Academy of Sciences of the Czech Republic

Institute of Geology
Annual Report 2004

CONTENTS

Editorial Note: This report is based on contributions of the individual authors; contents and scientific quality of the contributions lies within the responsibility of the respective author(s).
The report was compiled and finally edited by L. Slavík. English version was kindly revised by J. Adamovič.

KATALOGIZACE V KNIZE - NÁRODNÍ KNIHOVNA ČR

Geologický ústav (Akademie věd ČR)
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- **geologie**
- **geologický výzkum -- Česko**
- **ročenky**

55 – Vědy o Zemi. Geologické vědy

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1. Preface

The year 2004 was an exceptional one in many aspects. The complicated evaluation procedure of the Institutional Research Plan for 2005–2010 was finished. The procedure was performed in two steps. The first one was the internal evaluation within the Academy of Sciences. The Institute was covered by 5 referees, 4 from abroad (Prof. Dr. Derek C. Ford, Canada, Prof. Michal Kováč, Slovakia, Prof. Dr. Franz Pertlik, Austria, Prof. Dr hab. Alfred Uchman, Poland) one from Czech Republic (Prof. Dr. Zlatko Kvaček). After collection of the reviews, the evaluation committee met the Institute management. Three reviewers were present (Prof. Ford, Prof. Kováč and Prof. Kvaček). Institute officers commented on the Institutional Plan and responded to question. The final decision of the whole Academic Evaluation Committee was quite successful – the Institute obtained qualification B+. The second step was the evaluation organized by the Ministry of Education, Youths and Sports at inter-departmental level (universities, research centres, institutes of Academy of Sciences, etc.). Here, after additional reviews of 2 reviewers, our Institute obtained qualification A, ranking among the best evaluated institutes in the whole Czech Republic. Long-lasting effort in improving the quality of personnel and the level of scientific work was highly successful thanks to the willing approach of all Institute staff members.

The second important event in the life of the Institute was the appointment of the new Director. The currently valid legislation stipulates that the directors of institutes of the Academy of Sciences can hold their position for only two terms, i.e., for 8 years in total. As I took the position in 1996, my double-term came to an end. The two step procedure, comprising the recommendation of the Academic Committee as the first step and the election by the Institute Scientific Council as the second step, led to the election of Dr. Václav Cílek as the new Director for 2005–2009. Dr. Cílek succeeded in a hard competition of 3 other highly-qualified colleagues. Congratulations.

Pavel Bosák
Director of the Institute
1 October 1996 – 30 September 2004

A new person was elected the director of the Institute of Geology in autumn 2004: Václav Cílek, Quaternary geologist, the former head of the Laboratory of Environmental Geology. Václav Cílek has been working for the Institute (that existed under different names before 1992) since his graduation for almost 25 years. A new director may mean a new orientation; so, the essential question was: what are the prospects and trends of contemporary geology? New fields emerging within this science include paleoclimate and paleoenvironmental studies, or the study of biogeochemical cycling of elements or recent human impact. The "new geology" is more interdisciplinary, more "white-collared" science, gradually becoming a part of a wider stream of biological and historical sciences.

Nevertheless, I still believe that geology is basically a discipline that understand real stones, like botany understands real trees and plants. We have the feeling that modern mathematical methods and elaborate geochemical methods belong among the most advanced trends in the earth science field but, on the contrary, we observe that knowledge of actual nature is declining. Thus the task of the contemporary Institute of Geology is about the balance between "people of the rocks" and "people of the analytical machines“. There seems to be a lesser problem in creating new interdisciplinary fields than in the preservation of traditional geology "of stones". In spite of many modern trends, we may need it in the coming decades.

Václav Cílek
Director of the Institute
since 1 October 2004

2. General Information

Institute of Geology AS CR 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 across a relatively broad spectrum of problems in geology, geochemistry, paleontology and paleomagnetism. 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 Geological Institute of the Czechoslovak Academy of Sciences (ČSAV) was founded on July 1, 1961. Nevertheless its structure had developed in period of 1956 to 1960. During 1956 and 1957, several independent departments originated: Cabinet for Cartography, Laboratory of Paleontology, Laboratory of Engineering Geology, Laboratory for Pedology and Cabinet for Crystallography. In 1958, they merged, together with geographical departments, into Workplaces of Geological and Geographical Section of the ČSAV. On July 1, 1960, Institute of Geochemistry and Raw Materials of the ČSAV was established. This Institute covered technical and organisation 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 was 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 (AS CR) was established by the transformation from the ČSAV, and the Geological Institute became a part of the AS CR.

The Institute of Geology 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 and (paleo)karstology
- Quaternary geology and landscape evolution
- Paleomagnetism
- Magnetostratigraphy
- Petromagnetism

Scientific laboratories

The research potential of the Institute is divided into 7 units:

1. Laboratory of Terrane Architecture and Lithosphere Evolution
2. Laboratory of Platform Evolution
3. Laboratory of Paleoebiology and Paleoecology
4. Laboratory of Environmental Geology
5. Laboratory of Environmental Geochemistry
6. Laboratory of Paleomagnetism
7. Laboratory of Physical Methods

Specialized laboratories

The following specialized laboratories have been set up:

1. Paleomagnetic laboratory (Head: Ing. Petr Pruner, DrSc.)
2. Micropaleontological laboratory (Heads: RNDr. Jiří Bek, CSc. and RNDr. Ladislav Slavík, CSc.)
3. X-ray and DTA/TG laboratory (Head: RNDr. Karel Melka, CSc.)
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)
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. and RNDr. Miloš Burian)

The scientific concept of the Institute of Geology and the evaluation of its results lie within the responsibility of the Scientific Council 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 popularisation of the most important scientific results in the public media.

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3. Connections

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4. Staff (as of December 31, 2004)

Management

RNDr. Václav Cílek, CSc .	Director of the Institute
Prof. RNDr. Pavel Bosák, DrSc.	Deputy Director
Ing. Ottomar Gottstein, CSc.	Deputy Director (finances)
Doc. RNDr. Jindřich Hladil, DrSc.	Chairman of the Scientific Council

Administrative departments

Management Section

Jana Poťtová (assistant to the Director)

Information Centre and Library

RNDr. Helena Purkyňová – Head (librarian)
Mgr. Václava Škvorová (librarian)
Lenka Kulhavá (librarian)

Technical-Economic Section

Ing. Ottomar Gottstein, CSc. – Head
Alena Sokolová – Deputy Head

Technical Department
Ing. Ottomar Gottstein, CSc. – Head
Lubomir Arandjelović (computer specialist)
Ing. Miroslav Fridrich (computer specialist)
Tomáš Valter (computer specialist)
Karel Jeřábek (garage attendant, driver)
Petr Vachalovský (technical service)

Economic Department
Alena Sokolová – Head (accountant, human resources)
Miroslav Karlík (storeman)
Jana Klímová (accountant)
Božena Trenzeluková (phone operator, mail service)

Operation and Maintenance Department
Jiří Dobrovolný – Head (technician, X-ray, thermal analyses)
Antonín Čejka (technical service)
Magdaléna Čejková (janitor)
Karel Jeřábek (janitor)
Věra Plešáková (janitor)
Ivana Konopáčová (janitor)
Jaroslav Kratochvíl (technical service)
Martin Mráček (boiler operator)

Scientific laboratories

Laboratory of Terrane Architecture and Lithosphere Evolution

Scientific Staff:

Doc. RNDr. Jindřich Hladil, DrSc. – Head (basins in orogens, terranes, carbonate sediments)
Mgr. Martin Svojtka, PhD. – Deputy Head (petrology of deep crustal rocks, fission track methods, geochronology, geochemistry)
Ing. Jiří Fiala, CSc. (petrology and structure of lithosphere, W and N of the Bohemian Massif mainly)
RNDr. Ladislav Slavík, CSc. (conodont biostratigraphy, sedimentary sequences, paleogeography)
RNDr. Petr Štorch, DrSc. (graptolite stratigraphy, stratigraphy in general, sedimentary sequences, paleogeography)
RNDr. Zdeněk Vejnar, DrSc. (lithospheric units, metamorphic overprint, regional geology of BM)
Mgr. Leona Koptíková (sedimentary petrology, metasediments, magnetic susceptibility)
Mgr. Jiří Janečka (structural geology, strain modelling)
Mgr. Jiří Sláma (metamorphic petrology, isotope dating)

Technical Staff:

Ing. Jaroslava Pavková (secretary, data processing and preparation of outputs)
Josef Forman (topography, geodetic maps, GPS)

Laboratory of Platform Evolution

Scientific Staff:

Doc. RNDr. Jaromír Ulrych, DrSc. – Head (igneous petrology, geochemistry)
Mgr. Jiří Adamovič, CSc. – Deputy Head (basin analysis, tectonics)
RNDr. Vladimír Cajz, CSc. (volcanology)
Mgr. Jiří Filip, CSc. (fission track dating)
RNDr. Luboš Lang, CSc. (igneous petrology, mineralogy)
Mgr. Lukáš Ackerman (geochemistry, mantle mineralogy)
Mgr. Karel Malý (geochemistry)
Mgr. Vojtěch Musil (geochemistry of volcanic rocks, xenolith mineralogy)
prom. geol. Jiří Novák, CSc. (petrology)

Technical Staff:

Ing. Jaroslava Pavková (secretary, technician)
Jana Rajlichová (technician)
Václav Sedláček (technician)

Laboratory of Paleobiology and Paleoecology

Scientific Staff:

RNDr. Radek Mikuláš, CSc. – Head (ichnofossils)
RNDr. Marcela Svobodová, CSc. – Deputy Head (Cretaceous palynology)
RNDr. Jiří Bek, CSc. (Devonian and Carboniferous spores)
RNDr. Petr Čejchan, CSc. (paleoecology)
Mgr. Jiřina Dašková (Cenozoic palynology)
prom. geol. Arnošt Galle, CSc. (Devonian corals and paleogeography)
RNDr. Václav Houša, CSc. (Jurassic and Cretaceous stratigraphy, calpionellids and ammonoids)

RNDr. Magda Konzalová, CSc. (Proterozoic, Early Paleozoic, Jurassic, Cretaceous and Tertiary palynology)
Doc. RNDr. Zbyněk Roček, DrSc. (origin and evolution of the Amphibia, Tertiary Anura and Sauria)
RNDr. Miloš Siblík, CSc. (Mesozoic brachiopods)
RNDr. Milada Vavrdová, CSc. (Proterozoic, Paleozoic and Mesozoic palynology and plankton)
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)
Michaela Uldrychová (technician)

Laboratory of Exogenic Geology

Scientific Staff:
Mgr. Jaroslav Hlaváč – Head (Quaternary geology, malacozoology)
Mgr. Michal Filippi – Deputy Head (mineralogy, environmental geochemistry)
RNDr. Václav Cílek, CSc. (Quaternary geology)
Prof. RNDr. Pavel Bosák, DrSc. (karstology, paleokarstology, basin analysis)
Mgr. Eva Kadlecová (Cenozoic vertebrate paleontology)
Mgr. Lenka Lisá, PhD. (Quaternary sedimentology)
RNDr. Vojen Ložek, DrSc. (Quaternary geology, malacozoology)
RNDr. Eliška Růžičková (petrology, Quaternary geology)
Mgr. Zuzana Vařilová (geochemistry)
RNDr. Anna Žigová, CSc. (pedology, paleosols)
Mgr. Ondřej Zeman (hydrogeology)

Technical Staff:
Jana Macháčková (secretary, technician)
Miroslav Karlík (technician)

Laboratory of Exogenic Geochemistry

Scientific Staff:
RNDr. Tomáš Navrátil, PhD. – Head (aquatic and environmental geochemistry)
RNDr. Jan Rohovec, PhD. – Deputy Head (analytical chemistry, ICP analyses)
Doc. Ing. Petr Skřivan, CSc. (exogenic and environmental geochemistry)
Mgr. Petr Drahota (environmental geochemistry)
Ing. Ottomar Gottstein, CSc. (geochemistry of magmatic and metamorphic rocks)
Ing. Luděk Minařík, CSc. (geochemistry)
Mgr. Marek Vach, PhD. (environmental geochemistry)
Mgr. Jitka Špičková (environmental geochemistry)
RNDr. Maria Hojdová (environmental geochemistry)

Technical Staff:
RNDr. Miloš Burian (chemical analyst)
Ing. Irena Dobešová (environmental monitoring)
Jana Macháčková (secretary, technician)

Laboratory of Paleomagnetism

<u>Scientific Staff:</u>

Ing. Petr Pruner, DrSc. – Head (geophysics, paleomagnetism)
RNDr. Jaroslav Kadlec, Dr. – Deputy Head (Quaternary geology)
Mgr. Martin Chadima, PhD. (geophysics, paleomagnetism)
prom. fyz. Otakar Man, CSc. (geophysics)
RNDr. Günter Kletetschka, PhD. (paleomagnetism, geophysics)
Bc. Stanislav Šlechta (geophysics)
Mgr. Petr Schnabl (civil military service)

<u>Technical Staff:</u>

Jana Drahotová (technician)
Tomáš Kohout (technician)
Jiří Petráček (technician)
RNDr. Daniela Venhodová (technician)

Laboratory of Physical 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. Karel Melka, CSc. (X-ray and thermal analyses)

Scientific Council

Doc. RNDr. Jindřich Hladil, DrSc. (Institute of Geology AS CR) – Head of the Council
Ing. Petr Pruner, DrSc. (Institute of Geology AS CR) – Deputy Head of the Council
Mgr. Lenka Lisá, PhD. (Institute of Geology AS CR)
RNDr. Jan Krhovský, CSc. (Ministry of the Environment of the Czech Republic)
Doc. RNDr. Zdeněk Kukal, DrSc. (Czech Geological Survey, Council for Research and Development)
RNDr. Radek Mikuláš, CSc. (Institute of Geology AS CR)
RNDr. Tomáš Navrátil, PhD. (Institute of Geology AS CR)
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Mgr. Martin Svojtka, PhD. (Institute of Geology AS CR)
RNDr. Petr Štorch, DrSc. (Institute of Geology AS CR)
RNDr. Vladimír Rudajev, DrSc. (Institute of Rock Structure and Mechanics AS CR)
RNDr. Lilian Švábenická, CSc. (Czech Geological Survey)
Doc. RNDr. Jaromír Ulrych, DrSc. (Institute of Geology AS CR)

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Prof. György Buda (Department of Mineralogy, L. Eötvös University, Budapest, Hungary)
Dr. Pavel Čepek (Ackerrain 18, 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)
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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**
prom.geol., prom. fyz., Mgr.	M.Sc.
RNDr., PhDr.	no equiv.
CSc.	PhD.
DrSc.	DSc
Doc.	Assoc. Prof.
Ing.	Dipl.-Ing.

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5. Staff News

January

1.1. 2004 Mgr. Maria Hojdová (geochemistry)
joined the Institute

February

1.2.2004 Leona Koptíková (sedimentology)
joined the Institute

1.2.2004 Mgr. Milan Geršl (sedimentology)
joined the Institute

May

17.5.2004 Mgr. Petr Schnabl (accomplished the civil military duty)
left the Institute

July

1.7.2004 Mgr. Petr Schnabl (paleomagnetism)
joined the Institute

5.7.2004 RNDr. František Patočka, DrSc. (geology)
died

August

31.8.2004 Mgr.Monika Novotná (geology)
left the Institute

September

1.9.2004 Mgr. Karel Malý (geology)
joined the Institute

1.9.2004 Mgr. Jan Rohovec, PhD. (geochemistry)
joined the Institute

1.9.2004 Mgr. Vojtěch Musil (geology)
joined the Institute

1.9.2004 Mgr. Lukáš Ackerman (geology)
joined the Institute

1.9.2004 Mgr. Jiří Sláma (geology)
joined the Institute

November

1.11.2004 Michaela Uldrychová (technician)
joined the Institute

December

31.12.2004 Mgr. Milan Geršl (sedimentology)
left the Institute

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6. Undergraduate and Graduate Education

Undergraduate and Graduate Courses at Universities given by Staff Members of the Institute of Geology AS CR:

Bosák P.: *Principles of karstology and paleokarstology.* Undergraduate and Graduate course, Faculty of Science, Charles University, Prague.

Cajz V.: *Geological excursion – KGEO/0015.* Undergraduate course, Faculty of Pedagogy, University of Jan Evangelista Purkyně, Ústí nad Labem.

Cajz V.: *Geology – KGEO/0016.* Undergraduate course, Faculty of Pedagogy, University of Jan Evangelista Purkyně, Ústí nad Labem.

Cajz V.: *Regional geology of the Bohemian Massif – seminar.* Undergraduate course, Faculty of Pedagogy, University of Jan Evangelista Purkyně, Ústí nad Labem.

Cajz V.: *Regional geology of the České středohoří Mts. – seminar.* Undergraduate course, Faculty of Pedagogy, University of Jan Evangelista Purkyně, Ústí nad Labem.

Cílek V.: *Anima urbis*. Undergraduate course, Faculty of Humanistic Studies, Charles University, Prague.

Cílek V.: *Prague and its environment*. ECES (Eastern and Central European Studies) International Programme, Faculty of Philosophy, Charles University, Prague.

Cílek V.: *Programme USAC – Field studies and introduction to European culture, civilisation and landscape*, in cooperation with Faculty of Philosophy, Charles University, Prague.

Cílek V.: *Summer Field School*. Simon Fraser University, Vancouver, Canada, in cooperation with Faculty of Philosophy, Charles University, Prague.

Geršl M.: *Cave Fills and Speleothems*. Undergraduate course (complementary), Faculty of Science, Masaryk University, Brno.

Hladil J. & Nehyba S.: *Sedimentology*. Undergraduate course (regularly), Faculty of Science, Masaryk University, Brno.

Hladil J.: *Carbonate microfacies*. Undergraduate course (complementary), Faculty of Science, Charles University, Prague.

Hladil J.: *Field course on carbonate facies*. Open graduate course (complementary), Faculty of Science, Masaryk University, Brno.

Lisá L.: *Loesses of Eurasia*. Undergraduate course, Faculty of Science, Masaryk University, Brno.

Lisá L.: *Methods of Quaternary research.* Undergraduate course, Faculty of Science, Masaryk University, Brno.

Ložek V.: *Development of nature in the Quaternary.* Undergraduate course, Faculty of Science, Charles University, Prague.

Ložek V.: *Geology for the praehistorians*. Undergraduate course, Faculty of Philosophy, Charles University, Prague.

Ložek V.: *Introduction to study of the Quaternary*. Undergraduate course, Faculty of Philosophy, Charles University, Prague.

Mikuláš R.: *Ichnology and ichnofabric of sedimentary rocks.* Undergraduate course and practice (optional), Faculty of Science, Charles University, Prague.

Mikuláš R.: *Principles of Geology for Archaeologists.* Undergraduate course, Faculty of Philosophy (Archaeology), Charles University, Prague.

Roček, Z.: *Comparative anatomy of vertebrates.* Undergraduate course, Faculty of Science, Charles University, Prague.

Roček, Z.: *Evolution of vertebrates*. Undergraduate course, Faculty of Science, Charles University, Prague.

Roček, Z.: *Morphology of animals*. Undergraduate course, Faculty of Science, Charles University, Prague.

Roček, Z.: *Review of fossil vertebrates*. Undergraduate course, Faculty of Science, Charles University, Prague.

Sláma J., Libertínová J., Košler J. : ICPMS applications in geological sciences (in Czech). 4th Course of ICP Spectroscopy, open gradute course. Spectroscopical Society and Technical University, Brno.

Štorch P. *Graptolites – writing in the rocks*. Short graduate course, Universita degli studi di Modena e Reggio Emilia, Modena.

Vach M.: *Air Pollution Control*. Undergraduate course, Faculty of Forestry, Czech Agricultural University, Prague.
Vach M.: *Environmental chemistry*. Undergraduate course, Faculty of Forestry, Czech Agricultural University, Prague.
Žigová A.: *Geography of soils and protection of soil resources of the Czech Republic.* Undergraduate course, Faculty of Science, Charles University, Prague.

cooperation on courses and practices

Melichar R., Havíř J., **Janečka J.** & Rez J.: *Tectonic analysis*. Undergraduate course, Faculty of Science, Masaryk University, Brno.
Melichar R., Kuchovský T., **Janečka J.** & Rez J.: *Methods of practical geology and geological mapping.* Undergraduate course, Faculty of Science, Masaryk University, Brno.
Štorchová H., **Čejchan P.**: *Training in numerical phylogenetics.* Chair of Botany, Faculty of Science, Charles University, Prague.
Vacek F., **Koptíková L.**, Mikšíková L., **Musil V.** & Morávek R.: *Fundamentals of geology for geographers.* Undergraduate course, Faculty of Science, Charles University, Prague.
Vacek F., **Koptíková L.**, Mikšíková L., **Musil V.** & Morávek R.: *Introduction to geology for geographers – practical courses.* Undergraduate course, Faculty of Science, Charles University, Prague.

Supervision in Undergraduate Studies

Bokr P. (MSc. thesis), Institute of Geology and Palaeontology, Charles University, Prague (*co-supervisor* ***R. Mikuláš***)
Černý R. (MSc. thesis), Faculty of Science, Charles University, Prague (*supervisor* ***Z. Roček***)
Danko P. (MSc. thesis), Faculty of Science, Charles University, Prague (*supervisor* ***Z. Roček***)
Ferbar P. (MSc. thesis), Faculty of Science, Masaryk University, Brno (*supervisors R. Melichar &* ***P. Štorch***)
Havelková P. (MSc. thesis), South Bohemian University, České Budějovice, (*supervisor* ***Z. Roček***)
Horváthová L. (MSc thesis), Faculty of Science, Charles University, Praha (*supervisor* ***T. Navrátil***)
Janečka J. (MSc. thesis), Faculty of Science, Masaryk University, Brno (*supervisors R. Melichar &* ***P. Štorch***)
Koptíková L. (MSc. thesis), Faculty of Science, Charles University, Prague (*supervisors F. Vacek, I. Chlupáč &* ***J. Hladil***)
Kučerová K. (MSc. thesis), Faculty of Science, Masaryk University, Brno (*supervisors* ***J. Hladil*** *& M. Slobodník*)
Macáková J. (MSc. thesis), Faculty of Science, Charles University, Prague (*supervisor* ***M. Svojtka***)
Šlechta S. (MSc. thesis), Faculty of Science, Charles University, Prague (*supervisor* ***J. Kadlec***)
Štolfová K. (MSc. thesis), Institute of Geology and Palaeontology, Charles University, Prague (*co-supervisor* ***R. Mikuláš***)

Supervision in Graduate Studies

Baroň I. (PhD. thesis), Faculty of Science, Masaryk University, Brno (*supervisor* ***V. Cílek***)
Čáp P. (PhD. thesis), Faculty of Science, Charles University, Prague (*supervisors J. Marek and* ***P. Štorch***)
Dašková J. (PhD. thesis), Faculty of Science, Charles University, Prague (*supervisor O. Fatka, co-supervisor* ***M. Konzalová***)
Drábková J. (PhD. thesis), Charles University, Prague (*supervisor* ***J. Bek***)
Drahota P. (PhD. thesis), Faculty of Science, Charles University, Prague (*supervisor* ***P. Skřivan***)
Ekrt B. (PhD. thesis), Faculty of Science, Charles University (*supervisor O. Fejfar*, *co-supervisor* ***J. Zajíc***)
Geršl M. (PhD. thesis), Faculty of Science, Masaryk University, Brno (*supervisor* ***J. Hladil***)
Gilíková H. (PhD. thesis), Faculty of Science, Masaryk University, Brno (*supervisor* ***J. Hladil***)

Hlaváč J. (PhD. thesis), Faculty of Science, Charles University, Prague (*co-supervisors* ***V. Ložek*** *and* ***V. Cílek***)
Janečka J. (PhD. thesis), Faculty of Science, Masaryk University, Brno (*supervisor* ***J. Hladil*** *and R. Melichar*)
Koptíková L. (PhD. thesis), Faculty of Science, Charles University, Prague (*supervisor* ***J. Hladil***)
Kratochvílová L. (PhD. thesis), Inst. geol. Ingeneering, Technical University, Ostrava (*co-supervisor* ***V. Houša***)
Kubínová P. (PhD. thesis), Faculty of Forestry and Environment, Czech Agricultural University, Praha (*supervisor* ***P. Skřivan,*** *co-supervisor* ***M. Vach***)
Malý K. (PhD. thesis), Faculty of Science, Charles University, Prague (*supervisor* ***J. Adamovič***)
Mikšíková L. (PhD. thesis), Faculty of Science, Charles University, Prague (*supervisor* ***V. Cílek***)
Musil V. (PhD. thesis), Faculty of Science, Charles University, Prague (*supervisor* ***J. Ulrych***)
Navrátil T. (PhD. thesis), Institute of Geology, AS CR, Prague (*supervisor* ***P. Skřivan***)
Piras S. (PhD. thesis), Universita degli Studi di Modena e Reggio Emilia, Modena, Italy (*supervisors E. Serpagli and* ***P. Štorch***)
Pokorný R. (PhD. thesis), Faculty of Science, Charles University, Prague (*co-supervisor* ***R. Mikuláš***)
Schiller W. (PhD. thesis), Faculty of Science, Charles University/University of Munich (*supervisor* ***J. Ulrych***)
Schnabl P. (PhD. thesis), Faculty of Science, Charles University, Prague (*supervisor* ***P. Pruner***)
Špičková J. (PhD. thesis), Institute of Geology AS CR, Prague (*supervisor* ***P. Skřivan***)
Vacek F. (PhD. thesis), Faculty of Science, Charles University, Prague (*supervisor* ***P. Bosák***)
Vařilová Z. (PhD. thesis), Faculty of Science, Charles University, Prague (*supervisor* ***V. Cílek***)

Membership in academic boards at Universities

Prof. RNDr. Pavel Bosák, DrSc. – Member of the Scientific Board, Faculty of Science, Masaryk University, Brno. Member of the Board of Graduate Studies in Geology, Faculty of Science, Charles University, Prague. Member of the Board for Interdisplinary study of Quaternary at the Board of Graduate Studies in Geology, Faculty of Science, Masaryk University, Brno. Vice-Chairman and member of the Committee for degree of Doctor of Science in geological sciences.
RNDr. Václav Cílek, CSc. – Member of the Scientific Board, Faculty of Humanistic Studies, Charles University, Prague.
Doc. RNDr. Jindřich Hladil, DrSc. – Member of the Board of Graduate Studies in Geology, Faculty of Science, Charles University, Prague and Faculty of Science, Masaryk University, Brno. Member of the Committee for Finals of Undergraduate Students in Geology, Faculty of Science, Masaryk University, Brno. Alternating member of the Committee for degree of Doctor of Sciences in geological sciences.
RNDr. Jaroslav Kadlec, Dr. – Member of the Board of Undergraduate and Graduate Studies in Geology, Faculty of Science, Charles University, Prague.
Ing. Petr Pruner, DrSc. – Member of the Board of Graduate Studies in Geophysics, Faculty of Science, Charles University, Prague. Alternating member of the Committee for degree of Doctor of Science in geological sciences.
Doc. RNDr. Z. Roček, DrSc. – Member of the Board of Graduate Studies in Zoology, Faculty of Science, Charles University, Prague. Alternating member of the Committee for degree of Doctor of Sciences in geological sciences and Zoology and Animal Physiology.
Doc. Ing. Petr Skřivan, CSc. – Member of the Scientific Board (Section of Geology) of the Faculty of Science, Charles University, Prague; Member of the Board of Graduate Studies in Applied and Landscape Ecology, Faculty of Forestry, Czech Agricultural University, Prague.
RNDr. Petr Štorch, DrSc. – Member of the Scientific Board (Section of Geology), Faculty of Science, Charles University, Prague. Alternating member of the Committee for degree of Doctor of Sciences in geological sciences.
Doc. RNDr. Jaromír Ulrych, DrSc. – Member of the Board of Graduate and RNDr. Studies in Mineralogy and Geochemistry, Faculty of Science, Charles University, Prague.

RNDr. Anna Žigová, CSc. – Member of the Board of Graduate Studies in Physical Geography, Charles University, Prague. Member of Section of Soil Science of Scientific Council of Research Institute of Ameliorations and Soil Conservation, Prague

<u>Degrees obtained by the staff of the Institute of Geology AS CR</u>

Mgr.

Mgr. Jiří Janečka: *Analysis of the Očkov and Koda faults and tectonics of the adjacent area widely near Zadní Třebáň.* Institute of Geological Sciences, Faculty of Science, Masaryk University, Brno (June, 2004).

Mgr. Leona Koptíková: *Evolution of sedimentary environments related to the Choteč Event and the magnetic-susceptibility stratigraphic correlation of the Emsian–Eifelian sections (Holyně, Choteč, Koněprusy – Devonian limestones in Barrandian area).* Institute of Geology and Paleontology, Faculty of Science, Charles University, Prague (June, 2004).

RNDr.

RNDr. Tomáš Navrátil, PhD.: *Biogeochemistry of the II.A group elements in a forested catchment*. Institute of Geochemistry, Mineralogy and Natural Resources, Faculty of Science, Charles University, Prague (Septmeber, 2004)

RNDr. Maria Hojdová: *Microclimate of a peat bog and of the forest indifferent states of damage in the Šumava National Park*. Institute of Geochemistry, Mineralogy and Natural Resources, Faculty of Science, Charles University, Prague (February, 2004)

PhD.

Mgr. Martin Chadima, PhD.: *Structural development of the Drahanská vrchovina Upland (SE Rhenohercynian Zone) as studied by magnetic anisotropy.* Institute of Geological Sciences, Faculty of Science, Masaryk University, Brno (June, 2004)

RNDr. Tomáš Navrátil, PhD.: *Biogeochemistry of the II.A group elements in a forested catchment*. Institute of Geochemistry, Mineralogy and Natural Resources, Faculty of Science, Charles University, Prague (February, 2004)

7. Awards and Fellowships

Awards:

Prof. RNDr. Pavel Bosák, DrSc.: Associate Researcher, Karst Research Institute, Scientific Research Centre, Slovenian Academy of Sciences and Arts, Postojna
RNDr. Karel Melka,CSc.: Honorary membership of the Czech National Clay Group
Doc. RNDr. Zbyněk Roček, DrSc.: Josef Hlávka Award (Czech Literary Foundation) for a co-authorship of the book „Nový přehled biologie“.
RNDr. J. Zajíc, CSc.: The village of Žilov award for paleontological research of the Žilov and its environs.

Fellowships:

RNDr. Jaroslav Kadlec, Dr.: NSF–NATO Post-doc Fellowship at Michigan Technological University, USA
RNDr. Ladislav Slavík, CSc.: Alexander von Humboldt Foundation, Germany: Research Fellowship

8. Positions in International Organizations and Editorial Boards

Bek J.: Councillor, Organisation of Czech and Slovak palynologists, since1994.
Bek J.: Secretary General, International Federation of Palynological Societies, since 2004.
Bosák P.: Member, American Geophysical Union, the U.S.A., since 2002.
Bosák P.: Member, Commission for Physico-Chemistry and Hydrogeology of Karst, the International Speleological Union, since 1978.
Bosák P.: Member, Commission on Paleokarst and Speleochronology, the International Speleological Union, since 1986.
Bosák P.: Member, National Speleological Society, the U.S.A., since 1981.
Bosák P.: Secretary General, the International Union of Speleology, since 1993, re-elected 1997, 2001.
Dašková J.: Member, Organization of Czech and Slovak palynologists, since 2002.
Galle A.: Czech representative of the International Paleontological Association, since 1995.
Hladil J.: Corresponding Member, Subcommission on Devonian Stratigraphy of the IUGS, since 1993.
Houša V.: Member of International working group on the Jurassic/Cretaceous Boundary, IUGS International Stratigraphical Commission, since 1987.
Kadlec J.: IGBP – Core Project 7: Past Global Changes – coordinator for the Czech Republic.
Kadlec J.: IGBP – member of the National Committee.
Kadlec J.: INQUA – member of the Commission for terrestrial processes.
Ložek V.: Foreign Member, Polish Academy of Arts and Sciences, election approved by the Polish President in 1999.
Ložek V.: Member, Commission on Holocene, INQUA – Commission of Loess Studies, since 2003.
Melka K.: Czech/Slovak representative ECGA, the European Clay Groups Association, since 1991 (since 1998 representing only the Czech group).
Melka K.: Liaison officer, AIPEA, Association Internationale pour l‘ Etude des Argiles, since 1995.
Mikuláš R.: Czech Representative, IGCP 471, Evolution of Western Gondwana during the Late Palaeozoic, since 2003.
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 Morfology, since 2001.
Roček Z.: Member of the Executive Committee, World Congress of Herpetology, since 1994.
Roček Z.: Member of the Program Committee, 5th World Congress of Herpetology, since 2004.
Roček Z.: Vice-president, Societas Europaea Herpetologica, elected in 1998.
Růžičková E.: Corresponding member of COGEOENVIRONMENT, since 1992 (Commission on Geol. Sciences for Environmental Planning), since 1992.
Růžičková E.: Member, the IGBP National Committee, since 1993.
Siblík M.: Corresponding Member, Subcommision of Triassic stratigraphy of the IUGS, since 1999.
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.
Ulrych J.: Member, Permokarboner Kreis (Würzburg, FRG).
Zajíc J.: Member, Czech National Committee for International Geological Correlation Programme (IGCP), since 2003.

Editorial Boards

Bosák P.: *Acta Carsologica*, international journal, published by the Slovenian Academy of Sciences and Arts, Ljubljana, Slovenia; Member of Advisory Board, since 2004.
Bosák P.: *Český kras*, regional journal published by the Museum of the Czech Karst in Beroun, Czech Republic; co-Editor, since 1976.
Bosák P.: *Geologica Carpathica*, journal of the Carpatho-Balkanian Association, Geological Institute, Slovak Academy of Sciences, Bratislava; co-Editor, since 2000.
Bosák P.: *Geologos*, Wydzial Geologii, Uniwersytet Adama Mickiewicza, Poznań, Poland; Member of Editorial Board, since 2000.
Bosák P.: *International Journal of Speleology*, international journal published by Union Internationale de Spéléologie and Societá Speleologica Italiana, L'Aquilla, Italy; Member of Advisory Board, since 1994.
Bosák P.: *Speleo (Prague)*, society bulletin published by the Czech Speleological Society, Prague, Czech Republic; Member of Editorial Board, since 1990.
Bosák P.: *Theoretical and Applied Karstology*, Institutul de Speologie „Emil Rakovita", Bucuresti, Romania; Member of Editorial Board, since 2000.
Bosák P.: *UIS Bulletin*, information bulletin of the International Union of Speleology, Prague, Czech Republic; Editor-in-Chief, since 1993.
Bosák P.: *Annual report of the Institute of Geology*, Academy of Sciences of the Czech Republic, Co-editor, since 1998
Cajz V.: *Essentia (www.essentia.cz)*, Member of Editorial Board, since 2003.
Cílek V.: *Slovenský kras*, Liptovský Mikuláš, Slovakia; Member of Editorial Board, since 2000.
Hladil J.: *Geologica Carpathica*, Bratislava, Slovakia; Member of Editorial Board, since 2001.
Hladil J.: *Geological Quarterly*, Warszaw, Poland; Consulting Editor, since 2004.
Hlaváč J.: *Malacologica Bohemoslovaca*, Prague, Czech Republic; Member od Editorial Board, since 2003.
Ložek V.: *Studia Quarternaria*, Krakow, Poland; Member of Editorial Board, since 1999.
Melka K.: *Clay Minerals* (Journal of the European Clay Groups, London), Member of Editorial Board, since 1999.
Pruner P.: *Acta Universitatis Carolinae, Geologica*, Charles University Prague, Member of Editorial Board.
Pruner P.: *Geolines*, Institute of Geology, AS CR, Member of Editorial Board.
Roček Z.: *Biota*, Slovenia, Member of the editorial board since 2003.
Roček Z.: *Bulletin de la Societé Herpétologique de France,* Paris, France, Member of Editorial Board, since 1992.
Roček Z.: *Živa,* Prague, Member of the editorial board, since 1995.
Slavík L.: *Annual report of the Institute of Geology*, Academy of Sciences of the Czech Republic, Editor in Chief since 1999
Svojtka M.: *Acta Universitatis Carolinae, Geologica*, Charles University Prague, Member of Editorial Board.
Svojtka M.: *Geolines*, Institute of Geology, ASCR, Editor-in-Chief
Štorch P.: *Geological Journal*, Liverpool, Manchester, UK; Associated editor, since 1993.
Štorch P.: *Newsletters on Stratigraphy*, Berlin, Stuttgart; Associated editor since 1999.
Ulrych J.: *Academia*, Member of Editorial Board since 2004
Zajíc J.: *Bulletin of Geosciences,* Member of Editorial Board since 2001.

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9. List of Grants and Projects undertaken in the Institute of Geology

Foreign Grants and Joint Projects

Project of the Japan Society for the Promotion of Science. Grant for bilateral cooperation between Japan and foreign country. The root zone dynamics under the continent collision zone. The role of crustal melting at extremely high pressure and high temperature conditions (*T. Hirajima, M. Obata, T. Mori, Y. Hiroi, Kyoto University, Japan & **M. Svojtka***)

This study confirmed that eclogite associated with garnet peridotite from Nove Dvory has undergone very high-P (> 4 GPa) and high-T (1050–1150°C) metamorphism, which has been previously proposed by thermobarometry of garnet peridotite. Such high-P evidence has not yet been found in surrounding migmatitic gneiss and felsic granulite of the Gföhl Unit, and hence the Nove Dvory garnet peridotite body could be a tectonic block that ascended separately and intruded into crustal material: felsic granulite and migmatitic gneiss. To explain the exhumation of peridotite in the Variscan orogenic belt, lithospheric delamination related to continental collision can be considered. Origins of eclogite and peridotite can be one of the keys to give constraints to the juxtaposition process between the peridotite body and the surrounding crustal material. Geochemical study of eclogites from the Gföhl Unit indicated that the eclogites would have formed by high-P accumulation of garnet and clinopyroxene from a basaltic melt in the upper mantle. According to this idea, eclogites from Nove Dvory were not crustal material and were not located at crustal levels. However, we identified large garnet grains in the studied eclogite that preserve Ca-poor compositions in the central part, probably indicating the presence of relatively a lower-P stage prior to peak-P (> 4 GPa) metamorphism. Down-going lithosphere with crustal material may have dragged down relatively shallow mantle-wedge material to asthenospheric depth (≈ 150 km). Dragged hydrated peridotite layer is considered to be present along the hanging wall just above the down-going lithosphere in the subduction zone. The Nove Dvory peridotite body may have been a part of such a dragged hydrated peridotite layer. However, it is questionable whether the estimated P–T conditions (1050–1150°C, 4.5–4.9 GPa) can be attained by a simple subduction. In the thermal model calculations, temperatures on the surface of the down-going lithosphere do not reach such high temperatures. If relatively hot (young) crustal material was subducted, the down-going lithosphere can reach such high-T conditions (1050–1150°C) around 150km depth (4–5 GPa). If so, melting would have significantly occurred in the subducted crustal material at such extreme P-T conditions, which allows high buoyancy force for a rapid rise of the subducted material with hanging wall peridotite. Lack of a clear retrograde zoning of garnet in the studied eclogite possibly means very rapid exhumation of the Nove Dvory body.

Czech–Italian Joint Programme KONTAKT (Ministry of Education, Youth and Sports), Project no 23–ES1. Fossils as time indicators: Integrated conodont–graptolite biostratigraphy of selected Lower Palaeozoic sections of Czech Republic (Barrandian area) and Italy (Carnic Alps and Sardinia) (*E. Serpagli & A. Ferretti, University of Modena and Reggio Emilia, **P. Štorch** & **L. Slavík***)

Two reference sections with biostratigraphically important graptolite fauna have been studied in the shaly facies of the lower Kopanina Formation (lower Ludlow, Gorstian) S of Beroun, near Bykoš and Všeradice respectively. 21 graptolite species were described and three graptolite biozones were defined. Graptolites are associated with flattened nautiloid shells, rare bivalves, crinoids and ostracodes. Research on chitinozoan fauna is under progress.
Ludlow succession starts with the *nilssoni–uncinatus* Biozone. Its base is characterized by the first occurrence of *Neodiversograptus nilssoni*, accompanied by the appearance of *Monograptus uncinatus*, *Colonograptus colonus*, *C. roemeri* and *Bohemograptus bohemicus*. Also *Pristiograptus dubius*, *Plectograptus macilentus* and *Spinograptus spinosus* are common.
The lower boundary of the following progenitor Biozone is defined by the appearance of the index graptolite *Lobograptus progenitor*. There is a prominent overlap with *N. nilssoni* and *M. uncinatus* which both disappear from the fossil record well above the base of the *progenitor* Biozone. Along with common occurrence of the zonal index species, the *progenitor* Biozone assemblage is composed by

Monoclimacis micropoma, *P. dubius*, *C. colonus*, *C. roemeri*, *B. bohemicus*, *Sp. spinosus*, *Sp. münchi*, *Pl. macilentus*, and *Holoretiolites* cf. *mancki*.
First appearance of spinose saetograptid *Saetograptus fritschi* indicates the beginning of the *fritschi* Biozone with a rich assemblage containing *S. fritschi*, *S. chimaera*, *S.* cf. *leintwardinensis primus*, *P. dubius, C. colonus*, *Mcl. micropoma*, *Pseudomonoclimacis* n.sp., *B. bohemicus*, ?*L. simplex*, *Crinitograptus crinitus*, *Cr. operculatus*, *Pl. macilentus*, and *Holoretiolites* cf. *mancki*.
Problematic phosphatic elements associated with conodonts and other fossils are reported for the first time from Bohemia and are attributed to *Eurytholia bohemica* n.sp. Similar mineralized elements, interpreted as sclerites, were known only in a very narrow interval from Middle–Late Ordovician beds bordering the Iapetus Ocean. This new report comes from Silurian and Early Devonian limestones, well biostratigraphically dated by conodonts and graptolites, and provides significant range extension for these problematics as well as enlargment of their geographic area.

Czech–French Joint programme KONTAKT (Ministry of Education, Youth and Sports), Project BARRANDE 2003-2004-014-1. Volcanic, sedimentary and fossil record of the Barrandian area and its bearing on recognition of principal events in evolution of the Lower Palaeozoic extensional basins of the Variscan Europe (*Ch. Pin & J.-L. Paquette, Université de Blaise Pascal, Clermont-Ferrand;* ***P. Štorch*** *& V. Kachlík, Faculty of Science, Charles University, Prague*)

Geochemical studies on well biostratigraphically dated Cambrian and Ordovician–Middle Devonian siliciclastics of the Barrandian area have helped to elucidate sediment provenances and principal events in the evolution of the basin and its neighboring source areas. Sandstones of the Middle Cambrian Příbram–Jince Basin were derived from a Cadomian Neoproterozoic island arc. The source area of the Ordovician shallow-marine siliciclastics of the successor Prague Basin is a dissected Cadomian orogen. Late Cambrian acid volcanics of the Barrandian and Cambrian (meta)granitoids emplaced in the W part of the Teplá–Barrandian Cadomian basement are also discernible in these sediments. Old sedimentary component increased during the Ordovician. Early Llandovery siliciclastic rocks account for an abruptly weakened supply of terrigenous material and an elevated proportion of intrabasinal volcanics as an effect of continuing extension of the basin triggered by latest Ordovician glacioeustatic transgression. Emsian siliciclastics (intercalated in the Late Silurian to Early Devonian limestone suite) presumably comprise an addition of coeval basic/ultrabasic volcaniclastics. Givetian (Middle Devonian) flysch siliciclastics indicate reappearance of Cadomian source near the Barrandian area during early Variscan convergences of Armorican microplates that preceded accretion of the Teplá–Barrandian unit within the Bohemian Massif terrane mosaic.
Further informal but effective cooperations continued with Dominique Massa (France), Sebastian Lüning (Germany) and David Loydell (Great Britain), and have been integrated into the present and planned research activities.

International project supported by the Alexander von Humboldt Foundation. Late Silurian and earliest Devonian Conodont faunas – taxonomy and biostratigraphy (***L. Slavík****, P. Carls, Institut für Umweltgeologie, TU Braunschweig, Germany & J.I. Valenzuela-Ríos, Departamento de Geología, Universitat de València, Spain*)

The project concerns late Silurian to earliest Devonian conodonts, their taxonomic revision, and their biostratigraphic application. The main orientation is particularly on conodonts of the Lochkovian Stage with special attention to the Silurian/Devonian boundary. The respective strata have been correlated by means of conodonts on a global scale, however, only a comparatively low number of taxa in this interval was formally distinguished and named. Recent revisions of important elements have shown that the current concepts of intraspecific variability were too liberal and that this has resulted in lumping of actually different taxa under the same names. Their lumping has blunted the precision of taxonomy, phylogeny, and correlation considerably. In order to remedy this situation, to eliminate errors from the past, and to progress in the global correlation near the interesting Silurian/Devonian boundary, ample material from continuous sections in marine, mostly pelagic carbonate successions is studied under revised concepts. In our material from the type section of the Přídolí, we find elements of *Delotaxis* with alternating denticles (an index for the uppermost Silurian Zone) already below the acme of nov. gen. *W eosteinhornensis* and it overlaps with the latter. These findings with other conodont data from the Silurian/Devonian boundary show that the previous conodont zonation coined by Jeppsson on the basis of conodont faunas from the GSSP at Klonk is erroneous.

Joint Project of the Institute of Geology PAS (Poland) and Institute of Geology ASCR: Study of eclogite–granulite series of Rychleby and Zlote mountains, focused on signs of UHP metamorphism (*N. Bakun-Czubarow* & ***J. Fiala***)

The main goal of the studies was the discrimination of geochemical characteristics on rutiles separated from the eclogite rocks in the Orlica–Snieznik Complex (or Domain, OSD) and rutiles from other eclogites that occur in the Kamieniec Zabkowicki Complex of the Fore-Sudetic Block (FSB). The concentrations of HSF elements (Zr, Nb), type-3d transition metals (Cr, Fe) and other trace elements (Al, Si, Ca) in rutiles were documented using the electron microprobe methods. The rutiles from OSD are considerably enriched in Cr, to a lesser extent also in Zr, but are significantly depleted in Nb, all relative to rutiles from FSB eclogites. A new Cr-Zr-Nb discrimination diagram was designed to interpret the rutile-based provenances. The solutions obtained using this diagram are supported by other data. In this discrimination diagram, the fields with Cr-rich rutiles (from the type-Mg-Al-Cr eclogites of OSD) are markedly separated from those of Nb-rich rutiles (from type-Fe-Ti eclogites of FSB).

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: Cenozoic Alkaline Volcanic Series in western part of the Bohemian Massif (***J. Ulrych,*** *K. Balogh, Institute of Nuclear Research, Hungarian Academy of Sciences, Debrecen,* ***J.K. Novák,*** *F.E. Lloyd, University of Bristol, UK, E. Hegner, University of Munich* & *L.G. Viereck-Goette, University of Jena)*

Three Cenozoic events and alkaline volcanic rock series were recognized in W Bohemia: 1. Early Oligocene to Early Miocene event (31–20 Ma) in the Ohře Rift, 2. Middle to Late Miocene event (16.5–8.3 Ma) associated with the Cheb–Domažlice Graben, 3. Pleistocene (0.43–0.26 Ma) at the intersection of the Ohře Rift and Cheb–Domažlice Graben in the Cheb Basin area. Parental magmas of all these rocks series are inferred to have originated by low-degree melting of metasomatized sub-rift mantle initiated at >31 Ma. The mantle source was probably lithospheric mantle metasomatized by plume-like material. Volcanic activity pulsated afterwards from the Early Oligocene to the Pleistocene. Gas emanations rich in CO_2 containing mantle-derived He are spatially and genetically associated with Pleistocene volcanoes that are characterized by primitive magmas and products of explosive character. Nd–Sr isotopic compositions for primitive mafic rocks both in Cheb–Domažlice Graben, W Bohemia, ($^{87}Sr/^{86}Sr$: 0.7034–0.7039; $^{143}Nd/^{144}Nd$: 0.51277–0.51288), and in the Naab–Pritzwalk lineament area, Saxony ($^{87}Sr/^{86}Sr$: 0.7032–0.7037; $^{143}Nd/^{144}Nd$: 0.51282–0.51287), are rather uniform. The isotopic signature exhibits the common mantle component characteristic of the Cenozoic volcanism of Europe known as the European Asthenospheric Reservoir. On the basis of isotopic and trace element data of the primitive mafic rocks, we suggest that the source of the magmas is a sublithospheric HIMU mantle source.

Project of the University of Málaga (2004–2007), Ministerio de Educación y Cultura del Reinado Español BTE 2000-1150. Factors controlling low-grade metamorphic reactions in natural paragenesis (transition between the Maláguide and Alpujárride Complexes) and in experiments between 200 °C and 450 °C

Subproject: Metamorphism of mafic dyke rocks from the Málaga area (Betic Cordillera, southern Spain) (***J.K. Novák*** *& M.D. Ruiz Cruz, Universidad de Málaga*)

Several petrographically and geochemically distinct suites of mafic igneous dykes (33.6–17.0 Ma) crop out in /i/ the eastern limit of the Maláguide and Benamocurra Units (altered andesite, diorite), /ii/ a central part comprising northern proximity of Málaga City (tholeiitic basalt, sub-ophitic gabbro), and /iii/ the western zone built by Alpujárride Complex between Marbella and Fuengirola (basalt, basaltic andesite, andesite, and trachyandesite). The geochemical features of low-K suite I have attributes similar to EM 2 with enriched crustal component ($^{87}Sr/^{86}Sr$ /t/=0.70778–0.70897, εNd = +4.3–4.5) and those of suite II are similar to EM 1 that was modified by assimilation of altered subducted rocks ($^{87}Sr/^{86}Sr$/t/ = 0.70978–0.71067, εNd= -1.8 to -6.7). A solitary dyke contains contributions from HIMU and a radiogenic component ($^{87}Sr/^{86}Sr$/t/ = 0.70467, $^{143}Nd/^{144}Nd$ = 0.51281). Suite I has a relatively flat REE profile with slightly elevated LREE (La_N/Yb_N = 1.4–2.8) and displays an enrichment in Rb, U, K, and Pb, while calc-alkaline magmas of suite II are clearly enriched in LREE (La_N/Yb_N=3.0–7.6). They show a depletion in Nb, Ta, and Ti, and an enrichment in LILE (Rb, Th, K, Ba, and Sr), being similar to those of arc-related lavas. Basaltic dyke located north of Málaga is distinguished by far more extreme enrichment in LREE and compatible elements, such as Cr, Ni, and V. The following dominant LT/LP metamorphic mineral assemblages: /i/ chlorite and vermiculite-rich; /ii/ actinolite-rich, /iii/ talc and tremolite-bearing, and /iv/ epidote and zeolite-bearing in mafic dyke rocks were distiguished. A significant correlation was found between petrographical and geochemical characteristics of the Oligocene–Early Miocene magmas and their regional distribution.

Programme of the European Science Foundation
EEDEN (Environments and Ecosystem Dynamics of the Eurasian Neogene) / NECLIME (Neogene Vegetation and Climate Reconstructions) (*Projects leaders J. Eder, Museum of Natural Hiistory, Stuttgart, J.E. Meulenkamp, Inst. Earth Sci., Utrecht Univ., The Netherlands & V. Mosbrugger, Inst. a. Mus. of Geology and Palaeontology, Univ. Tuebingen, Germany*)

Subproject: Tertiary freshwater and wetland ecosystems of the North Bohemian lignite Basin (*Z. Kvaček, Faculty of Science, Charles University, Prague,* ***M. Konzalová, J. Dašková,*** *J. Sakala & J. Prokop, Faculty of Science, Charles University, Prague*)

Foliated trees and shrubs recorded in pollen grains from the high-resolution intervals (HRI 2 and the lower part of HRI 1) in the Neogene of the Paratethys area were revised and compared with the analogical finds in the Bohemian and other Neogene basins for the confirmation of the taxonomic assignment of the fossil grains. Some of them were also necessary to compare with the relevant modern taxa at the family and/or generic level to evaluate their assignment after the original assumption of the authors (for example, some genera of the Juglandaceae family, *Liquidambar* species and others). The documented specimens as *Alnus, Ulmus, Carya, Pterocarya, Engelhardia*, *Platycarya, Tiliaceae, Fagus, Quercus, Magnolia, Nyssa* foliated trees pollen showed a wide distribution in both the central Paratethys area and the Central European basins. The goal of the multivariate comparisons was to obtain more precise data for the modelling of the Neogene vegetation (J. Eder), and for paleoclimatic reconstructions based on the leaves, fruits and pollen. Their composition and climatic signals of the individual components in the whole taxa mosaic are thoroughly evaluated. The evolution of vegetation over large regions linked with the evolution of mammal faunas in the Neogene of Eurasia is the final aim of evaluation of these partial data.

Czech–Polish Joint Programme. Agreement of scientific co-operation between Czech and Polish Academies of Sciences. Programme No. 14. Correlation of the fossil floras of the Czech and Polish Republics: Investigation of differences in development of fossil vegetation pattern in Poland and Czech Republic (***M. Konzalová*** *& E. Zastawniak, Institute of Botany, Department of Palaeobotany, Polish Academy of Sciences, Krakow*)

The paleobotanical research lately carried out in the eastern part of the Ohře Rift (Czech and Polish parts), the palynospectra showed slight differences in the vegetational development in the regional scale and timing. The present research began predominantly on the comparative morphology of fossil and modern plants from the collection of pollen slides and seeds, involved conifers and mainly flowering dicots (*Angiospermae, Dicotyledones*), following the common investigation of the monocots in the eastern part of the Rift. *Glyptostrobus, Picea, Abies, Larix, Keteleeria Cathaya, Taiwania*, *Pseudotsuga, Pseudolarix, Cephalotaxus* were studied in more detail. The differences between *Taiwania* and *Cunninghamia* pollen were specified. *Cunninghamia* was recognized to be present in both the Czech and Polish Miocene basins. Among dicotyledonous taxa, we concentrated our research on the woody plants of Caucasian–Iranian provenance and their representation within the associations in the compared basins.

IGCP Project No. 471 Evolution of Western Gondwana during the Late Palaeozoic (*Project leaders C.O. Limarino & L.A. Buatois, INSUGEO, Argentina*)
Subproject: The Culm Facies of the northern Moravia, Czech Republic: Environmental and palaeogeographic constraints (***R. Mikuláš****, J. Zapletal, O. Bábek & T. Lehotský, Faculty of Science, Palacký University, Olomouc*)

The Lower Carboniferous Moravian–Silesian Culm Basin (MSCB) represents the easternmost part of the Rhenohercynian system of collision-related, deep-water foreland basins (Culm facies). The Upper Viséan Moravice Formation (MF) of the MSCB shows a distinct cyclic stratigraphic arrangement. Two major asymmetric megacycles bounded by a basal sequence boundary were revealed, each about 500 to 900 m thick. The megacycles start with 50-to-250m thick, basal segments of erosive channels–overbank successions and slope-apron deposits interpreted as lowstand turbidite systems. Up-section they pass into fine-grained, low-efficiency turbidite systems hundreds of metres thick. Paleocurrent data show two prominent directions: 1) basin axis-parallel, SSW–NNE directions, which are abundant in the whole MF, and 2) basin axis-perpendicular to oblique, W–E to NW–SE directions, which tend to be confined to the basal parts of the megacycles or channel-lobe transition systems in their upper parts. Based on the facies characteristics, paleocurrent data, sandstone composition data and trace-fossil distribution data, we suggest a combined tectonics-sediment supply driven model for the MF basin fill. Periods of increased tectonic activity resulted in slope oversteepening probably combined with increased rate of lateral, W–E sediment supply into the basin, producing the basal sequence boundary and the subsequent lowstand turbidite systems. During subsequent periods of low tectonic activity, the system was filled mainly from a distant southern point source, producing thick, low-efficiency turbidite systems. Consistently with the previous models, our own sediment composition data indicate a progressively increasing sediment input from high-grade metamorphic and magmatic sources up-section, most probably related to an uplift in the source area and progressive unroofing of its structurally deeper crustal parts. The first occurrence of the *Cruziana–Nereites* ichnofacies in sand-rich turbidite systems in the youngest parts of the MF (Goβel to Goβspi Zone), supported by rapidly increasing quartz contents in sandstones, is thought to indicate a transition from generally underfilled to generally overfilled phase in the evolution of the MSCB. This transition may be linked to the onset of Upper Viséan phase of northward basin-fill progradation assumed by previous authors.

Czech–Austrian Joint Programme "KONTAKT" (Ministry of Education, Youth and Sports) No. 2003-2: Documentation of the new Jurassic brachiopod localities in the UNESCO World Heritage area Hallstatt–Dachstein/Salzkammergut (***M. Siblík*** & *H. Lobitzer, Geologische Bundesanstalt Wien, Austria*)

In the area of Mitterwand SW of Hallstatt, the exact location of brachiopod localities was measured and further samples for research were taken. The numerous specimens of *Liospiriferina alpina*, *Cirpa ex gr. belemnitica*, *Zeilleria stapia* and *Zeilleria alpina* are typical of the local Liassic. Juvenile ammonites and a complete collection of characteristic brachiopods *Austriellula geyeri, Austriellula nux, Austriellula longicollis* and *Nucleatula retrocita* were found in the Norian of Taubenstein near Gosau. Very important were the finds of rich Liassic brachiopod fauna in the western part of the Totesgebirge (e.g., Plankensteinmoos) ascertained by W. Kerndler (Kammermuseum Bad Aussee), which were used for comparison with the material from the World Heritage Site. The most important taxa are the same in both areas studied.
Surprising find in the western part of the Totesgebirge was the lumachelle of *Rhynchonellina suessi* at the very Triassic/Jurassic boundary. This characteristic species, described from Sicily, has not been ascertained from the Northern Calcareous Alps yet.

Czech–Austrian Joint Programme "KONTAKT" (Ministry of Education, Youth and Sports) No. 2004-28 The Gosau Group between the Wolfgangsee and Traunsee (Salzkammergut, Upper Austria (***M. Svobodová***, *H. Lobitzer, Geologische Bundesanstalt Wien, Austria, L. Hradecká & L. Švábenická, Czech Geological Survey, Prague*)

Samples of marlstones of selected exposures from the classical area of the Gosau Formation – Schwarzenbach, Billroth, Gasthof Wacht near Wolfgangsee (Salzkammergut, Northern Calcareous Alps) yielded a poor and badly preserved palynomorph assemblage. Despite this fact, we can evidence the Middle Turonian age for the sample from the Billroth locality by the presence of angiosperm pollen of Normapolles group – *Trudopollis* spp. and the Coniacian–Santonian age for the Gasthof Wacht which belongs to the *Oculopollis–Complexiopollis* Dominance Zone (Góczán 1964, Góczán & Siegl-Farkas 1993). Both localities were deposited in the marine environment. Sediments at the Schwarzenbach locality were deposited in non-marine but probably tidally influenced environment (presence of small spiny micrhystrids).

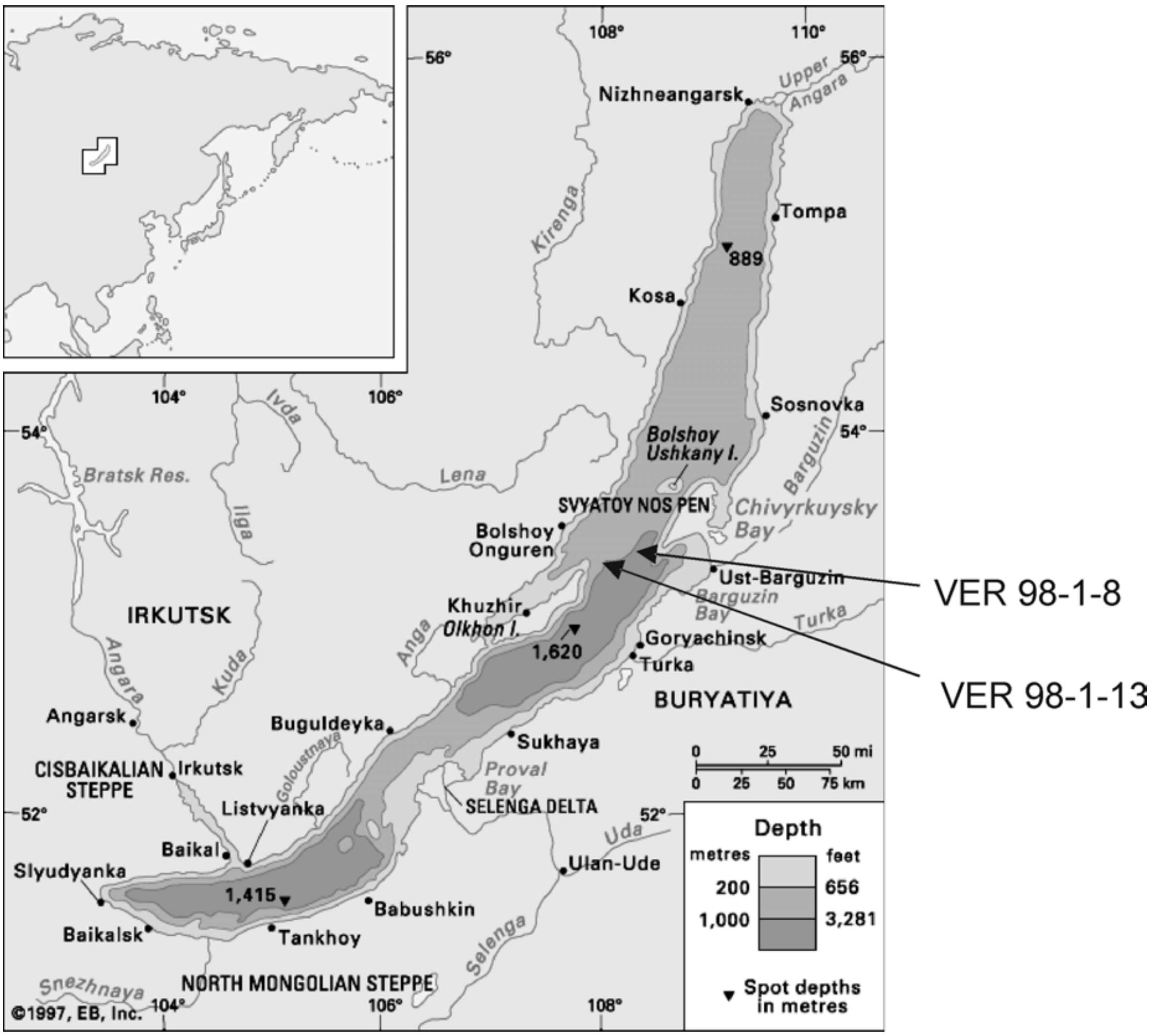
Czech–French Joint project of the "Centre de Paleontologie stratigraphique et Paléoécologie", CNRS, Université Claude-Bernard, Lyon and Institute of Geology AS CR
Project: Diversification of Normapolles during the Cenomanian and Turonian (Bohemian Cretaceous Basin and SE France (*H. Méon, G. Guignard, Centre de Paleontologie stratigraphique et Paléoécologie, CNRS, Université Claude-Bernard, Lyon &* ***M. Svobodová***)

Middle and Upper Cenomanian strata (*jukes-brownei* and *naviculare* Zones) of the Bohemian Cretaceous Basin (boreholes Louny, Vrbno) and SE France (locality Loudun) yielded data concerning the first triporate angiosperm pollen of the Normapolles group. Early triporate pollen originated mainly in the marginal marine facies, only rarely in the non-marine environment (borehole Čáslav). Anoxic deposits of the Thomel level (Vocontian basin), *archeocretacea* Zone, contain mostly genus *Atlantopollis* while the samples from the Pecínov Member are dominated by the genus *Complexiopollis.* During the Early Turonian (Bílá hora Formation) the Normapolles pollen became more abundant and diverse. Three types of Normapolles occur in the Cenomanian and Turonian – *Complexiopollis, Atlantopollis* and *Praeoculopollis.* New taxa, i.e., *Trudopollis* appear in the Middle Turonian, and this trend continues especially in the Late Turonian.

IGCP Project No. 463 Upper Cretaceous Oceanic Red Beds: Response to Ocean/Climate Global Change (*Project leaders R.W. Scott, USA, L. Jansa, Canada, M. Sarti, Italy, Ch. Wang, China, X. Wan, China, O. Tüysüz, Turkey & **M.Svobodová***)

Selected samples of the grey claystones from the Köseli outcrop (Unaz Formation, Turkey, field excursion of the IGCP 463, 2003) yielded Albian–Cenomanian palynomorph assemblages. The age was evidenced by the presence of dinocysts *Ovoidinium scabrosum, Palaeohystrichophora infusorioides.* Light-brown-red pelagic claystones did not yield any plant material.

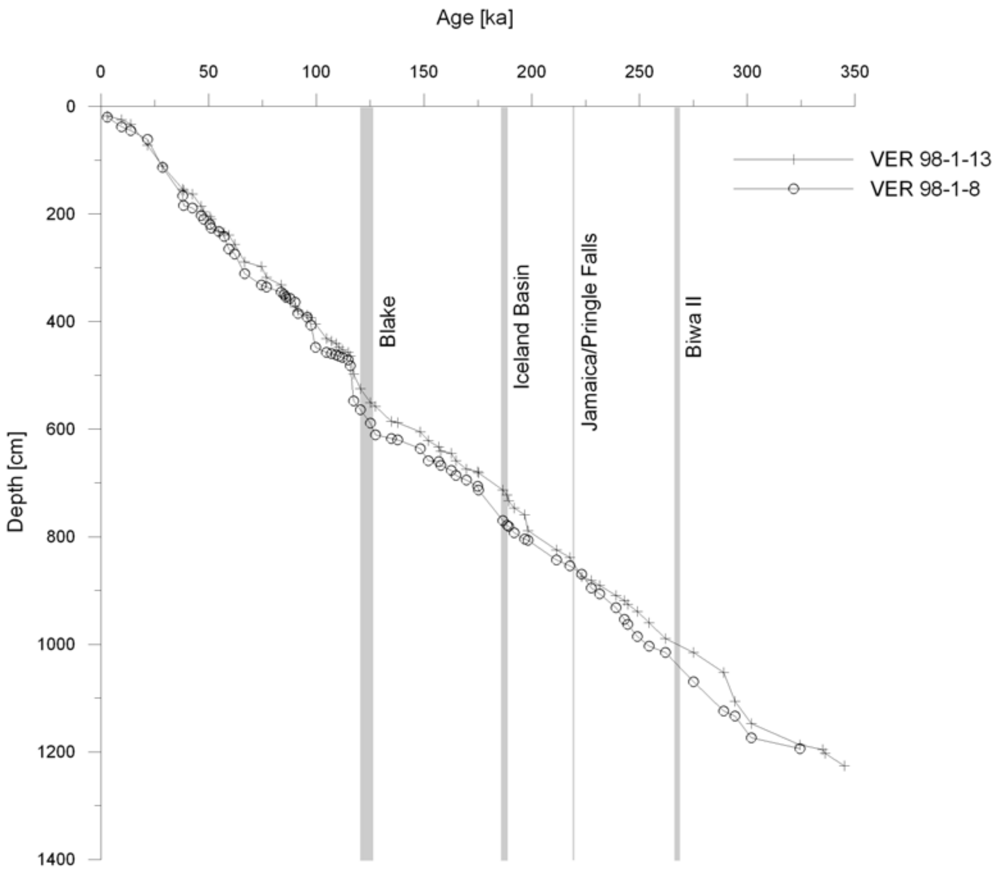
5th Framework Research Programme of the European Community EVK2-CT-2000-00057 CONTINENT+NAS, Amendment No. 2; Institute of Geology, ASCR partner No. 6 High-resolution continental paleoclimate record in the Lake Baikal: A key-site for Eurasian teleconnections to the North Atlantic Ocean and monsoonal system (*Principal co-ordinator H. Oberhänsli, GeoForschungsZentrum, Potsdam, FRG,* ***P. Pruner & J. Kadlec***)



Location of the boreholes in the Lake Baikal (P. Pruner & J. Kadlec)

Rock magnetic and paleomagnetic parameters were studied on pilot and hydraulic piston cores drilled in the Academician Ridge in the N segment of the basin. Two cores 1,839 and 1,284 cm long showed an alternation of greenish or grey diatom-rich and diatom-poor silty clay or clay. Samples were subjected to the successive rock magnetic analyses; the natural remanent magnetization (NRM) and the characteristic remanent magnetization (ChRM) determined after AF demagnetization. However, four short intervals of deviating declinations and inclinations are documented within the core VER 98-1-8 (45–65 cm, 625–650 cm, 750–765 cm and 1022–1025 cm). Three intervals of deviating declinations and inclinations with steep totally reversed inclinations (30–40^{o}) are also clearly present in core VER 98-1-13 (522–547 cm, 702–726 cm and 993–1005 cm). Except for samples with very low intensity, the maximum angular deviation (MAD) values are generally lower than 6^{o}, the paleomagnetic directions are well determined. The rock magnetic parameters, magnetic susceptibility (MS), saturation isothermal remanent magnetization (SIRM) and the calculated S-ratio were used to identify variations in the concentration, grain size and mineralogy of the magnetic material. The ChRM directions were clearly dominated by normal polarity, positive inclinations, indicating the Brunhes Chron age of the sediments. In core VER 98-1-13, the observed excursions were interpreted as the Blake excursion (~125 ka), the Iceland Basin excursion (~185 ka), the Jamaica/Pringle Falls excursion (~215 ka) and the Biwa II excursion (~260 ka).

Magnetostratigraphic results are correlated with relative paleointensity. A relative paleointensity record was derived from anhysteretic remanent magnetization (ARM) data, and from AF demagnetization of ARM and NRM. Our relative paleointensity record we correlated for the reference curve from Ocean Drilling Program (ODP) site 984. The reversal excursions fall within the intensity minima. Paleomagnetic data (i.e., declination, inclination, relative paleointensity) obtained from cores VER-98-1-8 and VER 98-1-13 indicate the age of deposits up to ca. 350 ka. On the basis of the identification of excursions 1 to 4, we correlated the magnetostratigraphic results (relative paleointensity and polarity) from the Lake Baikal sediments with comparable data sets from ODP site 984. By comparing the morphologies of the paleointensity records, a mean sedimentation rate in the range of 2.7–4.3 cm/ka can be estimated.



Palaeomagnetic data from the Lake Baikal Cores (P. Pruner & J. Kadlec)

Grants of the European Union – 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) *(H. Oberhaensli, GFZ Postdam, S. Osintsev, Arabika Irkutsk &* ***J. Kadlec, M. Chadima, L. Lisá****)*

Two types of detrital cave deposits were distinguished in the Botovskaya Cave (E Siberia) based on magnetic fabric, exoscopy of quartz grains, heavy mineral content and radioactivity content. The bottom sandy parts of sequences were deposited by a stream probably in the Tertiary, before the formation of local landscape morphology. The above lying, more clayey cave deposits were deposited during the Quaternary. Most of the original phreatic cave conduits were remodeled during the Tertiary vadose conditions, when the cave system was situated close to the local groundwater level.

NSF–NATO Post-doc Fellowship at MichiganTech University
No. DGE-0411426 Climatic and human impacts on the intensity and frequency of Late Holocene flood events – case study of the Morava River flood deposits (Czech Republic) (*J.F. Diehl, Michigan Technological University &* ***J. Kadlec***)

Samples of flood deposits collected from three excavated sections in flood sequences of the Morava River have been studied by different environmental magnetic approaches (frequency dependent MS, ARM magnetization, IRM acquisition, s-ratio). The preliminary results show significant differences between lower and upper parts of sequences indicating changes in source areas and erosion rates. The age of sediments will be determined by radiocarbon dating of charcoal and tree trunk fragments collected from sedimentary sections.

Grant Agency of the CR

No. 205/04/0060 Inorganic pollutants in selected types of precipitation and their impact on natural biogeochemical cycles in a model catchment (*Principal investigator* ***M. Vach,*** *contributions* ***T. Navrátil, P. Skřivan, M. Burian & J. Špičková***)

An attempt to indicate the sources and pathways of selected chemical substances in precipitation over central Bohemia was accomplished with help of bulk samples, collected in a forested rural landscape approx. 30 km SE from Prague, capital of the Czech Republic. They were analyzed to determine the concentration of selected major cations and anions (Na^+, K^+, Ca^{2+}, Mg^{2+}, NH_4^+, SO_4^{2-}, NO_3^-, Cl^-), as well as several minor and trace elements (Al, As, Be, Cd, Cu, Fe, Mn, Pb, Sr, Zn, F^-). The sources of individual components are estimated using the data sets of the content of individual elements/ions that are mutually screened by the correlation analysis. With respect to the distribution patterns of analytical values in the individual sets, the non-parametric Spearman correlation coefficient is applied for the analysis. In order to approximate the correlated parameters to the actual content of studied substances in the atmosphere (unaffected with the precipitation intensity) we mathematically modify the correlation analysis involving the washout process into the assessment. The correction is also involved in the analysis, to eliminate the varying decreasing temporal trends in deposition of the individual chemical contaminants.
Set of the bulk samples shows strong mutual correlation of the main acidifiers – compounds of N, S (and F). Good correlation occurs also at the typical lithogenic elements Al, K, Na, Ca, Mg, Sr, and the typical elements originating from the flue gases of the combustion chambers burning low quality brown coal – As, (Be), Cd, Cu, Pb, and Zn. The only strong correlation of Cl with Na (and Mg) indicates that majority of these elements originates from the oceanic spray. The content of pollutants in precipitation depends on the air masses types and on the rout of their approach to the sampling site. The typing of synoptic situations was employed for the determination of the air masses types and routs and of the corresponding fronts and precipitation fields.

No. 205/02/1121 Plant assemblages of the Radnice and Prkenný Důl–Žďárky members of the Late Palaeozoic continental basins of Bohemia (Westphalian) (*S. Opluštil, Faculty of Science, Charles University, Prague,* ***J. Bek, J. Dašková****, J. Pšenička, West Bohemian Museum, Plzeň, Z. Šimůnek, J. Drábková & M. Libertín, Czech Geological Survey*)

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 permineralised 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.
In Bolsovian and Westphalian D coal-bearing strata of the Late Palaeozoic continental basins of the Bohemian Massif, several fossiliferous tuff layers occur either intercalated in some coal seams or overlying them. Current taphonomical studies (in preparation) indicate mostly simple burial and taphonomical history of vegetation related to volcanic ash-fall. Influence of blast effect of volcanic eruption has not been proved since most of the trees were found in upright position without branches which were broken off by loaded ash and buried just below the trees together with plants growing in understorey or in shrubby level. It is indicated also by relatively regularly distributed branches and leafy shoots around the trunks. Thus, associations of plant fossils found in most of these volcanostic horizons are comparable to original fytocoenoses colonizing the original mire. These taphocoenoses were studied, based on material stored in major collections. This study allowed to distinguish plants according to their substrate preference (peat/clastic or both) and also to improve our knowledge on plant assemblages, which colonized middle to late Westphalian mires. Most of these assemblages are tree lycophyte dominated forest assemblages with well-developed understorey and shrubby level. Only one assemblage was dominated by *Calamites* with well-diversified fern understorey. Assemblage from the Štilec locality consists of 5 species, which represents pioneer herbaceous fytocoenosis. It

colonized shallow lake that replaced the original mire. Westphalian D mire assemblage was *Cordaites*–*Calamites* dominated with co-dominance of tree ferns of arborescent group.

No. 205/03/1124 Biochronology and taxonomy of the Middle Devonian polycystine Radiolaria of the Barrandian (***P.Čejchan***)

A detailed micropalaeontological sampling of the Chotec Fm. of the central and eastern part of the Devonian lead to the discovery to new data on radiolarians. These have been extracted from some cherts, "incomplete " cherts, siltstones and shales, i.e., rocks that did not yield determinable isolated radiolarians up to now. Radiolarian biota was newly found also in the lower part of the Chotec Fm., from where it had not been known previously (*costatus* and *australis* Zones, and, probably, also the upper part of the *partitus* Zone). Biota was sampled from measured sections, when possible. Taxa ascertained up to now include *Entactiniidae*, *Astroentactiniidae*, ?*Spongentactiniidae* a *Ceratoikiscidae*. Some chronospecies are new.

No. 205/02/1121 Plant assemblages of the Radnice and Prkenný Důl–Žďárky members of the Late Palaeozoic continental basins of Bohemia (Westphalian) (*S. Opluštil, Faculty of Science, Charles University, Prague,* ***J. Bek, J. Dašková****, J. Pšenička, West Bohemian Museum, Plzeň, Z. Šimůnek, J. Drábková & M. Libertín, Czech Geological Survey*)

The classic localities of Štilec near Žebrák and Ovčín near Radnice show coeval, but clearly different plant assemblages. The assemblages of the Štilec locality are relatively uniform with low plants about 1–1.5 m long. Fern *Kidstonia heraclensis* and calamite *Asterophyllites longifolius* dominated. Low diversity of plant assemblages and the absence of arborescent plants suggested that these were pioneer-swamp assemblages. Plant assemblages from the Ovčín locality are more diverse, having 20 natural species of herbaceous genera like *Selaginella, Sphenophyllum* and *Corynepteris*, shrubbby and sub-arborescent taxa like *Cordaites borrasifolius, Spencerites, Medulosa* and arborescent lycopods of genera *Lepidodendron, Lepidofloyos* and *Paralycopodites.* A specimen of arborecent lycopod *Lepidodendron selaginoides* is the biggest find of this species in the world; this find was reported in the media several times.

No. 205/04/0151 Ichnofosilie a ichnostavba sedimentárních sekvencí ordoviku v okolí Petrohradu Rusko (***R. Mikuláš, J. Žítt & J. Hladil***)

Ichnofabric of the early Ordovician sequences in the St Petersburg area is much more diversified and thus it can be interpreted in more detail, compared to the ichnologic content of the same formations in Estonia and in southern Scandinavia. The more complete geologic record in the St Petersburg area resulted from the palaeogeographic situation: the Early Ordovician epeiric sea had deepen from the Baltic region towards the Moscow basin, leaving less amount of stratigraphic gaps and various lithotypes, as well as more favourable conditions for diversified benthic assemblages. Thereby, trace fossils appear to be crucial for understanding some eustatic events. From the palaeobiologic point of view, drop-like chambers described from southern Scandinavia as *Gastrochaenolites oelandicus* show a surprising variability of shapes, sizes and substrates in the St Petersburg area. They represent a rare and excellent example of a rapid, "bustling" development of fossil behaviour.

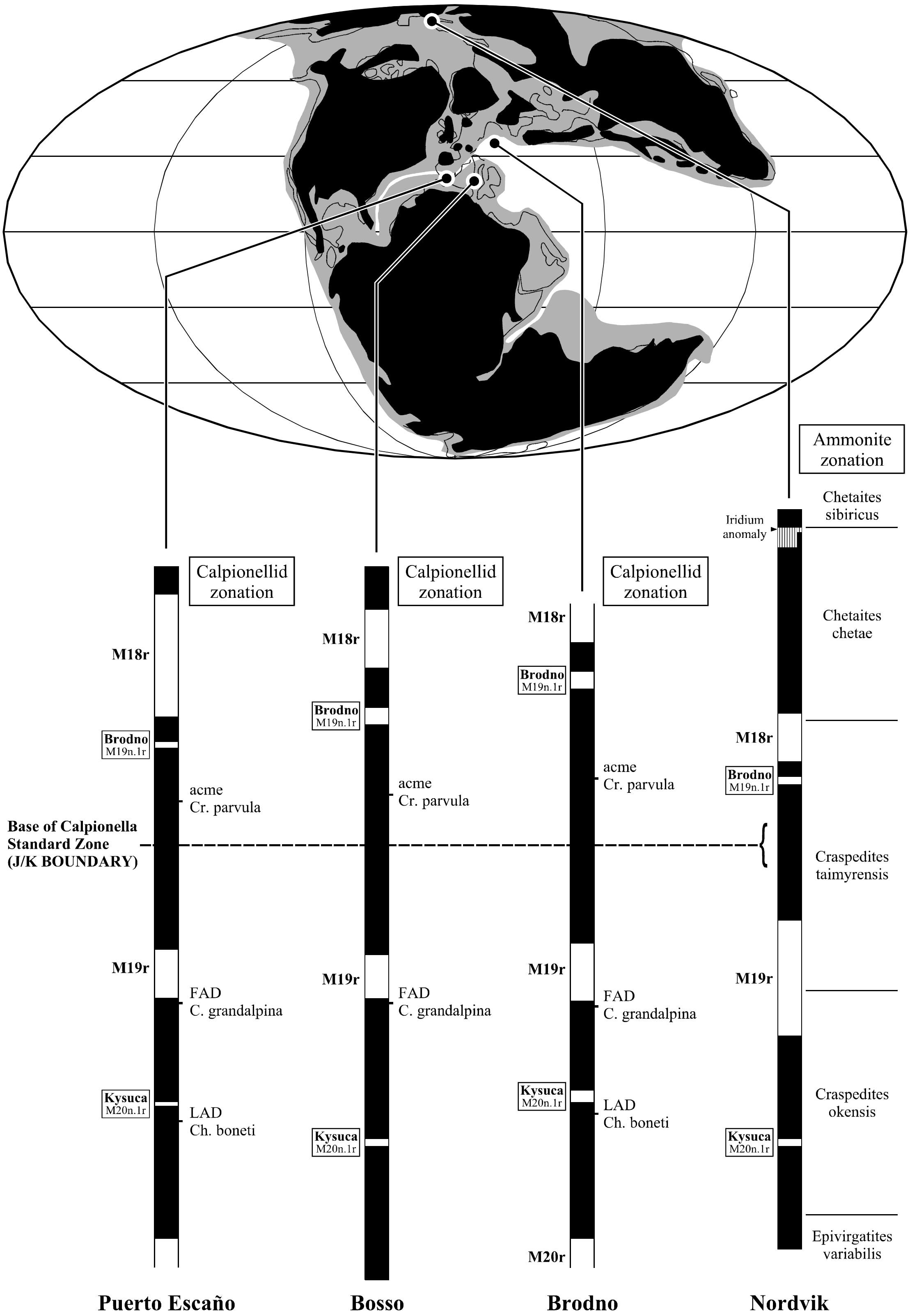
No. 205/03/1123: Brachiopods of the Northern Calcareous Alps in the fossil record at the Triassic x Jurassic boundary (***M.Siblík***)

In the "grey basis" facies of the Kendlbach Formation practically the samebrachiopod assemblages occur below and above the Triassic/Jurassic boundary, including *Callospiriferina* ex gr. *haueri* (Suess), *Lobothyris delta* (Neum.), *Saubachia* sp. and *Zeilleria* ex gr. *perforata* (Piette), which is characteristic for this Lowermost Liassic level – Planorbis Zone. This was confirmed basing also on new collections from the localities Vorderer Ampelsbach, Altjoch and Vorderskopf in the Karwendel Mountains. New collection from the Lower Liassic of the same area deposited in the collections of the Bayerische Staatssammlung für Palaeontologie in Munich and possibility of comparison with it made the complete overview of the development of the brachiopod faunas in this facies between Triassic and Jurassic possible. The age of the studied formations was recently documented by the study of the ammonite fauna made by K. Kment. Below lying Koessen Formation with the pelecypod and brachiopod fauna with prevailing species *Rhaetina gregaria* (Suess) – often in lumachelles, *Zeilleria norica* (Suess) and *Fissirhynchia* sp. is developed in most localities studied.

No. 205/02/1576 High-resolution magnetostratigraphic and micropalaeontological correlation across Jurassic – Cretaceous boundary strata in the Tethyan and Boreal realm (***P. Pruner, V. Houša, M. Chadima, O. Man, S. Šlechta*** & *M. Košťák, Faculty of Science, Charles University, Prague*).

The principal results of this project were to extend the detailed magnetostratigraphic, micro and macropalaeontological investigation of the Jurassic/Cretaceous (J/K) boundary from the Tethyan realm to profile in the Boreal realm. The studies were to carry out on the suitable continuous J/K which is located in the north of Siberia on the Nordvik Penisula, cape of Paksa, eastern shore of the Anabar bay. The detailed magnetostratigraphic and macropalaeontological investigation of the profile in the basal portion (27 m) precisely determine the boundaries of three reverse magnetozones (M18r, M19r, M20r), and to find correlation between magnetostratigraphic data (reflecting global events) and ammonite zonation. A key horizon for magnetostratigraphic investigation was biostratigraphically determined in the middle part of the Middle Volgian (Epivirgatites variabilis Zone), the lower part of the Upper Volgian (Craspedites okensis Zone), the upper part of the Upper Volgian – important Zones of Craspedites taimyrensis and Chetaites chetae (terminal part of the Volgian). At the base of the Berriasian respectively), the iridium enriched condensed horizon occurs in the Boreal region. It represents the HST in sequence terminology. In the upper part of the Epivirgatites variabilis Zone (12.5 m below the iridium anomaly horizont), a very marked sequence regressive boudary was recorded (LST). A summary of results of magnetostratigraphic and micropalaeontological investigations of the Jurassic/Cretaceous (J/K) boundary strata in the Tethyan realm hitherto obtained at three localities yielding reliable interpretation results. The localities in the Tethyan realm include the J/K sections at Brodno near Žilina (Western Carpathians, W Slovakia), the Bosso Valley (Umbria, central Italy) and at Puerto Escaño (Province of Cordóba, S Spain). These localities provided very detailed to high-resolution magnetostratigraphic data across the J/K boundary. The above mentioned three localities are characterized by favourable depositional setting, rich calpionellid associations and favourable petrophysical properties of the studied limestones. The limestone samples are characterized prevalently by three-components remanence. The palaeomagnetic components (C-components) of remanence were reliably inferred for most of the limestone samples after thermal demagnetization in the range of 420 (400, 440)°C to 540 (560, 580 even 590)°C. The MAVACS apparatus was employed for progressive thermal demagnetization.

The next investigation was to precisely detect two narrow reverse subzones in magnetozones M20n and M19n in Puerto Escaño profile. These have the same positions relative to the magnetozones above and below as the reverse subzones at the studied locality of Brodno, W Slovakia and of the Bosso Valley, Italy. However, marked regression is well documented in Puerto Escaño in the middle part of M19n. The correlation of three J/K boundary limestone strata in the Tethyan realm (Slovakia, Italy, Spain) is carry out by means of high-resolution magnetostratigraphy and biostratigraphy for the determination a global standard J/K boundary.



Magnetostratigraphic and micropalaeontological correlation across Jurassic – Cretaceous boundary strata in the Tethyan and Boreal realm (P. Pruner et al.)

No. 205/02/0449 Cave deposits and development of karst features in the Berounka River valley in the Bohemian Karst *(K. Žák, Czech Geological Survey,* ***J. Kadlec & V. Cílek****)*

Paleomagnetic polarity directions measured in the cave clastic deposits in the Vanocni Caves (Koneprusy Caves) show a age of sediments higher than 2.5 Ma (Gauss Chron). Higher MS values indicate a possible change in source area in comparison with the Early Miocene fluvial sediments in the Bohemian Karst. The AMS directions measured in the Early Miocene fine flood sediments indicate dominating current directions of the paleo-Berounka River from the E to the W (in the Bohemian Karst) and further to the Rakovnik and the Northern Bohemian basins.

Grant Agency of the Academy of Sciences CR

No. IAA3013209 Weathering products trapped in pure limestone on carbonate platforms: record of climate and early diagenesis (***J. Hladil, P. Bosák, L. Slavík, A. Langrová, P. Pruner, O. Man, A. Galle, M. Geršl,*** *H. Gilíková, Czech Geological Survey*, ***L. Koptíková,*** *K. Kučerová,Masaryk University, Brno, and others*)

Mineral dust and constituents of atmospheric aerosols together with seawater solutes and also lesser amounts of aquatic suspensions of riverine origin were (and are) embedded in pure limestones on consistently subsiding isolated platforms where they form complex impurity systems with components of micrometric/nanometric size. In vertical sections, these impurities are arranged in incremental series that show great variation in compositions and quantities. The HR stratigraphic methods adopted to platform carbonates are based mainly on gamma-ray spectrometry, magnetic properties of rock and minerals in combination with trace-element geochemistry, and they provide results that can nearly be compared with the resolution "of ice cores from modern glaciers and polar ice sheets".
Origin of impurities entrapped in Devonian limestones of Moravian Karst: The EMP–TEM investigations suggest that colloidal forms of trapped material prevailed. The chemical composition of embedded complex impurities is nearly unchanged, and the chemical compositions (ICP-MS, INAA, etc.), including REE distribution patterns, are typical for eolian input and precipitation of marine solutes, whereas local shedding, riverine and remineralization fluxes have limited significance.
Late Neogene and Recent carbonate rocks: The origin of magnetically anomalous zones, which are commonly developed below the sedimentary cycle boundaries, was explained using the sections in modern carbonate-sedimentation areas (e.g., in Atlantic and Pacific oceans). The pure limestones beneath the paleosols give strong positive magnetic susceptibility anomalies, although the content of iron is very low. The data are indicative of single-domain magnetite crystals of microbial origin. These modern sedimentary sequences provided the most important evidence of early diagenetical fixation of gamma-ray and ms-related HR stratigraphic patterns that are considerably linked to climate variation in close combination with the global environmental settings (chemical, particulate and biologically mediated fluxes).
Experiments about microbially induced changes in rock pores: Field experiments can be exemplified by a study that was located in Svratka River, near Brno–Modřice, in bottom mud with dominance of filamentous cyanobacteria and diatoms (associated with rich microbial consortia in general). A strong substrate-material selectivity was documented, and also a very complex control of microboring processes was found. The microprobe X-ray maps found increased concentrations of P (×3–4), Fe (×2–3), minor and trace elements, that were rimming these bioerosional microcavities.

No. IAA3013405 Lower Silurian of the Hlinsko Zone (E Bohemia): graptolite fossil record, biostratigraphy and palaeogeographical links. (***P. Štorch*** *& P. Kraft, Faculty of Science, Charles University, Prague*)

Rich early Silurian graptolite faunas have been found in Mrákotín Formation (Hlinsko Zone), in the vicinity of Mrákotín, Oflenda and Oldřetice, and the majority of graptolite zones, so far recognized in the Llandoverian succession of the classical Barrandian area, were identified in this area. These are the early Llandovery (Rhuddanian) *C. vesiculosus* Biozone, *D. triangulatus*, *D. pectinatus*, ?*M. simulans*, *P. leptotheca* and *L. convolutus* biozones of middle Llandovery (Aeronian) age and *R. linnaei*, *S. turriculatus*, *S. crispus*, *M. griestoniensis*, *T. tullbergi* and *O. spiralis* zones of the late Llandovery (Telychian) age. Graptolites of *T. tullbergi* and *O. spiralis* biozones were found in situ, in the abandoned quarry SSW of Mrákotín. No Wenlockian taxa occur among 84 graptolite species that we have recorded in the black-shale succession of the Hlinsko Zone. There is no apparent difference between the graptolite fauna of the Hlinsko area and that one of the Barrandian area. Lithological successions of the two areas, however, are different. Barren greenish mudstone beds which, in the Barrandian area, intercalate black graptolitic shales of the late Llandoverian Litohlavy Formation are missing in the Hlinsko Zone. There the whole Llandoverian sequence is composed of more or less heavily tectonized, contact metamorphosed clayey and siliceous black shales and lydites.

series	graptolite zone	Horný (1956)	Localities after Horný (1956)					Štorch & Kraft
wenlock	*centrifugus*	–						–
llandovery	*insectus*	–						–
	lapworthi							–
	spiralis	++	Mrákotín	Oflenda				●
	tullbergi	–						+
	griestoniensis	–						++
	crispus	+	Mrákotín					++
	turriculatus	–						+++
	linnaei	–						++
	sedgwickii	–						–
	convolutus	+++	Mrákotín	Oflenda	Medkovy kopce	Vojtěchov	Kladno	++
	leptotheca	–						+++
	simulans							?+
	pectinatus	++	Mrákotín		Medkovy kopce	Vojtěchov		++
	triangulatus	–						+++
	cyphus	–						–
	vesiculosus	–						+
	– acuminatus ascensus	–						–

Graptolite biozones and localities of the Mrákotín Formation (Hlinsko Zone). Biozonation refers to the Barrandian zonal scheme after Štorch (1994), updated by Štorch (2001 MS). Left column refers to current records of the biozones in the Hlinsko Zone (Štorch and Kraft, this report): – not recorded; ?+ tentative record; + unique or rare occurrence, ++ fair record, +++ abundant record; ● biozone recorded in the section, *„in situ“*. *M. simulans* and *C. lapworthi* biozones have not yet been recognized in 1956.

No. IAA3111102: Prevariscan and varsican tectonomagmatic evolution of Western Sudetes: the Ještěd Ridge as an example (*V. Kachlík, Faculty of Science, Charles University, Prague,* ***F. Patočka*** *&* ***J. Fiala***)

The Ještěd Ridge Unit (JRU) on the western borders of the allochthonous Krkonoše–Jizera terrane (KJT) is defined by Cadomian fundament of Lusatian Massif with intrusions of Cambrian–Ordovician granitoid rocks, and this basement is involved here, whereas the discordantly overriding units consist of rocks that have nearly all possible ages from Early Cambrian to Early Carboniferous. Four lithostratigraphic (tectonostratigraphic) units of highest magnitude have been confirmed on the base of geochemical, overall lithological and biostratigraphic data. These four units correspond to Machnín (Neoproterozoic), Radčice (Neoproterozoic to Lower Cambrian), Poniklá (Upper Ordovician to Lower Devonian) and Jítrava (Upper Devonian to Lower Carboniferous) groups, respectively. The juxtaposition of these groups is seen as a result of a continental collision. The relatioships among these units can, with certain confidence, suggest that the Machnín and Radčice groups were derived from the lower, ie, passive continental plate of widely Saxothuringian characteristics. The Jítrava Group as a closely hanging structure must correspond, in this direction of interpretation, to a volcanosedimentary complex which originally covered the passive Saxothuringian margins. The entire stack of tectonically overlying structures – the Poniklá Group and the South Krkonoše "terrane" (SKT) – are re-interpreted as a kind of the central terrane with sedimentary and volcanic fills of Saxothuringian affinity. The third member of this variscan collision zone (the upper continental plate) is absent in present collage of considerably eroded structures. However, the rocks of this upper plate may occur at the bottom of Intra-Sudetic Depression.

No. KJB3111305: Spatial and temporal changes of sandstone provenance in the Krkonoše Piedmont Basin and their tectonosedimentary implications (*K. Martínek, Faculty of Science, Charles University Prague,* ***M. Svojtka & R. Mikuláš***)

We have studied the low-temperature history of the sediments in the Krkonoše Piedmont Basin (KPB) using fission-track (FT) dating of apatites. The Krkonoše Piedmont Basin belongs to a system of post-orogenic extensional / transtensional basins which formed in the Bohemian Massif in the early post-orogenic phase, between the Westphalian and Saxonian times (c. 310 – 280 Ma). Most of the basins in Western and Central Bohemia are aligned along the NE-striking boundary of the Saxothuringian Zone of the Variscan orogen, with minor modifications of the structural picture caused by NW-oriented fault zones and small basins formed at a later stage (Stephanian) along NNE-oriented faults such as the Rödl / Blanice Fault Zones. The KPB has long been known as an exception to this trend, with its axis in the present-day geological picture having a generally E–W orientation.The older parts of the KPB basin fill underwent partial deformation during the formation of the Trutnov–Náchod sub-basin, which is indicated by the angular unconformity at the base of the Trutnov Formation, the main unit of the sub-basin infill, up to 600 m thick.
Five studied samples dated by fission-track technique come from outcrops from alluvial-fluvial Trutnov Formation (TF). Outcrops of the TF are dominated by brown-red conglomerates, sandstones with minor siltstone and mudstone interbeds and carbonate-cemented intervals. The apatite fission track lengths in all studied samples are very homogeneous and range from 12.1 $\pm$ 1.9 to 13.1 $\pm$ 1.5 micrometers (1 sigma). All horizontal confined tracks distributions are unimodal with a negative skewness, interpreted as resulting from a slow cooling through the apatite partial annealing zone (PAZ, 60 – 120°C). The measured FT apatite cooling ages range from the Early Cretaceous to Cretaceous / Paleogene and varies from 60 ± 5 Ma to 114 ± 11 (1 sigma), corresponding to an average cooling rate 0.5–1.1 °C/Ma from the Early Cretaceous to the present, while erosion rate exposed rocks with the average rate 24 – 54 m/Ma.

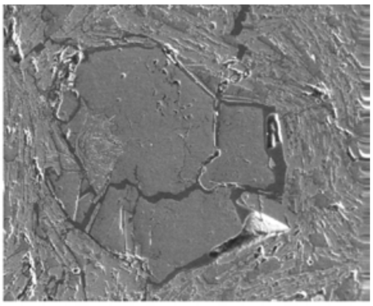
No. IAA3013403 The character of mantle/lower crust beneath the Bohemian Massif based on geochemical signatures of (ultra)mafic xenoliths in Cenozoic volcanics (***J. Ulrych, J.K. Novák, M. Lang, J. Adamovič, V. Cajz, M. Filippi, V. Musil, L. Ackerman,*** *E. Jelínek & M. Mihaljevič, Faculty of Science,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

Subproject: (Ultra)mafic mantle xenoliths in Cenozoic alkaline volcanics of the Bohemian Massif (Czech Republic) ***(J. Ulrych & J. Adamovič)***

A set of 115 occurrences of (ultra)mafic mantle xenoliths was reviewed. Xenoliths occur mostly in lava flows, less commonly in vents. Their host rocks correspond mostly to nephelinite basanites to olivine nephelinites. Olivine-bearing xenoliths (harzburgites > spinel lherzolites and peridotites) prevail over pyroxene-bearing xenoliths (clinopyroxenites >> wehrlites). Minerals are dominated by magnesian olivine ($Fo_{89\text{-}91}$) and orthopyroxene ($En_{88\text{-}91}$), chromian diopside (0.9–1.4 wt.% Cr_2O_3), and (Cr, Al)-spinels (100 Cr/Cr+Al = 15–54). Volcanic rocks carrying the xenoliths occur especially along faults E–W and ESE–WNW, and were always emplaced at the time of normal extension, probably independently of the structures typical for the Ohře Rift graben limitation; structures rather striking NW–SE were involved in the Pliocene and Pleistocene. The structures used for magma ascent were formed (and partly reactivated) in the Subhercynian and Laramide phases of the Alpine orogeny in the latest Cretaceous, Paleocene and earliest Eocene.

No. A3048201 Geochemistry of phonolitic–trachytic magmas: their sources and fractionation trends – examples from the Bohemian Massif (*Z. Řanda, J. Frána, J. Kučera, Nuclear Physics Institute AS CR,* ***J.K. Novák, J. Ulrych & M. Lang***)

Subproject: Phonolite weathering profiles at Mariánská hora Hill, České středohoří Mts., and sorption properties of clay residues (***J.K. Novák, K. Melka, J. Ulrych*** *& Z. Řanda, Nuclear Physics Institute AS CR*)



Smectite after pyroxene

Incomplete paleoweathering profiles (without lateritic nodular crust) located on top of the exhumed phonolite laccolith Mariánská hora Hill in Ústí nad Labem (26 Ma) have affinity to the Cenozoic landscape and past climatic–hydrologic regimes. Three superimposed saprolite horizons resulting from gradual weathering *in situ* have inherited textural and compositional characteristics similar to those of miaskitic variety of phonolite. Both the massive saprock and green-coloured saprolites from the bottom part host smectitic pseudomorphs after zoned clinopyroxene, while dominant sanidine and anorthoclase reacted later during the weathering process. Cation exchange capacities of such saprolite in mmol/100 g are as follows: Ca^{2+} = 26.8, Mg^{2+} = 5.8, Na^{+} = 0.20 and K^{+} = 0.11. The discolouring ability of this material was already proved experimentally in the past century. The uppermost white saprolite occurs as a result of kaolinitic replacement of feldspars and that of smectite to kaolinite transformation; no gibbsite neoformation was confirmed. Moreover, the underlying ferruginous horizon, up to 0.5 m thick, contains goethite coatings on smectitized pyroxene and cracks.
The paleoweathering profile provides an opportunity to trace the mobilization and redistribution of REE and other trace element contents from parent phonolite (ΣREE = 202–245 ppm) across the weathering profile (ΣREE = 228–260 ppm, fractionation for LREE, esp. Ce in lower saprolite horizons). With respect to parental phonolite, all REE abundances in white uppermost saprolite are elevated (ΣREE = 309 ppm), but the inherited U-shaped REE plot after phonolite is still characteristic.

Subproject: <u>Phonolite dyke differentiates adjacent to the Roztoky Volcanic Centre, České středohoří Mts.</u> (***J. Ulrych, J.K. Novák, M. Lang***, *Z. Řanda, Institute of Nuclear Research, Řež, a.s., K. Balogh, Institute of Nuclear Research, Hungarian Academy of Sciences, Debrecen & E.Hegner University of Munich, Germany)*

Phonolitic dykes are the geochemically most evolved members of the differentiated dyke suite of the Roztoky Intrusive Centre. The age of the phonolitic dyke rocks (ca. 30 Ma) mostly corresponds to the age of other members of the centre. Excess argon concentrated in nepheline and sanidine is most probably the reason for the apparently younger age of these rocks. Special varieties of such rocks range from sub-aphyric tinguaite, “tinguaite porphyry” to nepheline syenite porphyry with chilled tinguaite-textured margins. Tinguaitic rocks show prolonged “metastable” crystallization under the action of volatiles and the disequilibrium textures, e.g., peculiar “cell-shaped” and felty-to-prismatic matrix. Main similarities between the tinguaitic and nepheline syenite porphyry dykes lie in the equilibrium crystallization conditions of the earliest phenocrystic assemblages (miaskitic succession of clinopyroxene, amphibole, nepheline, and anorthoclase). Aegirine, titanite, apatite, perrierite and REE-carbonate occur as accessories. The evolved phonolitic magma concentrated alkalies and other incompatible elements, such as Rb, Cs, LREE, Zr, Hf, U, Th, Nb, Ta, and volatile components such as F, Cl, CO_2, and H_2O, which is reflected in an increasing agpaitic index.

No. A3013102 <u>Structural aspects of the evolution of volcanic centres: the České středohoří Mts. as an example</u> (***V. Cajz, J. Adamovič*** & *J. Mrlina, Geophysical Institute AS CR, Prague*)

A 3D model of the České středohoří Mts. volcanic centre was compiled based on the results of geological and geophysical studies. The data on tectonics were evaluated with respect to the area of the volcanic centre, and the tectonic setting of the centre was introduced into the model. The geophysical data comprise gravity, magnetics, shallow seismic, gamma-ray spectrometry and geoelectrics. The reassessed older data from previous geophysical survey were integrated together with the new ones to get interpretation from the largest possible area of the centre. Using the results of all these methods, the presumable surface of individual large hypabyssal essexitic intrusion was designed and used for the model. The prominent positive gravity anomaly in the area of the centre is caused by this hidden intrusion. It is situated on the right bank of the Labe River and only several highest peaks of this body are cropping out. The body of “*rongstockite”* on the left bank represents a

part of this large intrusion, detached by NE–SW-striking fault zone and noticeably modified by the explosive process which resulted in the emplacement of younger trachytic breccia, just touching the "rongstockite" in the N and W. The large body of breccia seems to comprise two genetically similar, but spatially different sets which may represent two explosive vents filled with trachytic material. This is revealed not only by the shape of the body and a different xenolithic load but also by two separated gravity minima. A more detailed gravity evaluation of this structure also demonstrates two intrusive foci of phonolitic magma inside the brecciated material. These phonolitic intrusions are of combined stock and sill character. The basaltic vents of superficial volcanic production – relics or roots of lava lakes which are scattered in the outer part of the centre around these two large central bodies – were confirmed by the geophysical survey, too.
The 3D digital model of the Volcanic Centre of the České středohoří Mts., processed by the Atlas graphic software, resulted in an instructive output showing the development of this subvolcanic structure. It can serve not only for the regional geologic ideas but also for creation of concepts of the development of the intrusive centres of larger volcanic complexes in general.

No. A3013302 Tectonic and volcanic controls on hydrothermal silicification in marginal zones of the Ohře Rift *(**J. Adamovič, J. Ulrych, V. Cajz, J.K. Novák, R. Mikuláš,** J. Zachariáš & M. Pudilová, Faculty of Science, Charles University Prague)*

Newly formed siliceous cement was identified at selected sites of sandstone silicification in marginal zones of the Ohře Rift (e.g., Milštejn, Dutý kámen, Skalice, Písečný vrch). The origin of all phases followed an episode of detrital quartz corrosion and generally appeared in this succession: quartz syntaxially overgrowing detrital grains – microquartz – fibrous chalcedony. In some cases, spherulitic chalcedony is present directly on secondary quartz overgrowths, thereby probably indicating opal recrystallization. The process of the precipitation of siliceous cement must have therefore taken place in two stages: 1. stage controlled by gradual fluid temperature decrease in alkaline environment, and 2. sudden SiO_2 precipitation controlled by a drop in pH at places of mixing with meteoritic waters. This is supported by the association of hydrothermal silicification phenomena with alkaline volcanic activity, the distribution of high-intensity silicification (chalcedony) along fracture zones of higher fluid flow, and increased alkali contents in strongly silicified sandstones (chalcedony) relative to weakly silicified sandstones (secondary overgrowths of quartz alpha). Sandstone effective porosity decreases towards the intrusive bodies, reaching minimum values (1–3 % along phonolitic intrusions, 15–20 % along basaltic intrusions) at a distance of 5–13 m from the intrusion; nearer to the intrusion, porosity increases as a result quartz dissolution.

No. A3013306 Palaeoecological pattern of coal seams of the Lampertice Member, Jan Šverma Mine, Intra-Sudetic Basin (Langsettian) (***J. Dašková, J. Bek,** S. Opluštil, Faculty of Science, Charles University Prague, J. Pšenička, West Bohemian Museum, Plzeň, Z. Šimůnek, J. Drábková, Czech Geological Survey & M. Libertín, National Museum, Prague*)

At the studied locality, one square metre of each fossiliferous bed was successively removed from the top towards the base and each plant fossil was recorded. The plant fragments were classified in categories: axis and trunks (> 10 cm), coarse (5–10 cm), medium (1–5 cm), small (< 1 cm). Their abundances were classified as: rare (1–5 pieces), common (6–25 pieces), abundant (> 25 pieces). Using palaeobotanical and sedimenological data, plant taphocenoses were divided into autochthonous, sub-autochthonous and allochthonous. Based on the latter, five different phytocenoses were reconstructed: 1. vegetation of the proximal channel banks, 2. vegetation of the planar peat swamp (arborescent vegetation), 3. vegetation of the floodplain, 4. vegetation of unstable substrates, 5. vegetation of valley slopes. The study area was an intermontane valley with a river, which is interpreted as transitional between braided and meandring river type with a well developed flood plain, low-sinuosity river channel and alternate bars. The river was probably running from SW to NE, to the place with the highest subsidence rates in the basin near Walbrzych in Poland.

No. A3013207 Devonian coral fauna of the Bohemian Massif (***A. Galle, J. Hladil & L. Slavík***)

Moravian Devonian rugose corals display strong relations not only to Central and West European rugose faunas but also to those from Iberia, Russian Platform, and the Ural Mts. Moravian Devonian rugosans are less numerous and less diverse if compared to the Devonian faunas of Germany, Poland, or Russian Platform. This is true also in the case of Late Frasnian radiation which occurred prior to Late Frasnian and Famennian extinction.

No. A3013206 Larval development and metamorphosis of extinct amphibians Palaeobatrachidae and Pipidae (Anura) (***Z.Roček***)

Developmental series of nearly 250 specimens of early Cretaceous (Hauterivian) tadpoles of *Shomronella jordanica* from Shomron (Samaria) region in central Israel, a small collection of tadpoles associated with adults of *Thoraciliacus rostriceps* from the Lower Cretaceous (Barremian) of Makhtesh Ramon, Israel, and more than 250 tadpoles from the Upper Cretaceous (Campanian/Maastrichtian boundary) from Stompoor, Marydale, South Africa were studied and compared with published data on the development of Tertiary (Middle Eocene–Early Oligocene) pipids from Patagonia, and with normal development of contemporary pipid frog *Xenopus*. These comparisons of the developmental series of the Cretaceous and contemporary pipid frogs provided significant data on changes of the developmental pattern, namely degree of ossification sequence and other developmental events. In general, it seems evident that ossification was considerably delayed in course of pipid evolution, whereas most of anatomical features typical for free living pipid larvae have been well established as early as in the early Cretaceous. Comparisons with the developmental series of the Late Oligocene Palaeobatrachidae from the locality of Bechlejovice near Děčín, Czech Republic (in many respects closely related to Pipidae) revealed that some morphological differences between the two families might be explained by their developmental mode (e.g., formation of the opithocoelous vertebral centrum in *Shomronella*).

No. B3013203 Recent biogeochemical cycling of II.A group of elements in a forested landscape with granite bedrock: a comparative study (***T. Navrátil***, *contributions* ***I. Dobešová, P. Skřivan, M. Burian, A. Žigová, M. Filippi & M. Karlík***)

The comparative biogeochemical study of II.A group elements has proved to be a convenient and useful tool to understand their *relative* dynamics in a selected experimental landscape. The advantage of this approach is the ability to carry out the research simultaneously at identical physicochemical conditions of the particular ecosystem. The biogeochemical behaviour of a chemical element is strongly dependent on numerous factors including the chemistry of the bedrock, precipitation height, precipitation chemistry, mean annual temperature, and type of vegetation cover.
The most abundant cation in bulk precipitation was Ca followed by Mg. The mean bulk fluxes of Ca and Mg decreased after 1999 probably due to lower emissions of Czech industrial dusts into the atmosphere. A strong correlation was present between the fluxes of Ca and Mg in bulk precipitation had a strong positive correlation. The concentrations and fluxes of Be, Sr and Ba in precipitation were low, especially after the completion of desulphurization of all Czech power plants in 1999. The most significant difference between bulk and throughfall fluxes was detected in the case of Mg as it was readily leached from the canopy. This vigorous leaching of Mg is possible due to a different position of Mg (i.e., chlorophyll molecules) in comparison to other II.A group elements in the canopy. In the case of beech, Mg was the element with the greatest contribution to neutralization of the throughfall solutes. In the case of spruce, the leaching of Mg and other elements was less than the contribution of acidificants (N, S), which resulted in additional acidification of spruce throughfall. The most important flux to the forest floor for all II.A group elements except Mg was litterfall.
The acid soils at LP catchment are depleted most notably in Ca with respect to the bedrock composition. Elevated leachable (0.1M HNO_3) concentrations of Mg, Ca, Sr and Ba occurred in the organic horizon as a result of biological recycling. The absence of a similar accumulation of Be in the organic horizon suggests its rapid mobilization from the organic material during and after its

decomposition. Beryllium leachable concentrations increased downwards in the soil profile due to its rapid mobilization under acid conditions. The leachable concentrations of Mg, Ca, Sr and Ba decreased in the middle part of the profile, then increased just above the bedrock due to weathering inputs.
The mean annual concentrations of Be, Ca, Mg and Sr in streamwater of LP catchment gradually decreased due to differing reasons. The mean Be concentrations decreased as a result of lower levels of acid deposition and consequential increased pH of streamwater. Concentrations of Ca and Mg decreased due to the decrease of SO_4^{2-} concentration in the streamwater.

No. A 3011201 Magnetostratigraphy and mineral magnetic study of cave and river deposits in central Europe (***P. Bosák, J. Kadlec, P. Pruner, O. Man, & M. Chadima***)

The model of the Nízké Tatry Mts. uplift created based on fission-track data obtained from apatites separated from granites shows two distinct periods of uplift: the first in the Late Mesozoic and the second since the Early Miocene till present. The incision rate of local karst valleys was estimated on the basis of magnetostratigraphic results from the cave sediments of the Nizke Tatry Mts. and U-series datings of speleothems. The Late Tertiary and Quaternary incision varied between 5 and 30 cm/ka.

No. A3013406 Structural and palaeotectonic development of the Barrandian Prague Basin (***P. Pruner, J. Hladil, P. Štorch, P. Schnabl, G. Kletetschka,*** *P. Kraft, Faculty of Science, Charles University, Prague & R. Melichar, Faculty of Science, Masaryk University, Brno*)

The area of the Barrandian Prague Basin is tectonically poorly explored, especially in small- to medium-scale tectonics: sufficient amount of exact quantitative data on bedding, dip directions and dips, fold structures etc. is missing in the published papers. The first step was to focus on the acquisition of a data set as complete as possible: a revision of unpublished documentation and new field investigation. Structural elements were measured in the field with higher accuracy and quantity than any time before, using modern instruments (Tectronic 4000).
Combination of the collected set of directional data, published detailed geological maps and the use of down-plunge method allows to solve quantitatively 3D-structures of selected areas. Based on this investigation, a modern method of strain analysis was applied to the selected localities. It enables to recognize possible distortion and to find principal strain directions. Palaeostress analysis was applied to faults, carbonate veins and stylolites.
The results of structural analyses were combined with simultaneously produced data on facies, biostratigraphy, geochemistry and palaeomagnetism to obtain information about the dimensions of segments, their translation and possible rotation, as well as timing of deformational events and general tectonic evolution.
Three major volcanic phases were recognized in the Silurian effusive basalts and volcaniclastics of the Svatý Jan Volcanic Centre in the northwestern limb of the Prague Synform (PS). The first one was dated between the early and the mid-Wenlock and the last to mid-Ludlow. Two alkaline basalt dykes of Wenlock to mid-Ludlow age N of the Svatý Jan Monastery were extensively sampled. Parallel-to-the-borders profiles and border-to-border sections were measured with sampling intervals of about 10 cm. Field data show that they were tilted to the W and NE as observed in a 100 m thick tuff sequence, which represents the second and intermediate volcanic phase. Sedimentation in the PS terminated during the Middle Devonian (Givetian) orogenic movements of the early Bretonian phase, which uplifted the Barrandian area. Post-Givetian folding and faulting deformed the synform infill and closed the Barrandian marine sedimentary cycle.
AMS studies of Dyke1 (79 samples in this 5 m thick dyke) and Dyke 2 (32 samples in this 3.5 m thick dyke) show two different fabrics: P fabric is considered to be related to the transtensional opening phase of the dyke, and oblique-to-the-border secondary fabric (S) possibly related with fluid circulation or a late tectonic event. These fabrics are carried by Ti-magnetite and magnetite, respectively. AF and thermal demagnetization were used to isolate remanent magnetization components in both dykes. Four components of magnetization, in agreement with the directions already published for the Bohemian Massif, were isolated: Middle to Late Silurian (C1), Late or Middle Carboniferous (C2),

Cretaceous (B) and Paleocene (D). The corresponding main carriers of magnetization are Ti-magnetite for components (C1,C2) ranging between 200–540 °C and 10(20)–40(65) mT, hematite and goethite for components (B,D) ranging between 580–640 °C and 120–200 °C and 20(40)–80(100) mT.
The mechanism of opening of both dykes was governed by dextral transtensional regime as deduced from AMS K1 axis. The ruptures were possibly dilated repeatedly, with several injections during mid-Ludlow times, also recorded in the fabrics. The first stage was dominant and controlled by the primary fabric of mainly oblate shape. This fabric is trending NNW–SSE, perpendicular to the direction of emplacement of the napes during the Late Devonian. Since the Rheic Ocean closed by the end of the Devonian, we may speculate that the nappe emplacement pre-dating this event was associated with the sinistral closure of this ocean.

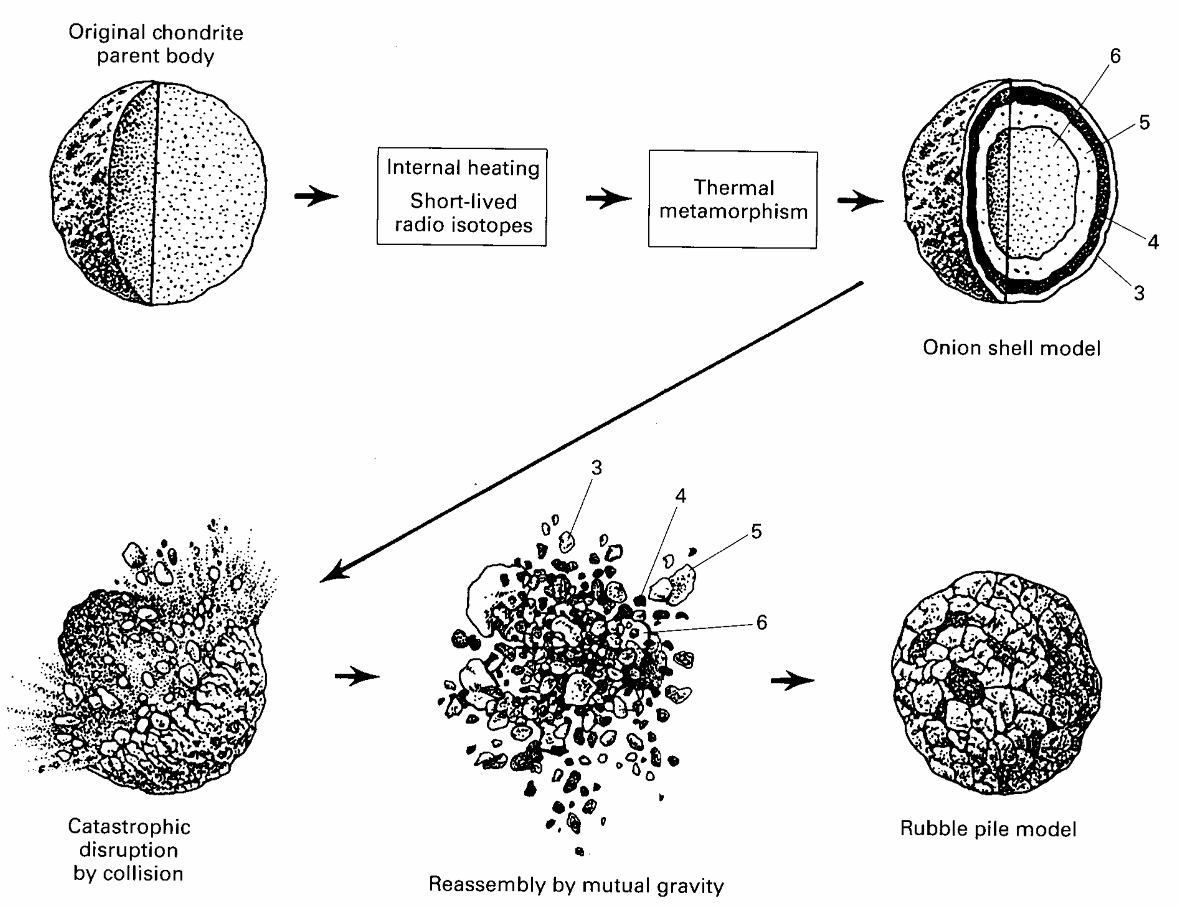
No. A 8002406 Start of the human activities in the Doubrava River flood plain (*I. Pavlů, Institute of Archaeology ASCR* & ***J. Kadlec***)

The Holocene flood-plain processes of the Doubrava River were reconstructed based on geophysical measurements (ground-penetrating radar, resistivity sounding) and radiocarbon dating of charcoal (4463–4203 years BP) and tree trunk fragments (6730–7000 years BP). A model of depositional history since the late glacial to present was proposed. The river system changed from braided to meandering in dependence of climatic change. An increased flood frequency is connected with human activities (mainly deforestation) since the Neolithic period.

Grants of the Charles University, Prague

GAUK No. 219/2003/B-GEO/PrF Influence of terrestrial events on the magnetic record of meteorites (*M. Kobr, Faculty of Science, Charles University, Prague* & ***T. Kohout***)

Meteorites represents a unique source of interplanetary material for laboratory study. The study of their physical properties helps us to understand the internal structure and properties of their source bodies – asteroids. The study of physical properties on meteorites covers measurements of density, porosity and magnetic properties. Densities and porosities tell us about the internal structure, coherency and asteroid collisions. Magnetic properties tell us about the history of meteorite material and about processes in early Solar System evolution. The database of meteorite physical properties can be used for rapid meteorite classification and gives us essential information to support planning, data processing and interpretation of recent and future asteroid space missions.
In addition, meteorites from planets and their moons or past planetesimals can fill important gap about the existence of extraterrestrial dynamos and other magnetizing processes in our Solar System.
The project is conducted in cooperation with University of Helsinki, NASA Goddard Space Flight Center and Charles University in Prague.



Two models describe the interior of a chondritic asteroid parent body: onion shell and rubble pile (From Norton 2002, modified by T. Kohout). The onion shell model begins with an accreted primitive body internally heated by short-lived isotopes. This results in the layered structure with layers of different metamorphic degree represented by meteorite petrographic types (3–6). The rubble pile structure forms when the onion shell body is catastrophically disrupted by an impact. The fragments gravitate together again, reassembling as a mix of petrographic types, into a rocky rubble pile. The internal structure of asteroid parent bodies is not clear. One of the topics of ongoing research is to combine physical data of different meteorite classes and types in order to investigate internal structure of asteroid parent bodies

Grants of the state departments

Project of the Ministry of the Environment (internal No. 7041)
The hot spring sedimentation of Karlovy Vary (Carlsbad) thermal structure and its significance for the future protection of the spa resort (*principal investigator **V. Cílek***)

Thermal sediments of Karlovy Vary (Carlsbad) form a “lid” some 1 m thick composed of two distinct layers. The older phase consists of grey siliceous breccia. It contains abundant (microbial ?) pyrite and less often minute barite crystals. The younger, overlying layer is predominantly composed of carbonate travertines of calcite-aragonite composition. It is closely associated with tectonic zones that locally function as mineral water resurgences. The travertines were deposited in two major stages – during the Eemian some 120 ky BP and during the last glacial. A major erosional event took place during the Late Glacial. It destroyed the travertine “lid” and induced a significant downcutting. Then, a new intensive Holocene phase filled the valley bottom with younger travertines.

Grant of the Ministry of Industry and Trade
No. 1HJ–PK Methods and tools for evaluation of effect of engeneered barriers on the distant interactions in environment of deep repository facility (*Principal investigator **T. Navrátil**, contributions Progeo s.r.o., ISATech s.r.o., Stavební geologie –Geotechnika a.s.*)

In the first stage of the project, attention was given to the possibilities and methods of flow and transport modeling in the fractured, porous and impermeable environments. Additionally, special attention was given to information on existing software applications suitable for conditions of this project. Search routine was aimed on generally used methods for modeling of the fractured environment, on listing of the software tools used for modeling in framework of such environment and on characterization of parameters for each one.

Project of the Ministry of Environment – Czech Geological Survey
Project No. CGS 2210 Territorial aspects and long-term monitoring system (Geomon) (*Principal investigator D. Fottová, Czech Geological Survey, GLI Order No. 7038, responsible person **P. Skřivan***)

The continued long-term monitoring of the chemistry of main natural aqueous fluxes (bulk precipitation, beech- and spruce throughfall, surface discharge) at the Lesní potok catchment in the Kostelec nad Černými Lesy area, central Bohemia, was focused on mapping of the principal migration characteristics of main atmospheric acidifiers and pollutants, as well as of several selected minor and trace elements. The gradual decrease of the deposition fluxes of Mn, Pb, Be, Cd, SO_4^{2-}, N_{total}, Cl^- and F^- in bulk precipitation throughout the last decade of the 20th century has proved their common, mainly anthropogenic origin. The most recent development of their deposition fluxes at the beginning of 21st century, however, is not predominantly determined by changes in the amount of emitted substances, but by the intensity of their removal from the atmosphere. Generally, the washing-out of gaseous substances and of solid aerosol mediated by water droplets is the dominant mechanism determining the deposition of the above mentioned elements. Provided that the extent of emissions of the monitored substances is steady, then the intensity and character of precipitation plays the dominant role in their deposition. First years of this century are characterized by strong fluctuation of the precipitation height. The relative differences between the years 2001 and 2004 reach more than 70 %, the lowest being in 2003 and the highest in 2002. In general, the deposition fluxes of the monitored substances as well the input of H^+ ions actually follow these differences. The highest volume-weighted pH value of precipitation was 4.65 in 2003, as opposed to pH = 3.98 in 1994.
The output of elements from the catchment generally depends on water discharge and on the concentration of elements in surface water. The concentration of metallic cations is proportional to the stream pH (lower pH of the stream water means higher input of protons that release more intensively the metals from soils and bottom sediments). The annual water discharge through the monitored stream generally copies the atmospheric input, but the annual values of evapotranspiration moderately differ according to the development of seasonal temperature and to the character and timing of

precipitation. All these factors affected the water discharge in the last four years, with the lowest one measured in 2004. The volume-weighted annual mean pH value of the stream water is generally proportional to the discharge. Nevertheless, a gradual increase in surface water pH with increasing pH of precipitation was observed. As yet, the highest annual mean pH of the stream water (pH = 4.96) was detected in 2004. All analyses of surface water collected in 2004 are not available yet, but it is expected that this year's output of many monitored substances will be the lowest throughout the whole monitoring time span.

Grant of the Ministry of Education, Youth and Sports
Project KONTAKT No. ME679 Correlation between European and Asian Hercynides: a consistent model of exhumation? (***M. Svojtka*** *& T. Hirajima, Kyoto University, Japan*)

Modelling of the thermal evolution of the crystalline units in the upper part of the Barun Valley in eastern Nepalese High Himalaya by AFTSolve software has shown that the rocks cooled from the apatite partial annealing zone (60–120° C) to 20 ºC since ca 3.0 Ma. The temperature has not changed significantly since ca. 1 Ma. The results of fission-track dating of zircon and apatite in the Makalu–Barun area evidence continuous denudation of the near-surface part of the High Himalayan rocks from the Neogene to the present, which is caused by their orogenic uplift as well as global or regional changes of climate. The observed recent landform changes confirm the high intensity of climate-driven morphogenetic processes, especially with very effective erosion and transport of weathered material in humid (monsoon) periglacial and seasonally warm mountain zones. This phenomenon is in a striking contrast to the relatively small range of denudation and transport of weathered material in the northern cold and semi-arid climatic zones of the Himalaya. Paleogeographical consequence of these long-term differences is the conspicuously deep penetration of erosion and denudation to rock massifs in regions of steep windward Tibetan-foreland transitions with the influence of humid air masses. The extreme activity of these climate-driven morphogenetic processes also stimulated an isostatic contribution to the uplift.
The apatite fission-track data documenting a rapid decrease in temperature from 120 ºC to 20 ºC in the gneisses already between 3.0–2.0 Ma suggest the existence of a 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 be taken as evidence for one of the substantial periods of rapid erosion and denudation of paleorelief of the High Himalayan nappe, which were stimulated by the integration of its tectonic uplift with the increasing intensity and range of exogenous geomorphic processes as a consequence of global climatic change.

Grant of the Ministry of Education, Youth and Sports
Project No. OG – 9/02 Stratigraphic architecture of Cenomanian strata of the Bohemian Cretaceous basin: relationships between depositional systems and reactivation of basement structures (*Principal investigator D. Uličný, J. Laurin, L. Špičáková, Geophysical Institute AS CR, S. Čech, Czech Geological Survey, R. Grygar, Technical University Ostrava, J. Košler, Faculty of Science Charles University, Diamo, Geofond &* ***M. Svobodová***)

Subproject Palynological analysis of the boreholes of the eastern part of the Bohemian Cretaceous Basin (***M. Svobodová***)

The reconstruction of the sedimentological environment of the boreholes was based on the changes in the composition of plant microfossil associations. The studied samples of clayey sandstones, grey claystones and siltstones were deposited in fluvial to shallow marine environments. Sediments belong to the Peruc–Korycany Formation, Pecínov Member. Fluvial and lacustrine environments were evidenced by the presence of sporomorhs and green-algae in parts of boreholes RO-43, RO-16, JE-1, JE-7, KN-4, NB-2, SK-15, VS-4. Marginal marine facies and marsh environment was documented by the occurrence of dinocysts tolerating salinity changes i.e., *Odontochitina operculata*, *Subtilisphaera* spp., and prasinophytes, pteridophytes spores, halophyte gymnosperm pollen of family Cheirolepidiaceae: *Corollina/Classopollis*, common inaperturate gymnosperms *Taxodiaceaepollenites*

hiatus, and/or faunal rests of microforaminifers were found in boreholes RO-43, RO-16, JE-7, KN-3, KN-5, NB-2, SK-15, RPV-4, LO-13, VS-4, TR-102A, VY-1. Marine environment (littoral to inner neritic) was characterized by wider occurrence of chorate dinocysts – *Oligosphaeridium, Achomosphaera, Surculosphaeridium* and some oceanic types i.e., *Pterodinium cingulatum* (boreholes RO-43, KN-5, NB-4, VS-4, RPV-4).
The age of the studied samples was based on the presence of marker species from the Normapolles group (*Complexiopollis* sp.) and dinocysts *Epelidosphaeridia spinosa*, both indicating the Late Cenomanian (boreholes RO-43, KN-5, RPV-4). Most samples contain common microfossils of the Cenomanian age.

Grant of the Ministry of the Environment
Project ISPROFIN No. 215124-1 – partial project: Slope movement hazards in the České středohoří Mts. (*co-ordinated by P. Kycl, Czech Geological Survey, Prague*)

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

Results of basic research of volcanics become the source material for specialized maps of geohazards to be used by local authorities and by the Ministry of the Environment. Volcanic rocks participate in the slope movement hazards directly by rock-falls and – together with the other, non-volcanic rock types – by supplying the material for landslides. The slope movement hazards are more frequent in areas where the base of the Tertiary volcanic complex is exposed, compared to the areas inside the complex. Solid volcanics, esp. those with irregular and columnar jointing, are more prone to rock-fall if exposed by erosion on steep slopes. Volcaniclastics, which are mostly cohesionless and primarily argillic (fine-grained hyaloclastites), are highly prone to landsliding. The combination of solid volcanics with argillized volcaniclastics at the base of the complex underlain by Cretaceous marlstones is very frequent and very hazardous. As erosion exposes the base of the volcanic complex and creates steep slopes, both types of slope movements may occur. Geological, tectonic and geomorphic setting were found to represent the most important controls on the generation of slope movements.

Industrial Grants

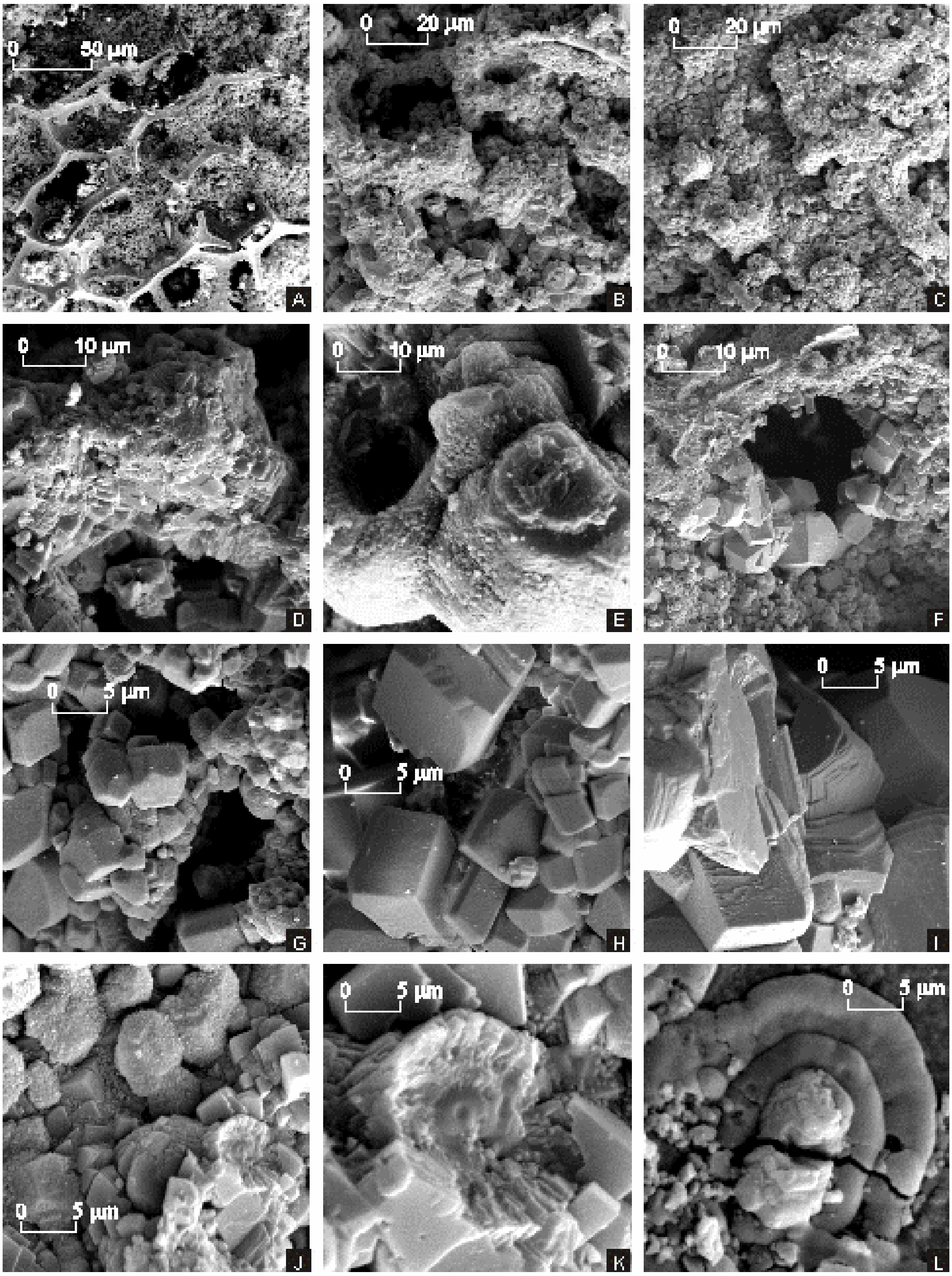
Czech–Moravian Cement, Inc., No. 4800006094, institute code 7004 Preparation of multi-element doped calcite crystal aggregates (***J. Hladil, M. Geršl, L. Lisá,*** *L. Strnad, and others*)

The commercially available artificial carbonate standards are doped by one or several elements, which typically have other than natural concentrations. Also the structures obtained using the hydrothermal growth of monocrystals or wet-pressuring of small crystallites are largely incomparable to natural fine crystalline aggregates, as is often required form analytical or other reasons.
The first attempt to find an alternative solution was based on the most common laboratory precipitation method ($CaCl_2$, NH_4HCO_3). The $CaCl_2$ adequately enriched in many trace elements was obtained directly by dissolution of relevant natural rocks. The supply of solutes was regulated by a series of fibrous wad bars, and the crystallization space consisted of several alternating segments with open-cell polyurethane (PU) foam and polyacrylamide gel (PAA), alternatively. The diffusive and bubbling CO_2 was also released from additional amounts of $NaHCO_3$ placed to the base of crystallization chambers. Solid phase of medium crystalline calcite was produced in mm–cm thick zones within the delicate polyurethane network, at places of low concentrations of aqueous polyacrylamide. This method based on moderately decelerated (PAA-mediated) crystallization in PU network allows to produce medium crystalline, multi-element doped and quite homogeneous calcite crystal "nuclei" that have compositions roughly (mostly in decadic orders) comparable to natural trace element concentrations of their "parental" natural-rock counterparts.
The second alternative method exploits "natural laboratories" in open-air or cave conditions, where hot-spring water highly enriched in trace element concentrations is degassing and calcite rafts precipitate at water level. The harvesting of these calcite rafts from water level of small lakes under constant conditions (e.g., after 5 hours) provides also a promising method to obtain appropriate calcite crystal aggregates. These aggregates consist of equal-sized rhombohedra, crystals have very slight variations in growth bands and, particularly, the upper side of each raft (determined by the water level) has a very smooth planar surface. This seems to be a promising complex of features also if considering the production of these materials in typical "closed laboratory" conditions.
The experiments made in "closed" and "natural" laboratories provided numerous other results on the crystallization of calcium carbonate. For example, the thick polyacrylamide, polysaccharide and albumine gels, if pure, are strongly inhibiting crystallization of carbonate (results from Karlovy Vary and Zbrašov Aragonite Cave).

Czech–Moravian Cement, Inc., Project No. 7003 Study of the Cenozoic sediments in the caves in southern part of Moravian Karst (***J. Kadlec***)

A wide suite of environmental magnetic methods complemented by reflex spectroscopy, voltametry and clay mineralogy was used in the study of the loess–paleosol sequence in Mokra near Brno. The results show more intense weathering of magnetic and clay minerals during temperate interglacial and interstadial stages. It is the same pattern like the behaviour of magnetic minerals in classical Chinese loess–paleosol sequences. Reverse paleomagnetic directions were identified on top of the interglacial paleosol and were interpreted as the Blake Event imprint.

Foreign project of GET, s.r.o., Prague
Subproject Petrographic description of volcanic and pyroclastic rocks from the Nutfield locality, northern Jamaica (***J.K. Novák***)
The Nutfield locality (Port Maria region) is known as an erosional remnant of the composite volcano located in the northern part of the Wagwater fault-bounded zone and covered by marine sedimentary sequences of the Richmond Fm. (Eocene). The amygdale-bearing trachybasalt, sodium-rich trachyte as well as devitrified trachydacitic tuffs have been subjects of the petrographic study supporting the stone quality assessment. Due to burial alteration and presence of “clastic limestone dykes”, a lower quality of trachyte and trachybasalt was indicated.



Diverse shapes of calcium carbonate (prevailingly calcite) precipitated in the peripheral zone on the "massive rhombohedral-calcite core". (J. Hladil) A–G – Outer parts of the PU network are incompletely coated by calcium carbonate, whereas (H and I) the inner parts are filled with consistently multi-element doped, rhombohedral calcite aggregates. J–L – The faster precipitation (not being PU-PAA decelerated) at places around the "core" produces various fabrics that are typical for the amorphous–crystalline transition forms. SEM micrographs (L. Lisá, F. Butula, Fac. Sci. MU Brno).

Czech–Moravian Cement, Inc., No. 7031, Geological operational control during landform simulation and reclamation of the Koněprusy quarrying area (***P. Bosák*, *J. Hladil*, *L. Slavík***, *and others*)

The limestone bodies and faults documented during final quarrying of the Northern Wall are similar to expectable structures that were designed during 2002–2004. The margins of Lochkovian synsedimentary elevation supported the Pragian formations of subtidal and reef skeletal accumulation, and the structure has regular features of a regional dextral-transpression strike-slip fault system. This fault system originated as early as during the late Lochkovian times, because a separate generation of hydrothermal, carbonate–sulfidic veins was found to fill the first cracks related to this deformation. The contact of related tectonic ridge with sea level (formation of planar erosional surfaces on elevated parts of Lochkovian cliffs) must be limited to the Lochkovian/Pragian boundary ages, as was documented by conodont faunas from end-Lochkovian rocks with rounded pebbles on the flanks of this paleohigh (~1 km to the S, for example). However, the maximum deformation along this synsedimentary fault in pre-orogenic basins (later detached) cannot be older than the end of the Pragian Stage, because no older rocks than these crinoidal–bryozoan limestones fill the wide and long crevices that occured in this fault-ridge (mostly the type-R Riedel shear structures).
The hypothesis about the existence of this end-Lochkovian to early Pragian linear rocky ridge is based also on the architecture of the sedimentary cover on the slopes, where the end-Lochkovian offlaps were replaced by a a series of early Pragian transgressive onlaps of clinoform beds. The above mentioned crevice fills have primarily subvertical (rarely also subhorizontal) contacts with weathered and sometimes also hydrothermally altered Lochkovian beds. Alteration and crusts are common features, broken pieces of Lochkovian beds are embedded in a coarse-grained "paste" material of the fills. The middle Pragian subtidal skeletal accumulation with end-middle Pragian reef were built directly on this tectonic structure. The gravitationally expanding rigid body of the reef was filled by neptunian dikes of Emsian to Givetian ages.
All these Devonian structures were changed by early Variscan deformation, when the Očkov thrust fault with its overriding mass pushed the Lochkovian core of this linear elevation above the Pragian slope sediments to the south. A series of subvertical and north-dipping faults cuts the old contacts between the Lochkov Limestone and Koněprusy Limestone fills. Many faults in this weakened part of allochthonous rigid limestones were also rejuvenated during the post-Paleozoic and even geologically very recent times. The final shaping of "geological heritage rocks" requires, therefore, a detailed work, which combines the requirements of rock stability with the optimum outcrop conditions (and outcrop accessibility in the future).

Project of GEKON, s.r.o., Prague: Kaolins – Kaznějov: Petrographic evaluation of samples (***J.K. Novák, P. Bosák, V. Sedláček & J. Dobrovolný***)

In the vicinity of Kaznějov and Horní Bříza, controversy exists over the residual (by weathering of Carboniferous arkose *in situ*) or transported nature of the kaolin deposit (saprolitic material form other places outside the basin). Textural, mineralogical and chemical criteria (samples from new boreholes) indicate that there are at least three types of kaolinite-bearing sandstones with a low content of clastic feldspar: (i) sandstone with clay-silt cement, (ii) sandstone with silt-sized, conctact-textured cement, and (iii) coarse-grained to conglomeratic sandstone with a secondarily recrystallized cement. Washable kaolin fraction with K-feldspar admixture is mainly related to medium-grained sandstone types, while that in the conglomeratic variety is mostly replaced by diagenetic K-feldspar due to the alkaline reaction of groundwater.

Institute of Nuclear Research, Řež, a.s.
Subproject No. 7012 Natural analog Ruprechtov – sedimentological study (*M. Hercík, Institute of Nuclear Research, Řež, a.s.,* ***P. Bosák & J. Adamovič***)

Boreholes were evaluated from the Miocene sedimentary and volcanosedimentary fill of the Hroznětín Basin in the western Ohře Rift graben. Three surfaces were identified as potentially advantageous for borehole correlation: (1) base of the weathering profile of granites of the Karlovy Vary pluton, (2) top of

the primary kaolin, and (3) top of secondary kaolin / base of the volcanodetrital formation. Seam horizons in the volcanodetrital formation are developed irregularly in horizontal as well as vertical direction, and do not provide any correlation horizon. This fact is explained by the prevailing character of deposition of the Volcaniclastic Formation: deposition from mudflows and debris flows (lahars) combined with the deposition on an alluvial plain dominated by floodplain–lacustrine habitats.
A horizon of laterite (lateritized kaolin) was detected, underlying the secondary kaolin. Its presence evidences a certain climatic oscillation from typically tropical forest environment to savanna-type landscape with a markedly periodical character of climate. The process of lateritization seems to be younger than the Staré Sedlo Formation and its silicification.
Kaolinization is a result of intensive weathering, not of hydrothermal alteration. The main stage of kaolinization took place before, and simultaneously with, the deposition of the Staré Sedlo Formation and provided sources of silica for its silicification. It cannot be excluded that kaolinization continued even after partial destruction of the Staré Sedlo Formation in a setting of rejuvenation of relief dynamics due to the reactivation of tectonic processes.
The style of the basin and the topography were strongly modified by tectonic activity. Tectonic activity increased after the deposition of the Staré Sedlo Formation again, resulting in steeper relief and destruction of this Middle Eocene lithostratigraphic unit. In addition, tectonic reactivation undoubtedly influenced volcanic activity responsible for the formation of the lithostratigraphic unit of the Volcaniclastic Formation.
The obtained facts and their interpretation indicate a syngenetic model of accumulation of radioactive elements with a low probability of their later redistribution / mobilization rather than epigenetic infiltration enrichment. Major portion of the uranium mineralization seems to have been sorbed by organic-rich sediments or iron compounds from surface waters.

North Bohemian Mines Co.
Project No. 7011 Special microscopic analyses of the sedimentary sequences (palynological investigation) of coal seam (***M. Konzalová***)

Characteristics of the vegetation sources, the recognition and interpretation of environmental conditions during the genesis of the upper part of the Upper Coal Seam were done within the present study in the open-cast Bílina Mine. Detailed taxonomic and quantitative analyses displayed frequent *Ulmaceae* and *Alnus*, the common pollen-forms of the monospecific *Alnipollenites verus* R. Pot. and domination of inaperturates of the swampy conifers similarily as in the whole seam. The research of the mined seam, recovered in day-by-day new sections, was aimed at paleofloral composition. In the upper part, a diverse spectrum was revealed, enriched by Juglandaceae, herbaceous plants and algal remains. The assemblages contribute to the more precise reconstruction of the Bílina Delta area. More than six different ecotypes and environments were recognized based on present microscopic studies – for example the limnic, swampy aquatic, gradually or periodically flooded, wet/dry and slope terrestrial communities with *Fagaceae* and *Platanaceae*. The knowledge and documentation of the coal-seam paleocommunities and microcomponents also involves the salvage of the paleobotanical/biological content of the mined seam.

Czech–Moravian Cement, Inc.,Project No. 03122201381 (NAMAK) Evolution and dynamics of the salt karst in Zagros Mts., Iran (*J. Bruthans, Faculty of Science, Charles University, Prague* & ***M. Filippi***)

In the Zagros Mountains and Iranian coast of the Persian Gulf, the Bozorgportal Cave (405 m) and Alenash Cave (estimated total length of about 150 m) were mapped and documented. Two caves were mapped on Hormoz Island: Fatima (660 m) and Leila (400 m). Most of the caves on the Kuh-e Jahani salt plug are very short, however, in rare cases the length of the caves can exceed 1 km. The White Foam Cave is an example. The caves on the Jahani salt plug are formed mainly by passages with meandering canyons, a feature indicating a rapid uplift of the salt massif at this locality.

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Programme of Advancements in Scientific Research in Key Directions

(a) K3012103 Project No. 03: Processes on the surface of the Earth and in its interior, its gaseous and plasma envelope and in the ambient space (*co-ordinator A. Špičák, Geophysical Institute, Academy of Sciences, Prague*)

Subproject: Dynamics of the evolution of continental lithosphere (*coordinator **V. Cajz**, contributions: **J. Fiala, J. Filip, M. Konzalová, K. Malý, O. Man, K. Melka, M. Němečková, J.K. Novák, E. Pivec, P. Pruner, L. Slavík, M. Svojtka, J. Ulrych, M. Vavrdová & Z. Vejnar***)

The project provided clues for solving a wide spectrum of questions and for the development of new methodologies. It provided support in all of the geological disciplines pursued at the Institute of Geology. The analysis of terrane architecture or considering the rearranged terrane segments of old origin, solution of metamorphic development depending on global-tectonic position, and research in platform development – all these subjects of investigation brought new contributions to the knowledge of the Earth crust. Simultaneously, the need to formulate theoretical aspects of a number of processes has arisen.

The lithology, lithostratigraphy, geochemistry and isotope studies of the Teplá–Barrandian Terrane (TB) led to the formulation of its geotectonic evolutionary model encompassing: magmatic arc along the N edge of Gondwana (568–585 Ma) with a back-arc basin (>585 Ma), closure of the basin, collision of the arc with the continent (Cadomian orogeny, 550–540 Ma), crustal extension and plutonism (523 Ma), and formation of grabens with molasse filling. The rifted microcontinents drifted to the N in the Ordovician, and the intervening Saxothuringian oceanic crust subducted below the TB continental crust in the Silurian and Early Devonian. The Variscan orogeny started in the Late Devonian due to collision of Saxothuringian and TB continents followed by a gravitational a collapse (342–362 Ma). The mantle lithosphere delamination in the next stage led to the penetration of a hot asthenosphere below the crust causing its rheological collapse accompanied by a rapid uplift of HT metamorphic rocks and granitic plutonism (341–351 Ma). The Variscan evolution terminates in the Late Viséan by anatectic granite intrusions (330 Ma). The West Bohemian shear zone has been characterized as a steep collapse structure along which the uplift of western segment led to juxtaposition of the cold TB terrane with the HT metamorphic rocks of the Moldanubian unit. Thermobarometric calculations of synkinematic plutonic rocks situated in the two units led to a relative displacement of min. 10 km within the period of 340–320 Ma. The crystalline basement of the Tertiary Cheb Basin exhibits a steep metamorphic grading with characteristic garnet, staurolite and andalusite zones in a subhorizontal arrangement. The vertical succession of psammo-pelitic, carbonatic and volcanogenic rock sequences, and the metabasite geochemical characteristics indicate together a rock complex typical for the passive continental margin extensional settings which probably governed the Late Cambrian to Early Ordovician.

Geochemical, facies and biostratigraphical studies of metamorphosed Cambrian sediments with volcanics in the Krkonoše Mountains, where the Early Variscan (Frasnian) overplating/ovethrusting by several units of Saxothuringian and/or nearly Barrandian compositions of sediments on the type-Lusatian basement was changed also by deformation events developing along with the strike-slip movements on very long shearing faults (or in small adjacent domains). These translational movements were effective both before and after the dominant late Variscan tensional deformation that considerably masks the previous, albeit significant, thrust faults. Similarly directed studies, also based on results of many disciplines, were focused on relationships between the original tectonic settings and succession of detachments, accretion, tectonic extrusion, strike-slip separation of units, etc., as it concerns the structures of Culm rocks in Moravia and Silesia. The geochemical documents provided voluminous evidence that a series of tectonically different basins was successively closed and their sediments were also successively deformed and then split into several tectonic units – this succession starts with open-ocean and ocean-island-arc features and continues with island-arc and active continental margin signatures. However, the oldest and youngest units of the Visean facies–Culmian rocks are different. The oldest one have prevailing source areas that are seen on deeply eroded cratonic surfaces, whereas the youngest units suggest that they (before deformation and transport further to the SE) actually represented end-fills of various pull-apart windows and foredeep molasse systems. Likewise, the Givetian material from the terminal parts of the Barrandian sedimentary sequences was also investigated, and conditions of very oblique deep-sea tectonic trench were indicated as well as record of distant island-arc volcanism. These changes closely preceded the tectonic stacking of amputated slices and, later on (during Frasnian/Famennian) also pushing of a part of this detached cover toward the foreland.

Likewise, the standard paleontological methods have brought significant results. In the Barrandian area, the investigation of conodonts in the span of Pragian–Zlíchovian stages contributed to a closer definition of the lower boundary of the Emsian, which was problematic before. The development in conodont stratigraphy of Lower Devonian and Upper Silurian specified the biostratigraphy of both series and their boundary, which has been postulated as the International Stratotype in the Barrandian. The palynomorph analysis of rocks from the Lower Cambrian to Devonian in SE Moravia showed a possibility of the oceanic crust subduction of the Tornquist Ocean below the northern margin of Gondwana. Continued plate dynamics during the Variscan orogeny could have caused the obduction of terranes of northern Gondwana margin over southern margins of Baltica. Brunovistulicum moved possibly towards the south during the Cambrian and Lower Ordovician, in a reverse direction to the peri-Gondwanan microcontinents. From this point of view, understanding of Brunovistulicum as a part of eastern Avalonia seems to be problematic.

The paleomagnetic team developed a method of reliability evaluation of paleomagnetic results (http://home.gli.cas.cz/man). A new method of the decomposition of natural remanent magnetization (NRM) into separate components was formulated. It enables the determination of the magnitude of a particular component along with its direction. New algorithms of how to compile a magnetostratigraphic profile were introduced and a new computer program for magnetostratigraphic data evaluation was created. Further specification of the “Fold-test” of former sediment attributes contributed to the correct interpretation of paleomagnetic properties of metamorphic rocks. The analysis of new paleomagnetic data from the Bohemian Massif, Western Carpathians, Armorican Massif and the terranes of Inner Mongolia, together with paleogeographic and tectonic results taken from Devonian to Triassic rocks north of the Alpine belt, west of the Ural Mts. to the British Isles, from the Permian to Neogene in the Alpine–Carpathian–Pannonian Zone and from the Devonian to Jurassic in the mobile belt of North China Block and Mongolia allows to contrast the Alpine and Hercynian mobile belts and provide a basic overview of aspects of global tectonic interpretations and correlation of paleolatitudinal drift. The results testify the stability of the European Lithospheric Plate and the opposite style of paleotectonic rotations in the Alpine and Hercynian tectonic belts.

Tectonothermal history of the Bohemian Massif was partially resolved by using apatite fission track method (AFTA). Three tectonothermal periods were distinguished. Maximum heating from the Late Devonian to Late Permian was followed by significant cooling. These processes can be interpreted as consequences of intensive Variscan orogeny with subsequent erosion. This was follewed by a period of remarkable thermal stability from the Late Permian to the Cretaceous, which is only disturbed by short episodes of stronger heating during the Late Cretaceous and Paleogene. This stability pattern can be interpreted as non-deposition or moderate deposition with the first manifestation of Alpine orogeny. Intensive Neogene heating and cooling was encountered, probably reflecting the dynamics of the Alpine orogeny.

The research of platform cover was traditionally orientated at the Eger/Ohře Rift structure. The results from the volcanic centre of the České středohoří Mts. confirmed a close genetic relationship between regional tectonic stress and emplacement of dyke rocks. A 3D model of the centre was constructed and rhomboidal-block setting inside the rift structure was proved including strike-slip movements. Geochemical research was concentrated on the study of lower-crustal xenoliths and acid differentiates of the alkaline volcanism. Based on geochemical investigation of characteristic mineral associations in relation to the P-T-X and fO2 conditions, crystallization of different Zr (REE,Ti etc.) phases in trachytic and phonolitic rocks was established thus supporting the existence of two chemically independent differentiation rock series. Discrepancies between K-Ar radiometric ages and geological criteria of phonolitic bodies was explained by the presence of excess Ar preferentially located in the structure of nepheline, commonly occurring especially in phonolitic rocks.

SELECTED INDIVIDUAL RESULTS:

Crystalline basement of the Tertiary Cheb (Eger) Basin, Saxothuringian Unit (***J. Fiala*** & ***Z. Vejnar***)

The lithology, geochemistry, and metamorphic grading of the crystalline basement of the Tertiary Cheb (Eger) Basin, Saxothuringian Unit: The crystalline basement of the Cheb Tertiary Basin comprises muscovite granite of the Smrčiny Pluton and crystalline schists of the Saxothuringian Unit. With increasing depth (as seen from the 1190 m deep borehole HV-18) these crystalline schists exhibit rapid metamorphic grading with the characteristic development of garnet, staurolite, and andalusite zones of subhorizontal arrangement. The dynamic MP-MT and static LP-MT crystallisation phases were followed by local retrograde metamorphism. The moderately dipping to subhorizontal foliation S2, which predominates in homogeneous segments, is followed by subvertical S3 cleavage. The vertical succession of psammo-pelitic, carbonatic and volcanogenic rock sequences, together with geochemical data from the metabasites, indicates a rock complex representing an extensional, passive continental margin setting, which probably originated in the Late Cambrian to Early Ordovician. On the contrary, the geochemistry of the silicic igneous rocks and of the limestone non-carbonate components point to the compressional setting of a continental island arc. This disparity can be partly explained by the inheritance of geochemical characteristics from Late Proterozoic rocks in the source region (both in volcanic processes and with entrapping of silt deposits in carbonate sediments).

Bohemian Ludlow conodont fauna revisited for the stratigraphic correlation use (***L. Slavík***)

A late Ludlow conodont fauna contains Pa elements of species and new genus of Spathognathodontidae. They are associated to comparable numbers of Pb and ramiform elements, which probably belong to one conodont apparatus (Sa element not yet known). Sc and Sb elements exhibit an incipient stage of alternation in denticle sizes. The Pb, M, Sc and Sb elements suggest close relations to *Zieglerodina* Murphy et al., but differences in the Pa element, mainly in its basal cavity require erection of a new genus. The discovery of origin of alternating denticulation of ramiform elements may serve as an important stratigraphic marker. It is developed in several clades of Spathognathodontidae from the late Ludlow and in the genus *Delotaxis* from the early Přídolí onward. Thus, we face a mode of adaption of the conodont apparatus to conditions that are different from those relevant for genus *Wurmiella* and *Ozarkodina* s.s. What these conditions are is far from being known, but the finding of the origins of such development seems to be stratigraphically useful.

Application of fission-track dating method on apatites of post-tectonic granites and Cenozoic volcanics of the Bohemian Massif (***J. Filip***)

The apatite fission track analysis AFTA technique was applied for the study of : 1. the Trutnov Formation of the Krkonoše Piedmont Basin (NE Bohemia, Permo-Carboniferous and Triassic complexes). Two individual blocks of different age (110 Ma, 65 Ma) and time–temperature paths were distinguished near the Hronov–Poříčí Fault. The blocks were uplifted from annealing zone in the Early and Late Cretaceous and have undergone individual geological histories until recent times. 2. Rožná uranium mine (E Bohemia, Moldanubian unaltered and altered paragneisses). The samples revealed a very similar time-temperature history: rapid uplift from totally annealing zone in the Late Permian to Middle Triassic (260–240 Ma), subsequent cooling and uplift in the Middle Triassic to Late Cretaceous and intensive reheating during the Neogene.

Late magmatic to postmagmatic (Zr,Ti,REE)-mineralization in evolved phonolite differentiates (***J. Ulrych, A. Langrová & J. K. Novák***)

1. Crystallization of the following Zr (REE, Ti, U, Th, Nb, Ta) phases in Cenozoic alkaline volcanics of the Bohemian Massif was approved based on PTX and fO_2 conditions:

A. Felsic, low-alkaline rocks of the trachyte type, low in incompatible elements (also in xenoliths of strongly alkaline nepheline syenites!), contain mostly silicates of the zircon series.
B. Felsic, high-alkaline rocks of the phonolite type, rich in incompatible elements, contain mostly complex silicates (hainite, eudialyte, perrierite, vlasovite, wöhlerite, lavenite).

C. Ultramafic melilitic rocks, especially their pegmatoids, characterized by higher fO_2 contain oxides of zirconolite-calzirtite type.
D. Felsic, high-alkaline rocks of the phonolite type rich in incompatible elements and CO_2 were newly found to contain also carbonates of REE.

2. Results of K-Ar dating of Cenozoic phonolitic volcanics (ca. 45–30 Ma) are often not in accordance with the "young" position of their bodies suggested by geological and geochemical characteristics. The explanation of this contradiction lies in the presence of excess Ar preferentially captured by the structures of sodalite and nepheline in these rocks and the late magmatic to post-magmatic hydrothermal mineralization.

Petrochemistry of Variscan granitoids of Central Europe: Correlation of Variscan granitoids of the Tisia and Pelsonia Terranes with granitoids of the Moldanubicum, Western Carpathian and Southern Alps. A Review: Part I. (*G. Buda, G., F. Koller, &* ***J. Ulrych***)

Three major groups of Central European Variscan granitoids can be distinguished based on petrologic and chemical data:

A. Low-K, high-Na, calc-alkaline, alkali-calcic, met/per aluminous, I- and S-types, trondhjemitic (slightly granodioritic)-suite, mostly magnesian granitoids formed in early stages of continent–continent collision (353–356 Ma). These types of granitoids occur in the northern part of the Central Bohemian Pluton (CBP) in the Moldanubian Zone or in the Austroalpine Zone of the outer belt of the Western Capathian Plutons (WCP). The granitoid melt source originated from partially melted ocenic and continental crusts due to compression.
B. High-K, high-Mg, calc-alkaline, metaluminous, I-type, monzonitic-suite granitoids with lamprophyre-derived small, ultrapotassic, Mg-rich intrusions formed in the post-collisional zone, where the melts originated from the partially melted, uplifted, LIL-rich mantle and continental crust, due to extension (334–354 Ma) after earlier compression. These plutons can be found in the southern part of the CBP, the eastern part of the Southern Bohemian Pluton (SBP) and northwestern part of the Tisia Terrain (TT). Later on (314–303 Ma), as a result of interaction of melts originated from depleted mantle and partial melted lower crust, low-K, high-Na, calc-alkaline-type granitoids formed during extension, occurring in the inner part of the WCP.
C. Peraluminous, S- or S/A-type granodiorite suite, small intrusions with some K-subalkaline and alkaline characters, formed in post-orogenic or probably rifting settings along the main tectonic zones, e.g., the Periadriatic–Balaton Lineament (Velence Mts., Gemericum) during the Early Permian (274 Ma).

The most unstable part of the Variscan orogenic belt was where the high-K, Mg-calc-alkaline granitoid and ultrapotassic intrusions occur (Massif Central, Vosges, Black Forest, the southern part of the CBP, the eastern part of the SBP and the northwestern part of the TT). They formed the innermost part of the Variscan Belt; only the TT occurs in allochthonous positions, which originated from the Moldanubian Zone and were completely separated from it since mid-Cretaceous times.

Crystalline complexes and metamorphic rocks of the Bohemian Massif (***M. Konzalová***)

The comparative study and re-examination of the selected samples involving different history and grade of metamorphism were carried out from the sites in the western part of the Moldanubicum, westernmost part of the Barrandian Proterozoic, the Podhořany crystalline rocks including the Hlinsko Zone and the metamorphic inlets (MI) in the central Bohemia. The differences in organization and colour of organic matter (OM) in microbiotas or their degraded derivates were studied under light microscope.
Graphitic gneisses of the Moldanubicum (Rittsteig locality) with high grade of alteration and pressure impact, contained graphitic particles without biomorphological markers (e.g., spore-shaped forms or quasi scolecodonts floccules comparable with the specimens from the Moldanubian Variegated Group). In the phyllitic slates of the Teplá–Barrandian region, the cross section of the black-coloured unicellular loricas of protists were revealed, although deformed by the adjacent crystals. It involves the rare finds of organic traces in these rocks, altered to a higher grade than the Central Bohemian Proterozoic rock analogues. Stronger alteration is also indicated by the lack of thin-walled plankters.

On the contrary, slates and particularly metagreywackes of the Central Bohemian sections contain envelopes of plankters which are grey in colour and translucent, with well defined morphologies. In their hue colour changes, they correspond to lower thermal gradient, in contrast to the rather questionable remains retained in the contact-metamorphosed rocks adjacent to the Central Bohemian pluton and its apophyses. High pressure and polymetamorphic alteration is suggested by the samples from the Podhořany Crystalline Complex, where opaque, probably altered OM was widely displaced by sulphides and reorganised. The opaque matter is coating recrystallized grains of the local siliciclastic rocks, filling their thin interspaces. In its character and replacement, it matches well the sequences of high thermal gradient and excessive heating. The typical epizonally altered shales (spotted shales) from the adjacent Hlinsko Zone showed – unlike the more strongly altered crystalline complex above – the path of the OM reorganization retained in the thin layer between porphyroblasts.

The selected samples referred to a link of perceptible alteration of the OM (thermal alteration index, Hayes et al. 1983), ranging from the grey (or brownish-grey) colour and transparency to opaque organic matter and adequately different thermal gradients and local fluid temperaures. Besides these phenomena, reorganization and displacement of the OM were observed in the epizonally and mesozonally altered rocks. Parallel-studied assemblages of organic components and their preservation in the deposits within younger volcanic rocks provided good tools for the hue colour and thermal alteration of the OM.

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(b) K3046108 Project No. 08: Climatic and human impact on the development of natural environment (*Project co-ordinator K. Balík, Institute of Rock Structure and Mechanics, Academy of Sciences, Prague*)

Subproject: Proxy-record of climatic changes preserved in river and cave sediments (*coordinator* ***J. Kadlec,*** *contributions:* ***I. Dobešová, M. Filipi, O. Kvídová, O. Man, L. Minařík, T. Navrátil, P. Pruner, E. Růžičková, P. Skřivan, M. Vach & A. Žigová***)

Summary:
Paleoenvironmental and paleoclimatic reconstructions and assessment of human impact on the environment (***J. Kadlec***)

Last climatic cycle (last Interglacial and Glacial)
Results of environmental magnetic methods applied in loess–paleosol sequences in Znojmo, and Mokra at Brno show pattern of 1st-order climatic oscillations (glacial and interglacial stages), which are comparable with data from the Loess Plateau in China. A sequence in Dolni Vestonice records short-term climatic oscillations compared with Heinrich events. The same climatic pattern was detected in the Lake Baikal sediments (CONTINENT Project). The age of hydrological processes in the cave systems located in Moravia, Slovakia, Slovenia, Hungary and in Siberia was clarified based on magneto-stratigraphic and mineral magnetic studies of cave sediments. These stratigraphic interpretations were in most cases verified by U-series dating of flowstone layers intercalated in detrital sediment sequences in caves.
Current Interglacial
Holocene development of the Doubrava River flood plain was reconstructed based on geophysical data, indicating flood-plain architecture, and radiocarbon dating of tree trunk fragments and organic material. Magnetic susceptibility measurements of the sediments from the Plesne Lake revealed a detailed paleoclimatic record representing the last 15 ka. Malacozoological and sedimentological study of key calcareous tufa cascades in the Bohemian Karst completed with radiometric datings (^{14}C, $^{232}Th/^{234}U$) verified the termination of tufa deposition during dramatic climatic change in the late Bronze Age. The subsequent destruction of the cascades started probably in the Little Ice Age and continues until present.
Human impact on the environment
Contents of As, Cu, Pb increased in the experimental area of the Lesni Potok Catchment near Kostelec n. C. lesy during the last years. The reason is in higher anthropogenic atmospheric deposition of these elements. Monitoring in the open experimental area (Koneprusy) shows stagnation of Pb, Zn, Cd, Cu, Be, SO_4^{2-}, NO_3^-, F^- content due to industry restructuring, desulphurization of heat power-plants and a decline in the use of fertilizers in agriculture.

Distribution and cycling of selected trace elements in the experimental catchment of Lesní potok (***I. Dobešová, L. Minařík, T. Navrátil, P. Skřivan & J. Špičková***)

The study of the distribution of As, Be, Cd, Cu a Pb in the crystalline bedrock of the Lesní potok catchment (monzo- and syenogranite of the Říčany massiff), as well as in soil (mostly cambisol) has shown the enrichment in As, Be, Pb, in soils also in Cd. The present atmospheric (mostly anthropogenic) input of As, Cu and Pb is significant, in contrast to the inputs of Be and Cd. The long-dated backward evaluation of the Cd cycling, however, indicates a presumable responsibility of Cd deposition throughout the intensive industry develepoment in Central Europe, as suggested by the present total content of labile-bound Cd in soils in the monitored area.
The most recent results of monitoring generally indicate a continued stagnation in the deposition fluxes of all signifiant anthropogenic chemical components of the deposition (Pb, Zn, Cd, Cu, Be, SO_4^{2-}, NO_3^-, F^- and others), namely since 1999. The pronounced decrease in the deposition of all mentioned components was observed throughout the years 1990 to 2000, resulting from the restructuring of industry, desulphuration of all coal-burning power plants, sales ban of leaded gasoline by the end of 2000 and the attenuation of agricultural activities (strong cut-down in the application of industrial fertilizers). The most pronounced decrease of input of anthropogenic acidificants also occurred

throughout that time span, which was reflected in the gradual increase in pH values of atmospheric precipitation.
The response of acidified atmospheric precipitation was recorded in the soil water and surface water chemistry of the forest ecosystems. A significant increase in the concentrations of numerous toxic trace elements, accompanied by excessive leaching of main base cations (Ca and Mg) and their chemical homologues, were observed in these types of water. Together with these elements, toxic Al and even the group of REE elements in the vegetation are increasingly leached. It was also documented that the changing chemistry of soil water successively affects the root uptake of nutrients by the forest vegetation.

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(c) K6005114 Project No. 14: Biodiversity and the function of ecological systems (*Project coordinator: J. Kirschner, Institute of Botany AS CR*)

Subproject: Environmental crises in the geological past: co-evolution of biological and geological environment (*coordinator* ***V. Cílek,*** *contributions:* ***J. Bek, P. Čejchan, J. Filip, A. Galle, J. Hladil J. Hlaváč, V. Houša, E. Kadlecová, L.Lisá, V. Ložek, R. Mikuláš, Z. Roček, M. Siblík, L. Slavík, M. Svobodová P. Štorch, Z. Vařilová J. Zajíc, O. Zeman*** & ***J. Žítt***)

SELECTED INDIVIDUAL RESULTS:

Cosmic spherules of the Bohemian Massif (***V. Cílek***)

The project dealt with a number of specific problems, but for this purpose we chose a result that might be interesting to a wider scope of Earth science experts. Magnetite and glassy or silicate spherules have been found in the territory of the Czech Republic since 1945 at various stratigraphic positions. They represent very probably a mixture of spheres of various (redeposited) ages and origins, with the most important role possibly played by volcanic explosion spherules.
In 1980 to 1989, one of the authors (V. Cílek) was a member of the Czech Interkosmos team working mostly on Lunar samples including metallic (Fe-Ni) impact spherules and glassy (volcanic?) spherules brought by Russian satellites. The natural glasses and terrestrial spherical microparticles seemed to be interesting material to be compared to Lunar spherules. But getting deeply in the problem we grew more and more sceptical. The first blow to the cosmic origin of spherules were magnetite particles undistinguishable from most of the "metallic" spherules collected in rocks of the Bohemian Massif but embedded into subvolcanic facies of Sichote–Alin (Far East, Russia) andesites. Later, we received samples of anatectic riebeckite granites from Tyrnyaus in the Caucasus Mts. where green and reddish "glassy" spherules were encapsulated among plagioclase crystals. Then, during experiments with coal burning, we received glassy spherules (composition: fayalite, clinopyroxenes, abundant spinelid crystals including magnetite, Fe-Mg spinels, hercynite) which we could distinguish from Carboniferous and Permian spherules from Kladno and Úpice using a microprobe.
Glassy and magnetite spherules are abundant accessories in majority of the sediments of Bohemian Massif from the Proterozoic to the Holocene. They occur even as spherules of various origin in crystalline complexes, granitoids and volcanic rocks and they may get released by the decomposition of the original rocks. This is why an enigmatic mixture of spherules of various age and genesis including those of probable terrestrial as well as extra-terrestrial origins can be found in modern sediments.

Direct sedimentary origin of stromatactis fenestral fabrics in limestone (***J. Hladil***)

A more than 120-year puzzle about stromatactis was solved using the revision of field materials and sedimentation experiments. Stromatactis is a name for the laterally spread limestone cavities, which have intact smooth floors but vaulted cuspate and digitate roofs. Thrilling discussions about their origin were started in the late 19th century, and two directions – biotic and abiotic – competed to find any reliable solution. Dissolved stromatoporoids, algae, sponges, microbial mats and buried soft bodies or burrows of metazoans were alternatives to dissolved mineral crusts, corrosion by fluids, cracking by overpressured water, stress zebra structures or methane or carbondioxide hydrates. Abiogenic explanations considered also different compaction and collapsing in the sediment. The ideas that these stromatactis fenestrae copied some thick microbial mats on the seafloor or mucous bacteria clumps in the sediment emerged mainly during the last decade. The majority of these concepts concentrated on moldic cavities.
However, the new, "sedimentological" working hypothesis is different. There exist many relevant observations, but most significant is the fact that these fenestrae are regularly developed in sediments which consist of extremely polydisperse (ro-phi > 4; phi 0; 10) and markedly polymodal material, i.e., in a basically chaotic mixture of variously shaped, mostly angular and bizzare-shaped, friable and often porous particles. A possible component of the sedimentary material was also found in dispersed active organic mud with a number of bacterial filaments and microbubbles. Such a mixture causes specific behaviour in suspensions (slurries) and during the sedimentation itself.

The carefully prepared artificial materials simulating their natural counterparts in sediments (e.g., finely crushed-and-powdered limestone rocks, alternatively with additives of active organic mud and bacterial filaments) were used for a series of experiments conducted in this direction. Sedimentation in vessels and troughs was an almost entirely simulated natural process that led to the origin of stromatactis cavities, including all necessary details (and successions).
For the school demonstration "how stromatactis can originate", we can use even the simplest equipment: a wide glass bottle filled with crushed/powdered limestone and tap water, ~ 1 : 4 (this ratio can be also higher or lower). After shaking (can be repeated), the sedimentation of this turbulent slurry usually produces the stromatactis-like fenestral structures. If we wish to prepare the stromatactis fenestrae of large dimensions, we shall use a modest admixture of bacterial (or other) microscopic organic filaments with microbubbles.

World zonal correlations of Late Lochkovian conodonts (***L. Slavík***)

Biostratigraphic results from the Upper Lochkovian sections from the Barrandian area and their correlation with conodont data from Spanish central Pyrenees, central Nevada, Yukon Teritorry (NW Canada) and from the eastern Guadarrama (central Spain) confirm that standard conodont zonal scale has several conspicuous discrepancies. Former assumptions on stratigraphic gaps below the onset of the Praha Formation in the stratotype area seem to be unlikely. It has been found out that the index of the standard conodont zone for the latest Pragian – *Pedavis pesavis*, which is missing in many Barrandian sections, may overlap with the representatives of the genus *Ancyrodelloides* that reach the top Lochkovian. Accordingly, there are probably no substantial stratigraphic lacunae in the latest Lochkovian in the Barrandian area.

High-resolution graptolite biostratigraphy and correlation of selected Lower Silurian formations of peri-Gondwanan Europe (***P. Štorch***)

Low-diversity, shallow and cold-water graptolite fauna has been described from the Lower Silurian shales and sandstones of the Tedjert Formation, exposed along the northern periphery of the Tamesna Basin (Algerian–Nigerian borderland). *Normalograptus ajjeri*, *Neodiplograptus africanus*, *Neodiplograptus fezzanensis*, *Paraclimacograptus libycus* and *Pristiograptus* cf. *renaudi* enable biostratigraphic correlation of this remote, sand–shale unit with smaller or greater parts of the Tanezzuft Formation and its equivalents, developed in the northward situated Murzuq, Kufra, Ghadames, and Polignac basins and around the Ahaggar Massif. Largely monospecific assemblages of the Tamesna Basin were correlated with less proximal, oligospecific assemblages of the other North African basins and further, although indirectly, with moderate- and high- diversity faunas of the peri-Gondwanan Europe (e.g., Hesperian Massif, Armorican Massif, Bohemian Massif, Sardinia). Tedjert Formation ranges from Rhuddanian to earliest Telychian according to graptolite data.

Mazuelloids of the basal Pridolian of the Prague Basin (***P. Čejchan***)

Occurrence of exceptionally preserved mazuelloids was ascertained at the base of the Pridoli Fm in the Jarov Quarry near Beroun. They constitute a moderately diversified thanatocenosis. Mazuelloids occur here with excellent grade of preservation, 3D and with much detail, as seen on structures of the surfaces of outer and inner (organo)phosphatic shells. The outer sphere is separated from the inner one by a seam up to several micrometres thick, which is interpreted as a cast of originally organic membrane, later dissolved during fossilization and diagenetic processes. In this case, the organophosphatic spheres are interpreted as +/- original state, and not as a result of diagenesis, which is the case of the material published by Kozur (1999), Sannemann (1955), and others. A detailed study of surface structures was carried out using the scanning electron microscope.

Fauna of the Permo-Carboniferous limnic basins of the Czech Republic (***J. Zajíc***)

A succession of the lake fish communities of the non-marine Upper Carboniferous and Lower Permian sediments of the Czech Republic was reviewed The most important lakes were characterized by their ichthyofauna and grouped into six main stratigraphic levels: The Nýřany Lake (*Pyritocephalus*–

Sceletophorus Biozone), the Mšec Lake (*Elonichthys* Subzone), the Kounov Lake (*Sphaerolepis* Subzone), the Klobuky, Zdětín, and Ploužnice Lakes (*Sphaerolepis* Subzone), the Rudník, Zbýšov, and Lubě Lakes (*Acanthodes gracilis*), the Kalná, Ruprechtice, Otovice, and Bačov Lakes (*Xenacanthus decheni* Biozone). The fish communities were categorized from the paleoecological and biostratigraphic point of view. Four trophic levels were distinguished according to teeth, fins, body shape, and body size. Durophagic–omnivorous benthic forms of the 3rd trophic level are represented by dipnoans and euselachiid sharks, planktivorous forms of the same trophic level by acanthodians and actinopterygians. Predominating actinopterygians and rare crossopterygians are classified as small piscivorous and benthivorous forms of the 4th trophic level. Just xenacanthid sharks fall within the 5th trophic level (small piscivorous forms). The highest trophic level (big piscivorous forms) contains xenacanthid sharks and huge actinopterygians such as *Acrolepis gigas*. The local biozone *Sphaerolepis–Watsonichthys* was formally renamed for the *Sphaerolepis–Elonichthys* Biozone. New boundaries of the *Acanthodes gracilis* and *Xenacanthus decheni* biozones were defined in the Intra-Sudetic and Boskovice basins.

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10. Organization of conferences and scientific meetings

Conferences and Symposia organized in 2004

The 17th Conference on Clay Mineralogy and Petrology, Prague, September 13–17, 2004 – Jointly organized by the Institute of Rock Structure and Mechanics AS CR, Czech National Clay Group, and Institute of Geology AS CR (M. Šťastný – chairman, **K. Melka, J.K. Novák** – members of the Organizing Committee). About 46 participants, including 22 specialists from 15 foreign countries were present.

4th International Bioerosion Workshop, Prague, August 29 – September 4, 2004. Organized by the Institute of Geology AS CR, Prague and National Museum, Prague. Scientific Committee: **R. Mikuláš**, **J. Hladil, J. Žítt**, J. Kvaček (National Museum, Prague) and J. Marek (Faculty of Science, Charles University, Prague). The principal aim of the meeting was to confront the experience of workers in modern ecosystems (especially reefs) with the practice of those who decipher the fossil record. 26 scientists (17 from abroad; USA, Great Britain, Germany, Australia, Hungary, Italy, Denmark, Canada, Austria) attended the workshop and presented 40 lectures and posters.

10th Coal Geology Conference, Prague, June 7–11, 2004. Organized by the Institute of Geology, AS CR. Organizing committee: J. Pešek, S. Opluštil, P. Bezuško & **J. Zajíc**. About 50 participants from 7 countries took part in the symposium.

10th Days of Pedology – Pedodiversity, Roztoky u Křivoklátu, September 20–21, 2004. Organized by the Czech Society of Soil Science, the Committee of Soil Science of the Czech Academy of Agricultural Science, Department of Soil Science and Geology of Czech University of Agriculture Prague, Institute of Geology AS CR and Research Institute of Ameliorations and Soil Conservation Prague with cooperation the Administration of Protected Landscape Area Czech Karst (Organizing Committee: J. Kozák – chairman, **A. Žigová** – vice-chairman, M. Rohošková, L. Borůvka, R. Vácha, **V. Ložek**, V. Švihla, J. Němeček, J. Kulhavý, P. Novák). 103 participants including 6 from the Slovak Republic.

XVIIth Conference on Clay Mineralogy and Petrology, Prague, September 13–17, 2004. Organized by the Czech National Clay Group in collaboration with the Institute of Rock Structure and Mechanics (M. Šťastný) and Institute of Geology (**K. Melka**), both institutes of the Academy of Sciences of the Czech Republic.

The PAGES Project workshop, Prague, April 5, 2004. Organized by the Institute of Geology, ASCR, Prague; Chairman: **J. Kadlec.**

Conferences and Symposia under preparation

Third Meeting of the J.E. Hibsch Association, May 2005, Ústí nad Labem. Organized by the Institute of Geology, ASCR (**J. Ulrych, V. Cajz, J. & Adamovič**) and by the Municipal Museum of Ústí nad Labem (T. Wiesner).

The 6th European Paleobotany Conference 7–11 September 2006. Organized by the National Museum, Prague, Faculty of Science, Charles University, Prague and Institute of Geology AS CR, Prague; Organizing Committee: J. Kvaček, S. Opluštil, Z. Kvaček, J. Sakala, V. Teodoridis, M. Libertín, **J. Dašková, J. Bek.** Now the conference is under preparation – the first circular was presented in Argentina during the palaeobotanical meeting and the conference centre was selected.

3RD Workshop on Ichnotaxonomy, Prague, September 2006. Organized by the Institute of Geology AS CR, Scientific Guarantees A.K. Rindsberg (USA) and **R. Mikuláš**. 20–30 specialists are expected to solve principal problems of classification and nomenclature of trace fossils, and to share data for the new issue of Treatise on Invertebrate Paleontology.

11. Publication activity of the Institute of Geology

In 2004, the Institute of Geology published two issues of **GeoLines** – one issue with conference proceedings and one monograph. 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 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.

2004
GeoLines 17 (2004)
Proceedings (abstracts and excursion guides focused on the structure and evolution of Western Carpathians) of the 9th Meeting of the Czech Tectonic Studies Group and 2nd Meeting of the Central European Tectonics Group (held at Lučenec, Slovakia, April 22–25, 2004). Edited by M. Svojtka.

GeoLines 18 (2004)
This special paleontological issue contains papers by Václav Houša and Zdeněk Vašíček: Ammonoidea of the Lower Cretaceous Deposits (Late Berriasian, Valanginian, Early Hauterivian) from Štramberk, Czech Republic, and by Martin Košťák: Cenomanian through the Lowermost Coniacian Belemnitellidae PAVLOW (Belemnitida, Coleoidea) of the East European Province

The Institute of Geology, based on agreements, supported the publication of the reviewed journal **Geologica Carpathica** – an international geological journal published by the Geological Institute, Slovak Academy of Sciences, Bratislava, Slovakia, co-published by the Polish Geological Institute, Warsaw, Poland, and Institute of Geology, AS CR, Prague. Printing office: Veda, Publishing House of the Slovak Academy of Sciences, Bratislava, Slovakia = http:/www.geologicacarpathica.sk/

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12. Publication activity of staff members of the Institute of Geology

12a) Papers published in 2004

publications in journals included in the ISI Web of Science (IF value according to a list from 2003)

3.528* **Kletetschka G.,** Acuna M.H., **Kohout T.**, Wasilewski P.J. & Connerney J.E.P. (2004): An empirical scaling law for acquisition of thermoremanent magnetization. – *Earth and Planetary Science Letters,* 226, 3-4: 521-528. Amsterdam.

3.465* **Geršl M. & Hladil J.** (2004): Weathering products trapped in pure platform limestones: Geochemical picture of magnetic susceptibility and gamma-ray variations. – *Proceedings of the Conference Goldschmidt 2004*, *Copenhagen, Denmark*, Abstract p. A446, *In: Geochimica et Cosmochimica Acta*, Vol: 68, Issue: 12, Supplement.

3.465* **Hladil J.** & Gemperle A. (2004): CaO nucleation preceding carbonate growth in dying microbial particles (subsurface environment). – *Proceedings of the Conference Goldschmidt 2004*, *Copenhagen, Denmark*, Abstract p. A408, *In: Geochimica et Cosmochimica Acta*, Vol: 68, Issue: 12, Supplement.

3.465* **Vach M., Navrátil T.**, Fišák J., & **Skřivan P.** (2004): Assessment of sources and pathways of atmospheric contaminants in precipitation over central Bohemia. – *Proceedings of the Conference Goldschmidt 2004*, *Copenhagen, Denmark*, Abstract 4.62.P02, p. A461., *In: Geochimica et Cosmochimica Acta*, Vol: 68, Issue: 11, Supplement.

3.465* **Navrátil T., Vach M.,** Norton S. & **Skřivan P**. (2004): Chemistry and modeling of the response of a small stream to a short-term in-stream acidification. – *Proceedings of the Conference Goldschmidt 2004*, *Copenhagen, Denmark*, Abstract 4.62.P11, p. A466., *In: Geochimica et Cosmochimica Acta, Geochimica et Cosmochimica Acta,* Vol: 68, Issue: 11, Supplement.

2.992* **Kletetschka G.,** Connerney J.E.P, Ness N.F., Acuna M.H. (2004): Pressure effects on martian crustal magnetization near large impact basins. – *Meteoritics & Planetary Scince*, 39, 11: 1839-1848.

2.754* **Čejchan P.** (2004): LUCA, or just a conserved Archaeon?: Comments on Xue et al. (2003) – *Gene*, Vol. 333: 47-50. Elsevier, Amsterdam.

2.490* Nakamura D., **Svojtka M.**, Naemura K. & Hirajima T. (2004): Very high-pressure (>4 GPa) eclogite associated with the Moldanubian Zone garnet peridotite (Nové Dvory, Czech Republic). – *Journal of Metamorphic Geology*, 22: 593-603. London.

1.878* **Patočka F. & Štorch P.** (2004): Evolution of geochemistry and depositional settings of Early Palaeozoic siliciclastics of the Barrandian (Teplá-Barrandian Unit, Bohemian Massif, Czech Republic). – *International Journal of Earth Sciences*, 93: 728-741. Stuttgart.

1.878* Bábek O., **Mikuláš R.,** Zapletal J. &: Lehotský T. (2004): Combined tectonic-sediment supply-driven cycles in a Lower Carboniferous deep-marine foreland basin, Moravice Formation, Czech Republic. - *International Journal of Earth Sciences*, 93: 241-261.

1.629* Vater M. & **Roček Z.** (2004): Development of the skeleton in the Alpine Newt, Triturus alpestris, and its bearing to reconstruction of larval development in early tetrapods. – *Journal of Morphology* 260: p. 337.

1.629* **Roček Z.** (2004): Ontogeny in Tertiary frogs. – *Journal of Morphology* 260: p. 322.

1.629* **Roček Z.** (2004): Morphological features in anuran development reflecting the fish-to amphib transition. – *Journal of Morphology* 260: p. 323.

1.629* Majorová H. & **Roček Z.** (2004): Transformation of aortic arches during metamorphosis of the Spade-Foot Toad, *Pelobates fuscus*. – *Journal of Morphology* 260: p. 309.

1.629* Královec K. & **Roček Z.** (2004): Structure and development of the ethmoidal part of the skull in Anura, and its ancestral pattern in Temnospondyli. – *Journal of Morphology* 260: p. 305.

1.629* Havelková P. & **Roček Z.** (2004): Development of the pectoral girdle in *Discoglossus* (Anura: Discoglossidae). – *Journal of Morphology,* 260: p. 297.

1.455* **Filippi M.** (2004): Oxidation of the arsenic-rich concentrate at the Přebuz abandoned mine (Erzgebirge Mts., CZ): the mineralogical evolution. – *Science of the Total Environment*, 322, 271-282.

1.400* Wang J., Zhang G., **Bek J.** & Pfefferkorn H.W. (2004): A new morphological type of operculate microspore *Discinispora* gen. nov., from the Permian petrified Noeggerathialean strobilus *Discinites sinensis* Wang. – *Review of Palaeobotany and Palynology*, 128: 229-245. Amsterdam.
1.400* Libertín M. & **Bek J.** (2004): *Huttonia spicata* (Sternberg) emend., and its spores, the Radnice Basin (Bolsovian), Carboniferous continental basins of the Czech Republic. – *Review of Palaeobotany and Palynology*, 128: 247-261. Amsterdam.
1.400* Kvaček Z., **Dašková J.** & Zetter R. (2004): A re-examination of Cenozoic Polypodium in North America. – *Review of Palaeobotany and Palynology*, 128: 219-227.
1.400* Drábková J., **Bek J.** & Opluštil S. (2004): The first compression fossils of *Spencerites* (Scott) emend., and its isospores from the Bolsovian (Pennsylvanian) of the Kladno-Rakovník and Radnice basins, Czech Republic. – *Review of Palaeobotany and Palynology*, 130: 59-88. Amsterdam.
1.400* **Bek J.** & Opluštil S. (2004): Palaeoecological constraints of some *Lepidostrobus* cones and their parent plants from the Late Palaeozoic continental basins of the Czech Republic. – *Review of Palaeobotany and Palynology*, 131: 49-89. Amsterdam.
0.956* Méon H., Guignard G., Pacltová B., **Svobodová M.** (2004): Normapolles. Comparaison entre l´Europe centrale et du Sud-Est pendant le Cénomanien et le Turonien: évolution de la biodiversité et paléoenvironnement. – *Bulletin de Société Géologique de France*, 175, 6: 579-593.
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0.793* **Hladil J.**, Carew J.L., Mylroie J.E., **Pruner P.**, **Kohout T.**, Jell J.S., Lacka B. & **Langrová A.** (2004): Anomalous magnetic susceptibility values and traces of subsurface microbial activity in carbonate banks on San Salvador Island, Bahamas. – *Facies*, 50/2: 161-182. Erlangen.
0.627* **Slavík L.** (2004): The Pragian-Emsian conodont successions of the Barrandian area: search of an alternative to the GSSP polygnathid-based correlation concept. – *Geobios*, 37/4: 454-470. Lyon.
0.612* **Pivec E., Ulrych J. & Langrová A.** (2004): On the origin of pseudoleucite from Loučná/Böhmisch Oberwiesenthal, Krušné hory/Erzgebirge Mts., Bohemia. – *Neues Jahrbuch für Mineralogie, Abhandlungen,* 179, 3: 221–238. Stuttgart.
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0.280* **Ulrych J.,** Fediuk F., **Lang M.** & Martinec P. (2004): Late Paleozoic volcanics of the Czech part of the Intra-Sudetic Basin, Bohemian Massif: Petrological and geochemical characteristics. – *Chemie der Erde,* 64: 127–153. Jena.
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12c) Lectures and poster presentations

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Adamovič J. & Havránek P. (2004): Siliceous karst forms in the Lužické hory Mts., northern Bohemia. *Lecture. 8th International Symposium on Pseudokarst, 26-29 May 2004, Teplý Vrch – Slovakia*.

Adamovič J. & Kidston J. (2004): Porosity reduction in coarse detrital rocks along dike contacts: evidence from basaltic and phonolitic dikes. *Lecture*. *AAPG European Region Conference with GSA, October 10-13, 2004, Prague.*

Adamovič J. (2004): Distribuce železitého tmelu v pískovcích jizerského souvrství. *Lecture*. *Křídový seminář, 25.-26. 3. 2004, Česká geologická služba Praha.*

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Adamovič J. (2004): Specific relief of ferruginous sandstones and sinters in northern Bohemia. *Poster. 8th International Symposium on Pseudokarst, 26-29 May 2004, Teplý Vrch – Slovakia*.

Adamovič J., Malý K. & Zachariáš J. (2004): Secondary quartz cementation around phreatomagmatic structures, Bohemian Cretaceous Basin, Czech Republic. *Lecture. Second International Maar Conference, 21-26 September 2004, Hungary – Slovakia – Germany.*

Bek J.: Carboniferous sphenophyllalean spores and their parent plants. *Lecture. IGCP 469 Meeting, October 9-11th, Freiberg, Germany.*

Bek J.: Comparison of natural *(in situ*) and artificial (dispersed) Pennsylvanian lycospores. *Lecture. The XIth International Palynological Congress, July, Granada. Spain.*

Bek. J. Palaeozoic *in situ* spore studies. *Lecture. Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences. November 29th. Nanjing, China.*

Bezdička P., Grygar T., Hradil D. Novotná K., **Kadlec J., Pruner P., Schnabl P. & Šlechta S.**: Late Pleistocene and Holocene mineral and magnetic imprint in the Lake Baikal sediments. *Lecture. Paleo, Rock and Environmental Magnetism 9th Castle Meeting*, *June 27-July 3, 2004*, *Tatranská Javorina, Slovakia.*

Bezdička P., Grygar T., Hradil D., Novotná K., **Kadlec J. & Pruner P.**: Clay minerals in Late Pleistocene-Holocene sediments from the Lake Baikal. *Poster. 2nd Mid- European Clay Conference, 20-24 September 2004, Miskolc, Hungary.*

Bosák P., Bella P., **Cílek V.**, Ford D.C., Hercman H., **Kadlec J.**, Osborne A., **Pruner P.** & Žák K.: Reconstruction of evolution of the Ochtiná Aragonite Cave (Slovakia) based on datings. *Lecture. Vedecké kolokvium: Ochtinská aragonitová jaskyňa. Unikátny fenomén svetového dedičstva, 27 October 2004, Teplý vrch, Slovakia.*

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Bosák P., **Pruner P.**, Mihevc A., Zupan Hajna N., Horáček J., **Kadlec J., Man O. & Schnabl P.**: Palaeomagnetic and palaeontological research in Račiška pečina Cave, SW Slovenia. *Poster. 12th International Karstological School, Classical Karst – Dating of Cave Sediments, 21-24 June 2004, Postojna*, Slovenia.

Bosák P.: Cave sediments: dating. *Invited key speaker lecture. 12th International Karstological School, Classical Karst – Dating of Cave Sediments, 22 June 2004, Postojna*, Slovenia.

Bosák P.: Confined speleogenesis in the Koněprusy Devonian (Czech Karst, Czech Republic): review. *Lecture. 23. Szkola Speleologiczna, 3-8 February 2004, Macocha, Moravský kras, Czech Republic.*

Bosák P.: Krasové procesy a sedimenty: datování. *Invited lecture. 3. Národní speleologický kongres, 8 October 2004, Sloup, Moravský kras, Czech Republic.*

Bosák P.: Notes on the history of some karstological terms-hydrothermal karst, geysermite, vadose zone. *Lecture. Symposium ALCADI 2004, 23 October 2004, Chata Macocha, Moravský kras, Czech Republic.*

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Cajz V. & Adamovič J.: Tectonic controls on location of phreatomagmatic phenomena, eastern Eger Rift, North Bohemia. *Poster. The Second International Maar Conference 2004, September 21-26, Lajosmizse/Kecskemét, Hungary.*

Cajz V.: Tectonic studies inside the Ohře/Eger Rift – the České středohoří Mts. volcanic range. *Lecture. International Workshop „Basalts 2004", November 5-7, Czocha Castle, Poland.*

Cajz V.: Volcanostratigraphy, lithostratigraphy and geochemistry of the České středohoří Mts. basaltic rocks, Ohře/Eger Rift. *Lecture. International Workshop „Basalts 2004", November 5-7, Czocha Castle, Poland.*

Chadima M., Cifelli F. & Günther A.: Correlation between magnetic anisotropy and phyllosilicate preferred orientation for various sedimentary rocks. *Lecture. Paleo, Rock and Environmental Magnetism 9th Castle Meeting*, *June 27-July 3, 2004*, *Tatranská Javorina, Slovakia.*

Chadima M., Cifelli F., Hansen A. & Hirt A.M.: The origin of tectonic fabrics in „undeformed" clays: the early stages of deformation in extensional sedimentary basins. *Poster. Professor William Lowrie´s Retirement Symposium, Modern Paleomagnetism in the Earth Sciences, July 19, 2004, Zürich.*

Chadima M., Pruner P., Grygar T. & Hirt A.M.: Normal and Inverse magnetic fabrics in Mesozoic Black Shales, Northern siberia, Russia: Siderite Controlled? *Lecture. AGU Fall Meeting 2004, 13-17 December, San Francisco, USA*.

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Cílek V.: Krajina jako palimpsest. *Lecture. 30. konference zahradních architektů, 8-9 September 2004, Klatovy.*

Cílek V.: Lovci a sběrači. *Lecture. Krajinářské sympozium a exkurze. 14 August 2004. Dubá*.

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Cílek V.: Workshop Symbiosis. *Lecture. Fakulta architektury ČVÚT, 26-28 August 2004, Horažďovice.*

Dašková J. (2004): Revize rodu Chaloneria a jejich spor ze svrchního karbonu kontinentálních pánví ČR (Bolsovian-Stephanian B). *Lecture. Paleontologický seminář, PřF UK, Praha, Albertov*

Dašková J., Kvaček J. & Pátová R.: Fertile fern fronds and their in-situ spores from the Cenomanian of the Czech Republic. *Poster. XI. IPC - International Palynological Congress, 2004, Spanish Palynological Association, Granada, Spain. Book of Conference Abstracts, p. 461.*

Dašková J., Kvaček J., Pátová R.: In situ spores of the fertile fern fronds from the Cenomanian of the Czech Republic. *Lecture. 5. česko-slovenská a polská paleontologická konference, Lecture. 16. - 18.6. 2004, Geologický ústav Dionýza Štúra, Bratislava, Slovensko.*

Geršl M. & Hladil J.: Weathering products trapped in pure platform limestones: Geochemical picture of magnetic susceptibility and gamma-ray variations. *Poster. (Presentation). 14th Annual Goldschmidt Conference, Processes in Geochemistry: Forces, Fluxes and Structures, 5-11.6. 2004, Copenhagen.*

Geršl M. & Hladil J., Hypr D. & Stepišnik U.: Variability of carbon dioxide concentrations in Zbrašov Aragonite Caves and its assessment on the base of nine-year monitoring research (in Czech). *Lecture. 3rd National Speleological congress, 8- 10.10.2004, Sloup.*

Gilíková H., **Mikuláš R. &Vavrdová M.**: Bazální klastika na jižní Moravě: stáří a paleogeografie. *Lecture. 5. česko-slovenská a polská paleontologická konference, Lecture. 16.-18.6. 2004, Geologický ústav Dionýza Štúra, Bratislava, Slovensko.*

Głazek J., Bella P., **Bosák P.**, Hercman H., **Pruner P.**: Geneza i wiek Jaskini Bielskiej. *Lecture. 38. Sympozjum Speleologiczne, 7-10 October 2004, Zakopane.*

Głazek J., **Bosák P.**, **Pruner P.** & Bella P.: Neogene hydrothermal karst in Tatra Mts. *Lecture. Vedecké kolokvium: Ochtinská aragonitová jaskyňa. Unikátny fenomén svetového dedičstva, 28 October 2004, Teplý vrch, Slovakia.*

Halířová J., Hypr D., Leontovyčová D. & **Geršl M.**: Stream sediments and suspended solids in the Complex Monitoring of Water Quality in the border part of the Labe River. *Lecture. (performed by J. Halířová), 10th Conference on Quaternary "Kvartér 2004"*, *Brno.*

Hladil J. & Gemperle A.: CaO nucleation preceding carbonate growth in dying microbial particles (subsurface environment). *Poster. (Presentation). 14th Annual Goldschmidt Conference, Processes in Geochemistry: Forces, Fluxes and Structures, 5-11.6. 2004, Copenhagen.*

Hladil J.: Environmental relationships of endolithic microborers and substrates in barrandian limestones of Devonian age, Czech Republic. <u>Lecture.</u> *4th International Bioerosion Workshop, 30.8. - 3.9.2004, Prague.*

Hladil J.: Present state of the stratigraphical subdivision the Devonian system, development of high-resolution stratigraphic methods and progress in time callibration (in Czech). <u>Lecture.</u> *Joint Meeting of the Czech Geological Society and Faculty of Science of the Charles University, 100th Anniversary of Prof. B. Bouček, 20.10.2004, Prague.*

Hlaváč J.: Mollusca of the NP Bavarian Forest (Germany). <u>Lecture.</u> *Conference XX. Krajowe Seminarum Malakologiczne, 31 March – 2 April, 2004, Krościenko, Poland*.

Hojdová M.: Biogeochemistry of Mercury – Influence of precipitation and litterfall on dynamics of mercury and methylmercury in the forest floor of a forested catchment in Germany. <u>Lecture.</u> *Sources and Impact of Urban Air Pollution, 25-27.October 2004, Venice/Italy.*

Hojdová M.: Teplotni rezim na raselinisti a v lese ruzneho stupne poskozeni v Narodnim parku Sumava. <u>Lecture.</u> *III. seminar z ekologie mokradu a hydrobotaniky, poradany na pamet Slavomila Hejneho Botanickým ustavem AVCR a Jihoceskou universitou" v Treboni od 27.-28.1.2004*.

Hrouda F., **Chadima M.**, Schulmann K., Mixa P. & Krejčí O.: The AMS and ductile deformation of rocks of the acretionary prism of the easternmost Rheno-Hercynian: implications for dynamics of the respective subduction factory. <u>Lecture.</u> *European Geosciences Union, 1st General Assembly, SE MPR11, 25-30 April 2004, Nice, France.*

Žítt J.: Mořské hvězdice (Asteroidea) svrchního cenomanu-spodního turonu české křídové pánve. <u>Lecture.</u> Seminář křídařů (profesionálů i amatérů) k příležitosti 100. výročí narození Josefa Soukupa a Antonína Culka. Praha, 25. – 26. 3. 2004.

Kadlec J., Hercman H., Danišik M., **Pruner P., Chadima M., Schnabl P., Šlechta S.**, Grygar T. & Granger D.: Datování jeskynních sedimentů a rekonstrukce krasové morfologie Nízkych Tatier. <u>Lecture.</u> 3. *Nár. speleol. kong., Čes, speleol. Spol., October 9, 2004, Sloup.*

Kadlec J., Hercman H., Danišik M., **Pruner P., Chadima M., Schnabl P., Šlechta S.**, Grygar T. & Granger D.: Dating of cave deposits and reconstruction of karst morphology of the Nízké Tatry Mts. Slovakia. <u>Poster.</u> *12th International Karstological School, „Classical Karst“. Dating of cave sediments, 21-24 June 2004, Postojna, Slovenia*.

Kadlec J., Hercman H., **Pruner P., Schnabl P.**, Diehl J.F., Šroubek P., Granger D. & Beneš V.: Dating of cave deposits and reconstruction of karst morphology of the Moravian Karst (Czech Republic) and the Nizke Tatry Mts. (Slovakia). <u>Lecture.</u> *Seminář Remote Sensing Institute, Michigan Technological University, December 6, 2004, Houghton.*

Kadlec J., Pruner P., Venhodová D., Hercman H. & Nowicki T.: Stáří a geneze sedimentů v Ochozské jeskyni (Moravský kras). <u>Lecture.</u> *3. Nár. speleol. kong., Čes. speleol. Spol., October 9, 2004, Sloup.*

Kadlec J.: Environmentálně magnetický záznam ve spraších a fosilních půdách. <u>Lecture.</u> *Seminář skupiny Geomorfologie a kvartér při ČGS, May 8. 2004, Dolní Věstonice.*

Kadlec J.: Environmentálně magnetický záznam ve sprašovém profilu v Mokré (Moravský kras). <u>Lecture</u>. *Seminář projektu PAGES, April 5, 2004, Praha.*

Kadlec J.: Klima a říční procesy. <u>Lecture.</u> *Seminář skupiny Geomorfologie a kvartér při ČGS, September 4, 2004, Mikulčice.*

Kadlec J.: Kvartérní eolické sedimenty. <u>Lecture.</u> *Bakalář. kurs Geologie kvartéru, PřFUK, Praha, April 4, 2004, Praha.*

Kadlec J.: Kvartérní sedimenty krasových oblastí. <u>Lecture.</u> *Bakalář. kurs Geologie kvartéru, PřFUK, April 14, 2004, Praha.*

Kadlec J.: Příčiny klimatických změn - aneb hrozí zánik našeho života? <u>Lecture.</u> *Cyklus přednášek Slovenského muzea ochrany přírody a jeskyňářství, March 17, 2004, Liptovský Mikuláš.*

Kadlec J.: Příčiny klimatických změn v kvartéru. *Cyklus přednášek pro studenty archeologie Filosof. fak. Západočeské university, October 12, 2004, Plzeň.*

Kadlec J.: Příčiny klimatických změn. <u>Lecture.</u> *Seminář Ústavu anorganické chemie AVČR, June 9, 2004, Řež.*

Kalvoda J., Košler J. & **Svojtka M.**: Morphotectonic evidence for chronodynamics of uplift in the East Nepal HimalayaMorfo. <u>Poster.</u> *(performed by J. Kalvoda), 30th Congress of the International Geographical Union and Joint International Geomorphology Conference, 15-20.8.2004, Glasgow.*

Kletetschka G., Acuna M., **Kohout T.**, Wasilewski P.J. & Connerney J.: An Empirical Scaling Law for Acquisition of Thermoremanent Magnetization. <u>Lecture.</u> *European Geosciences Union, 1st General*

Assembly, SE MPR9, 25-30 April 2004, Nice, France.

Kletetschka G., Wasilewski P.J., **Kohout T.**, Herrero-Bervera E. & Fuller M.D.: Detecting ultra-low magnetic fields with common magnetic minerals. Poster. *AGU Fall Meeting 2004, 13-17 December, San Francisco, USA.*

Kletetschka G.: Interactions during the TRM acquisition of SD hematite. Lecture. *Paleo, Rock and Environmental Magnetism 9th Castle Meeting, June 27-July 3, 2004, Tatranská Javorina, Slovakia.*

Kohout T., Pesonen L.J.: Physical properties of Stony Meteorites and Asteroid Parent Bodies - From Laboratory Scale to Astronomical Scale. Lecture. *International Science Symposium on Sample returns from Solar System Minor Bodies " The 1st HAYABUSA Symposium", October 20-22 2004, (ISAS, JAXA) Sagamihara, Kanagava, Japan.*

Kohout T., Cheron A., Donadini F., **Kletetschka G.** & Pesonen L.J.: The possible scenarios of the Neuschwanstein meteorite history based on physical properties. Poster. *AGU Fall Meeting 2004, 13-17 December, San Francisco, USA*.

Kohout T., Donadini F., Pesonen L.J.: Petrophysical Characteristic of Neuschwanstein EL-6 Chondrite. Lecture. *67th Annual Meeting of the Meteorological Society, August 2-6 2004, Rio de Janeiro, Brazil.*

Kohout T., Kletetschka G., Kobr M., **Pruner P.** & Wasilewski P.J.: Magnetic Properties of Chondritic Meteorites and the Terrestrial Weathering. Lecture. *European Geosciences Union, 1st General Assembly, SE PS8, 25-30 April 2004, Nice, France.*

Kontny A., **Kletetschka G.** & Wasilewski P.J.: Magnetic Mineralogy in Oxidized Lava Flows. Poster. *AGU Fall Meeting 2004, 13-17 December, San Francisco, USA*.

Konzalová M.: Detritic coal composition – vegetation sources for the Bohemian Miocene Coal Basins. Poster. *10-th Coal Geology Conference, June 7-11, 2004, Prague*

Konzalová M.: Redwood on the slopes of the E. Sudetic block? (Tertiary, Miocene, Czech Republic). Lecture. *5. česko-slovenská a polská paleontologická konference.16.-18. června 2004, Bratislava*.

Kvaček J., **Dašková J.** & Pátová R.: Fertile fern fronds and their in-situ spores from the Cenomanian of the Czech Republic. Poster. *VII. International Organization of Palaeobotany Conference, 1.3.-26.3. 2004, Museo Paleontológico Feruglio, Argentina. Book of Conference Abstracts, p. 70-71.*

Lauritzen S.E., Linge H.C., Hercman H., Vít J., Glazek J., **Bosák P.**: ^{230}Th/^{230}U dating of the Amaterska speleothem AM6, Moravski Kras, the Czech Republic. Poster. *12th International Karstological School, Classical Karst – Dating of Cave Sediments, 21-24 June 2004, Postojna, Slovenia.*

Libertín M., Pšenička J., **Dašková J.**, Opluštil S., **Bek J.** & Drábková J.: In situ peat-swamp forest from the tuff bed of the Whetstone Horizon (Czech Republic, Bolsovian). Lecture. *IGCP 469 Meeting, October 9-11th, Freiberg, Germany.*

Libertín M. & **Dašková J.**: Autochthonous plant taphocenosis preserved in pyroclastic rocks of the Bolsovian, Upper Carboniferous, Czech Republic (Central Europe). Poster. *VII. International Organization of Palaeobotany Conference, 21.3.-26.3. 2004, Museo Paleontológico Feruglio, Argentina.*

Libertín M. & **Dašková J.**: The palaeoecology model of the river environment (Duckmantian) in the Intrasudetic Basins (Czech Republic). Lecture. *VII. International Organization of Palaeobotany Conference, 21.3.-26.3. 2004, Museo Paleontológico Feruglio, Argentina.*

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Lisá L.: Quaternary sediments of the Brno Town. Lecture. *IAS 23rd Meeting Coimbra-Portugal.*

Lisá L.: Váté písky v Brně?. Lecture. *10. konference Kvartér, Brno*.

Malý K., Zachariáš J. & **Adamovič J.** (2004): Nové poznatky o silicifikaci pískovců, ohárecký rift. Lecture. *Seminář Ústavu mineralogie, geochemie a nerostných zdrojů PřF UK Praha, 22. 11. 2004, Praha.*

Man O.: Is the Fisher distribution reproducible? Poster. *European Geosciences Union, 1st General Assembly, SE MPR11, 25-30 April 2004, Nice, France.*

Martínek K., Drábková J., **Mikuláš R.**, Šimůnek Z., Štamberg S. & **Zajíc J.** (2004): Paleoenvironmental changes at the Carboniferous-Permian boundary: sedimentary and paleontological record of the Boskovice Basin, Czech Republic. Lecture. *10th Coal Geol. Conf. Prague 2004, 10. Prague*.

Nakamura D., Naemura K., Hirajima T. & **Svojtka M.**: Very high-pressure (>4 GPa) eclogite associated with the Moldanubian Zone garnet peridotite (Nové Dvory, Czech Republic). *Lecture. (performed by Nakamura D.), 32nd International Geological Congress., 20-28.8.2004, Florence.*

Novák J.K.: Tinguaitic dyke rocks from the Roztoky Volcanic Centre, České středohoří Mts., NW Bohemia. *Lecture. Workshop: Basalt 2004, November 5-11, 2004. Czocha near Lubań/Poland.*

Novák J.K., **Melka K., Ulrych J.** & Řanda Z. (2004): Phonolite weathering profiles at Mariánská hora Hill, České středohoří Mts., and sorption properties of clay residues. *Lecture & poster. 17th Conference on Clay Mineralogy and Petrology, Prague, September 13-17, 2004. Praha*.

Novák J.K., Ulrych J., Řanda Z., **Langrová A. & Lang M.** (2004): Xenoliths of alkali pyroxenite-ijolite series in the Cenozoic Loučná-Oberwiesenthal Complex, Bohemia/Saxony: derived from mantle or a deeper alkaline complex? *Poster. 32. International Geological Congress, Florence/Italy, August 20-28, 2004. Florence/Italy.*

Opluštil S & **Bek J.**: Lepidodendraceae of the Late Palaeozoic continental basins of the Czech Republic. *Lecture. IGCP 469 Meeting, October 9-11th, Freiberg, Germany.*

Pokryszko B. M., Auffenberg K., **Hlaváč J.** & Naggs F.: Old and new pupilloids from Pakistan. *Poster. Conference World Congress of Malacology, Molluscan Megadiversity: Sea, Land and Freshwater, Malacological Society of Australasia, 11-16 July 2004, Perth, Western Australia.*

Pruner P.: Principles of paleomagnetic and magnetostratigraphic methods applied to the cave sediment dating. *Invited Lecture. 12th International Karstological School, „Classical Karst“. Dating of cave sediments, 21-24 June 2004, Postojna, Slovenia.*

Pruner P., Bosák P., Zupan Hajna N., Mihevc A., **Man O. & Schnabl P.**: Palaeomagnetic and palaeontological research in Križna jama, Planinska jama and Postojna jama: preliminary results. *Poster. 12th International Karstological School Classical Karst“. Dating of cave sediments, 21-24 June 2004, Postojna, Slovenia.*

Pruner P., **Bosák P.**, Zupan Hajna N., Mihevc A., **Man O. & Schnabl P.**: Palaeomagnetic research of cave sediments in Križna jama, Planinska jama and Postojnska jama: preliminary results. *Poster. 12th International Karstological School, Classical Karst – Dating of Cave Sediments, 21-24 June 2004, Postojna*, Slovenia.

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Stepišnik U. & **Geršl M.**: The flood loam deposits inside collapse dolines of Postojna karst (Slovenia). *Lecture. 3rd National Speleological congress, 8- 10.10.2004, Sloup.*

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Valenzuela-Ríos J.I. & **Slavík L.**: ¿Existe el Praguiense (Devónico Inferior) en Europa? Lecture. (*performed by J.I Valenzuela-Ríos*) – *XX Jornadas de la Sociedad Española de Paleontología, October 20-23. Alcalá de Henares, Spain.*

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Žigová A.: Evoluce půdního pokryvu Českého krasu ve vztahu k pedodiverzitě a klasifikačnímu systému půd. Invited lecture. *10. Pedologické dny 2004, 20-21 October 2004, Roztoky u Křivoklátu.*

Zodrow E. L. Pšenička J. Šimůnek Z. Cleal C. J. & **Bek J.**: The general view of compression *Acitheca* species from Canada-Czech Republic-France (Westphalian D- Stephanian). Lecture. *The VIIth International Organization of Palaeobotany Conference, March, Bariloche. Argentina.*

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13. Laboratories

Laboratories of the Institute are not independent units. They are incorporated within the structure of scientific departments and within the unit of Service Laboratories of Physical Methods. The chapter summarizes the list of the most important laboratory equipment.

Paleomagnetic laboratory (head Ing. Petr Pruner, DrSc.)

Basic equipments

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.

X-ray and DTA/TG laboratory (head RNDr. Karel Melka, CSc.)
PHILIPS X´Pert APD (1997)
CHIRANA Mikrometa II PŘI 32 (1963)
DRON UM1 (1983)
DERIVATOGRAPH Q 1500 Monimex (1982, computerized in 1998)
Goniometer Weissenberg KS A 2 (1964)
Goniometer BUERGER (1968)
Gandolfi chamber (1978)
Guinier T ENRAF-NONIUS chamber (1969)

Electron scanning and microprobe laboratory (head Ing. Anna Langrová)
Microprobe CAMECA 100 (2002)
Microprobe JEOL JXA-50A (1972)
EDAX System PHILIPS (1996)
Accesory devices for preparation of samples

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 for thin and polished sections (head Ing. Anna Langrová)
MINOSECAR (1962, 1970)
DISCOPLAN (1990)
PEDEMOX PLANOPOL (1989)
Montasupal (1977)
DP.U.4 PDM-Force (1993)

Microscopic laboratory (head Mgr. Michal Filippi)
System for picture analysis: Steromicroscope NIKON SM2-U with adapters and CCD camera JVC TK 1381 (1998)
Streomicroscope Nikon SMZ 800 (2003)
Polarization microscope ORTHOPLAN Photometre LEITZ (1983)
Microscope MEF REICHERT (1964)
10x Polarization microscope AMPLIVAL ZEISS (1971, 1973, 1974, 1975, 1981, 1990)
Microscope DIALUX-PO 550012 LEITZ (1966)
3x Polarization microscope POLMI (1963, 1967)
4x Polarization microscope MEOPTA (1965, 1966, 1969)
3x Ore polarization microscope MIN (1961, 1967, 1968)
Ore polarization microscope MIN 8 (1967)
Ore polarization microscope MIN 9 (1968)
3x Microscope MPD (1966)
Microscope MST (1967, 1974)
Biological microscope OPTON (1991)
Microscope NIKON ALPHAHOT 2/HP (1995)
Microscope NF PK (1964)
4x Microscope (1963, 1968, 1969)
9x Polarization microscope (163, 1965, 1966, 1967)
27x Stereomicroscope (1957–1963, 1965–1968, 1973)
Spectrophotometrical microscope MSF 1 REICHERT (1970)
2x Microscope C36 (1958, 1975)
Microscope A36 (1960)
2x Microscope B36 (1961)
Binocular microscope (1959)
Stereomicroscope SM XX (1968)
2x Projection microscope (1968, 1969)
Microscope DNO 714 (1994)

Fisson track laboratory (head Mgr. Jiří Filip, CSc.)
Analytical system for fisson track – Microscope AXIOPLAN ZEISS and Trackscan system 452110 AUTOSCAN (1999)
Polishing and griding machine MTH APX 010 (2003)

Laboratory of liquid and solid samples (heads RNDr. Jan Rohovec, PhD. and 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)

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14. Financial Report

(in thousands Czech Crowns)

A. INCOMES	
1. From the annual budget of the Academy of Sciences CR	28, 289
2. From the Grant Agency of the ASCR (accepted research projects)	3,836
3. From the Grant Agency CR (accepted research projects)	3,942
4. From the internal research projects of the Acad. Sci. CR	2,278
5. From other state sources (Ministry of Environment, etc.)	1,047
6. Applied research	1,962
7. Investments (for laboratory facilities)	1,039
8. Investments (for buildings)	588
TOTAL INCOMES	**42,981**

B. EXPENSES	
1. Scientific staff – wages, medical insurance	16,538
2. Research and scientific activites	10,288
3. Administration and technical staff – admin. expenses, wages, medical insurance	7,146
4. General expenses (postage shipping, maintenance of buildings, energies, transport, office supplies, miscellaneous, etc)	6,509
5. Library (subscriptions etc.)	623
6 Editorial activites (Geolines, Annual Report, Geologica Carpathica)	250
7 Investments (for laboratory facilities)	1,039
8 Investments (for buildings)	588
TOTAL EXPENSES	**42,981**