Reduced arsenite is released from anoxic environments into the intermediately oxic groundwaters in wells and into the oxic stream waters. The release of As to these solutions and its concentration to high hazardous levels, which vary seasonally, depend on the amount of available iron and manganese in the soil and stream sediment systems, on the rate of reductive dissolution of Fe(III) oxyhydroxides and arsenate minerals.

The results of the thesis answer some As-related questions raised at the beginning of my PhD project and substantially contribute to the quantitative biogeochemical model of As at the Mokrsko gold deposit. The research presented in this dissertation has, however, also opened new questions and possible future directions in As research. The main open questions are:

What is the scale-dependence of arsenopyrite weathering rate? There have been a variety of experimental studies addressing the kinetics of arsenopyrite oxidation by ferric iron or oxygen at low or circumneutral pH (e. g., Fernandez et al. 1996; Ruitenberg et al. 1999; Mihaljevič et al. 2004; Yunmei et al. 2004; McKibben et al. 2008). However, there is no data of arsenopyrite weathering kinetics inferred from field studies. Our preliminary results indicate that the rate of arsenopyrite oxidation in the watersheds within the Čelina-Mokrsko gold district, 0.4×10^{-14} to 1.8×10^{-14} mol m^{-2} s^{-1} (calculated according to a model presented by Pačes 1983), is approximately four orders of magnitude lower than laboratory rates determined under similar pH conditions (Mihaljevič et al. 2004; Walker et al. 2006). The characteristics of the watershed needed for the evaluation of the field based rate constant of arsenopyrite dissolution rate were: (1) the fraction of the surface of rock occupied by the arsenopyrite (0.007); (2) the mean thickness of permeable rock (20 m); the mean porosity of water-saturated rock (0.2); the specific wetted surface area of rock (2 x 105 $m^2.m^{-3}$); (4) the specific weathering flux of arsenopyrite, related to the unit surface area of the watershed (1.3 x 0^{-7} to 5.8 x10^{-7} mol.m^2.y^{r-1}; Drahota et al. 2006). The most probable reason for the difference between the rates derived in the laboratory and in the field is the history of the surfaces of reacting arsenopyrite. On the contrary to the fresh surfaces for the experiments, the arsenopyrite surfaces in the natural system are many thousands of years old, and largely covered by the weathering products (Filippi et al. 2007), which act as inhibitor of dissolution. In addition, the large and fresh surface of arsenopyrite in the experiments is probably characterised by larger number of defects which dissolve faster than the smooth, rounded surfaces characteristic for very old and leached surfaces. These microscopic properties of surface area are not incorporated in the evaluation of the field derived constant of arsenopyrite dissolution.

Such unresolved scale-dependence of the weathering rates seriously limits our ability to extrapolate laboratory results to other scales and conditions. This extrapolation is necessary for quantifying environmental impacts. The unusually wide range of observation scales from small batch experiments to watershed, for which data are available for sulphide (arsenopyrite), makes the Mokrsko gold deposit a potentially useful model system for further investigating the scale-dependence of arsenopyrite weathering rates.

What are the solubility data for pharmacosiderite and arseniosiderite? The stability of pharmacosiderite and arseniosiderite is currently of particular concern in relation to their disposal as a residue from mineral-extraction operations (e. g., Paktunc et al. 2004) or in relation to their natural occurrence as a weathering product (e. g., Yi & Lairen 1991; Morin et al. 2002; Borba & Figueiredo 2004; Filippi et al. 2004). While the solubility and stability of scorodite (Dove & Rimstidt 1985; Krause & Ettel 1989; Zhu & Merkel 2001; Langmuir et al. 2006) as well as its dissolution kinetics (Harvey et al. 2006) were extensively studied, similar data for pharmacosiderite and arseniosiderite do not exist. The conversion of pharmacosiderite to arseniosiderite and their conversion to Fe oxyhydroxide does occur, accompanied with the release of As to solution, and as such understanding and controlling their solubilities is of special relevance in effort to limit As releases to soil and pore-water.

Specific part of the problems related to the solubility of discrete As-bearing substrates in Mokrsko soils represents interpretation of the results of sequential extractions in terms of binding of As to specific minerals (*cf.* Poňavič 2000; Filippi et al. 2007; Doušová et al. 2008). It is important to note that the sequential extraction only divides As content of a test sample into portions soluble in particular reagents under particular conditions. Whilst these reagents are often selected with the intention that they should target well-defined mineral phases (and may indeed do so in many cases) such specificity cannot be guaranteed. Hence, interpretation of the results of sequential extraction in terms of binding of As to specific minerals is unjustifiable, unless additional, X-ray-based, analytical techniques are applied to the residues at each stage in the extraction to identify precisely the remaining solid components.

What is the role of microbial interactions in As mobility? Field investigations have shown striking prevalence of As(III) in oxic environments at the study site that generally correlates with high organic matter abundance, suggesting that the non-equilibrium conditions were microbially mediated. In addition, our preliminary study on the distribution of organic As species also detected biomethylated As species (MMA and DMA) in the surface waters, pore-water and groundwater. Arsenic was found to accumulate near the anoxic-oxic boundary, suggesting that its mobility may be mediated in part by redox-sensitive sorption-dissolution reactions. Arsenic-reducing bacteria may play a substantial role in these processes. Sulphate-reducing bacteria may influence As mobility either by direct enzymatic As reduction or indirect As reduction resulting from sulphidogenesis. Depending on prevailing redox conditions, sulphidogenesis may lead either to soluble As(III) production or precipitation of As sulphides. Similar observations have been made in highly reducing environments of the study site. Seasonal oxidation and reduction reactions involving Mn substantially affect the concentration of soluble As in stream waters at the deposit. These reactions are commonly microbially mediated (Stumm & Morgan 1996). Our results emphasize the importance of understanding biologically mediated processes affecting As(III)/As(V) cycling, precipitation/dissolution and adsorption/desorption reactions in the biogeochemical model.

BORBA R.P. & FIGUEIREDO B.R. (2004): A influencia das condiçoes geoquímicas na oxidaçao da arsenopirita e na mobilidade do arsenio em ambientes superficiais tropicais. – *Revista Brasileira de Geociencias*, 34: 489–500.

DOUŠOVÁ B., MARTAUS A., FILIPPI M. & KOLOUŠEK D. (2008: Stability of arsenic species in soils contaminated naturally and in an anthropogenic manner. – *Water, Air and Soil Pollution*, 187: 233–241.

DOVE P.M. & RIMSTIDT J.D. (1985): The solubility and stability of scorodite $FeAsO_4.2H_2O$. – *American Mineralogist*, 70: 838–844.

DRAHOTA P., PACES T., PERTOLD Z., MIHALJEVIC M. & SKRIVAN P. (2006): Weathering and erosion fluxes of arsenic in watershed mass budgets. – *Science of Total Environment*, 372: 306–316.

FERNANDEZ P., LINGE H. & WADSLEY M. (1996): Oxidation of arsenopyrite (FeAsS) in acid. 1. reactivity of arsenopyrite. – *Journal of Applied Electrochemistry*, 26: 575–583.

FILIPPI M., DOUSOVÁ B. & MACHOVIC V. (2007): Mineralogical speciation of arsenic in soils above the Mokrsko-west gold deposit, Czech Republic. – *Geoderma*, 139: 154–170.

FILIPPI M., GOLIÁŠ V. & PERTOLD Z. (2004): Arsenic in contaminated soils and anthropogenic deposits at the Mokrsko, Roudný, and Kašperské Hory gold deposits, Bohemian Massif (CZ). – *Environmental Geology*, 45: 716–730.

HARVEY M.C., SCHREIBER M.E., RIMSTIDT J.D., GRIFFITH M.M., 2006. Scorodite dissolution kinetics: implications for arsenic release. – Environmental Science Technology, 40: 6709–6714.

KRAUSE E. & ETTEL V.A. (1989): Solubilities and stabilities of ferric arsenate compounds. –*Hydrometallurgy*, 22: 311–337.

LANGMUIR D., MAHONEY J. & ROWSON J. (2006): Solubility products of amorphous ferric arsenate and crystalline scorodite ($FeAsO_4{\cdot}2H_2O$) and their application to arsenic behavior in buried mine tailings. – Geochimica et Cosmochimica Acta, 70: 2942–2956.

McKIBBEN M.A., TALLANT B.A. & DEL ANGEL J.K. (2008): Kinetics of inorganic arsenopyrite oxidation in acidic aqueous solutions. – *Applied Geochemistry*, 23: 121–135.

MIHALJEVIČ M., SISR L., ETTLER V., ŠEBEK O. & PRŮŠA J. (2004): Oxidation of As-bearing gold ore – a comparison of batch and column experiments. – Journal of Geochemical Exploration, 81: 59–70.

MORIN G., LECOCQ D., JUILLOT F., CALAS H., ILDEFONSE Ph., BELIN S., BRIOIS V., DILLMANN PH., CHEVALLIER P., GAUTHIER CH., SOLE A., PETIT P.E. & BORENSZTAJN S. (2002): EXAFS evidence of sorbed arsenic(V) and pharmacosiderite in a soil overlying the Echassieres geochemical anomally, Allier, France. – *Buletin de la Société géologique de France*, 173: 281–291.

PAČES T. (1983): Rate constants of dissolution derived from the measurements of mass balances in hydrological catchments. – Geochimica et Cosmochimica Acta, 47: 1855–1863.

PAKTUNC D., FOSTER A., HEALD S. & LAFLAMME H. (2004): Speciation and characterization of arsenic in gold ores and cyanidation tailings using X-ray absorption spectroscopy. – Geochimica et Cosmochimica Acta, 68: 969–983.

POŇAVIČ M. (2000): Metody sekvenční extrakce při studiu forem arzenu v půdě. – MSc Thesis, PřFUK, Praha.

RUITENBERG R., HANSFORD G., REUTER M. & BREED A. (1999): The ferric leaching kinetics of arsenopyrite. – *Hydrometallurgy*, 52: 37–53.

STUMM W. & MORGAN J.J. (1996): Aquatic chemistry. – John Wiley.

YI L. & LAIREN L. (1991): Preliminary study of the characteristics and genesis of arsenate minerals in the oxidized zone of the Debao skarn-type Cu-Sn ore deposit in Guangxi. – *Acta Geologica Sinica-Engl*, 42: 187–194.

YUNMEI Y., YONGXUAN Z., WILLIAMS-JONES A.E., ZHENMIN G. & DEXIAN L. (2004): A kinetic study of oxidation of arsenopyrite in acidic solutions: implications for the environment. – *Applied Geochemistry*, 19: 435–444.

ZHU Y. & MERKEL B. (2001): The dissolution and solubility of scorodite, FeAsO4·2H2O evaluation and simulation with PHREEQC2. – *Wissenschaftliche Mitteilungen Instituts für Geologie, TU Bergakademie Freiberg*, 18: 1–12.

FILIPPI M. (2007): **Contribution to arsenic solid phase speciation in soils and mine wastes**.

The presented dissertation attempts to contribute to the current knowledge on the arsenic (As) mineralogical speciation in diverse types of solid materials, such as contaminated soils and mine wastes.

The introductory part of the dissertation provides a general introduction to As chemical and physical characteristics and to the behavior in the environment, with the main emphasis on As solid phase speciation in soils and mine wastes. Next part of the dissertation summarizes and briefly evaluates mineralogical methods to the study of primary and secondary As-bearing phases. The main aim is to help with better orientation in the application of these methods. The literature review showed that although a rank of modern methods have been developed in last years (HAADF–STEM, AFM, BFM, PIXE, XAS techniques, ND, etc.), there remain several established methods (XRD, SEM, etc.) as a starting step for mineralogical research. Some other group of methods has been found as possible useful for the study of As solid phase speciation (e. g., RS, DTA, TGA, Vis DRS, VMP).

The main part of the dissertation is presented as a set of three papers on similar subjects published in scientific journals – Environmental Geology, Science of the Total Environment and Geoderma.

The following geochemical and mineralogical methods and approaches were used to achieve the particular aims (summarized collectively): soil samples were characterized by its pH, chemical composition (by X-ray fluorescence, XRF), carbonate, humus, exchangeable cations and H^+, and oxalate extractable Fe contents. Mineralogical and chemical speciation of the As was studied by mineralogical methods and sequential extraction: the As-bearing minerals were concentrated by several ways (panning, heavy fluids) and determined using X-ray diffraction analysis (XRD), the Debye-Scherrer powder method, scanning electron microscopy equipped with an energy-dispersive microanalysis (SEM–EDX), electron microprobe analysis (EMPA) and Raman spectroscopy.

The first published paper titled "Arsenic in contaminated soils and anthropogenic deposits at the Mokrsko, Roudný, and Kašperské Hory gold deposits, Bohemian Massif (CZ)" describes research of the soil, mine tailing, and waste dump profiles above three mesothermal gold deposits in the Bohemian Massif with different anthropogenic histories. The amorphous hydrous ferric oxides, As-bearing goethite, K-Ba- or Ca-Fe- and Fe- arsenates pharmacosiderite, arseniosiderite, and scorodite, and sulphate–arsenate pitticite were determined as products of arsenopyrite or arsenian pyrite oxidation. The As behaviour in the profiles studied differs in dependence on the surface morphology, chemical and mineralogical composition of the soil, mine wastes, oxidation conditions, pH, presence of (or distance from) primary As-mineralisation in the bedrock, and duration of the weathering effect. Although the primary As-mineralisation and the bedrock chemical composition are roughly similar, there are distinct differences in the As behaviour amongst the Mokrsko, Roudný and Kašperské Hory deposits.

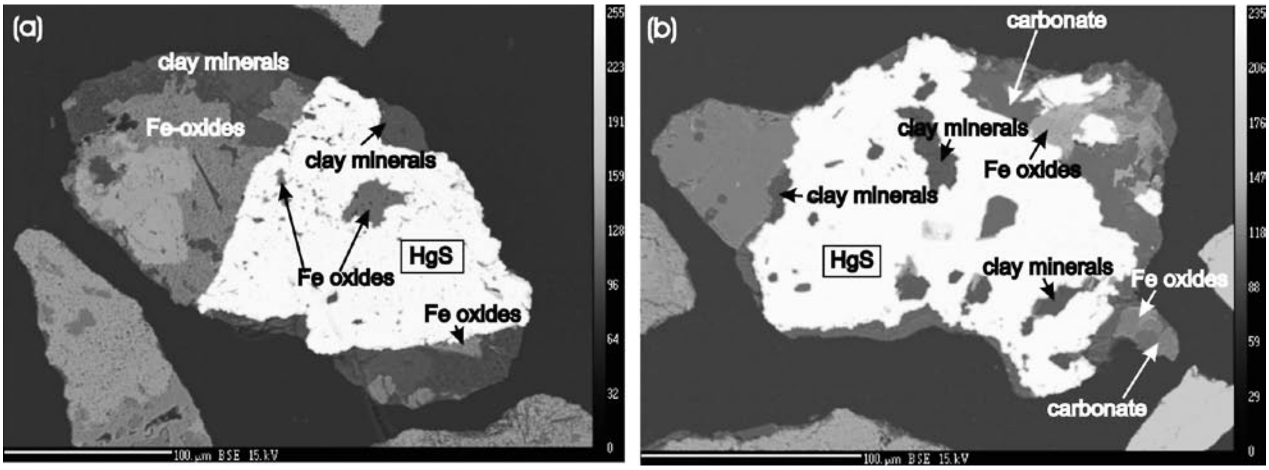
The aims of the second paper titled "Oxidation of the arsenic-rich concentrate at the Přebuz abandoned mine (Erzgebirge Mts., CZ): mineralogical evolution" were: i) To study the oxidation of two most common primary As minerals, arsenopyrite and löllingite, stored in a unique anthropogenic deposit; and ii) To evaluate As contamination in the close surroundings of this deposit. The studied concentrate (ore concentrate with up to 65 wt. % of As) contains very small proportion (<5 vol.%) of gangue minerals such as quartz and feldspars; the oxidation of arsenopyrite and löllingite (and accessory pyrite) is thus practically not complicated by interference with additional minerals and elements. Arsenolite, scorodite, kaatialaite and native sulphur were found to be the main secondary phases originating by dissolution of arsenopyrite and löllingite. New secondary phases precipitate on the surface of the ore-concentrate body but also form cement among the grains of finely milled material. The following succession of secondary minerals was determined: arsenolite, scorodite + native sulphur and kaatialaite. Significant As migration into the proximal environment was revealed: 2,580 and 13,622 $mg.kg^{-1}$ were the highest arsenic concentrations in two sections excavated at distances of 0.5 and 1.5 m from the concentrate body.

Two directions of possible future research exist. The first is a continuation in the study of the Mokrsko soils. The unusually rich occurrence of arsenates in these soil calls for a more detailed mineralogical study combined with the study of the soil−groundwater interaction. An understanding of the conditions of the precipitation and preservation of stability of the secondary As minerals in the studied soils should help in the understanding of the arsenopyrite transformation during the pedogenesis on As-bearing granite in general.

HOJDOVÁ M. (2008): **Mercury speciation determined by thermo-desorption analysis at two sites contaminated by mining**.

Historic mercury mining represents an environmental threat due to high Hg concentration in waste material. Mercury ores were mined for more than 150 years in the central Czech Republic, but the extent of Hg contamination in the vicinity of former Hg mining sites has not been yet investigated. The objectives of the study were to evaluate the Hg sources in mine wastes, assess the extent of Hg contamination in historical mining area and to estimate potential mobility of Hg in the mine waste and soils. The method of thermal desorption in combination with ICP–OES (TDA–ICP–OES) has been applied to determine Hg speciation in solid samples.

Both mine wastes and soils collected near the Hg mines were highly elevated in total Hg concentrations (up to 120 $\mu g.g^{-1}$ and 10 $\mu g.g^{-1}$, respectively). Soils exhibited the highest Hg concentrations mostly in subsurface Ah soil horizons. Higher Hg concentrations in Ah horizons relative to those in organic horizons could indicate recent declines in Hg deposition, although other matrix effects could contribute to these results.



■ **Fig. 89.** Micrographs of mine waste mineral particles identified by SEM–EDS.

Mine wastes contained mostly cinnabar (HgS; >80 %) and only minor fraction (<14 %) of total Hg amount was identified as Hg bound to surfaces of mineral particles, such as Fe-oxyhydroxides or clay minerals. Presence of HgS particles (identified by TDA-ICP-OES) was verified by scanning electron microscopy (SEM; Fig. 89). In comparison to waste material the proportion of HgS in soils was smaller (60–80 %). From the environmental point of view HgS is relatively stable in the soils. Its dissolution is limited and it is transported mostly in the form of particles. Nevertheless Hg(II) sorbed to mineral components poses environmental threat due to its mobility and potential formation of highly toxic methyl-Hg.

TDA–ICP–OES seems to be appropriate for differentiation of Hg sulfides, metallic Hg and humic bound Hg. Identification of Hg sorbed onto mineral soil particles is possible, but distinguishing among sorption substrates (e. g., Fe-, Al- or Mn- oxyhydroxides or clay minerals) is limited.

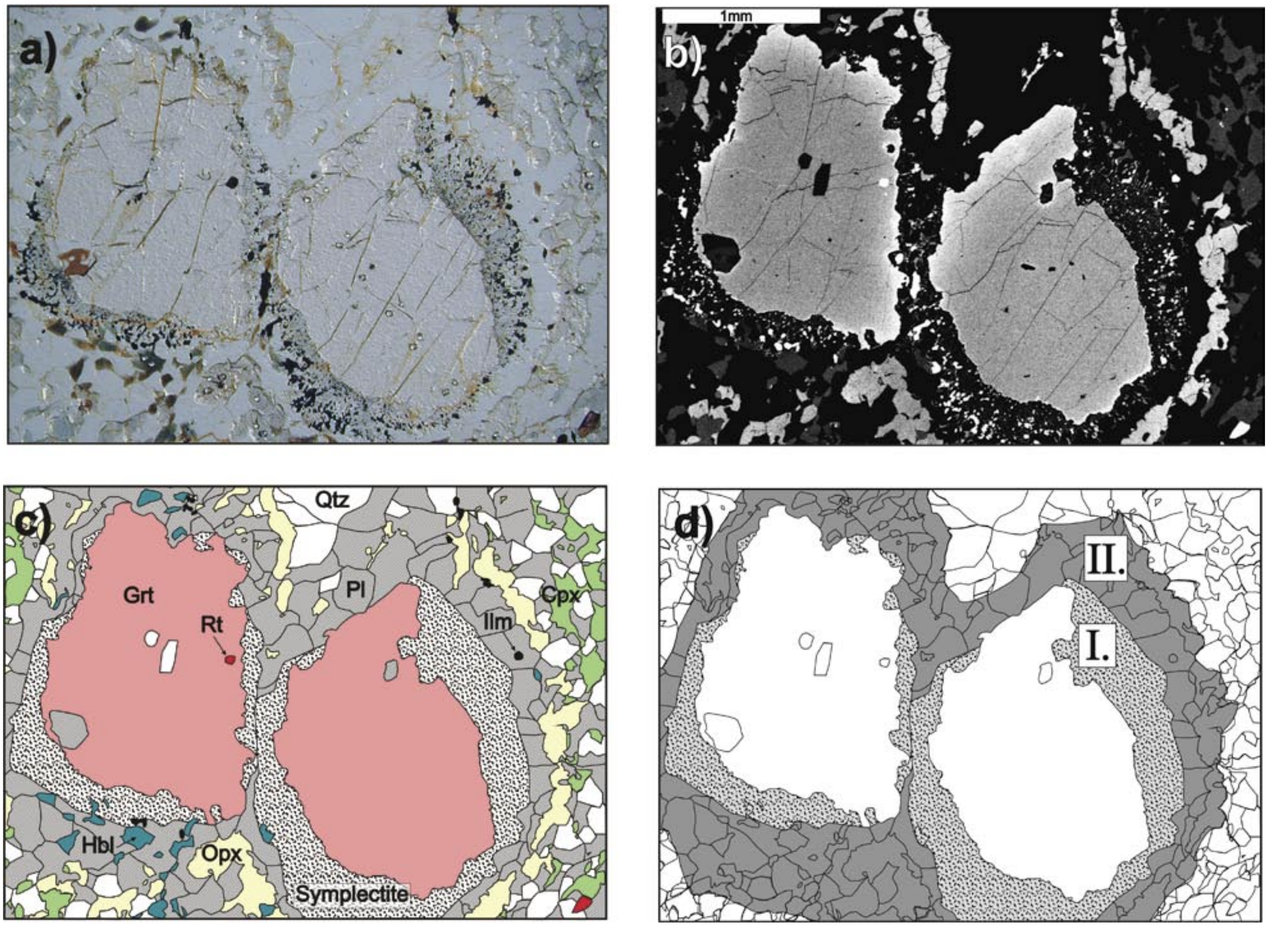
SLÁMA J. (2007): **Distribution of trace elements and Hf isotopes in metamorphic minerals**.

This thesis deals with various aspects of trace element and isotope geochemistry of metamorphic rocks with the main goal to develop and test the use of isotopes and trace elements for deciphering P-T conditions and timescales of metamorphism. The thesis consists of three chapters that all have a format of scientific papers (of which one has been published and one submitted for publication) and that are preceded by general introduction and followed by conclusions.

The paper in the first chapter investigates Hf isotopic data in minerals from a mafic pyroxene granulite from the southern Bohemian Massif which, together with their major and trace element composition and petrological observations, were used to decipher the metamorphic history and behaviour of zircon in the granulite. The Hf isotopic composition in the minerals was used to estimate whether the decompression reaction, namely the consumption of garnet and rutile, could have provided Zr for the formation of newly grown metamorphic zircon. It has been shown that the variation in the Hf isotopic composition of zircons and its comparison with the evolution of Hf in other minerals can be potentially used to link the growth of zircon to specific metamorphic reactions. In the present study, the formation of zircons could not be related to the latest (decompression) phase of the metamorphic evolution of the mafic granulite. The structurally and chemically distinct domains observed in zircons are older than the decompression reaction and rather than a new zircon growth, they represent chemical-physical changes, such as is zircon recrystallization process with fluid phase present. The presence of amphibole with high content of Zr suggests that some of Zr released during the decomposition of garnet has been sequestered in the fluid phase. The excess of Zr from rutile to ilmenite reaction was accommodated by formation of baddeleyite inclusions in ilmenite. The study of Hf isotopic evolution of minerals in the mafic granulites provided a time estimate for the garnet decompression reaction for which the P-T conditions were calculated using the pseudosection method at P = 12–14 kbar and T = 1,000 °C (Fig. 91). The age for the granulite decompression indicated by the evolution of Hf isotopes in garnet and orthopyroxene was calculated between 333 and 331 Ma, i. e. ca. 7 Ma younger than the available U-Pb zircon ages from the Moldanubian granulites and than the newly obtained 343 ± 2 Ma laser ablation ICP–MS U-Pb age of zircons.

Collectively, the combination of Hf isotopic, trace element and petrological study of minerals provides us with an excellent tool to decipher the metamorphic crystallization and reaction histories of highly metamorphosed rocks. It allows assessing the redistribution of elements during metamorphic reactions and to relate the reactions to the crystallization of geochronologically important accessory phases, such as is the zircon. This approach can be applied to other rocks and mineral assemblages as well as to isotopic systems other than Lu-Hf.

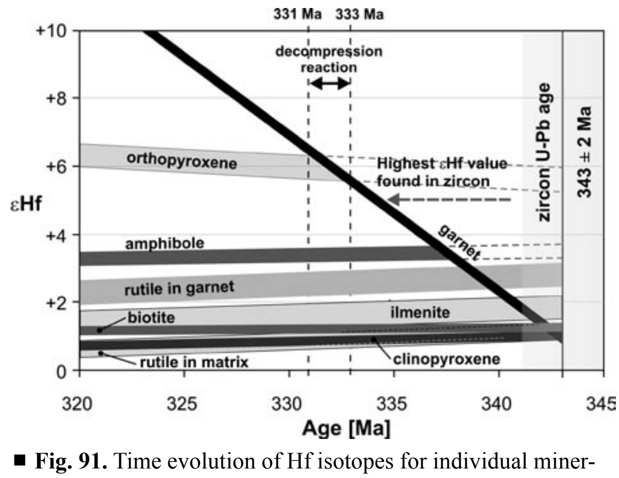
The second chapter focuses on distribution of trace elements between coexisting minerals in mesozonally metamorphosed metapelitic rocks with an attempt to define a trace element geothermometer. Samples of Ca-poor and Ca-rich metapelitic rocks from three different metamorphic terrains – Scottish Dalradian, Austroalpine basement unit of the Alps and metapelitic rocks from Kabul and South Badakhshan blocks in Afghanistan - were studied in order to evaluate the trace element par-



■ **Fig. 90.** Decompression reaction corona around garnet (after Slama et al. 2007). a) Optical image in transmitted polarized light; b) corresponding BSE image; c) sketch of mineral distribution in the reaction corona; d) reaction zones: I. – symplectitic assemblage of Opx, An and Mag, II. – Qtz-depleted corona of An, Opx and Hbl.

titioning between coexisting pairs of garnet-biotite and biotite-muscovite. Partitioning of Sc, V, Co, Zn, Hf, Ba and Zr was investigated for effects of mineral major element composition and crystal structures of the studied minerals and temperature achieved during the metamorphism.

Distribution of Sc, V, Co and Zn between coexisting garnet and biotite in the studied metapelitic rocks agrees with the previously published data, although some of the elements show larger concentration variations, probably due to wide range of whole-rock compositions analysed in this study. The partitioning of these elements between coexisting garnet and biotite in metapelites is controlled mainly by major element composition of minerals and their crystal-chemical properties (relationships between the charge and ionic radius of substituting element and the ideal ionic radius of the main cation occupying the site of the crystal lattice). Sc shows random distribution between garnet and biotite that might be caused by non-ideal behaviour of this element in the garnet structure. The partitioning of Zn in the studied Ca-rich metapelites deviates significantly from the previously published data. The partitioning of Zn between coexisting garnet and biotite is not controlled solely by temperature but probably also by mineral composition and crystal structure. Accordingly, partitioning of Zn cannot be recommended for use in trace element garnet-biotite thermometry.



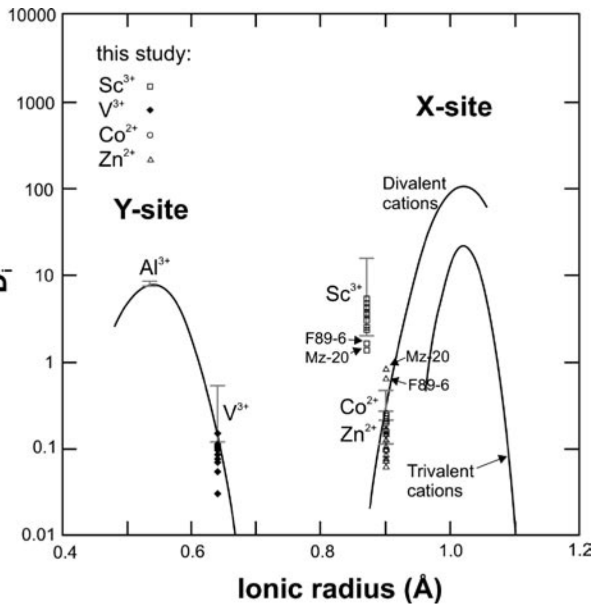
■ **Fig. 91.** Time evolution of Hf isotopes for individual minerals in the studied mafic granulite. The bands represent Hf evolution trends in minerals; widths of the bands are 2 sigma of the εHf values (after Slama et al. 2007).

Distribution of Sc, V, Co, Zn and Ba between coexisting biotites and muscovites agrees with the previously published data but similar to the garnet-biotite pair, their concentrations show more variability, probably because of the compositional variations in samples used in this study. Partitioning of all studied trace elements is controlled mainly by the crystal chemical effects and by the compositions of the studied minerals. Consistent with the previous studies, the partitioning of Ba between biotites and muscovites correlates with temperature. The present study shows that Ba represents the most promising trace element to be used in trace element exchange geothermometry of metapelitic rocks.

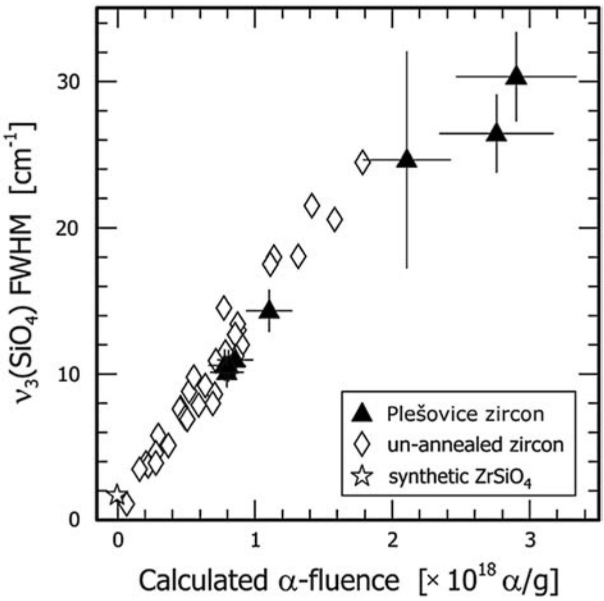
The paper in the **third chapter** represents a compilation of structural, trace element, and isotopic data of zircon from a potassic granulite that occurs in the Blanský les massif (Plešovice quarry) in the southern Czech Republic (Fig. 93). This zircon is being suggested as a new natural standard material for U-Pb and Hf isotopic microanalysis by laser ablation inductively coupled plasma mass spectrometry (LA ICP–MS).

Data obtained by different techniques (ID–TIMS, SIMS and LA ICP–MS) in several laboratories suggest that the Plešovice zircon has a concordant U-Pb age with a weighted mean $^{206}Pb/^{238}U$ date of 336.9 ± 0.2 Ma (ID–TIMS, 95% confidence limits) and U-Pb age homogeneity on the scale used in LA ICP–MS dating (Fig. 95). This date is in average ca 1 Ma younger than the previously reported U-Pb date of zircon from this potassic granulite.

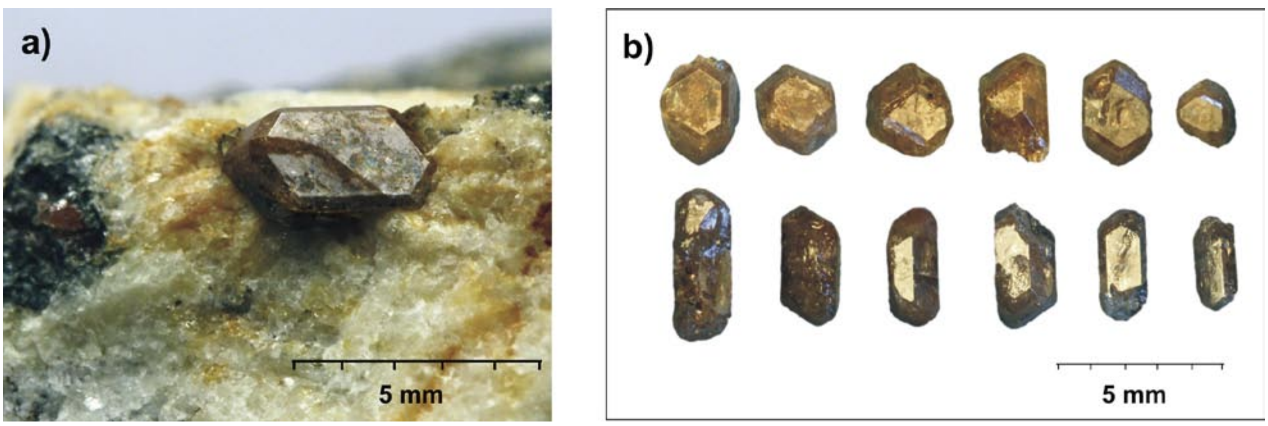
Solution and laser ablation multicollector (MC) ICP–MS analyses of a multigrain sample of the Plešovice zircon (>0.9 wt. % Hf) suggest a homogenous Hf isotopic composition within and between the grains. The low Lu/Hf (up to 0.001) and Yb/Hf (up to 0.005) ratios in the zircon result in only a small influence of the choice of isobaric interference correction procedure on the value and uncertainty of the corrected $^{176}Hf/^{177}Hf$ ratios (Fig. 99). The mean $^{176}Hf/^{177}Hf$ value of 0.282481 ± 0.000013 (2SD) is considered as the best estimate of the Hf



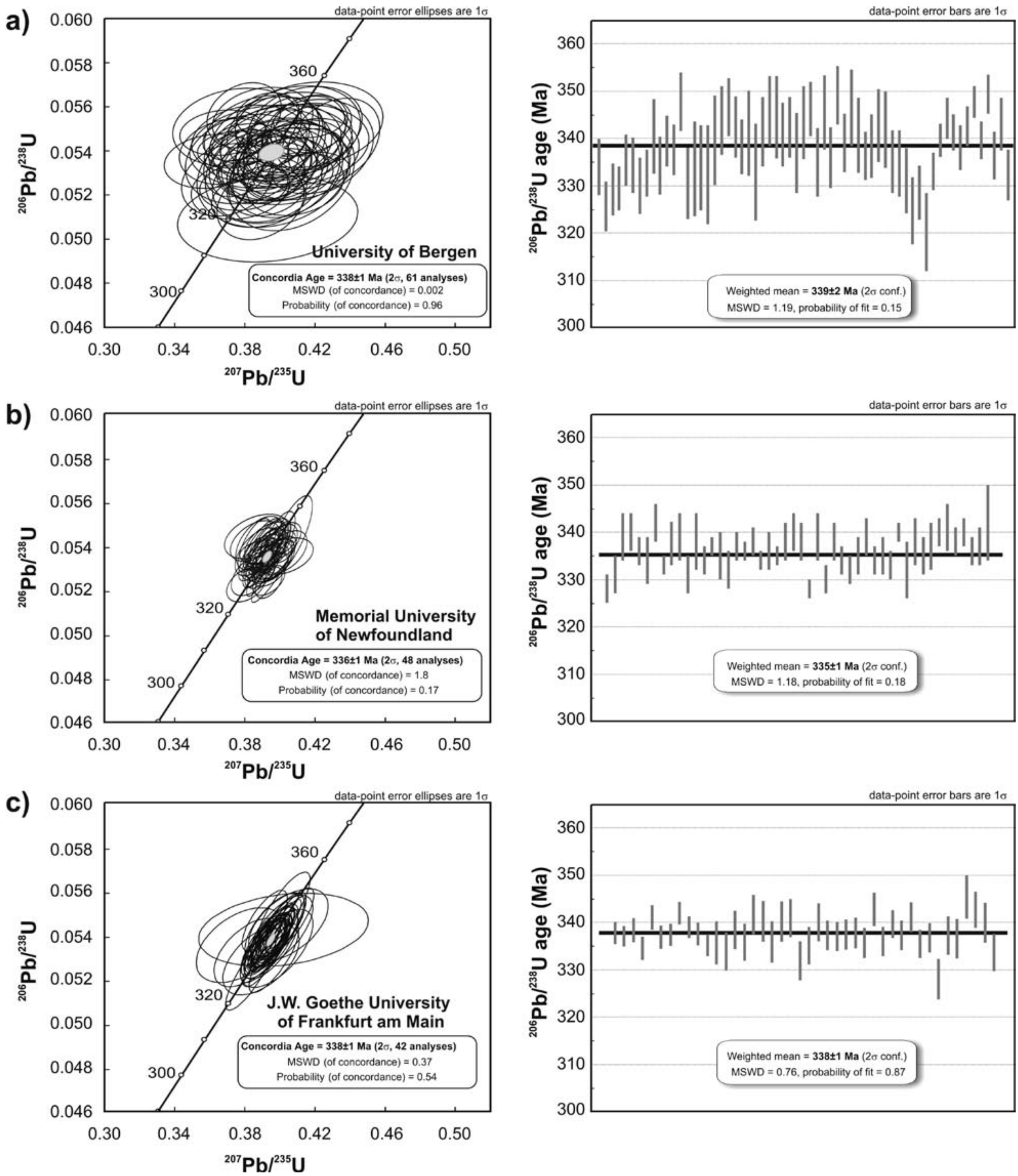
■ **Fig. 92.** Plot of ionic radius of elements versus molar partition coefficient for coexisting pairs of garnet and biotite calculated for the structure of garnet. The range of published values is plotted in gray.



■ **Fig. 94.** Plot of the FWHM (full width at half-maximum) of the $\gamma_3(SiO_4)$ Raman band versus time-integrated α-fluence showing increasing degree of metamictization in actinide-rich parts of the Plešovice zircon. Open diamond symbols – zircon samples representing nearly complete accumulation of the alpha-event damage (after Slama et al. 2008).



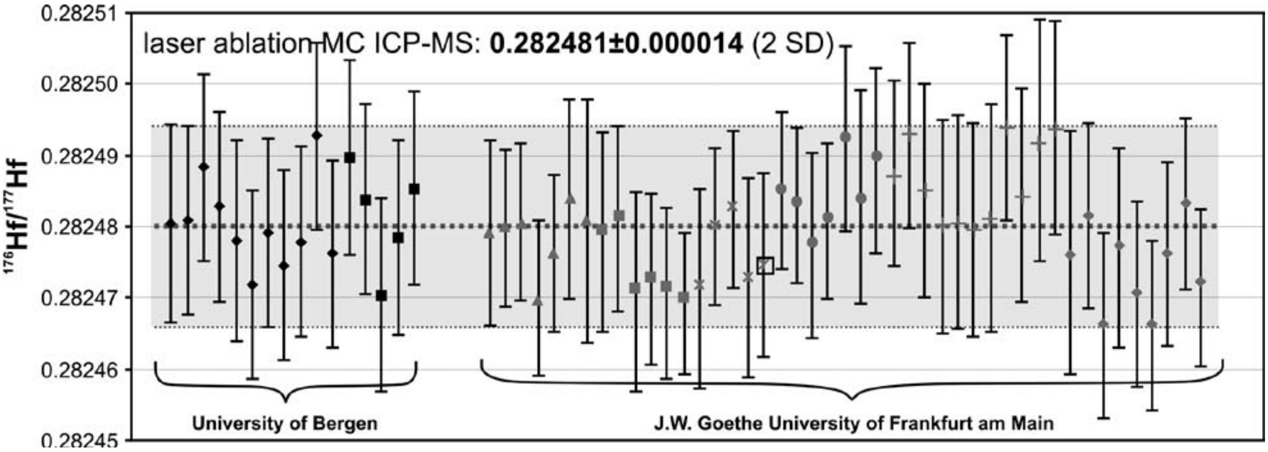
■ **Fig. 93.** a) Large, short prismatic crystal of the Plešovice zircon in K-feldspar matrix of the host potassic granulite (after Slama et al. 2008); b) typical crystal shapes of the Plešovice zircons with prevailing equant morphology (top) and less common prismatic morphology (bottom).



■ **Fig. 95.** Laser ablation ICP–MS U-Pb ages obtained at: a) University of Bergen, b) Memorial University of Newfoundland and c) J.W. Goethe University of Frankfurt am Main. On the left are concordia plots and on the right are $^{206}Pb/^{238}U$ dates. Error ellipses in the concordia plots and error bars on the $^{206}Pb/^{238}U$ plots are 1σ Concordia age ellipses (gray filled) are 2σ. Note the differences in uncertainties of individual data between a) and b), c) which is a result of different data reduction procedures used by individual laboratories (after Slama et al. 2008).

isotopic composition in the Plešovice zircon. At this stage of characterization, the homogeneity of Hf isotopic composition in the Plešovice zircon is superior to other natural zircon standards used for laser ablation ICP-MS analysis.

Raman spectroscopy, optical and BSE imaging and trace element analysis revealed the presence of strongly radiation-damaged domains in ca 10 % of studied Plešovice zircon grains. These domains are rich in actinides (up to ~3,000 ppm U and up



■ **Fig. 96.** Hf isotopic composition of the Plešovice zircon sample obtained by laser ablation MC ICP–MS analyses. The mean $^{176}Hf/^{177}Hf$ composition with 2σ uncertainty for all analyses is shown as gray shaded area. Different symbols indicate individual zircon grains (after Slama et al. 2008).

to ~520 ppm Th) and appear as bright patches on BSE images that can be easily avoided during the laser ablation ICP–MS analysis. Although there has been no significant Pb loss found in these zones, they should be avoided during routine laser ablation ICP–MS analysis because of likely space charge effects and different ablation properties. Similarly, occasional inclusions of K-feldspar and apatite can be easily identified in optical microscope and avoided during the analysis.

Despite the significant variations in trace element contents that preclude the use of the Plešovice zircon as a standard/reference material for *in situ* trace elements analyses, the age and Hf isotopic homogeneity of the Plešovice zircon together with its relatively high U and radiogenic Pb contents makes it an ideal calibration and reference material for laser ablation ICP–MS measurements, especially when using low laser energies and/or small diameters of laser beam required for improved spatial resolution.

5. Publication activity of staff members of the Institute of Geology

5a. Papers published in 2007

*publications in journals included in the ISI Web of Science (IF value according to a list from 2007)

3.873* *KOHOUT T.*, KOSTEROV A., JACKSON M., PESONEN L.J., *KLETETSCHKA G.* & LEHTINEN M. (2007): Low-temperature magnetic properties of the Neuschwanstein EL6 meteorite. – *Earth and Planetary Science Letters*, 261: 143–151.

3.806* *ACKERMAN L.*, MAHLEN N., JELÍNEK E., MEDARIS G., *ULRYCH J.*, STRNAD L. & MIHALJEVIČ M. (2007): Geochemistry and evolution of Subcontinental Lithospheric mantle in Central Europe: evidence from peridotite xenoliths of the Kozákov volcano, Czech Republic. – *Journal of Petrology*, 48, 12: 2235–2260.

3.216* *SLÁMA J.*, KOŠLER J. & PEDERSEN R. (2007): Behaviour of zircon in high-grade metamorphic rocks: evidence from Hf isotopes, trace elements and textural studies. – *Contributions to Mineralogy and Petrology*, 154, 3: 335–356.

3.000* ŘANDA Z., FRÁNA J., MIZERA J., KUČERA J., *NOVÁK J.K.*, *ULRYCH J.*, BELOV ANATOLIJ G. & MASLOV OLEG D. (2007): Instrumental neutron and photon activation analysis in the geochemical study of phonolitic and trachytic rocks. – *Geostandards & Geoanalytical Research,*, 31, 3: 275–283.

2.744* CHANG L., ROBERTS A.P., MUXWORTHY A.R., TANG Y., CHEN Q., ROWAN C.J., LIU Q. & *PRUNER P.* (2007): Magnetic characteristics of synthetic pseudo-single-domain and multi-domain greigite (Fe3S4). – *Geophysical Research Letters*, 34, 24, L24304: 1–6.

2.547* KOLESOVÁ H., LAMETSCHWANDTNER A. & *ROČEK Z.* (2007): The evolution of amphibian metamorphosis: insights based on the transformation of the aortic arches of *Pelobates fuscus* (Anura). – *Journal of Anatomy*, 210: 379–393.

2.162* GRYGAR T., BLÁHOVÁ A., HRADIL D., BEZDIČKA P., *KADLEC J.*, *SCHNABL P.*, SWANN G. & OBERHANSLI H. (2007): Lake Baikal climatic record between 310 and 50 ky BP: Interplay between diatoms, watershed weathering and orbital forcing. – *Palaeogeography, Palaeoclimatology, Palaeoecology*, 250: 50–67.

2.162* ŠROUBEK P., DIEHL J.F. & *KADLEC J.* (2007): Historical Climatic Record from Flood Sediments Deposited in the Interior of Spirálka Cave, Czech Republic. – *Palaeogeography, Palaeoclimatology, Palaeoecology*, 251: 547–562.

2.162* TOMAŠOVÝCH A. & *SIBLÍK M.* (2007): Evaluating compositional turnover of brachiopod communities during the end-Triassic mass extinction (Northern Calcareous Alps): Removal of dominant groups, recovery and community reassembly. – *Palaeogeography, Palaeoclimatology, Palaeoecology*, 244: 170–200.

1.898* *FILIPPI M.*, DOUŠOVÁ B. & MACHOVIČ V. (2007): Mineralogical speciation of arsenic in soil above the Mokrsko-west gold deposit, Czech Republic. – *Geoderma*, 139, 1–2: 154–170.

1.842* *KLETETSCHKA G.*, *PRUNER P.*, *VENHODOVÁ D.* & *KADLEC J.* (2007): Magnetic record associated with tree ring density: Possible climate proxy. – *Geochemical Transactions*, 8, 2: 1–11.

1.719* *ACKERMAN L.*, ZACHARIÁŠ J. & PUDILOVÁ M. (2007): P–T and fluid evolution of barren and lithium pegmatites from Vlastějovice, Bohemian Massif, Czech Republic. – *International Journal of Earth Sciences*, 96, 4: 623–638.

1.376* RAGE J.-C. & *ROČEK Z.* (2007): A new species of *Thaumastosaurus* (Amphibia: Anura) from the Eocene of Europe. – *Journal of Vertebrate Paleontology,* 27: 329–336.

1.250* VYLITA T., *ŽÁK K.*, *CÍLEK V.*, HERCMAN H. & MIKŠÍKOVÁ L. (2007): Evolution of hot-spring travertine accumulation in Karlovy Vary/Carlsbad (Czech Republic) and its significance for the evolution of Teplá valley and Ohře/Eger rift. – *Zeitschrift für Geomorphologie*, 51, 4: 427–442.

1.224* *NAVRÁTIL T.*, SHANLEY J.B., *SKŘIVAN P.*, KRÁM P., MIHALJEVIČ M. & *DRAHOTA P.* (2007): Manganese Biogeochemistry in a Central Czech Republic Catchment. – *Water, Air, and Soil Pollution*, 186, 1–4: 149–165.

1.206* *SKÁLA R.*, ONDRUŠ P., VESELOVSKÝ F., TÁBORSKÝ Z. & ĎUĎA R. (2007): Vihorlatite, $Bi_{24}Se_{17}Te_4$, a new mineral of the tetradymite group from Vihorlat Mts., Slovakia. – *European Journal of Mineralogy*, 19: 255–265.

1.179* *ULRYCH J.*, *ADAMOVIČ J.*, *ŽÁK K.*, FRÁNA J., ŘANDA Z., *LANGROVÁ A.*, *SKÁLA R.* & CHVÁTAL M. (2007): Cenozoic "radiobarite" occurrences in the Ohře (Eger) Rift, Bohemian Massif: Mineralogical and geochemical revision. – *Chemie Erde, Geochemistry*, 67, 4: 301–312.

1.082* *HOJDOVÁ M.*, HUANG J., KALBITZ K. & MATZNER E. (2007): Effects of throughfall and literfall manipulation on concentrations of methylmercury and mercury in forest-floor percolates. – *Journal of Plant Nutrition and Soil Science*, 170: 373–377.

1.057* POVONDRA P., *SKÁLA R.* & CHAPMAN R. (2007): Hydrothermal assemblage of Cl-, F- and OH-bearing apatite-group minerals from Maglovec, near Prešov, Slovakia. – *Canadian Mineralogist*, 45, 6: 1355–1366.

1.057* LAUFEK F., DRÁBEK M., *SKÁLA R.*, HALODA J. & TÁBORSKÝ Z. (2007): Vavřínite, Ni_2SbTe_2, a new mineral species from the Kunratice Cu–Ni sulfide deposit, Czech Republic. – *Canadian Mineralogist*, 45, 5: 1213–1219.

1.017* *SLAVÍK L.*, VALENZUELA-RÍOS J.I., *HLADIL J.* & CARLS P. (2007): Early Pragian conodont-based correlations between the Barrandian area and the Spanish Central Pyrenees. – *Geological Journal*, 42, 5: 499–512.

0.989* BÁBEK O., PŘIKRYL T. & *HLADIL J.* (2007): Progressive drowning of carbonate platform in the Moravo-Silesian Basin (Czech Republic) before the Frasnian/Famennian event: facies, compositional variations and gamma-ray spectrometry. – *Facies*, 53, 2: 293–316.

0.907* *BREITER K.*, ŠKODA R. & UHER P. (2007): Nb-Ta-Ti-W-Sn-oxide minerals as indicators of a peraluminous P- and F-rich granitic system evolution: Podlesí, Czech Republic. – *Mineralogy and Petrology*, 91, 3–4: 225–248.

0.868* *MIKULÁŠ R.* & RINDSBERG ANDREW K. (2007): Third International Workshop on Ichnotaxonomy (WIT-III): Prague and Jevíčko, Czech Republic, September 4–9, 2006. – *Episodes*, 30, 1: 57–58.

0.735* ČÍŽ R. & *RUDAJEV V.* (2007): Linear and nonlinear attributes of ultrasonic time series recorded from experimentally loaded rock samples and total failure prediction. – *International Journal of Rock Mechanics and Mining Sciences*, 44, 3: 457–467.

0.707* SUCHÝ, V., SÝKOROVÁ, I., *MELKA, K., FILIP, J.*, MACHOVIČ, V. (2007): Illite „crystallinity", coalification of organic matter and microscructural development associated with lowest-grade metamorphism of Neoproterozoic sediments in the Teplá-Barrandian unit, Czech Republic. – *Clay Minerals*, 42, 4: 503–526.

0.682* *HOUŠA V.*, *PRUNER P.*, ZAKHAROV V.A., KOŠŤÁK M., *CHADIMA M.*, ROGOV M.A., *ŠLECHTA S.* & MAZUCH M. (2007): Boreal- Tethyan Correlation of the Jurassic – Cretaceous Boundary Interval by Magneto- and Biostratigraphy. – *Stratigraphy and Geological Correlation*, 15, 3: 297–309.

0.658* *ŠTORCH P.* & MASSA D. (2007): Middle Telychian (upper Llandovery, Silurian) graptolites from boreholes of northwestern Libya: Their biostratigraphic significance and palaeogeographical implication. – *Geobios*, 40, 4: 535–540.

0.563* ETTLER V., *ROHOVEC J., NAVRÁTIL T.,* MIHALJEVIČ M. (2007) Mercury Distribution in Soil Profiles Polluted by Lead Smelting. – *Bulletin of Environmental Contamination and Toxicology,* 78, 1: 12–16.

0.207* KODEŠOVÁ R., PAVLŮ L., KODEŠ V., *ŽIGOVÁ A.* & NIKODEM A. (2007): Impact of spruce forest and grass vegetation cover on soil micromorphology and hydraulic properties of organic matter horizon. – *Biologia*, 62, 5: 565–568.

*CARLS P., *SLAVÍK L.* & VALENZUELA-RÍOS J.I. (2007): Revisions of conodont biostratigraphy across the Silurian-Devonian boundary. – *Bulletin of Geosciences*, 82, 2: 145–164. Praha.

* *GALLE A.* (2007): *Spinophyllum* Wedekind, 1922 (Anthozoa, Rugosa), in the Lower Givetian (Devonian) of the Bohemian Massif. – *Bulletin of Geosciences*, 82, 2: 133–144.

**HLADIL J.*, *KOPTÍKOVÁ L.*, RŮŽIČKA M. & KULAVIAK L. (2007): Experimental effects of surfactants on the production of stromatactis-shaped cavities in artificial carbonate sediments. – *Bulletin of Geosciences*, 82, 1: 37–50.

*HORÁČEK I., MIHEVC A., ZUPAN HAJNA N., *PRUNER P.* & *BOSÁK P.* (2007): Fossil vertebrates and paleomagnetism update of one of the earlier stages of cave evolution in the Classical karst, Slovenia: Pliocene of Črnotiče II site and Račiška pečina Cave. – *Acta carsologica*, 36, 3: 453–468.

**PETRUŽÁLEK M.*, *VILHELM J.*, *LOKAJÍČEK T.* & *RUDAJEV V.* (2007): Assessment of P-Wave Anisotropy by Means of Velocity Ellipsoid. – *Acta Geodynamica et Geomaterialia*, 4, 3(147): 23–31.

**ŽÁK K.*, *PRUNER P.*, *BOSÁK P.*, *SVOBODOVÁ M.* & *ŠLECHTA S.* (2007): An unusual paleokarst sedimentary rock in the Bohemian Karst (Czech Republic), and its regional tectonic and geomorphologic relationships. – *Bulletin of Geosciences*, 82, 3: 275–290.

**ŽIGOVÁ A.*, ŠŤASTNÝ M., KREJČOVÁ J. & HÁJEK P. (2007): Characterization of anthropogenic influence on the soil cover on selected localities of Prague. – *Acta Geodynamica et Geomaterialia*, 4, 3: 39–49. Praha.

BEK J., FENG Z. & WANG J. (2007): Spores of Carboniferous sigillarians. – *Journal of Stratigraphy*, 31, 1: 14–16. Nanking.

BELLA P., *BOSÁK P., PRUNER P.*, HOCHMUTH Z., HERCMAN H. (2007): Magnetostratigrafia jaskynných sedimentov a speleogenéza Moldavskej jaskyne a spodných častí Jasovskej jaskyne. – *Slovenský kras*, XLV: 15–42. Liptovský Mikuláš.

BOROVIČKA J. (2007): *Psilocybe medullosa* (Bres.) Borovička, comb. nova. – *Mykologický sborník*, 84, 4: 114. Praha.

BOROVIČKA J. (2007): Poznáváme holubinky XII. Holubinka parková – *Russula exalbicans* (Pers.) Melzer et Zvára. – *Mykologický sborník*, 84, 4: 116–118. Praha.

BOROVIČKA J. (2007): Dva nálezy pavučince olivového – *Cortinarius infractus* (Pers.) Fr. - *Mykologický sborník*, 84, 4: 118–120. Praha.

BOSÁK P. (2007): Kras střemeníčsko-rachavské skupiny ker konicko-mladečského devonu (Javoříčský kras): vyhodnocení vrtných prací (Karst phenomena in the Střemeníčko-Rachava group of tectonic blocks in the Konice-Mladeč Devonian (Javoříčko Karst, Czech Republic): evaluation of borehole logs). – *Přírodovědné studie Muzea Prostějovska*, 9(2006): 7–39. Prostějov.

BOSÁK P. & GERŠL M. (Eds., 2007): *Speleofórum 2007*, 26: 1–66. Praha.

BOSÁK P. & GERŠL M. (Eds., 2007): *3. ročník konference Kras*: 1–43. Praha.

BREITER K. (Ed., 2007): *Sborník abstrakt a exkurzní průvodce. 3. sjezd České geologické společnosti, Volary 19.-22. září 2007.* – Česká geologická společnost: 1–116. Praha.

BREITER K. & *ŽÁK K.* (2007): Neobvyklá žilná hornina ze štoly pod Matčinou horou u Zbiroha. – *Zprávy o geologických výzkumech v roce 2006*: 120–124. Praha.

CHÁB J., STRÁNÍK Z., ELIÁŠ M., *ADAMOVIČ J.*, *BREITER K.* & *CAJZ V.* (2007): *Geological map of the Czech Republic 1:500 000*. – Česká geologická služba. Praha.

CÍLEK V. (2007): Krajina a geodiverzita. – *In:* ČIHAŘ M. et al. (Eds.): *Udržitelný management přírodě blízkých oblastí*: 33–39. – Ústav pro životní prostředí. Přírodovědecká fakulta UK. Praha.

DAŠKOVÁ J. & KVAČEK J. (Eds., 2007): *Palaeobotany – contribution to the evolution of plants and vegetation*. – Proceedings, National Museum, Prague, June 28–29: 1–48. Národní muzeum. Praha.

ERNÉE M., DOBEŠ M., *HLAVÁČ J.*, KOČÁR P., KYSELÝ R. & ŠÍDA P. (2007): Zahloubená chata ze středního eneolitu v Praze 9 – Miškovicích. Výsledky archeologických a přírodovědných analýz. – *Památky archeologické*, XCVIII: 31–108. Praha.

FENG Z., WANG J. & *BEK J.* (2007): A new megasporangiate sigillarian fructification from Early Pennsylvanian Yanhugou Formation of Xiaheyan in Ningxia, northwestern China. – *Journal of Stratigraphy*, 31, 1: 20–22. Nanking.

FILIP J., ULRYCH J., ADAMOVIČ J., BALOGH K. (2007): Hydrothermal fluid activation along faults and contacts of subvolcanic bodies: apatite fission-track data from Tertiary volcanics of the Bohemian Massif. – *Journal of Geosciences*, 52, 3–4: 211–220.

FILIPPI M. (2007): Vlčí hora u Černošína – klasické naleziště augitu, amfibolu a olivínu. – *Minerál*, 15, 2: 110–113. České Budějovice.

FILIPPI M., BRUTHANS J. & VILHELM Z. (2007): Namak 2006: za nejdelší solnou jeskyní světa. – *Spelofórum 2007*, 26: 25–34. Praha.

FILIPPI M., MAGDÍK P. & MÁNEK J. (2007): Suletice – staronová lokalita amfibolu v Českém středohoří. – *Minerál*, 15, 2: 116–118. České Budějovice.

HAVELKOVÁ, P., HERREL, A., AERTS, P. & *ROČEK Z.* (2007): Analýza pohybu živočichů zpomaleným RTG videozáznamem a význam této analýzy pro řešení speciálních biologických problémů. – *Inovační podnikání & transfer technologií*, 2007, 1, příloha IV–V.

HLADIL J. (2007): Eifelian-Frasnian Amphipora limestones, biostromes and bioherms, Moravian Karst, Czech Republic. – *Mémoires du Muséum National d´ Histoire Naturelle*, 195: 187–189. Paris.

HLADIL J. (2007): The earliest growth stages of Amphipora. – *Österreichische Akademie der Wissenschaften, Schriftenreihe der Erdwissenschaftlichen Kommissionen*, 17: 51–65. Wien.

HLADIL J. & RŮŽIČKA M. (2007): Stromatactic patterns formation in geological sediments: field observations versus experiments. – *In*: GUERTS B., CLERCX H. & UIJTTEWAAL W. (Eds.): *Particle-Laden Flow - From Geophysical to Kolmogorov Scales,* ERCOFTAC (European Research Community on Flow, Turbulence and Combustion), Series 11: 85–94. Springer. Dordrecht.

HOUŠA V., *PRUNER P.*, *CHADIMA M.*, *ŠLECHTA S.*, ZAKHAROV V.A., ROGOV M.A., KOŠŤÁK M. & MAZUCH M. (2007): Rezultaty magnitostratigrafičeskoj Borealno-Tetičeskoj korreljaciji pograničnogo jursko-mělovogo intervala i ich interpretacija. – *Paleontologija, paleobiogeografija i paleoekologija. Materialy LIII sessiji Paleontologičekovo obščestva*: 133–135. Sankt Petěrburg.

HOUŠA V., *PRUNER P.*, ZAKHAROV V.A., KOŠŤÁK M., *CHADIMA M.*, ROGOV M.A., *ŠLECHTA S.* & MAZUCH M. (2007): Borealno–teticheskaya korrelacia pogranichnogo jursko-melovogo intervala po magnitno- i biostratigraficheskim dannym. – *Stratigrafia. Geologicheskaya korrelacia*, 15, 3: 63–75. Moskva.

HRADECKÁ L., KVAČEK J., LOBITZER H., SCHLAGINTWEIT F., *SVOBODOVÁ M.* & ŠVÁBENICKÁ L. (2007): Bericht 2007 über biostratigraphische, paläobotanische und fazielle Arbeiten in der Gosau-Gruppe von Russbach am Pass Gschütt auf Blatt 95 St. Wolfgang im Salzkammergut. – *Jahrbuch der Geologischen Bundesanstalt*, 147, 3+4: 684–686. Wien.

KADLEC J. & *ŠLECHTA S.* (2007): Stáří fluviálních sedimentů v jeskyni Výpustek (Moravský kras). – *Speleo (Praha)*, 47: 13–16.

KADLEC J., ŠROUBEK P., DIEHL J.F., HERCMAN H., *PRUNER P.* & *VENHODOVÁ D.* (2007): How old are cave deposits abundant in Pleistocene fauna preserved in the Bone Passage in the Sloupsko-šošůvská Cave (Moravian Karst)? – *Scripta-Geology*, 35: 37–41. Brno.

KÄMPF H., MRLINA J., *ULRYCH J., ACKERMAN L.* & HRADECKÝ P. (2007): Stop 3 (3–1 to 3–3) Surroundings of the Železná Hůrka Hill (Eisenbühl). – *In:* VENERA Z. (Ed.): *CzechTec 07. 5th Meeting of the Central European Tectonic Studies Group (CETeG) & 12th Meeting of the Czech Tectonic Studies Group (ČTS), April 11–14, 2007, Teplá, Czech Republic. Proceedings and excursion guide*: 119–125. Czech Geological Survey. Praha.

KIRCHNER K., MÁČKA Z. & *CÍLEK V.* (2007): Scree and blocky formations in Northern and Central Bohemia: geologic and geomorphic development. – *Acta Geographica Silesiana*, 2: 19–26. Sosnowiec.

KOHOUT T., ELBRA T., PESONEN L.J., *SCHNABL P.* & *ŠLECHTA S.* (2007): Magnetic susceptibility as a tool to match asteroids and meteorites. - *In: XXIII Geophysics days, Geophysical Society of Finland, Oulu, Finland, May 23–24*: 69–73. Oulu.

KŘÍBEK B., MAJER V., BEZUŠKO P., PAŠAVA J., *ADAMOVIČ J.*, NYAMBE I., LIYUNGU K. & CHIBESAKUNDA F. (2007): Zhodnocení vlivu těžby a úpravy měděných a kobaltových rud na životní prostředí v zambijské části Copperbeltu: výsledky projektu rozvojové spolupráce. – *Zprávy o geologických výzkumech v roce 2006*: 160–162. Praha.

KVAČEK J. & *DAŠKOVÁ J.* (2007): Revision of the type material in the genus Nathorstia Heer (Filicales). – *Journal of the National Museum (Prague), Natural History Series*, 176, 7: 117–123. Praha.

KVAČEK J., LOBITZER H., MELLER B. & *SVOBODOVÁ M.* (2007): Bericht 2007 über paläobotanische Untersuchungen in der Gosau des Tiefengrabens auf Blatt 95 St. Wolfgang im Salzkammergut. – *Jahrbuch der Geologischen Bundesanstalt*, 147, 3+4: 684. Wien.

LISÁ L. (Ed., 2007): *Excursion Guidebook to the Easter Field Trip to Moravia*. – University of Cambridge: 1–59. Cambridge.

LISÁ L., PEŠKA M., MERTA D., BAJER A. & ZŮBEK A. (2007): Aplikace geoarcheologie při interpretaci pleistocenních and holocenních sedimentů v prostoru Náměstí Svobody v Brně. – *Ve službách archeologie*, 2007, 1: 177–181. Brno.

LOKAJÍČEK T. & *KLÍMA K.* (2007): Determination of first arrival time of seismic/ultrasonic signals by means of high order statistic approach. – *Transactions of the VSB – Technical University of Ostrava, Civil Engineering Series*, VII, 2: 175–182. Ostrava.

MENTLIK P., *LISÁ L.* & MINÁR J. (2007): Concept of geomorphological analysis of previously glaciated areas (based on analysis of the surroundings of prášilské jezero lake and jezero Laka lake, Šumava Mts., Czech Republic). – *Landform analysis*, 5: 58–59. Pań.

MIKULÁŠ R. (2007): Dubové kmeny v holocenních usazeninách Labe: substrát pro zachování hmyzu, stop po jeho činnosti a stop exploatace dřevité hmoty dalšími organizmy. – *Zpravodaj České geologické společnosti*, 3, 5: 23–35. Praha.

MURAKAMI M. & *SVOJTKA M.* (2007): Zircon fission-track technique: a laboratory procedure adopted at the Institute of Geology, Academy of Sciences of the Czech Republic, v. v. i. – *Fission Track News Letter*, 20: 13–19. Tokyo.

PAŠAVA J., VYMAZALOVÁ A., KNÉSL I. & *ACKERMAN L.* (2007): PGE in ultramafic rocks of the hidden ophiolite complex near Svitavy, Bohemian Massif. – *In:* ANDREW C.J. (Ed.): *9th Biennial Meeting of the Society for Geology Applied to Mineral Deposits, Irish Association for Economic Geology, Dublin, August 20–23. Proceedings*: 1591–1594. Dublin.

PAŠAVA J., VYMAZALOVÁ A., KNÉSL I. & *ACKERMAN L.* (2007): Studium distribuce Pt-kovů v ultrabazických horninách svitavské tíhové anomálie. – *Zprávy o geologických výzkumechv roce 2006*: 130–132. Praha.

PETRUŽÁLEK M., LOKAJÍČEK T., RUDAJEV V. & *VILHELM J.* (2007): Relation between migmatite structure and ultrasonic parameters under various loading conditions. – *Transactions of the VSB – Technical University of Ostrava, Civil Engineering Series*, VII, 2: 253–261. Ostrava.

POLÁK M., SOSNA K., VANĚČEK M., MICHÁLKOVÁ J., HANUS R., ROUSOVÁ P., *NAVRÁTIL T.,* ZÁRUBA J., KŘÍŽOVA H., MILICKÝ M., NAVRÁTILOVÁ V. (2007) Praktické ověřování modelového řešení hydrodynamických a migračních parametrů granitových bloků. – *Acta Montanistica Slovana,* 12, 1: 232–236.

PRUNER P., BOSÁK P., MIHEVC A. & ZUPAN HAJNA N. (2007): Paleomagnetický výzkum sedimentů v krasových oblastech Slovinska: využití při pakleotektonických rekonstrukcích. – *Inovační podnikání & transfer technologií*, 1, příloha: X–XI. Praha.

RAPPRICH V., *CAJZ V.*, KOŠŤÁK M., PÉCSKAY Z., ŘÍDKOŠIL T., RAŠKA P. & RADOŇ M. (2007): Reconstruction of eroded monogenic Strombolian cones of Miocene age: A case study on character of volcanic activity of the Jičín volcanic field (NE Bohemia) and estimation of subsequent erosional rates. – *Journal of Geosciences*, 52, 3–4: 169–180. Praha.

RADOŇ M., *LANGROVÁ A., ULRYCH, J.* & *SKÁLA R.* (2007): Draselný živec z čediče významné mineralogické lokality na vrchu Kočka u Žitenic v Českém středohoří. – *Bulletin mineralogicko-petrologického oddělení Národního Muzeav Praze*, 14–15: 96–103. Praha.

RAPPRICH V. & *CAJZ V.* (2007): Charakter kenozoické vulkanické aktivity v severovýchodních Čechách (Geopark Český ráj). – *Acta Musei Turnoviensis,* 2 (Vents 2007): 21–22. Turnov.

RAPPRICH V. & *CAJZ V.* (2007): The nature of Cenozoic volcanic activity in northeastern Bohemia (Bohemian Paradise Geopark). – *Acta Musei Turnoviensis,* 2 (Vents 2007): 40–41. Turnov.

ROJÍK P., *HLADIL J., LISÁ L.*, SIDORINOVÁ T., STRADIOTOVÁ A. & VYLITA T. (2007): *Za geologickými zajímavostmi Karlových Varů, Sokolovské pánve a západních Krušných hor*. – Exkurze České geologické společnosti, 20 podzim 2007: 1–28. Czech Geological Society. Prague.

SIBLÍK M. (2007): Brachiopodové fauny triasu a jury v oblasti Salzkammergut v Rakousku. – *Zprávy o geologických výzkumech v roce 2006*: 166–167. Praha.

SKÁLA R. & ČADA M. (2007): Chebské vltavíny. – *Bulletin Mineralotgicko-petrologického oddělení Národního Muzea v Praze*, 14–15: 25–39.

SLAVÍK L., BOSÁK P. & *ADAMOVIČ, J.* (Eds., 2007): *Institute of Geology. Annual Report 2006*. – Institute of Geology AS CR: 1–88. Praha.

ŠPIČÁK A., KÄMPF H., BOUŠKOVÁ A., MRLINA J., FALK H., WEINLICH F.H., *ACKERMAN L.*, FÖRSTER A., HRADECKÝ P., HORÁLEK J., POLÁK V. & *ULRYCH J.* (2007): Field trip guide, April 11, 2007. Manifestations of Recent Dynamics of the Western Part of the Eger (Ohře) Rift. – *In:* VENERA Z. (Ed.): *CzechTec 07. 5th Meeting of the Central European Tectonic Studies Group (CETeG) & 12th Meeting of the Czech Tectonic Studies Group (ČTS), April 11–14, 2007, Teplá, Czech Republic. Proceedings and excursion guide*: 107–108. Czech Geological Survey. Praha.

STOLZ D., ŠREIN V., JOHN J. & *ŽÁK K.* (2007): Nález bulavy v údolí Žloukavy (k. ú. Račice, okr. Rakovník). – *Archeologie ve středních Čechách*, 11: 171–175. Praha.

URBAN J., MARGIELEWSKI W., *ŽÁK K.*, HERCMAN H., SUJKA G. & MLECZEK T. (2007): The calcareous speleothems in the pseudokarst Jaskinia Slowianska-Drwali cave, Beskid Niski Mts., Poland. – *Nature Conservation (Kraków)*, 63, 6: 119–128.

VAVRDOVÁ M., GILÍKOVÁ H. & *MIKULÁŠ R.* (2007): First Ediacaran (Vendian) cryptarchs from the Měnín – 1 borehole (South Moravia). – *Geologické výzkumy na Moravě a ve Slezsku v roce 2006*: 56–59. Brno.

ZAJÍC J. (2007): Carboniferous Fauna of the Krkonoše Piedmont Basin. – *Acta Musei reginaehradecensis, Ser. A*, 32: 11–16. Hradec Králové.

ŽÁK K. & ELLEDER L. (2007): Povodňová historie v krasovém kaňonu řeky Berounky v okolí obce Srbsko v posledních dvou stoletích. – *Český kras*, XXXIII: 9–15. Beroun.

ŽÁK K., KOLČAVA M., JÄGER O. & *ŽIVOR R.* (2007): Evidence jeskyní Českého krasu: doplňky a změny za období 1.10.2005 až 1.10.2007. – *Český kras*, XXXIII: 28–30. Beroun.

ZULAUF G., ROMANO S.S., DÖRR W. & *FIALA J.* (2007): Crete and the Minoan Terranes: Age constraints from U-Pb dating of detrital zircons. – *Geological Society of America, Special Paper*, 423: 401–411.

Books and chapters in books

ADAMOVIČ J. & KIDSTON J. (2007): Sandstones and their attributes. – *In*: HÄRTEL H., *CÍLEK V.*, HERBEN T., JACKSON A. & WILLIAMS R. (Eds.): *Sandstone landscapes*: 13–24. Academia. Praha.

BOSÁK P., KNEZ M., *PRUNER P.* & SLABE T. (2007): Paleomagnetne raziskave jame brez stropa pri Kozini. – *In:* KNEZ M. & SLABE T. (Eds.): *Kraški pojavi, razkriti med gradnjo slovenskih avtocest*: 185–194. Založba ZRC. Ljubljana.

CÍLEK V. (2007): Climate, microclimate and paleoclimate of sandstone areas of Central and Northern Bohemia. – *In*: HÄRTEL H., *CÍLEK V.*, HERBEN T., JACKSON A. & WILLIAMS R. (Eds.): *Sandstone landscapes*: 97–103. Academia. Praha.

CÍLEK V., LOŽEK V., MIKULÁŠ R. & *ŽÁK K.* (2007): The Holocene sedimentation under sandstone rockshelters of Northern Bohemia, Czech Republic. – *Terra Praehistorica, Festschrift für Klaus-Dieter Jäger zum 70. Geburtstag (Beiträge zur Ur- und Frühgeschichte Mitteleuropas, 48)*: 63–79. Archäologische Gesellschaft in Thüringen e.V. Weimar.

CÍLEK V., WILLIAMS R., OSBORNE A., MIGON P. & *MIKULÁŠ R.* (2007): The origin and development of sandstone landforms. – *In*: HÄRTEL H., *CÍLEK V.*, HERBEN T., JACKSON A. & WILLIAMS R. (Eds.): *Sandstone landscapes*: 34–43. Academia. Praha.

CÍLEK V. & *ŽÁK K.* (2007): Late Glacial and Holocene sedimentation under sandstone rock shelters of Northern Bohemia (Czech Republic). – *In*: HÄRTEL H., *CÍLEK V.*, HERBEN T., JACKSON A. & WILLIAMS R. (Eds.): *Sandstone landscapes*: 135–138. Academia. Praha.

FIŠÁK J., CHALOUPECKÝ P., ŘEZÁČOVÁ D., *VACH M., SKŘIVAN P.* & *ŠPIČKOVÁ J.* (2007): The comparison of pollutant concentrations in liquid falling and deposited precipitation, and throughfall. – *In*: MORRISON GREGORY M. & RAUCH S. (Eds.): *Highway and Urban Environment*: 129–142. Springer. Dordrecht.

GOLAB Z., *MIKULÁŠ R.*, *ADAMOVIČ J.*, HÁJEK A. & SPÍŠEK J. (2007): Góry Stolowe/Broumovské stěny Cliffs (Poland/Czech Republic). –*In*: HÄRTEL H., *CÍLEK V.*, HERBEN T., JACKSON A. & WILLIAMS R. (Eds.): *Sandstone Landscapes*: 329–332. Academia. Praha.

HÄRTEL H., *ADAMOVIČ J.* & *MIKULÁŠ R.* (2007): General overview of European sandstone landscapes. – *In*: HÄRTEL H., *CÍLEK V.*, HERBEN T., JACKSON A. & WILLIAMS R. (Eds.): *Sandstone landscapes*: 321–324. Academia. Praha.

HÄRTEL H., *CÍLEK V.*, HERBEN T., JACKSON A. & WILLIAMS R. (Eds., 2007): *Sandstone Landscapes*. – Academia: 1–494. Praha.

MIKULÁŠ R. (2007): Microforms of the sandstone relief. – *In*: HÄRTEL H., *CÍLEK V.*, HERBEN T., JACKSON A. & WILLIAMS R. (Eds.): *Sandstone Landscapes*: 66–75. Academia. Praha.

MIKULÁŠ R. (2007): The concept of porokarst: sandstone sculpturing across climatic zones and lithofacies. – *In*: HÄRTEL H., *CÍLEK V.*, HERBEN T., JACKSON A. & WILLIAMS R. (Eds.): *Sandstone Landscapes*: 79–82. Academia. Praha.

MIKULÁŠ R., *ADAMOVIČ J.*, BÍLÝ M. & THELENOVÁ J. (2007): Lusatian/Zittau Mountains (Czech Republic/Germany). – *In*: HÄRTEL H., *CÍLEK V.*, HERBEN T., JACKSON A. & WILLIAMS R. (Eds.): *Sandstone Landscapes*: 347–349. Academia. Praha.

MIKULÁŠ R., *ADAMOVIČ J.*, HÁJEK A. & SPÍŠEK J. (2007): Adršpašsko-teplické skály Cliffs and Ostaš Hill (Czech Republic). – *In*: HÄRTEL H., *CÍLEK V.*, HERBEN T., JACKSON A. & WILLIAMS R. (Eds.): *Sandstone Landscapes*: 332–335. Academia. Praha.

MIKULÁŠ R., *ADAMOVIČ J.*, HOFFMANN A., BERAN L. & HONCŮ M. (2007): Kokořín and Doksy area (Czech Republic). – *In*: HÄRTEL H., *CÍLEK V.*, HERBEN T., JACKSON A. & WILLIAMS R. (Eds.): *Sandstone Landscapes*: 339–343. Academia. Praha.

MIKULÁŠ R., *ADAMOVIČ J.*, HÄRTEL H., BENDA P. & TRÝZNA M. (2007): Elbe Sandstones (Czech Republic/Germany). – *In*: HÄRTEL H., *CÍLEK V.*, HERBEN T., JACKSON A. & WILLIAMS R. (Eds.): *Sandstone Landscapes*: 326–328. Academia. Praha.

MIKULÁŠ R., *ADAMOVIČ J.* & ŠOLTYSOVÁ L. (2007): Bohemian Paradise (Czech Republic). – *In*: HÄRTEL H., *CÍLEK V.*, HERBEN T., JACKSON A. & WILLIAMS R. (Eds.): *Sandstone Landscapes*: 335–339. Academia. Praha.

MIKULÁŠ R., *ADAMOVIČ J.*, VIŠŇÁK R. & HONCŮ M. (2007): Česká Lípa and Ralsko Hill area (Czech Republic) – *In*: HÄRTEL H., *CÍLEK V.*, HERBEN T., JACKSON A. & WILLIAMS R. (Eds.): *Sandstone Landscapes*: 434–346. Academia. Praha.

PRUNER P., *CHADIMA M.* & *ŠTORCH P.* (2007): Structural evolution of the Prague synform (Czech Republic) during Silurian times: An AMS, rock magnetism, and palomagnetic study of the Svatý Jan pod Skalou dikes. Consequences for the nappes emplacement. – *Geological Society of America, Special Paper (The Evolution of the Rheic Ocean: From Avalonian-Cadomian active margin to Alleghenian-Variscan collision)*, 423: 249–265.

ŘEZNÍČEK J. & *ROČEK Z.* (2007): *Srovnávací anatomie obratlovců*. – Pedagogická fakulta UK: 1–91. Praha.

WILLIAMS R. & *ADAMOVIČ J.* (2007): Glossary. – *In*: HÄRTEL H., *CÍLEK V.*, HERBEN T., JACKSON A. & WILLIAMS R. (Eds.): *Sandstone landscapes*: 405–414. Academia. Praha.

ZUPAN HAJNA N., *BOSÁK P.* & *PRUNER P.* (2007): Raziskave jamskih sedimentov iz zapolnjene jame pri Divači. – *In:* KNEZ M. & SLABE T. (Eds.): *Kraški pojavi, razkriti med gradnjo slovenskih avtocest*: 177–184. Založba ZRC. Ljubljana.

5b. Papers published in 2008

* publications in journals with impact factor (IF value according to a list from 2008)

3.531* *SLÁMA J.*, KOŠLER J., CONDON D.J., CROWLEY J.L., GERDES A., HANCHAR J.M., HORSTWOOD M.S.A, MORFIA G.A., NASDALA L., NORBERT N., SCHALTEGGER U., SCHOENE B., TUBRETT M.N. & WHITEHOUSE M.J. (2008): Plešovice zircon – a new natural reference material for U-Pb and Hf isotopic microanalysis. – *Chemical Geology*, 249, 1–2: 1–35.

3.303* *ULRYCH J.*, DOSTAL J., HEGNER E., BALOGH K. & *ACKERMAN L.* (2008): Late Cretaceous to Paleocene melilitic rocks of the Ohře/Eger Rift in northern Bohemia, Czech Republic: Insights into the initial stages of continental rifting. – *Lithos*, 101: 141–161.

2.890* ETTLER V., *NAVRÁTIL T.*, MIHALJEVIČ M., *ROHOVEC J.*, ZUNA M., ŠEBEK O., STRNAD L. & *HOJDOVÁ M.* (2008) Mercury deposition/accumulation rates in the vicinity of a lead smelter as recorded by a peat deposit. – *Atmospheric Environment*, 42, 24: 5939–6154.

2.694* VOJTÍŠEK P., *ROHOVEC J.* & KLIMENTOVÁ J. (2008): Lanthanide complexes of 2,2’, 2’ -(10-{[Hydroxy(phenyl)phosphoryllmethyll}-1,4,7,10-tetraazacyclododecan-1,4,7-triyl)triacetic acid: Structural characterisation of intermediates from the proposed complexation mechanism in the systems of Ln(III)-dota-Type Ligands – *European Journal of Inorganic Chemistry*, 25, 3948–3956.

2.937* *ULRYCH J.*, DOSTAL J., HEGNER E., BALOGH K. & *ACKERMAN L.* (2008): Late Cretaceous to Paleocene melilitic rocks of the Ohře/Eger Rift in northern Bohemia, Czech Republic: Insights into the initial stages of continental rifting. – *Lithos,* 101: 141–161. Amsterdam.

1.993* *KOHOUT T.*, *KLETETSCHKA G.*, ELBRA T., ADACHI T., MIKULA V., PESONEN L.J., *SCHNABL P.* & *ŠLECHTA S.* (2008): Physical properties of meteorites – Applications in space missions to asteroids. – *Meteoritics & Planetary Science*, 43, 6: 1009–1020.

1.677* KERN H., IVANKINA T.I., NIKITIN A.N., *LOKAJÍČEK T.* & *PROS Z.* (2008): The effect of oriented microcracks and crystallographic and shape preferred orientation on bulk elastic anisotropy of a foliated biotite gneiss from Outokumpu. – *Tectonophysics*, 457, 3–4: 143–149.

1.677* *SLÁMA J.*, DUNKLEY D.J., KACHLÍK V. & KUSIAK M.A. (2008): Evidence for a transition from island-arc to passive setting on the continental margin of Gondawana: U-Pb zircon dating of Neoproterozoic metaconglomerates from the SE margin of the Teplá-Barrandian Unit, Bohemian Massif. – *Tectonophysics*, 461, 1–4: 44–59.

1.493* SEDLÁK P. ŠIKULA J., *LOKAJÍČEK T.* & MORI Y. (2008): Acoustic and electromagnetic emission as a tool for crack localization. – *Measurement Science & Technology*, 19 045701, 4: doi: 10.1088/0957-0233/19/4/045701

1.482* *ŽÁK K.*, ONAC B.P., PERSOIU A. (2008): Cryogenic carbonates in cave environments: A review. – *Quaternary International*, 187: 84–96.

1.398* DOUŠOVÁ B., MARTAUS A., *FILIPPI M.* & KOLOUŠEK D. (2008): Stability of arsenic species in soils contaminated naturally and in an anthropogenic manner. – *Water, Air and Soil Pollution*, 187, 1–4 : 233–241.

1.325* FENG Z., WANG J., *BEK J.* (2008): Nudasporestrobus ningxicus gen. et sp. nov., a novel sigillarian megasporangiate cone from the Bashkirian (Early Pennsylvanian) of Ningxia, northwestern China. – *Review of Palaeobotany and Palynology*, 149, 3–4: 150–162.

1.325* *BEK J.* (2008): Late Mississippian–early Pennysylvanian (Serpukhovian–Bashkirian) miospore assemblages of the Bohemian part of the Upper Silesian Basin, Czech Republic. – *Review of Palaeobotany and Palynology,* 152, 1–2: 40–57.

1.325* *BEK J.*, DRÁBKOVÁ J., *DAŠKOVÁ J.*, LIBERTÍN M. (2008): The sub-arborescent lycopsid genus *Polysporia* Newberry and its spores from the Pennsylvanian (Bolsovian–Stephanian B) continental basins of the Czech Republic. – *Review of Palaeobotany and Palynology*, 152, 3–4: 176–199.

1.139* *ŠPIČKOVÁ J.*, *DOBEŠOVÁ I.*, *VACH M.*, *SKŘIVAN P.*, MIHALJEVIČ M. & *BURIAN M.* (2008): The influence of the limestone-quarry Čertovy schody (Czech Republic) on the precipitation chemistry and atmospheric deposition. – *Chemie der Erde*, *Geochemistry*, 68: 105–115.

1.136* ZACHARIÁŠ J., *ADAMOVIČ J.* & KONEČNÝ P. (2008): Uraninite–pyrite association, a sensitive indicator of changes in fluid chemistry: element gains and losses. – *Canadian Mineralogist,* 46, 5: 1159–1172.

1.081* ZACHARIÁŠ J., *ADAMOVIČ J.* & *LANGROVÁ A.* (2008): Trace element chemistry of low-temperature pyrites – an indicator of past changes in fluid chemistry and fluid migration paths (Eger Graben, Czech Republic). – *Geologica Carpathica*, 59, 2: 117–132.

1.031* *VILHELM J.*, *RUDAJEV V.*, *LOKAJÍČEK T.*, *ŽIVOR R.* (2008): Application of autocorrelation analysis for interpreting acoustic emission in rock. –*International Journal of Rock Mechanics and Mining Sciences*, 45, 7: 1068–1081.

1.026* BRUTHANS J., ASADI N., *FILIPPI M.*, VILHELM Z. & ZARE M. (2008): Erosion rates of salt diapirs surfaces: An important factor for development of morphology of salt diapirs and environmental consequences (Zagros Mts., SE Iran). –*Environmental Geology*, 53, 5: 1091–1098.

1.026* *NAVRÁTIL T., ROHOVEC J.* & *ŽÁK K.* (2008) Floodplain sediments of the 2002 catastrophic flood at the Vltava (Moldau) River and its tributaries: mineralogy, chemical composition, and post-sedimentary evolution. – *Environmental Geology,* 56, 2: 399–412.

0.940* *ŠTORCH P.* & FEIST R. (2008): Lowermost Silurian graptolites of Montagne Noire, France. – *Journal of Paleontology*, 82, 5: 938–956.

0.892* *MIKULÁŠ R.*, GILÍKOVÁ H. & *VAVRDOVÁ M.* (2008): Late Proterozoic to Early Palaeozoic platform deposits of Southern Moravia (Czech Republic). –*Geological Quarterly*, 52, 4: 335–348.

0.888* JUŘIČKOVÁ L., HORSÁK M., CAMERON R., HYLANDER K., MIKOVCOVÁ A., *HLAVÁČ J.C.* & *ROHOVEC J.* (2008): Land snail distribution patterns within a site: The role of different calcium sources. – *European Journal of Soil Biology,* 44, 2: 172–179.

0.796* KOBAYASHI T., HIRAJIMA T., HIROI Y. & *SVOJTKA M.* (2008): Determination of SiO_2 Raman spectrum indicating the transformation from coesite to quartz in Gföhl migmatitic gneisses in the Moldanubian Zone, Czech Republic. – *Journal of Mineralogical and Petrological Sciences*, 103:105–111.

0.796* NAEMURA K., YOKOYAMA K., HIRAJIMA T. & *SVOJTKA M.* (2008): Age determination of thorianite in phlogopite-bearing spinel-garnet peridotite in the Gföhl Unit, Moldanubian Zone of the Bohemian Massif. – *Journal of Mineralogical and Petrological Sciences*, 103: 285–290.

0.770* ADACHI T. & *KLETETSCHKA G.* (2008): Impact-Pressure Controlled Orientation of Shatter Cone Magnetizations in Sierra Madera, Texas, USA. – *Studia Geophysica et Geodaetica*, 52, 2: 237–254.

0.770* *MAN O.* (2008): On the identification of magnetostratigraphic polarity zones. – *Studia Geophysica et Geodaetica*, 52, 2: 173–186.

0.770* *KOHOUT T.*, *KLETETSCHKA G.*, DONADINI F., FULLER M. & HERRERO-BEVERA E. (2008): Analysis of the natural remanent magnetization of Rocks by measuring the efficiency ratio through alternating field demagnetization spectra. – *Studia Geophysica et Geodaetica*, 52, 2: 225–235.

0.659* KUČERA J., *NOVÁK J.K.*, KRANDA K., PONCAR J., KRAUSOVÁ I., SOUKAL L., CUNIN O. & LANG M. (2008): INAA and petrological study of sandstones from the Angkor monuments: consideration on their provenance. – *Journal of Radioanalytical and Nuclear Chemistry*, 278, 2: 299–306.

0.609* *HOJDOVÁ M.*, *NAVRÁTIL T.* & *ROHOVEC J.* (2008): Distribution and Speciation of Mercury in Mine Waste Dumps. – *Bulletin of Environmental Contamination and Toxicology*, 80, 3: 237–241.

0.589* *VILHELM J.*, *LOKAJÍČEK T.*, *RUDAJEV V.* & VEVERKA J. (2008): Correlation Analysis of the Ultrasonic Emission from Loaded Rock Samples – the Study of Interaction of Microcracking Nucleation Centres. – *Rock Mechanics and Rock Engineering*, 41, 5: 695–714.

0.532* *KADLEC J.*, *CHADIMA M.*, *LISÁ L.*, HERCMAN H., OSINTSEV A. & OBERHÄNSLI H. (2008): Clastic cave deposits in Botovskaya Cave (Eastern Siberia, Russian Federation). – *Journal of Cave and Karst Studies*, 70, 3: 142–155.

0.377* PAŠAVA J., KŘÍBEK B., VYMAZALOVÁ A., SÝKOROVÁ I., *ŽÁK K.* & ORBERGER B. (2008): Multiple sources of metals of mineralization in Lower Cambrian black shales of South China: Evidence from geochemical and petrographic study. – *Resource Geology*, 58, 1: 25–42.

0.369* SABOL M., HOLEC P. & *WAGNER J.* (2008): Late Pliocene Carnivores from Včeláre 2 (Southeastern Slovakia). – *Paleontological Journal*, 42: 531–543.

**BOSÁK P.*, KNEZ M., *PRUNER P.*, SASOWSKY I., SLABE T., ŠEBELA S. (2008): Palaeomagnetic research into unroofed caves opened during the highway construction at Kozina, SW Slovenia. – Annales (Anali za istrske in mediteranske študije), Series Historia Naturalis, 17(2007), 2: 249–260. Koper.

*CARLS P., *SLAVÍK L.* & VALENZUELA-RÍOS J.I. (2008): Comments on the GSSP for the basal Emsian stage boundary: the need for its redefinition. – *Bulletin of Geosciences*, 83, 4: 383–390.

**HLADIL J.*, STRNAD L., ŠÁLEK M., JANKOVSKÁ V., ŠIMANDL P., SCHWARZ J., SMOLÍK J., *LISÁ L.*, *KOPTÍKOVÁ L.*, *ROHOVEC J.*, *BÖHMOVÁ V.*, *LANGROVÁ A.*, KOCIÁNOVÁ M., MELICHAR R. & *ADAMOVIČ J.* (2008): An anomalous atmospheric dust deposition event over Central Europe, 24 March 2007, and fingerprinting of the SE Ukrainian source. – *Bulletin of Geosciences*, 83, 2: 175–206.

*ŠTORC R. & *ŽÍTT J. (2008):* Late Turonian ophiuroids (Echinodermata) from the Bohemian Cretaceous Basin, Czech Republic. – *Bulletin of Geosciences*, 83, 2: 123–140.

*TRČKOVÁ J., ŠREIN V., ŠŤASTNÝ M. & *ŽIVOR R.* (2008): The ralationship between gneisses from the Kola Superdeep Borehole and their surface analogues. – *Acta Geodynamica et Geomaterialia*, 5, 1(149): 57–63.

**VILHELM J.*, *RUDAJEV V.*, *ŽIVOR R.*, *LOKAJÍČEK T.* & *PROS Z.* (2008): Comparison of field and laboratory seismic velocity anisotropy measurement (scaling factor). *Acta Geodynamica et Geomaterialia*, 5, 2(150): 161–169.

**ŽÍTT J.* & VODRÁŽKA R. *(2008):* New data on Late Turonian crinoids from the Bohemian Cretaceous Basin, Czech Republic. – *Bulletin of Geosciences*, 83, 3: 311–326.

*ZUPAN HAJNA N., MIHEVC A., *PRUNER P.*, *BOSÁK P.* (2008): Cave Sediments from Postojnska–Planinska Cave System (Slovenia): Evidence of Multi-Phase Evolution in Epiphreatic Zone. – *Acta carsologica*, 37, 1: 63–86.

BOGUSCH P., DVOŘÁK L. & *HLAVÁČ J. Č.* (2008): Výsledky průzkumu měkkýšů (Mollusca: Gastropoda, Bivalvia) v okolí města Blatná v jihozápadních Čechách. – *Malacologica Bohemoslovaca*, 7(2008): 33–46.

BOROVIČKA J. (2008): The correct author citation of the recently published name *Pluteus fenzlii*. – *Czech Mycology*, 60, 1: 123–124.

BOROVIČKA J. (2008): Pečárka vločkatá – *Agaricus subfloccosus* (J.E. Lange) Hlaváček nalezena u Kerska. – *Mykologický sborník*, 85, 3: 88–90.

BOROVIČKA J. (2008): Poznáváme holubinky XIII. Holubinka doupňáková – *Russula grisea* (Batsch.) Fr. – *Mykologický sborník*, 85, 2: 41–44.

BOROVIČKA J. (2008): Pozor na závojenku jarní – *Entoloma vernum* S. Lundell. – *Mykologický sborník*, 85, 2: 46–48.

BOROVIČKA J. (2008): Štítovka žlutá - *Pluteus leoninus* (Schaeff.) P. Kumm. – *Mykologický sborník*, 85, 3: 90–92.

BOROVIČKA J. (2008): Vzácné druhy šťavnatek – *Hygrophorus* v PP Na Stříbrné u Českého Šternberka. – *Mykologický sborník*, 85, 4: 119–122.

BOROVIČKA J. (2008): The wood-rotting bluing *Psilocybe* species in Central Europe – an identification key. – *Czech Mycolology*, 60, 2: 73–192.

BOSÁK P. (2008): Karst processes and time. – *Geologos*, 14: 15–24. Poznaň.

BREITER K. (2008): Mineral and textural evolution of a subvolcanic mildly aluminous A-type granite: The Hora Svaté Kateřiny stock, Krušné Hory Mts., Czech Republic. – *Zeitschrift fur geologische Wissenschaften*, 36, 6: 365–382. Berlin.

CÍLEK V. (2008): Svět, Evropa, město – nová situace. – *Sborník z Mezinárodní konference Regenerace měst – místa a lidé/ Urban Regeneration – places and people*: 8 pp. Magistrát hl.m. Prahy. Praha.

DAŠKOVÁ J. (2008): *In situ* pollen of *Alnus kefersteinii* (Goeppert) Unger (Betulales: Betulaceae) from the Oligocene of Bechlejovice, Czech Republic. – *Journal of the National Museum (Prague), Natural History Series*, 177, 2: 27–31. Praha.

DAŠKOVÁ J. (2008): List of publications of Professor RND. Blanka Pacltová, CSc. – *Acta Musei Nationalis Pragae*, 64, 2–4: 51–57. Praha.

FILIPPI M., JÄGER O. & BRUTHANS J. (2008): Namak 2007: expanze na nové solné pně. – *Speleofórum 2008*, 27: 56–67. Česká speleologická společnost. Praha.

FILIPPI M. & VLAČIHA V. (2008): Sádrovec z Března u Loun. – *Minerál*, XVI, 1: 22–27. České Budějovice.

GERŠL M., *FILIPPI M.* & BRUTHANS J. (2008): Nález raftových stalagmitů v solném krasu v Íránu. – *3. ročník konference Kras, Speleofórum 2008*, 27: 119–122. Praha.

GRYNDLER M., *BOROVIČKA J.*, GRYNDLEROVÁ H. & GRYNDLER E. (2008): Fructification of *Langermannia gigantea* in artificially inoculated field soil. – *Czech Mycology* 60, 2: 231–242.

HLAVÁČ J. (2008): Nález kelnatky (Mollusca – Scaphopoda) v eneolitickém objektu v Úholičkách (okr. Praha-západ). – *Archeologické rozhledy*, 60, 2: 309. Praha.

HORA Z.D., *LANGROVÁ A.* & *PIVEC E.* (2008): Fluorite- Molybdenite Porphyry-Like Hydrothermal System, East-Central British Columbia (NTS 093A/10W). – *Geological Fieldwork 2007*, Paper 2008-1: 17–30.

HORÁČEK I. & *BOSÁK P.* (2008): Special characteristics of paleokarst studies. – *In: BOSÁK P.*, FORD D.C., GLAZEK J. & HORÁČEK I. (Eds.): *Paleokarst. A Systematic and Regional Review*: 565–568. Karst Waters Institute, Digital Reprint, DR-2.

HRADECKÁ L., BŘÍZOVÁ E., HAVLÍČEK P. & *SVOBODOVÁ M.* (2008): Mikropaleontologický výzkum svrchněpleistocenních sedimentů v pískovně u Pístů. – *Zprávy o geologických výzkumech v roce 2007*: 120–123. Praha.

JURKOVÁ N., *BOSÁK P.*, KOMAR M. & *PRUNER P.* (2008): Relict flowstone at Machnín (the Ještěd Ridge, North Bohemia, Czech Republic) and its importance for relief evolution. – *Geomorphologia Slovaca et Bohemica*, 2(2007): 19–24. Bratislava.

KODEŠOVÁ R., KOČÁREK M., KODEŠ V., *ŽIGOVÁ A.*, KOZÁK J. & ŠIMŮNEK J. (2008): Vliv půdní mikromorfologie na půdní vlastnosti ovlivňující transport kontaminantů v zemědělských půdách. – *In:* SOBOCKÁ J. & KULHAVÝ J. (Eds.): *Sborník příspěvků. Půda v moderní informační společnosti:* 476–485. CD-ROM. Bratislava.

KRIŠTŮFEK V., ELHOTTOVÁ D., KOVÁČ Ľ., CHROŇÁKOVÁ A., *ŽÁK K.* & SVĚTLÍK I. (2008): Stáří kupy netopýřího guana v jeskyni Domica (NP Slovenský kras) a elektronová mikroskopie exkrementů netopýrů. – *Slovenský kras, Acta Carsologica Slovaca*, 46, 1: 163–170. Liptovský Mikuláš.

KUBÍNOVÁ P., *DRAHOTA P.*, FIŠÁK J., *SKŘIVAN P.* & *ROHOVEC J.* (2008): Meteorologické situace v hydrologickém roce 2007 a jejich důsledky pro biogeodynamiku některých chemických prvků v modelovém povodí Lesního potoka. – In: ŠÍR M., TESAŘ M. & LICHNER L. (Eds.): *Hydrologie malého povodí 2008, Ústav pro hydrodynamiku AV ČR, Praha, Proceedings*: 163–168. Praha.

LISÁ L., KOLAŘÍK V. & BAJER A. (2008): The Geoarchaeological and Micromorphological Reconstruction of Medieval Food Store Room Floor Layers, the case study from Tisnov, Czech Republic. – *Frankfurter geowisscheschaftliche Arbeiten*, 30: 67–75.

LISÁ L., MLEJNEK O., NERUDOVÁ Z., NERUDA P., *KADLEC J.*, VALOCH K., MUSIL R., DOLÁKOVÁ N. & HYPR D. (2008): E*xkurze oborové skupiny Geomorfologie – Kvartér České geologické společnosti. Ochoz, Moravský kras, 29. 11. 2008*. – Česká geologická společnost: 1–60. Brno.

LISÁ L., PEŠKA M., MERTA D., BAJER A. & ZŮBEK A. (2007): Aplikace geoarcheologie při interpretaci pleistocenních and holocénních sedimentů v prostoru Náměstí Svobody v Brně. – *Ve službách archeologie*, 1: 177–181. Brno.

MACHADO G., *VAVRDOVÁ M.*, FONSECA P.E., CHAMINÉ H. & ROCHA F.T. (2008): Overview of the stratigraphy and initial quantitative biogeographical results from the Devonian of the Albergaria-a-Velha Unit (Ossa Morena zone, W Portugal). – *Acta Musei Nationalis Pragae Series B*, 64, 2–4: 109–113.

MATĚJ J., DUŠEK P. & *LANGROVÁ A.* (2008): Hladinová koroze kovových materiálů. – *Sklář a keramik*, 58C: 46–51. Teplice.

LOKAJÍČEK T. & *KLÍMA K.* (2008): High-Order Statistics Approach: Automatic Determination of Sign and Arrival Time of Acoustic Emission Signal. – *In*: KANJI ONO (Ed.): *28th European Conference on Acoustic Emission Testing*, Krakow, September 17–19, 2008: 82–87.

LOKAJÍČEK T. & *KLÍMA K.* (2008): Sign and arrival time determination of Acoustic emission signals by means of high-order statistic approach. – *In*: MAZAL P. & PAZDERA L. (Eds.): *Sborník příspěvků 38. mezinárodní konference Defektoskopie 2008*, Brno, November 4–6, 2008: 123–129.

MENTLIK P., *LISÁ L.* & MINÁR J. (2007): Concept of geomorphological analysis of previously glaciated areas (based on analysis of the surroundings of the Prášilské jezero lake and jezero Laka lake, Šumava Mts., Czech Republic). – *Landform analysis*, 5: 58–59. Poznań.

MIKULÁŠ R. (2008): Geologie a paleontologie Doupovských hor. – *Exkurze České geologické společnosti*, 21, jaro 2008: 1–28. Praha.

MIKULÁŠ R. (2008): The principle of "Frozen Evolution" and its manifestation in the fossil record: the brachiopod genus *Aegiromena* Havlíček, 1961 (Upper Ordovician, Czech Republic). – *In:* BUDIL P. (ed.): Paleontological Workshop held in honour of Doc. Dr. Jaroslav Kraft, CSc. (9. 4. 1940 – 10. 1. 2007): 32–38. Czech Geological Society. Praha.

MIKULÁŠ R. & PROUZA V. (2008): K otázce provenience svrchnokarbonských slepenců v severovýchodních Čechách. – *Zprávy o geologických výzkumech v roce 2007*: 27–29. Praha.

MIKULÁŠ R. & ZASADIL B. (2008): Paleontologický význam dutin ve fosilních dřevech permokarbonského stáří středočeských a západočeských kamenouhelných pánví. – *Zprávy o geologických výzkumech v roce 2007*: 124–127. Praha.

NIKODEM A., KODEŠOVÁ R., KODEŠ V., PAVLŮ L., BORŮVKA L. & *ŽIGOVÁ A.* (2008): Charakteristika hydraulických vlastností půd pro numerické modelování transportu acidifikantů. – *In:* SOBOCKÁ J. & KULHAVÝ J. (Eds.): *Sborník příspěvků. Půda v moderní informační společnosti:* 582–589. Bratislava. CD-ROM.

PAŠAVA J., VYMAZALOVÁ A., KNÉSL I. & *ACKERMAN L.* (2007): Studium distribuce Pt-kovů v ultrabazických horninách svitavské tíhové anomálie. – *Zprávy o geologických výzkumech v roce 2006*: 130–132. Praha.

PETRUŽÁLEK M., LOKAJÍČEK T., RUDAJEV V. & *VILHELM J.* (2008): Lokalizace jevů akustické emise v anizotropním prostředí. – *Transactions of the VSB – Technical University of Ostrava, Civil Engineering,* Series VIII, 2: 213–222. Ostrava.

PETRUŽÁLEK M., *VILHELM J.*, *LOKAJÍČEK T.* & *RUDAJEV V.* (2008): Changes of anisotropy of P-wave velocity propagation during deformation process of rock samples. – *28th European Conference on Acoustic Emission Testing, Krakow, September 17–19, 2008*:130–135. Kraków.

PŘIKRYL T. (2008): *Scopeloides glarisianus* (Gonostomatidae, Stomiiformes) na středně oligocénní lokalitě Rožnov pod Radhoštěm – Rysova hora. – *Zprávy o geologických výzkumech v roce 2007*:130–131. Praha

PRUNER P., *SCHNABL P.* & LUKENEDER A. (2008): Preliminary results of magnetostratigraphic investigations across the Jurassic/Cretaceous boundary strata in the Nutzhof, Austria. – *Berichte der Geologischen Bundesanstalt,* 74: 83–84. Wien.

RUDAJEV V. & *ŽIVOR R.* (Eds., 2008): *Proceedings of XXXI. Czech – Polish – Slovak Symposium on Mining and Environmental Geophysics*, Janov nad Nisou, September 24–27, 2007, Institute of Geology AS CR: 1–72. Praha.

SCHNABL P., *CAJZ V.*, *CHADIMA M.*, RAPRICH V., *ŠLECHTA S.* & *PRUNER P.* (2008): Magnetostratigrafický výzkum vulkanického komplexu Úhošť Doupovské hory). – *Acta Musei Turnoviensis*, 3: 55–58. Turnov.

SCHNABL P., LUKENEDER A. & *PRUNER P.* (2008): Preliminary results of magnetic mineralogy investigations of Upper Jurassic and Lower Cretaceous sediments from Nutzhof, Austria. – *Berichte der Geologischen Bundesanstalt,* 74: 98–99. Wien.

SIBLÍK M. WITH CONTRIBUTION BY LOBITZER H. (2008): A Jurassic Brachiopod fauna from the Mitterwand Area near Hallstatt (Upper Austria). – *Jahrbuch der Geologischen Bundesanstalt*, 148, 1: 59–87. Wien.

ŠIKULA J., MORI Y., *LOKAJÍČEK T.*, KOKTAVÝ P., MAJZNER J. & SEDLÁK P. (2008): Crack creation kinetics characterization by electromagnetic and acoustic emission. – *In*:

28th European Conference on Acoustic Emission Testing, Krakow, September 17–19, 2008: 118–123. Kraków.

SLAVÍK L., *HLADIL J.*, *KOPTÍKOVÁ L.*, CARLS P. & VALENZUELA-RÍOS J. (2008): Integrated stratigraphy of the Lower Devonian in the Barrandian area, Czech Republic: An introduction of the project, preliminary data. – *SDS Subcommission on Devonian Stratigraphy Newsletter*, 23: 71–74. Monster.

ŠTAMBERG S. & *ZAJÍC J.* (eds.) (2008): *Faunas and palaeoenvironments of the Late Palaeozoic.* – Special Publication to 5th Symposium on Permo-Carboniferous Faunas. Museum of Eastern Bohemia at Hradec Králové: 1–80. Hradec Králové.

ŠTEMPROK M., SEIFERT TH., HOLUB F.V., CHLUPÁČOVÁ M., DOLEJŠ D., *NOVÁK J.K., PIVEC E.* & *LANG M.* (2008): Petrology and geochemistry of Variscan dykes from the Jáchymov (Joachimsthal) ore district, Czech Republic. – *Journal of Geosciences*, 53, 1: 65–104.

ŠTORCH P. & KRAFT P. (Eds., 2008): *Workshop on Graptolite volume of Treatise on Invertebrate Paleontology and GWG Meeting. Abstract book and excursion guide*. – Geologický ústav AV ČR: 1–51. Praha.

SVOBODOVÁ M. (2008): To celebrate the 80th birthday of the outstanding scientist: Prof. RNDr. Blanka Pacltová, CSc. – *Acta Musei Nationalis*, *Series B, Historia Naturalis*, 64, 2–4: 49–51. Praha.

SVOBODOVÁ M. & *VAVRDOVÁ M.* (2008): *Spesovicornea pacltovae* gen. and sp. n., a new elateroid sporomorph from the Bohemian Cenomanian (Czech Republic). – *Acta Musei Nationalis, Series B, Historia Naturalis,* 64, 2–4: 133–138. Praha.

VAŘILOVÁ Z., *ADAMOVIČ J.* & BRZÁK P. (2008): Relikty jurských uloženin: Vápenka u Doubic. – *Minulosti Českého Švýcarska*, 5: 94–107. Krásná Lípa.

VAVRDOVÁ M. (2008): Proterozoic acritarchs from the Precambrian – Cambrian transition in southern Moravia (Měnín – 1 borehole, Czech Republic). – *Bulletin of Geosciences*, 83,1: 85–92.

ŽÁK K., SCHMELZOVÁ R., *HLAVÁČ J.*, GOTTFRIED L., URBÁNEK R., BRUTHANS J., SVĚTLÍK I. & MAJER M. (2008): Mlýn v Kodě – přírodovědné, historické a technické aspekty. – *Český kras*, XXXIV: 5–20. Beroun.

ŽIGOVÁ A., ŠŤASTNÝ M., *LOŽEK V.* & ŠREIN V. (2008): Soil cover of the protected areas of Prague as an indicator of environmental changes. – *Acta Research Reports*, 17: 21–25. Praha.

ŽIGOVÁ A., ŠŤASTNÝ, M. & KREJČOVÁ J. (2008): Vývoj půd na spraších v antropicky ovlivněných a chráněných územích Prahy. – *In:* Sobocká J. & Kulhavý J. (Eds.): *Sborník příspěvků. Půda v moderní informační společnosti*: 307–313. Bratislava. CD-ROM.

ŽIGOVÁ A., ŠŤASTNÝ M., KREJČOVÁ J. & *KOPTÍKOVÁ L* (2008): Diverzita půd v CHKO Krivoklátsko. – *In:* ROHOŠKOVÁ M. & JAKŠÍK O. (Eds.): *12. Pedologické dny na téma Antropogenní zatížení půd. Sborník příspěvků:* 164–171. Česká zemědělská univerzita. Praha. CD-ROM.

ZUPAN HAJNA N., MIHEVC A., *PRUNER P.* & *BOSÁK P.* (2008): Paleomagnetne datacije fluvialnih sedimentov iz Postojnske Jame, Zgube Jame in Planinske jame. – *Kras*, April 2008, 88: 40–45. Postojna.

Books and chapters in books

BOSÁK P. (2008): Bohemian Massif, Czech Republic. – *In:* PIEŃKOWSKI G., SCHUDACK M.E. (EDS.), BOSÁK P., EZAY R., FELDMAN-OLSZEWSKA A., GOLONKA J., GUTOWSKI J., HERNGREEN G.F.W., JORDÁN P., KROBICKI M., LATHUILIERE B., LEINFELDER R.R., MICHALÍK J., MÖNNING E., NOE-NYGAARD N., PÁLFY J., PINT A., RASSER M.W., REISDORF A.G., SCHMIDT D.U., SCHWEIGERT G., SORLYK F., WETZEL A. & WONG T.E.: Jurassic in McCann T. (Ed.): *The Geology of Central Europe, Vol. 2: Mesozoic and Cenozoic*: 899–890. The Geological Society. London.

BOSÁK P. (2008): Clays and sands in paleokarst. – *In: BOSÁK P.*, FORD D.C., GLAZEK J. & HORÁČEK I. (Eds.): *Paleokarst. A Systematic and Regional Review*: 431–442. Karst Waters Institute, Digital Reprint, DR-2.

BOSÁK P. (2008): Conclusions. – *In: BOSÁK P.*, FORD D.C., GLAZEK J. & HORÁČEK I. (Eds.): *Paleokarst. A Systematic and Regional Review*: 615-618. Karst Waters Institute, Digital Reprint, DR-2.

BOSÁK P. (2008): An introduction to karst-related mineral deposits. – *In: BOSÁK P.*, FORD D.C., GLAZEK J. & HORÁČEK I. (Eds.): *Paleokarst. A Systematic and Regional Review*: 367–375. Karst Waters Institute, Digital Reprint, DR-2.

BOSÁK P. (2008): Hydrogeological problems of opencast and underground mining of mineral deposits encountered during their exploration, development and exploitation stages. – *In: BOSÁK P.*, FORD D.C., GLAZEK J. & HORÁČEK I. (Eds.): *Paleokarst. A Systematic and Regional Review*: 511. Karst Waters Institute, Digital Reprint, DR-2.

BOSÁK P. (2008): Preface. – *In: BOSÁK P.*, FORD D.C., GLAZEK J. & HORÁČEK I. (Eds.): *Paleokarst. A Systematic and Regional Review*: 13–14. Karst Waters Institute, Digital Reprint, DR-2.

BOSÁK P. (2008): Problems of the origin and fossilization of karst forms. – *In: BOSÁK P.*, FORD D.C., GLAZEK J. & HORÁČEK I. (Eds.): *Paleokarst. A Systematic and Regional Review*: 577–598. Karst Waters Institute, Digital Reprint, DR-2.

BOSÁK P., FORD D.C. & GŁAZEK J. (2008): Terminology. – *In: BOSÁK P.*, FORD D.C., GLAZEK J. & HORÁČEK I. (Eds.): *Paleokarst. A Systematic and Regional Review*: 25–32. Karst Waters Institute, Digital Reprint, DR-2.

BOSÁK P., FORD D.C., GŁAZEK J. & HORÁČEK I. (2008): Introduction. – *In: BOSÁK P.*, FORD D.C., GLAZEK J. & HORÁČEK I. (Eds.): *Paleokarst. A systematic and Regional Review*: 19–21. Karst Waters Institute, Digital Reprint, DR-2.

BOSÁK P., FORD D.C., GŁAZEK J. & HORÁČEK I. (Eds.; 2008): *Paleokarst. A Systematic and Regional Review.* – Karst Waters Institute, Digital Reprint, DR-2: 1–728.

BOSÁK P., HORÁČEK I. & PANOŠ V. (2008): Paleokarst of Czechoslovakia. – *In: BOSÁK P.*, FORD D.C., GLAZEK J. & HORÁČEK I. (Eds.): *Paleokarst. A Systematic and Regional Review*: 107–135. Karst Waters Institute, Digital Reprint, DR-2.

CHÁB J., *BREITER K.*, FATKA O., *HLADIL J.*, KALVODA J., ŠIMŮNEK Z., *ŠTORCH P.*, VAŠÍČEK Z., *ZAJÍC J.* & ZAPLETAL J. (2008): *Stručná geologie základu Českého masivu a jeho karbonského a permského pokryvu*. – Vydavatelství České geologické služby: 1–284. Praha.

CHÁB J. & *ZAJÍC J.* (2008): Paleozoikum povariské platformy v Českém masivu a jeho blízkém okolí – svrchní perm. – *In*: CHÁB J., *BREITER K.*, FATKA O., *HLADIL J.*, KALVODA J., ŠIMŮNEK Z., *ŠTORCH P.*, VAŠÍČEK Z., *ZAJÍC J.* & ZAPLETAL J.: *Stručná geologie základu Českého masivu a jeho karbonského a permského pokryvu*: Vydavatelství České geologické služby: 201. Praha.

DOBRORUKOVÁ J., GUTZEROVÁ N., CHOCHOLOUŠKOVÁ Z., KUČERA T.Č. & *MIKULÁŠ R.* (2008): *Přírodopis: Inspirace a projekty. 100 námětů pro tvořivou výuku*. – Scientia: 1–203. Praha.

DRVOTOVÁ M., *HLAVÁČ J.Č.*, HORSÁK M., BERAN L., DVOŘÁK L., JUŘIČKOVÁ L. & MÜCKSTEIN P. (2008): *Měkkýši (Mollusca) Žďárských vrchů*. – Parnassia, 3: 1–79. Agentura Ochrany přírody a krajiny České republiky, CHKO Žďárské vrchy. Žďár nad Sázavou.

FATKA O. & *HLADIL J.* (2008): Kambrium. – *In*: CHÁB J., *BREITER K.*, FATKA O., *HLADIL J.*, KALVODA J., ŠIMŮNEK Z., *ŠTORCH P.*, VAŠÍČEK Z., *ZAJÍC J.* & ZAPLETAL J.: *Stručná geologie základu Českého masivu a jeho karbonského a permského pokryvu*: 117–119. Vydavatelství České geologické služby. Praha.

GŁAZEK J., *BOSÁK P.* & FORD D.C. (2008): Paleokarst as a problem. – *In: BOSÁK P.*, FORD D.C., GLAZEK J. & HORÁČEK I. (Eds.): *Paleokarst. A Systematic and Regional Review*: 23. Karst Waters Institute, Digital Reprint, DR-2.

HLADIL J. (2008): Devon. – *In*: CHÁB J., *BREITER K.*, FATKA O., *HLADIL J.*, KALVODA J., ŠIMŮNEK Z., *ŠTORCH P.*, VAŠÍČEK Z., *ZAJÍC J.* & ZAPLETAL J.: *Stručná geologie základu Českého masivu a jeho karbonského a permského pokryvu*: 126–135. Vydavatelství České geologické služby. Praha.

HLADIL J. & CHÁB J. (2008): Povaha paleozoických faun a sedimentačních systémů. – *In*: CHÁB J., *BREITER K.*, FATKA O., *HLADIL J.*, KALVODA J., ŠIMŮNEK Z., *ŠTORCH P.*, VAŠÍČEK Z., *ZAJÍC J.* & ZAPLETAL J.: *Stručná geologie základu Českého masivu a jeho karbonského a permského pokryvu*: 117–140. Vydavatelství České geologické služby. Praha.

HLADIL J., KALVODA J. & ZAPLETAL J. (2008): Spodní karbon, do konce visé. – *In*: CHÁB J., *BREITER K.*, FATKA O., *HLADIL J.*, KALVODA J., ŠIMŮNEK Z., *ŠTORCH P.*, VAŠÍČEK Z., *ZAJÍC J.* & ZAPLETAL J.: *Stručná geologie základu Českého masivu a jeho karbonského a permského pokryvu*: 135–139. Vydavatelství České geologické služby. Praha.

MIKULÁŠ R. (2008): Xylic substrates at the fossilisation barrier: oak trunks (*Quercus* sp.) in the Holocene sediments of the Labe River, Czech Republic. – *In:* WISSHAK M. & TAPANILA L. (Eds.): *Current developments in bioerosion*: 415–429. Springer. Berlin, Heidelberg.

ŠTAMBERG S. & *ZAJÍC J.* (2008): *Carboniferous and Permian faunas and their occurrence in the limnic basins of the Czech Republic*. – Muzeum východních Čech v Hradci Králové: 1–224. Hradec Králové.

ŠTAMBERG S., *ZAJÍC J.*, MARTÍNEK K., PROUZA V. & ŠIMŮNEK Z. (2008): Excursion guide – Krkonoše Piedmont Basin and Boskovice Graben. – *In:* ŠTAMBERG S. & *ZAJÍC J.* (Eds.): *Faunas and palaeoenvironments of the Late Palaeozoic*: 57–77. Hradec Králové.

ŠTORCH P. (2008): Silur. – *In*: CHÁB J., *BREITER K.*, FATKA O., *HLADIL J.*, KALVODA J., ŠIMŮNEK Z., *ŠTORCH P.*, VAŠÍČEK Z., *ZAJÍC J.* & ZAPLETAL J.: *Stručná geologie základu Českého masivu a jeho karbonského a permského pokryvu*: 121–125. Vydavatelství České geologické služby. Praha.

ŠTORCH P. & *HLADIL J.* (2008): Ordovik. – *In*: CHÁB J., *BREITER K.*, FATKA O., *HLADIL J.*, KALVODA J., ŠIMŮNEK Z., *ŠTORCH P.*, VAŠÍČEK Z., *ZAJÍC J.* & ZAPLETAL J.: *Stručná geologie základu Českého masivu a jeho karbonského a permského pokryvu*: 119–121. Vydavatelství České geologické služby. Praha.

ZAJÍC J. (2008): Perm. – *In*: CHÁB J., *BREITER K.*, FATKA O., *HLADIL J.*, KALVODA J., ŠIMŮNEK Z., *ŠTORCH P.*, VAŠÍČEK Z., *ZAJÍC J.* & ZAPLETAL J.: *Stručná geologie základu Českého masivu a jeho karbonského a permského pokryvu*: Vydavatelství České geologické služby: 172–174. Praha.

ZAJÍC J. & VAŠÍČEK Z. (2008): Svrchní karbon – pennsylvan. – *In*: CHÁB J., *BREITER K.*, FATKA O., *HLADIL J.*, KALVODA J., ŠIMŮNEK Z., *ŠTORCH P.*, VAŠÍČEK Z., *ZAJÍC J.* & ZAPLETAL J.: *Stručná geologie základu Českého masivu a jeho karbonského a permského pokryvu*: Vydavatelství České geologické služby: 170–172. Praha.

ZAJÍC J., VAŠÍČEK Z. & *HLADIL J.* (2008): Nejmladší spodní karbon – spodní namur. – *In*: CHÁB J., *BREITER K.*, FATKA O., *HLADIL J.*, KALVODA J., ŠIMŮNEK Z., *ŠTORCH P.*, VAŠÍČEK Z., *ZAJÍC J.* & ZAPLETAL J.: *Stručná geologie základu Českého masivu a jeho karbonského a permského pokryvu*: Vydavatelství České geologické služby: 1–140. Praha.

ZUPAN HAJNA N., MIHEVC A., *PRUNER P.* & *BOSÁK P.* (2008): *Palaeomagnetism and Magnetostratigraphy of Karst Sediments in Slovenia*. – Carsologica, 8: 1–266. Založba ZRC SAZU. Postojna–Ljubljana.

5c. Electronic media 2007

BRITTON T., ANDERSON C., JACQUET D., LUNDQVIST S., BREMER K. & *ČEJCHAN P.* (2007): 9PATHd8 – a program for phylogenetic dating of large trees on Plan 9 OS. – computer program. http://plan9.bell-labs.com/sources/contrib/pac/sys/src/cmd/bio/

ČEJCHAN P. (2007): Raw2qap: a program to convert raw abundance data to input for a Quadratic Assignment Problem, to solve for environmental gradient. – computer program. http://cm.bell-labs.com/sources/contrib/pac/sys/src/cmd/bio/

ČEJCHAN P. (2007): 9fitch: a program to do phylogenetic analysis by Fitch's method. – computer program. http://cm.bell-labs.com/sources/contrib/pac/sys/src/cmd/bio/
ČEJCHAN P. (2007): RGB – a package of programs for exact color analysis. – computer program. http://cm.bell-labs.com/sources/contrib/pac/sys/src/cmd/img/
ČEJCHAN P. (2007): RadBib: A bibliography of Radiolaria: taxonomy and occurrences, 1838-2006. – citation database. http://www.gli.cas.cz/home/cejchan/db/radbib/index.html
ČEJCHAN P. (2007): Tools for the "Partial Importance Sampler", a software for phylogenetic analysis. – software. http://cm.bell-labs.com/sources/contrib/pac/rc/bin
ČEJCHAN P. & TAILLARD E. (2007): QAP – a package of programs to solve the Quadratic Assignment Problem under Plan 9. – computer program. http://plan9.bell-labs.com/sources/contrib/pac/sys/src/cmd/math/
ČEJCHAN P. & BRAUN A. (2007): Middle Tournaisian Radiolaria from phosphatic nodules of Mokrá, Moravia, CZ. – Web presentation of results. http://www.gli.cas.cz/home/cejchan/research/mokra/index.html
HAESELER A. VON, MEYER S. & *ČEJCHAN P.* (2007): Parat – a program to infer phylogeny and site-specific evolutionary rates on Plan 9 OS. – computer program. http://plan9.bell-labs.com/sources/contrib/pac/sys/src/cmd/bio
HLADIL J. (2007): Czech National Commitee for International Geoscience Programme – IGCP. 2007. – Website maintenance, publishing the new data, factual reports and agenda. http://home.gli.cas.cz/hladil/igcp/Default.htm
REVELL L. & *ČEJCHAN P.* (2007): IDC : a program for the calculation of independent contrasts on Plan 9 OS. – computer program. http://plan9.bell-labs.com/sources/contrib/pac/sys/src/cmd/bio/
REVELL L. & *ČEJCHAN P.* (2007): Multi_mantel : a program for multiple matrix regression and hypothesis testing for Plan 9. – computer program. http://plan9.bell-labs.com/sources/contrib/pac/sys/src/ape/cmd/bio/
REVELL L. & *ČEJCHAN P.* (2007): Skewers: a program for Cheverud's random skewers method of matrix comparison for Plan 9. – computer program. http://plan9.bell-labs.com/sources/contrib/pac/sys/src/ape/cmd/bio/
REVELL L. & *ČEJCHAN P.* (2007): T-method: a program for Roff's T-method of matrix comparison on Plan 9 OS. – computer program. http://plan9.bell-labs.com/sources/contrib/pac/sys/src/cmd/bio/
RONQUIST F., HUELSENBECK J.P. & *ČEJCHAN P.* (2007): 9MrBayes: a program for the Bayesian estimation of phylogeny. – computer program. http://cm.bell-labs.com/sources/contrib/pac/sys/src/ape/cmd/bio/
STRIMMER K., SCHMIDT H.A., VINGRON M., HAESELER A VON. & *ČEJCHAN P.* (2007): 9TREE-PUZZLE: a computer program to reconstruct phylogenetic trees. – computer program. http://cm.bell-labs.com/sources/contrib/pac/sys/src/ape/cmd/bio/
WIGNALL P.B. & *ČEJCHAN P.* (2007): Permian Radiolaria of the Fantasque Fm., Ursula Creek, Canada. – Web presentation of scientific research. http://www.gli.cas.cz/home/cejchan/research/ursula/index.html
ZAJÍC J. (2007): 5th Symposium on Permo-Carboniferous Faunas 2008. – Official web page of the sympozium. http://www.gli.cas.cz/shk/SymposiumHK.htm

5d. Electronic media 2008

ČEJCHAN P. (2008): Dms: a simple utility to convert geographic data from the GPS. – computer program. http://plan9.bell-labs.com/sources/contrib/pac/sys/src/cmd/geo/ dms.tbz
ČEJCHAN P. (2008): Libolorspace: A C-library to convert an image representation between different colorspaces. – computer library. https://sourceforge.net/projects/libcolorspace/
ČEJCHAN P. (2008): Mpp: a simple utility to compute scale of SEM images. – computer program. http://plan9.bell-labs.com/sources/contrib/pac/sys/src/cmd/util/ mpp.tbz
ČEJCHAN P. (2008): Netpbmutils: image manipulation and enhancement scripts using the netpbm library. – computer programs package. http://plan9.bell-labs.com/sources/contrib/pac/rc/bin/netpbmutils.tar.bz2
ČEJCHAN P. (2008): Paleobiology Source Code Archive: matrix and vector operation library. – computer library. http://paleodb.org/paleosource/code.php?stage=download&project_no=24
ČEJCHAN P. (2008): RadBib 2007: A bibliography of Radiolaria: taxonomy and occurrences, published in 2007. – reference database. http://www.gli.cas.cz/home/cejchan/db/radbib/2007.html
ČEJCHAN P. (2008): Stratigraphic Server 2008. – database, webserver. http://www.gli.cas.cz/home/cejchan/db/StratServ/2008.htm
FLEGR J., ZÁBOJ P. & *ČEJCHAN P.* (2008): Treept: a program for permutation testing of concordance between phylogeny and the distribution of phenetic traits, ported to Plan 9 OS. – computer program. http://plan9.bell-labs.com/sources/contrib/pac/sys/src/ape/cmd/bio/ Treept.tbz
HLADIL J. (2008): Czech National Commitee for International Geoscience Programme – IGCP. 2008. – Website maintenance, publishing the new data, factual reports and agenda. http://home.gli.cas.cz/hladil/igcp/Default.htm
HLADIL J. (2008): The Devonian MS and GRS reference section Moravian Karst (Middle to Upper Devonian, upper Eifelian to uppermost Frasnian): the latest stratigraphically up-dated version based on the 2005-IJES data. – Electronic database maintenance, a stratigraphically updated data on the reference section for international use. http://home.gli.cas.cz/hladil/www/moravia-ms-grs-2005.htm
HLADIL J. (2008): An interdisciplinary research project on particulates and sediments: The Stromatactis Page. 2008. – The data about research project, documents and illustrations. http://home.gli.cas.cz/hladil/www/strmtc1.htm

HLADIL J. & KONDZIOLKA J. (2008): Jednoduchý návod ke sběru prachu. http://www.ian.cz/detart_fr.php?id=2808

KONDZIOLKA J., *HLADIL J.*, *LISÁ L.* & ŠÁLEK M. (2008): Odkud spadl prach Severní Moravě? (March 12, 2008). http://www.ian.cz/detart_fr.php?id=2809

LANGROVÁ A. & *HLADIL J.* (2008): Prachový sediment Karviná (12. březen 2008). http://kojan.ian.cz/c/big/prach.html

LISÁ L., *HLADIL J.* & KONDZIOLKA J. (2008): Prach Ukrajiny – rozřešení!. http://www.ian.cz/detart_fr.php?id=2825

MIKULÁŠ R. (2008): Změny klimatu. In: Mezinárodní rok planety Země. http://nts1.cgu.cz/mrpz, http://www.geology.cz/rok-zeme/dokumenty/mrpz-vystava-poster-zmeny-klimatu.pdf

MIKULÁŠ R. (2008): Horský pramínek v Praze. http://fotopribeh.avcr.cz/?p=gal&id=65-2

MAREŠ P., ŠLECHTOVÁ A., *SCHNABL P.* (2008): Jak to bylo s českou přírodou. – Výukové DVD. Univerzita Karlova v Praze, Scientica Agency s.r.o., Praha.

ZAJÍC J. (2008): Paleoecology, Paleogeography, Stratigraphy and Climatic Changes of the Upper Stephanian (Gzhelian) of the Central and Western Bohemian Basis. – Web presentation of the grant project of the Grant Agency of Sciences of the Czech Republic. http://www.gli.cas.cz/IAA300130703/Projekt IAA300130703.htm.

5e. Extended abstracts and abstracts 2007

ACKERMAN L., PUCHTEL I., WALKER R. & JELÍNEK E. (2007): Re-Os depth profile of the upper mantle beneath Central Europe. – *17th Annual V.M. Goldschmidt Conference 2007, The Geochemical Society and EAG, Cologne, Germany, August 20–24, Geochimica et Cosmochimica Acta*, 71, 15: A4.

ADACHI T. & *KLETETSCHKA G.* (2007): Using oxygen isotope and magnetism to reconstruct the paleotemperature framework of the ancient travertine deposits in Death Valley, CA. – *17th Annual V.M. Goldschmidt Conference 2007, The Geochemical Society and EAG, Cologne, Germany, August 20–24, Geochimica et Cosmochimica Acta*, 71, 15: A 5. Cologne.

ADACHI T., *KLETETSCHKA G.* & MIKULA V. (2007): Frequency Dependent Susceptibility Analysis of Magnetic Carriers: Application to Fe-Oxides on Mars surface. – *2007 American Geophysical Union Fall Meeting, San Francisco, USA, December 10–14, Eos Trans. AGU, 88(52), Fall Meet. Suppl., Abstract:* GP21A-0119. San Francisco.

ADACHI T., *KLETETSCHKA G.*, CHAN M., MIKULA V., *ADAMOVIČ J.*, *PRUNER P.*, *SCHNABL P.* & WASILEWSKI P. (2007): High field remagnetization of hematite concretions from Utah, USA and Czech Republic. – *38th Lunar and Planetary Science Conference, Lunar and Planetary Institute, Houston, TX, USA, April 12–16, Lunar and Planetary Science,* XXXVIII, 1101: 1–2. Houston.

ADACHI T., *KLETETSCHKA G.*, MIKULA V., CHAN M., *ADAMOVIČ J.*, HERRERO-BERVERA E. & FULLER M. (2007): Testing the origin of Martian ‚blueberries': magnetic measurements may be key to the answer. – *Rocky Mountain Section – 59th Annual Meeting, Geological Society of America, St. George, Utah, May 7–9, Proc. Geol. Soc. Amer., Rocky Mountain Section – 59th Annual Meeting*: 2pp. St. George.

ADACHI T., *KLETETSCHKA G.*, WASILEWSKI P.J. & MIKULA V. (2007): Magnetic Signatures of Impact Fractured Rocks from Sierra Madera, Texas, USA - Implications to Magnetic Anomalies on Mars. – *2007 Joint Assembly, American Geophysical Union, Acapulco, Mexico, May 22–25. Eos Trans. AGU, 88(23), Jt. Assem. Suppl., Abstract:* P41A-02. Acapulco.

BELLA P., *BOSÁK P.*, GŁAZEK J., HERCMAN H., *KADLEC J.*, KICIŃSKA D., KOMAR M., KUČERA M. & *PRUNER P.* (2007): Datovanie výplní Belianskej jaskyne: geochronologické záznamy jej genézy. – *Aragonit*, 12: 127–128. Liptovský Mikuláš.

BOSÁK P. (2007): Time and karst: some considerations. – *Acta carsologica*, 36, 1: 207–208. Postojna.

BOSÁK P. (2007): Time and karst: some considerations. – *Karst Waters Institute, Special Publication*, 12 *(Time in Karst)*: 207–208.

BOSÁK P. & *PRUNER P.* (2007): Magnetostratigraphy of Cave Sediments. – *EOS Trans. AGU, 88, 23, Jt. Assem. Suppl., Abstracts*: GP52A-04. Acapulco.

BOSÁK P. & *PRUNER P.* (2007): Magnetostratigraphy of Cave Sediments: Experience from Europe. – *Conference and Activities Program. I Congreso FEPUR/V Congreso FEALC 2007: Discovering the underground world of Latin America and the Caribbean*: 96. Univ. de Puerto Rico.

BOSÁK P., ZUPAN HAJNA N., MIHEVC A. & *PRUNER P.* (2007): Time recorded in cave deposits – 10 years of paleomagnetic research in Slovenian caves. – *Gudebook & Abstracts. Karst and Cryokarst. 25th Speleological School. 8th GLACKIPR Symposium. Sosnowiec–Wrocław, Poland, March 19–26, 2007*: 77–78. Sosnowec–Wroław.

BREITER K. (2007): Dvojslídné granity plutonu Plechého na Trojmezí České republiky, Německa a Rakouska. – *In: BREITER K.* (Ed.): *3. Sjezd České geologické společnosti, Česká geologická společnost, Volary, September 19–22. Sborník abstrakt a exkurzní průvodce*: 104–111. Praha.

BREITER K. (2007): Glimerit – neobvyklá surovina šumavských kameníků. – *In: BREITER K.* (Ed.): *3. Sjezd České geologické společnosti, Česká geologická společnost, Volary, September 19–22. Sborník abstrakt a exkurzní průvodce*: 12. Praha.

CARLS P. & *SLAVÍK L.* (2007): Zonation concept in stratigraphic correlation – a discussion. – *In:* ZLINSKÁ A. (Ed.): *8. Paleontologická konferencia, Štátny geologický ústav Dionýza Štúra, Bratislava, June 14–15, Zborník abstraktov*: 30. Bratislava.

CARLS P., *SLAVÍK L.* & VALENZUELA-RÍOS J. (2007): Pridolian to Mid-Lochkovian Biostratigraphic time marks in

Bohemia. – *In:* OVER D.J. & MORROW J. (Eds.): *Subcommission on Devonian Stratigraphy and IGCP 499 Devonian Land Sea Interaction, Eureka, NV, September 9–18, Program and Abstracts*: 24–25. Geneseo.

CARLS P., *SLAVÍK L.* & VALENZUELA-RÍOS J. (2007): Succession of Biostratigraphic marks for the Early Emsian. – *In:* OVER D.J. & MORROW J. (Eds.): *Subcommission on Devonian Stratigraphy and IGCP 499 Devonian Land Sea Interaction, Eureka, NV, September 9–18, Program and Abstracts*: 22–23. Geneseo.

ČEJCHAN P. (2007): Coenocline reconstruction using graph theory and Bayesian probability data generator. – *In:* BALLENTINE CH. & MUNDELL C. (Eds.): *United Kingdom – Visegrad Four Frontiers of Science Symposium, Royal Society, Krakow, March 21–23, Abstract volume*: 1–2. Kraków.

ČEJCHAN P. (2007): Reconstruction of presumed environmental/time gradient from fossil assemblages – *In:* ZLINSKA A. (Ed.): *8. Paleontologická konferencia, GÚDŠ, Bratislava, June 15–16, Book of Conference Abstracts*: 31. Bratislava.

CHADIMA M., *CAJZ V.* & HROUDA F. (2007): Normal and inverse magnetic fabric in dikes and sills (Eger Graben, NW Czech Republic). – *IUGG XXIV General Assembly, International Union of Geodesy and Geophysics, Perugia, Italy, July 2–13, 2007*: No. 7740. Perugia.

CHADIMA M., CHLUPÁČOVÁ M., ŽÁČEK M., SKÁLA R. & HROUDA F. (2007): Some unusual magnetic minerals found in palaeo-slags, North Bohemian Browncoal basin; their termomagnetic and low field characteristics. – *IUGGXXIV General Assembly, International Union of Geodesy and Geophysics, Perugia, Italy, July 2–13, 2007*: No. 7754. Perugia.

CHADIMA M., *KADLEC J.*, POKORNÝ J. & HROUDA F. (2007): On detection of small changes in frequency-dependent magnetic susceptibility of weakly magnetic sediments: implications for magnetic granulometry. – *AGU Fall Meeting 2007, American Geophysical Union, San Francisco, USA, December 10–14, Eos Trans. AGU, 88 (52), Fall Meet. Supll., Abstract*: GP53B-1212. San Francisco.

CIFELLI F., MATTEI M., *CHADIMA M.*, LENSER S. & HIRT A.M. (2007): The importance of the AMS analysis for reconstructing the tectonic history in weakly deformed sediments. – *IUGGXXIV General Assembly, International Union of Geodesy and Geophysics, Perugia, Italy, July 2–13:* No. 8012. Perugia, Italy.

ČÍŽ R. & *RUDAJEV V.* (2007): Fractal Analysis of Ultrasonic Emission in Compressed Rocks. – *Proceedings of 69th EAGE Conference & Exhibition incorporating SPE EUROPEC 2007, London, June 10–15*, Z-99. London. [CD ROM].

DULAI A., SCHLÖGL J., *SIBLÍK M.*, SZABÓ J., SZENTE I., VÖRÖS A. & MANDL G.W. (2007): Der Hierlatzkalk der Plankerau bei Bad Mitterndorf und sein geologisches Umfeld (SW. Totes Gebirge, Oesterreich). – *In:* HUBMANN B. & GROSS M. (Eds.): *13. Jahrestagung der Oesterr. Paläont. Gesellschaft, Bad Mitterndorf, August 31–September 2, Conference abstracts*: 5. Bad Mitterndorf.

GILÍKOVÁ H., BURIÁNEK D., FILIPIAK P., HANŽL P., *HLADIL J.*, JACHOWICZ M. & OTAVA J. (2007): Konečně... aneb co vše nám vypověděly sedimenty na výchoze ‚Lanovka' (Tišnov-Předklášteří). – *In:* FAMĚRA M. & KROPÁČ K. (Eds.): *Moravian-Silesian Palaeozoic 2007, Olomouc, March 8, Sborník abstraktů:* 10–11. Olomouc.

HAVELKOVÁ, P., HERREL, A., AERTS, P. & *ROČEK Z.* (2007): Origin of anuran jumping locomotion: inference from functional morphology and comparative anatomy. – *Abstracts of the 8th International Congress of Vertebrate Morphology, Paris, July 2007*: 51.

HLADIL J., *KOPTÍKOVÁ L.*, *GERŠL M.*, *LANGROVÁ A.*, *PRUNER P.*, *GALLE A.*, BÁBEK O., FRÁNA J., OTAVA J. & *CHADIMA M.* (2007): A multiple-parameter approach to analyzing the mid-punctata zone anomalous signatures in pure limestones (Moravian Karst, Brunovistulian terrane, central Europe). – *In:* OVER D.J. & MORROW J. (Ed): *Subcommission on Devonian Stratigraphy and IGCP 499 Devonian Land Sea Interaction, Eureka, NV, 2007, September 9–18, Program and Abstracts:* 42–45. Geneseo.

HOJDOVÁ M., *NAVRÁTIL T.* & *ROHOVEC J.* (2007): Mercury distribution and speciation in soils affected by historic mercury mining in the Czech Republic. – *In:* STŘELCOVÁ K., ŠKVARENINA J. & BLAŽENEC M. (Eds.): *International Scientific Conference Bioclimatology and Natural Hazards, Slovenská bioklimatologická společnost, Poľana nad Detvou, Slovenská republika, September 17–20, Proceedings:* 73. Poľana nad Detvou.

HORÁČEK I., MIHEVC A., ZUPAN-HAJNA N., *PRUNER P.* & *BOSÁK P.* (2007): Biostratigrafické a paleomagnetické doklady starších fází krasovění v oblasti klasického Krasu (Slovinsko). – *In:* ROSZOKOVÁ A. & IVANOV M. (Eds.): *13. Kvartér 2007, Brno, November 27, Sborník abstrakt*: 12. Brno.

KLETETSCHKA G. & ADACHI T. (2007): Magnetic/isotopic characteristic of the spherule-rich impact ejecta blanket from the Chicxulub crater: analog for robotic exploration of similar deposits on Mars. – *Rocky Mountain Section – 59th Annual Meeting, Geological Society of America, St. George, Utah, May 7–9, Proc. Geol. Soc. Amer., Rocky Mountain Section – 59th Annual Meeting*: 2pp. St. George.

KLETETSCHKA G., ADACHI T., *ADAMOVIČ J.*, MIKULA V. & CHAN M. (2007): Utah and Czech Mars analog concretions; Aquatic hematite and goethite characterization. – *17th Annual V.M. Goldschmidt Conference 2007, The Geochemical Society and EAG, Cologne, Germany, August 20–24, Geochimica et Cosmochimica Acta*, 71, 15: A 493, Cologne.

KLETETSCHKA G., ADACHI T. & MIKULA V. (2007): Electromagnetic spacecraft used for magnetic navigation within asteroid belt, mining concepts and asteroid magnetic classification. – *38th Lunar and Planetary Science Conference, Houston, TX, USA, April 12–16, Lunar and Planetary Science,* XXXVIII: 1093. Houston.

KLETETSCHKA G., MIKULA V., ADACHI T. & FULLER M. (2007): Preliminary non-invasive measurement of magnetic susceptibility of the frontal lobe: a possible antecedent marker for Alzheimer's disease. – *2007 American Geophysical Union Fall Meeting, American Geophysical Union, San Francisco, USA, December 10–14, Eos Trans. AGU, 88(52), Fall Meet. Suppl., Abstract*: B33C-1440. San Francisco.

KLETETSCHKA G., ZBORIL R., ADACHI T., MIKULA V., HERMANEK M. & WASILEWSKI P. (2007): New insight into the origin of anomalous magnetism of titanohematite lamellae in rhombohedral oxide assemblages -consequence for Mars magnetism. *– 2007 Joint Assembly, American Geophysical Union, Acapulco, Mexico, May 22–25, Eos Trans. AGU, 88 (23), Jt. Assem. Suppl., Abstract:* GP 33A-07. Acapulco.

KOBAYASHI T., HIRAJIMA T., HIROI Y. & *SVOJTKA M.* (2007): Raman and cathodoluminescence (CL) study of zircon inclusions derived from Gföhl felsic rocks in the Moldanubian Zone, Czech Republic. *– 17th Annual V.M. Goldschmidt Conference 2007, The Geochemical Society and EAG, Cologne, Germany, August 20–24, Geochimica et Cosmochimica Acta*, 71, 15, Supplement 1: 499. Cologne.

KODEŠOVÁ R., KOČÁREK M., KODEŠ V., KOZÁK J. & *ŽIGOVÁ A.* (2007): Impact of varying micromorphology on water flow and solute transport. *– EGU General Assembly 2007, EGU, Vienna, May 15–20. Geophysical Research Abstract, Vol. 9*: SRef-ID: 1607–7962/gra/EGU2007-A03477 on CD ROM. Vienna.

KOHOUT T., *KLETETSCHKA G.* & PESONEN L.J. (2007): Identification of the Shock Effects in the the Avanhandava H4 Chondrules Based on the Coercivity Spectra of the Remanent Magnetization. *– 38[th] Lunar and Planetary Science Conference, Lunar and Planetary Institute, Houston, TX, USA, April 12–16, Lunar and Planetary Science*, XXXVIII: No. 1773. Houston.

KOHOUT T., KOSTEROV A., JACKSON M., PESONEN L.J., *KLETETSCHKA G.* & LEHTINEN M. (2007): Daubreelite and troilite as a source of cometary and minor body magnetism in cold environment. *– 70[th] Annual Meteoritical Society Meeting, The Meteoritical Society, Tuscon, USA, August 13–17, Meteoritics and Planetary Science, Supplement*, 42, 8: A 85. Tuscon.

KOHOUT T., KOSTEROV A., JACKSON M., PESONEN L.J., LEHTINEN M. & *KLETETSCHKA G.* (2007): Low-temperature magnetic properties of the Neuschwanstein EL6 meteorite. *– IUGG XXIV General Assembly, International Union of Geodesy and Geophysics, Perugia, Italy, June 2–13*: No. 3138. Perugia.

KOPTÍKOVÁ L., *HLADIL J.*, *SLAVÍK L.* & FRÁNA J. (2007): The precise position and structure of the Basal Choteč Event: lithological, MS-and-GRS and geochemichal characterization of the Emsian-Eifelian carbonate stratal successions in the Prague Syncline (Teplá-Barrandian unit, Central Europe). *– In:* OVER D.J. & MORROW J. (Eds.): *Subcommission on Devonian Stratigraphy and IGCP 499 Devonian Land Sea Interaction, Eureka, NV, 2007, San Diego State University & SUNY-Geneseo, Eureka, September 9–18. SDS & IGCP 499 Eureka NV 2007 Program and Abstracts:* 55–57. Geneseo.

KOSTEROV A., *KOHOUT T.*, JACKSON M., *KLETETSCHKA G.* & LEHTINEN M. (2007): Low temperature Magnetic Properties of Daubreelite, Troilite and Enstatite Chondrites. *– 2007 American Geophysical Union Fall Meeting, American Geophysical Union, San Francisco, USA, December 10–14, Eos Trans. AGU, 88(52), Fall Meet. Suppl., Abstract:* GP24A-06. San Francisco.

KRÁLOVEC, K. & *ROČEK Z.* (2007): Development of the anterior part of skull in the Anura. *– Abstracts of the 8[th] International Congress of Vertebrate Morphology, Paris, July 2007*: 68

KUBÍNOVÁ P., *NAVRÁTIL T.* & *SKŘIVAN P.* (2007): The Role of Vegetation in Hydrochemical Cycles of Selected Transition Metals. *– In:* STŘELCOVÁ K., ŠKVARENINA K. & BLAŽENEC M. (Eds.): *Bioclimatology and natural hazards, Slovenská bioklimatologická spoločnost, Zvolen – Poľana nad Detvou, September 17–20. Proceedings:* 114. Zvolen.

KUČERA J. & *NOVÁK J.K.* (2007): Petrographical and elemental characterization of the sandstones used in the construction of the Angkor monuments. *– International Conference ICC 07, Center for Khmer Studies, Siem Reap, June 5–6, Book of Conference Abstracts*: p. 86. Siem Reap.

KUČERA J., *NOVÁK J.K.* & *LANG M.* (2007): INAA and petrological study of sandstones from the Angkor monuments. *– MTAA-12 (Modern Trends in Activation Analysis), JSA - Japanese Goverment Team for Safeguarding Angkor, Tokyo, September 16–22*: 31. Tokyo.

KULAVIAK L., VEČEŘ M., RŮŽIČKA M., DRAHOŠ J. & *HLADIL J.* (2007): Patterns in sedimentary deposits of geomaterials. *– 54[th] Conference on Chemical and Process Engineering CHISA 2007, Srní na Šumavě, October 15–18, Book of Conference Abstracts*: 260. Prague.

KULAVIAK L., VEČEŘ M., RŮŽIČKA M., DRAHOŠ J. & *HLADIL J.* (2007): Rheological properties of geological material. *– 4[th] Annual European Rheology Conference (AERC 2007), Napoli, May 12–14, Book of Abstracts, Industrial Rheology and Processing*: 269. Napoli.

KULAVIAK L., VEČEŘ M., RŮŽIČKA M., DRAHOŠ J. & *HLADIL J.* (2007): Rheology of liquid–solid system. *– 54[th] Conference on Chemical and Process Engineering CHISA 2007, Srní na Šumavě, October 15–18. Book of Conference Abstracts*: 261. Prague.

KULAVIAK L., VEČEŘ M., RŮŽIČKA M. & *HLADIL J.* (2007): Rheology features of geological dispersions. *– 34[th] International Conference of Slovak Society of Chemical Engineering, Tatranské Matliare, Slovakia, May 21–25. Proceedings*: 75. Bratislava, Slovakia.

KULAVIAK L., VEČEŘ M., RŮŽIČKA M., *HLADIL J.* & DRAHOŠ J. (2007): Flow behaviour of model suspensions. *– 34[th] International Conference of Slovak Society of Chemical Engineering, Tatranské Matliare, Slovakia, May 21–25, Proceedings*: 125. Bratislava.

KVAČEK J. & *DAŠKOVÁ J.* (2007): Nové výsledky výzkumu křídových kapradin z čeledi Matoniaceae. *– 8. Paleontologická konferencia, Bratislava, June 14–15, Book of Conference Abstracts*: 60. Bratislava.

LOBITZER H., BUDAI T., DULAI A., HAAS J., HRADECKÁ L., KVAČEK J., MAYR M., MINDSZENTY A., MONOSTORI M., OTTNER F., PIROS O., SCHLAGINTWEIT F., *SIBLÍK M.*, *SVOBODOVÁ M.*, SZABO J., SZENTE I., ŠVÁBENICKÁ L., VÖRÖS A. & ZORN I. (2007): Neue Ergebnisse zur Geologie des Salzkammergutes im Rahmen der bilateralen Zusammenarbeit der Geologischen Bundesanstalt mit den Nachbarnländern. *– 13. Jahrestagung der Österrischen Paläontologische Gesellschaft, Bad Mittern-*

dorf, August 31 – September 2, Conference abstracts: 13-18. Bad Mitterndorf.

MACHADO G., *VAVRDOVÁ M*., FONSECA P., CHAMINÉ H., & ROCHA P.T. (2007): Palynomorphs from the metasediments of the Bemposta-Minhoteira sector (Albergaria-a-Nova area, Ossa Morena zone, W Portugal). – *CIMP Lisbon 07, Joint meeting of spore/pollen and acritarch subcommissions. Lisbon, Portugal, 24-28 September*: 25–28.

MIKULÁŠ R. (2007): Fossil root traces and root-generated biogenic structures as objects studied by paleoichnology. – *In:* DAŠKOVÁ J. (Ed.): *Palaeobotany – contributions to the evolution of plants and vegetation (recognizing the contribution of Zlatko Kvaček on the occasion of his 70th year), Prague, June 28–29*: 39–40. Praha.

NORBERG N., NASDALA L., KOŠLER J., *SLÁMA J.*, GOTZE J. & GROSCHOPF N. (2007): Radiation damage, internal textures and post-growth history of the Plesovice zircon standard. – *17th Annual V.M. Goldschmidt Conference 2007, Cologne, Germany, August 19–24, Conference abstract, Geochimica et Cosmochimica Acta,* 71, 15, Supplement 1: A723. Cologne.

PAŠAVA J., VYMAZALOVÁ A., KNÉSL I. & *ACKERMAN L.* (2007): PGE in ultramafic rocks of the hidden ophiolite complex near Svitavy, Bohemian Massif. – *In:* ANDREW C.J. et al. (Eds.): *Digging Deeper" Proceedings of the 9th Biennial Meeting of the Society for Geology Applied to Mineral Deposits, vol. 2*, Dublin, Ireland: 1591-1594.

PETRUŽÁLEK M., LOKAJÍČEK T., RUDAJEV V. & *VILHELM J.* (2007): Changes of kinematic and dynamic parameters of ultrasonic sounding as a result of different types of loading regimes and different orientation of rock foliation. – *Geophysical Research Abstracts, EGU General Assembly 2007, European Geosciences Union,Vienna, April 16–20, 2007*, 9: 03832, Vienna. CD ROM.

PETRUŽÁLEK M., VILHELM J., LOKAJÍČEK T. & *RUDAJEV V.* (2007): Influence of mutual orientation of foliation and acting loading on P-wave velocity. – *31st Polish-Czech-Slovakian Symposium on Mining and Environmental Geophysics, Janov nad Nisou, September 24–27, Proceedings of Abstracts,* 28. Praha.

PRUNER P., *HOUŠA V.*, ZAKHAROV V.A., KOŠŤÁK M., *CHADIMA M.*, ROGOV M., *ŠLECHTA S.* & MAZUCH M. (2007): The First Boreal-Tethyan Correlation of the Jurassic-Cretaceous Boundary Interval by the Magnetostratigraphy. – *2007 Joint Assembly, American Geophysical Union, Acapulco, Mexico, May 22–25, Eos Trans. AGU, 88(23), Jt. Assem. Suppl., Abstract*: GP 52A-05. Acapulco.

ŘANDA Z., *ULRYCH J.,* TUREK K. & FRÁNA J. (2007): K otázce radiobarytů. – *Souhrny přednášek Semináře Radioanalytické Metody IAA 06,* Praha 28. června 2006: 30–33. Praha.

SIBLÍK M. (2007): Jurassic brachiopod fauna of the Hallstatt vicinity. – *13. Jahrestagung der Österreichischen Paläontologische Gesellschaft, Bad Mitterndorf, August 31 – September 2, Conference abstracts*: 24. Bad Mitterndorf.

SIBLÍK M. (2007): Review of the Upper Triassic and Lower Liassic brachiopods of the Northern Calcareous Alps. – *Evolution and growth of the Alpine-Himalayan Mountain Belts: from the break-up of Gondwana to the collision with Eurasia., Milano, April 3, Conference abstracts*: 21–22. Milano.

SLAVÍK L., HLADIL J., KOPTÍKOVÁ L., CARLS P. & VALENZUELA-RÍOS J.I. (2007): Integrated stratigraphy of the Lower Devonian in the Barrandian area, Czech Republic – A preliminary data from the Lochkovian. – *In:* ACENOLAZA G., VERGEL M., PERALTA S. & HERBST R. (Eds.): *Field Meeting IGCP 499 (IUGS/UNESCO) Devonian land-sea interaction: evolution of ecosystems and climate, San Juan, Argentina, May 13–23, Abstract book*: 80–83. San Juan.

SVOJTKA M., MURAKAMI M., NÝVLT D., MACÁKOVÁ J., *FILIP J.* & MIXA P. (2007): Provenance and post-sedimentary low-temperature evolution of the James Ross Basin sediments (Antarctic Peninsula) based on zircon and apatite fission-track analysis. – *17th Annual V.M. Goldschmidt Conference 2007, Geochemical Society and the EAG, Cologne, Germany, August 20–24. Geochimica et Cosmochimica Acta*, 71, 15, Supplement 1: A990.

SVOJTKA M., NÝVLT D., *MURAKAMI M.*, MACÁKOVÁ J., *FILIP J.* & MIXA P. (2007): Zircon and apatite fission-track dating of the James Ross Basin sediments (Antarctic Peninsula). – *In:* VENERA Z. (Ed.): *CzechTec 07, 5th Meeting of the Central European Tectonic Studies Group (CETeG) and 12th Meeting of the Czech Tectonic Studies Group (ČTS), Teplá, May 11–14. Proceedings and excursion guide*: 84. Teplá.

VEČEŘ M., KULAVIAK L., RŮŽIČKA M., WEIN O., DRAHOŠ J. & *HLADIL J.* (2007): Viscometry of geological materials. – *4th Annual European Rheology Conference (AERC 2007), Napoli, May 12–14, Book of Abstracts, Industrial Rheology and Processing*: 276. Napoli.

VILHELM J., LOKAJÍČEK T., PROS Z., RUDAJEV V. & *ŽIVOR R.* (2007): Study of influence of scaling factor on seismic velocity anisotropy. – *31st Polish-Czech-Slovakian Symposium on Mining and Environmental Geophysics, Janov nad Nisou, September 24–27, Proceedings of Abstracts*: 36. Praha.

ZAJÍC J. (2007): Upper Carboniferous non-marine euselachiids of the Czech Republic. – *40th Anniversary Symposium on Early Vertebrates/Lower Vertebrates, Uppsala, August 13–16, Ichthyolith Issues, Special Publication*, 10: 97–98. Uppsala.

ZAKHAROV V.A., *PRUNER P.* & ROGOV M.A. (2007): New correlation chart of the Jurassic-Cretaceous Boundary beds of Arctic and South Europe based on magnetostratigraphy and status of the Volgian Stage. – *4th Symposium International Geological Correlation Programe Project 506 – Jurassic marine: non-marine correlation, Bristol, United Kingdom, July 4–8, Abstracts*: 1–3. Bristol.

ŽIGOVÁ A., KOZÁK J. & ŠIMŮNEK J. (2007): Vliv půdní mikromorfologie na půdní vlastnosti ovlivňující transport kontaminantů v zemědělských půdách. – *1. Konference České pedologické společnosti a Societas pedologica slovaka, Rožnov pod Radhoštěm, August 20–23, Sborník Abstraktů: Půda v moderní informační společnosti:* 74. Bratislava.

ŽIGOVÁ A. & ŠŤASTNÝ M. (2007): Vývoj půd na spraších v antropicky ovlivněných a chráněných územích Prahy. – *1. Konference České pedologické společnosti a Societas* *pedologica slovaka., Societas Pedologica Slovaca, Česká pedologická společnost, VÚPOP Bratislava, Rožnov pod Radhoštěm, August 20–23. Sborník Abstraktů. Půda v moderní informační společnosti*: 46. Bratislava.

ŽIVOR R. (2007): Jizerské hory Mountains – Geology and Geomorphology. *– 31st Polish-Czech-Slovakian Symposium on Mining and Environmental Geophysics, Janov nad Nisou, September 24–27, Proceedings of Abstracts*: 4–6. Praha.

ZUPAN HAJNA N., MIHEVC A., *PRUNER P.* & *BOSÁK P.* (2007): Paleomagnetic data from Postojnska jama-Planinska jama System (Classical Karst, Slovenia): Review. *– 15th International Karstological School "Classical Karst", Karst Research Institute, Postojna, June 17–22*: 2 pp on CD ROM. Postojna.

ZUPAN HAJNA N., MIHEVC A., *PRUNER P.* & *BOSÁK P.* (2007): Time recorded in cave deposits – 10 years of paleomagnetic research in Slovenian caves. *– Acta carsologica*, 36, 1: 242. Postojna.

ZUPAN HAJNA N., MIHEVC A., *PRUNER P.* & *BOSÁK P.* (2007): Time recorded in cave deposits – 10 years of paleomagnetic research in Slovenian caves. *– Karst Waters Institute, Special Publication*, 12 (*Time in Karst*): 242.

5f. Extended abstracts and abstracts 2008

ABRATIS M., VIERECK-GOETTE L., *ULRYCH J.* & MUNSEL D. (2008): Melilitic rocks of the CECIP – Examples from Vogtland/W-Bohemia (Germany/Czech Republic). *– 18th Annual V.M. Goldschmidt Conference 2008, The Geochemical Society and EAG, Vancouver, Canada, June 13–18, Geochimica et Cosmochimica Acta*, 72, 12, Suppl. 1.: A2.

ABRATIS M., VIERECK-GOETTE L., *ULRYCH J.* & MUNSEL D. (2008): Melilitites and associated alkaline silica-undersaturated rocks of the Vogtland/W Bohemia (Germany/Czech Republic). *– 33rd International Geological Congress Oslo 2008, ICP Information Newsletter*, 34, 4/6: 1325145. Oslo.

ACKERMAN L. & STRNAD L. (2008): PGE geochemistry of strongly differentiated intrusions from the Bohemian Massif, Czech Republic. *– 18th Annual V.M. Goldschmidt Conference 2008, The Geochemical Society and EAG, Vancouver, Canada, June 13–18, Geochimica et Cosmochimica Acta*, 72, 12, Suppl. 1: A4.

ADACHI T. & *KLETETSCHKA G.* (2008): A new method of testing the heterogeneity of the impact origin, shatter cones of newly discovered impact site, Santa Fe, New Mexico, USA. *– Large Meteorite Impacts and Planetary Evolution IV, Vredefort Dome, South Africa, August 17 - 21. Large Meteorite Impacts and Planetary Evolution IV (LMI 2008), 3092:* 1–2. Vredefort Dome.

ADACHI T., *KLETETSCHKA G.* & *ADAMOVIČ J.* (2008): Magnetic Characterization of Fe-Oxides concretions from Utah, USA and Czech Republic as terrestrial analogues of Mars. *– Japan Geoscience Union Meeting 2008, May 25–30. Japan Geoscience Union Meeting 2008,* E111–006: 1. Chiba, Japan.

ASADÍ, N., ZARE, M., BRUTHANS, J. & *FILIPPI, M.*: The role of salt domes and salt caves on creation of geoparks and geoturism development in Iran (written in persian). *– The 1st international conference of Geoparks and their role on geotourism 27. 1.–2. 2. 2008, Qeshm Free Zone Organization. Proceedings*: 11–23. Qeshm, Iran

BÁBEK O., *HLADIL J.*, CHLACHULA J. & *KOPTÍKOVÁ L.* (2008): Correlation potential of spectral reflectance logs compared to gamma-ray and magnetic susceptibility. *– 2008 SEPM Research Conference, Society for Sedimentary Geology, Kilkee, Ireland, June 22–28. Outcrops Revitalized: Tools, Techniques and Applications*: 8. Kilkee, Ireland.

BELLA P., *BOSÁK P.*, GŁAZEK J., HERCMAN H., KICIŃSKA D., NOWICKI T., PAVLARČÍK S., *PRUNER P.* (2008): The antiquity of the famous Belianská Cave (Slovakia). *– Proceedings of the 14th International Congress of Speleology 2005*, 2: 437. Athens (2005).

BERKYOVÁ S., FRÝDA J. & *KOPTÍKOVÁ L.* (2008). Environmental and biotic changes close to the Emsian/Eifelian boundary in the Prague Basin, Czech Republic: paleontological, geochemical and sedimentological approach. *– International Conference Global Aligments of Lower Devonian Carbonate and Clastic Sequences, SDS/IGCP Project 499 joint field meeting, 25. 8. – 3. 9. 2008, State Committee of the Republic of Uzbekistan on Geology and Resources, Kitab State Geological Reserve. Contributions:* 18–19. Tashkent.

BOROVIČKA J., KOTRBA P., GRYNDLER M. (2008): Silver accumulation in macrofungi. *–18th Annual V.M. Goldschmidt Conference 2008, The Geochemical Society and EAG, Vancouver, Canada, June 13–18, Geochimica et Cosmochimica Acta,* 72 (12S): A99.

BOROVIČKA J., KOTRBA P., GRYNDLER M., ŘANDA Z. (2008): Drahé kovy v houbách. *– Mykologické listy*, 104: 45–46.

BOSÁK P. (2008): Entrance Facies of Cave Sediments. *– 16th International Karstological School "Classical Karst" – Karst sediments.Guide Book & Abstracts*: 63–64. Karst Res. Inst. SRC SASA. Postojna.

BOSÁK P. (2008): What is palaeokarst? *– Karst Waters Institute, Special Publication,* 14 *(I.D. Sassowsky, Ch.T. Feazel, J.E. Mylroie, A.N. Palmer, M.V. Palmer, Eds.: Karst from Recent to Reservoirs)*: 26–27. Leesburg.

BOSÁK P., PRUNER P., MIHEVC A., ZUPAN HAJNA N., HORÁČEK J., *KADLEC J., MAN O., SCHNABL P.* (2008): Palaeomagnetic and palaeontological research in Račiška pečina Cave, SW Slovenia. *– Proceedings of the 14th International Congress of Speleology 2005*, 2: 619. Athens (2005).

BOULVAIN F., DASILVA A., MABILLE C., POULAIN G., *HLADIL J., GERŠL M., KOPTÍKOVÁ L.* & *SCHNABL P.* (2008): Magnetic susceptibility correlation of km-thick Eifelian–Frasnian sections (Belgium–Czech Republic). *– 26th IAS Meeting on Sedimentology, International Association of Sedimentologists, Bochum, September 1–3. Abstracts and Field Trips, Schriftenreihe der Deutschen Gesellschaft für Geowissenschaften*, 58: 57. Hannover.

BREITER K. & ŠKODA R. (2008): Arsenic-involved alteration of Zr-Th-REE accessory minerals from Hora Svaté Kateřiny granite stock, Czech Republic. – *In:* HARLOV D. and BROSKA I. (Eds.): *Mineral equilibria, metasomatism and mass transport: evolution and stabilisation of rock on a fluid-rich world. Proceedings from MIMET 2008 workshop Smolenice, Slovak Republic, April 8–10, 2008*: 14–17. Bratislava.

CARLS P., *SLAVÍK L.* & VALENZUELA-RÍOS J.I. (2008): Application to the SDS for revision of the Pragian-Emsian GSSP. –*International Conference Global Alignments of Lower Devonian Carbonate and Clastic Sequences, SDS and IGCP Project 499 joint field meeting, State Committee of the Republic of Uzbekistan on Geology, Kitab State Geological Reserve, August 25 – September 3. Contributions*: 21–22. Tashkent.

ČERMÁK S., *WAGNER J.*, FEJFAR O. & HORÁČEK I. (2008): Updated record of the Pliocene mammalian assemblanges from the Czech and Slovak Republic. –*6th Meeting of European Association of Vertebrate Palaeontologists, Spišská Nová Ves, Slovak Republic. June 30 – July 5. Volume of Abstracts*: 99. Spišská Nová Ves.

CHADIMA M., HROUDA F. & *CAJZ V.* (2008): On the interpretation of normal and inverse magnetic fabric in dikes. – *Contribution to Geophysics and Geodesy 2008, Special issue,* 38: 39–40. Bratislava.

CHADIMA M. & JELÍNEK V. (2008): Anisoft 4.2. – Anisotropy data browser. – *Contribution to Geophysics and Geodesy 2008. Special issue,* 38: 41. Bratislava.

ČEJCHAN P. (2008): Mazuelloids from the Kacak Member (?uppermost Eifelian) of the Barrandian, Czechia. – *9th Paleontological Conference, Polish Academy of Sciences, Institute of Paleobiology, Warszawa, Poland, October 10–11. Abstracts*: 19–20. Warszawa.

ČÍŽ R., *LOKAJÍČEK T., RUDAJEV V.* & SHAPIRO S. (2008): Seismic Attribute – based Evaluation of Anisotropic Piezosensitivity Theory. – *Extended Abstracts EAGE Rome 2008, June 9–12, 2008*: P118. Roma. CD ROM.

DAŠKOVÁ J. & KVAČEK J. (2008): Reproductive structures of Cretaceous Matoniaceae - new genus *Konijnenburgia*. – *12th International Palynological Congress - 8th International Organisation of Palaeobotany Conference, University of Bonn, Germany, August 30–July 5, Abstract Volume*: 57. Bonn.

DAŠKOVÁ J. (2008): *Alnus kefersteinii* (Goeppert) Unger and its *in situ* pollen (Bechlejovice, Tertiary, Czech Republic). – *9th Paleontological Conference, Polish Academy of Sciences, Institute of Paleobiology, Poland, Warszava, October 10–11, Book of Conference Abstracts*: 21. Warszawa.

DRONOV A.V. & *MIKULÁŠ R.* (2008): Ordovician trace fossils from the Irkutsk basin, Siberian Platform. – *Second International Congress on Ichnology, Cracow, Poland, September 1–5, 2008, Abstract Book*: 32–33. Warszawa.

FINNEY S.C., MITCHELL, C.E. & *ŠTORCH P.* (2008): I s there paleoecological partitioning of inshore and offshore graptolite faunas of the *pacificus* Biozone? – *Workshop on Graptolite volume of Treatise on Invertebrate Paleontology and GWG Meeting. Abstract book and excursion guide*: 8. Geologický ústav AV ČR, Praha.

GILÍKOVÁ H., *HLADIL J.*, LEICHMANN J. & PATOČKA F. (2008): Co již víme o sedimentech kambria v jižní části brunovistulika. – *Moravskoslezské paleozoikum 2008 (Moravian-Silesian Paleozoic 2008), Ústav geologických věd Přírodovědecké fakulty Masarykovy univerzity v Brně, Brno, March 14. Sborník abstraktů Moravskoslezské paleozoikum 2008*: 7–8. Brno.

GRABOWSKI J., BÁBEK O., *HLADIL J.*, *PRUNER P.*, *SCHNABL P.*, WERNER T., *GERŠL M.* & OTAVA J. (2008): Late Variscan remagnetization of Devonian carbonates in the Moravo-Silesian Zone (Czech Republic): implications for dating tectonic deformations. – *International Meeting of Young Researchers in Structural Geology and Tectonics, YORSGET, University of Oviedo (Universidad de Oviedo), Oviedo, July 1–3. Programme and Extended Abstracts*: 657–660. Oviedo.

GRYGAR, T., *KADLEC J.* & SVETLIK I. (2008): Chemical analysis of expandable clay minerals as a tool to stratigraphic correlation of flood sediments of the last millennia, Morava River, Czech Republic. – *FLAG Biennial Meeting, 2008: Advances in river system and environmental change research at the crossroad of Western and Eastern Europe, Abstract Book*: 1 p. Budapest.

GRYGAR T., *KADLEC J.* & *ŽIGOVÁ A.* (2008): Cations in expandable clay minerals: a snapshot of past soil solution chemistry. – *Geophysical Research Abstracts*, 10: A-02757. Wien.

HLADIL J., *GALLE A.*, *ČEJCHAN P.*, *KOPTÍKOVÁ L.*, *FILIP J.*, NOVOTNÁ D., RON C., VONDRÁK J., STRNAD L. & FRÁNA J. (2008): The emerging potential of growth rhythms for definition of ocean-atmospheric circulation domains and possible implications for palaeogeography in orogenic belts. – *In:* KÖNIGSHOF P., LINNEMANN U. (Ed): *From Gondwana and Laurussia to Pangea: Dynamics of Oceans and Supercontinents. 20th International Senckenberg-Conference and 2nd Geinitz-Conference. Final Meeting of IGCP 497 and IGCP 499, Forschungsinstitut und Naturmuseum Senckenberg, Museum für Mineralogie und Geologie Dresden, Frankfurt am Main, September 30 – October 3. Abstracts and Programme*: 51–52. Frankfurt am Main, Dresden.

HLADIL J., *KOPTÍKOVÁ L.*, *LISÁ L.*, *ČEJCHAN P.*, RŮŽIČKA M., KULAVIAK L., *ADAMOVIČ J.*, *JANEČKA J.*, VEČEŘ M., DRAHOŠ J. & HAVLICA J. (2008): Stromatactis and stromatactum pattern formation in sediment: constraints from fluid mechanics and rheology and implications for environments, sedimentary architecture and cyclostratigraphy. – *International Conference Global Alignments of Lower Devonian Carbonate and Clastic Sequences, SDS and IGCP Project 499 joint field meeting, State Committee of the Republic of Uzbekistan on Geology, Kitab State Geological Reserve, August 25 – September 3. Contributions*: 36–40. Tashkent.

HLADIL J., *SLAVÍK L.*, *KOPTÍKOVÁ L.*, *SCHNABL P.*, VACEK F., BÁBEK O. & *GERŠL M.* (2008): Relationships between magnetic susceptibility of limestones and sea level change ("direct relationship and major crises on the Earth"). – *The 33rd International Geological Congress, International Un-*

ion of Geological Sciences, Oslo, August 6–14. Abstract, HPS-01 General contributions to stratigraphy: 1343596. Oslo. CD-ROM.

HLADIL J., *SLAVÍK L.*, *SCHNABL P.*, *KOPTÍKOVÁ L.*, FRÁNA J., VACEK F. & BÁBEK O. (2008): The gross environmental phenomenon of the classical Pragian stage ("hot lowstand"). – *33rd International Geological Congress, International Union of Geological Sciences, Oslo, August 6–14. Abstract, HPF-01 General contributions to paleontology and historical geology*, Part 1: 1343454. Oslo. CD-ROM.

HOJDOVÁ M., *NAVRÁTIL T.*, *ROHOVEC J.* & PENÍŽEK V. (2008): Mercury contamination of soils in vicinity of historical mining area. –*The 33rd International Geological Congress, International Union of Geological Sciences, Oslo, August 6–14. Abstract, EGC-01 General contributions to environmental geochemistry*, Part 2: 1340257. Oslo. CD-ROM.

HOUŠA V., *PRUNER P.*, ZAKHAROV V., KOŠŤÁK M., *CHADIMA M.*, ROGOV M., *ŠLECHTA S.* & MAZUCH M. (2008): Principal results of Boreal – Tethyan Correlation of the Jurassic – Cretaceous Boundary by Magnetostratigraphy. – *5th International Symposium of IGCP 506, UNESCO, Hammamet, Tunisia, April 28–31. Marine and non-marine Jurassic: global correlation and major geological events. Abstract Volume:* 81–82. Hammamet.

JURKOVÁ N., *BOSÁK P.*, KOMAR M. & *PRUNER P.* (2008): In-situ flowstone outcrops at Machnín – the first indication of unroofed cave in the Czech Republic. – *16th International Karstological School "Classical Karst" – Karst sediments. Guide Book & Abstracts*: 77. Karst Research Institute SRC SASA. Postojna.

KADLEC J., DIEHL J.F., BESKE-DIEHL S., GRYGAR T. & SVETLIK I. (2008): Natural and human impacts on the magnetic signal from the Late Holocene flood-plain deposits of the Morava River (Czech Republic). – *FLAG Biennial Meeting, 2008: Advances in river system and environmental change research at the crossroad of Western and Eastern Europe*: 1 p. Budapest.

KADLEC J., GRYGAR T., SVETLÍK I., ETTLER V., MIHALJEVIČ M., DIEHL J. & BESKE-DIEHL S. (2008): Morava River flood plain sediments deposited during the last millennium: Climatic and anthropogenic record. – *33rd International Geological Congress. August 6–14, Abstract, GMS-02 Geomorphology and landscape response to global change, GMS02102L*. Oslo. CD-ROM.

KALVODA L., DLOUHÁ M., DRÁB M., DRAHOKOUPIL J., GRISHIN A., MAREK J., SEDLÁK P., VRATISLAV S., *HLADIL J.*, *CHADIMA M.* & KOCKELMANN W. (2008): Investigation of microstructural anisotropy of limestone. – *11th European Powder Diffraction Conference, EPDIC, Institute of High Pressure Physics, Polish Academy of Sciences, Warszawa, September 19–22. Conference Engine Pielaszek Research, Book of Abstracts EPDIC 11*: 76–77. Warszawa.

KLETETSCHKA G. (2008): Magnetic Signature of Soils due to Wild Fires. – *Workshop on Soil Magnetism: Multi-disciplinary Perspectives, Emerging Applications and New Frontiers, Cranfield University, United Kingdom, August 18–20. Workshop on Soil Magnetism, Agenda*: 1–9. Cranfield.

KLETETSCHKA G. (2008): Testing of the presence of large electromagnetic pulse during the Tunguska event for the Mirror Matter hypothesis. – *100 years of Tungus problem – Krasnoyarsk, Russia, June 27–29. 100 years of Tungus problem*: 1. Krasnoyarsk.

KLETETSCHKA G. & ADACHI T. (2008): Magnetic Detection of Large Magnetic Fields that Occurred During the Vredefort Impact, Implications for Mars Magnetic Anomalies. – *Large Meteorite Impacts and Planetary Evolution IV, Lunar and Planetary Institute, Vredefort Dome, South Africa, August 17–21. Large Meteorite Impacts and Planetary Evolution IV (LMI 2008), 3094*: 1–2. Vredefort Dome.

KLETETSCHKA G., GETTY S.A. & ADACHI T. (2008): First steps towards the remote detection of radiation resistant life forms. – *Japan Geoscience Union Meeting 2008, Chiba, Japan, May 25–30. Japan Geoscience Union Meeting 2008, P222-001*: 1. Chiba.

KLETETSCHKA G., KLETETSCHKA K. & MIKULA V. (2008): Magnetic signatures recorded in rocks and trees located inside the Tunguska blast 100 years ago, implications for Mirror Matter, Comet, and Kimberlite Pipe explosion hypotheses. – *2008 American Geophysical Union Fall Meeting, San Francisco, December 15–19. Eos Trans. AGU, 89(53), Fall Meet. Suppl., Abstract*: GP21C-0787. San Francisco.

KOHOUT T., DEUTSCH A., PESONEN L.J., HORNEMANN U. & HEIKINHEIMO E. (2008): Shock recovery experiments with artificially made magnetite pellets in the range of 10 to 45 GPa. – *28th Nordic Geological Winter Meeting, Department of Civil Engineering at Aalborg University; the Geological Survey of Denmark and Greenlan, Aalborg, Denmark, January 7. 28th Nordic Geological Winter Meeting Abstract Volume*: 125. Aalborg.

KOHOUT T. & *KLETETSCHKA G.* (2008): Magnetic Record of Ordinary Chondrite Chondrules. – *2007 American Geophysical Union Fall Meeting, San Francisco, USA, December 10–14. Eos Trans. AGU, 88(52), Fall Meet. Suppl., Abstract GP53A-0956*: 1. San Francisco, USA.

KOHOUT T., KOSTEROV A., HALODA J. & TÝCOVÁ P. (2008): Magnetic properties of enstatite chondrites and iron bearing sulfides. – *Contribution to Geophysics and Geodesy 2008. Special issue,* 38: 60–61. Bratislava.

KOHOUT T., O'SULLIVAN K., LOSIAK A., KRING D., THAISEN K. & WEIDER S. (2008): Robotic and human exploration of the Schrödinger basin. – *Joint Annual Meeting of LEAG-ICEUM-SRR (2008), Cape Canavera, Florida, October 28–31. Abstract*: 4078. Cape Canavera, Florida.

KOHOUT T., PESONEN L.J., DEUTSCH A., HORNEMANN U. & HEIKINHEIMO E. (2008): Shock recovery experiments in the range of 10 to 45 GPa - comparison of results of synthetic magnetite and terrestrial diabase. – *2008 American Geophysical Union Fall Meeting, San Francisco, December 15–19. Eos Trans. AGU, 89(53), Fall Meet. Suppl., Abstract GP21C-0790*: 1–2. San Francisco.

KOPTÍKOVÁ L., BERKYOVÁ S., *HLADIL J.*, *SLAVÍK L.*, *SCHNABL P.*, FRÁNA J. & *BÖHMOVÁ V.* (2008): Long-distance correlation of Basal Chotec Event sections using magnetic susceptibility (Barrandian –vs– Nevada) and lateral and vertical variations in fine-grained non-carbonate mineral phases. – *International Conference Global Aligments of Lower Devonian Carbonate and Clastic Sequences, SDS/IGCP Project 499 joint field meeting, State Committee of the Republic of Uzbekistan on Geology and Resources, Kitab State Geological Reserve, August 25 – September 3. Contributions*: 60–62. Tashkent.

KOPTÍKOVÁ L., *HLADIL J.*, *SLAVÍK L.*, FRÁNA J. & VACEK F. (2008). Evidence of a significant change between Lochkovian and Pragian: detailed lithological, geophysical, geochemical and mineralogical aspects (Pozary 3 section in Prague Synform). – *Field workshop 2008 IGCP 499-UNESCO "Devonian Land-Sea Interaction, Evolution of Ecosystems and Climate" (DEVEC), 23. 4. – 30. 4. 2008, Libyan Petroleum Institute, Abstracts:* 10–14. Tripoli.

KOSLER J., FLIEGEL D., *SLAMA J.* & PEDERSEN R.B. (2008): Laser ablation MC ICP-MS U-Pb zircon dating using multiple channeltron ion counting detection. – *18th Annual V.M. Goldschmidt Conference 2008, July 2008, Vancouver, Canada. Goldschmidt Conference abstract, Geochimica et Cosmochimica Acta*, 72, 12, Suppl. 1: A492.

KOŠLER J., FORST L. & *SLÁMA J.* (2008): LamDate and LamTool: spreadsheet-based data reduction for laser ablation ICP-MS. – *Mineralogical Association of Canada Short Course 40. Laser-Ablation-ICP-MS in the Earth Sciences. CURRENT PRACTICES AND OUTSTANDING ISSUES.* Appendix A4.

KULAVIAK L., RŮŽIČKA M., DRAHOŠ J. & *HLADIL J.* (2008): Cavities formation in sedimentary deposits. – *35th International Conference of Slovak Society of Chemical Engineering, SSCHE 2008, Slovak Society of Chemical Engineering, Tatranské Matliare, May 26–30. Book of Abstracts CD-ROM, Part 8, Session B – Hydrodynamics, Mixing, Fluid Fow, Heat and Mass Transfer*: 218. Bratislava.

KULAVIAK L., VEČEŘ M., RŮŽIČKA M., DRAHOŠ J. & *HLADIL J.* (2008): Flow behavior of model suspensions: hydrodynamical instabilities of polydispersed settling layers. – *18th International Congress of Chemical and Process Engineering, CHISA 2008, Czech Society of Chemical and Process Engineering, Praha, August 24–28. Abstract CD-ROM, Fluid flow and multiphase systems, Topic 8*: 1471. Praha.

KULAVIAK L., VEČEŘ M., RŮŽIČKA M., DRAHOŠ J. & *HLADIL J.* (2008): Viscosity characteristic of real suspensions. – *35th International Conference of Slovak Society of Chemical Engineering, SSCHE 2008, Slovak Society of Chemical Engineering, Tatranské Matliare, May 26–30. Book of Abstracts CD-ROM, Posters – Hydrodynamics, Mixing, Fuid Flow, Heat and Mass Transfer, P048*: 219. Bratislava.

KULAVIAK L., VEČEŘ M., RŮŽIČKA M., DRAHOŠ J. & *HLADIL J.* (2008): Viscosity characteristics of geological suspensions. –*18th International Congress of Chemical and Process Engineering, CHISA 2008, Czech Society of Chemical and Process Engineering, Praha, August 24–28. Abstract CD-ROM, Fluid flow and multiphase systems, Topic 8*: 1472. Praha.

LIBERTÍN M. & *DAŠKOVÁ J.* (2008): Primitive gallery forest from the Intrasudetic Basins. – *5th Symposium on Permo-Carboniferous Faunas, Muzeum východních Čech, Hradec Králové, July 7–11, Book of Conference Abstracts*: 16–17. Hradec Králové.

LOJKA R., DRÁBKOVÁ J., *ZAJÍC J.*, FRANCŮ J., SÝKOROVÁ I. & GRYGAR T. (2008): Environmental response to climatically driven lake-level fluctuations: record from Stephanian B freshwater reservoir of eastern tropical Pangea (Mšec Member, Kladno-Rakovník Basin, Central Bohemia). – *In:* ŠTAMBERG S. & *ZAJÍC J.* (Eds.): *Faunas and palaeoenvironments of the Late Palaeozoic*: 18. Hradec Králové.

LOSIAK A., *KOHOUT T.*, LOSIAK A., THAISEN K., WEIDER S. & KRING D. (2008): Establishing a precise absolute chronology of the Moon – a need for robotic missions. – *Joint Annual Meeting of LEAG-ICEUM-SRR (2008), Cape Canavera, Florida, October 28–31. Joint Annual Meeting of LEAG-ICEUM-SRR (2008) Abstract:* 4072. Cape Canaveral.

LUKENEDER A., *PRUNER P.*, *SCHNABL P.*, REHÁKOVÁ D. & HALASOVÁ D. (2008): Nutzhof – A new key section for the Jurassic– Cretaceous boundary (Klippenbelt, Lower Austria). – *PANGEO Austria 2008, S17 Pangeo Paläontologie:* 1. Wien.

MACHADO G., *HLADIL J.*, *KOPTÍKOVÁ L.*, FONSECA P.E., *GALLE A.* & ROCHA F.T. (2008): Middle Devonian reef fauna and co-occuring acritarchs from deformed volcano-sedimentary sequences within the Beja Igneous Complex (SW Ossa-Morena Zone, Portugal). – *In:* KÖNIGSHOF P., LINNEMANN U. (Eds.): *From Gondwana and Laurussia to Pangea: Dynamics of Oceans and Supercontinents. 20th International Senckenberg-Conference and 2nd Geinitz-Conference, Final Meeting of IGCP 497 and IGCP 499., Forschungsinstitut und Naturmuseum Senckenberg, Museum für Mineralogie und Geologie Dresden, Frankfurt am Main, September 30 – October 3. Abstracts and Programme*: 88–90. Frankfurt am Main, Dresden.

MACHADO G., *VAVRDOVÁ M.*, FONSECA P.I., CHAMINÉ F.T. & ROCHA F.T. (2008): Dating and differentiation of geological units in highly deformed and metamorphosed rocks – Can palynology help? Examples from the Ossa Morena Zone (W Portugal). – *International Meeting of Young Researchers in Structural Geology and Tectonics*: 375–374. Oviedo.

MACHADO G., *VAVRDOVÁ M.*, FONSECA P.E., CHAMINÉ H.I. & ROCHA F.T. (2008): Organic-walled microplankton from the Upper Devonian of the Albergaria-a-Velha black shales (Ossa Morena zone, W Portugal) and its paleobiogeographical implications: preliminary results – *12th International Palynological Congress IPC-XII 2008/ 8th International Organization of Paleobotany conference IOPC-VIII. August 30 – September 5, Abstract volume, Terra Nostra*, 2008, 2: 176. Bonn.

MARTÍNEK K., *SVOJTKA M.* & FILIP J. (2008): Multiphase cooling and exhumation of the Krkonoše Piedmont Basin during Mesozoic – Cenozoic basin inversion based on apatite fission track analysis. – *The 33rd International Geological Congress, IUGS, IGCC, Oslo, Norway. Abstract: SES-07 (Dynamics of sedimentary basins)*: 07. Oslo. CD-ROM.

MARTÍNEK K., *SVOJTKA M.* & FILIP J. (2008): Permo-Carboniferous Krkonoše Piedmont Basin inversion: cooling and exhumation during Mesozoic – Cenozoic based on apatite fission track analysis. – *POKOS 3, Uniwersytet Wroclawski, Kudowa Zdrój. Proceedings: Baseny srodgórskie: kontekst regionalny srodowisk i procesów sedymentacji*: 14. Kudowa Zdrój.

MIKULÁŠ R. (2008): Bioerosion features in tufa sediments in the floodplain of the Labe river, Czech Republic. – *6th International Bioerosion Workshop, July 13–20, 2008, Salt Lake City, Utah. Abstract Book*: 30. Salt Lake City.

MIKULÁŠ R., BROMLEY R.G., GENISE J.F. (2008): The find of insect borings in the Middle Jurassic lignite, Bornholm, Denmark. – *6th International Bioerosion Workshop, July 13–20, 2008, Salt Lake City, Utah. Abstract Book*: 17. Salt Lake City.

MIKULÁŠ R., FATKA O., SZABAD M. (2008): Predation and scavenging traces on trilobite exoskeletons, Middle Cambrian, Czech Republic. – *6th International Bioerosion Workshop, July 13–20, 2008, Salt Lake City, Utah. Abstract Book:* 13. Salt Lake City.

MIKULÁŠ R., GUTIÉRREZ MARCO J.C (2008): The ichnogenus *Arachnostega* Berting, 1992: one of the most common trace fossils in the Mediterranean Region of the Ordovician. – *Second International Congress on Ichnology, Cracow, Poland, September 1–5, 2008, Abstract Book:* 82–83. Warszawa.

MIKULÁŠ R., ZASADIL B. (2008): Fungal (?) pits in the Late Paleozoic and Tertiary mineralized wood, Czech Republic. – *6th International Bioerosion Workshop, July 13–20, 2008, Salt Lake City, Utah. Abstract Book:* 31. Salt Lake City.

NAVRÁTIL T., HOJDOVÁ M., ROHOVEC J., PENÍŽEK V. & VAŘILOVÁ Z. (2008): Effect of fire on Hg pools in soils of forested ecosystem. – *The 33rd International Geological Congress, International Union of Geological Sciences, Oslo, August 6–14. Abstract CD, EGC-01 General contributions to environmental geochemistry*: 1340433. Oslo. CD-ROM.

NOVÁK J.K. (2008): High-Ti basaltic rocks of the Western Krušné hory Mts.: Possible parent rock types fro the Ti-bearing clays in the Sokolov Basin? – *11th Coal Geology Conference Prague 2008, Volume of Abstracts*: p. 21. Praha.

NOVÁK J.K., ULRYCH J., ACKERMAN L., JELÍNEK E., *CHADIMA M., SCHNABL P.,* MIZERA J. & ŘANDA Z. (2008): High-Ti basaltic rocks in the uplifted shoulder of the Ohře (Eger) Rift, Western Bohemia/Saxony. – *33rd International Geological Congress, EUR-12 Cenozoic volcanism in Europe. Abstract on*: HPS3-0. Oslo. CD-ROM.

O'SULLIVAN K., *KOHOUT T.*, LOSIAK A., KRING D., THAISEN K. & WEIDER S. (2008): Schrödinger basin: A geologically diverse landing area. – *Joint Annual Meeting of LEAG-ICEUM-SRR (2008), Cape Canavera, Florida, October 28–31. Joint Annual Meeting of LEAG-ICEUM-SRR (2008) Abstract*: 4081. Cape Canaveral.

POKORNÝ P., DRESLEROVÁ D., KUNEŠ P., PETR L., KOZÁKOVÁ R., ABRAHAM V., *HLAVÁČ J.* & ŠMAHELOVÁ L. (2008): Long-term development of cultural landscape in Central Bohemia as a co-evolution of human impacts and natural processes. Outline of an interdisciplinary project. – *12th International Palynological Congres and 8th International Organisation of Palaeobotany Conference, Bonn, Germany, August 30 – September 5, Terra Nostra 2008*, 2: 224 –225.

PRUNER P., *BOSÁK P.*, *KADLEC J.*, *SCHNABL P.*, *ŠLECHTA S.*, *MAN O.*, HORÁČEK I., ZUPAN HAJNA N. & MIHEVC A. (2008): Paleomagnetic and palaeontological research in Račiška pečina cave, SW Slovenia. – *Contribution to Geophysics and Geology 2008, Special issue,* 38: 105–106. Bratislava.

PRUNER P., SCHLÖGL J. & KOŠŤÁK M. (2008): In memory of Miloš Rakús. – *5th International Symposium of IGCP 506, UNESCO, Hammamet, Tunisia, April 28–31. Marine and non-marine Jurassic: global correlation and major geological events. Abstract Volume*: 17–18. Hammamet.

PRUNER P., SCHLÖGL J. & KOŠŤÁK M. (2008): In memory of Václav Houša. – *5th International Symposium of IGCP 506, UNESCO, Hammamet, Tunisia, April 28–31. Marine and non-marine Jurassic: global correlation and major geological events. Abstract Volume*: 19–21. Hammamet.

PRUNER P., *SCHNABL P.* & LUKENEDER A. (2008): Magnetostratigraphy across the Jurassic/Cretaceous boundary strata in the Nutzhof, Austria – preliminary results. – *Contribution to Geophysics and Geology 2008, Special issue.* 38: 105–106. Bratislava.

PRUNER P., ZUPAN-HAJNA N., MIHEVC A., *VENHODOVÁ D.*, *SCHNABL P.*, *ŠLECHTA S.* & *BOSÁK P.* (2008): Paleomagnetic research of cave sediments in Slovenia in 2007. – *16th International Karstological School "Classical Karst" – KARST SEDIMENTS, Short scientific papers*: 1–3. Karst Research Institute ZRC SAZU, Postojna.

PRUNER P., ZUPAN-HAJNA N., MIHEVC A., *VENHODOVÁ D.*, *SCHNABL P.*, *ŠLECHTA S.* & *BOSÁK P.* (2008): Paleomagnetic research of cave sediments in Slovenia in 2007. – *16th International Karstological School "Classical Karst" – KARST SEDIMENTS, Abstracts*: 95. Karst Research Institute ZRC SAZU, Postojna.

ŘANDA Z., MIZERA J., *NOVÁK J.K.*, *ULRYCH J.* & KUČERA J. (2008): Instrumental neutron and photon activation analysis of high-titanium basaltic rocks. – *2nd International-Nuclear Chemistry Congress (INCC 08), 13–18 April 2008, Cancún, México. Program–Abstract Book*: 70. Cancún.

SCHNABL P., *CAJZ V.*, *CHADIMA M.*, *ŠLECHTA S.*, RAPRICH V. & *PRUNER P.* (2008): Magnetostratigraphic investigation of volcanic rock from the Úhošť hill (Doupovské hory Mts.). – *Contribution to Geophysics and Geodesy. Specal issue,* 38: 125–126. Bratislava.

SCHNABL P., *PRUNER P.* & LUKENEDER A. (2008): Rock-magnetic investigation of upper Jurassic and lower Cretaceous sediments from Nutzhof, Austria. – *Contribution to Geophysics and Geodesy. Specal issue,* 38: 121–122. Bratislava.

SCHNABL P., *PRUNER P.*, *HOUŠA V.*, *CHADIMA M.* & *ŠLECHTA S.* (2008): Summary of basic magnetic parameters on the Jurassic – Cretaceous boundary. – *Contribution to Geophysics and Geodesy. Specal issue,* 38: 123–124. Bratislava.

SIBLÍK M. (2008): Review of the Upper Triassic brachiopods in the Northern Calcareous Alps. – *Book of abstracts. Berichte der Geologischen Bundesanstalt*, 76: 63–65. Wien.

ŠIMŮNEK Z., *ZAJÍC J.* & DRÁBKOVÁ J. (2008): Biota of the Líně Formation (Stephanian C), mode of preservation and its palaeoecological interpretation. – *11th Coal Geology Conference Prague 2004, Volume of Abstracts*: 35–36. Praha.

SLAMA J., PEDERSEN R.B. & KOSLER J. (2008): Evolution of the Jan Mayen Ridge – New data from the Jan Mayen Fracture Zone. – *18th Annual V.M. Goldschmidt Conference 2008, July 2008, Vancouver, Canada. Goldschmidt Conference abstract, Geochimica et Cosmochimica Acta*, 72, 12, Suppl. 1: A877.

SLAVÍK L. (2008): Conodont faunas from the Barrandian area – their potential for detail biostratigraphic subdivision of the Lower Devonian. – *9th Paleontological Conference, Institut of Paleobiology, Polish Academy of Sciences, Warszawa, October 10–11. Abstracts*: 86–87. Warszawa.

SLAVÍK L., CARLS P., VALENZUELA-RÍOS J., *HLADIL J.*, KALVODA J. & *KOPTÍKOVÁ L.* (2008): Pragian of the Prague Synform: stratigraphy, global correlation and boundary problems. – *International Conference Global Alignments of Lower Devonian Carbonate and Clastic Sequences, SDS and IGCP Project 499 joint field meeting, State Committee of the Republic of Uzbekistan on Geology, Kitab State Geological Reserve, August 25 – September 3. Contributions*: 110–112. Tashkent.

SLAVÍK L., CARLS P., VALENZUELA-RÍOS J., *KOPTÍKOVÁ L.*, *HLADIL J.* & VACEK F. (2008): Proposal of detailed biostratigraphic subdivision of the Lochkovian in the Prague Synform. – *Field workshop 2008 IGCP 499-UNESCO "Devonian Land-Sea Interaction, Evolution of Ecosystems and Climate" (DEVEC), Libyan Petroleum Institute, Tripoli, Libya, May 23–30. Abstracts*: 15–19. Tripoli.

SLAVÍK L., *KOPTÍKOVÁ L.* & *HLADIL J.* (2008): Integrated stratigraphy of the Lower Devonian in the Prague Synform (Barrandian area, Czech Republic) – biostratigraphic refinements. – *In:* KÖNIGSHOF P., LINNEMANN U. (Ed): *From Gondwana and Laurussia to Pangea: Dynamics of Oceans and Supercontinents. 20th International Senckenberg-Conference and 2nd Geinitz-Conference, Final Meeting of IGCP 497 and IGCP 499., Forschungsinstitut und Naturmuseum Senckenberg, Museum für Mineralogie und Geologie Dresden, Frankfurt am Main, September 30 – October 3. Abstracts and Programme*: 133. Frankfurt am Main, Dresden.

ŠLECHTA S. & *KADLEC J.* (2008): Environmentální záznam v jeskynních sedimentech. – *14. KVARTÉR 2008, Ústav geologických věd PřF MU, Brno, November 27, Sborník abstrakt:* 23–24. Brno.

ŠLECHTA S. & *KADLEC J.* (2008): Mineral magnetic environmental record in clastic cave deposits. – *Contribution to Geophysics and Geodesy*. *Special issue*, 38: 134. Bratislava.

ŠTAMBERG S. & *ZAJÍC J.* (2008): Carboniferous and Permian faunas and their occurrence in the limnic basins of the Czech Republic. – *In:* ŠTAMBERG S. & *ZAJÍC J.* (Eds.): *Faunas and palaeoenvironments of the Late Palaeozoic*, 45–46. Hradec Králové.

STEHLÍK F. (2008): Analýza polohových změn koryt řeky Moravy ve Strážnickém Pomoraví: vliv regulace na dynamiku toku. – *14. KVARTÉR 2008, Ústav geologických věd PřF MU, Brno, November 27, Sborník abstrakt:* 24–25. Brno. + *CD ROM*

ŠTORCH P. (2008): Silurian graptolite biofacies of Bohemia: a history envisaged from species diversity and morphological disparity patterns. – *Workshop on Graptolite volume of Treatise on Invertebrate Paleontology and GWG Meeting. Abstract book and excursion guide*: 22. Geologický ústav AV ČR, Praha.

STRNAD L., ETTLER V., MIHALJEVIČ M. & *HLADIL J.* (2008): Trace elements in landfill calcite: a comparison of solution & laser ablation ICP-MS and calibration to different standard material (SRM NIST glass and USGS MACS carbonate). –*SEM-SEA 2008, XXVIII Reunión de la Sociedad Española de Mineralogía, XXI Reunión de la Sociedad Española de Arcillas, Sociedad Española de Mineralogía, Universitad de Zaragoza, Zaragoza, September 16–19. Comunicaciones de la XXVIII Reunión de la Soc. Española de Mineralogía, La revista Macla*: 235–236. Madrid.

SUTTNER T.J., BERKYOVÁ S., HUBMANN B., *KOPTÍKOVÁ L.*, FRÝDA J. & *HLADIL J.* (2008). The Basal Chotec Event in neritic sequences of the Prague Basin and the Graz Palaeozoic compared. From Gondwana and Laurussia to Pangea: Dynamics of Oceans and Supercontinents. – *20th International Senckenberg-Conference and 2nd Geinitz-Conference. Final Meeting of IGCP 497 and IGCP 499, 30. 9. – 3. 10. 2008, Forschungsinstitut und Naturmuseum Senckenberg, Museum für Mineralogie und Geologie Dresden, Frankfurt am Main. Abstracts and Programme*: 232–234. Frankfurt am Main, Germany.

THAISEN K., LOSIAK A., *KOHOUT T.*, O'SULLIVAN K., WEIDER S. & KRING D. (2008): Geographic information systems: An enabling tool for lunar Exploration. – *Joint Annual Meeting of LEAG-ICEUM-SRR (2008), Cape Canaveral, Florida, October 28 - 31. Joint Annual Meeting of LEAG-ICEUM-SRR (2008) Abstract*: 4098. Cape Canaveral.

VILHELM J., RUDAJEV V., ŽIVOR R., LOKAJÍČEK T. & PROS Z. (2008): Influence of Structure and Cracks Distribution on P-wave Velocity Anisotropy in Rocks – Laboratory and Field Study. – *Extended Abstracts EAGE Rome 2008, June 9–12, 2008*: P184. Roma. CD-ROM.

WAGNER J., LIPECKI G. & KRAWCZYK M. (2008): New evidence of *Ursus minimus* from the territory of Poland. – *14th International Cave Bear Symposium, Appenzell, Switzerland, September 18–22. Abstracts*: 29. Appenzell.

WERNER T., GRABOWSKI J., *PRUNER P.*, *SCHNABL P.* & *HLADIL J.* (2008): Preliminary AMS and rock magnetic interpretations for Devonian carbonates of Moravo-Silesian Zone (Czech Republic). – *Contribution to Geophysics and Geodesy 2008. Special Issue*, 38: 140–141. Bratislava.

ZAJÍC J. (2008): The main Late Carboniferous and Early Permian lake fish communities of the Czech Republic. – *In:* ŠTAMBERG S. & *ZAJÍC J.* (Eds.): *Faunas and palaeoenvironments of the Late Palaeozoic*, 53-54. Hradec Králové.

ZAJÍC J. (2008): The limnic origin of majority of the Permo-Carboniferous basins of the Bohemian Massif. - *In:* ŠTAMBERG S. & *ZAJÍC J.* (Eds.): *Faunas and palaeoenvironments of the Late Palaeozoic*, 55. Hradec Králové.

ZAJÍC J. (2008): Czech and Moravian Permian acanthodians. – *In:* ŠTAMBERG S. & *ZAJÍC J.* (eds.): *Faunas and palaeoenvironments of the Late Palaeozoic*, 56. Hradec Králové.

ŽIGOVÁ A., ŠŤASTNÝ M. & KREJČOVÁ J. (2008): Soil development on spongilitic marlstones in natural and human impacted systems at selected localities of Prague (Czech Republic). – *Book of Abstracts. EUROSOIL CONGRESS 2008. August 25–29, 2008*: 178–179. Wien.

ŽIGOVÁ A., ŠŤASTNÝ M., KREJČOVÁ J. & *KOPTÍKOVÁ L.* (2008): Diverzita půd v CHKO Krivoklátsko. – *12. Pedologické dny na téma Antropogenní zatížení půd. Sborník příspěvků:* 35. Česká zemědělská univerzita. Praha.

ŽÍTT J., ČECH S., KOŠŤÁK M., HRADECKÁ L. & *SVOBODOVÁ M. (2008):* Micrasterids (Echinoidea) in siliciclastic sediments of the upper Turonian (Bohemian Cretaceous Basin): taxonomy, taphonomy, sedimentary environment, biostratigraphy. – *9th Paleontological Conference, Warszawa, 10–11 October 2008, Abstracts*: 107–108. Warszawa.

ŽÍTT J., VODRÁŽKA R., ČECH S., HRADECKÁ L., *SVOBODOVÁ M.* Taphocoenoses of the Cenomanian/Turonian boundary interval: the case study of Plaňany, Bohemian Cretaceous Basin. – *9th Paleontological Conference, Warszawa, 10-11 October 2008. Abstracts*: 108–109. Warszawa.

ZUPAN-HAJNA N., MIHEVC A., *PRUNER P.* & *BOSÁK P.* (2008): Age of cave sediments in Slovenia. – *3. Mitteleuropäische Geomorphologietagung Geomorphologie in Wissenschaft und Praxis, Universität Salzburg, Österreich, Salzburg, September 28, Kompetenzen*: 49. Salzburg.

ZUPAN-HAJNA N., MIHEVC A., *PRUNER P.* & *BOSÁK P.* (2008): Results of palaeomagnetic research of karst sediments in Slovenia. – *33rd International Geological Congress, International Union of Geological Sciences, Oslo, August 6–14. Abstract, GSM-03 Karst as a global phenomenon,* Part 2: 1324797. Oslo. CD-ROM.

5g. Lectures and poster presentations 2007

ACKERMAN L., PUCHTEL I., WALKER R. & JELÍNEK E.: Re-Os depth profile of the upper mantle beneath Central Europe. *Lecture. 17th Annual Goldschmidt, August 19–24, 2007.* Köln.

ADACHI T. & *KLETETSCHKA G.*: Using oxygen isotope and magnetism to reconstruct the paleotemperature framework of the ancient travertine deposits in Death Valley, CA. *Poster. Goldschmidt 2007 – "atoms to planets, August 19–24, 2007.* Köln.

ADACHI T., *KLETETSCHKA G.* & MIKULA V.: Frequency Dependent Susceptibility Analysis of Magnetic Carriers: Application to Fe-Oxides on Mars surface. *Poster. 2007 American Geophysical Union Fall Meeting, December 10–14, 2007.* San Francisco, USA.

ADACHI T., *KLETETSCHKA G.*, CHAN M., MIKULA V., *ADAMOVIČ J.*, *PRUNER P.*, *SCHNABL P.* & WASILEWSKI P.: High field remagnetization of hematite concretions from Utah, USA and Czech Republic. *Poster. 38th Lunar and Planetary Science Conference, April 12–16, 2007.* Houston.

ADACHI T., *KLETETSCHKA G.*, MIKULA V., CHAN M., *ADAMOVIČ J.*, HERRERO-BERVERA E. & FULLER M.: Testing the origin of Martian 'blueberries': magnetic measurements may be key to the answer. *Invited Lecture. Rocky Mountain Section – 59th Annual Meeting, May 7–9, 2007.* St. George.

ADACHI T., *KLETETSCHKA G.*, WASILEWSKI P.J. & MIKULA V.: Magnetic Signatures of Impact Fractured Rocks from Sierra Madera, Texas, USA – Implications to Magnetic Anomalies on Mars. *Poster. 2007 Joint Assembly, May 22–25, 2007.* Acapulco.

BOROVIČKA J., KOTRBA P., GRYNDLER M.: Silver accumulation in macrofungi. *Poster. 18th Annual Goldschmidt, July 13–18, 2008.* Vancouver.

BOROVIČKA J., KOTRBA P., GRYNDLER M., ŘANDA Z.: Drahé kovy v houbách. *Lecture. Výroční konference ČVSM, February 16, 2008*. České Budějovice.

BREITER K.: Dvojslídné granity plutonu Plechého na Trojmezí České republiky, Německa a Rakouska. *Invited Lecture. 3. Sjezd České geologické společnosti, September 19–22, 2007.* Volary.

BREITER K.: Glimerit – neobvyklá surovina šumavských kameníků. *Poster. 3. Sjezd České geologické společnosti, September 19–22, 2007.* Volary.

CARLS P. & *SLAVÍK L.*: Zonation concept in stratigraphic correlation – a discussion. *Poster. 8. Paleontologická konferencia, June 14–15, 2007.* Bratislava.

CARLS P., *SLAVÍK L.* & VALENZUELA-RÍOS J.: Pridolian to Mid-Lochkovian Biostratigraphic time marks in Bohemia. *Lecture. Subcommission on Devonian Stratigraphy and IGCP 499 Devonian Land Sea Interaction, Eureka, NV, September 9–18, 2007.* Eureka.

CARLS P., *SLAVÍK L.* & VALENZUELA-RÍOS J.: Succession of Biostratigraphic marks for the Early Emsian. *Lecture. Subcommission on Devonian Stratigraphy and IGCP 499 Devonian Land Sea Interaction, Eureka, NV, September 9–18, 2007.* Eureka.

ČEJCHAN P.: Coenocline reconstruction using graph theory and Bayesian probability data generator. *Poster. UK-V4 Frontiers of Science Symposium, March 21–23, 2007.* Kraków.

ČEJCHAN P.: Reconstruction of presumed environmental/time gradient from fossil assemblages. *Poster. 8. paleontologická konferencia, June 15–16, 2007.* Bratislava.

CHADIMA M., *CAJZ V.* & HROUDA F.: Normal and inverse magnetic fabric in dikes and sills (Eger Graben, NW Czech Republic). *Poster. IUGG XXIV General Assembly, July 2–13, 2007.* Perugia.

CHADIMA M., CHLUPÁČOVÁ M., ŽÁČEK M., SKÁLA R. & HROUDA F.: Some unusual magnetic minerals found in palaeo-slags, North Bohemian Browncoal basin; their termomagnetic and low field characteristics. *Poster. IUGGXXIV General Assembly, July 2–13, 2007.* Perugia.

CHADIMA M., *KADLEC J.*, POKORNÝ J. & HROUDA F.: On detection of small changes in frequency-dependent magnetic susceptibility of weakly magnetic sediments: implications

for magnetic granulometry. *Poster. AGU Fall Meeting 2007, December 10–14, 2007.* San Francisco.

CIFELLI F., MATTEI M., *CHADIMA M.*, LENSER S. & HIRT A.M.: The importance of the AMS analysis for reconstructing the tectonic history in weakly deformed sediments. *Invited Lecture. IUGGXXIV General Assembly, July 2–13, 2007.* Perugia.

ČÍŽ R., *RUDAJEV V.*: Fractal Analysis of Ultrasonic Emission in Compressed Rocks. *Poster. 69th EAGE Conference & Exhibition incorporating SPE EUROPEC 2007, June 10–15, 2007.* London.

DULAI A., SCHLÖGL J., *SIBLÍK M.*, SZABÓ J., SZENTE I., VÖRÖS A. & MANDL G.W.: Der Hierlatzkalk der Plankerau bei Bad Mitterndorf und sein geologisches Umfeld (SW. Totes Gebirge, Oesterreich). *Poster. 13. Jahrestagung der Oesterr. Paläont. Gesellschaft, August 31 – September 2, 2007.* Bad Mitterndorf.

FULLER M., HALEKAS J., ADACHI T., *KLETETSCHKA G.* & *KOHOUT T.*: Lunar Magnetism: IRMs Normalization and Impact Related Magnetization. *Lecture. 2007 Joint Assembly, May 22–25, 2007.* Acapulco.

GILÍKOVÁ H., BURIÁNEK D., FILIPIAK P., HANŽL P., *HLADIL J.*, JACHOWICZ M. & OTAVA J.: Konečně... aneb co vše nám vypověděly sedimenty na výchoze ‚Lanovka' (Tišnov-Předklášteří). *Lecture. Moravian-Silesian Palaeozoic 2007 (Moravskoslezské paleozoikum 2007), March 8, 2007.* Olomouc.

GILÍKOVÁ H., BUDIL P., ČECH S., HANŽL P., *SVOBODOVÁ M.* & ZIEGLER V.: Křídové sedimenty východní části Mongolského Altaje. *Poster. 3. Sjezd České geologické společnosti, September 19–22, 2007.* Volary.

HAVELKOVÁ P., HERREL A., AERTS P. & *ROČEK Z.* (2007): Origin of anuran jumping locomotion: inference from functional morphology and comparative anatomy. *Lecture. 8th International Congress of Vertebrate Morphology, Paris,* July 2007.

HLADIL J., *KOPTÍKOVÁ L.*, *GERŠL M.*, *LANGROVÁ A.*, *PRUNER P.*, *GALLE A.*, BÁBEK O., FRÁNA J., OTAVA J. & *CHADIMA M.*: A multiple-parameter approach to analyzing the mid-punctata zone anomalous signatures in pure limestones (Moravian Karst, Brunovistulian terrane, central Europe). *Lecture. Subcommission on Devonian Stratigraphy and IGCP 499 Devonian Land Sea Interaction, Eureka, NV, 2007, September 9–18, 2007.* Eureka.

HLAVÁČ J.: Archeomalakologický výzkum v ČR a jeho problematika (minulost a současnost metodického přístupu). *Lecture. 3. pracovní setkání Archeobotanické skupiny, February 22–23, 2007.* Plzeň.

HOJDOVÁ M.: Mercury distribution and speciation in soils affected by historic mercury mining in the Czech Republic. *Lecture. The First Meeting of Young Soil Scientists, May 24–25, 2007.* Praha.

HOJDOVÁ M., *NAVRÁTIL T.* & *ROHOVEC J.*: Mercury distribution and speciation in soils affected by historic mercury mining in the Czech Republic. *Lecture. International Scientific Conference Bioclimatology and Natural Hazards, September 17–20, 2007.* Poľana nad Detvou.

HORÁČEK I., MIHEVC A., ZUPAN-HAJNA N., *PRUNER P.* & *BOSÁK P.*: Biostratigrafické a paleomagnetické doklady starších fází krasovění v oblasti klasického Krasu (Slovinsko). *Lecture. 13. KVARTÉR 2007, November 27, 2007.* Brno.

HOUŠA V., *PRUNER P.*, *CHADIMA M.*, *ŠLECHTA S.*, ZAKHAROV V.A., ROGOV M.A., KOŠŤÁK M. & MAZUCH M.: Rezultaty magnitostratigraficheskoi Borealno-Teticheskoi korreliacii pogranichnogo jursko-melovogo intervala i ikh interpretacia. *Lecture. LIII sesia paleontologicheskovo obshchestva, May 2–6, 2007.* Sankt Petěrburg.

HRADECKÁ L., LOBITZER H., OTTNER F., SCHLAGINTWEIT F., *SVOBODOVÁ M.*, ŠVÁBENICKÁ L. & ZORN I.: Contributions to the lithostratotype of "Hofergrabenmergel" (Hochmoos Formation, Lower Gosau Subgroup, Coniacian/Santonian, Upper Austria). *Poster. ATA Geologische Bundesanstalt 2007, May 7–11, 2007.* Linz.

HRADECKÁ L., LOBITZER H., OTTNER F., SCHLAGINTWEIT F., *SVOBODOVÁ M.*, ŠVÁBENICKÁ L. & ZORN I.: Die Hofergrabenmergel (Hochmoos-Formation, Untere Gosau-Subgruppe) der klassischen Lokalität in Gosau, Oberösterreich. *Poster. 13. Jahrestagung der Oesterr. Paläontol. Gesellschaft, August 31 – September 2, 2007.* Bad Mitterndorf.

HRADECKÁ L., LOBITZER H., OTTNER F., SCHLAGINTWEIT F., *SVOBODOVÁ M.*, SZENTE I., ŠVÁBENICKÁ L. & ZORN I.: Biostratigraphie und Ablagerungsbedingungen der „Eisenbach-Gosau" am Traunsee. *Poster. 13. Jahrestagung der Österr. Paläontol. Gesellschaft, August 31 – September 2, 2007.* Bad Mitterndorf.

HRADECKÁ L., LOBITZER H., OTTNER F., SCHLAGINTWEIT F., *SVOBODOVÁ M.*, SZENTE I., ŠVÁBENICKÁ L. & ZORN I.: Biostratigraphy and Palaeoenvironment of the Lower Gosau Subgroup of Eisenbach Brook in Salzkammergut (Upper Austria). *Poster. ATA Geologische Bundesanstalt 2007, May 7–11, 2007.* Linz.

KADLEC J., GRYGAR T., SVĚTLÍK I. & ETTLER V.: Holocenní sedimenty řeky Moravy (Strážnické Pomoraví), klíč k rekonstrukci přírodních a antropogenních vlivů na chování říčního systému. *Invited Lecture. Seminář ze sedimentární geologie, May 2, 2007.* Praha.

KADLEC J. & *ŠLECHTA S.*: Environmentální záznam v sedimentech Holštejnské jeskyně v Moravském krasu. *Lecture. 13. KVARTÉR 2007, November 29, 2007.* Brno.

KADLEC J., ŠROUBEK P., DIEHL J.F., HERCMAN H., *PRUNER P.* & *VENHODOVÁ D.*: How old are cave deposits abundant in Pleistocene fauna preserved in the Bone Passage in the Sloupsko-šošůvská Cave (Moravian Karst)? *Poster. 13th International Cave Bear Symposium, September 20–24, 2007.* Brno.

KÄMPF H., MRLINA J., *ULRYCH J.*, *ACKERMAN L.* & HRADECKÝ P.: Surroundings of the Železná Hůrka Hill (Eisenbühl). *Lecture. CzechTec 07 – 5th meeting of the Central European Tectonic Studies Group (CETeG) and 12th Meeting of the Czech Tectonic Studies Group (ČTS), May 11–14, 2007.* Teplá.

KLETETSCHKA G. & ADACHI T.: Magnetic/isotopic characteristic of the spherule-rich impact ejecta blanket from the Chicxulub crater: analog for robotic exploration of similar deposits on Mars. *Invited Lecture. Rocky Mountain Section – 59th Annual Meeting, May 7–9, 2007.* St. George.

KLETETSCHKA G., ADACHI T. & MIKULA V.: Electromagnetic spacecraft used for magnetic navigation within asteroid belt, mining concepts and asteroid magnetic classification. *Poster. 38th Lunar and Planetary Science Conference, April 12–16, 2007.* Houston.

KLETETSCHKA G., ADACHI T., *ADAMOVIČ J.*, MIKULA V. & CHAN M.: Utah and Czech Mars analog concretions; Aquatic hematite and goethite characterization. *Lecture. Goldschmidt 2007 – "atoms to planets, August 19–24, 2007.* Cologne.

KLETETSCHKA G., MIKULA V., ADACHI T. & FULLER M.: Preliminary non-invasive measurement of magnetic susceptibility of the frontal lobe: a possible antecedent marker for Alzheimer's disease. *Poster. 2007 American Geophysical Union Fall Meeting, December 10–14, 2007.* San Francisco.

KLETETSCHKA G., ZBORIL R., ADACHI T., MIKULA V., HERMANEK M. & WASILEWSKI P.: New insight into the origin of anomalous magnetism of titanohematite lamellae in rhombohedral oxide assemblages -consequence for Mars magnetism. *Lecture. 2007 Joint Assembly, May 22–25, 2007.* Acapulco

KOBAYASHI T., HIRAJIMA T., HIROI Y. & *SVOJTKA M.*: Raman and cathodoluminescence (CL) study of zircon inclusions derived from Gföhl felsic rocks in the Moldanubian Zone, Czech Republic. *Poster. 17th Annual V.M. Goldschmidt Conference 2007, August 20–24, 2007.* Köln.

KODESOVA R., KOCAREK M., KODES V., KOZAK J. & *ZIGOVA A.*: Impact of varying micromorphology on water flow and solute transport. *Lecture. European Geosciences Union, General Assembly 2007. 15–20 April, 2007.* Wien.

KODEŠOVÁ R., KOČÁREK M., KODEŠ V., *ŽIGOVÁ A.*, KOZÁK J. & ŠIMŮNEK J.: Vliv půdní mikromorfologie na půdní vlastnosti ovlivňující transport kontaminantů v zemědělských půdách. *Poster. 1. Konference České pedologické společnosti a Societas pedologica Slovaka. 20.–23.8.2007.* Rožnov pod Radhoštěm.

KOHOUT T., ELBRA T., PESONEN L.J., *SCHNABL P.* & *ŠLECHTA S.*: Magnetic susceptibility as a tool to match asteroids and meteorites. *Poster. XXIII Geophysics days, May 23–24, 2007.* Oulu.

KOHOUT T., *KLETETSCHKA G.* & PESONEN L.J.: Identification of the Shock Effects in the the Avanhandava H4 Chondrules Based on the Coercivity Spectra of the Remanent Magnetization. *Poster. 38th Lunar and Planetary Science Conference, April 12–16, 2007.* Houston.

KOHOUT T., KOSTEROV A., JACKSON M., PESONEN L.J., *KLETETSCHKA G.* & LEHTINEN M.: Daubreelite and troilite as a source of cometary and minor body magnetism in cold environment. *Poster. 70th Annual Meteoritical Society Meeting, August 13–17, 2007.* Tuscon.

KOHOUT T., KOSTEROV A., JACKSON M., PESONEN L.J., LEHTINEN M. & *KLETETSCHKA G.*: Low-temperature magnetic properties of the Neuschwanstein EL6 meteorite. *Lecture. IUGG XXIV General Assembly, June 2–13, 2007.* Perugia.

KOPTÍKOVÁ L., *HLADIL J.*, *SLAVÍK L.* & FRÁNA J.: The precise position and structure of the Basal Chotec Event: lithological, MS-and-GRS and geochemical characterisation of the Emsian-Eifelian carbonate stratal successions in the Prague Syncline (Tepla-Barrandian unit, central Europe). *Lecture. Subcommission on Devonian Stratigraphy and IGCP 499 Devonian Land Sea Interaction, Eureka, NV, 2007, September 9–18, 2007.* Eureka.

KOSTEROV A., *KOHOUT T.*, JACKSON M., *KLETETSCHKA G.* & LEHTINEN M.: Low temperature Magnetic Properties of Daubreelite, Troilite and Enstatite Chondrites. *Lecture. 2007 American Geophysical Union Fall Meeting, December 10–14, 2007.* San Francisco.

KRÁLOVEC K. & *ROČEK Z.* (2007): Development of the nasal region of the anuran skull. Poster. *8th International Congress of Vertebrate Morphology, Paris*, July 2007.

KUBÍNOVÁ P., *NAVRÁTIL T.* & *SKŘIVAN P.*: The Role of Vegetation in Hydrochemical Cycles of Selected Transition Metals. *Lecture. Bioclimatology and natural hazards, September 17–20, 2007.* Zvolen – Poľana nad Detvou.

KUČERA J. & *NOVÁK J.K.*: Petrographical and elemental characterization of the sandstones used in the construction of the Angkor monuments. *Lecture. InternationalConference ICC 07, June 5–6, 2007.* Siem Reap.

KUČERA J., *NOVÁK J.K.* & *LANG M.*: INAA and petrological study of sandstones from the Angkor monuments. *Lecture. MTAA-12 (Modern Trends in Activation Analysis), September 16–22, 2007.* Tokyo.

KULAVIAK L., VEČEŘ M., RŮŽIČKA M. & *HLADIL J.*: Rheology features of geological dispersions. *Poster. 34th International Conference of Slovak Society of Chemical Engineering, May 21–25, 2007.* Tatranské Matliare.

KULAVIAK L., VEČEŘ M., RŮŽIČKA M., DRAHOŠ J. & *HLADIL J.*: Patterns in sedimentary deposits of geomaterials. *Poster. 54th Conference on Chemical and Process Engineering CHISA 2007, October 15–18, 2007.* Srní na Šumavě.

KULAVIAK L., VEČEŘ M., RŮŽIČKA M., DRAHOŠ J. & *HLADIL J.*: Rheological properties of geological material. *Poster. 4th Annual European Rheology Conference (AERC 2007), May 12–14, 2007.* Napoli.

KULAVIAK L., VEČEŘ M., RŮŽIČKA M., DRAHOŠ J. & *HLADIL J.*: Rheology of liquid–solid system. *Lecture. 54th Conference on Chemical and Process Engineering CHISA 2007, October 15–18, 2007.* Srní na Šumavě.

KULAVIAK L., VEČEŘ M., RŮŽIČKA M., *HLADIL J.* & DRAHOŠ J.: Flow behaviour of model suspensions. *Lecture. 34th International Conference of Slovak Society of Chemical Engineering, May 21–25, 2007.* Tatranské Matliare.

LISÁ L.: Application of geological aspects in archaeology. *Poster. United Kingdom – Visegrad Four Frontiers of Science Symposium, 21. –23. 2. 2007.* Krakow.

LISÁ L. & GRYGAR T.: The Climate Record of the End of the Last Glacial Period based on geochemical and micromorphological Study – the Case Study from Gravetian Settlement in Dolni Vestonice (Czech Republic). *Lecture. Joint Meeting PTG-DGG Geo-Pomerania Sczetin 2007 – Geology cross-bordering the Western and Eastern European Platform, 24.–26. 9. 2007.* Sczetin.

LOBITZER H., BUDAI T., DULAI A., HAAS J., HRADECKÁ L., KVAČEK J., MAYR M., MINDSZENTY A., MONOS-

TORI M., OTTNER F., PIROS O., SCHLAGINTWEIT F., *SIBLÍK M.*, *SVOBODOVÁ M.*, SZABO J., SZENTE I., ŠVÁBENICKÁ L., VÖRÖS A. & ZORN I.: Neue Ergebnisse zur Geologie des Salzkammergutes im Rahmen der bilateralen Zusammenarbeit der Geologischen Bundesanstalt mit den Nachbarnländern. *Invited Lecture. 13. Jahrestagung der Österr. Paläontol. Gesellschaft, August 31–September 2, 2007.* Bad Mitterndorf.

LOKAJÍČEK T., *KLÍMA K.*: Stanovení času příchodu seismických/ultrazvukových signálů pomocí statistických momentů vyšších řádů. *Lecture. OVA´07 – New Knowledge and Measurements in Seismology, Engineering Geophysics and Geotechnics, April 17–19, 2007*. Ostrava

MAN O.: The (un)ambiguity of identification of magnetostratigraphic polarity zones. *Poster. Magnetic Interactions UK 2007, January 9–10, 2007.* Cambridge.

MENTLIK P. & *LISÁ L.*: Zalednění v okolí jezera Laka. *Lecture. Stav geomorfologických výzkumů v roce 2007, 2. – 4. 4. 2007.* Malenovice.

MIHEVC A., ZUPAN HAJNA N., *PRUNER P.* & *BOSÁK P.* Paleomagnetic data from Postojnska Jama-Planinska Jama System (Classical Karst, Slovenia): Review. Poster. *15th International Karstological School "Classical Karst" – Management of transboundary karst aquifers, June 20, 2007.* Postojna.

MIHEVC A., ZUPAN HAJNA N., *PRUNER P.* & *BOSÁK P.* Time recorded in cave deposits – 10 years of paleomagnetic research in Slovenian caves. Poster. *International symposium: Time in Karst, 16. 3. 2007*. Postojna.

MIKULA V., *KLETETSCHKA G.*, ADACHI T. & FULLER M.: Alzheimer patients can be distinguished from other patients by non invasive measurement of magnetic susceptibility of their frontal lobe (preliminary data). *Poster. Annual Meeting of the German Genetics Society: Genetics of Aging, October 11–13, 2007.* Jena.

MIKULA V., *KLETETSCHKA G.*, ADACHI T. & FULLER M.: Future Application of JWST Microshutter Technology for Use in Neural Implants. *Poster. The Mid Atlantic MEMS Allience, Special Topics Symposium, Towards In Vivo Microsystems, October 2, 2007.* Rockville.

NIKODEM A., KODEŠOVÁ R., KODEŠ V., PAVLŮ L., BORŮVKA L., *ŽIGOVÁ A.*: Soil hydraulic properties characterzation for numerical modeling of acidificants transport. *Poster. 1. Konference České pedologické společnosti a Socientas pedologica Slovaka. 20. –23. 8 .2007.* Rožnov pod Radhoštěm.

NORBERG N., NASDALA L., KOŠLER J., *SLÁMA J.*, GOTZE J. & GROSCHOPF N.: Radiation damage, internal textures and post-growth history of the Plesovice zircon standard. *Poster. 17th Annual V.M. Goldschmidt Conference 2007, August 19–24, 2007.* Köln.

PAŠAVA J., VYMAZALOVÁ A., KNÉSL I. & *ACKERMAN L.*: PGE in ultramafic rocks of the hidden ophiolite complex near Svitavy, Bohemian Massif. *Poster. 9th Biennial Meeting of the Society for Geology Applied to Mineral Deposits, August 20–23, 2007.* Dublin.

PETRUŽÁLEK M., LOKAJÍČEK T., RUDAJEV V. & *VILHELM J.*: Changes of kinematic and dynamic parameters of ultrasonic sounding as a result of different types of loading regimes and different orientation of rock foliation. *Poster. EGU General Assembly 2007, European Geosciences Union, April 16–20, 2007.* Wien.

PETRUŽÁLEK M., LOKAJÍČEK T., RUDAJEV V. & *VILHELM J.*: Vliv vzájemné orientace struktury migmatitu a směru jednoosého namáhání na parametry ultrazvukového prozařování. *Lecture. OVA'07 – New Knowledge and Measurements in Seismology, Engineering Geophysics and Geotechnics, April 17–19, 2007*. Ostrava

PETRUŽÁLEK M., VILHELM J., LOKAJÍČEK T. & *RUDAJEV V.*: Influence of mutual orientation of foliation and acting loading on P-wave velocity. *Lecture. 31st Polish-Czech-Slovakian Symposium on Mining and Environmental Geophysics, September 24–27, 2007.* Janov nad Nisou.

PRUNER P., *HOUŠA V.*, ZAKHAROV V.A., KOŠŤÁK M., *CHADIMA M.*, ROGOV M., *ŠLECHTA S.* & MAZUCH M.: The First Boreal-Tethyan Correlation of the Jurassic-Cretaceous Boundary Interval by the Magnetostratigraphy. *Lecture. 2007 Joint Assembly, May 22–25, 2007.* Acapulco.

ŘANDA Z., ULRYCH J., TUREK K. & FRÁNA J.: K otázce radiobarytů. *Lecture. Radioanalytické metody IAA 06, 28. 06. 2006,* Praha.

SIBLÍK M.: Jurassic brachiopod fauna of the Hallstatt vicinity. *Poster. 13. Jahrestagung der Oesterr. Paläont. Gesellschaft, August 31 – September 2, 2007.* Bad Mitterndorf.

SIBLÍK M.: Review of the Upper Triassic and Lower Liassic brachiopods of the Northern Calcareous Alps. *Invited Lecture. Evolution and growth of the Alpine-Himalayan Mountain Belts:from the break-up of Gondwana to the collision with Eurasia., April 3, 2007.* Milano.

SLÁMA J., KOŠLER J., CROWLEY J.L., GERDES A., HANCHAR L., HORSTWOOD M.S.A., MORRIS G.A., NASDALA L., NORBERG N., SCHALTEGGER U., TUBRETT M.N. & WHITEHOUSE M.J.: Plešovice zircon – a new natural standard for U-Pb and Hf isotopic microanalysis. *Lecture. 17th Annual V.M. Goldschmidt Conference 2006, August 19–24, 2007*. Köln.

SLÁMA J., KOŠLER J. & PEDERSEN R.: Behaviour of zircon in high-grade metamorphic rocks: evidence from Hf isotopes, trace elements and textural studies. *Lecture. CzechTec 07 – 5th meeting of the Central European Tectonic Studies Group (CETeG) and 12th Meeting of the Czech Tectonic Studies Group (ČTS), May 11–14, 2007.* Teplá.

SLAVÍK L., *HLADIL J.*, *KOPTÍKOVÁ L.*, CARLS P. & VALENZUELA-RÍOS J.I.: Integrated stratigraphy of the Lower Devonian in the Barrandian area, Czech Republic – A preliminary data from the Lochkovian. *Lecture. Field Meeting IGCP 499 (IUGS/UNESCO) Devonian land-sea interaction: evolution of ecosystems and climate, May 13–23, 2007.* San Juan.

ŠTORCH P.: Applied graptolite research - What use are planktic graptolites? *Invited Lecture. May 1, 2007.* University of Kansas. Lawrence.

ŠTORCH P.: Fossil record - an important tool in sequence stratigraphic interpretations. *Invited Lecture. May 8, 2007.* University of California, Riverside.

ŠTORCH P.: Geological and Cultural Sites in Prague and the Barrandian Basin of the Czech Republic. *Invited Lecture. May 14, 2007.* California State University, Long Beach.

SVOBODOVÁ M.: Palynology of „black shale“ sequences near the Cenomanian/Turonian boundary (Bohemian Cretaceous Basin, Czech Republic). *Poster. 8. paleontologická konferencia, June 14–15, 2007*. Bratislava.

SVOJTKA M.: Datování nízkoteplotních událostí za pomoci metody fission- track na zirkonech a apatitech: teorie, modelování, aplikace. *Lecture. Tektonický seminář G421S33 0/2 z, November 19, 2007*. Praha.

SVOJTKA M., *MURAKAMI M.*, NÝVLT D., MACÁKOVÁ J., *FILIP J.* & MIXA P.: Provenance and post-sedimentary low-temperature evolution of the James Ross Basin sediments (Antarctic Peninsula) based on zircon and apatite fission-track analysis. *Poster. 17th Annual V.M. Goldschmidt Conference 2007, August 20–24, 2007*. Köln.

SVOJTKA M., NÝVLT D., *MURAKAMI M.*, MACÁKOVÁ J., *FILIP J.* & MIXA P.: Zircon and apatite fission-track dating of the James Ross Basin sediments (Antarctic Peninsula). *Poster. CzechTec 07, 5th Meeting of the Central European Tectonic Studies Group (CETeG) and 12th Meeting of the Czech Tectonic Studies Group (ČTS), May 11–14, 2007*. Teplá.

VILHELM J., LOKAJÍČEK T., PROS Z., RUDAJEV V. & *ŽIVOR R.*: Study of influence of scaling factor on seismic velocity anisotropy. *Lecture. 31st Polish-Czech-Slovakian Symposium on Mining and Environmental Geophysics, September 24–27, 2007*. Janov nad Nisou.

ZAJÍC J.: Upper Carboniferous non-marine euselachiids of the Czech Republic. *Lecture. 40th Anniversary Symposium on Early Vertebrates/Lower Vertebrates, August 13–16, 2007*. Uppsala.

ZAKHAROV V.A., *PRUNER P.* & ROGOV M.A.: New correlation chart of the Jurassic-Cretaceous Boundary beds of Artic and South Europe based on magnetostratigraphy and status of the Volgian Stage. *Lecture. 4th Symposium International Geological Correlation Programe Project 506 – Jurassic marine: non-marine correlation, July 4–8, 2007*. Bristol.

ŽIGOVÁ A., ŠŤASTNÝ M., KREJČOVÁ J.: Vývoj půd na spraších v antropicky ovlivněných a chráněných územích Prahy. *Lecture. 1. Konference České pedologické společnosti a Societas pedologica Slovaka. 20.-23.8.2007*. Rožnov pod Radhoštěm.

5h. Lectures and poster presentations 2008

ABRATIS M., VIERECK-GOETTE L., *ULRYCH J.* & MUNSEL D.: Melilitic rocks of the CECIP – Examples from Vogtland/W-Bohemia (Germany/Czech Republic). *Lecture. Goldschmidt Conference 2008, 13–18 July*. Vancouver.

ABRATIS M., VIERECK-GOETTE L., *ULRYCH J.* & MUNSEL D.: Melilitites and associated alkaline silica-undersaturated rocks of the Vogtland/W Bohemia (Germany/Czech Republic). *Lecture. 33rd International Geological Congress 2008, 6–14 August,* Norway, Oslo.

ACKERMAN L. & STRNAD L.: PGE geochemistry of strongly differentiated intrusions from the Bohemian Massif, Czech Republic. *Poster. 18th Annual V.M. Goldschmidt, July 13-18, 2008*. Vancouver.

ADACHI T. & *KLETETSCHKA G.*: A new method of testing the heterogeneity of the impact origin, shatter cones of newly discovered impact site, Santa Fe, New Mexico, USA. *Poster. Large Meteorite Impacts and Planetary Evolution IV, August 17–21, 2008*. Vredefort Dome.

ADACHI T., *KLETETSCHKA G.* & *ADAMOVIČ J.*: Magnetic Characterization of Fe-Oxides concretions from Utah, USA and Czech Republic as terrestrial analogues of Mars. *Lecture. Japan Geoscience Union Meeting 2008, May 25–30, 2008*. Chiba.

ADAMOVIČ J.: Koncepce pískovcové morfofacie (The concept of sandstone morphofacies). *Lecture. Klokočky 2008, April 23–24, 2008*. Bělá u Turnova.

ADAMOVIČ J.: Pískovec jako geologický záznamník (Sandstone as a geological diary). *Lecture. Seminar on Sandstone Landscapes, April 28, 2008*. Praha.

ASADÍ N., ZARE M., BRUTHANS J. & *FILIPPI M.*: The role of salt domes and salt caves on creation of geoparks and geoturism development in Iran. *Invited Lecture. The 1st international conference of Geoparks and their role on geoturism, Paper (Invited Lecture), ISBN non, 27. 1.–2. 2. 2008*. Qeshm.

BÁBEK O., *HLADIL J.*, CHLACHULA J. & *KOPTÍKOVÁ L.*: Correlation potential of spectral reflectance logs compared to gamma-ray and magnetic susceptibility. *Lecture. 2008 SEPM Research Conference, June 22–28, 2008*. Kilkee.

BLÁHOVÁ A., GRYGAR T., *KADLEC J.,* SVITAVSKÁ-SVOBODOVÁ H. & VESELÁ J.: Contribution of diatom analysis to reconstruction of floodplain development of the Morava River (Czech Republic). *Poster. 20th International Diatom Symposium 2008, 7–13 September*. Dubrovnik.

BERKYOVÁ S., FRÝDA J. & *KOPTÍKOVÁ L.*: Environmental and biotic changes close to the Emsian/Eifelian boundary in the Prague Basin, Czech Republic: paleontological, geochemical and sedimentological approach. *Lecture. International Conference Global Aligments of Lower Devonian Carbonate and Clastic Sequences, SDS/IGCP Project 499 joint field meeting, August 25 – September 3, 2008*. Kitab.

BOROVIČKA J., KOTRBA P. & GRYNDLER M.: Silver accumulation in macrofungi. *Poster. 18th Annual Goldschmidt, July 13–18, 2008*. Vancouver.

BOULVAIN F., DASILVA A., MABILLE C., POULAIN G., *HLADIL J.*, *GERŠL M.*, *KOPTÍKOVÁ L.* & *SCHNABL P.*: Magnetic susceptibility correlation of km-thick Eifelian–Frasnian sections (Belgium–Czech Republic). *Poster. 26th IAS Meeting on Sedimentology, September 1–3, 2008*. Bochum.

CARLS P., *SLAVÍK L.* & VALENZUELA-RÍOS J.I.: Application to the SDS for revision of the Pragian-Emsian GSSP. *Lecture. International Conference Global Alignments of Lower Devonian Carbonate and Clastic Sequences, SDS and IGCP Project 499 joint field meeting, August 25 – September 3, 2008*. Kitab.

ČEJCHAN P.: Mazuelloids from the Kacak Member (?uppermost Eifelian) of the Barrandian, Czechia. *Poster. 9th Paleontological Conference, October 10–11. Polish Academy of Sciences, Institute of Paleobiology.* Warszawa.

ČEJCHAN P.: Giant mineralized acritarchs (mazuelloids) from Eifelian/Givetian boundary, Bohemia. *Poster. Global alignments of Lower Devonian carbonate and clastic sequences: SDS/IGCP Project 499 joint field meeting, August 25 – September 3, 2008.* Kitab.

ČERMÁK S., *WAGNER J.*, FEJFAR O. & HORÁČEK I.: Updated record of the Pliocene mammalian assemblanges from the Czech and Slovak Republic. *Poster. 6th Meeting of European Association of Vertebrate Palaeontologists. June 30 – July 5, 2008.* Spišská Nová Ves.

CHADIMA M.: Magnetic fabric of dikes and sills (České středohoří Mts. – Czech Republic). *Poster. Magnetic Interactions UK 2007, January 9–10, 2008.* Cambridge.

CHADIMA M., HROUDA F. & *CAJZ V.*: On the interpretation of normal and inverse magnetic fabric in dikes. *Lecture. Paleo, Rock and Environmental Magnetism 11th Castle Meeting, June 22–28, 2008.* Bojnice.

CHADIMA M. & JELÍNEK V.: Anisoft 4.2. – Anisotropy data browser. *Lecture. Paleo, Rock and Environmental Magnetism 11th Castle Meeting, June 22–28, 2008.* Bojnice.

ČÍŽ R., *LOKAJÍČEK T., RUDAJEV V.* & SHAPIRO S.: Seismic Attribute – based Evaluation of Anisotropic Piezosensitivity Theory. *Poster. EAGE Rome 2008, June 9–12, 2008.* Roma.

DAŠKOVÁ J. & KVAČEK J.: Reproductive structures of Cretaceous Matoniaceae - new genus *Konijnenburgia*. *Lecture. 12th International Palynological Congress - 8th International Organisation of Palaeobotany Conference, August 30–July 5, 2008.* Bonn.

DAŠKOVÁ J.: *Alnus kefersteinii* (Goeppert) Unger and its *in situ* pollen (Bechlejovice, Tertiary, Czech Republic). *Poster. 9th Paleontological Conference, October 10–11, 2008.* Warszawa.

DRONOV A.V. & *MIKULÁŠ R.*: Ordovician trace fossils from the Irkutsk basin, Siberian Platform. *Lecture. Second International Congress on Ichnology, Poland, September 1–5, 2008.* Kraków.

FILIPPI M., BRUTHANS J., VILHELM Z., ASADI N. & ZARE M.: 3N Cave (6580 m) – The Longest Salt Cave in the World. *Poster. Impression of Geopark on Tourism Development, Unpublished (Poster), 28. 1. – 30. 1. 2008, Qeshm Free Zone Organization, Qheshm Geopark.* Qeshm.

FINNEY S.C., MITCHELL C.E. *& ŠTORCH P.:* Is there paleoecological partitioning of inshore and offshore graptolite faunas of the *pacificus* Biozone? *Lecture. Workshop on Graptolite volume of Treatise on Invertebrate Paleontology and GWG Meeting. July 23, 2008.* Svatý Jan pod Skalou.

FROLÍK J. & *HLAVÁČ J.*: Bašta Prachárna v Chrudimi očima archeologa a přírodovědce. *Lecture. Forum Archaeologiae Post-medievalis, April 8–9, 2008.* Praha.

GALLE A., *HLADIL J.* & *ČEJCHAN P.*: Stromatoporoid growth periodicity investigated. *Poster. 9th Czech-Polish-Slovak Paleontological Conference, 10. –11.10. 2008.* Warszawa.

GILÍKOVÁ H., *HLADIL J.*, LEICHMANN J. & PATOČKA F.: Co již víme o sedimentech kambria v jižní části brunovistulika. *Lecture. Moravskoslezské paleozoikum 2008 (Moravian-Silesian Paleozoic 2008), March 14, 2008.* Brno.

GRABOWSKI J., BÁBEK O., *HLADIL J.*, *PRUNER P.*, *SCHNABL P.*, WERNER T., *GERŠL M.* & OTAVA J.: Late Variscan remagnetization of Devonian carbonates in the Moravo-Silesian Zone (Czech Republic): implications for dating tectonic deformations. *Poster. International Meeting of Young Researchers in Structural Geology and Tectonics, YORSGET, July 1–3, 2008.* Oviedo.

GRYGAR T., *KADLEC J.* & SVETLIK I.: Chemical analysis of expandable clay minerals as a tool to stratigraphic correlation of flood sediments of the last millennia, Morava River, Czech Republic. *Lecture. FLAG Biennial Meeting 2008, September 3–7, 2008.* Budapest.

GRYGAR T., *KADLEC J.* & *ŽIGOVÁ A.*: Cations in expandable clay minerals: a snapshot of past soil solution chemistry. *Poster. EGU General Assembly 2008, 13–18 April, 2008.* Wien.

HLADIL J., *GALLE A* & *ČEJCHAN P.*: Growth patterns of stromatoporoids as possible indicators of broad palaeoenvironmental conditions. *Poster. International Conference Global Alignments of Lower Devonian Carbonate and Clastic Sequences, SDS and IGCP Project 499 joint field meeting, August 25 – September 3, 2008.* Kitab.

HLADIL J., DASILVA A., *KOPTÍKOVÁ L.* & *SLAVÍK L.*: Application of magnetic susceptibility as a palaeoclimatic proxy on Palaeozoic sediments and characterization of the magnetic signal. *Lecture. From Gondwana and Laurussia to Pangea: Dynamics of Oceans and Supercontinents. 20th International Senckenberg-Conference and 2nd Geinitz-Conference, Business Meeting of IGCP 499, October 3, 2008.* Frankfurt am Main.

HLADIL J., *GALLE A.*, *ČEJCHAN P.*, *KOPTÍKOVÁ L.*, *FILIP J.*, NOVOTNÁ D., RON C., VONDRÁK J., STRNAD L. & FRÁNA J.: The emerging potential of growth rhythms for definition of ocean-atmospheric circulation domains and possible implications for palaeogeography in orogenic belts. *Lecture. From Gondwana and Laurussia to Pangea: Dynamics of Oceans and Supercontinents. 20th International Senckenberg-Conference and 2nd Geinitz-Conference. Final Meeting of IGCP 497 and IGCP 499, September 30 – October 3, 2008.* Frankfurt am Main.

HLADIL J., *KOPTÍKOVÁ L.*, *LISÁ L.*, *ČEJCHAN P.*, RŮŽIČKA M., KULAVIAK L., *ADAMOVIČ J.*, *JANEČKA J.*, VEČEŘ M., DRAHOŠ J. & HAVLICA J.: Stromatactis and stromatactum pattern formation in sediment: constraints from fluid mechanics and rheology and implications for environments, sedimentary architecture and cyclostratigraphy. *Lecture. International Conference Global Alignments of Lower Devonian Carbonate and Clastic Sequences, SDS and IGCP Project 499 joint field meeting, August 25 – September 3, 2008.* Kitab.

HLADIL J., *SLAVÍK L.*, *KOPTÍKOVÁ L.*, *SCHNABL P.*, VACEK F., BÁBEK O. & *GERŠL M.*: Relationships between magnetic susceptibility of limestones and sea level change ("direct relationship and major crises on the Earth"). *Lec-*

ture. The 33rd International Geological Congress, August 6–14, 2008. Oslo.

HLADIL J., *SLAVÍK L.*, *SCHNABL P.*, *KOPTÍKOVÁ L.*, FRÁNA J., VACEK F. & BÁBEK O.: The gross environmental phenomenon of the classical Pragian stage ("hot lowstand"). *Lecture. 33rd International Geological Congress, August 6–14, 2008.* Oslo.

HOJDOVÁ M., *NAVRÁTIL T.* & *ROHOVEC J.*: Mercury contamination of soils in vicinity of historical mining area. *Lecture. The 33rd International Geological Congress, August 6–14, 2008.* Oslo.

HOUŠA V., *PRUNER P.*, ZAKHAROV V., KOŠŤÁK M., *CHADIMA M.*, ROGOV M., *ŠLECHTA S.* & MAZUCH M.: Principal results of Boreal - Tethyan Correlation of the Jurassic – Cretaceous Boundary by Magnetostratigraphy. *Poster. 5th International Symposium of IGCP(International Geological Correlation Programme) 506, April 28–31, 2008.* Hammamet.

KADLEC J.: Magnetostratigrafie jeskynních sedimentů Nízkých Tater. *Lecture. IV. Letná škola kvartérnych štúdií 2008, Demanovská jaskyňa Slobody. 21.–28. 6.* Demänová.

KADLEC J.: Povodňové sedimenty řeky Moravy (Strážnické Pomoraví) - geofyzikální a geochemický archív holocenních říčních procesů. *Lecture. Geochemické semináře České geologické služby. Podzimní cyklus 2008, December 12, 2008* . Praha.

KADLEC J.: Příčiny klimatických změn, aneb bude ohrožen náš život?. *Lecture. Geochemický seminář Ústavu geochemie, mineralogie a nerostných zdrojů UK PřF, November 18, 2008*. Praha.

KADLEC J., GRYGAR T., SVETLÍK I., ETTLER V., MIHALJEVIČ M., DIEHL J. & BESKE-DIEHL S.: Morava River flood plain sediments deposited during the last millennium: Climatic and anthropogenic record. *Lecture. 33rd International Geological Congress, August 6–14*. Oslo.

KADLEC J., DIEHL J.F., BESKE-DIEHL S., GRYGAR T. & SVETLIK I.: Natural and human impacts on the magnetic signal from the Late Holocene flood-plain deposits of the Morava River (Czech Republic). *Lecture. FLAG Biennial Meeting, September 3–7, 2008*. Budapest.

KALVODA L., DLOUHÁ M., DRÁB M., DRAHOKOUPIL J., GRISHIN A., MAREK J., SEDLÁK P., VRATISLAV S., *HLADIL J.*, *CHADIMA M.* & KOCKELMANN W.: Investigation of microstructural anisotropy of limestone. *Poster. 11th European Powder Diffraction Conference, EPDIC, September 19–22, 2008.* Warszawa.

KLETETSCHKA G.: Magnetic Signature of Soils due to Wild Fires. *Lecture. Workshop on Soil Magnetism: Multi-disciplinary Perspectives, Emerging Applications and New Frontiers, August 18–20, 2008.* Cranfield.

KLETETSCHKA G.: Testing of the presence of large electromagnetic pulse during the Tunguska event for the Mirror Matter hypothesis. *Poster. 100 years of Tungus problem, June 27–29, 2008.* Krasnoyarsk.

KLETETSCHKA G. & ADACHI T.: Magnetic Detection of Large Magnetic Fields that Occurred During the Vredefort Impact, Implications for Mars Magnetic Anomalies. *Lecture. Large Meteorite Impacts and Planetary Evolution IV, August 17–21, 2008.* Vredefort Dome.

KLETETSCHKA G., GETTY S.A. & ADACHI T.: First steps towards the remote detection of radiation resistant life forms. *Lecture. Japan Geoscience Union Meeting 2008, May 25–30, 2008.* Chiba.

KLETETSCHKA G., KLETETSCHKA K. & MIKULA V.: Magnetic signatures recorded in rocks and trees located inside the Tunguska blast 100 years ago, implications for Mirror Matter, Comet, and Kimberlite Pipe explosion hypotheses. *Poster. 2008 American Geophysical Union Fall Meeting, December 15–19, 2008.* San Francisco.

KLETETSCHKA G., LUNSFORD A., GETTY S.A., ADACHI T., MIKULA V. & WASILEWSKI P.: Magnetic probing of extraterrestrial solid surfaces. *Poster. Japan Geoscience Union Meeting 2008, May 25–30, 2008.* Chiba.

KOČÁR P., SŮVOVÁ Z., KOČÁROVÁ R., HENDRYCHOVÁ L. & *HLAVÁČ J.*: Bioarcheologický výzkum kapucínského kláštera na náměstí Republiky v Praze – první výsledky. *Lecture. Forum Archaeologiae Post-medievalis, April 8–9, 2008*. Praha.

KOHOUT T., DEUTSCH A., PESONEN L.J., HORNEMANN U. & HEIKINHEIMO E.: Shock recovery experiments with artificially made magnetite pellets in the range of 10 to 45 GPa. *Lecture. 28th Nordic Geological Winter Meeting, January 7, 2008.* Aalborg.

KOHOUT T., KOSTEROV A., HALODA J. & TÝCOVÁ P.: Magnetic properties of enstatite chondrites and iron bearing sulfides. *Poster. Paleo, Rock and Environmental Magnetism 11th Castle Meeting, June 22–28, 2008.* Bojnice.

KOHOUT T. & *KLETETSCHKA G.*: Magnetic Record of Ordinary Chondrite Chondrules. *Poster. 2007 American Geophysical Union Fall Meeting, December 10–14, 2008.* San Francisco.

KOHOUT T., O'SULLIVAN K., LOSIAK A., KRING D., THAISEN K. & WEIDER S.: Robotic and human exploration of the Schrödinger basin. *Poster. Joint Annual Meeting of LEAG-ICEUM-SRR, October 28–31, 2008.* Cape Canaveral.

KOHOUT T., PESONEN L.J., DEUTSCH A., HORNEMANN U. & HEIKINHEIMO E.: Shock recovery experiments in the range of 10 to 45 GPa - comparison of results of synthetic magnetite and terrestrial diabase. *Poster. 2008 American Geophysical Union Fall Meeting, December 15–19, 2008.* San Francisco.

KOPTÍKOVÁ L., BERKYOVÁ S., *HLADIL J.*, *SLAVÍK L.*, *SCHNABL P.*, FRÁNA J. & *BÖHMOVÁ V.*: Long-distance correlation of Basal Chotec Event sections using magnetic susceptibility (Barrandian –vs– Nevada) and lateral and vertical variations in fine-grained non-carbonate mineral phases. *Lecture. International Conference Global Aligments of Lower Devonian Carbonate and Clastic Sequences, SDS/ IGCP Project 499 joint field meeting, August 25 – September 3, 2008.* Kitab.

KOPTÍKOVÁ L., *HLADIL J.*, *SLAVÍK L.*, FRÁNA J. & VACEK F.: Evidence of a significant change between Lochkovian and Pragian: detailed lithological, geophysical, geochemical and mineralogical aspects (Pozary 3 section in Prague Synform). *Field workshop 2008 IGCP 499-UNESCO "Devonian Land-Sea Interaction, Evolution of Ecosystems and Climate" (DEVEC), April 23–30, 2008*. Tripoli.

KUBÍNOVÁ P., *DRAHOTA P.*, FIŠÁK J., *SKŘIVAN P.* & *ROHOVEC J.*: Meteorologické situace v hydrologickém roce 2007 a jejich důsledky pro biogeodynamiku některých chemických prvků v modelovém povodí Lesního potoka. *Lecture. Hydrologie malého povodí 2008, April Paper (Lecture), ISBN 978-80-87117-03-3, 23–24, 2008*. Praha.

KULAVIAK L., RŮŽIČKA M., DRAHOŠ J. & *HLADIL J.*: Cavities formation in sedimentary deposits. *Lecture. 35th International Conference of Slovak Society of Chemical Engineering, SSCHE 2008, May 26–30, 2008.* Tatranské Matliare.

KULAVIAK L., VEČEŘ M., RŮŽIČKA M., DRAHOŠ J. & *HLADIL J.*: Flow behavior of model suspensions: hydrodynamical instabilities of polydispersed settling layers. *Lecture. 18th International Congress of Chemical and Process Engineering, CHISA 2008, August 24–28, 2008.* Praha.

KULAVIAK L., VEČEŘ M., RŮŽIČKA M., DRAHOŠ J. & *HLADIL J.*: Viscosity characteristic of real suspensions. *Poster. 35th International Conference of Slovak Society of Chemical Engineering, SSCHE 2008, May 26–30, 2008.* Tatranské Matliare.

KULAVIAK L., VEČEŘ M., RŮŽIČKA M., DRAHOŠ J. & *HLADIL J.*: Viscosity characteristics of geological suspensions. *Poster. 18th International Congress of Chemical and Process Engineering, CHISA 2008, August 24–28, 2008.* Praha.

LIBERTÍN M. & *DAŠKOVÁ J.*: Primitive gallery forest from the Intrasudetic Basins. *Lecture. 5th Symposium on Permo-Carboniferous Faunas, July 7–11, 2008.* Hradec Králové.

LISÁ L., KVIETOK M. & PETR L.: Ukázka interakce krajina – člověk – krajina na příkladu geoarcheologického výzkumu lokality Praha – Sobín. *Lecture. 14. KVARTÉR 2008, 27. 11. 2008*. Brno.

LOJKA R., DRÁBKOVÁ J., *ZAJÍC J.*, FRANCŮ J., SÝKOROVÁ I. & GRYGAR T.: Environmental response to climatically driven lake-level fluctuations: record from Stephanian B freshwater reservoir of eastern tropical Pangea (Mšec Member, Kladno-Rakovník Basin, Central Bohemia). *Lecture. 5th Symposium on Permo-Carboniferous Faunas, July 7–11, 2008*. Hradec Králové.

LOSIAK A., *KOHOUT T.*, LOSIAK A., THAISEN K., WEIDER S. & KRING D.: Establishing a precise absolute chronology of the Moon – a need for robotic missions. *Poster. Joint Annual Meeting of LEAG-ICEUM-SRR (2008), October 28–31, 2008.* Cape Canaveral.

LUKENEDER A., *PRUNER P.*, *SCHNABL P.*, REHÁKOVÁ D. & HALASOVÁ D.: Nutzhof – A new key section for the Jurassic- Cretaceous boundary (Klippenbelt, Lower Austria). *Poster. PANGEO AUSTRIA 2008, September 22–25, 2008.* Wien.

MACHADO G., *HLADIL J.*, *KOPTÍKOVÁ L.*, FONSECA P.E., *GALLE A.* & ROCHA F.T.: Middle Devonian reef fauna and co-occuring acritarchs from deformed volcanosedimentary sequences within the Beja Igneous Complex (SW Ossa-Morena Zone, Portugal). *Lecture. From Gondwana and Laurussia to Pangea: Dynamics of Oceans and Supercontinents. 20th International Senckenberg-Conference and 2nd Geinitz-Conference, Final Meeting of IGCP 497 and IGCP 499, September 30 – October 3, 2008.* Frankfurt am Main.

MACHADO G.,*VAVRDOVÁ M.*, FONSECA P.E., CHAMINÉ H.I. & ROCHA F.T., Stratigraphy and biogeographical results from the Devonian of the Albergaria – a – Velha Unit. *Lecture. Konference na počest prof. Blanky Pacltové, Přírodovědecká fakulta UK, prosinec 2008*. Praha.

MARTÍNEK K., *SVOJTKA M.* & FILIP J.: Multiphase cooling and exhumation of the Krkonoše Piedmont Basin during Mesozoic-Cenozoic basin inversion based on apatite fission track analysis. *Lecture. The 33rd International Geological Congress*, *6. –14. 8. 2008*. Oslo.

MARTÍNEK K., *SVOJTKA M.* & FILIP J.: Permo-Carboniferous Krkonoše Piedmont Basin inversion: cooling and exhumation during Mesozoic – Cenozoic based on apatite fission track analysis. *Lecture*. *POKOS 3, 15. –21. 9. 2008*. Kudowa Zdroj.

MIKULÁŠ R.: Bioerosion features in tufa sediments in the floodplain of the Labe river, Czech Republic. *Poster. 6th International Bioerosion Workshop, July 13–20, 2008.* Salt Lake City.

MIKULÁŠ R.: Epigenetické voštiny. *Lecture. Seminář "Klokočí 2008 – pískovce", April 23–24, 2008.* Bělá u Turnova.

MIKULÁŠ R.: The principle of "Frozen Evolution" and its manifestation in the fossil record: the brachiopod genus Aegiromena Havlíček, 1961 (Upper Ordovician, Czech Republic). *Lecture. Paleontological workshop held in honour of Doc. RNDr. Jaroslav Kraft, CSc., October 17–18, 2008.* Plzeň, Rokycany.

MIKULÁŠ R., BROMLEY R.G. & GENISE J.F.: The find of insect borings in the Middle Jurassic lignite, Bornholm, Denmark. *Lecture. 6th International Bioerosion Workshop, July 13–20, 2008.* Salt Lake City.

MIKULÁŠ R., FATKA O. & SZABAD M.: Predation and scavenging traces on trilobite exoskeletons, Middle Cambrian, Czech Republic. *Lecture. 6th International Bioerosion Workshop, July 13–20, 2008.* Salt Lake City.

MIKULÁŠ R., FATKA O., SZABAD M., MICKA V. & ŠINÁGL M.: The Cambrian Arachnostega (and few other ichnologic surprises) from the Middle Cambrian, Czech Republic. *Poster. Second International Congress on Ichnology, Poland, September 1–5, 2008*. Kraków.

MIKULÁŠ R., GENISE J.F. & BROMLEY R.G.: Insect borings in the Jurassic lignites, Bornholm, Denmark. *Lecture. 11th Coal Geology Conference, May 26–30, 2008*. Praha.

MIKULÁŠ R., GUTIÉRREZ MARCO J.C.: The ichnogenus *Arachnostega* Bertling, 1992: one of the most common trace fossils in the Mediterranean Region of the Ordovician. *Lecture. Second International Congress on Ichnology, Poland, September 1–5, 2008*. Kraków.

MIKULÁŠ R. & ZASADIL B.: Fungal (?) pits in the Late Paleozoic and Tertiary mineralized wood, Czech Republic. *Poster. 6th International Bioerosion Workshop, July 13–20, 2008.* Salt Lake City.

MIKULÁŠ R., ZASADIL B.: The paleontological sitgnificance of hollows in Carboniferous to Permian fossils wood of the Central-Western Bohemian coal-bearing basis. *Lecture. 11th Coal Geology Conference, May 26–30, 2008*. Praha.

NATALIN N.M., *MIKULÁŠ R.* & DRONOV A.V.: Trace fossils coupled with "Ediacara-like" enigmatic structures: Middle

Cambrian, St. Petersburg Region, Russia. *Poster. Second International Congress on Ichnology, Poland, September 1–5, 2008*. Kraków.

NAVRÁTIL T., HOJDOVÁ M., ROHOVEC J., PENÍŽEK V. & VAŘILOVÁ Z.: Effect of fire on Hg pools in soils of forested ecosystem. *Poster. The 33rd International Geological Congress, August 6–14, 2008.* Oslo.

NOVÁK J.K.: High-Ti basaltic rocks of the Western Krušné hory Mts.: Possibnle parent rock types for thr Ti-bearing clays in the Sokolov Basin? *Lecture 11th Coal Geology Conference, May 26–30, 2008*. Praha.

NOVÁK J.K., ULRYCH J., ACKERMAN L., JELÍNEK E., *CHADIMA M.*, SCHNABL P., MIZERA J. & KUČERA J.: High-Ti basaltic rocks in the uplifted shoulder of the Ohře (Eger) Rift, Western Bohemia/Saxony. *Poster. 33rd International Geological Congress, August 6–14, 2008.* Oslo.

O'SULLIVAN K., *KOHOUT T.*, LOSIAK A., KRING D., THAISEN K. & WEIDER S.: Schrödinger basin: A geologically diverse landing area. *Poster. Joint Annual Meeting of LEAG-ICEUM-SRR (2008), October 28–31, 2008.* Cape Canaveral.

PETRUŽÁLEK M., LOKAJÍČEK T., RUDAJEV V. & *VILHELM J.*: Lokalizace jevů akustické emise v anizotropním prostředí. *Lecture. OVA ´08 – New Knowledge and Measurements in Seismology, Engineering Geophysics and Geotechnics, April 8–10, 2008.* Ostrava.

PETRUŽÁLEK M., LOKAJÍČEK T., RUDAJEV V. & VILHELM J.: Lokalizace jevů akustické emise v anizotropním prostředí. *Lecture. OVA '08 – New Knowledge and Measurements in Seismology, Engineering Geophysics and Geotechnics, April 8-10, 2008.* Ostrava.

PRUNER P.: Magnetostratigrafie jursko-křídových sedimentů v tethydní a boreální oblasti. *Lecture. Seminář Ústavu HG IG a GF na PřF UK, December 8, 2008.* Praha.

PRUNER P., BOSÁK P., KADLEC J., SCHNABL P., ŠLECHTA S., MAN O., HORÁČEK I., ZUPAN-HAJNA N. & MIHEVC A.: Paleomagnetic and palaeontological research in Račiška pečina cave, SW Slovenia. *Poster. Paleo, Rock and Environmental Magnetism 11th Castle Meeting, June 22–28, 2008.* Bojnice.

PRUNER P., SCHLÖGL J. & KOŠŤÁK M.: In memory of Miloš Rakús. *Lecture. 5th International Symposium of IGCP (International Geological Correlation Programme) 506, April 28–31, 2008.* Hammamet.

PRUNER P., SCHLÖGL J. & KOŠŤÁK M.: In memory of Václav Houša. *Lecture. 5th International Symposium of IGCP (International Geological Correlation Programme) 506, April 28–31, 2008.* Hammamet.

PRUNER P., SCHNABL P. & LUKENEDER A.: Magnetostratigraphy across the Jurassic/Cretaceous boundary strata in the Nutzhof, Austria – preliminary results. *Lecture. Paleo, Rock and Environmental Magnetism 11th Castle Meeting, June 22–28, 2008.* Bojnice.

PRUNER P., SCHNABL P. & LUKENEDER A.: Preliminary results of magnetostratigraphic investigations across the Jurassic/Cretaceous boundary strata in the Nutzhof, Austria. *Lecture. 1st International Meeting on Correlation of Cretaceous Micro- and Macrofossils, May 16–18, 2008.* Wien.

PRUNER P., ZUPAN-HAJNA N., MIHEVC A., *VENHODOVÁ D., SCHNABL P., ŠLECHTA S.* & *BOSÁK P.*: Paleomagnetic research of cave sediments in Slovenia in 2007. *Lecture. 16th International Karstological School "Classical Karst", June 16–21, 2008.* Postojna.

PRUNER P., ZUPAN-HAJNA N., MIHEVC A., *VENHODOVÁ D., SCHNABL P., ŠLECHTA S.* & *BOSÁK P.*: Paleomagnetic research of cave sediments in Slovenia in 2007. *Poster. 16th International Karstological School "Classical Karst", June 16–21, 2008.* Postojna.

ŘANDA Z., MIZERA J., *NOVÁK J.K., ULRYCH J.* & KUČERA J.: Instrumental neutron and photon analysis of high-titanium basaltic rocks from continental rift. *Lecture. 2nd International Nuclear Chemistry Congress (INCC).* Cancún

SCHNABL P., CAJZ V., CHADIMA M., RAPRICH V., *ŠLECHTA S.* & *PRUNER P.*: Magnetostratigrafický výzkum vulkanického komplexu Úhošť Doupovské hory). *Lecture. Seminář Odborné skupiny vulkanologie České geologické společnosti, October 6–8, 2008.* Turnov – Sedmihorky.

SCHNABL P., CAJZ V., CHADIMA M., ŠLECHTA S., RAPRICH V. & *PRUNER P.*: Magnetostratigraphic investigation of volcanic rock from the Úhošť hill (Doupovské hory Mts.). *Lecture. Paleo, Rock and Environmental Magnetism 11th Castle Meeting, June 22–28, 2008.* Bojnice.

SCHNABL P., LUKENEDER A. & *PRUNER P.*: Preliminary results of magnetic mineralogy investigations of Upper Jurassic and Lower Cretaceous sediments from Nutzhof, Austria. *Poster. 1st International Meeting on Correlation of Cretaceous Micro- and Macrofossils, May 16–18, 2008.* Wien.

SCHNABL P., PRUNER P., HOUŠA V., CHADIMA M. & *ŠLECHTA S.*: Summary of basic magnetic parameters on the Jurassic–Cretacous boundary. *Poster. Paleo, Rock and Environmental Magnetism 11th Castle Meeting, June 22–28, 2008.* Bojnice.

SCHNABL P., PRUNER P. & LUKENEDER A.: Rockmagnetic investigation of upper Jurassic and lower Cretaceous sediments from Nutzhof, Austria. *Poster. Paleo, Rock and Environmental Magnetism 11th Castle Meeting, June 22–28, 2008.* Bojnice.

SIBLÍK M.: Review of the Upper Triassic brachiopods in the Northern Calcareous Alps. *Poster. Meeting IGCP 467 and STS „Upper Triassic Subdivisions, Zonations and Events", 28. 9. – 2. 10. 2008.* Bad Goisern.

ŠIMŮNEK Z., *ZAJÍC J.* & DRÁBKOVÁ J.: Biota of the Líně Formation (Stephanian C), mode of preservation and its palaeoecological interpretation. *Lecture. 11th Coal Geology Conference Prague 2008, May 26–30, 2008.* Praha.

SLAVÍK L.: Conodont faunas from the Barrandian area – their potential for detail biostratigraphic subdivision of the Lower Devonian. *Poster. 9th Paleontological Conference, October 10–11, 2008.* Warszawa.

SLAVÍK L., CARLS P., VALENZUELA-RÍOS J., *HLADIL J.*, KALVODA J. & *KOPTÍKOVÁ L.*: Pragian of the Prague Synform: stratigraphy, global correlation and boundary problems. *Lecture. International Conference Global Alignments of Lower Devonian Carbonate and Clastic Sequences,*

SDS and IGCP Project 499 joint field meeting, August 25 – September 3, 2008. Kitab.

SLAVÍK L., CARLS P., VALENZUELA-RÍOS J., *KOPTÍKOVÁ L.*, *HLADIL J.* & VACEK F.: Proposal of detailed biostratigraphic subdivision of the Lochkovian in the Prague Synform. *Lecture. Field workshop 2008 IGCP 499-UNESCO "Devonian Land-Sea Interaction, Evolution of Ecosystems and Climate" (DEVEC), May 23–30, 2008.* Tripoli.

SLAVÍK L., *KOPTÍKOVÁ L.* & *HLADIL J.*: Integrated stratigraphy of the Lower Devonian in the Prague Synform (Barrandian area, Czech Republic) – biostratigraphic refinements. *Lecture. From Gondwana and Laurussia to Pangea: Dynamics of Oceans and Supercontinents. 20th International Senckenberg-Conference and 2nd Geinitz-Conference, Final Meeting of IGCP 497 and IGCP 499, September 30 – October 3, 2008.* Frankfurt am Main.

ŠLECHTA S.: Paleoenviromentalni rekonstrukce. *Lecture. Seminář Ústavu HG IG a GF na PřF UK, December 8, 2008.* Praha.

ŠLECHTA S. & *KADLEC J.*: Environmentální záznam v jeskynních sedimentech. *Lecture. 14. KVARTÉR 2008, November 27, 2008.* Brno.

ŠLECHTA S. & *KADLEC J.*: Environmentální záznam v jeskynních sedimentech. *Lecture. Semináře HIG v letním semestru 2008/2009 Ústavu hydrogeologie, inženýrské geologie a užité geofyziky Přírodovědecké fakulty Univerzity Karlovy v Praze, December 8, 2008.* Praha.

ŠLECHTA S. & *KADLEC J.*: Mineral magnetic environmental record in clastic cave deposits. *Poster. Paleo, Rock and Environmental Magnetism 11th Castle Meeting, June 22–28, 2008.* Bojnice.

ŠTAMBERG S. & *ZAJÍC Z.*: Carboniferous and Permian faunas and their occurence in the limnic basins of the Czech Republic. *Lecture. 5th Symposium on Permo-Carboniferous Faunas, July 7–11, 2008.* Hradec Králové.

STEHLÍK F.: Analýza polohových změn koryt řeky Moravy ve Strážnickém Pomoraví: vliv regulace na dynamiku toku. *Lecture. 14. KVARTÉR 2008, November 27, 2008.* Brno.

ŠTORCH P.: Silurian graptolite biofacies of Bohemia: a history envisaged from species diversity and morphological disparity patterns. *July 23, 2008. Workshop on Graptolite volume of Treatise on Invertebrate Paleontology and GWG Meeting.* Svatý Jan pod Skalou.

STRNAD L., ETTLER V., MIHALJEVIČ M. & *HLADIL J.*: Trace elements in landfill calcite: a comparison of solution & laser ablation ICP-MS and calibration to different standard material (SRM NIST glass and USGS MACS carbonate). *Poster. SEM-SEA 2008, XXVIII Reunión de la Sociedad Española de Mineralogía, XXI Reunión de la Sociedad Española de Arcillas, September 16–19, 2008.* Zaragoza.

SUTTNER T.J., BERKYOVÁ S., HUBMANN B., *KOPTÍKOVÁ L.*, FRÝDA J. & *HLADIL J.*: The Basal Chotec Event in neritic sequences of the Prague Basin and the Graz Palaeozoic compared. From Gondwana and Laurussia to Pangea: Dynamics of Oceans and Supercontinents. *Poster. 20th International Senckenberg-Conference and 2nd Geinitz-Conference. Final Meeting of IGCP 497 and IGCP 499, Spetember 30 – October 3, 2008.* Frankfurt am Main.

SVOBODOVÁ M., ŠPIČÁKOVÁ L. & ULIČNÝ D.: Palynomorphs, paleoenvironment and sequence stratigraphy in the boreholes of Cenomanian and Lower Turonian age from the Bohemian Cretaceous Basin, Czech Republic. *Poster. 12th International Palynological Congress and 8th International Organisation of Palaeobotany Conference, August 30 – September 5, 2008.* Bonn.

THAISEN K., LOSIAK A., *KOHOUT T.*, O'SULLIVAN K., WEIDER S. & KRING D.: Geographic information systems: An enabling tool for lunar Exploration. *Poster. Joint Annual Meeting of LEAG-ICEUM-SRR (2008), October 28–31, 2008.* Cape Canaveral.

VILHELM J., *RUDAJEV V.*, *ŽIVOR R.*, *LOKAJÍČEK T.* & *PROS Z.*: Influence of structure and cracks distribution on P-wave velocity anisotropy in rocks – laboratory and field study. *Poster. EAGE Rome 2008, June 9–12, 2008.* Roma.

VAVRDOVÁ M., GILÍKOVÁ H., *MIKULÁŠ R.*: Vend na jižní Moravě. *Konference na počest prof. Blanky Pacltové., Přírodovědecká fakulta UK v Praze, prosinec 2008.* Praha.

WAGNER J., LIPECKI G. & KRAWCZYK M.: New evidence of *Ursus minimus* from the territory of Poland. *Poster. 14th International Cave Bear Symposium, September 18 – 22, 2008.* Appenzell.

WERNER T., GRABOWSKI J., *PRUNER P.*, *SCHNABL P.* & *HLADIL J.*: Preliminary AMS and rock magnetic interpretations for Devonian carbonates of Moravo-Silesian Zone (Czech Republic). *Poster. Paleo, Rock and Environmental Magnetism 11th Castle Meeting, June 22–28, 2008.* Bojnice.

ZAJÍC J.: The main Late Carboniferous and Early Permian lake fish communities of the Czech Republic. *Lecture. 5th Symposium on Permo-Carboniferous Faunas, July 7–11, 2008.* Hradec Králové.

ZAJÍC J.: The limnic origin of majority of the Permo-Carboniferous basins of the Bohemian Massif. *Lecture. 5th Symposium on Permo-Carboniferous Faunas, July 7–11, 2008.* Hradec Králové.

ZAJÍC J.: Czech and Moravian Permian acanthodians. *Lecture. 5th Symposium on Permo-Carboniferous Faunas, July 7–11, 2008.* Hradec Králové.

ŽIGOVÁ A., ŠŤASTNÝ M. & KREJČOVÁ J.: Soil development on spongilitic marlstones in natural and human impacted systems at selected localities of Prague. (Czech Republic). *Poster. EUROSOIL CONGRESS 2008. August 25–29, 2008.* Wien.

ŽIGOVÁ A., ŠŤASTNÝ M., KREJČOVÁ J. & *KOPTÍKOVÁ L.*: Diverzita půd v CHKO Krivoklátsko. *12. Pedologické dny na téma: "Antropogenní zatížení půd".Lecture. 16.–17. 9. 2008.* Kostelec nad Černými lesy.

ŽÍTT J., VODRÁŽKA R., ČECH S., HRADECKÁ L. & *SVOBODOVÁ M.* Taphocoenoses of the Cenomanian/Turonian boundary interval: the case study of Plaňany, Bohemian Cretaceous Basin. *Poster. 9th Paleontological Conference, 10.–11 October 2008.* Warszawa.

ŽÍTT J., ČECH S., KOŠŤÁK M., HRADECKÁ L. & *SVOBODOVÁ M.*: Micrasterids (Echinoidea) in siliciclastic sedi-

ments of the upper Turonian (Bohemian Cretaceous Basin): taxonomy, taphonomy, sedimentary environment, biostratigraphy. *Lecture. 9th Paleontological Conference, 10. –11 October 2008*. Warszawa.
ZUPAN-HAJNA N., MIHEVC A., *PRUNER P.* & *BOSÁK P.*: Age of cave sediments in Slovenia. *Lecture. 3. Mitteleuropäische Geomorphologietagung, September 23–28, 2008.* Salzburg.
ZUPAN-HAJNA N., MIHEVC A., *PRUNER P.* & *BOSÁK P.*: Results of palaeomagnetic research of karst sediments in Slovenia. *Lecture. 33rd International Geological Congress, August 6–14, 2008.* Oslo.

5i. Unpublished reports 2007

BOSÁK P. (2007)*: Komentář ke skutečnostem zjištěným při posuzování postupu těžebních stěn Velkolomu Čertovy schody – západ. Akce sanace a rekultivace severní stěny. Období: leden až prosinec 2006*. – Geol. úst. AV ČR, v. v. i. pro Velkolom Čertovy schody, a. s.: 1–10. Praha.
BOSÁK P. (2007): *Posudek postupu těžebních stěn Velkolomu Čertovy schody – západ. Akce sanace a rekultivace severní stěny. Období: leden až prosinec 2006*. – Geol. úst. AV ČR, v. v. i. pro Velkolom Čertovy schody, a. s.: 1–215, 1–23. Praha.
BOSÁK P., *PRUNER P.* (Red.), BELLA P., HERCMAN H., HOCHMUTH Z. & KICIŃSKA D. (2007): *Výzkum sedimentárních výplní vybraných jeskyní na Slovensku. Etapová zpráva č. 6.* – Geol. úst. AV ČR, v. v. i. pro Správu Slovenských jaskýň: 1–48. Praha.
NOVÁK J.K. (2007): *Hlavní geologické rysy spolkové země Lara, severozápad Venezuely.* – Geol. úst. AV ČR, v. v. i. pro GET, Ltd.: 1–29. Praha.
NOVÁK J.K., *BEK J.*, *BOSÁK P.*, *PAVKOVÁ J.*, *STRAKOVÁ J.* & *DOBROVOLNÝ J.* (2007): *Kaolinitické pískovce Nekmíř – Horní Bělá. Závěrečná zpráva*. – MS, Geol. úst. AV ČR, v. v. i. pro Gekon, Ltd.: 1–27, 1–14,1–22,1–9,1–6. Praha.
NOVÁK J.K., *BOSÁK P.* & *KORBELOVÁ Z.* (2007): *Petrographic expertise of building stones taken from the temple complex Angkor, Cambodia.* – Geol. úst. AV ČR, v. v. i. pro Centrum výzkumu Řež, Ltd.: 1–40. Praha.
NOVÁK J.K., *BOSÁK P.*, *KORBELOVÁ Z.* & *PAVKOVÁ J.* (2007): Selected igneous rocks from the Benbow Inlier-west proposed as crushed rock aggregates, Jamaica. Progress Report. – Inst. Geol. AS CR, v. v. i. for GET, Ltd.: 1–35, 1–21. Praha.
NOVÁK J.K., *BOSÁK P.* & *PAVKOVÁ J.* (2007): *High-grade limestones from the Santa Cruz Mts., Jamaica. Progress Report*. – Inst. Geol. AS CR, v. v. i. for GET, Ltd.: 1–25,1–5. Praha.
NOVÁK J.K., *BOSÁK P.* & *ŽIVOR R.* (2007): *Kaolinitické pískovce, Krašovice-Trnová.* – Geol. úst. AV ČR, v. v. i. pro Gekon, Ltd.: 1–27. Praha.
ŽÁK K., *BOSÁK P.* & *CÍLEK V.* (2007): *Doporučení k celostátnímu systému evidence jeskyní v Agentuře ochrany přírody a krajiny ČR (JESO).* – Geol. úst. AV ČR, v. v. i.: 1–17. Praha.

5j. Unpublished reports 2008

BOSÁK P. (2008): *Odhady propustnosti. Praha 6 – Suchdol. Staveniště nové budovy GLÚ AV ČR, v. v. i.* – Geol. úst. AV ČR, v. v. i.: 1–7. Praha.
BOSÁK P. (2008): *Posudek postupu těžebních stěn Velkolomu Čertovy schody – západ. Akce sanace a rekultivace severní stěny. Období: leden až prosinec 2007*. – Geol. úst. AV ČR, v. v. i. pro Velkolom Čertovy schody, a. s.: 1–73, 1–21. Praha.
BOSÁK P. (2008): *Prvotní grafická dokumentace vrtných jader podle popisu vrtů (nekorigováno karotáži). Akce Mělník-Benátky nad Jizerou. Surovina: černé uhlí; č. 29792204. Geoindustria Praha, n.p. – Geoindustria GMS Praha, a.s. 1984-1991. Zahrnuje vrty Geoindustria akce č. 29792204, vrty Ústředního ústavu geologického (MJ, MB, apod.)*. – Arch. Geol. Úst. AV ČR, v. v. i.: 1–10 + 65 příl. (6 boxů). Praha.
BOSÁK P. (2008): *Prvotní grafická dokumentace vrtných jader podle popisu vrtů (nekorigováno karotáži). Akce Mělník-Benátky nad Jizerou. Surovina: černé uhlí; č. 01792206. Geoindustria Praha, n.p. – Geoindustria GMS Praha, a. s. 1984-1991*. – Arch. Geol. Úst. AV ČR, v. v. i.: 1–2 + 3 příl. (1 box). Praha.
BOSÁK P. (2008): *Special diagenetic and hypergenic features in the Koněprusy Limestone, Koněprusy deposit, Barrandian. Progress Report*. – Inst. Geol. AS CR, v. v. i. for VLČS, a. s.: 1–92. Praha.
BOSÁK P., PRUNER P., WOO K.-S. & HERCMAN H. (Eds., 2008)*: Palaeomagnetic research of fill of selected cave sediments in Korea. Final Report.* – Inst. Geol. AS CR, v. v. i.: 1–134. Praha.
BOSÁK P., *SKÁLA R.*, ZUPAN HAJNA N. & OTONIČAR B. (Eds., 2008)*: Mineralogic analyses of samples from karst sediments in Slovenia, 4. Final Report*. – Inst. Geol. AS CR, v. v. i. and IZRK SRC SASU: 1–98. Praha-Postojna.
BRUTHANS J. & *FILIPPI M.* (2008): *Vývoj a rychlosti procesů v solném krasu v pohoří Zagros, Írán: rychlosti denudace, stáří krasových jevů a řídící faktory.* - Grantová agentura Akademie Věd České Republiky: 1–14. Praha.
NOVÁK J.K. & *BOSÁK P.* (2008): *Diverse rock types from Jamaica: perspectives from petrography and whole-rock chemistry*. – Inst. Geol. AS CR, v. v. i. for GET, Ltd.: 1–23, 1–16. Praha.
NOVÁK J.K. & *BOSÁK P*. (2008): *Sedimentary kaolin and sand of the Black River Bay, Jamaica as supplementary raw material. Initial Report*. – Inst. Geology AS CR, v.v.i. for GET, Ltd: 1–24. Praha.
NOVÁK J.K., *BOSÁK P.* & *PAVKOVÁ J.*: *High-grade limestones from the Santa Cruz Mts. Progress report 2. Pure calcaren-*

ite and calcirudite from the Santa Cruz Mts., Jamaica as raw cementitious materials. – Inst. Geol. AS CR, v. v. i. for GET, Ltd.: 1–34, 1–15. Praha.

NOVÁK J.K., BOSÁK P., PAVKOVÁ J. & *ERDINGEROVÁ J.* (2008): *Sklářské a slévárenské písky z území mezi Zahrádkami a Srním: detritické minerální asociace v zrnitostních frakcích. Závěrečná zpráva*. – Geol. Úst. AV ČR, v. v. i for GEKON, Ltd.: 1–67. Praha.

NOVÁK J.K., PAVKOVÁ J. & *BOSÁK P.* (2008): *Volcanic and volcaniclastic rocks from the Bito and Ramble area, Jamaica: Petrography and whole-rock chemistry. Progress report No. 1*. – Inst. Geol. AS CR, v. v. i. for GET, Ltd.: 1–52. Praha.

RUDAJEV V. & J. BUBEN (2008): *Ocenění seismického ohrožení na základě polynomiální aproximace funkce rozdělení kmitů zrychlení na staveništi JE Temelín. Expertíza*. – Geol. úst. AV ČR, v. v. i. for ČEZ Jaderná elektrárna Temelín: 1–28. Praha.

ŽÁK K. (2008): *Feasibility of karst hydrogeological research in the Loferer Schacht area, Loferer Steinberge, Austria*. – Inst. Geol. AS CR, v. v. i. for Deutscher Alpenverein, Höhlengruppe Frankfurt/Main: 1–21. Praha.

ŽIVOR R. (2008): *Triaxiální pevnosti vybraných typů hornin. Závěrečná zpráva*. – Geol. úst. AV ČR, v. v. i. pro ČGS pobočka Brno: 1–13. Praha.

5k. Popular science

Magazines, journals, newspapers, books 2007

CÍLEK V. (2007): Až bude Mostecko opět nádherný kraj. – *Hospodářské noviny, 16. 1. 2007*: 9. Praha.

CÍLEK V. (2007): *Borgesův svět*. – Dokořán: 1–228. Praha.

CÍLEK V. (2007): Buffalo Bill a Eliška Stříbrná Dolar. – *Kladno Záporno – kulturní revue pro Kladno*, 2: 58-61. Kladno.

CÍLEK V. (2007): Cesta do Uničova aneb o mezeře mezi ptáky. – *Analogon*, 50/51: 101–103. Praha.

CÍLEK V. (2007): Co je a kde se vzala geodiverzita. – *Bedrník*, 1, 5: 12–16. Středisko ekologické výchovy a etiky. Rýchory.

CÍLEK V. (2007): Do Středozemí bych v létě nejezdil. Rozhovor s B. Fliedrem. – *Lidové noviny, 20. 1., příloha Horizont*: 11. Praha.

CÍLEK V. (2007): Doslov: manažeři a náčelníci. – *In:* KRATOCHVÍL I.: *Manažerova lidská tvář*: 113–115. Nakladatelství P. Novák-Gimli.

CÍLEK V. (2007): Duchovní rozměr ropy. Esej o světě, který je založen na rychlosti. – *Respekt*, 9: 19. Praha.

CÍLEK V. (2007): Dům a domov. – *Respekt*, 32: 27. Praha.

CÍLEK V. (2007): Egyptský bestiář. – *Respekt*, 37: 58–59. Praha.

CÍLEK V. (2007): Esej o kladenských haldách a krajině ve znamení Stalkera. – *In:* M. BARTOŠ (Ed., 2007): *Krajinou pochybností. Sborník z Ekologických dnů v Olomouci*: 151–162. Olomouc–Nymburk.

CÍLEK V. (2007): Globální špačci na úsvitu nové doby. – *Respekt*, 39: 58. Praha.

CÍLEK V. (2007): Jak Saudové zachraňují civilizaci. Spory o znamení konce ropné doby. – *Respekt*, 26: 26. Praha.

CÍLEK V. (2007): Jako svět máme našlápnuto k problémovému období. Rozhovor s T. Mikšovským. – *Petrol Magazín*, 3/2007: 12–14. Praha.

CÍLEK V. (2007): Kam směřuje poloostrov Evropa. – *Respekt*, 14: 26. Praha.

CÍLEK V. (2007): Klimatická svoboda – *Respekt*, 27: 1. Praha.

CÍLEK V. (2007): Logický absurdní svět. – *Respekt*, 38: 59. Praha.

CÍLEK V. (2007): Lupiči, čarodějnice a strach. Jak se poučit z katastrof malé doby ledové. – *Respekt*, 30: 18. Praha.

CÍLEK V. (2007): Matka krav a otec bahna. – *Katalog výstavy Lughnasad 2007. Bohyně Brigith jako pramatka zemědělství*: 21–22. Sdružení Lugh. Kačina.

CÍLEK V. (2007): Mezera mezi dvěma stromy. Jak spolu souvisejí aleje, sny a vztahy ke starým lidem. – *Respekt*, 24: 26. Praha.

CÍLEK V. (2007): Na každého z nás pracuje 70 otroků. Rozhovor o ropě s J. Maškem. – *MF Dnes, 23. 7. 2007, Ekonomika*: B3. Praha.

CÍLEK V. (2007): Návrat mocných draků. Klima se mění, vědci hlásí podíl na řízení světa. – *Respekt*, 7: 18. Praha.

CÍLEK V. (2007): Olomouc. Neviditelné město. – *In:* M. BARTOŠ (Rd., 2007): *Krajinou pochybností. Sborník z Ekologických dnů v Olomouci*: 15–32. Olomouc–Nymburk.

CÍLEK V. (2007): Pohodlný život. – *SME, 5. 5. 2007*: 14. Bratislava.

CÍLEK V. (2007): Pochod stromů. Kde leží pravlast středoevropského buku? – *Respekt*, 44: 59. Praha.

CÍLEK V. (2007): Postavme pomník Rudolfu II. – *Respekt*, 5: 21. Praha.

CÍLEK V. (2007): Proč zanikají říše. – *Respekt*, 27: 21. Praha.

CÍLEK V. (2007): Ropa jako metafora civilizace. – *MF Dnes, Víkend/Věda, 20. 1. 2007*: C9. Praha.

CÍLEK V. (2007): Rozpad komplexních společností. Civilizace jsou křehké a přechodné záležitosti. – *Vesmír*, 86, 3: 147–151. Praha.

CÍLEK V. (2007): Tekutý čas na starých horách. Globalizace versus vinařství. – *Respekt*, 36: 59. Praha.

Cílek V. (2007): Už nikdy nie až tak ľahučko. – *SME, 7. 3. 2007, Fórum*: 2. Bratislava.

CÍLEK V. (2007): Z čeho jsou složeny pyramidy. – *Respekt*, 21: 26. Praha.

CÍLEK V. (2007): Záhada paleocenního uhlíku. – *Vesmír*, 3: 760. Praha.

CÍLEK V. (2007): Zahrádkaření je vášeň. – *Krkonoše/Jizerské hory*, 6: 4. Trutnov.

CÍLEK V. (2007): Zpět k chudobě. Ceny ropy. – *Respekt*, 46: 64–65. Praha.

CÍLEK V., HARTL M. & SCHMELZOVÁ R. (2007): *Krásná černobílá Poldi. Josef Hoffmann, evropský architekt na Kladně*. – Společnost Poldi Hütte: 1–56. Kladno.

CÍLEK V. & KAŠÍK M. (2007): *Nejistý plamen. Průvodce ropným světem*. – Dokořán: 1–191. Praha.

HLADIL J., JAROŠOVÁ J., MATYÁŠ J. & HNÍKOVÁ E. (2007): Milovníci extrémů kontra atom. – *Lidové noviny, příloha Věda, 9. 6. 2007*: 3. Praha.

JAROŠOVÁ J. & *KADLEC J.* (2007): Ledovcové archivy I. – *Lidové noviny, 1. 9. 2007*: 9. Praha.

KADLEC J. (2007): Krápníky promlouvají o minulosti. – Lidové noviny, 27. 10. 2007: 10. Praha.

KOŘEN V., NÝVLT D., MENTLÍK P., BŘÍZOVÁ E., JANÁSKOVÁ B. & *HLAVÁČ J.*: Planeta věda. O době ledové. *Broadcast (in Nationwide TV). ČT24, December 9, 2007.* Praha.

MATYÁŠ J., *HLADIL J.*, *KOPTÍKOVÁ L.* & VAVERKA P. (2007): Mikroskopická vstupenka do minulosti – Bakterie a další organismy žijící v extrémním prostředí prozrazují, jak dříve ožívala krajina po ekologických katastrofách. – *Lidové noviny, příloha Věda, 31. 3. 2007*: 11. Praha.

Magazines, journals, newspapers, books 2008

BÁRTA M., *CÍLEK V.*, ČERNÝ V., FILIP J., HALUZÍK R., HORÁČEK I., KRATOCHVÍL Z., MARKOŠ A., MEDUNA P., POKORNÝ P., SÁDLO J., SLANINA F., STORCH D. & ŠTORCHOVÁ H. (2008): *Něco překrásného se končí. Kolapsy v přírodě a společnosti*. – Dokořán: 1–254. Praha.

BOROVIČKA J. (2008): Jsou houby radioaktivní? – *Lidové noviny, 13. 9. 2008*: 26. Praha.

CÍLEK V. (2008): Optimistická zpráva o průběhu velkého civilizačního kolapsu na okrese Prachatice. – *Salon 551, Literární a kulturní příloha Práva, 3. 1. 2008*: 1 a 4.. Praha.

CÍLEK V. (2008): Nová situace. – Národní, 3: 12–13. Praha.

CÍLEK V. (2008): Pluh a mor. – *Respekt*, 2: 58–59. Praha.

CÍLEK V. (2008): Neurotica. – *Respekt*, 2: 59. Praha.

CÍLEK V. (2008): Zůstáváme stranou. Rusko a evropská energetika. – *Respekt*, 11: 56–57. Praha.

CÍLEK V. (2008): Žijeme na dluh. – *Respekt*, 19: 58–59. Praha.

CÍLEK V. (2008): Tahat čerta za ocas. Budoucnost české energetiky. – *Respekt*, 24: 58–59. Praha.

CÍLEK V. (2008): Ochlazení, které nepřišlo. Vědci předpověděli změny klimatu již před třiceti lety. – *Respekt*, 28: 59. Praha.

CÍLEK V. (2008): Ochránci pouště. – *Respekt*, 29: 56-57. Praha.

CÍLEK V. (2008): Lidská drenáž. – *Respekt*, 34: 39. Praha.

CÍLEK V. (2008): Chvála stagnace. – *Respekt*, 37: 58. Praha.

CÍLEK V. (2008): Oběd máš v lednici. – *Respekt*, 38: 58–59. Praha.

CÍLEK V. (2008): Svět prázdných ropných děr. – *Respekt*, 44: 56–58. Praha.

CÍLEK V. (2008): Nevýhody googlu. – *Respekt*, 48: 59. Praha.

CÍLEK V. (2008): Konec všeho – probuzení ve století úpadků. Recenze. – *Vesmír*, 87, 2: 132–133. Praha.

CÍLEK V. (2008): Energetická bezpečnost České republiky. – *Vesmír*, 87: 582–585. Praha.

CÍLEK V. (2008): Bludné kameny často provokují zažitou pravdu. – *Hospodářské noviny, 2. 4. 2008*: 9. Praha.

CÍLEK V. (2008): Život nejen na ekonomické houpačce. – *Hospodářské noviny, 23. 10. 2008*: 11. Praha.

CÍLEK V. (2008): Chvála 19. století. Strom jako člen rodiny. – *Konec konců*, 1: 49–51. Brno.

CÍLEK V. (2008): Nepříjemná synergie 21. století: klima, společnost a ropa. Seminář „Klimatické změny a co s nimi?“ – *Fontes Rerum*, 22: 111–125. Praha.

CÍLEK V. (2008): Nejspíš nastává éra neklidné společnosti. – *MF Dnes, Příloha Kavárna, 4. 7. 2008*: D4–D6. Praha.

CÍLEK V. (2008): Čtenář poezie. – *Tvar*, 14: str. 11. Praha.

CÍLEK V. (2008): Materiál kladenských hald. – *Zastavení naučné stezky č. 6. Majrovka*. Kladno.

CÍLEK V. (2008): Řekni: Jsem dítě Země a Hvězdné oblohy. – *Katalog Lughnasad 2008*: 21–30. Lugh. Praha.

CÍLEK V. (2008): Neetníci, freetři a hikokomori: příliš inteligentní a příliš líní. – *In: Sborník „Nové trendy v zaměstnávání mladých a stárnoucích zaměstnanců*: 1–6. JASEKA. Praha.

CÍLEK V. (2008): Hikikomori: příliš inteligentní a příliš líní. – *Krok – Knihovnická revue Olomouckého kraje*, 4: 26–28. Olomouc.

CÍLEK V. (2008): Posvátná krajina. – *Člověk a výchova*, 2: 10–13. Praha.

CÍLEK V. (2008): Žijeme v období obecné změny. Rozhovor s H. Kolářovou. – *Zpravodaj MŽP*, 11: 23–26. Praha.

CÍLEK V. (2008): O stavbách, krajině a společnosti. Rozhovor s J. Schmidtem. – *Architekt*, 04: 24–29. Praha.

CÍLEK V. (2008): Stará a nová příroda. – *Naše příroda*, 1: 72–77. Olomouc.

CÍLEK V. (2008): Řekni: Jsem dítě země a hvězdné oblohy. – *Logos*, 1/2: 73–85. Praha.

CÍLEK V. (2008): Stavět podle přírody nebo podle člověka? Should we build according nature or man? – *In:* KRATOCHVÍL P. (Ed.): *Zelená architektura.cz/Green architecture.cz*: 31–36. Praha.

CÍLEK V. (2008): Kameny z Čech. – *In:* CAILLOIS R.: *Kameny a další texty*:101–106. Malvern. Praha.

CÍLEK V. (2008): Výchozí situace. – *In:* OSVALDOVÁ B. & KOPÁČ R. (Eds.): *Pokusy a dobrodružství: poznámky k eseji*: 29–36. Karolinum. Praha.

CÍLEK V. (2008): Svatý Prokop a tradice jeskynních poustevníků. – *In:* DVOŘÁK O. & HOLEČKOVÁ M.: *Krajinou Čertovy brázdy*: 162–167. Nakladatelství MH Beroun.

CÍLEK V. (2008): *Můj tučňák. Divné verše. Výběr básní V. Nezvala. Mocca*. – Dokořán: 1–64. Praha.

CÍLEK V. (2008): *Dýchat s ptáky. Obyčejné texty o světlu paměti, pravdě oblaků a útěše míst*. – Dokořán: 1–247. Praha.

CÍLEK V., MACH P. & PETRŽÍLEK P. (2008): Klimatické změny a co s nimi? Záznam diskuze ze stejnojmenného semináře. – Fontes Rerum 22, 59–110. Praha.

CÍLEK V. & MARKOŠ A. (2008): Horká hluboká biosféra. – *In:* MARKOŠ A.: Profil absolventa: 283–304. Academia. Praha.

CÍLEK V., KORBA M. & MAJER M. (2008): *Podzemní Praha. Jeskyně, doly, štoly, krypty a podzemní pískovny velké Prahy*. – Eminent: 1–320. Praha.

FILIPPI M. (2008): Erupce, lávové proudy a nebe plné popela. – *Outdoor, Speciál Sopky 08´*: 90–95. Praha.

FILIPPI M. (2008): Kamčatka – Geošpeky a žhavé perly. – *Outdoor, Speciál Sopky 08´*: 44–48. Praha.

FILIPPI M. & PROSICKÝ O. (2008): 99+1 věc, kterou byste měli vědět o sopce. – *Outdoor, Speciál Sopky 08´*: 6–12. Praha.

GOREY E. (2008): *Kuriozní lenoška jiné příběhy*. Překlad: *CÍLEK V.* & KOČOVÁ J. – Dokořán: 1–111. Praha.

GRYGAR T. & *KADLEC J.* (2008): Přírodní archiv řeky Moravy. – *Vesmír*, 87: 466–470. Praha.

HEJNA A., *MIKULÁŠ R.*, LENHART Z., PAVLÍK R., DUDÍK P. & VLACH O. (2008): Pozůstatky po dolování na mapách pro OB. – *Orientační běh*, 2008/2: 13–14. Praha.

JAROŠOVÁ J. & *KADLEC J.* (2008): Faraoni se mohli setkat s mamuty. – *Lidové noviny, 13. 9. 2008*: 26. Praha.

JAROŠOVÁ J., METELKA L. & *KADLEC J.* (2008): Koráli ukazují kolísání oceánů. – *Lidové noviny 26. 4. 2008*: 26. Praha.
KOPTÍKOVÁ L. (2008): Zemní pyramidy s granátovou čepičkou. – *Vesmír*, 87, 2: 156–160. Praha.
KOŘEN V. & *HLAVÁČ J.*: Živé srdce Evropy: Lačník stepní. *Broadcast (in Nationwide TV). ČT1, February 25, 2008.* Praha.
LISÁ L., *HLADIL J.*, VYLITA T. (2007): Mikrosvět a makrosvět vřídlovce – karlovarská přírodní laboratoř. – *Vesmír*, 86, 7: 420–425. Praha.
LISÁ L., LISÝ P. (2007): Petroglyfy v kyrgyzských horách. – *Vesmír*, 86, 4: 240–244. Praha.
MIKULÁŠ R. (2008): Divočina na Jižním Městě. – *Respekt*, 19, 17: 58–59.
MIKULÁŠ R. (2008): Geologická úvaha nad dobrodružstvími Rychlých Šípů v pískovcových skalách. – *Booklet for the exhibition of illustrations, Discovery Tours, s. r. o. & Geopark Český ráj, o. p. s.*: 1–2. Malá Skála.
MIKULÁŠ R. (2008): Hledání ztracené pospolitosti. – *Kladno Záporno – kulturní revue pro Kladno*, 5: 91–92. Kladno.
MIKULÁŠ R. (2008): Impakt faktor a soutěživost před 25 lety, dnes, za 25 let? – *Vesmír* 87, 3: 194–195. Praha.
MIKULÁŠ R. (2008): Jak vybočit z řady. – *Respekt*, 19, 40: 58–59. Praha.
MIKULÁŠ R. (2008): Krása mramorů východního Pobaltí: barvy a stopy živočichů. – *Kámen* 2008/2: 76–77. Praha.
MIKULÁŠ R. (2008): Mění se celková hmotnost naší planety za dobu její existence? Odpověď na otázku čtenáře.– *Lidové noviny, Příloha Věda 10. 6. 2008*: 2. Praha.
MIKULÁŠ R. (2008): Projekt nastolující otázky. Dolf Seilacher a výstava Fossil Art. – *Kulturní týdeník A*2, 4, 39: 8. Praha.
MIKULÁŠ R. (2008): Terény pro orientační běh, brownfields a nová divočina. – *Orientační běh*, 2008/2: 15–18. Praha.
MIKULÁŠ R. (2008): Úkryty a útočiště. – *Kulturní týdeník A2*, 4, 19: 21. Praha.
MIKULÁŠ R. (2008): Zasvěcená samota. – *Respekt*, 19, 31: 56–58. Praha.
MIKULÁŠ R. & JAROŠOVÁ J. (2008): Louka předčí prales. – *In:* MATYÁŠ J. (Ed.): Meteor pro LN, *Lidové noviny, Příloha Věda, 31. 5. 2008*: 3. Praha.
MIKULÁŠ R. & JAROŠOVÁ J. (2008): Život několikrát vymřel. – *In:* MATYÁŠ J. (Ed.): Meteor pro LN, *Lidové noviny, Příloha Věda, 24. 5. 2008*: 3. Praha.
PROSICKÝ O., *FILIPPI M.* & JAKOUBKOVÁ D. (2008): Rizika pohybu po sopce. – *Outdoor, Speciál Sopky 08´*: 78–79. Praha.
PŘIBÁŇ J., VAŠÍČEK Z., SEMÍN M., FREIOVÁ M., VYBÍRAL J., *CÍLEK V.*, KOMÁREK S., HNILIČKA P., STELLNER F. & BOJAR T. (2008): *Otisky komunismu. Imprints of communism*. – Mitte Studio: 1–136. Praha.
ŘÍDKOŠIL T., *CAJZ V.* & RAPPRICH V. (2008): Třetihorní vulkány. – *Krkonoše, Jizerské hory, 2:* 38–39. Vrchlabí.
SMUTEK D., DOUCEK J., *MIKULÁŠ R.* &VODRÁŽKA R. (2008): Heřmanův Městec. Město u dvou moří. Průvodce naučnou stezkou.–*Společnost přátel Železných hor a Grantis, s.r.o*: 1–12. Heřmanův Městec.
VAŘILOVÁ Z. & *ADAMOVIČ J.* (2008): Červený svět v permu aneb Doba zániku posledních českých velehor. – *Zpravodaj Národního parku České Švýcarsko 2008*: 8–9. Krásná Lípa.

Television and radio broadcasting 2007

HLADIL J. & HÁDKOVÁ J.: Vstupte! s geologem Jindřichem Hladilem – Poznejte extrémofily, mikroorganizmy, které si libují v extrémních životních podmínkách. *Broadcast (in Nationwide Radio). Český rozhlas – Leonardo (Czech Radio – Leonardo), April 20, 2007*. Praha.
HLADIL J. & HÁDKOVÁ J.: Vstupte! s geologem Jindřichem Hladilem – Poznejte extrémofily, mikroorganizmy, které si libují v extrémních životních podmínkách. *Broadcast (in Nationwide Radio). Český rozhlas – Leonardo (Czech Radio – Leonardo), April 20, 2007*. Praha.
HLADIL J. & JAROŠOVÁ J.: Extrémofilové a jaderná úložiště. *Broadcast (in Nationwide Radio). Český rozhlas 2 – Meteor, Český rozhlas – Leonardo, June 9, 2007*. Praha.
HLADIL J., JAROŠOVÁ J. & KODEŠ J.: Extrémofilové. *Serial (in Nationwide Radio). Český rozhlas 2 – Meteor, April 24, 2007*. Praha.
HLADIL J., *PRUNER P.* & VEVERKA L.: Proč se mění mapa světa – Procesy v zemské kůře a plášti a s tím spojené pohyby litosférických desek. *Broadcast (in Nationwide Radio). Český rozhlas – Leonardo, January 26, 2007*. Praha.
OLIVOVÁ J. & *HLADIL J.*: Extrémofilové. *Serial (in Nationwide Radio). Český rozhlas 3 – Vltava, Mozaika – Věda, May 6–11, 2007*. Praha.
ROHOVEC J.: Projekt: Otevřená věda. *Audio-visual work, January 2007*.
VEVERKA L., RAJLICH P., *HLADIL J.*, *MIKULÁŠ R.* & VOJTA A.: Geologická záhada? Čechy jako impaktový kráter. *Broadcast (in Nationwide Radio). Český rozhlas – Leonardo, June 29, 2007*. Praha.

Television and radio broadcasting 2008

ADAMOVIČ J.: Pravčická brána. *Evening TV News (in Nationwide TV). ČT 1, ČT24, August 11, 2008. Praha.*
JAROŠOVÁ J. & *KADLEC J.*: Koráli ukazují kolísání oceánů. *Pořad METEOR Českého rozhlasu Čro 2 Praha a Čro Leonardo, April 26, 2008*. Praha.
JAROŠOVÁ J. & *KADLEC J.*: Faraoni se mohli setkat s mamuty. *Pořad METEOR Českého rozhlasu Čro 2 Praha a Čro Leonardo, September 13, 2008*. Praha.
KADLEC J.: Tajemství řeky Moravy. *Pořad METEOR Českého rozhlasu Čro2 Praha a ĆRo Leonardo, January 5, 2008.* Praha.
MIKULÁŠ R.: Země a život. Zahájení Mezinárodního roku planety Země (an interview with J. Kořen). *Broadcast (in Nationwide Television), ČT 24, February 2, 2008*. Praha (Praha).
MIKULÁŠ R., STAŇKOVÁ H.: Mezinárodní rok planety Země. *Broadcast (in Nationwide Radio). Český rozhlas – Leonardo (Czech Radio – Leonardo), February 12–14, 2008*. Praha (Praha).
MIKULÁŠ R. & DUŠEK J.: Duše K – měsíčník o vědě. *Broadcast (in Nationwide Radio). Český rozhlas 2, March 21, 2008*. Praha (Praha).
MIKULÁŠ R. & JAROŠOVÁ J. (2008): Život a Země. *Serial (in Nationwide Radio), three parts. Český rozhlas 2 – Meteor, April–August 2008*. Praha (Praha).
MIKULÁŠ R. & KOŘEN V.: Dvořákova stezka. In: KOŘEN V. (Ed.): Živé srdce Evropy. *Broadcast (in Nationwide Television), ČT 1, April 16, 2008*. Praha (Praha),

http://www.ceskatelevize.cz/vysilani/16.04.2008/208562210700075-18:40-1-zive-srdce-evropy-dvorakova-stezka-dvorakova-stezka.html

MIKULÁŠ R. & KOŘEN V. (Eds.): Pěnovec. In: KOŘEN V. (Ed.): Živé srdce Evropy. *Broadcast (in Nationwide Television), ČT 1, May 2, 2008*. Praha (Praha), http://www.ceskatelevize.cz/vysilani/02.05.2008/208562210700085-11:50-2-zive-srdce-evropy-penovec-penovec.html

MIKULÁŠ R. & MRÁZEK D.: Geologická historie okolí Prahy. *Broadcast (in Nationwide Radio). Český rozhlas – Leonardo (Czech Radio – Leonardo), recording October 16, 2008*. Praha (Praha).

MIKULÁŠ R. & OLIVOVÁ J.: Ichnologie – jak živé organismy transformují horniny *Broadcast (in Nationwide Radio). Český rozhlas 3 – Vltava and Český rozhlas – Leonardo (Czech Radio – Leonardo), March 26, 2008.* Praha (Praha).

MIKULÁŠ R., *LISÁ L.* & STAŇKOVÁ H.: Geologie Doupovských hor. Přírodovědný magazín Natura. *Broadcast (in Nationwide Radio). Český rozhlas – Leonardo (Czech Radio – Leonardo), June 20, 2008*. Praha (Praha).

MIKULÁŠ R. & VELINSKÝ F.: Ediakarská fauna. Magazín Planetárium. *Broadcast (in Regional Networks and in Nationwide Czech Radio – Leonardo), October 25–31*. Ústí nad Labem and Praha (Praha).

MIKULÁŠ R., *FILIPPI M.*, *ROHOVEC J.* & MRÁZEK D.: Exkurze v Geologickém ústavu AVČR. Přírodovědný magazín Natura. *Broadcast (in Nationwide Radio). Český rozhlas – Leonardo (Czech Radio – Leonardo), November 13, 2008*. Praha (Praha).

STAŇKOVÁ H., *MIKULÁŠ R.*, ZEDNÍK J. & ŠTĚDRÁ V.: Organismus naší planety je jedna velká skládačka Diskusní pořad „Třetí dimenze. *Broadcast (in Nationwide Radio). Český rozhlas - Leonardo (Czech Radio - Leonardo), February 14, 2008*. Praha (Praha).

ŠTORCH P.: Cesta do doby ledové. *Television Programme (in Nationwide TV). Port, ČT 2, November 11*, 2008. Praha.

TAMCHYNA R. & *KADLEC J.*: Ptejte se. *Český rozhlas radio Leonardo, March 3, 2008.* Praha.

1. Lectures for popular audience 2007

KADLEC J.: Příčiny klimatických změn aneb hrozí zánik našeho života? *Lecture.* Klub důchodců, Praha 4, *October 9, 2007.* Praha.

ŽÁK K.: Přednáška o jeskyních Českého krasu. *Lecture.* Museum of the Czech Karst, *November 29, 2007.* Beroun.

Lectures for popular audience 2008

ADAMOVIČ J.: Kde se vzala pískovcová skalní města. *Lecture. Týden vědy a techniky 3.–9. 11. 2008, Městská knihovna Praha.*

KADLEC J. (2008): Příčiny klimatických změn aneb bude ohrožený náš život? *Lecture. Ochrana fauny ČR. Středisko ekologické výchovy, areál Stanice pro zraněné živočichy, January 18, 2008. Votice.*

MIKULÁŠ R.: Země a život (Earth and Life). *In:* Zahájení Mezinárodního roku planety Země. *Press conference including the intereview for the Nationwide Television ČT 24. Academy of Sciences of the Czech Republic, Praha, February 10, 2008.*

MIKULÁŠ R.: Poustevnické krajiny v Čechách (The Bohemian Landscape and Emeritism). *Lecture. School of Applied Art, Praha, May 22, 2008.*

MIKULÁŠ R.: Geologie kvádrových pískovců (Geology of thick-bedded sandstones). *Lecture., Czech Mountaineering Society, Slatiňany, April 5, 2008.*

MIKULÁŠ R.: Co po nás zbude v předměstské krajině (Human traces in Present Suburban Landscape). *Lecture., Administrative Department of Praha-Kunratice, April 26, 2008.*

MIKULÁŠ R.: Geologická historie (a geologické historky) z Dobešky a okolí (Geological history /and geologists' stories/ of the vicinity of Dobeška, Praha). *Lecture. O.s. Sklep sobě, Divadlo Dobeška (Dobeška Theater), October 16, 2008.*

ROHOVEC J.: Geochemie. *Lecture*. The course „Den Země". *November, 2008.*

Exhibition

LIBERTÍN M. & *DAŠKOVÁ J.*: Pohlednice z našich karbonských pralesů. *Exhibiton, April 1 – June 17, 2007. Organized by National museum in Praha.* Prachatice.

6. Organization of conferences and scientific meetings

2007

Workshop: **Archeological field trip for grade 2 students of University of Cambridge, Moravia, western Slovakia, Austria, May 15–21, 2007**. Organized by University of Cambridge. Organizing committee: *Lisá L.*

The excursion was organized for students of archaeology from University of Cambridge. The localities included in the excursion program covered mainly Paleolithic localities in the area of Moravia (Předmostí, Kůlna Cave, Dolní Věstonice), neolithic locality in Krumlovský Les and also the famous Slavic site of Mikulčice. Localities in Slovakia included mainly Paleolithic and Slavic localities within the area around Bratislava. Students also visited Austrian site Carnuntum – Roman occupation. In total there were 35 participants.

International Conference: **Palaeobotany – contribution to the evolution of plants and vegetation, Praha, June 28–29, 2007**. Organized by Národní muzeum. Organizing committee: Kvaček J., *Dašková J.,* Kovar-Eder J. & Walther H.

The symposium covers a broad range of topics related to Tertiary and Cretaceous fossil plants. The conferece has been organized on the occasion of the 70th birthday of Zlatko Kvaček. 31 participants (20 from abroad).

Training Course: **Quaternary meeting (Velanská cesta, Netolice), České Budějovice, July 2–3, 2007**. Organized by Česká geologická skupina. Organizing committee: *Lisá L.*

The meetings of Quaternary students are annually organized by the Quaternary group of the Czech Geological Society.

The aim of these meetings is to visit interesting localities and discuss the problems connected with the given theme. Meeting in České Budějovice lasted two days and two localities were visited. Velanská cesta is the former lake close to the České Budějovice and we discussed a possibility of grant application concerned the research of this locality. Netolice is an archaeological site north of České Budějovice and the possibilities of geoarchaeological research were discussed there. The total number of participants was 10.

Conference: **3. Sjezd České geologické společnosti (3rd Congress of the Czech Geological Society), Volary, September 19–22, 2007**. Organized by the Česká geologická společnost. Organizing committee: *Breiter K.*

The symposium was held in town of Volary in southern Bohemia. The goal of the Congress was to bring together people from all branches of the Czech geological community to inform each other about actual scientific results and problems.

Total of 125 participants from Czech Republic, and Slovakia took part in this meeting and 85 lectures and posters were presented. Three one-day excursions present new results obtained during geological investigation of the Šumava Mts.

International Symposium: **XXXI. Czech – Polish – Slovak Symposium on mining and environmental geophysics, Janov nad Nisou, September 24–27, 2007.** Organized by the Institute of Geology AS CR, v. v. i. Organizing committee: *Rudajev V.* (chairman), *Živor R.* & *Petružálek M.*

The symposium was held in village of Janov nad Nisou (Jizerské hory Mts.) near city of Liberec (northern Bohemia). The goal of the Symposium was to present and to discuss new research projects, problems and obtained results connected with application of mining geophysics, especially mining seismology to the industry and to promote methods and results obtained by research teams and by engineers. Presentation of current environmental problems solved by geophysical methods was another goal of Symposium. Total of 45 participants from Czech Republic, Poland and Slovakia took part this symposium and 29 lectures were presented. A half day excursion was realized during Symposium. The Brewery and veteran car museum in Liberec–Vratislavice, Bozkov dolomite cave and Mumlava waterfall near Harrachov were visited. Abstracts of all presented lectures were published in *Proceedings of Abstracts* (Rudajev V. & Živor R., Eds., 2007, 38 pp.). Papers were published in monothematic issue of Journal *Acta geodynamica et geomaterialia*, vol. 5, No. 2 (150) or post-symposium *Proceedings of XXXI. Czech-Polish-Slovak Symposium on Mining and Environmental Geophysics* (Rudajev V. & Živor R., Eds., 2008, 72 pp.).

2008

Workshop: **Klokočky 2008 – field seminar on sandstone microrelief and mesorelief, Bělá u Turnova, April 23–24, 2008.** Organized by Institute of Geology AS CR, v. v. i., and by Český ráj, o. p. s. Organizing committee: *Adamovič J.* & Mertlík J.

The seminar consisted of indoor workshops each morning and of afternoon field trips. The topics solved centered around the definition of „sandstone morphofacies“, i. e., the set of microrelief parameters visible on vertical walls which would be typical of sandstones of a broader area and which would correspond to certain lithological parameters. Fifteen sandstone experts participating in the seminar were affiliated with domestic research institutions (Academy of Sciences, Charles University), caving clubs dealing with sandstone relief documentation, and nature conservation organizations.

Workshop: **Seminář o pískovcových krajinách (Seminar on sandstone landscapes), Prague, April 28, 2008.** Organized by the Administration of the Bohemian Switzerland National Park and by Institute of Geology AS CR, v. v. i. Organizing committee: Härtel H. & *Adamovič J.*

The seminar was held in the main building of the Academy of Sciences CR in Prague. This location permitted for a wide attendance by naturalists working in sandstone regions and by general public (ca. 60 participants). The lectures concentrated on sandstone geology and landscape protection, dating of relief-forming processes, and on animal and plant life typical for sandstone areas. Many of the lecturers and participants recruited from the team of authors of the recently published monograph „Sandstone Landscapes“ (Academia, Prague).

International Conference: **11th Coal Geology Conference, Prague, May 26–30, 2008.** Organized by the Faculty of Science, Charles University, Prague in co-operation with Ministry of Environment of the Czech Republic; Severočeské doly, a. s.; Sokolovská uhelná, právní nástupce, a. s.; Vynálezy, s. r. o.; Nikon, s. r. o.; Institute of Geology AS CR, v. v. i.; Czech Geological Survey, Prague; Institute of Rock Structure and Mechanics AS CR, v. v. i.; Institute of Geonics AS CR, v. v. i. Organizing committee: Pešek J., Opluštil S., Holý M., Mach K., Martinec P., Rojík P., Rozkošný I., Sýkorová I., Šimůnek Y. & *Zajíc J.*

The main topic of the conference was the reasonable utilization of coal reserves with regard to the environment. The other topics were geology and paleontology of coal-bearing strata; coal prospecting, exploration, evaluation and utilization; energy policy; trace elements in coal; coalbed methane; environmental impact of mining; coal combustion and reclamation. One-day field trip to the Sokolov and Cheb Tertiary Basins were realized during the conference. 66 participants from the Czech Republic, Bulgaria, China, Egypt, Iran, the Netherlands, Poland, Rumania, Slovakia, Turkey, and the Ukraine took part this conference and 42 lectures together with 13 posters were presented. Abstracts of all presented lectures were published in the Volume of Abstracts.

International Symposium: **5th Symposium on Permo-Carboniferous Faunas, Hradec Králové, Czech Republic, July 7–11, 2008.** Organized by the Museum of Eastern Bohemia at Hradec Králové and the Institute of Geology, v.v.i. of the Academy of Sciences of the Czech Republic. Organizing committee: Štamberg S. & *J. Zajíc J.*

The current studies concerning Carboniferous and Permian vertebrates, invertebrates, ichnofossils, paleobiogeography and biostratigraphy were presented. One-day workshop „Marine and Freshwater Environments in Carboniferous and Permian Deposits“ was included. Interpretations of the depositional environments (marine versus freshwater) of the Carboniferous and Permian fossil communities were discussed. Two days of field trips to the Krkonoše Piedmont and Boskovice Basins were realized by the end of the symposium. 34 participants from the Czech Republic, Australia, Canada, France, Germany, Italy, Slovakia, United Kingdom, and United States took part this symposium and 32 lectures were presented. Abstracts of all presented lectures were published in the Special Publication „Faunas and palaeoenvironments of the Late Palaeozoic".(Štamberg & Zajíc (eds.) 2008).

International workshop: **Workshop on Graptolite volume of Treatise on Invertebrate Paleontology and GWG Meeting, Svatý Jan pod Skalou, July 16–24, 2008.** Organized by Institute of Geology AS CR, v. v. i. in collaboration with Faculty of Sciences, Charles University. Organizing committee: *Štorch P.* & Kraft P.

The international workshop of the Graptolite Treatise authors and other fellow workers to achieve a progress in the book manuscript preparation and to discuss various topics of current graptolite research. A series of short papers presented at GWG Meeting has been published in a thematic issue of Bulletin of Geosciences (edited by P. Štorch, P. Kraft and D.K. Loydell) in April 2009.

Training Course: **Quaternary meeting (Moravian Karst II.), Moravian Karst, November 29, 2008**. Organized by the group Geomophology–Quaternary of the Czech Geological Society. Organizing committee: *Lisá L.*

The meetings of Quaternary students are annually organized by the Quaternary group of Czech Geological Society. The meeting in Moravian Karst was connected with the annual meeting of people working in Quaternary research. The southern part of Moravian Karst was visited and covered the entrance and lectures in Ochozská, Pekárna and Švédův stůl caves. The number of participants was 26.

7. Undergraduate and Graduate Education

7a. Undergraduate and Graduate Courses at Universities given by Staff Members of the Institute of Geology AS CR 2007

CAJZ V.: *Regional geology and volcanology of the České středohoří Mts.* (KGEO-0105). Undergraduate (optional) Course, Faculty of Science, University of J.E. Purkyně, Ústí nad Labem.

CAJZ V.: *Regional geology – field excursion* (KGEO-0106). Undergraduate (optional) Course, Faculty of Science, University of J.E. Purkyně, Ústí nad Labem.

CHVÁTALOVÁ A. & *CAJZ V.*: *Geology for geographers* (KGEO-P 226/P 147). Undergraduate Course, Faculty of Science, University of J.E. Purkyně, Ústí nad Labem.

CÍLEK V.: Czech Landscape. Seminar, Academy of Fine Arts, Technical University, Brno.

CÍLEK V.: Singularity (8206R080). Seminar, Faculty of Fine Arts, Technical University, Brno.

CÍLEK V.: European history and mentality. CHP, Collegium Hieronymi Pragense (Consortium of U.S. Universities), Praha

CÍLEK V.: Excursion USAC and Erasmus: Two five days excursions "Vienna-Budapest-Bratislava: Town and its environment". Faculty of Liberal Arts, Charles University, Praha.

DAŠKOVÁ J.: *Micropalaeontology* (K68). Undergraduate and Graduate (optional) Course, Faculty of Education, Charles University, Praha.

DATEL J. & *MIKULÁŠ R*: *Principles of Geology* (PVPAPA500029). Undergraduate (obligatory) Course, Department of Archaeology, Philosophical Faculty, Charles University, Prague.

DRESLEROVÁ D. & *LISÁ L.*: *Quaternary sedimentology and pedology* (program B7105R001/ENV). Joint undergraduate (optional) Course of environmental archaeology, Faculty of Philosophy, University of West Bohemia, Pilsen.

HOJDOVÁ M.: *Principles of Geology* (APA78E). Undergraduate Course, Faculty of Agrobiology, Food and Natural Resources, Czech University of Agriculture, Praha.

JELÍNEK E. & *ACKERMAN L.*: *Geochemistry of endogenic processes* (GP431902a). Undergraduate (obligatory) and Graduate (optional) Course, Faculty of Science, Charles University, Praha.

KADLEC J.: *Causes and consequences of the Quaternary climatic changes* (MG421P15). Undergraduate and Graduate Course, Faculty of Science, Charles University, Praha.

KADLEC J.: *Dating of karst sediments* (G9241). Undergraduate Course, Faculty of Sciences, Masaryk University, Brno.

KADLEC J.: *Geology of the Quarternary* (MG421P18G). Undergraduate Course, Faculty of Science, Charles University, Praha.

MAREK J. & *MIKULÁŠ R.*: *Animal paleoecology* (MG422P21). Undergraduate (optional) Course, Faculty of Science, Charles University, Praha.

MELICHAR R. & *JANEČKA J.*: *Tectonic analysis* (G7320). Undergraduate (obligatory) and Graduate (optional) Course, Faculty of Science, Masaryk University, Brno.

MIKULÁŠ R.: *Trace fossils and ichnofabric of sedimentary rocks* (MG421P40). Undergraduate and Postgraduate (optional) Course, Faculty of Science, Charles University, Praha.

NAVRÁTIL T. & *HOJDOVÁ M.*: *Heavy metals in the environment* (MG431P92). Undergraduate and Graduate Course, Faculty of Science, Charles University, Praha.

PRUNER P.: *Paleomagnetism in plate tectonics* (G440P61). Undergraduate and Graduate Course, Faculty of Science, Charles University, Praha.

ROČEK Z.: *Morphology of animals* (MB170P46). Bachelors Course, Faculty of Science, Charles University, Praha.

ROČEK Z.: *Comparative anatomy of vertebrates* (MB170P47). Undergraduate Course, Faculty of Science, Charles University, Praha.

ROČEK Z.: *Evolution of vertebrates* (MB170P43). Undergraduate and Graduate Course, Faculty of Science, Charles University, Praha.

ROČEK Z.: *Morphology of animals* (MB170P46). Undergraduate Course, Faculty of Science, Charles University, Praha.

ROČEK Z.: *Review of fossil vertebrates* (MB170P45). Undergraduate Course, Faculty of Science, Charles University, Praha.

ROČEK Z.: *Zoology of fossil vertebrates* (KZO/375). Undergraduate (optional) Course, Biological Faculty, Southbohemian University, České Budějovice.

RUDAJEV V.: *Physics of rock fracturing – selected topics.* Postgraduate Course, Faculty of Science, Charles University, Praha.

RUDAJEV V.: *Induced seismicity.* Postgraduate Course, Faculty of Science, Charles University, Praha.

ŠTORCH P.: *Principles and methods of stratigraphy* (G421P25). Undergraduate (optional) Course, Faculty of Science, Charles University, Praha.

ULRYCH J.: *Interpretation of mineralogical data.* (G431P67). Undergraduate (optional) Course, Faculty of Science, Charles University, Praha.

ULRYCH J.: *Systematic mineralogy* (D108003). Graduate (optional) Course, Faculty of Inorganic Chemistry, University of Chemical Technology, Praha.

VACH M.: *Air Protection* (ZVZ22E). Undergraduate Course, Forestry and Environmental Faculty, Czech Agricultural University, Praha.

VACH M.: *Atmospheric processes* (ZVZ01E). Undergraduate Course, Forestry and Environmental Faculty, Czech Agricultural University, Praha.

VACH M.: *Environmental chemistry I* (ZVZ04E). Undergraduate Course (Bc.), Forestry and Environmental Faculty, Czech Agricultural University, Praha.

VACH M.: *Environmental chemistry II* (ZVZ08E). Undergraduate Course (MSc.), Forestry and Environmental Faculty, Czech Agricultural University, Praha.

VACH M.: *Physico-chemical aspects of processes in environment* (ZVZ09E). Undergraduate Course, Forestry and Environmental Faculty, Czech Agricultural University, Praha.

VACH M.: *Transport of contaminants in atmosphere* (ZVL24E). Undergraduate Course, Forestry and Environmental Faculty, Czech Agricultural University, Praha.

ŽIGOVÁ A.: *Geography of soils and protection of soil resources of the Czech Republic* (MZ330P90). Undergraduate Course, Faculty of Science, Charles University (Praha).

7b. Undergraduate and Graduate Courses at Universities given by Staff Members of the Institute of Geology AS CR 2008

CAJZ V.: *Regional geology and volcanology of the České středohoří Mts.* (KGEO–0105). Undergraduate (optional) Course, MSc., Faculty of Science, University of J.E. Purkyně, Ústí nad Labem.

CAJZ V.: *Regional geology – field excursion* (KGEO–0106). Undergraduate (optional) Course, MSc., Faculty of Science, University of J.E. Purkyně, Ústí nad Labem.

CAJZ V., *CHADIMA M.*, *MIKULÁŠ R.* & *ZAJÍC J.*: *Selected topics in geological science* (KGEO-0110). Undergraduate (optional) course, MSc., Faculty of Science, J.E. Purkyně University, Ústí nad Labem.

CHVÁTALOVÁ A. & *CAJZ V.*: *Geology for geographers* (KGEO–P 226/P 417). Undergraduate Course, Bc., Faculty of Science, University of J.E. Purkyně, Ústí nad Labem.

CÍLEK V.: Singularity: Czech landscape – evolution and protection (8206R080). Seminar, Faculty of Fine Arts, Technical University, Brno.

CÍLEK V.: *European mentality, history and landscape* . Collegium Hieronymi Pragense

DRESLEROVÁ D. & *LISÁ L.*: *Quaternary sedimentology and pedology* (program B7105R001/ENV). Joint undergraduate (optional) Course of environmental archaeology, Faculty of Philosophy University of West Bohemia in Pilsen.

JELÍNEK E. & *ACKERMAN L.*: *Geochemistry of Endogenic Processes* (G431P02a). Undergraduate Obligatory Course, Faculty of Science, Charles University, Praha.

KADLEC J.: *Quaternary Geology* (MG421P18G). Undergraduate Course (Bc.), Faculty of Science, Charles University, Praha.

KNEBLOVÁ L. & *KUBÍNOVÁ P.*: *Drinking water treatment and sewage treatment* (ZVZ14Z). Undergraduate Course. Faculty of Environmental Sciences. Czech University of Life Sciences Prague.

KOŠŤÁK M. & *MIKULÁŠ R.*: *Paleoecology* (MG422P51). Undergraduate (optional) Course, Faculty of Science, Charles University, Prague.

LISÁ L.: Quaternary sedimentology, geomorphology and pedology (Environmental archeology, B7105). Undergraduate (MSc., optional) Course, Philosophical Faculty, Westbohemian University, Plzeň.

MIKULÁŠ R.: *Trace fossils and ichnofabric of sedimentary rocks* (MG421P40). Undergraduate and Postgraduate (optional) Course, Faculty of Science, Charles University, Prague.

NAVRÁTIL T. & *HOJDOVÁ M.*: *Heavy metals in the environment* (MG431P92). Undergraduate and Graduate Course, Faculty of Science, Charles University, Praha.

OPLUŠTIL S. & *MIKULÁŠ R.*: *Seminar in sedimentology* (MG421S31B). Undergraduate (optional) Course, Faculty of Science, Charles University in Prague.

PŘIKRYL T.: *Comparative Anatomy of Vertebrates* (MB170P47). Undergraduate (optional) Course and Practical Study, Faculty of Science, Charles University, Prague.

PŘIKRYL T.: *Morphology of animals* (MB170C46). Practical Study, Faculty of Science, Charles University, Prague.

PRUNER P.: *Paleomagnetism in plate tectonics* (G440P61). Undergraduate and Graduate Course, Faculty of Science, Charles University, Praha.

ROČEK Z.: *Morphology of animals* (MB170P46). Bachelors Course, Faculty of Science, Charles University, Praha.

ROČEK Z.: *Comparative anatomy of vertebrates* (MB170P47). Undergraduate Course, Faculty of Science, Charles University, Praha.

ROČEK Z.: *Evolution of vertebrates* (MB170P43). Undergraduate and Graduate Course, Faculty of Science, Charles University, Praha.

ROČEK Z.: *Morphology of animals* (MB170P46). Undergraduate Course, Faculty of Science, Charles University, Praha.

ROČEK Z.: *Review of fossil vertebrates* (MB170P45). Undergraduate Course, Faculty of Science, Charles University, Praha.

ROČEK Z.: *Zoology of fossil vertebrates* (KZO/375). Undergraduate (optional) Course, Biological Faculty, Southbohemian University, České Budějovice.

RUDAJEV V.: *Physics of rock fracturing – selected topics*. Postgraduate Course, Faculty of Science, Charles University, Praha.

SKÁLA R.: Introduction to systematic mineralogy (MG431P48). Undergraduate (Bc.) Course, Faculty of Science, Charles University, Praha.

SKÁLA R.: Principles of mineralogy (MG431P52/MG431P52U). Undergraduate (Bc.) Course, Faculty of Science, Charles University, Praha.

SKÁLA R.: Impact cratering and shock metamorphosis. (MG431P39) Undergraduate (optional, MSc.) Course, Faculty of Science, Charles University, Praha.

ŠTORCH P.: *Principles and methods of stratigraphy* (G421P25). Undergraduate (optional) Course, Faculty of Science, Charles University, Praha.

ULRYCH J.: *Interpretation of mineralogical data.* (G431P67). Undergraduate (optional) Course, Faculty of Science, Charles University, Praha.

ULRYCH J.: *Systematic Mineralogy* (D 108003). Graduate (optional) Course, Faculty of Chemical Technology, University of Chemical Technology, Praha.

VACH M.: *Air Protection* (ZVZ22E). Undergraduate Course, Forestry and Environmental Faculty, Czech Agricultural University, Praha.

VACH M.: *Atmospheric processes* (ZVZ01E). Undergraduate Course, Forestry and Environmental Faculty, Czech Agricultural University, Praha.

VACH M.: *Environmental chemistry I* (ZVZ04E). Undergraduate Course, Forestry and Environmental Faculty, Czech Agricultural University, Praha.

VACH M.: *Environmental Chemistry II* (ZVZ08E). Undergraduate Course, Forestry and Environmental Faculty, Czech Agricultural University, Praha.

VACH M.: *Physico-chemical aspects of processes in environment* (ZVZ09E). Undergraduate Course, Forestry and Environmental Faculty, Czech Agricultural University, Praha.

VACH M.: *Transport of contaminants in atmosphere* (ZVL24E). Undergraduate Course, Forestry and Environmental Faculty, Czech Agricultural University, Praha.

ŽIGOVÁ A.: *Geography of soils and protection of soil resources of the Czech Republic* (MZ330P90). Undergraduate Course, Faculty of Science, Charles University, Praha.

7c. Supervision in Undergraduate Studies 2007+2008

BOKR P. (MSc. Thesis), Faculty of Science, Charles University, Prague (*co-supervisor R. Mikuláš, defended 2007*).

DOUCEK J. (Bc. Thesis), Faculty of Science, Charles University in Praha (*supervisor R. Mikuláš, defended in 2008*)

DVOŘÁKOVÁ M. (Bc. Thesis), Faculty of Science, Charles University, Praha (*supervisor J. Kadlec, defended in 2008*)

KŘÍŽOVÁ L. (Bc. Thesis), Faculty of Science, Charles University, Praha (*co-supervisor L. Lisá, finished in 2008*)

ČERMÁKOVÁ HANA (MSc. thesis), Faculty of Science, Charles University, Praha (*supervisor Z. Pros, graduated in 2008*)

DOLEŽALOVÁ L. (MSc. thesis), Faculty of Science, Charles University, Praha (co-*supervisor J. Adamovič, graduated in 2007*)

DOUCEK J. (MSc. Thesis), Faculty of Science, Charles University, Praha (*supervisor R. Mikuláš, since 2008*).

DRÁBKOVÁ V. (MSc. thesis), Faculty of Science, Charles University, Praha (*co-supervisor/advisor J. Hladil, since 2008*)

HOŠEK J. (MSc.Thesis), Faculty of Science, Charles University, Praha (*supervisor J. Kadlec, since 2008*)

KRŇANSKÁ M. (MSc. Thesis), Faculty of Science, Charles University, Praha (*supervisor L. Ackerman, defended in 2008*)

KOVAČIKOVÁ V. (MSc. thesis), Faculty of Science, Charles University in Praha (*supervisor T. Navrátil, since 2008*)

KUČEROVÁ K. (MSc. thesis), Faculty of Science, Masaryk University in Brno (*supervisor J. Hladil*)

MATOUŠKOVÁ Š. (MSc. Thesis), Faculty of Science, Charles University, Praha (*supervisor J. Rohovec, defended in 2007*).

POLECHA R. (MSc. Thesis), Faculty of Science, Charles University, Praha (*co-supervisor/advisor J. Hladil, since 2008*)

SVITEK T. (MSc. thesis), Faculty of Science, Charles University, Praha (*co-supervisor T. Lokajíček*).

VÁVROVÁ-MACÁKOVÁ J. (MSc. Thesis). Faculty of Science, Charles University, Praha (*supervisors M. Svojtka & J. Filip, defended in 2008*).

7d. Supervision in Graduate Studies 2007+2008

ACKERMAN L. (PhD. thesis), Faculty of Science, Charles University, Praha (co-*supervisor J. Ulrych, defended in 2008*)

ALTOVÁ V. (PhD. thesis), Faculty of Science, Charles University, Praha (*co-supervisor P. Bosák*).

AXMANN D. (Ph.D. thesis), Faculty of Science, Masaryk University, Brno (*supervisor R. Mikuláš, since 2008*).

DANKO P. (Ph.D. thesis), Faculty of Science, Charles University in Praha (*supervisor Roček Z.*)

DAŠKOVÁ J. (PhD. thesis), Faculty of Science, Charles University, Praha (*co-supervisor M. Konzalová, defended in 2008).*

DRAHOTA P. (PhD. thesis), Faculty of Science, Charles University, Praha (*co-supervisor P. Skřivan, defended 2008*).

GERŠL M. (PhD. thesis), Faculty of Science, Masaryk University, Brno (*supervisor J. Hladil, defended in 2008*).

GILÍKOVÁ H. (PhD. thesis), Faculty of Science, Masaryk University in Brno (*supervisor J. Hladil, defended 2007*).

HAVELKOVÁ P. (Ph.D. thesis), Faculty of Science, Charles University in Praha (*supervisor Roček Z.*)

HOJDOVÁ M. (PhD. thesis), Faculty of Science, Charles University, Praha (*supervisor T. Navrátil, defended in 2008*).

JANEČKA J. (PhD. thesis), Faculty of Sciences, Masaryk University, Brno (*supervisor J. Hladil*).

JURKOVÁ N. (PhD. thesis), Faculty of Science, Charles University, Praha (*supervisor P. Bosák*).

KOPTÍKOVÁ L. (PhD. thesis), Faculty of Science, Charles University, Praha (*supervisor J. Hladil*).

KUBÍNOVÁ P. (PhD. thesis), Faculty of Forestry and Environment, Czech University of Agriculture, Praha (*supervisor M. Vach*, co-*supervisor P. Skřivan*).

KULAVIAK L. (PhD. thesis), University of Chemical Engineering, Praha (*co-supervisor/advisor Hladil J.*)

MACHADO G.M.J. (PhD. thesis), Faculdade de Ciéncias, Universidade de Aveiro, Portugal (*co-supervisor M. Vavrdová*).

PETRUŽÁLEK M. (PhD. thesis), Faculty of Science, Charles University, Praha (co-*supervisor T. Lokajíček*).

POKORNÝ R. (PhD. thesis), Institute of Geology and Paleontology, Charles University, Prague (*co-supervisor R. Mikuláš, since 2005*).

PŘIKRYL T. (Ph.D. thesis), Faculty of Science, Charles University, Praha (*supervisor J. Zajíc*).

SCHNABL P. (PhD. thesis), Faculty of Science, Charles University, Praha (*supervisor P. Pruner*).

ŠLECHTA S. (PhD. thesis), Faculty of Science, Charles University, Praha (*co-supervisor J. Kadlec, since 2005*).

ŠPIČKOVÁ J. (PhD. thesis), Institute of Geology AS CR, Praha (*supervisor P. Skřivan*).

STEHLÍK F. (PhD. thesis), Faculty of Science, Charles University, Praha (*supervisor J. Kadlec, since 2008*).

SVITEK T. (PhD. thesis), Faculty of Science, Charles University, Praha (*supervisor T. Lokajíček*)

VACEK F. (PhD. thesis), Faculty of Science, Charles University, Praha (*supervisor P. Bosák, advisor J. Hladil*).

ŽIVOR R. (PhD. thesis), Faculty of Science, Charles University, Praha (co-*supervisor V. Rudajev*).

7e. Membership in scientific and academic boards

BOSÁK P.

Vice-Chairman, Committee for degree of Doctor of Sciences (DSc.) in geological sciences at Academy of Sciences of the Czech Republic;

Member, Scientific Council of Faculty of Science, Masaryk University, Brno, Czech Republic;

Member of the Academic Assembly of the Academy of Sciences of the Czech Republic;

Member, Committee for Interdisciplinary study of Quaternary at the Board of Graduate Studies in Geology, Faculty of Science, Masaryk University, Brno, Czech Republic;

Member, Board of Graduate Studies in Geology, Faculty of Science, Charles University, Praha, Czech Republic;

Supervisor for PhD studies, Faculty of Science, Masaryk University, Brno, Czech Republic;

Member, Committee for State Doctoral Examinations for Interdisciplinary study of Quaternary at the Board of Graduate Studies in Geology, Faculty of Science, Masaryk University, Brno, Czech Republic;

Chairman of Executive Board of Institute of Geology of the AS CR v. v. i.

CÍLEK V.

Member of the Scientific Board, Faculty of Humanistic Studies, Charles University, Praha;

Member of the Scientific Board of the Czech Geological Survey; Member of the Academic Assembly of the Academy of Sciences of the Czech Republic;

Member of the Academic Assembly of the Academy of Sciences of the Czech Republic;

Vice-chairman of Executive Board of Institute of Geology of the ASCR v. v. i.

HLADIL J.

Alternating Member of the Committee for Degree of Doctor of Sciences in Geological Sciences, Academy of Sciences CR;

Member of the Board of Graduate Studies in Geology, Faculty of Science, Charles University, Praha;

Member of the Board of Graduate Studies in Geology, Faculty of Sciences, Masaryk University, Brno;

Member of the Committee for Finals of Undergraduate Students in Geology, Faculty of Sciences, Masaryk University;

Member of the RNDr. Doctoral Examination Committee in Geology, Faculty of Sciences, Masaryk University.

KADLEC J.

Member of the Board of the Undergraduate and Graduate Studies in Geology, Faculty of Science, Charles University, Praha.

LOKAJÍČEK T.

Member of the Board of Graduate Studies in Applied Geology, Faculty of Science, Charles University, Praha.

MIKULÁŠ R.

Member of the Board for Popularization of Sciences, Academy of Sciences of the Czech Republic (since 2000).

Czech Representative, International Paleontologic Association (since 2005).

NAVRÁTIL T.

External Member of the State Magisterium and Rigorosa Examinations in Geology, Faculty of Science, Charles University, Praha.

PRUNER P.

Member of the Board of the Graduate Studies in Geophysics, Faculty of Science, Charles University, Praha;

Alternating member of the Commitee for degree of Doctor of Sciences (DSc.) in geological sciences;

Member of Executive Board of Institute of Geology of the AS CR v. v. i.

ROČEK Z.

Member, Committee for degree of Doctor of Sciences (DSc.) in geological sciences at Academy of Sciences of the Czech Republic;

Member, Committee for degree of Doctor of Sciences (DSc.) in zoology and physiology at Academy of Sciences of the Czech Republic.

RUDAJEV V.

Member of Council for Sciences of Academy of Sciences of the Czech Republic;
Chairman of the Commission for defending Doctor of Sciences Thesis (DSc.) in Geological Sciences, Academy of Sciences of the Czech Republic;
Member of the Commission for defending Doctor of Sciences Thesis (DSc.) in Geophysical Sciences, Academy of Sciences of the Czech Republic;
Member of the Board of Graduate Studies in Applied Geology, Faculty of Science, Charles University, Praha;
Member of the Board of Graduate Studies in Geophysics, Matematical Physical Faculty, Charles University, Praha;
Member of Institute Board of Institute of Geology of the ASCR v. v. i.
Member of Supervisory Boards of Astronomical Institute of the ASCR v. v. i. and Institute of Theoretical and Applied Mechanics of the ASCR v. v. i.

SKŘIVAN P.

Member of the Board of Graduate Studies in Applied and Landscape Ecology, Faculty of Forestry, Czech University of Agriculture, Praha.
Vice-chairman of the Advisory Board of the Institute of Geology of the AS CR, v. v. i.

SVOBODOVÁ M.

Secretary of the Grant Agency of Academy of Sciences, Council No. 3 Earth and Space Sciences; Member of the Academic Assembly of the Academy of Sciences of the Czech Republic;
Member of Institute Board of Institute of Geology of the AS CR, v. v. i.

ŠTORCH P.

Member of the Scientific council of the Geological Division, Faculty of Science, Charles University, Praha;
Alternating member of the Committee for Degree of Doctor of Science in Geological Sciences, AS CR;
Vice-Chairman of the Czech Commission on Stratigraphy.

ULRYCH J.

Member of the Committee for Degree of Doctor of Science in Geological Sciences, Bratislava;
Alternating member of the Committee for Degree of Doctor of Science in Geological Sciences, Praha;
Member of the Board of Graduate and RNDr. Studies in Mineralogy and Geochemistry, Faculty of Science, Charles University, Praha;
Member of the Habilitation Committee in Mineralogy and Geochemistry, Faculty of Chemical Technology, University of Chemical Technology, Praha;
Vice-chairman of the Grant Commission of the Academy of Sciences, Council No. 3 Earth and Space Sciences.

ŽÁK K.

Member of the Czech Science Foundation, Discipline Committees No. 2: Natural sciences, and No. 205: Earth and space sciences;
Member of Work Group Geology of the Accreditation Commission of the Czech Ministry of Education, Youth and Sports.

ŽIGOVÁ A.

Member of the Board of Graduate Studies in Physical Geography, Charles University, Praha;
Member of the Section of Soil Science of Scientific Council of the Research Institute for Soil and Water Conservation, Praha.

7f. Membership in foreign Academies

BOSÁK P.: Foreign Member, Polish Academy of Arts and Sciences (election approved by the Polish President in 2007).

BOSÁK P.: Corresponding Member, Slovenian Academy of Sciences and Arts (elected 2005).

LOŽEK V.: Foreign Member, Polish Academy of Arts and Sciences (election approved by the Polish President in 1999).

7g. Degrees obtained by the staff of the Institute of Geology AS CR

PhD.

2007

Mgr. *MICHAL FILIPPI*: *Contribution to arsenic solid phase speciation in soils and mine wastes*. PhD. Thesis, 128 pp. Faculty of Science, Charles University, Praha (September 2007).

Mgr. *JIŘÍ SLÁMA*: *Distribution of trace elements and Hf isotopes in metamorphic minerals*. PhD. Thesis, 159 pp. Faculty of Science, Charles University, Praha (September 2007).

2008

Mgr. *LUKÁŠ ACKERMAN*: *Geochemistry of upper mantle rocks from Kozákov and Horní Bory, Bohemian Massif*. PhD. Thesis, 129 pp. Faculty of Science, Charles University, Praha (September 2008)

Mgr. *JAN BOROVIČKA*: *Geochemical and ecological aspects of trace elements content in macrofungi*. PhD. Thesis, 23 pp. Faculty of Science, Charles University, Praha (June 2008)

Mgr. *JIŘINA DAŠKOVÁ*: *Pollen and spores* in situ. PhD. Thesis, 164 pp. Faculty of Science, Charles University, Praha (September 2008).

Mgr. *PETR DRAHOTA*: *Geochemical model of arsenic at the Mokrsko gold deposit.* PhD. Thesis, 90 pp. Faculty of Science, Charles University, Praha (June 2008).

Mgr. *MÁRIA HOJDOVÁ*: *Mercury speciation determined by thermo-desorption analysis at two sites contaminated by mining*. PhD. Thesis, 64 pp. Faculty of Science, Charles University, Praha (September 2008).

Prof.
2007
Doc. RNDr. *ZBYNĚK ROČEK*, DrSc. Professor of Zoology, Faculty of Science, Charles University, Praha (October 2007)

7h. Awards
CÍLEK V.: Award of the Minister of the Environment Martin Bursík for systematic writing about environmental and climatic issues.
CÍLEK V.: Czech Head (Česká hlava), Category Media.
CÍLEK V. & KASIK M.: Petrolawards, Category: Publication activity, book *Unsure Flame*.
SLÁMA J., KOŠLER J. & PEDERSEN R.B.: Awarded talk for the best student oral presentation, CzechTec 07 – 5th meeting of the Central European Tectonic Studies Group (CETeG) and 12th Meeting of the Czech Tectonic Studies Group (ČTS), April 11–14, 2007, Teplá, Czech Republic.

7i. Institute staff on Fellowships and Stages

Kohout T.: PhD. Study (University of Helsinki, Finland, January 1, 2007 – December 31, 2008, 24 months).

Together with cosmic spherules, interplanetary dust particles and lunar samples returned by Apollo and Luna missions, meteorites are the only source of extraterrestrial material on Earth. The physical properties of meteorites, especially their magnetic susceptibility, bulk and grain density, porosity and paleomagnetic information, have wide applications in planetary research and can reveal information about origin and internal structure of asteroids. Thus, an expanded database of meteorite physical properties was compiled with new measurements done in meteorite collections across Europe using a mobile laboratory facility.

However, the scale problem may bring discrepancies in the comparison of asteroid and meteorite properties. Due to inhomogenity, the physical properties of meteorites studied on a cm or mm scale may differ from those of asteroids determined on km scales.

Further difference may arise from shock effects, space and terrestrial weathering and from difference in material properties at various temperatures. Close attention was given to the reliability of the paleomagnetic and paleointensity information in meteorites and the methodology to test for magnetic overprints was prepared and verified.

Lisá L.: *Marie-Curie Fellowship* (University of Cambridge, Great Britain, January 1 – December 31, 2007, 12 months).

Marie-Curie Fellowship was granted by the EU and connected with the project with the title Geoarchacheology of European Loess. The supervisor was Martin Jones from University of Cambridge and the main aim of the fellowship was to cooperate on the research covering thematically climatic record in loess localities within Moravia with the context of Gravettian occupation. The second aim was transfer of knowledge and L. Lisa was trained in the method of micromorphology in the laboratory of Mr. Charly French in Cambridge.

Navrátil T.: *Fulbright Research Scholar Fellowship* (Earth Science Department, University of Maine, Orono, USA, October 2007 – April 2008, 6 months).

The work with faculty members of the University of Maine represented broad study of the behavior of inorganic elements in forested ecosystems. The major emphasis was on the Bear Brook Watershed project in Maine (BBWM), the preliminary suggestions for the fate of missing sulfate were corrected. Precipitation of Al-sulfate-rich phases in soils has been evaluated as unlikely, while laboratory experiments proved that adsorption of sulfate on secondary Al and Fe hydroxides is the possible explanation. Results of the performed research have been summarized in two scientific papers.

Slavík L.: *Alexander von Humboldt Research Fellowship. A Resumption* (Institut für Umweltgeologie, Technische Universität Braunschweig, Germany, June – August 2008, 3 months).

First of all we focused on Lochkovian (Early Devonian) biostratigraphy and global time-correlation based on conodont faunas. Another intense focus of the work was our attempt to calibrate the Devonian System. Several recently published articles and our permanent need of relative time assignment of studied sedimentary successions have provoked us to think about real duration of Devonian stages. We started to evaluate distinct morphological steps (some of them may reflect evolution rate) in several faunal lineages and match them against available up-to-date radiometric calibration. We discovered large discrepancies between the proportion of faunal successions and sedimentary record on one side and the corresponding distances between radiometric ages on other side.

Štorch P.: *Fulbright Research Scholar Fellowship* (California State University, Long Beach, USA, November 2006 – July 2007, 8 months).

Late Ordovician mass extinction, namely that of Katian graptolites at the base of Hirnantian, has been studied by P. Štorch in the frame of his nine-months lasting Fulbright Research Scholar Fellowship at California State University, Long Beach, USA. Studies on "Graptolites of the *pacificus* through *persculptus* zones in the mountain ranges of north-central Nevada: a comparison of shelf-margin, continental rise and ocean basin faunas during the Late Ordovician extinction" have been carried out in collaboration with S.C. Finney, C.E. Mitchell, and M.J. Melchin.

Svojtka M.: *Field sampling* (Czech polar station of Johan Gregor Mendel, Antarctica, James Ross Island, January 30 – March 12, 2007).
Samples were collected from deglaciated outcrops from the James Ross and Seymour islands near Antarctic Penninsula (northernmost part of the mainland of Antarctica). All studied samples are sandstones (Aptian/Albian to Eocene) with known individual stratigraphic and depositional biostratigraphic ages. We have used geochronological dating methods to find probable sources of these sediments and reconstruct post-depositional time-temperature evolution of the James Ross sedimenary basin.

8. Positions in Editorial Boards and International Organizations 2007 and 2008

8a. Editorial Boards

ADAMOVIČ J.: *Příroda*, Member of the Editorial board, Agency for Landscape Conservation and Nature Protection, Praha, Czech Republic (since 2008).

BOROVIČKA J.: *Mykologický sborník*, Editor-In-Chief, Czech Mycological Society, Praha, Czech Republic (since 2007).

BOSÁK P.: *Aragonit*; Member of Editorial Board, published by the Admistration of Slovak Caves, Liptovský Mikuláš, Slovakia since 2008).

BOSÁK P.: *Acta Carsologica*, Member of Executive Board (since 2007), International journal, published by Slovenian Academy of Sciences and Arts, Ljubljana, Slovenia (Member of Advisory Committee 2004–2007).

BOSÁK P.: *Geologica Carpathica*, Member of the Executive Committee (since 2005), Official journal of the Carpathian-Balkan Geological Association, Bratislava, Slovak Republic (Co-editor 2001–2005).

BOSÁK P.: *Kras i Speleologia*, Member of editorial board, Scientific journal published by Silesian University, Sosnowiec, Poland; (since 2004).

BOSÁK P.: *Theoretical and Applied Karstology*, Member of editorial board, Scientific journal published by Speleological Institute "Emil Racoviţa", Bucuresti – Cluj, Romania (since 2000).

BOSÁK P.: *Speleofórum*; Co-editor, published by the Czech Speleological Society, Praha, Czech Republic (since 2000).

BOSÁK P.: *Geologos*, Member of Editorial Board, Scientific journal published by Faculty of Geology, Adam Mickiewicz University, Poznań, Poland (since 2000).

BOSÁK P.: *International Journal of Speleology*, Member of Advisory Board, Official international journal of the Union Internationale de Spéléologie and Societá Speleologica Italiana, L'Aquilla, Italy (since 1994).

BOSÁK P.: *Speleo* (Praha), Member of Editorial Board, Society bulletin published by the Czech Speleological Society, Praha, Czech Republic (since 1990).

BOSÁK P.: *Český kras* (Beroun), Co-editor (since 1998), Regional journal published by the Museum of the Czech Karst in Beroun, Czech Republic (Member of Editorial Board since 1976).

BOSÁK P.: *Annual report of the Institute of Geology*, Co-editor, Academy of Sciences of the Czech Republic (since 1998).

CÍLEK V.: *Slovenský kras*, Member of Editorial Board, International journal, Slovak Museum of Nature Protection and Speleology, Liptovský Mikuláš, Slovakia (since 2000).

CÍLEK V.: *Geologica Carpathica*, Co-editor, Official journal of the Carpathian-Balkan Geological Association, Bratislava, Slovak Republic (since 2005).

CÍLEK V.: *Vesmír*, Member of Editorial Board, Vesmír, s. r. o., Praha, Czech Republic (since 2006).

CAJZ V.: *Essentia (internet journal)*, Member of Editorial Board, www.essentia.cz (since 2003).

HLADIL J.: *Geological Quarterly*, Consulting Editor, Polish Geological Institute, Warszaw, Poland (since 2004).

HLADIL J.: *Geologica Carpathica*, Member of the Executive Committee, Official Journal of the Carpathian-Balkan Geological Association, Bratislava, Slovak Republic (since 2001).

HLADIL J.: *Bulletin of Geosciences*, Co-editor, Czech Geological Survey, Praha, Czech Republic (since 2006).

HLAVÁČ J.: *Malacologica Bohemoslovaca* – electronical journal, Member of Editorial Board, Institute of Zoology, Slovak Academy of Sciences, Bratislava, Slovak Republic (since 2006).

LOŽEK V.: *Studia Quarternaria*, Member of Editorial Board, Polish Academy of Sciences, Krakow, Poland; (since 1999).

MIKULÁŠ R.: *Geolines*, Member of Editorial Board, Institute of Geology AS CR, v. v. i., Praha, Czech Republic (since 1998).

MIKULÁŠ R.: *GEO* – Czech Version, Member of Scientific/Editorial Board, Motor-Presse Bohemia s.r.o., Praha, Czech Republic (since 2005).

PRUNER P.: *Geolines*, Member of Editorial Board, Institute of Geology AS CR, v. v. i., Praha, Czech Republic (since 1997).

RUDAJEV V.: *Acta geodynamica et geomaterialia,* Member of Editorial Board, International journal, Institute of Rock Structure and Mechanics AS CR, v. v. i. (since 1990).

ROČEK Z.: *Revija Biota. Revija za biologio in ekologijo*. Member of the Editorial Board, International journal, Društvo za proučevanje ptic in varstvo narave, Rača, Slovenia (since 2003).

SKÁLA R.: *Journal of the Czech Geological Society*, Member of the Editorial Board, Scientific journal of the Czech Geological Society, Praha, Czech Republic (since 2005).

SVOJTKA M.: *Geolines*; Editor-in-Chief, Institute of Geology AS CR, v. v. i., Praha, Czech Republic (since 1996).

ŠTORCH P.: *Geological Journal*, Member of the Editorial Board, John Wiley & Sons, Liverpool, Manchester, Great Britain (since 1993).

ŠTORCH P.: *Newsletters on Stratigraphy*, Member of the Editorial Board, Gebrüder Borntraeger, Berlin, Stuttgart, Germany (since 1999).

ŠTORCH P.: *Journal of the Czech Geological Society*, Member of the Editorial Board, Scientific journal of the Czech Geological Society, Praha, Czech Republic (since 1998).

ŠTORCH P.: *Geolines*, Member of the Editorial Board, Institute of Geology AS CR, v. v. i., Praha, Czech Republic (since 1995).

ŠTORCH P.: *Bulletin of Geosciences*, Member of the Editorial Board, international journal, Czech Geological Survey, Praha, Czech Republic (since 2001).

ŠTORCH P.: *Paleontological Contribution*s. Member of the Editorial Board, Electronic Journal published by the University of Kansas, Lawrence USA since 2008.

ULRYCH J.: *Academia*, Member of Editorial Board of the Publishing House, Praha, Czech Republic (since 2004).

ZAJÍC J.: *Bulletin of Geosciences*, International journal, Member of the Editorial Board Czech Geological Survey, Praha (since 2001).

ŽÁK K.: *Bulletin of Geosciences*, Co-editor, International journal, Czech Geological Survey, Praha (since 2006).

ŽÁK K.: *Český kras*, Co-editor (since 2008), Regional journal published by the Museum of the Czech Karst, Beroun, Czech Republic (Member of Editorial Board since 2007).

8b. Positions in International Organizations

BEK J.: General Secretary–Treasurer, International Federation of Palynological Societies (since 2005).

BOSÁK P.: Vice-President &Treasurer, the International Union of Speleology (elected in 2005).

DRAHOTA P.: Vice-president, Joint SGA Student Chapter Praha-Freiberg (since 2002).

GALLE A.: Czech representative of the International Paleontological Association (since 1995).

HLADIL J.: Web Administrator, Czech National Committee for IGCP (since 1994).

HLADIL J.: Titular Member, Subcommission on Devonian Stratigraphy of the IUGS (since 1993).

KADLEC J.: Co-ordinator for the Czech Republic, IGBP – PAGES Project (since 1998).

MIKULÁŠ R.: Czech representative, International Palaeontological Association (since 2006).

MIKULÁŠ R.: Working Group of the Treatise on Invertebrate Paleontology, Part W, Trace Fossils (since 2001).

ROČEK Z.: Member of the Executive Committee, International Society of Vertebrate Morphology (since 2001).

ROČEK Z.: Vice-President, Societas Europaea Herpetologica (elected in 1998).

ROČEK Z.: Member of the Executive Committee, World Congress of Herpetology (since 1994).

SIBLÍK M.: Corresponding Member (since 2006), Subcommission of Triassic stratigraphy (Member since 1981).

SLAVÍK L.: Corresponding Member, Subcommission on Devonian Stratigraphy of the IUGS (since 1999).

ŠTORCH P.: Titular Member, Subcommission on Silurian Stratigraphy of the IUGS (since 2004).

9. Institute structure and staff

After the transformation into the public research institution, the organization scheme of the Institute partly changed. Some laboratories were joined together and organization scheme simplified.

9a. Organization units

The research potential of the Institute is divided into 8 units:

1. *Laboratory of Geological Processes* extends the knowledge of temperature, pressure and time conditions of different stages of magmatic process in crustal and upper mantle settings as well as of the set of hydrothermal, low- and high-grade metamorphic processes. The evolution of sedimentary basins is studied with special reference to processes affecting the character of sedimentation and diagenesis, and to tectonic deformation of basin fills. Besides the employment of a classical set of geological, petrographic and geochemical methods, new, progressive laboratory approaches have been developed.
2. *Laboratory of Paleobiology and Paleoecology* develops in four principal directions. These comprise the study of living conditions and biostratigraphy of invertebrate fossil groups (conodonts, corals, brachiopods, echinoderms and graptolites), evolution of vertebrate groups (fishes and amphibians), palynology of Carboniferous and Cretaceous sediments, and paleoichnology in a broad stratigraphic range from the Ordovician to the Recent.
3. *Laboratory of Environmental Geochemistry and Geology* integrates the studies of chemical elements dynamics in environment with the geology processes, as they are recorded in sediments and soils formed during the Tertiary and Quaternary. Basic attention is paid to studies of complicated interactions between biotic and abiotic compartments of the nature, climatic oscillations and environmental changes in the past, and anthropogenic impact on the present natural processes.
4. *Paleomagnetic Laboratory* deals with paleomagnetism, magnetostratigraphy, mineral magnetism, geological interpretation of obtained data, and development of new laboratory techniques. Research is focused on a determination of basic magnetic and paleomagnetic characteristics of Phanerozoic terrestrial and extraterrestrial materials including high-resolution magnetostratigraphy, and environmental magnetism. Data interpretations encompass geotectonic, stratigraphic and paleogeographic synthesis including paleoclimatic and human-impact reconstructions.
5. *Laboratory of Physical Properties of Rocks* concentrates on the study of strain response of ultrabasic rocks to a dual regime of loading and the analysis of changes of acoustic emission and ultrasound permeability during sample loading.
6. *Laboratory of Physical Methods* is a service analytical unit.

Specialized laboratories

Laboratories of the Institute are not independent units. They are incorporated within the structure of scientific and service departments. The following specialized laboratories have been set up:

1. Paleomagnetic laboratory (Head: Ing. Petr Pruner, DrSc.).
2. Micropaleontological laboratory (Heads: RNDr. Jiří Bek, CSc. & RNDr. Ladislav Slavík, CSc.).
3. X-ray and DTA/TG laboratory (Head: RNDr. Roman Skála, PhD.).
4. Electron scanning and microprobe laboratory (Head: Ing. Anna Langrová).
5. Laboratory of rock processing and mineral separation (Head: Václav Sedláček).
6. Laboratory for thin and polished sections (Head: Ing. Anna Langrová).
7. Microscopic laboratory (Head: Mgr. Michal Filippi, PhD.).
8. Sedimentary laboratory (Head: RNDr. Anna Žigová, CSc.).
9. Fission track laboratory (Head: Mgr. Jiří Filip, CSc.).
10. Laboratory of liquid and solid samples (Heads: RNDr. Jan Rohovec, PhD. & RNDr. Miloš Burian).
11. Laboratory of rock behaviour under high pressure (Head: RNDr. Vladimír Rudajev, DrSc.).

The scientific concept of the Institute and the evaluation of its results lie within the responsibility of the Executive Board that includes both the internal and external members. Besides research, staff members of the Institute are involved in lecturing at universities and in the postgraduate education system. Special attention is also paid to popularization of the most important scientific results in the public media.

Organization chart

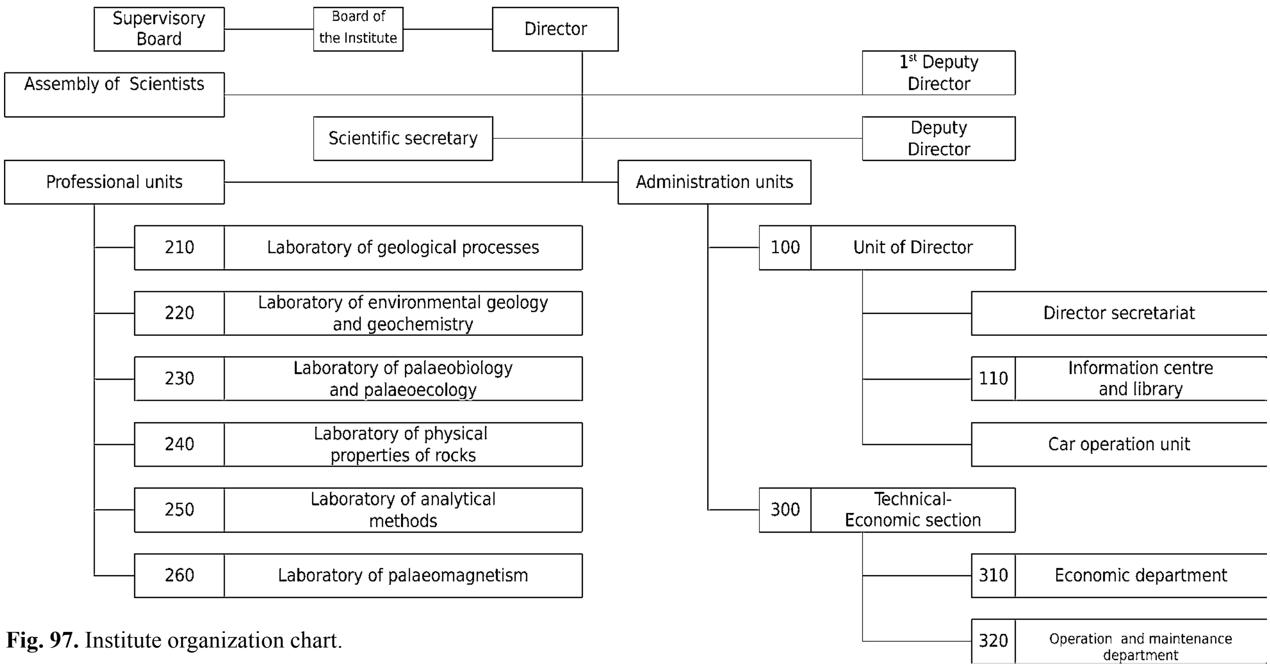


Fig. 97. Institute organization chart.

9b. Contact information

Information on the Institute of Geology is available on Internet: http://www.gli.cas.cz

e-mail address book

Ackerman Lukáš	ackerman@gli.cas.cz
Adamovič Jiří	adamovic@gli.cas.cz
Balabán Mikuláš	balaban@gli.cas.cz
Bek Jiří	bek@gli.cas.cz
Böhmová Vlasta	bohmova@gli.cas.cz
Bosák Pavel	bosak@gli.cas.cz
Breiter Karel	breiter@gli.cas.cz
Brožek Josef	brozek@gli.cas.cz
Cajz Vladimír	cajz@gli.cas.cz
Cílek Václav	cilek@gli.cas.cz
Čejchan Petr	cej@gli.cas.cz
Dašková Jiřina	daskova@gli.cas.cz
Dobešová Irena	dobesova@gli.cas.cz
Dobrovolný Jiří	dobrovolny@gli.cas.cz
Drahota Petr	drahota@gli.cas.cz
Erdingerová Julie	erdingerova@gli.cas.cz
Fiala Jiří	fiala@gli.cas.cz
Filip Jiří	filip@gli.cas.cz
Filippi Michal	filippi@gli.cas.cz
Filler Vlastimil	filler@gli.cas.cz
Forman Josef	forman@gli.cas.cz
Fridrich Miroslav	fridrich@icpf.cas.cz
Galle Arnošt	galle@gli.cas.cz
Gottstein Ottomar	trifid@gli.cas.cz
Hladil Jindřich	hladil@gli.cas.cz
Hlaváč Jaroslav	hlavac@gli.cas.cz

Hojdová Maria	hojdova@gli.cas.cz
Chadima Martin	chadima@gli.cas.cz
Janečka Jiří	janecka@gli.cas.cz
Kadlec Jaroslav	kadlec@gli.cas.cz
Kadlecová Eva	kadlecova@gli.cas.cz
Klímová Jana	klimova@gli.cas.cz
Kubínová Petra	kubinova@gli.cas.cz
Kohout Tomáš	kohout@gli.cas.cz
Konopáčová Ivana	konopacova@gli.cas.cz
Konzalová Magdalena	konzalova@gli.cas.cz
Koptíková Leona	koptikova@gli.cas.cz
Korbelová Zuzana	korbelova@gli.cas.cz
Kulhavá Lenka	kulhava@gli.cas.cz
Lang Miloš	lang@gli.cas.cz
Langrová Anna	langrova@gli.cas.cz
Lechnýřová Kateřina	lechnyrova@gli.cas.cz
Lisá Lenka	lisa@gli.cas.cz
Lokajíček Tomáš	lokajicek@gli.cas.cz
Ložek Vojen	vlozek@volny.cz
Man Otakar	man@gli.cas.cz
Mikuláš Radek	mikulas@gli.cas.cz
Navrátil Tomáš	navratilt@gli.cas.cz
Novák Jiří	novak@gli.cas.cz
Nováková Marcela	novakova@gli.cas.cz
Pavková Jaroslava	pavkova@gli.cas.cz
Petráček Jiří	petracek@gli.cas.cz
Petružálek Matěj	petruzalek@gli.cas.cz
Pořtová Jana	portova@gli.cas.cz
Pros Zdeněk	pros@gli.cas.cz
Pruner Petr	pruner@gli.cas.cz
Rajlichová Jana	rajlichova@gli.cas.cz
Roček Zbyněk	rocek@gli.cas.cz
Rohovec Jan	rohovec@gli.cas.cz
Rudajev Vladimír	rudajev@gli.cas.cz
Schnabl Petr	snabl@gli.cas.cz
Siblík Miloš	siblik@gli·cas.cz
Skřivan Petr	skrivan@gli.cas.cz
Škvorová Václava	skvorova@gli.cas.cz
Sláma Jiří	slama@gli.cas.cz
Slavík Ladislav	slavik@gli.cas.cz
Sokolová Alena	sokolova@gli.cas.cz
Skála Roman	skala@gli.cas.cz
Svobodová Marcela	msvobodova@gli.cas.cz
Svojtka Martin	svojtka@gli.cas.cz
Šlechta Stanislav	slechta@gli.cas.cz
Štěrbová Věra	sterbova@gli.cas.cz
Štorch Petr	storch@gli.cas.cz
Špičková Jitka	spickova@gli.cas.cz
Trenzeluková Božena	trenzelukova@gli.cas.cz
Ulrych Jaromír	ulrych@gli.cas.cz
Vach Marek	vach@gli.cas.cz
Vavrdová Milada	midla@gli.cas.cz
Vávrová Bronislava	vavrova@gli.cas.cz
Venhodová Daniela	venhodova@gli.cas.cz
Veverka Ján	veverka@gli.cas.cz
Vilhelm Jan	vilhelm@gli.cas.cz
Zajíc Jaroslav	zajic@gli.cas.cz
Žák Karel	zak@gli.cas.cz
Žigová Anna	zigova@gli.cas.cz
Živor Roman	zivor@gli.cas.cz
Žitt Jiří	zitt@gli.cas.cz

Institute management	inst@gli.cas.cz
Geolines Editorial Board	geolines@gli.cas.cz
Library	knih@gli.cas.cz

9c. Staff (as of December 31, 2008)

Advisory Board

RNDr. Jiří Rákosník, CSc. (Head Office AS CR). . . . . Chairman
Doc. Ing. Petr Skřivan, CSc. . . . . Vice-Chairman
Prof. Ing. Jiří Čtyroký, DrSc. (Scientific Council AS CR, Praha) . . . . Member
Prof. Jiří Pešek, DrSc. (Faculty of Science, Charles University, Praha) . . . . Member
Doc. Ing. Richard Šňupárek, CSc. (Institute of Geonics AS CR, Ostrava) . . . . Member

Executive Board

Prof. RNDr. Pavel Bosák, DrSc. . . . . Chairman
Vice-Chairman: RNDr. Václav Cílek CSc. . . . . Vice-Chairman
Ing. Ottomar Gottstein, CSc. . . . . Member
Ing. Petr Pruner, DrSc. . . . . Member
RNDr. Vladimír Rudajev, DrSc. . . . . Member
RNDr. Marcela Svobodová, CSc. . . . . Member
Mgr. Pavel Kavina, PhD (Ministry of Industry and Trade of the Czech Republic) . . . . Member
RNDr. Jan Krhovský, CSc. (Ministry of the Environment of the Czech Republic) . . . . Member
Doc. RNDr. Jiří Souček, CSc. (University of Finance and Administration Praha). . . . . Member

Management

RNDr. Václav Cílek, CSc . . . . Director of the Institute (CEO)
Prof. RNDr. Pavel Bosák, DrSc. . . . . 1st Deputy Director
Ing. Ottomar Gottstein, CSc. . . . . Deputy Director (finances)

Administrative departments

Management Section

Michaela Uldrychová (assistant to the Director)
Marcela Nováková (assistant to the Director)
Jana Pořtová (assistant to the Director; maternity leave)

Information Centre and Library
Bc. Kateřina Lechnýřová – Head (librarian)
Mgr. Václava Škvorová (librarian)

Car Operation Unit
Karel Jeřábek (garage attendant, driver, storeman, janitor)

Technical-Economic Section

Ing. Ottomar Gottstein, CSc. – Head
Alena Sokolová – Deputy Head, accountant

Economic Department
Jana Klímová (accountant)
Věra Štěrbová (human resources)
Božena Trenzeluková (phone operator, mail service)

Operation and Maintenance Department
Mikuláš Balabán (computer specialist)
Antonín Čejka (technical service)
Magdaléna Čejková (janitor)
Petr Vachalovský (technical service)
Kaiserová Vlasta (janitor)

Scientific laboratories

Laboratory of Geological Processes

Scientific Staff:
Mgr. Jiří Adamovič, CSc. –Head (basin analysis, tectonics)
Mgr. Leona Koptíková – Deputy Head (sedimentary petrology, metasediments, magnetic susceptibility)
Mgr. Lukáš Ackerman, PhD. (geochemistry, mantle mineralogy)
RNDr. Karel Breiter, PhD. (petrology, mineralogy)
RNDr. Vladimír Cajz, CSc. (volcanology)
Ing. Jiří Fiala, CSc. (petrology and structure of lithosphere, western and northern
Mgr. Jiří Filip, CSc. (fission track dating)
Doc. RNDr. Jindřich Hladil, DrSc. (basins in orogens, terranes, carbonate sediments)
Mgr. Tomáš Hrstka (petrology)
Mgr. Jiří Janečka (structural geology, strain modelling)
RNDr. Miloš Lang, CSc. (igneous petrology, mineralogy)
Mgr. Lenka Lisá, PhD. (Quaternary sedimentology)
prom. geol. Jiří Novák, CSc. (petrology)
Mgr. Jiří Sláma, PhD. (metamorphic petrology, isotope dating)
Mgr. Martin Svojtka, PhD. (petrology of deep crustal rocks, fission track methods, geochronology, geochemistry)
Doc. RNDr. Jaromír Ulrych, DrSc. (igneous petrology, geochemistry)
RNDr. Zdeněk Vejnar, DrSc. (lithospheric units, metamorphic overprint, regional geology of the Bohemian Massif)

Technical Staff:
Josef Forman (topography, geodetic maps, GPS)
Ing. Jaroslava Pavková (secretary, technician)
Jana Rajlichová (technician)
Václav Sedláček (technician)

Laboratory of Palaeobiology and Palaeoecology

Scientific Staff:
RNDr. Marcela Svobodová, CSc. – Head (Cretaceous palynology)
RNDr. Radek Mikuláš, CSc. – Deputy Head (ichnofossils)
RNDr. Jiří Bek, CSc. (Devonian and Carboniferous spores)
RNDr. Petr Čejchan, CSc. (paleoecology, Radiolaria, mazuelloids)
Mgr. Stanislav Čermák (Cenozoic vertebrate paleontology, small mammals)
Mgr. Jiřina Dašková (Cenozoic palynology)
prom. geol. Arnošt Galle, CSc. (Devonian corals and paleogeography)
Mgr. Tomáš Přikryl (vertebrate paleontology, fishes)
Doc. RNDr. Zbyněk Roček, DrSc. (origin and evolution of the Amphibia, Tertiary Anura and Sauria)
RNDr. Miloš Siblík, CSc. (Mesozoic brachiopods)
RNDr. Ladislav Slavík, CSc. (Silurian-Devonian stratigraphy, conodont biostratigraphy, sedimentary sequences, paleogeography)
RNDr. Petr Štorch, DrSc. (graptolite stratigraphy, stratigraphy in general, sedimentary sequences, paleogeography)
RNDr. Milada Vavrdová, CSc. (Proterozoic, Paleozoic and Mesozoic palynology and plankton)
Mgr. Jan Wagner (Cenozoic vertebrate paleontology, large mammals)
RNDr. Jaroslav Zajíc, CSc. (Carboniferous and Permian vertebrates and stratigraphy, acanthodians)
RNDr. Jiří Žítt, CSc. (Cretaceous and Tertiary paleoecology and sedimentology, echinoids and crinoids)

Technical Staff:
Ing. Bronislava Vávrová (secretary, technician)
Josef Brožek (photographer)

Laboratory of Environmental Geology and Geochemistry

Scientific Staff:
RNDr. Tomáš Navrátil, PhD. – Head (aquatic and environmental geochemistry)
Mgr. Michal Filippi, PhD. – Deputy Head (mineralogy, environmental geochemistry)
Mgr. Jan Borovička, PhD. (biogeochemistry)
Prof. RNDr. Pavel Bosák, DrSc. (karstology, geomorphology, sedimentology)
RNDr. Václav Cílek, CSc. (Quaternary and environmental geology)
Mgr. Petr Drahota, PhD. (environmental geochemistry)
Mgr. Jaroslav Hlaváč, PhD. (Quaternary geology, malacozoology)
RNDr. Maria Hojdová, PhD. (environmental geochemistry)
Mgr. Eva Kadlecová (Cenozoic vertebrate paleontology)
Ing. Petra Kubínová (biogeochemistry)
RNDr. Vojen Ložek, DrSc. (Quaternary geology, malacozoology)

RNDr. Jan Rohovec, PhD. – Deputy Head (analytical chemistry, ICP analyses)
Doc. Ing. Petr Skřivan, CSc. (exogenic and environmental geochemistry)
Mgr. Marek Vach, PhD. (environmental geochemistry)
RNDr. Karel Žák, CSc. (Quaternary geology, environmental geochemistry)
RNDr. Anna Žigová, CSc. (pedology, paleopedology)

Technical Staff:
RNDr. Miloš Burian (chemical analyst)
Ing. Irena Dobešová (environmental monitoring)

Laboratory of Palaeomagnetism
Scientific Staff:
Ing. Petr Pruner, DrSc. – Head (geophysics, paleomagnetism)
Mgr. Martin Chadima, PhD. – Deputy Head (geophysics, paleomagnetism)
RNDr. Jaroslav Kadlec, Dr. (Quaternary geology)
RNDr. Günter Kletetschka, PhD. (paleomagnetism, geophysics)
Mgr. Tomáš Kohout (physical properties of meteorites)
prom. fyz. Otakar Man, CSc. (geophysics)
Mgr. Petr Schnabl (geophysics)
Mgr. Filip Stehlík (paleomagnetism)
Mgr. Stanislav Šlechta (geophysics)

Technical Staff:
Jakub Bressler (technician)
Jana Drahotová (technician)
Jiří Petráček (technician)
RNDr. Daniela Venhodová (technician)

Laboratory of Physical Properties of Rocks
Scientific Staff:
RNDr. Vladimír Rudajev, DrSc. – Head (geophysics, seismics, geomechanics)
RNDr. Roman Živor – Deputy Head (geomechanics)
Ing. Tomáš Lokajíček, CSc. (seismic modelling)
Ing. Zdeněk Pros, CSc. (seismic modelling)
Mgr. Matěj Petružálek (geophysics, acoustic emission analysis)
RNDr. Ján Veverka, PhD. (geophysics, acoustic emission analysis)
Doc. RNDr. Jan Vilhelm, CSc. (geophysics)

Technical Staff:
Zdeněk Erdinger (technician, rock cutter)
Julie Erdingerová (technician)
Vlastimil Filler (technician, electrician)
Miroslav Grusman (mechanic)
Vlastimil Nemejovský (mechanic, technician)
Jarmila Straková (technician)

Laboratory of Analytical Methods
Ing. Anna Langrová – Head (microprobe and scanning microscope analyst)
RNDr. Zuzana Korbelová – Deputy Head (microprobe and scanning microscope operator)
Ing. Vlasta Böhmová, PhD. (microprobe and scanning microscope operator)
Jiří Dobrovolný (X-ray and thermal analyses)
Jaroslava Jabůrková (preparation of thin/polished sections)
Ivana Konopáčová (preparation of thin/polished sections)
RNDr. Roman Skála, PhD. (X-ray and thermal analyses)

Foreign consultants
Prof. György Buda (Department of Mineralogy, L. Eötvös University, Budapest, Hungary)
Dr. Pavel Čepek (Burgwedel, Germany)
Prof. Petr Černý (Department of Earth Sciences, University of Manitoba, Winnipeg, Canada)
Prof. Jaroslav Dostal (Department of Geology, Saint Mary's University, Halifax, Canada)
Prof. Peter E. Isaacson (Department of Geology, College of Mines and Earth Resources, University of Idaho, Moscow, USA)
Dr. Horst Kämpf (GeoForschungsZentrum, Postdam, Germany)
Prof. Dr hab. Ryszard Kryza (Institute of Geological Sciences, Wroclaw University, Poland)
Prof. Henri Maluski (Université Montpelier II, Montpelier, France)
Prof. Ronald Parsley (Department of Geology, Tulane University, New Orleans, USA)
Prof. Dr. Franz Pertlik (Institut für Mineralogie und Kristallografie, Universität Wien, Geozentrum, Austria)
Prof. Henning Sørensen (Geological Institute, University of Kobenhagen, Denmark)
Prof. John A. Winchester (Department of Geology, University of Keele, Great Britain)

Note: Czech scientific and pedagogical degrees are equivalents of:

Czech degree	Equivalent
Bc.	BSc, BA
prom. geol., prom. fyz., Mgr.	MSc, MA
RNDr., PhDr.	no equiv.
CSc.	PhD.
DrSc.	DSc
Doc.	Assoc. Prof.
Ing.	Dipl.-Ing.

***

Staff News

left:

Martin Mráček (boiler operator)	Aug. 31, 2007
Mgr. Jitka Špičková (environmental geochemistry)	Sept. 31, 2007
Jaroslav Kratochvíl (technical service)	Dec. 31, 2007
Jana Macháčková (secretary, technician)	Dec. 31, 2007
Ing. Luděk Minařík, CSc. (geochemistry)	Dec. 31, 2007
Jarmila Straková (technician)	Dec. 31, 2007
RNDr. Zdeněk Vejnar, DrSc. (regional geology)	Dec. 31, 2007
RNDr. Ján Veverka, PhD. (geophysics)	Dec. 31, 2007
Lenka Kulhavá (librarian)	March 31, 2008
Mgr. Kadlecová Eva (Cenozoic vertebrate paleontology)	May 12, 2008

RNDr. Zdeněk Pros, CSc. (seismic modelling) Dec. 7, 2008
RNDr. Miloš Burian Dec. 31, 2008
Mgr. Jiří Janečka (structural geology, strain modelling) Dec. 31, 2008

joined:
Vlastimil Nemejovský (mechanic, technician) Feb. 1, 2007
Martin Holub (boiler operator) Aug. 1, 2007
Mgr. Kateřina Lechnýřová (librarian) Sept. 1, 2007
Mgr. Jan Borovička (biogeochemistry) Jan. 1, 2008
Mgr. Stanislav Čermák (vertebrate paleontology) Jan. 1, 2008
Mgr. Tomáš Přikryl (vertebrate paleontology) Jan. 1, 2008

Mgr. Jan Wagner (vertebrate paleontology) Jan. 1, 2008
Mgr. Filip Stehlík (paleomagnetism) Feb. 1, 2008
Tereza Nováková (chemical analyst) Sept. 1, 2008
Jakub Bressler (chemical analyst) Oct. 1, 2008
Mgr. Tomáš Svitek (gephysics) Oct. 1, 2008

9d. Laboratories

The chapter summarizes the list of the most important laboratory equipment.

Paleomagnetic laboratory (head Ing. Petr Pruner, DrSc.)

The Magnetic Vacuum Control System MAVACS is a self-contained automatic system creating a limited space with the magnetic field eliminated i. e., a non-magnetic environment or magnetic vacuum. The operation of MAVACS is based on the feedback loop principle. The Earth's magnetic field is compensated for by the triaxial Helmholz Induction Coil System HELICOS. The resulting field difference is continually measured in each of its three axes by the Rotating Coil Magnetometer ROCOMA, which has its sensors installed inside the HELICOS. The output of the ROCOMA controls the Iduction Coil Control Unit ICCON, which supplies the HELICOS generating the compensating magnetic field. In this way the feedback loop is closed in all the three axes, thus securing a variation-free magnetic vacuum. The above mentioned factors formed the basis for the development of a system which creates a magnetic vacuum in a space of about 5 litres below a value of ±2nT, the typical offset of the magnetic field sensor being smaller than ±0.1nT. Multi-component analysis of the structure of the remanent magnetization and reproduction of the palaeomagnetic directions even in rocks whose magnitude of secondary magnetization represents 97 to 99 % of the magnitude of natural remanent magnetization, can be achieved accurately with this system.

The JR-6A and two JR-5A Spinner Magnetometers – the most sensitive and accurate instruments for measurement of remanent magnetization of rocks. All functions are microprocessor-controlled.

The KLY-3 Kappabridge, CS-23 and CS-L Furnance Apparatus – sensitive, commercially available laboratory instrument for measuring anisotropy of magnetic susceptibility (AMS) as well as bulk susceptibility and for measuring the temperature variation of susceptibility (from -190 to 700 °C).

Two LDA -3 AF Demagnetizer – the process is microprocessor-controlled and automated.

The magnetizing coil serves for the induction of the isothermal remanent magnetization.

The AMU-1A Anhysteretic Magnetizer is an option to the LDA-3 AF demagnetizer. This equipment permits the deliberate, controlled anhysteretic magnetization of a specimen.

The KLF-4 magnetic susceptibility meter is designed for rapid and precise laboratory measurement of magnetic susceptibility of rocks, soils, and materials investigated in environmental studies in weak magnetic fields ranging in their intensity from 5 A/m to 300 A/m.

755 SRM for Discrete Samples with Automatic Sample Handler and AF Degausser.

Liquid helium-free Superconducting Rock Magnetometer (SRM), type 755 4K SRM: the set includes a measurement system, alternating field demagnetizer, three-layer permalloy degauss shield, automatic sample holder, electronic unit and software. Sensitivity of the dipole moment is lower than 1x10-12 Am2 RMS for aperture size (sample size) of 4.2 cm. A system is including an automatic sample holder, permitting remanent magnetization measurement in three axes. Possibility of remanent magnetization measurement is without sample rotation.

X-ray and DTA/TG laboratory (head RNDr. Roman Skála, PhD.)

PHILIPS X´Pert APD (1997) is an X-ray powder diffractometer used for phase composition and crystal structures investigations. The diffractometer is of theta-2theta type with moving detector arm. It is equipped with fixed divergence and receiving optics, secondary graphite monochromator and a point proportional counter.

DERIVATOGRAPH Q 1500 Monimex (1982, computerized in 1998) is the system for differential thermo-gravimetry.

Electron scanning and microprobe laboratory (head Ing. Anna Langrová)

Microprobe CAMECA 100 (2002) is the central instrument of the Laboratory used mainly for local chemical analysis of solid geological materials. The microprobe is equipped by four crystal spectrometers and detectors for imaging in secondary and back-scattered electrons. The choice of spectrometer crystals makes the instrument capable of analyzing elements in the range from B to U from (thin-) sectioned and polished solid-state samples.

Microprobe JEOL JXA-50A (1972) was a predecessor of the CAMECA 100 instrument. It was used mainly together with EDAX (see below) for fast chemical analysis.

EDAX System PHILIPS (1996) was the energy dispersive system for fast local chemical microanalysis.

Accessory devices for preparation of samples include carbon coating devices and gold sputtering machine and they are crucial to keep the analytical laboratory running smoothly.

Laboratory of rock processing and mineral separation (head Václav Sedláček)

Electromagnetic separator SIM-I (1968)

Electromagnetic separator (1969)

Laboratory table WILFLEY 13 B (1990)
Vibration processor VT 750 (1992)
Crusher CD 160*90 (1991)
Laboratory mill RETSCH (1970)
Crusher ŽELBA D 160/3 (1999)
Mill SIEBTECHNIK (1995)

Laboratory of thin and polished sections (head Ing. Anna Langrová)
MINOSECAR (1962, 1970) is a cut-off machine with a diamond cutting wheel
DISCOPLAN (1990) is a precision cutting and grinding machine.
PEDEMOX PLANOPOL (1989) is a grinding and polishing machine
Montasupal (1977) is a grinding machine with a diamond grinding wheel.
DP.U.4 PDM-Force (1993) is a lapping machine used with deagglomerated grinding powder (alumina) mixed with water before use.

Laboratory of Microscopy (head Mgr. Michal Filippi, PhD.)
Polarization microscope OLYMPUS BX51 with digital camera OLYMPUS DP70 equipped by X-ray fluorescence with wave-length filters; QuickPHOTO MICRO 2.2 software (2006)
Binocular microscope OLYMPUS SZX16 with digital camera OLYMPUS SP 350; software Deep Focus 3.0 (2007)
Binocular microscope OLYMPUS SZ51 (2007)
Microscope NIKON ALPHAHOT 2/HP (1995)
Polarization microscope AMPLIVAL ZEISS (1974)
Polarization microscope POLMI (1967)
Binocular microscope (1959)
Polarization microscope ORTHOPLAN Photometre LEITZ (1983)

Fisson track laboratory (head Mgr. Jiří Filip, CSc.)
Analytical system for fisson track:
Microscope AXIOPLAN ZEISS and Trackscan system 452110 AUTOSCAN (1999)
Microscope ZEISS IMAGER M1m and computer-controlled microscope stage AUTOSCAN (2008)
Polishing and grinding machine MTH APX 010 (2003)

Laboratory of liquid and solid samples (heads RNDr. Jan Rohovec, PhD. & RNDr. Miloš Burian)
AAS Spectrometer VARIAN SpectrAA 300 (1991)
lamps As, Be, Cd, Cu, Cr, Fe, Mn, Ni, Co, Pb, Sr, Zn, Rb, Ba+GTA96+VEA76
Analytical weights SARTORIUS Basic analytical (1992)
Filtration blocks B-2A Epi/FL (1996)
Analytical weights BALANCE 2000G (1999)
Decomposition unit PLAZMATRONIKA SERVICE S.C. (1995)
Set of vacuum lysimeters PRENART (1999)
ICP-EOS spectrometer Iris Intrepid XSP (2004)
Ultrasonic Nebulizer CETAC (2004)
Mercury analyser AMA 254
In the course of 2008 a new apparatus for analysis of ultra-low amounts of mercury and mercury speciation was acquired. The apparatus producted by PSAnalytical (England) is working on principle of fluorescence spectroscopy. It is equipped with single-purpose HPLC for various mercury containing species separation. The detection limit is about 0,1 ppt Hg. The apparatus is used for mercury monitoring in the environment. Identification of the mercury species present is considered to be an advanced analytical technique. Speciation analysis is performed after pre-concentration of Hg containing species and followed by separation on HPLC.

Laboratory of rock behaviour under high pressure (head RNDr. Vladimír Rudajev, DrSc.)
MTS 815 – PC controlled servo hydraulic rock testing system with high stiffness for compressive loading up to 4500 kN.
High pressure chamber for elastic anisotropy measurement under hydrostatic pressure up to 700 MPa.
Electronically controlled high pressure generator PG-HY-700-1270 (700MPa)
Hydraulic press for uniaxial compressive loading up to 3000 kN with conventional triaxial cell for confinig pressure up to 150 MPa.
Hydraulic press for uniaxial compressive loading up to 300 kN.
Hydraulic press for uniaxial compressive loading up to 100 kN.
Rheological weight press for uniaxial compressive loading up to 500 kN.
Rheological mechanical presses for uniaxial compressive loading up to 80 kN.
Rheological weight presses for tensile loading up to 3 kN.
Vallen AMSY-5 – multichannel acoustic emission system.
Digital strain meters Hottinger (Centipede-100, UPM-40, UPM-60).
Permeability apparatus for measurement permeable and low permeable materials under constant hydraulic incline.
Equipment for sample preparation (stone saw machines, drilling machines, grinding and milling machines) allows preparation of test samples (specimens) of various shapes (cubic, prismatic, cylindrical, spherical).

10. Financial Report

In thousands of Czech Crowns (CZK)

2007

A. INCOMES		
1.	From the annual budget of AS CR	13 205
2.	From the Grant Agency of the AS CR (accepted research projects)	8 390
3.	From the Grant Agency CR (accepted research projects)	2 262
4.	From the internal research projects of the AS CR	22 042
5.	From other public sources	288
6.	Applied research	2 200
7.	Investment (instruments)	2 129
8.	Investment (constructions)	295
TOTAL INCOMES		50 811
B. EXPENSES		
1.	Scientific staff (wages, insurances)	32 169
2.	Research and scientific activities	11 108
3.	Administration and technical staff (wages, insurances)	1 014
4.	General expenses (postage shipping, maintenance of buildings, energies, transport, office supplies, miscellaneous, etc.)	3 046
5.	Library	762
6.	Editorial activities	288
7.	Investment (instruments)	2 129
8.	Investment (constructions)	295
TOTAL EXPENSES		50 811

2008

A. INCOMES		
1.	From the annual budget of AS CR	7 880
2.	From the Grant Agency of the AS CR (accepted research projects)	8 877
3.	From the Grant Agency CR (accepted research projects)	2 496
4.	From the internal research projects of the AS CR	27 690
5.	From other public sources	406
6.	Applied research	1 341
7.	Investment (instruments)	2 254
8.	Investment (constructions)	82 775
TOTAL INCOMES		133 719
B. EXPENSES		
1.	Scientific staff (wages, insurances)	32 649
2.	Research and scientific activities	10 221
3.	Administration and technical start (wages, insurances)	3 413
4.	General expenses (postage shipping, maintenance of buildings, energies, transport, office supplies, miscellaneous, etc.)	4 060
5.	Library	291
6.	Editorial activities	120
7.	Investment (instruments)	190
8.	Investment (constructions)	82 775
TOTAL EXPENSES		133 719

Notes

Notes

Research Reports 2007 & 2008

Institute of Geology AS CR, v. v. i.

The report was compiled and finally edited by P. Čejchan and P. Bosák. The English version was revised by J. Adamovič.
Editorial Note: This report is based on contributions of the individual authors; contents and scientific quality of the contributions lie within the responsibility of the respective author(s)

Layout by Robert Janák / Printed by www.cenytisku.cz, Praha

ISBN 978-80-87443-01-9
200 copies

KATALOGIZACE V KNIZE - NÁRODNÍ KNIHOVNA ČR

Geologický ústav (Akademie věd ČR)
Research reports 2007 & 2008 / the report was compiled and finally edited by P. Čejchan and P. Bosák. -- Prague: Institute of Geology, Academy of Sciences of the Czech Republic, 2010. -- 180 s.
ISBN 978-80-87443-01-9 (brož.)

55:005.71 * 001-026.12 * (437.311)
- Geologický ústav (Akademie věd ČR)
- geologické ústavy -- Česko
- vědecká činnost -- Česko -- 2001-2010
- Praha (Česko)
- zprávy

55 – Vědy o Zemi. Geologické vědy [7]

ISBN 978-80-87443-01-9