Academy of Sciences of the Czech Republic

Institute of Geology
Annual Report 2002

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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 and P. Bosák. English version was kindly revised by J. Adamovič.

KATALOGIZACE V KNIZE - NÁRODNÍ KNIHOVNA ČR

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1. Preface

The year of 2002 was important for the life of the Institute. The organisation structure of the Institute was reconstructed (see the scheme at the end of the Annual Report). The process reflected both the results of evaluation of the Institute (for period of 1995 to 1999) and the adaptation to recent trends in Earth sciences and the Institute mid-term scientific program. Our approach was based on establishment of flexible structure consisting of teams concentrated around mainstream scientists. We abandoned the old division to scientific departments and service units, and a new structure based on smaller laboratories was established. The structure of the Institute consists of the Administrative Section and Scientific Laboratories (see Chapter 2).

The management also changed a little during the year 2002. We have a new Deputy Director (František Patočka) and a newly appointed Scientific Secretary (Jaromír Ulrych). We also selected a person in charge of contacts with scientific programs of the EU and NATO (Radek Mikuláš).

The second important achievement in 2002 was the installation of CAMECA 100 microprobe in the Laboratory of Physical Methods. The total costs were covered by a special grant of the Academy of Sciences of the Czech Republic and from sources of the Institute. The Institute obtained the up-to-date equipment allowing to produce high-precision data especially for geochemistry, petrology, paleontology and other disciplines. The operation of the instrument was ceremoniously opened by a short workshop on November 26, 2002, attended by a number of specialists and users.

We continued in support of two geological journals: *Geologica Carpathica* (co-edition with the Geological Institute of Slovak Academy of Sciences, Bratislava, and Central Geological Institute, Warsaw, Poland), and *Journal of the Czech Geological Society* (co-edition with the Czech Geological Society, Prague), as well as in our own publication activity (*GeoLines*).

As the change is the life, also the structure of this Annual Report changed. We abandoned the structure listing results according to scientific department/laboratories. The new structure is based on sources of finances, i.e., foreign grants and projects, grants and projects covered from Czech sources and finally projects of applied research (industrial grants and projects). We are sure that the new structure will help the reader in better orientation in scientific activities and outputs of our Institute.

Pavel Bosák, DSc.
Director of the Institute

2. General Information

Essential description of activities of the Institute. 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.

*History of the Institute***.** 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.

Present research. The Institute of Geology is a wide-spectrum institute developing essential geological, paleontological, petrological, mineralogical and other disciplines, recently accentuating environmental geology and geochemistry.

Scientists of the Institute of Geology are now working on more than 50 projects supported by central and ministerial grant agencies and by the industry, by foreign institutions and grant agencies (European Science Foundation, UNESCO, 5th General Plan of the EU etc.). Some of the projects are based on the numerous bilateral international agreements signed between the Institute and foreign partners. In the last years, the research concentrates on complex study of the history of the geological setting and the environment from the oldest times to the civilization-affected present times. The study of global environmental change is based particularly on the record preserved in the territory of the Czech Republic and Europe. The main emphasis is directed to:

(1) Compilation of models of the architecture of the Bohemian Massif, especially the study of composition and origin of individual terranes of different sizes;

(2) Volcanostratigraphy and differentiation history of post-Variscan volcanic complexes;

(3) Paleobiology and paleoecology, biostratigraphy, paleobiogeography and paleoenvironmental interpretation of stratal successions;

(4) Study of climatic oscillations and paleoenvironmental changes in the geological past;

(5) Geochemical processes in soils, in settling ponds and in young sediments, and

(6) Paleomagnetism and its application to terrane structure, detection of continental drift and rotation of blocks, high-resolution magnetostratigraphy in Phanerozoic sediments with special reference to Jurassic/Cretaceous carbonate sequences and Cenozoic fluvial sediments and cave fills.

The major research areas especially developed in the Institute have been as follows:

- 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 scientific laboratories:

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

Laboratory of Terrane Architecture and Lithosphere Evolution

In structural geology and global tectonics, the Laboratory concentrates on the study of architecture of terranes in different scales and the interpretation of their paleotectonic settings. In petrology and geochemistry of magmatic and sedimentary rocks (and their metamorphic equivalents), the research is focused on the origin and evolution of rock complexes.

Scientific results of the Laboratory (together with relevant conclusions from geochronology, stratigraphy, sedimentology, paleontology and paleomagnetism) are directed towards spatial limitation of terranes, determination of their provenance and the main evolutionary characteristics ending with accretion and formation of terrane mosaic (architecture) during orogenies. Work of the Laboratory provides the basis necessary for further development and extension of the knowledge of the evolution of continental lithosphere.

Head: RNDr. František Patočka, DrSc.

Deputy Head: Doc. RNDr. Jindřich Hladil, DrSc.

Laboratory of Platform Evolution

concentrates on the complex study of problems of platform evolution in different regions, with special reference to volcanostratigraphy, phases and differentiation of post-orogenic volcanic complexes. The study of deformational phases, spatial distribution and the character of post-orogenic deformation contributes to the understanding of the origin and evolution of young volcanism and sedimentary basins. In connection with volcanic activity, deeper structure of platforms is studies, particularly in selected parts of the Bohemian Massif.

A wider use of geochemical methods, especially geochronology and isotope geochemistry, is a necessary prerequisite.

Head: Doc. RNDr. Jaromír Ulrych, DrSc.

Deputy Head: Mgr. Jiří Adamovič, CSc.

Laboratory Palaoebiology and Paleoecology

is engaged with the study of fossil environments, communities of fossil organisms contained in sedimentary record. The research deals with paleoecology, dynamics of the origin, developemnt and decline of communities of organisms, and with the evolution of marine and continental areas of floral and faunal distribution (paleogeography). Paleobiological applications – evolutionary science and biostratigraphy – are also studied. Taxonomy is the necessary tool to achieve relevant results but does not pose the aim of the study as such. Special attention is given to the fossil record in the Czech Republic, in the Variscan Europe, in the Alps and the Carpathians, considering the need of interaction with other laboratories of the Institute.

Head: RNDr. Radek Mikuláš, CSc.

Deputy Head: Mrs. RNDr. Marcela Svobodová, CSc.

Laboratory of Environmental Geology
is dealing with the study of rocks and processes taking place in the latest geological past, especially in the Cenozoic. Attention is given to the study of climatic oscillations, environmental changes and landscape protection, particularly in the central European region, and to different aspects of interaction between humans and their natural background.
These goals are achieved with the aid of a number of biostratigraphic and analytical methods including the method of isotope analysis, geochronology, paleobiology, and others. The results serve not only to the understanding of general natural laws of climatic and environmental evolution, but also as input data in the design of strategy and care for the present landscape and its environment.
Head: RNDr. Václav Cílek, CSc.
Deputy Head: Mgr. Jaroslav Hlaváč

Laboratory of Environmental Geochemistry
studies biogeodynamics of chemical elements in the environment. The study is focused on the present changes and trends in the cycles of ecologically significant elements induced by climatic oscillations and human activity.
The methods of study include qualitative and quantitative description of interactions among essential environmental components (rocks, soil cover, surface waters and groundwaters, sediments, vegetation and atmosphere), monitored in typologically characteristic model areas. The aim of the study is to obtain a broad, synthetizing idea of chemical aspects of the development of Central European environment.
Head: Mgr. Tomáš Navrátil
Deputy Head: Doc. Ing. Petr Skřivan, CSc.

Laboratory of Paleomagnetism
deals with the study of paleomagnetism and magnetostratigraphy, development of laboratory procedures of identification of magnetic stability of rocks, magnetomineralogy and geotectonic applications of the obtained paleomagnetic data.
The aim of the study is to characterize paleomagnetic parameters and essential characteristics of Phanerozoic rocks, subsequent interpretation of paleomagnetic data for the purpose of geotectonic and paleogeographic sytheses and high-resolution magnetostratigraphy applied to selected stratal successions.
Head: Ing. Petr Pruner, DrSc.
Deputy Head: RNDr. Jaroslav Kadlec, Dr.

Laboratory of Physical Methods
incorporates the Laboratory of Electron Microanalysis and Microscopy, Laboratory of X-ray Diffraction and the Laboratory of Sample Preparation. Besides direct use of these methods, it is also engaged in further developemnt of their applications and enhancement of the precision of analytical procedures.
In a detailed scale, the Laboratory studies internal structures of minerals. In the area of material composition of rocks and minerals, it provides precise quantitative data on the content and spatial distribution of major and trace elements. Selected methods of isotope geochronology using electron microanalysis are being developed. Methods of elecron microscopy provide detailed 3D images of fossils, minerals and rock textures and structures.
Results of the Laboratory yield a rich database for the research carried out in other laboratories of the Institute.
Head: Mrs. Ing. Anna Langrová
Deputy Head: Mrs. RNDr. Zuzana Korbelová

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)

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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Ing. Ottomar Gottstein, CSc	Deputy Director (finances)
RNDr. František Patočka, DrSc.	Deputy Director
Doc. RNDr. Jaromír Ulrych, DrSc.	Scientific Secretary
Doc. RNDr. Jindřich Hladil, DrSc.	Chairman of the Scientific Council

Administrative departments

Management Section

Marcela Nováková (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)
Karel Jeřábek (garage attendant, driver)
Petr Vachalovský (technical service)
Josef Chmelař (civil military service)
Martin Horváth (civil military service)
Petr Schnabl (civil military service)
Petr Záras (civil military 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 (charlady)
Karel Jeřábek (cleaning)
Vlasta Kaiserová (charlady)
Ivana Konopáčová (charlady)
Jaroslav Kratochvíl (technical service)
Martin Mráček (boiler operator)
Zdeňka Pekárková (charlady)

Scientific laboratories

Laboratory of Terrane Architecture and Lithosphere Evolution

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Ing. Jiří Fiala, CSc. (structural geology, metamorphic petrology)
Mgr. Monika Novotná (structural geology, tectonics and metamorphic petrology)
RNDr. Ladislav Slavík, CSc. (Devonian stratigraphy, conodonts)
RNDr. Petr Štorch, DrSc. (Ordovician and Silurian stratigraphy, graptolites, paleogeography)
Mgr. Martin Svojtka, Ph.D. (geochronology, geochemistry)
RNDr. Zdeněk Vejnar, DrSc. (structural geology, metamorphic petrology)

Technical Staff:

Ing. Jaroslava Pavková (secretary, technician)
Josef Forman (technician)

Laboratory of Platform Evolution

Scientific Staff:

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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)
prom. geol. Jiří Novák, CSc. (petrology)
Prof. RNDr. Jiří Pešek, DrSc. (coal geology, basin analysis)
RNDr. Edvín Pivec, CSc. (igneous petrology and mineralogy)

Technical Staff:

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

Laboratory of Paleobiology and Paleoecology

<u>Scientific Staff:</u>

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RNDr. Marcela Svobodová, CSc. – Deputy Head (Cretaceous palynology)
RNDr. Jiří Bek, CSc. (Devonian and Carboniferous spores)
RNDr. Petr Čejchan (paleoecology)
Dr. Jeffrey G. Eaton (Fulbright fellow, U.S.A.)
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)

<u>Technical Staff:</u>

Ing. Bronislava Vávrová (secretary, technician)
Josef Brožek (photographer)

Laboratory of Exogenic Geology

<u>Scientific Staff:</u>

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Mgr. Jaroslav Hlaváč – Deputy Head (Quaternary geology, malacozoology)
RNDr. Pavel Bosák, DrSc. (karstology, paleokarstology, basin analysis)
Mgr. Michal Filippi (mineralogy, environmental geochemistry)
Mgr. Eva Kadlecová (Cenozic vertebrate paleontology)
RNDr. Vojen Ložek, DrSc. (Quaternary geology, malacozoology)
RNDr. Eliška Růžičková (petrology, Quaternary geology)
Mgr. Zuzana Vařilová (geochemistry)
RNDr. Anna Žigová, CSc. (pedology, paleosoils)
Mgr. Ondřej Zeman (hydrogeology)

<u>Technical Staff:</u>

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Miroslav Karlík (technician)

Laboratory of Exogenic Geochemistry

Scientific Staff:

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Ing. Irena Dobešová (geochemistry)
Ing. Ottomar Gottstein, CSc. (geochemistry of magmatic and metamorphic rocks)
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Laboratory of Paleomagnetism

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Bc. Stanislav Šlechta (geophysics)

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Laboratory of Physical Methods

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Ing. Vlasta Böhmová, Ph.D. (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

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RNDr. Jaroslav Kadlec, Dr. (Institute of Geology AS CR) – Deputy Head of the Council (since November 11, 2002)
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Doc. RNDr. Jaromír Ulrych, DrSc. (Institute of Geology AS CR)

Foreign consultants

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)
Dr. Horst Kämpf (GeoForschungsZentrum, Postdam, Germany)
Prof. Dr hab. Ryszard Kryza (Institute of Geological Sciences, Wroclaw University, Poland)
Prof. Henri Maluski (Université Montpelier II, Montpelier, France)
Prof. Ronald Parsley (Department of Geology, Tulane University, New Orleans, USA)
Prof. Dr. Franz Pertlik (Institut für Mineralogie und Kristallografie, Universität Wien, Geozentrum, Austria)
Prof. Henning Sørensen (Geological Institute, University of Kobenhagen, Denmark)
Prof. John A. Winchester (Department of Geology, University of Keele, Great Britain)

Note: Czech scientific and pedagogical degrees are equivalents of:

Czech degree	**Equivalent**
prom.geol., prom. fyz., Mgr.	MSc
RNDr., PhDr.	no equiv.
CSc.	Ph.D.
DrSc.	DSc
Doc.	Assoc. Prof.
Ing.	Dipl.-Ing.

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5. Staff News

January

31.1.2002	RNDr. Edvín Pivec, CSc. (igneous petrology and mineralogy) left the Institute (retired)

February

1.2.2002	Mgr. Marek Vach, Ph.D. (environmental geochemistry) joined the Institute

March

1.3.2002	Hana Špirková (technician) joined the Institute

May

1.5.2002	RNDr. Miloš Lang, CSc. (petrology) joined the Institute

1.5.2002	RNDr. Edvín Pivec, CSc. (igneous petrology and mineralogy) joined the Institute
June	
17.6.2002	Mgr. Martin Chadima (accomplished the civil military service)
30.6.2002	PhDr. Liljana Peza (librarian) left the Institute
30.6.2002	Mgr. Jana Štěpánková, Ph.D. (paleomagnetism) left the Institute
30.6.2002	Mgr. Jana Svobodová, Ph.D. (igneous and metamorphic petrology, geochemistry) died
July	
1.7.2002	Mgr. Martin Chadima (geophysics, paleomagnetism) joined the Institute
1.7.2002	Bc. Stanislav Šlechta (accomplished the civil military service)
15.7.2002	Doc. RNDr. Luftulla Peza, DrSc. (Mesozoic molluscs) left the Institute (retired)
August	
1.8.2002	Lubomir Arandjelovič (computer specialist) joined the Institute
31.8.2002	Mgr. Petra Vítková (petrology) left the Institute
31.8.2002	Václav Javůrek (computer specialist) left the Institute
31.8.2002	RNDr. Edvín Pivec, CSc. (igneous petrology and mineralogy) left the Institute
Setpember	
1.9.2002	Mgr. Jiřina Dašková (Cenozoic palynology) joined the Institute
2.9.2002	Petr Záras (civil military service) joined the Institute
23.9.2002	Martin Horváth (civil military service) joined the Institute
24.9.2002	Mgr. Ondřej Zeman (hydrogeology) joined the Institute
25.9.2002	Lenka Kulhavá (librarian) joined the Institute
25.9.2002	Prof. RNDr. Jiří Pešek, DrSc. (coal geology, basin analysis) joined the Institute
October	
1.10.2002	Bc. Stanislav Šlechta (geophysics) joined the Institute
1.10.2002	RNDr. Edvín Pivec, CSc. (igneous petrology and mineralogy) joined the Institute
November	
18.11.2002	Mgr. Petr Schnabl (civil military service) joined the Institute
December	
31.12.2002	Zdena Pekárková (charlady) left the Institute
31.12.2002	RNDr. Edvín Pivec, CSc. (igneous petrology and mineralogy) 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:

Bek J.: *Evolution of Palaeozoic spores*. Undergraduate course, Faculty of Science, Charles University, Prague.

Cílek V. & Zaslove J.: *History, language and landscape*. Summer Programme, Simon Fraser University, Vancouver, Canada.

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

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

Dašková J.: *Methods of the palaeontological research (part – Microscopic work, forms and applications)*. Undergraduate course, Faculty of Science, Charles University, Prague.

Dašková J.: *Systematic palaeontology (part – palaeobotany)*. Undergraduate course (practice). Faculty of Science, Charles University, Prague.

Dašková J.: *Systematic palaeontology for the teachers (part – micropalaeobotany)*. Undergraduate course, Faculty of Science, Charles University, Prague.

Hladil J. & Geršl M.: *Field course on carbonate facies in the Moravian Karst*. Open Graduate course, Faculty of Science, Masaryk University, Brno.

Hladil J. & Mišík M.: *Carbonates 2002 – paleosols, hardgrounds and firmgrounds*. Open Graduate course, Faculty of Science, Masaryk University, Brno.

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

Hladil J.: *Carbonate microfacies*. Undergraduate course – partly combined with Carbonates 2002 Brno, Faculty of Science, Charles University, Praha.

Kadlec J.: *Causes and consequences of Quaternary climatic changes*. Graduate and Postgraduate course, Faculty of Science, Charles University, Prague.

Kadlec J.: *Geology of the Quaternary*. Undergraduate course, Faculty of Science, Charles University, Prague.

Kadlec J.: *Quaternary climate*. Graduate and Postgraduate course, Faculty of Science, Masaryk University, Brno.

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

Mikuláš R.: *Ichnofacies*. Palaeontologic colloquium, Undergraduate and Graduate course, Faculty of Science, Charles University, Prague.

Mikuláš R.: *Ichnofossils. In:* Martínek K.: *Sedimentary Geology.* Undergraduate course, Faculty of Science, Charles University, Prague.

Němečková M.: Course of Geological Survey, Undergraduate course (practice), Masaryk University, Faculty of Science, Brno.

Roček Z., Švátora M. & Exnerová A.: *Morphology of animals*. Undergraduate course, Faculty of Science, Charles University, Prague.

Roček Z., Švátora M., Exnerová A. & al.: *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.: *Review of fossil vertebrates*. Undergraduate course, Biological Faculty, South-Bohemian University, České Budějovice.

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

Sokol J. & **Cílek V.**: *Prague as the living history*. CERGE-UPCES Programme with coordination of Faculty of Humanities, Charles University, Prague.

Uchman A. & **Mikuláš R.**: *Short Course in Ichnology*. Undergraduate and Postgraduate course - practice, Faculty of Science. Palacký University, Olomouc.

Ulrych J.: *Interpretation of Mineralogical Data.* Graduate course, Faculty of Science, Charles University, Prague.

Ulrych J.: *Special Mineralogy.* Graduate course, Technological Faculty of the Technical University, Prague.

Vach M.: *Air Protection.* Undergraduate course (selected lectures), Faculty of Forestry, Czech Agricultural University, Prague.

Vach M.: *Chemistry of the Environment.* Undergraduate course (and practice), Faculty of Forestry, Czech Agricultural University, Prague.

Žigová A.: *Geography of soils and protection soil resources of the Czech Republic.* Undergraduate course, Faculty of Science, Charles University, Prague.

Supervision in Undergraduate Studies

Beran L. (MSc. thesis), Department of systematic zoology, Faculty of Science, Charles University, Prague (*supervisor* ***V. Ložek***)

Brůna J. (MSc. thesis), Faculty of Science, Masaryk University, Brno (*supervisor* ***Z. Roček***)

Charvátová K. (MSc. thesis), Faculty of Science, Masaryk University, Brno (*supervisor* ***J. Hladil***)

Danko P. (MSc. thesis), Faculty of Science, Charles University, Prague (*supervisor* ***Z. Roček***)

Ferbar P. (MSc. thesis), Faculty of Science, Masaryk University, Brno (*supervisor R. Melichar, co-supervisor* ***P. Štorch***)

Goldbachová J. (MSc. thesis), Faculty of Forestry, Czech Agricultural University, Prague (*supervisor* ***M. Vach***)

Horvátová L. (MSc. thesis), Faculty of Science, Charles University Prague (*supervisor M. Mihaljevič and* ***T. Navrátil***)

Hubačík M. (MSc. thesis), Faculty of Science, Masaryk University, Brno (*supervisor R. Melichar and co-supervisor* ***J. Hladil***) – stopped in 2002.

Jambor P. (MSc. thesis), Faculty of Science, Charles University, Prague (*supervisor* ***Z. Roček***)

Janečka J. (MSc. thesis), Faculty of Science, Masaryk University, Brno (*supervisor R. Melichar and co-supervisor* ***P. Štorch***)

Kubínová P. (MSc. thesis), Faculty of Forestry, Czech Agricultural University, Prague (*supervisor* ***M. Vach***)

Majorová H. (MSc. thesis), Faculty of Science, Charles University, Prague (*supervisor* ***Z. Roček***)

Mühldorf, J. (MSc. Thesis), Faculty of Science, Charles University, Prague (*supervisor* ***J. Kadlec***)

Ondráček P. (MSc. thesis), Faculty of Science, Charles University (*supervisor P. Kraft*, *co-supervisor* ***J. Zajíc***)

Rudolfová J. (MSc. thesis), Faculty of Science, Charles University, Prague (*supervisor* ***Z. Roček***)

Sazamová L. (MSc. thesis), Faculty of Forestry, Czech Agricultural University, Prague (*supervisor* ***M. Vach***)

Špičková J. (MSc. thesis), Faculty of Science, Charles University Prague (*supervisor* ***I. Dobešová***)

Stehlík F. (BSc. Thesis), Faculty of Science, Charles University, Prague (*supervisor* ***J. Kadlec***)

Štolfová K. (MSc. thesis), Faculty of Science, Charles University, Prague (*supervisor K. Martínek and* ***R. Mikuláš***)

Zahradníček O. (MSc. thesis), Faculty of Science, Charles University, Prague (*supervisor* ***Z. Roček***)

Supervision in Graduate Studies

Baroň I. (Ph.D. thesis), Faculty of Science, Masaryk University, Brno (*supervisor* ***V. Cílek***)

Černý R. (Ph.D. thesis), Faculty of Science, Charles University, Prague (*supervisor* ***Z. Roček***)

Dašková J. (Ph.D. thesis), Faculty of Science, Charles University, Prague (*supervisor Z. Kvaček and* ***M. Konzalová***)

Drábková J. (Ph.D. thesis), Faculty of Science, Charles University, Prague (*supervisor O. Fatka and* ***J. Bek***)

Drahota P. (Ph.D. thesis), Faculty of Science, Charles University, Prague (*supervisor Z. Pertold and* ***P. Skřivan***).

Ekrt B. (Ph.D. thesis), Faculty of Science, Charles University (*supervisor O. Fejfar*, *co-supervisor* ***J. Zajíc***)
Geršl M. (Ph.D. thesis), Faculty of Science, Masaryk University, Brno (*supervisor* ***J. Hladil***)
Gilíková H. (Ph.D. thesis), Faculty of Science, Masaryk University, Brno (*supervisor* ***J. Hladil*** *and co-supervisors/advisors* ***F. Patočka*** *and J. Leichmann*)
Havelková P. (Ph.D. thesis), Biological Faculty, South Bohemian University, České Budějovice (*supervisor* ***Z. Roček***)
Hlaváč J. (Ph.D. thesis), Institute of Geology and Palaeontology, Faculty of Science, Charles University, Prague (*co-supervisors* ***V. Ložek*** *and* ***V. Cílek****)*
Juřičková J. (Ph.D. thesis), Department of systematic zoology, Faculty of Science, Charles University, Prague (*supervisor* ***V. Ložek***)
Královec K. (Ph.D. thesis), Faculty of Science, Charles University, Prague (*supervisor* ***Z. Roček***)
Kvítková L. (Ph.D. thesis), Faculty of Science, Masaryk University, Brno (*co-supervisor* ***E. Růžičková***)
Navrátil T. (Ph.D. thesis), Faculty of Science, Charles University, Prague (*supervisor E. Jelínek and* ***P. Skřivan***)
Němečková M. (Ph.D. thesis), Faculty of Science, Masaryk University, Brno (*external supervisor* ***F. Patočka***)
Slepičková-Štěpánková J. (Ph.D. thesis), Faculty of Science, Charles University, Prague (*co-supervisor* ***P. Pruner***)
Štorc R. (Ph.D. thesis), Faculty of Science, Charles University, Prague (*co-supervisor* ***J. Žítt***)
Strnad L. (Ph.D. thesis), Faculty of Science, Charles University, Praha (*supervisor P. Jakeš and co-supervisor/advisor* ***J. Hladil***)
Trbušek J. (Ph.D. thesis), Moravian museum, Olomouc (*supervisor* ***Z. Roček***)
Vařilová Z. (Ph.D. thesis), Faculty of Science, Charles University, Prague (*supervisor* ***V. Cílek***)

Membership in academic boards at Universities

RNDr. Pavel Bosák, DrSc. – Member of Scientifc Board, Faculty of Science, Masaryk University, Brno; Member, Board of Graduate Studies in Geology, Faculty of Science, Charles University, Prague; Member, Board for Interdisciplinary study of Quaternary at the Board of Graduate Studies in Geology, Faculty of Science, Masaryk University, Brno.
RNDr. Václav Cílek, CSc. – Member of the Board of Graduate Studies in Geology, Faculty of Science, Masaryk University, Brno; Member of the Scientific Board, Faculty of Humanistic Studies, Charles University, Prague.
Mgr. Jiřina Dašková – Member of the Academic Senate, Faculty of Science, 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.
RNDr. Jaroslav Kadlec, Dr. – Member of the Board of Undergraduate and Graduate Studies in Geology, Faculty of Science, Charles University, Prague.
RNDr. František Patočka, DrSc. – Member of the Board of Graduate Studies in Geology, Faculty of Science, Charles University, Prague and Faculty of Science, Masaryk University, Brno.
Ing. Petr Pruner, DrSc. – Member of the Board of Graduate Studies in Geophysics, Faculty of Science, Charles University, Prague.
Doc. RNDr. Zbyněk Roček, DrSc. – Member of the Board of Graduate Studies in Zoology, Faculty of Science, Charles University, Prague.
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.

Doc. RNDr. Jaromír Ulrych, DrSc. – Member of two independent Boards of Graduate Studies in Mineralogy and Geochemistry, Faculty of Science, Charles University, Prague; Member of the Habilitation Commission of Faculty of Science, Charles University, Prague.
RNDr. Anna Žigová, CSc. – Member of the Board of Graduate Studies in Physical Geography, Charles University, Prague.

Degrees obtained by the staff of the Institute of Geology AS CR

Ph.D.

Mgr. Marek Vach: *The modeling of atmospheric boundary layer in the area of anemo-orographic system in the Krkonoše Mountains (in Czech)*. Institute of Applied Ecology, Faculty of Forestry, Czech Agricultural University, Prague (May, 2002)

7. Positions in International Organizations and Editorial Boards

Bek J.: Councillor of the Organization of Czech and Slovak palynologists, since 1994.
Bek J.: Vice-President of the International Federation of Palynological Societies, since 2001.
Bosák P.: Secretary General, the International Union of Speleology,since 1993, re-elected 1993, 1997.
Bosák P.: Member, the Commission on Paleokarst and Speleochronology, the International Speleological Union, since 1986.
Bosák P.: Member, the Commission for Physico-Chemistry and Hydrogeology of Karst, the International Speleological Union, since 1978.

Cílek V.: National representative, Past Global Changes: Pole-Equator-Pole III profile. UN project, since 1993.
Galle A.: Czech representative of the IPA, International Paleontological Association.
Hladil J.: Corresponding Member of the SDS, Subcommission on Devonian Stratigraphy of IUGS, since 1993.
Hladil J.: Voted Council Member and Representative of Europe-III Group of Countries, IASFCP, the International Association for Study of Fossil Cnidaria and Porifera, since 1995.
Hladil J.: Voted Secretary of the CzNC IGCP, International Geological Correlation Programme, since 1994.
Kadlec J.: The IGBP - Core Project 7: Past Global Changes: Coordinator for the Czech Republic
Ložek V.: Foreign Member, Polish Academy of Arts and Sciences.
Melka K.: Czech/Slovak Representative, ECGA, the European Clay Groups Association, since 1991.
Melka K.: Liaison officer, AIPEA, Association Internationale pour l‘ Etude des Argiles, since 1995.
Mikuláš R.: Member of the Working group on Treatise on Invertebrate Paleontology, Trace Fossils, since 2000.
Roček Z.: Member of Executive Committee of the International Society of Vertebrate Morphologists, since 2001.
Roček Z.: Member of the Executive Committee of the World Congress of Herpetology, since 1994.
Roček Z.: Member of the Finacial Advisory Committee, WCH, World Congress of Herpetology, since 2002.
Roček Z.: Member of the International Herpetological Committee, since 1989.
Růžičková E.: Corresponding member of COGEOENVIRONMENT, since 1992 (Commission on Geol. Sciences for Environmental Planning).
Růžičková E.: Member of IGBP National Committee, since 1993.
Siblík M.: Corresponding Member of the Subcommission of Triassic Stratigraphy of the IUGS, since 1999.
Slavík L.: Corresponding Member of the SDS, Subcommission on Devonian Stratigraphy of IUGS, since 1999.

Štorch P.: Corresponding Member of the SSS, Subcommission on Silurian Stratigraphy of IUGS, since 1992.
Svojtka M.: Geochemical Society Member (The Geochemical Society,Washington University), since 2002.

Editorial Boards

Bosák P.: *Geologica Carpathica* (co-editor, impacted journal of the Carpatho-Balkanian Association, Geological Institute, Slovak Academy of Sciences, Bratislava, since 2000).
Bosák P.: *International Journal of Speleology* (member of Advisory Board, international journal, published by Societa Speleologica Italiana, L'Aquilla, Italy, since 1994).
Bosák P.: *UIS Bulletin* (Editor-in-Chief, information bulletin of the International Union of Speleology, Prague, Czech Republic, since 1993).
Bosák P.: *Theoretical and Applied Karstology* (member of editorial board, Institutul de Speologie „Emil Rakovita", Bucuresti, Romania, since 2000).
Bosák P.: *Geologos* (member of editorial board, Wydzial Geologii, Uniwersytet Adama Mickiewicza, Poznań, Poland, since 2000).
Bosák P.: *Český kras (Beroun)* (co-editor, regional journal published by the Museum of the Bohemian Karst in Beroun, Czech Republic, since 1976).
Bosák P.: *Speleo (Praha)* (member of editorial board, society bulletin published by the Czech Speleological Society, Prague, Czech Republic, since 1990).
Bosák P.: *Speleofórum* (co-editor, Czech Speleological Society, Prague, Czech Republic, since 1998).
Cílek V.: *Encyclopaedia of Life Support Systems,* HTE-Honorary Theme Editor, UNESCO, Theme 1.1.: Earth System: History and Natural Variability.
Cílek V.: *Slovenský kras* (Liptovský Mikuláš, Slovakia), Member of Editorial Board, since 2000.
Hladil J.: *Geologica Carpathica*, Bratislava, Member of Editorial Board and Scientific Board.
Kadlec J.: *Geolines* (Institute of Geology, AS CR), Editor-in-Chief.
Ložek V.: *Studia Quarternaria*, Kraków, Poland, Member of Editorial Board, since 1999
Melka K.: *Clay Minerals*, Journal of the European Clay Groups, London, Member of Editorial Board, since 1999.
Mikuláš R.: *Geolines* (Institute of Geology, AS CR), Member of Editorial Board.
Patočka F.: *Geolines* (Institute of Geology, AS CR), Member of Editorial Board.
Patočka F.: *Geologia Sudetica* (Wroclaw, Poland), Member of Editorial Board, since 1997.
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.: *Živa* (AS CR Prague), Member of Editorial Board, since 1995.
Štorch P.: *Bulletin of the Czech Geological Survey*, Prague, Member of Editorial Board.
Štorch P.: *Journal of the Czech Geological Society*, Prague, Member of Editorial Board.
Štorch P.: *Geolines* (Institute of Geology, AS CR), Member of Editorial Board.
Štorch P.: *Geological Journal*, Liverpool, Manchester, Associated editor, since 1993.
Štorch P.: *Newsletters on Stratigraphy*, Berlin, Stuttgart, Associated editor, since 1999.
Svojtka M.: *Acta Universitatis Carolinae, Geologica* (Charles University, Prague), Member of Editorial Board.
Svojtka M.: *Geolines* (Institute of Geology, AS CR), Member of Editorial Board.
Zajíc J.: *Bulletin of the Czech Geological Survey*, Prague, Member of Editorial Board, since 2001.

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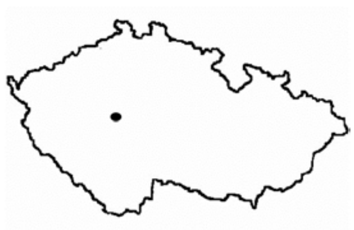
8. List of Grants and Projects undertaken in the Institute of Geology

Foreign Grants and Joint Projects

EMOZMID (Elemental mobility in the oxidation zone of mineral deposits in temperate zone climatic conditions of Central Europe) Rio Tinto Technology Development Ltd. (RTTD) project (No. 79-502 881) (*Project leader Z. Pertold, Institute of Geochemistry Mineralogy and Mineral Resources, Faculty of Science, Charles University, Prague, Czech Republic)*

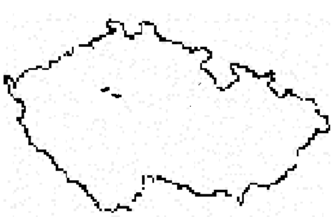
Subproject: Arsenic bound in contaminated soils at the Mokrsko gold deposit, Bohemian Massif (CZ) ***(M. Filippi*)**



The secondary mineralisation, soil pH and other selected soil parametres were studied in natural and anthropogenic soils and sediments. The use of heavy fluid separation for concentration of secondary arsenic phases was found to be suitable for further detailed mineralogical investigation. Species already known from previous research were confirmed and separated in significant amounts (pharmacosiderites, arseniosiderite, scorodite, Fe-oxyhydroxides) and some previously unknown mineral species were identified (jarosite, pharmacosiderite, two types of goethite and numerous forms of other Fe-oxyhydroxides). Secondary arsenic mineralogy is clearly different in profiles studied above different types of bedrock. The X-ray powder diffraction analyses of heavy concentrates (fractions >2.81 g.cm^{-3}) combined with monocrystal X-ray method (used on separated grains) showed distinct differences in secondary minerals content and character. It has been shown that amounts of secondary minerals differ in individual horizons, mostly in dependence on: (1) presence of relicts of primary ore minerals; (2) lateral migration of As-rich solutions. Generally, arsenic was most often found in Fe-oxyhydroxides (mainly in goethites) in profiles above volcanosedimentary rocks and in the profile from forested area above granodiorite, and in pharmacosiderite and arseniosiderite, less in scorodite and goethite in profiles above granodiorite bedrock.

Grant of the Fulbright Association, U.S.A.

Microvertebrates of the Bohemian Cretaceous Basin (***Jeffrey G. Eaton,*** *Fulbright fellow at the Institute of Geology, AS CR*)



The nonmarine to brackish interval within the Peruc-Korycany Formation (in the Peruc and Korycany members) of late Cenomanian (Cretaceous) age in Bohemia is famous for its fossil plants but no vertebrates have been recovered from this interval. In September, 2002, I initiated a project to carefully screen wash test samples from seven localities and many horizons within the Peruc–Korycany Formation (with the help of Dr. David Uličný and Dr. Lenka Špičáková of the Geophysical Institute, Czech Academy of Sciences). We preferentially sampled very fine-grained units that evidenced some organic preservation, mostly muddy deposits occurring either as channel fills or floodplain stratal units. These samples were disaggregated using dilute hydrogen peroxide. The disaggregated matrix was wet processed through nested sieves of 2 mm and 0.6 mm diameter wire cloth. Although beautifully preserved bits of plants, including charred fragments and leaf cuticle were recovered, there was no evidence of bone (phosphatic materials) or invertebrate skeletal materials (calcium carbonate). Although the vertebrates and invertebrates must have thrived in these well-vegetated flood plains and swamps, it is likely that their skeletons were dissolved as a result of the acidity of the soils, the high ground water table, and slow depositional rates. During the spring of 2003, we will look for other environments that may be more favorable to the preservation of vertebrates in the Cretaceous sequences of Bohemia.

American Chemical Society, The Petroleum Research Fund: Re-evaluation of mid-Paleozoic strata in southern Peru in context of Late Devonian Gondwanan glaciation (*P.E. Isaacson, Geological Department, University of Idaho, Moscow, E. Díaz Martínez, Departmento de Estratigrafia, Facultad de Ciencias Geologicas, Universidad complutense de Madrid, Madrid,* ***M. Vavrdová*** *&* ***J. Bek***)

Subproject: Palynology of selected sections in Western Gondwana (***M. Vavrdová*** *&* ***J. Bek***)

Favourably to moderately well-preserved palynomorphs were reviewed from several stratigraphic sections in the Tarija-Titicaca and Madre de Dios basins, Bolivia. Glacial influence of these basins has been documented.. Palynological residues yielded both plant microfossils indigenous to the Malvinokaffric Realm and cosmopolitan species, which allow long-distance age correlation. Microfossils of marine origin prevail in Silurian and Early Devonian (Lochkovian–Pragian) palynospectra. Middle to Late Devonian assemblages have conspicuous palynomorphs of terrestrial origin (dispersed miospores and fragmented plant debris), and they are mixed with marine palynomorphs, including *Umbellasphaeridicum saharicum.* Palynomorphs assmeblages of Early Devonian age are supplemented by independent biostratigraphic control of chitinozoan populations. Provincialism in the distribution pattern of palynomorphs of marine provenance and apparentl uniformity of the coeval continental paleofloral record are remarkable..

Grant project of University College of Cape Breton, Sydney, Canada: In situ pecopterid microspores from near the Westphalian D-Cantabrian boundary in Sydney Coalfield, Nova Scotia, Canada (*leader: E. L. Zodrow, Centre for Natural History, University College of Cape Breton, Sydney, Canada,* ***J. Bek****, J. Pšenička, West-Bohemian Museum, Pilsen, Ch. Cleal, National Museums and Galleries of Wales, Department of Biodiversity, Cathays Park, Cardiff, UK & A.R. Hemsley, Laboratory for experimental Palynology, Department of Earth Sciences, Cardiff University, UK*)

Subproject: Tree ferns at Point Aconi, Sydney Coalfield: Evidence from variability of microspores (***J. Bek***)

Sydneia manleyi gen. et sp. nov. is based on part of a fertile frond from the upper Westphalian D of the Sydney Coalfield, Nova Scotia, Canada. It has small synangia composed of laterally-fused sporangia that are elongate and with a circular cross section. The sporangia yielded variably sized monolete and trilete spores with laevigate and microspinate ornamentation; intermediate forms were also observed. The spores can be correlated with the sporae dispersae species *Latosporites minutus*, *Punctatosporites oculus*, and *Laevigatosporites minimus*. Size distribution of the spores is variable and highly skewed, suggesting heterogeneity of the spores within the sporangium. Spore ultrastructure indicates that the fossil is part of a fern, and the morphology of the spores and synangia indicate marattialean affinities. From 150 samples of fertile fronds of marattialean plants from Sydney Coalfield, Nova Scotia, almost 100 specimens yielded in situ spores. Ferns are divided into several categories accoding to their morphology and in situ spores. Some new species are proposed. *Polymorpha*-Group yielded spores of the *Cyclogranisporites*-type, *Miltonii*-Group possesses spores of the *Verrucosisporites-Cyclogranisporites*-type, *Arborescens*-Group produced the smallest monolete, scabrate spores of the *Laevigatosporites-Latosporites-Punctatosporites*-type. *Plumosa*-Group contains spores of the *Raistrickia*-type.

Programme of the European Scientific Foundation

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

The flora of the roof of the main lignite seam has been studied in the North Bohemian Lignite Basin at Bílina. This flora is rich in macro- & microremains, contains numerous SE Asian & N American elements.Various plant organs are present The vegetation is azonal, like the main part of the fossil vegetations of the Most Basin, influenced by the high level of groundwater as well as surface water during the flooding of the vegetation cover. Vegetation is also attributable to the floristic complex of Bílina-Brandis, and finally, main part of the original vegetation has been formed by the *Nyssa-Taxodium* association.

Working Group of the Treatise on Invertebrate Paleontology, Part W, Trace Fossils

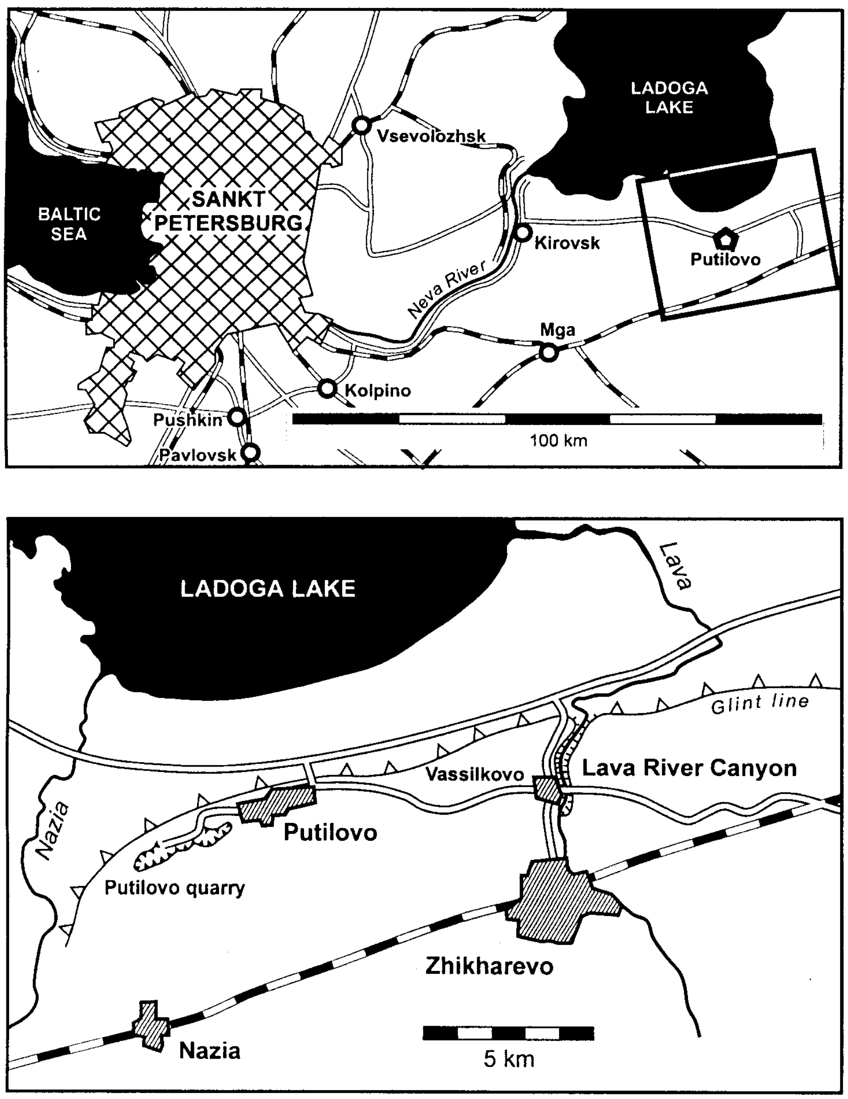
Subproject: Names for traces: a uniform *approach (M. Bertling, Geologisch-Paläontologisches Institut, Universität Münster; S. Braddy, Department of Earth Sciences, University of Bristol, R.G. Bromley, K.S.S. Nielsen, Geologisk Institut, København Universitet; G.D. Demathieu, Centre des Sciences de la Terre, Université de Bourgogne, Dijon,* ***R. Mikuláš****, J.K. Nielsen, Geologisk Museum, København; A. K. Rindsberg, Geological Survey of Alabama; M. Schlirf, Institut für Paläontologie, Würzburg & A. Uchman, Geologiczny Institut, Jagiellonian University, Kraków).*

The taxonomic treatment of trace fossils needs a uniform approach, independent of the ethologic groups concerned. To this aim, *trace fossils* are rigorously defined with regard to biological taxa and physical sedimentary structures. Potential ichnotaxobases are evaluated, with morphology resulting as the most important criterion. For traces of bioerosion and herbivory as well as for coprolites, substrate plays a key role. Size, producer, age, facies and preservation are rejected as ichnotaxobases. Separate names for undertracks and other poorly preserved material are gradually to be replaced by ichnotaxa based on well-preserved specimens. Modern traces may be identified using established trace-fossil taxa but new names can only be based on fossil material, even if the distinction between modern and fossil frequently must remain arbitrary. It must be stressed that ichnotaxa may not be incorporated into biological taxa in systematics. Composite trace fossil structures (complex structures made by different species) have no ichnotaxonomic standing but compound traces (complex structures made by one individual tracemaker) may be named separately under certain provisions. The following emendations are proposed to the "International Code of Zoological Nomenclature": Ichnofamilies must be typified, and ichnotaxa should be based solely on trace fossils as defined herein.

Czech-Russian Joint Project: Bilateral cooperation between Department of Historical Geology, St Petersburg State University and Laboratory of Palaeobiology and Palaeoecology, Institute of Geology AS CR Prague

Stratigraphy, sequence stratigraphy and paleontology of the Ordovician of the Baltoscandian Region
(A.V. Dronov, St. Petersburg State University & ***R. Mikuláš****)*

Ichnofabric (bioturbation and bioerosion) patterns show a conspicuous symmetry across the Volkhov depositional sequence, Ordivician of the St. Petersburg region) This fact suggests a close relationship between the ichnofabric and the sea-level change. Biodetrital limestones interpreted as calcareous tempestites show evidence of relatively deep bioturbation (ca. 15 cm); both depth and intensity are high. The ichnogenera *Thalassinoides*, *Chondrites*, *Paleophycus*, *? Dolopichnus*, *Trypanites*, *Gastrochaenolites* and *Planolites* contribute for the most part to the overall substrate disturbance. Intensive deep bioturbation and even bioerosion occurs in the studied area even below the recently re-interpreted Early/Middle Ordovician boundary. This observation suggests that diverse boring strategies and deep bioturbation, as well as other modern features (e.g., complex tiering, re-visiting of filled burrows) may appear first during the Early Ordovician in this region.



Location maps of the studied area in the Baltoscandian Region (R. Mikuláš).

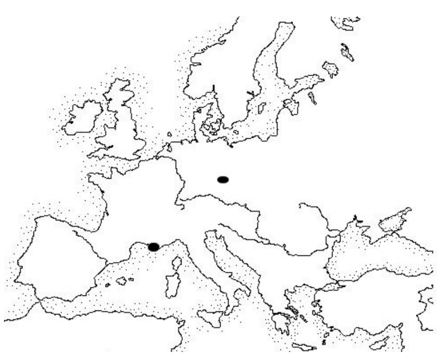
Czech-Austrian Joint Programme "KONTAKT" (Ministry of Education, Youth and Sports)
No. 2001-4: Classical Triassic and Liassic brachiopod localities in the UNESCO World Heritage area Hallstatt-Dachstein-Salzkammergut (***M. Siblík*** *& H. Lobitzer, Geologische Bundesanstalt, Wien)*

Grey Hallstatt Limestone at the locality of Taubenkogel near Gosau yielded frequent specimens of *Norella geyeri* (Bittn.) and *Austriellula nux* (Suess), both proving Upper Norian age of the locality. The Mitterwand (Dürrenalpe) area SW of Hallstatt offers good possibilities to sample Lower and Middle Jurassic brachiopods. As to the Middle Jurassic fauna, the sampling sites here yield neither very numerous nor extremely well-preserved brachiopod specimens, ammonites are practically absent. Middle Jurassic rocks found on Mitterwand at the present days are different from those of the typical ammonite-bearing, red micritic "Klausschichten" at the near former classical locality at Klausalpe, being usually greyish and reddish biosparites with Mn enrichment. A series of minor brachiopod occurrences of Lower and Middle Jurassic age has been ascertained during our field works in the Mitterwand area, thus well documenting the Schäffer´s conception (1975) of a megabreccia building this part of the Hallstatt area. Among new finds of Middle Jurassic brachiopods on the Mitterwand, the following characteristic species should be mentioned: *Septocrurella* (?) *defluxa* (Opp.), *Apringia atla* (Opp.), *Striirhynchia subechinata* (Opp.), *Striirhynchia berchta* (Opp.), *Capillirhynchia brentoniaca* (Opp.), *Karadagithyris gerda* (Opp.) and *"Terebratula" fylgia* Opp. They all give evidence of the Bajocian–Bathonian age of the sampling sites.

Czech-Austrian Joint Programme "KONTAKT" (Ministry of Education, Youth and Sports)
No. 2002-5: Paleoenvironment and biostratigraphy of the classical Gosau Group within the Hallstatt-Dachstein-Salzkammergut UNESCO World Heritage Site (***M. Svobodová,*** *H. Lobitzer, Geologische Bundesanstalt Wien, L. Hradecká & L. Švábenická, Czech Geological Survey, Prague)*

Paleoenvironmental and biostratigraphical investigations (based on palynomorphs, foraminifers, and calcareous nannofossils) were carried out on marlstone samples from the classical localities Eisenbach-Gosau near Traunsee (Turonian) and Hofergraben in Gosau (Late Coniacian-Early Santonian age; Northern Calcareous Alps, Upper Austria).

Bilateral cooperation between the Institute of Geology AS CR and the Centre de Paleontologie stratigraphique et Paléoécologie, CNRS, Université Claude-Bernard, Lyon
Project: Diversification of Normapolles during the Cenomanian and Turonian: An example from Bohemian-Saxonian Basin and SE France (*H. Méon, G. Guignard****,*** *Centre de Paleontologie stratigraphique et Paléoécologie, CNRS, Université Claude-Bernard, Lyonn &* ***M. Svobodová****)*



Fossil angiosperm group known as Normapolles appeared in the late middle Cenomanian and continued up to the Eocene. They are characterized by complex germinals. The rise and dispersal of the first Normapolles genera – *Atlantopollis* and *Complexiopolli* – was documented during the Late Middle Cenomanian in marginal marine environment in the boreholes Louny (Ln-1), Vrbno nad Lesy (Vl-1) and outcrops – a part of the Pecínov quarry (Czech Republic) and Loudan (Vienne Department, western France). Three primitive types of genus *Complexiopollis* and one type of *Atlantopollis* were found in the middle part of *jukes-brownei* Zone. While the Normapolles pollen in the sediments of the Cenomanian and Lower Turonian of the Bohemian Cretaceous Basin (outcrops Karlov, Velim, Markovice), are mostly very rare, Normapolles in France are abundant and more diverse (Vergons). During the Middle Turonian some new taxa as *Trudopollis, Vacuopollis* appear and this trend is more striking in the Upper Turonian (outrops Úpohlavy and Marignac). Differences existing between Bohemian Cretaceous Basin and localities from the southeastern France are most probably caused by provincialism and facies differences.

Grant for bilateral cooperation between Japan and foreign country, 2001–2003 of the Japan Society for the Promotion of Science, Project leader T. Hirajima & M. Obata, T. Mori, Y. Hiroi, Kyoto University, Japan & ***M. Svojtka***)
Project: The root zone dynamics under the continent collision zone. The role of crustal melting at extremely high pressure and high temperature conditions (***M. Svojtka***)

Fission-track (FT) dating of accessory minerals such as zircon is a useful tool for determining ages of a variety of geological processes including exhumation and cooling of metamorphic and igneous rocks, and for sedimentary provenance studies.
We present results of zircons from high-grade metamorphic rocks and associated granites from the Moldanubian Zone in the Bohemian Massif. A broad, unimodal distribution and a negative skewness characterize the track length histogram of granulite gneisses, with a peak around 11 µm. This type of distribution is interpreted in terms of slow cooling through the partial annealing zone. Thus the FT zircon age of this sample, 241 ± 12 Ma, is approximately interpreted to be the time of cooling through the zircon. In contrast, the track length histogram in granites shows a broad, unimodal distribution and a positive skewness, with a peak around 8 µm. This type of distribution is interpreted in terms of recent reheating up to the partial annealing zone followed by relatively short-term residence in the total stability zone. Therefore, the observed age of granites, 216 ± 14 Ma, is probably a mixture of two ages, i.e., time of initial cooling and reheating (and subsequent cooling) events. As a result, the age merely gives an older limit of the time of reheating. A possible thermal source of this reheating episode is probably Alpine orogenic cycle (ca. 60–20 Ma, Middle Alpine orogenic cycle), which affects mainly the southern parts of the Bohemian Massif.

Joint project of the Polish Academy of Sciences and the Academy of Sciences of the Czech Republic
Project: Study of eclogite–granulite series of Rychleby and Złote Mts. focused on signs of UHP metamorphism (*Project leaders* ***J. Fiala*** *& N. Bakun-Czubarow, Institute of Geological Sciences, PAN, Warszawa*)

Separated rutile fractions of five eclogite samples from the Orlica-Snieznik dome and the Kamienec Zabkowicki unit were examined for possibility of use as datable minerals by U-Pb methods. The very low primary U contents, however, did not allow this use, the radiogenic Pb contents being below the detection limits of the mass-spectrometric method.

Czech-French Joint Project KONTAKT, Ministry of Education, Youth and Sports CR, Program „BARRANDE“ No. 2001-002-1(-2): From crystalline massif to a pebble in (meta)conglomerate: dating by Ar-Ar method in low-strain domains (Datations Ar-Ar de zones protégées diverses l'echelles: du massif au galet) (2001-2002) *(H. Maluski, Lab. de Géochronologie CNRS-UMR, Montpellier, France**, F. Patočka** & V. Kachlík, Faculty of Science, Charles University, Prague)*

Subproject: Granitoid gneisses with relict orbicular granitoids from the Varied Group of the southern Bohemian Massif Moldanubicum: protolith derived from melting of Archaean crust? *(**F. Patočka**, V. Kachlík, Faculty of Science, Charles University, Prague, J. Dostal, St. Mary's University, Halifax, Canada & J. Frána, Institute of Nuclear Physics, Řež, AS CR)*

Amphibolite facies granitoid gneisses with relicts of orbicular granitoids occur as tectonic slivers in metasedimentary sequence of the Varied Group of the Moldanubicum of the southern Bohemian Massif. Magmatic age of the granitoid gneisses was dated by U-Pb method on zircons at ca. 2.1 Ga. Rocks similar to the studied granitoid gneisses as regards mineral composition, protolith age and tectonostratigraphic position appear in rare relicts throughout the Variscan Belt of Europe – e.g., granitoid gneisses in the Icartian basement of the Armorican Massif. The granitoid gneisses correspond to quartz diorites, tonalites and granodiorites in mineral composition. The orbicular granitoids (orbicular tonalities to granodiorites) consist of ellipsoidal orbicules and rather heterogeneous matrix which is ranging in composition and texture from biotite gneiss to granodiorite–tonalite(±aplite). The orbicular granitoids show either none or very weak deformation, and may be interpreted as extremely rare low-strain domains preserved within the granitoid gneiss body. The granitoid gneisses and orbicular granitoids represent chemically uniform group of rocks as evidenced by contents of lanthanides and less mobile trace elements (e.g., Th, Nb, Zr and Y). The REE distributions of the studied samples are characterized by very steep patterns given by advanced LREE/HREE fractionation (La_N/Lu_N ~ 18-32), significant HREE-depletion (Yb_N < 8) together with substantial internal fractionation of heavy lanthanides (Gd_N/Lu_N ~ 2-3), and absence of Eu-anomaly (Eu/Eu* ~ 0.9-1.1). The rocks are depleted in Th (< 10 ppm), Nb (~ 7 ppm) and Y (~ 12 ppm), and slightly enriched in Sc (~ 5-10 ppm) in a comparison with vast majority of granitoids of the Bohemian Massif. The ORG-normalized trace element compositions of the granitoid gneisses and orbicular granitoids are similar to modern volcanic arc/active continental margin granitoids. The granitoid gneisses were classified as I-type granitoids also as regards Nd-isotopes, the $\varepsilon_{Nd(T)}$ value of –25 obtained for the granitoid gneisses corresponds to DM model age of ca. 3 Ga, and proves that the granitoid gneiss protolith was presumably derived from melting of Archaean crust. The chemical features of the granitoid gneisses and orbicular granitoids correspond to pricipal characteristics of TTG (tonalite-trondhjemite-granodiorite) suites of pre-2.5 Ga high-grade complexes composing most of the crust of presumed Archaean age. This chemical inheritance seems to prove a substantial involvement of the Archaean TTG suite during the magmatic origin. The early Proterozoic intrusion of the protolith may be associated with convergences and collisions of island arc-continent and continent-continent types during the Eburnean orogeny of West Gondwana.

Czech-Italian Joint Project KONTAKT, Ministry of Education, Youth and Sports CR, No. 23 – ES 1. Fossils as time indicators: Integrated conodont-graptolite biostratigraphy of selected Lower Paleozoic sections of Czech Republic (Barrandian area) and Italy (Carnic Alps and Sardinia) *(**P. Štorch, L. Slavík**, E. Serpagli & A.-L. Feretti, University of Modena, Italy)*

Numerous graptoloid specimens have been identified in a large olistolith of Silurian black shales and lydites situated within the Culm-type Hercynian Sulcis flysch complex of SW Sardinia. The graptolite fauna discovered at Punta S´Omu de Is Abis (Sulcis area) is attributable to the middle *spiralis* – lower *lapworthi* biozones of the uppermost Llandovery. Of nine species recorded, *Stomatograptus grandis*, *Monoclimacis geinitzi, Diversograptus*

ramosus, Cyrtograptus lapworthi ?, *Oktavites excentricus* and "*Monograptus*" aff. *nodifer* have been recognized for the first time in Italy. Using the specimens from Punta S´Omu de Is Abis and topotypic material from Bohemia, *Stomatograptus grandis* (Suess 1851) was revised and its stratigraphical range re-evalued.
Rich and diversified graptolite faunas of the *linnaei* and *turriculatus* biozones, composed of 27 species, were discovered at Sedda de S`Ortis and Cungiareddu in Gerrei area of southern-central Sardinia. Several successive graptolite assemblages with considerable Bohemian affinities have been encountered including that of the basal *runcinatus-gemmatus* Subzone. Many graptolite taxa were recognized for the first time in Sardinia.

Czech-French Joint Project KONTAKT, Ministry of Education, Youth and Sports CR, Program "BARRANDE" No. 2001-032-1(-2): Plate-tectonic movements and paleoclimatological changes recorded in Lower Paleozoic rocks of peri-Gondwanan Europe ***(P. Pruner, P. Štorch**, T. Aifa & J.-P. Lefort, University of Rennes)*

(1) Within extensive outcrops of the Silurian effusive basalts and volcaniclastics belonging to the major Svatý Jan Volcanic centre, two dykes of alkaline basalts with feldspar phenocrysts were found cropping out in a small gorge above the left bank of the Kačák Creek, between Sedlec and Svatý Jan pod Skalou. These two dykes have been sampled to study Silurian extension of the Prague Basin. The dykes are situated in the lower part of a 100 m thick volcaniclastic sequence and represent either feeding channels for the later part of the volcaniclastic succession or fissures which supplied the basalt magma to the lava-shield of the next volcanic period. Thus the Late Wenlock to Mid Ludlow age of the dykes can be assumed. Dyke 1 (northwestern of the two dykes) is oriented N–S and dips at 70° to the West. The fissure may have been opened repeatedly and used by two subsequent intrusions as suggested by rock magnetic data and an internal plane surface developed ca 2 m from the western contact of the dyke. Dyke 2 (exposed on a steep slope above the creek) dips 55° NE. Feldspar phenocrysts are more or less aligned parallel to the dyke margins. Sampling technique followed one perpendicular section and two dyke-margin parallel sections, with a spacing of around 10 cm. AMS and ARM measurements on pilot specimens show that most of the fabric is primary. But according to AMS plots two fabrics have been distinguished: a parallel fabric (P) related to the opening phase of the dykes, an oblique secondary fabric (S) due to either alteration or fluid circulation or a late tectonic event. 58 samples have been subjected to thermal and AF demagnetization. Five components of magnetization, in agreement with published directions for the Bohemian massif, have been isolated: Mid–Late Silurian (C1), Late Carboniferous (C), Late Permian to Early Triassic (C2) and Recent to Miocene (B, D) with high inclination. The main carriers are (Ti)magnetite and maghemite. The mechanism of opening of dyke 1 was a dextral transtension. It may have been opened during several stages related probably to different timing of multiple magma injections. This is corroborated by the different components, mainly Paleozoic in age.

(2) Ordovician rocks of Crozon Peninsula (Rosan, Postolonnec and Kermeur Fms.) and Rennes Basin (Coëtquidan, Marette) of the Armorican Massif were investigated. The obtained paleomagnetic data were compared to those obtained, and mostly published, from Ordovician rocks of Barrandian area of the Bohemian Massif. Separation of respective remanent magnetization components was carried out: three components of magnetization have been isolated according to unblocking temperatures (medium- to high-coercivity spectra). A positive fold test as well as a positive polarity test have been evidenced in the Late Ordovician Rosan Fm. Our data show evidence of a large paleomeridian (paleorotation) difference but very close values of paleolatitude between the Barrandian and Crozon-Rennes areas. Late Ordovician paleolatitude values of 23–25°S from components of normal and reverse polarities of HUTC from quartzitic sandstones and limestones of Crozon Peninsula were computed. Red siltstones of Arenig age from Marette Quarry show preliminary paleolatitude of 37°S.

Hungarian Scientific Research Fund (OTKA), Grant No. T 035004: The study of the Quaternary development of the Gömör-Torna Karst and the paleomagnetic research of the sediments from the Baradla Cave

Subproject: Paleomagnetic analysis of sediments from the Baradla Cave, Aggtelek National Park, Hungary *(**P. Bosák**, **J. Kadlec**, **P. Pruner**, J. Móga, Department of Geography, Eötvos Loránd University, Budapest, Hungary & H. Hercman, Institute of Geological Sciences, Polish Academy of Sciences, Warsaw)*

Totally 96 paleomagnetic samples from 5 selected profiles in the Baradla Cave were taken for paleomagnetic and magnetostratigraphic research. Unconsolidated sediments were studied by the alternating filed method (AC). The solid samples, mostly from speleothems, were studied also by the thermal demagnetisation (TD). Two samples were dated by U-series method. All samples studied provided normal magnetic polarisation, except samples from the middle part of stalagmite in the profile in Münnich-táró. Owing to the Th/U dating of reverse polarised zone from stalagmite, which yielded the average numerical age of 114 to 115 ka, we can conclude that all studied sediments are younger than Brunhes/Matuyama boundary at 0.78 Ma. This result is conformable with most of the recent studies.

Czech-Slovenian Joint Programme "KONTAKT" (Ministry of Education, Youth and Sports CR)
Project No. 2002/009: Evolution of karst and caves based on study of cave fills, Slovenia (***P. Pruner, P. Bosák*** & *A. Mihevc, Karst Research Institute, SAZU, Postojna, Slovenia*)

High-resolution magnetostratigraphy of speleothems from Snežna jama, Kamnik-Savinja Alps, Slovenia: the Snežna jama Cave is located in the Kamnik-Savinja Alps, NE Slovenia, in a Raduha Ridge. The cave is huge, more or less horizontal representing fossil phreatic/epiphreatic conduit. It is penetrated by vertical shafts – invasion vadose (proglacial) caves. Close to cave entrance, there is about 3 m high wall composed of speleothems – a complex sequence of flowstone with numerous breaks in deposition, six of them are principal. The lower part of the profile (about 85 cm) contains abundant terrigenous component (terra rossa-derived clay). Stalagmites developed in several periods are completely buried by nearly horizontal younger sequences of flowstone. Continuous speleothem log was recovered from the profile in a total length of about 2.4 m. The rock column was cut to cubes in the laboratory (2 x 2 x 2 cm) and studied both by thermal demagnetisation (23 samples, 12 steps – 20 to 620 ^{o}C) and alternating field method (98 samples, 14 steps – 1 to 100 mT). Magnetic properties identified the lithological boundary. On the contrary to the upper part, the lower one shows both higher magnetic susceptibility and higher remanent magnetisation. The turn point can indicate important paleogeographical change. Magnetostratigraphic log is composed of 7 normal and 6 reverse polarised magnetozones. The age of speleothems detected by the U-series alpha-counting spectrometry falls outside the method range, i.e. over 350 ka. Uranium isotopic equilibria indicate the age over 1.2 Ma. The age of the fill is pre-Quaternary, clearly older than 1.77 Ma. The most probable age from correlation with geomagnetic polarity timescales is about 3.0 to 5.0 or 1.8 to 3.6 Ma. Both possibilities can indicate the growth rate of speleothems of about 1.1 to 1.3 m per 1 Ma. The age of speleogenesis can be compared to some of unroofed caves in the area of the Classical Karst (SW Slovenia) connected with the Messinian period. Snežna jama was uplifted to high altitudes by younger (Plio-Pleistocene) uplift of the Alpine chain.

Joint Project of the Institute of Geology and Geophysicis, Chinese Academy of Sciences, Beijing and Institute of Geology, AS CR, Prague

Project: Paleomagnetism and paleogeography of terranes and separate units of the North-China Block, comparison with other regions in Mongolia (*Investigator:* ***P. Pruner****, contributions:* ***J. Kadlec****, Baochun Huang & Zhu Rixiang, Institute of Geology and Geophysicis, Chinese Academy of Sciences, Beijing*)

The paleomagnetic investigations were carried out in Inner Mongolia on Devonian, Permian and Jurassic rocks with respect to the Major China Blocks. These blocks are separated by Paleozoic and Mesozoic accretionary belts and/or large faults and formed a tectonically complicated area. Paleomagnetic studies summarizes data from volcanic and sedimentary rocks from area north of the Mongolian Fold Belt. All samples were stepwise demagnetized using thermal or alternating field method. Combined rock-magnetic study and detailed magnetic component analysis, a multiphase and heavy secondary remagnetization have been revealed. A primary magnetization cannot be isolated from most samples. The higher temperature component was separated from most of samples, the corresponding pole positions are close to the Jurassic of the North China Block. Paleomagnetic directions were calculated using the principal component analysis of Kirschvink and site-means of the direction were calculated using the standard Fisher statistics. The polar wandering path for the North China Block shows a northward shift from the Late Permian to the Late Triassic and the Middle Jurassic. The new paleomagnetic data from Inner Mongolia will be correlated with the data of North China Block and Mongolia.

Czech-Polish Agreement on Cooperation in Science and Technology
Project: Reflection of climate changes and human impact in the alluvia of the Elbe and Vistula rivers (comparison study) *(T. Kalicki, A. Budek, Polish Academy of Science, Institute of Geography,* ***J. Kadlec & E. Růžičková***)

The study of climate impact on river processes in the Labe River basin has been continued. A sample of wood from an artificially modified trunk (stilts of bridge?) excavated from fluvial sediments in the sand pit at Lysá nad Labem was dated in the Radiocarbon Laboratory at Charles University in Prague. The wood grew in time period AD 936 ±113 years. The overlying fluvial sands were deposited during the last millennium documenting recent strong flood activity of the Labe River. Samples from floodplain deposits and soil horizons collected in the Labe River basin (Ostrá, Sandberg, Hradišťko) for micro-morphological and geochemical analyses are still in a process in the Institute of Geography, Krakov, Poland.

Grant Agency of the CR

No. 205/02/1121 Plant assemblages of the Radnice and Prkenný Důl-Žďárky members of the Late Paleozoic 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 localities Štilec near Žebrák, Ovčín near Přívětice, Kladno, Beroun and Radnice yielded an exceptional amount and way of preservation of macrofloral and palynological remains. The area of 42 m^2 was exposed and about 2 tons of paleontological material were collected. Plant assemblages of both localities are different although they were grown at the same time. Plant assemblages of the Štilec locality are relatively uniform with low plants about 1-1.5 m long, dominated by fern *Kidstonia heraclensis* and calamite *Asterophyllites longifolius*. Low diversity of plant assemblages and the absence of arborescent plants suggested pioneer-swamp assemblages. Plant assemblages from the Ovčín locality are more diverse with 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 and this finds was reported several times in media (televisions, newspapers, journals and magazines). The results of the research belong among ten greatest succeesses of the Czech science during the last 10 years according to voting of journalists (DNES 4/12003).

No. 205/01/0639 Tertiary freshwater and wetland ecosystems of the North Bohemian Lignite Basin (*Z.Kvaček, Faculty of Science, Charles University, Prague,* ***M. Konzalová,*** *J. Sakala,* ***J. Dašková*** *& J. Prokop, Faculty of Science, Charles University, Prague)*

Occurrences of conifers studied in the Tertiary of the North Bohemian Lignite Basin from the period of volcanic activity to the deposition of the upper coal seam in the Bílina Open Mine show several paleoenviromental consequences. Pollen of *Pinaceae – Pityosporites* sp. div. occur already in the lowermost part of the Volcanic Formation, at the locality of Kučlin, and continue in variable amount and taxa composition through the whole Most Formation. *Cupressaceae – Taxodiaceae* group was recorded in a continuous line of occurrence only in the Volcanic Formation on the southern rim of the basin underlying the coal seams. They comprise more than a half of the total sum of the counted sporomorphs (contrary to the taxa of the family *Pinaceae)*. Bisaccate pollen of *Pinaceae* are represented by *Pityosporites microalatus* (R. Pot.) Th. et Pf., *P. labdacus* (R. Pot.) Th. et Pf., *Pityospor. minutus* (Zakl.) W. Kr., *Piceapollis* sp. and *Tsuga,* occurring with abundances below five percent only. The amounts of *Cupressaceae – Taxodiaceae* already characterize swamp conditions comparable with the coal-forming communities of the Miocene basin. Ferns of the family *Polypodiaceae* are second in frequency after the last group of conifers. Both smooth and ornamented monolete spores are present, *Laevigatosporites haardti* (R. Pot. et Ven.), *Verrucatosporites alienus* (R. Pot.) Th. et Pf., *V. favus* (R. Pot.) Th. et Pf., *V. irregularis* W. Kr., *V. balticus* W. Kr. a.o. The oldest representatives in the Ohře Rift sediments were recorded in the Volcanic Formation, and most of them are ubiquitous, with local abundance within the whole coal-bearing succession (abundant at the localities of Droužkovice, former Vršany, Bílina Mine, overlying beds at the former localities of Želénky, Kyjice and many other localities). They represent mostly taxa of *Polypodiaceae* (rich species of the genus *Polypodium* and other genera) but also of family *Davalliaceae* (a.o. families) which produce verrucated monolete spores. *Polypodiaceae* are, however, very common and of cosmopolitan distribution within the Tertiary coal seams of different ages.

No. 205/00/1000 A multidisciplinary research of the Dětaň locality (Tertiary of the Doupov Mts.): the integration of paleontology and pedology *(**R. Mikuláš, A. Žigová, E. Kadlecová**, O. Fejfar & J. Sakala, Charles University, Prague)*

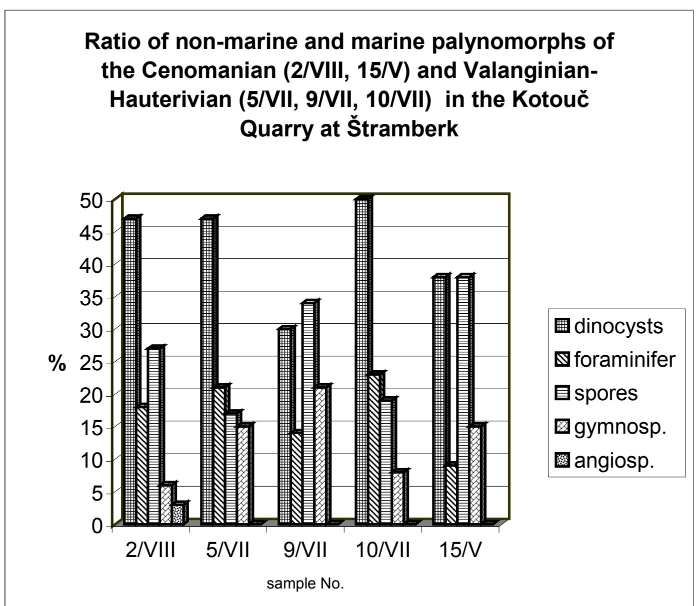
Starting points for interpretation of the geological record of the locality Dětaň include direct stratigraphic evidence. No direct stratigraphic data are available for the quartzites, which are interpreted as a pre-Oligocene silcrete (its origin corresponds well with the presumed warm and humid climate). The ichnofabric of the silcrete (i.e., root and ?insect traces) documents the existence of vegetation and fauna. In the following period, contemporaneous with the mammal zone MP-21, the limiting factor of vegetation development was a repeated fall of basaltic tuff. Because no tuff level provided a record of pedogenesis, intervals between the eruptions must have been very short (tens of years at maximum) and the vegetation was poor. Subsequently, the locality appeared in a flood plain of a watercourse bringing volcanic material; at that time, the ecosystems were at least twice destructed by pyroclastic flows, which left violet, sharply bounded beds. For a short time, also swamp and lacustrine settings are presumed. The ecosystem succession was disrupted by repeated lava flows.

No. 205/00/0944 Middle Liassic brachiopod fauna and the development of the brachiopod assemblages in the Liassic of the Northern Calcareous Alps (***M. Siblík***)

The Hierlatz classical occurrence of Middle Liassic fauna showed biosparitic white and red crinoid limestones containing brachiopod fauna with most frequent species *Cirpa latifrons* (Stur in Geyer), *Prionorhynchia polyptycha* (Opp.), *Calcirhynchia plicatissima* (Quenst.), *Cuneirhynchia fraasi* (Opp.), *Liospiriferina alpina* (Opp.), *Liospiriferina obtusa* (Opp.), *Zeilleria mutabilis* (Opp.), *Zeilleria alpina* (Opp.), *Bakonyithyris ewaldi* (Opp.) and *Lobothyris* ex gr. *punctata* (Sow.). This assemblage is characteristic of the Upper Sinemurian age. The red micritic fissure fillings on Hierlatz representing most probably higher stratigraphical level contain a different brachiopod assemblage showing on average smaller specimens. These taxa were neither figured nor described in the classical Geyer´s monograph (1889). Even if there was no stratigraphically important ammonite fauna found in these micrites, some brachiopod species could indicate already the Pliensbachian (?) level: *Prionorhynchia* (?) *flabellum* (Menegh.), *Pisirhynchia pisoides* (Zitt.), *Gibbirhynchia* aff. *Rh. plicatissima* (Quenst.) and then a terebratulid *Phymatothyris cerasulum* (Zitt.), which was for the first time ascertained on Hierlatz by A. Vörös already in 1994. New samplings in the area of Mitterwand (Dürrenalpe) SW of Hallstatt have not yielded brachiopod species that could point to a level younger than Upper Sinemurian, and the local assemblage does not differ much from that of the biosparitic limestones on Hierlatz. Locality of Erlakogel NE of Ebensee yielded rich brachiopod fauna in 2 different horizons. White, fine biodetrital limestones and red micrites with white crinoid fragments near the mountain top contain the following species as the most frequent ones*:* *Calcirhynchia* (?) *plicatissima* (Quenst.), *Cuneirhynchia cartieri* (Opp.), *Cuneirhynchia fraasi* (Opp.), *Liospiriferina alpina* (Opp.), *Liospiriferina* cf. *semicircularis* (Böse), *Dispiriferina* aff. *segregata* (Di Stef.), *Lobothyris andleri* (Opp.*), Zeilleria mutabilis*, *Zeilleria stapia* (Opp.) and *Zeilleria* aff. *sarthacensis* (d´Orb.). The character of this assemblage supports Upper Sinemurian age. Topographically lower occuring white and pink biosparitic crinoidal limestones yielded *“Terebratula” schlosseri* Böse, *“Terebratula” gracilicostata* Böse, *Zeilleria thurwieseri* (Böse), *Cirpa* aff. *subcostellata* (Gem.), *Calcirhynchia fascicostata* (Uhlig), *Spiriferina* cf. *oxygona* Eud.-Desl. and *Bakonyithyris* (?) cf. *ovimontana* (Böse). Especially first 3 species are characteristic of the horizon and prove its Pliensbachian age. They were established by Böse (1897) and originate from Kramsach in Tirol, where the Pliensbachian age was well documented by the accompanying ammonites.

No. 205/01/1582 Microfossils from the Lower Cretaceous pelitic sediments in the Štramberk area (Outer Western Carpathians): biostratigraphy, paleoecology (***M. Svobodová**, L. Hradecká, L. Švábenická, Czech Geological Survey, Prague & P. Skupien, Technical University Ostrava*)

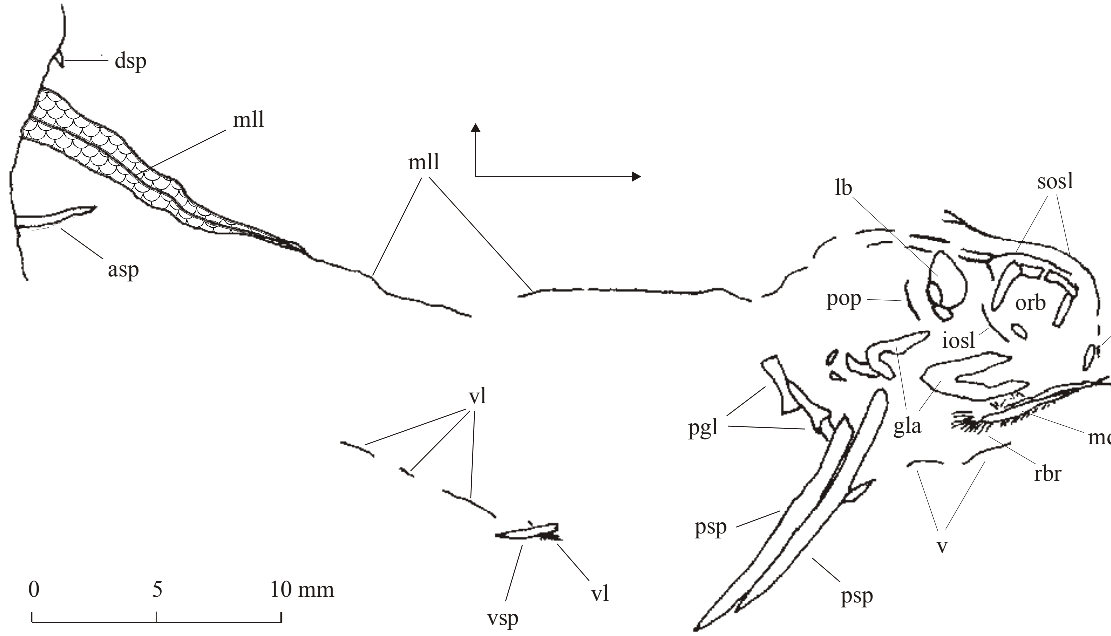
Based on the fossil record and distribution of palynomorphs (sporomorphs and dinoflagellate cysts), foraminifers and calcareous nannofossils, several biostratigraphically different microfossil associations have been distinguished among dark grey to black pelitic sequences of the Silesian Unit (Outer Western Carpathians) overlying the Tithonian–Lower Berriasian Štramberk limestone body. The occurrence of Valanginian–Hauterivian microfossil assemblages was documented in the Plaňava Formation of the Kotouč quarry (levels VI, VII) in Štramberk by diverse spores and gymnosperm pollen i.e., *Foraminisporis assymetricus, Concavissimisporites verrucosus, Staplinisporites caminus, Callialasporites dampieri, Callialasporites trilobatus, Corollina torosa, Cycadopites* sp. div. etc. Dinocyst assemblage were characterized by *Circulodinium brevispinosum, Cribroperidinium orthoceras, Kiokansium polypes, Systematophora scoriacea.* Foraminiferal assemblages yielded prevailingly benthic specimens of *Lenticulina.* Hauterivian age was evidenced by *Citarina seitzi.* The Late Jurassic and Berriasian age was documented only by calcareous nannofossils. *Watznaueria britannica* dominated the Late Jurassic assemblages while the Berriasian *Nannoconus stenmannii minor, Cruciellipsis cuviellieri.* Valanginian, zone CC3 was evidenced by *Calcicalathina oblongata*, Late Valanginian-Early Hauterivian, zone CC4 by association of *Eifellithus striatus.* Barremian deposits were evidenced by dinocysts and sporomorphs in the Obecní lom Quarry in Štramberk Late Albian–Cenomanian microfossils were documented in the Kotouč Quarry in levels IV, V and VIII. The uppermost Albian, zone BC27/UC0a, is characterized by *Watznaueria barnesae, Eifellithus turriseifelii.* The lowermost Cenomanian, zone BC27/UC0c, is marked by *Gartnerago theta, Prediscosphaera cretacea.* Foraminifera of the Late Albian–Cenomanian are characterized by *Rotalipora appenninica– R. cushmani,* Middle Cenomanian by *Rotalipora reicheli.* Angiosperm pollen of the Early Cenomanian are characterized by *Tricolpites sagax, Tricolpites variabilis* and *Psilatricolporites* sp. Dinocyst assemblage of the Albian–Cenomanian age is evidenced by *Litosphaeridium siphoniphorum, Palaeohystrichophora infusorioides, Ovoidinium scabrosum, Ovididinium verrucosum.*



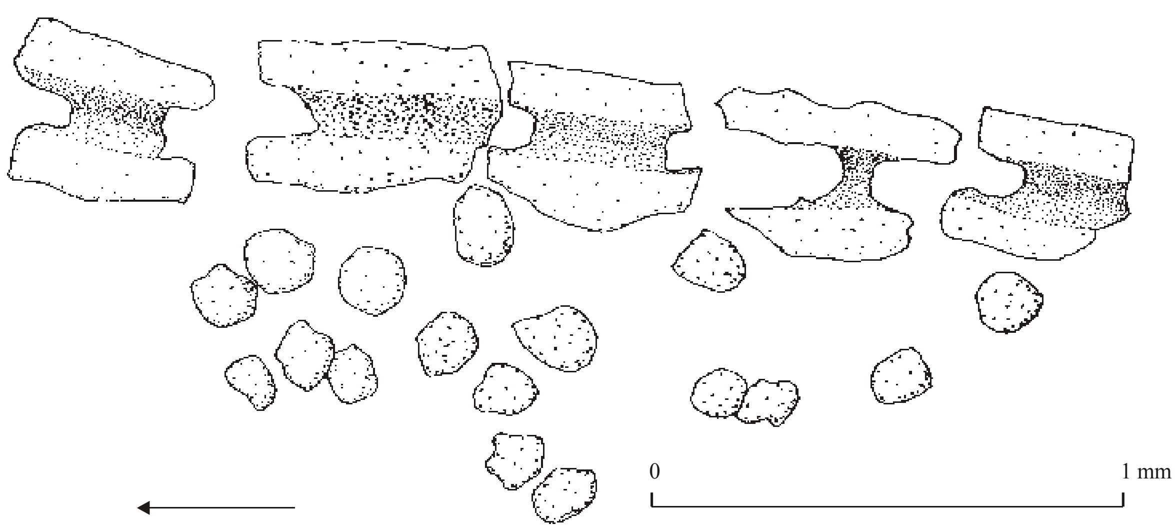
Palynomorph ratio in the Valanginian–Hauterivian and Cenomanian deposits in the Kotouč Quarry at Štramberk (Silesian Unit, Outer Western Carpathians) (M. Svobodová).

No. 206/00/0942 Permian acanthodians of the Czech Republic (***J. Zajíc***)

Permian acanthodians were discovered in three basins – the Blanice and Boskovice Grabens and the Krkonoše Piedmont Basin. The Blanice Graben yielded sporadic and poorly preserved specimens only. All specimens from the Krkonoše Piedmont Basin were found in the Rudník Horizon. Typical fossiliferous sediments of the Rudník Horizon (organic matter rich "black shales" and grey laminated carbonatic mudstones) include typical specimens of *Acanthodes gracilis* (the same type which was originally described from the North Sudetic Basin in Poland). The ontogenetic series consist of different stages from very young specimens up to subadults (the most frequent stage) and presumable adults (the sexual maturity is not possible to prove). Ontogenetic development of the body squamation was studied in detail. The small rhomboidal ventral scaly shield was discovered between pectoral and ventral fin spines of the young and early subadult stages. This structure occurs on the transition of paired ventrolateral sensory lines to unpaired ventral sensory line. Dorsal squamation of the subadults and adults passes continuously to the dorsal tesserae of the head. Specimens coming from the second type of fossiliferous sediments of the Rudník Horizon (hard violet to red laminated carbonate from the locality Vrchlabí – road cut) differ both in the type of fossilization and in body proportions (e.g., extremely long ventral fin spine). Sporadic finds (or literary references) of acanthodians were known from some localities of the Boskovice Graben till now. New finds from the south (locality Padochov, gas line) and north (Kladoruby) of the basin as well as older undescribed finds (Černá Hora, highway; Zbraslavec) provide great number of new osteological and biometrical data. Finds of otoliths with parts of labyrinths in some Moravian specimens are rather rare in acanthodians in general. Several specimens show extremely long dermotrichia inside the pectoral fin. A similar situation (majority species *Acanthodes bronni* with short and minority species *Acanthodes tholeyi* with long pectoral dermotrichia) was described from the Saar Basin. Differences in ventral fin spine lenght, biometrical data, and pectoral dermotrichia length probably also indicate separate taxa. Some specimens both from the Krkonoše Piedmont Basin and the Boskovice Graben show curious changes on the scale crowns – rather deep angular or rounded depressions. Mentioned changes do not occur on the whole body. They are mostly situated on the fins and around them. The reason of the deformations could be a disease of the scales under the central part of the crown (crown microstructure formed by the small hollows is not damaged).



***Acanthodes gracilis*; juvenile specimen, posterior part is broken off; squamation is indicated by scales-like fill; anterior and dorsal directions are marked by arrows; abbreviations: asp – anal fin spine, cmo – circumorbital bone, dsp – dorsal fin spine, gla – gill arch, iosl – infraorbital sensory line, lb – labyrinth, mdo – mandibular bone (mandibular splint), mll – main lateral line, pgl – pectoral girdle, pop – preopercular sensory line, psp – pectoral fin spine, rbr – branchiostegal ray(s), sosl – supraorbital sensory line, v – ventral sensory line (unpaired), vl – ventrolateral sensory line, vsp – ventral fin spine; M 4282; Padochov; Zbýšov Horizon (J. Zajíc).**



***Acanthodes gracilis*; five segments of a sensory line of the head with obvious longitudinal canal (on top) and attendant circular tesserae (below); anterior direction is marked by arrow; PUK-12; Zbraslavec (J. Zajíc).**

No. 205/02/P014 Lochkovian conodont zonation (***L. Slavík***)

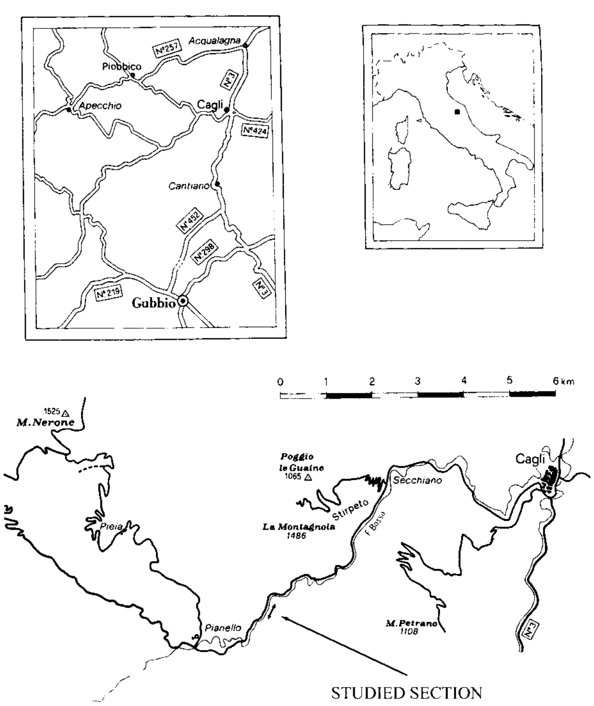
The Lo/Pg GSSP section was re-investigated considering the insufficient documentation of many relevant conodonts (deficiency of figures, descriptions and systematics) and particularly because of an apparent inaccuracy in documentation of the relevant specimen defining the GSSP. The main purpose was to verify occurrences of stratigraphically significant taxa and also to compare conodont faunas from Velká Chuchle with other Lo/Pg sections. The Lo/Pg boundary interval was resampled by seven 4-kg samples. Due to previous numbering, the orientation in the section was quite easy and the results obtained from past investigations by Schönlaub (in Chlupáč, 1985) and Weddige (1987), as well as from the present studies can be readily compared on corresponding levels. New biostratigraphic data obtained revealed several important points. The first conodont sample 1vc taken from bed No. 2 confirmed Lochkovian age. The first specimens of the typical Pragian conodonts were identified in bed No. 10 (sample 3vc) – *Latericriodus steinachensis* (Al-Rawi) morphotype eta, but they occur together with presumably Lochkovian forms *Ozarkodina* cf. *remscheidensis remscheidensis*. Relatively rich conodont faunas were recovered from bed No. 11 (sample 4vc), just below the defined lower Pragian boundary. The Lochkovian taxa at this level already disappeared, but the first specimens of the genus *Eognathodus* occur. These elements are assigned to *Eognathodus sulcatus* "*eosulcatus*", i.e., to the form, which covers the GSSP–defining specimen found by Weddige (1987) and which was erected due to redefinition of Murphy (1989). According to new investigations, the first occurrences of *E. s.* "*eosulcatus*" – an index for the first Pragian *sulcatus* Zone thus lies approximately 15 cm lower in the section than was previously believed. This means that the GSSP point was surely set up higher than the real entries of this taxon are. In addition, bed No. 11 provided also two other typically Pragian taxa – eta and beta morphotypes of *L. steinachensis*. Stratigraphic overlap of these two morphotypes (older eta morph and its younger descendant beta morph) may actually indicate significantly later stratigraphic age than the earliest Pragian. *Ozarkodina pandora* alpha Murphy et al. and *Ozarkodina* sp. were also described at this early level. As was expected with respect to previous studies, the overlying bed No. 12 yielded *E. s.* "*eosulcatus*" in association with the both morphotypes of *L. steinachensis* and also several other forms, which are comparable with *Icriodus angustoides angustoides* Carls & Gandl. The lower boundary of newly introduced *steinachensis* Zone (Slavík in press) is characterized by the first occurrence of *L. steinachensis* eta morph in bed No. 10, thus below the beginning of the Pragian according to valid decision about the GSSP. In comparison with the other Barrandian sections, this morphotype is a more suitable indicator for the base of the Pragian in this area, than the forms of *Eognathodus sulcatus* (Slavík 2000). Moreover, the number of specimens of *L. steinachensis* in the Barrandian area is much higher and their occurrences are more reliable than those of *E. sulcatus* morphotypes. A rapid change in conodont fauna is marked mostly by a strong decrease in both taxonomic diversity and abundance that is linked to the onset of typically Pragian "nodular" limestone facies. Apart from the problematic first occurrence of *E. s.* "*eosulcatus*" mentioned above, the assessment of the last sampled conodont fauna with review of previous studies on the Lochkovian/Pragian GSSP at Velká Chuchle (Barrandian) have pointed out that the GSSP has been defined on the basis of a specimen that has been never figured or described.

No. 206/01/1580 Asteroidea (Echinodermata) from the Upper Cretaceous of Bohemia (***J. Žítt***)

Extraordinary number of completely new data was obtained by the study of dissociated skeletal elements of asteroids. Taxonomic examination revealed 23–27 species in the shallow-water deposits of the Bohemian Cretaceous Basin.
1. Family Goniasteridae Forbes: *Metopaster* sp. 1, sp. 2, sp. 3, sp. 3(?); *Nymphaster* sp. 1, sp. 2, sp. 2(?), sp. 3, *B-aster* sp. 1, *C-aster* sp. 1, *D-aster* sp. 1, *E-aster* sp.1, *G-aster* sp. 1; 2. Family Pycinasteridae Spencer et Wright: *Pycinaster* sp. 1, sp. 1(?), sp. 2; *Phocidaster* sp. 1; 3. Family Stauranderasteridae Spencer: *Hadranderaster* sp. 1; *Stauranderaster* sp. 1, sp. 2; 4. Family Sphaerasteridae Schoendorf: *Valettaster* sp. 1; 5. Family Astropectinidae Gray:

Astropecten sp. 1, *Lophidiaster* sp. 1, sp. 2; 6. Family Calliasterellidae Schoendorf: *Arthraster* sp. 1, sp. 1(?); 7. Family Asteriidae Gray: *A-aste*r sp. 1; 8. Family so far indetermined: *F-aster* sp. 1.
Stratigraphical distribution: 1/ Upper Cenomanian (Korycany Member of the Peruc-Korycany Formation; Kuchyňka u Brázdimi, Předboj – classical loc., Kozomín, Radim, Velim-Veronika): *Hadranderaster* sp.1, *Lophidiaster* sp.1, *Metopaster* sp.1, *Nymphaster* sp.1, *Pycinaster* sp.1(?), *Stauranderaster* sp.1, *A-aster* sp.1.; 2/ Lower Turonian (mostly the Bílá hora Formation; Novoveské Vrchy, Čenkov, Velim-Václav, Chrtníky, Kamajka near Čáslav, Kaňk-Na Vrších, Kaňk-Turkaňk, aj.): *Arthraster* sp.1, *Astropecten* sp.1, *Lophidiaster* sp.2, *Metopaster* sp.2, *Metopaster* sp.3, *Nymphaster* sp.2, *Nymphaster* sp.3, *Phocidaster* sp.1, *Pycinaster* sp.1, *Stauranderaster* sp.1, *Valettaster* sp.1; *A-aster* sp.1, *B-aster* sp.1, *C-aster* sp.1, *D-aster* sp.1, *E-aster* sp.1, *F-aster* sp.1.; 3/ Middle Turonian (Korycany Member; Zbyslav): *Arthraster* sp.1(?), *Metopaster* sp.2, *Metopaster* sp.3, *Nymphaster* sp.2(?), *Pycinaster* sp.1, *Stauranderaster* sp.2, *Valettaster* sp.1.; 4/ Upper Turonian (Teplice Formation; Úpohlavy) : *Metopaster* sp. 3(?), *G-aster* sp.1.; Among the complete skeletons and larger fragments, on the basis of old collections (National Museum, Praha), a large pycinasterid (?) species was identified in the Korycany Member (Korycany, upper Cenomanian) (*Pycinaster*(?) sp.1). Complete asteroid specimens imprinted in coarse sandstones (Middle Turonian, mostly eastern Bohemia) are hardly determinable and are now preliminarily referred to *Stellaster (?) schulzei* Cotta et Reich. Comparative studies of some Recent asteroids (*Ogmaster*, *Stellaster*, *Ctenodiscus*, *Archaster*, *Asterina*, *Protoreaster*, *Oreaster*, *Astropecten, a.o.*) are made with main emphasis to the functional morphology of arm and marginal disc elements. Works with a catalogue (in the form of an atlas) of dissociated skeletal elements of studied fossil asteroids continue. Basic parts of this atlas will be placed at the author's echinoderm website which is also under preparation.

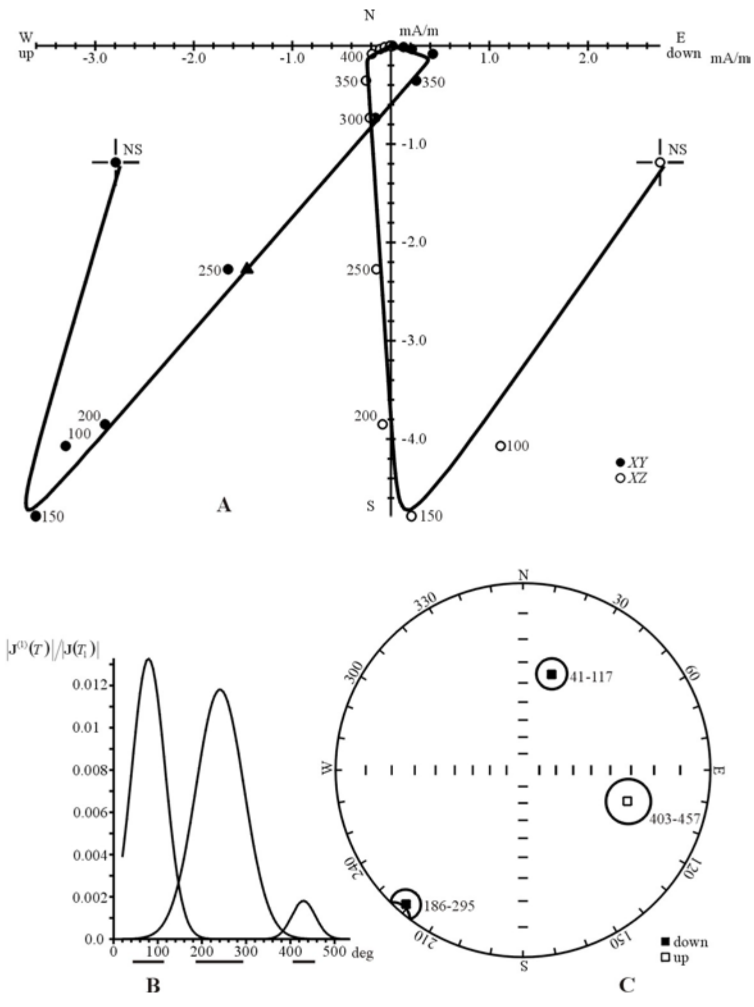
No. 205/02/1576 High-resolution magnetostratigraphic and micropaleontological correlation across Jurassic – Cretaceous boundary strata in the Tethyan and Boreal realm (***P. Pruner, V. Houša, M. Chadima, O. Man, S. Šlechta*** & *M. Košťák, Faculty of Science, Charles University, Prague*).



The principal aim of the detailed magnetostratigraphic and micropaleontological investigation of the Jurassic/Cretaceous (J/K) boundary limestones in the basal portion (40 m) of the Bosso Valley section was to precisely determine the boundaries of magnetozones and narrow reverse subzones, and to find correlation between magnetostratigraphic data (reflecting global events) and calpionellid zonation. Two reverse subzones were detected in magnetozones M20n and M19n. These have the same positions relative to the magnetozones above and below as the reverse subzones at the recently studied locality of Brodno near Žilina, W Slovakia. Both the Brodno and Bosso sections hitherto represent the only magnetostratigraphic profiles across the J/K boundary strata in the continent-based outcrops in the Tethyan realm, displaying both reverse subzones, well correlable with analogous subzones in the M-sequence of marine magnetic anomalies. Samples of the studied upper Tithonian and lower Berriasian limestones are characterized by a three- or even four-component remanence, with the carrier of paleomagnetic directions being the C-component, separated by multi-component analysis after progressive thermal demagnetization in the interval of ca. 400 °C to the magnetite unblocking temperature (around 550 °C). Other aspects of the use of magnetization changes in limestones for a possible correlation are also discussed in this study. In addition, the existence of a prominent post-tectonic component of remanent magnetization is pointed out. This imprint, recorded in the Bosso Valley and elsewhere in the Tethyan realm, dates most probably to the Neogene and is worth of further investigations.

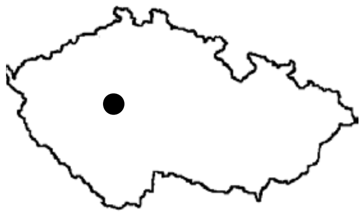
Subproject: Identification of NRM components by means of thermal demagnetization spectrum (***O. Man***)

The natural remanent magnetization (NRM) is given by a vector sum of its components acquired in different relatively short time intervals during the rock formation and its subsequent history. No geological information can be inferred from it unless these components are identified, e.g., by means of thermal partial demagnetization experiments and their appropriate mathematical processing. For example, NRM as a differentiable function of temperature is estimated from the data these experiments resulted in. The NRM components can be identified using the first derivative of this function, since the local maxima of its absolute value reveal the temperature intervals where the magnetization is changing most rapidly, but the direction of partial magnetization may be relatively stable. The above type of processing has been developed in the framework of the subproject.



(A) Vector component diagram plotting projections of the vectors onto the XY and XZ planes. NRM as a smooth function (thick line) was estimated from the experimental data (circles labeled by temperatures). (B) Three components were identified. (C) Stereographic projections of their directions with 95% confidence limits (O. Man).

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, Prague, **J. Kadlec & V. Cílek***)



The joint project is conducted together with the Czech Geological Survey. In the investigated area four key sections preserved in caves developed in both banks of the Berounka River canyon were documented and sampled for heavy minerals analyses. The heavy mineral variations allow to distinguish if fluvial sediments were deposited during the Tertiary or in the Quaternary. Paleomagnetic orientation was measured in fine fluvial deposits exposed in the Portálka Cave. Normal remanent polarity suggests that sediments are younger than the Brunhes/Matuyama paleomagnetic boundary (780 ka) and were probably deposited during the early Middle Pleistocene.

Grant Agency of the Academy of Sciences CR

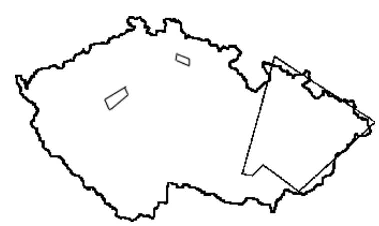
No. A3013005 Holocene evolution of soil cover of the protected landscape areas of the Czech Republic (***A. Žigová, V. Cílek, V. Ložek,*** *V. Šrein & M. Šťastný, Institute of Rock Structure and Mechanics AS CR, Prague*)

A network of 35 soil profiles in the Protected Landscape Areas of Blanský les, Český kras, České středohoří, Kokořínsko, Křivoklátsko, Litovelské Pomoraví and in the Voděradské bučiny National Nature Reserve represent long-term standards for the monitoring of soil cover changes. The soils were characterized on the basis of their mineralogical and geochemical composition, and the microscopic studies helped to decipher their Holocene evolution. The most widespread soil type in the studied protected areas is Cambisol. This soil type is developed on wide range of parent material in all climates under a wide range of vegetation types. Leptosols are genetically young soils and evidence of soil formation is limited by thin and weakly developed horizons. Rendzic Leptosol occurrs in the territory of Blanský les, Český kras and Litovelské Pomoraví. Haplic Leptosols covers large parts of Křivoklátsko and Český kras. Loess is a parent material for the development of soil types as Albeluvisol (Křivoklátsko, Litovelské Pomoraví) and Luvisol (Český kras, Kokořínsko).

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

Systematic description of the rugosan taxa from Moravian Devonian has confirmed, till the present, the occurrence of species *Calceola sandalina, Solipetra* sp., *Moravophyllum ptenophylloides, Ceratophyllum multifossulatum, Peneckiella fasciculata, P.* sp., *Alaiophyllum jana, A*. sp. nov., *Disphyllum* cf. *caespitosum, D. veronika, Thamnophyllum monozonatum, Th. kozlowskii, Th. caespitosum, Th. moravicum, Th.* sp., *n. gen. n. sp., Tabulophyllum mcconnelli, T. maria, T.* sp., *Rachaniephyllum* sp., *Wapitiphyllum laxum, Rhytidolasma* sp., *Pseudohexagonaria katerinae, Circumtextiphyllum* sp. nov., *Battersbyia* cf. *anisactis, Dendrostella praerhenana, D. trigemme, Amplexocarinia* cf. *tortuosa, Breviphrentis joae, Cyathophyllum (C.) dianthus, C.(C.) degener, C. (Peripaedium)* sp., *Heliophyllum* sp., *Charisphyllum conicum, C.* sp. nov., and *Enallophrentis* sp. have been described. It would be inconsiderate to judge on basis of fraction of Moravian rugosan fauna but strong connections to Germany and Poland are obvious. Faunal elements from Iberian and Carnic (*Solipetra*) and Russian platform regions (*Circumtextiphyllum*) are rare. The presence of earlier described *Heliophyllum* and *Breviphrentis* as well as newly found *Enallophrentis* confirms a strong influx of genera endemic for Eastern North America Realm earlier in the Devonian.

Subproject: Investigation of paleobiologic character of *Amphipora* using the morphology of the youngest growth stages and fossilized reactions of this organism to limit environments, or during recovery after injuries (***J. Hladil****, in cooperation with C.W. Stearn, Kitchener, Ontario, Canada*)



The earliest growth stage seen in *Amphipora* is an irregular slightly granulated and usually convex disc, which is 150 to 250 μm across. This disc was precipitated on a small bioclastic grain(s) of soft substrate, rarely on the surface of dead shells or stromatoporoid coenostea. Its size corresponds to that of normal, non- feeding and free-swimming larvae of protist-sponge type. The first generation of granulae that grow up to pillars occurs even on the small bottom disc. These insertions of pillars with subsequent formation of primary tube are very specific traits, which may indicate some primitive coral-sponge ancestors (or at least trends in this direction). The primary tube develops after the formation of the bottom disc but before the growth of normal, sponge-like *Amphipora* structure. This tube has a thin dark-coloured layer on its outer surface and transparent calcite accreted on the inner side. If the specimen died during this primary tube stage, the outer margin is very sharply defined and slopes inwards. The growth of normal amphiporid structure may have corresponded to the time when a single and small, hypothetical "spongocoel" grew into multiple "spongocoels". However, this is purely a speculation based on a change from the primary tube to inflated structures of adult *Amphipora* stem. Vertical growth seems to have been the main growth strategy of *Amphipora* animals and coating strategies are rare. Stimulation for the change to lateral expansion could be triggered by environmental factors, such as injuries by grazers or rock particles in agitated water. The change to coating varieties commonly starts with an incomplete repetition of the ontogenic development that is marked with a short primary tube, which grows up. The observed features, particularly the early ontogenic successions, suggest that *Amphipora* should not be considered as a real stromatoporoid sponge or even coral. It was a very independent lineage with unclear links to archaeocyathids and also foraminifers. (Note that the oldest foraminifers, or similar marine shelled protists, should have become a separate taxonomic unit even during the Precambrian, as seen in present documents on biomarkers). In spite of possible deep ancestry, the really abundant amphiporids emerged exclusively during the Silurian–Devonian "unique greenhouse" (Eltonian to Frasnian worldwide), whereas the Homerian precursors and Famennian relicts are very rare.

No. A3013902 Fructifications and spore populations of plant groups Lycoppodiophyta, Equisetophyta and Polypodiophyta from Carboniferous continental basins of the Czech Republic (***J. Bek, J. Dašková**, J. Pšenička, West-Bohemian Museum, Plzeň, S. Opluštil, Faculty of Science, Charles University, Prague, M. Libertín, Z. Šimůnek & J. Drábková, Czech Geological Survey, Prague*).

Lycopod genus *Polysporia* was emended. *Polysporia* is interpreted as a vegetative stem with repeated occurrence of sterile and fertile portions. Micro- and megasporangia occur together on fertile parts of the stem usually without any pattern. Isolated megaspores are correlated with the dispersed genus *Valvisisporites.* Isolated microspores are correlated with the dispersed species *Endosporites zonalis, E. formosus* and *E. globiformis.* Equisetalean species *Huttonia spicata* was emended and considered to having only one sporangium on one sporangiophore. In situ micro- and megaspores were isolated from type specimens of the species and are described for the first time. A new lycopod genus *Pepostrobus* with the only species *Pepostrobus sonae,* and *Kladnostrobus* with the only species *Kladnostrobus clealii* were proposed. Strange reticulate in situ spores are reported for the first time and represent quite new morphological type of lycopod microspores. Distal laminae and pedicels are not well-developed, which supports the hypothesis that *Kladnostrobus clealii* may belong to some new, relatively primitive type of lycopod cones. Two species of sphenophyllalean strobili, *Bowmanites brasensis* sp. nov. and *B. pseudoaquensis* are described based on in-situ spores which represent new morphological type of sphenophyllalean spores. Cone of *B. brasensis* is organically associated with a stem with prominent heterophyllous leaves. Compressed *Spencerites* species *S. havlenae* and *S. striatus* are proposed as new species. Remains of both, fertile and sterile parts of *Spencerites* are described for the first time. *Spencerites* is interpreted as sub-arborescent dichotomously branching (probably repeatedly) lycopod plant with fertile zones close to the apical portions. First compressed specimens of the world provided new information about the morphology and habitus of the plant. Isospores of the *Spencerisporites*-type possess two-layered central body and two-layered pseudosaccus what is quite new information about the morphology of these isospores. Two new species of *Botryopetris, B. barthelii* and *B. pilsensis* were studied palynologically and from macrofloral point of view. Both specimens represented the first finds of *Botryopteris* as compression. New lycopod species *Lepidostrobus dawsonii* from South Joggins, Nova Scotia (Westphalian D), Canada, is proposed. The solitary lycophyte cone is preserved as a longitudinally split compression with cone axis appears to be comparatively narrow. Sphenophyllalean strobilus *Bowmanites dictyosporum* was studied from macrofloral and palynological points of view. In-situ microspores were described from Upper Pennsylvanian of Illinois, USA, from petrified (coal-balls) sporangia and were interpretated as of filicalean affinity. Bohemian specimens clearly referred these sporangia and microspores to sphenophyllalean plants and represent quite new morphological type of sphenophyllalean spores. New species of lycophyte *Cystosporites* and *Cappasporites*-producing strobili have been proposed. Cones of the *Cappastrobus*-type with *Cappasporites* microspores are described for the first time from compressed specimens. Unique different stages of ontogeny of preovule megaspores of the *Cystosporites*-type isolated from the new genus *Bohemiocarpon* are described for the first time in the history of paleobotanical research.

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

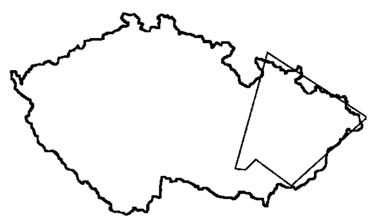
A detailed account of development of skeletal and some soft-tissue structures was based on several tens of fossil tadpoles and metamorphosing larvae of the genus *Palaeobatrachus* preserved in diatomite sediments collected from the fossil site of Bechlejovice, Czech Republic. Since *Palaeobatrachidae* are conventionally considered a member of the superfamily *Pipoidea*, this developmental series was compared with normal development of the contemporary anuran *Xenopus laevis* as defined by Nieuwkoop and Faber. As a basis for this comparison, the developmental series of cleared and stained (alizarin/toluidin-blue) whole-mount specimens of *Xenopus laevis* was used. The comparison revealed that in spite of some morphological similarities between *Palaeobatrachus* and *Xenopus* that might be caused by the fact that both are permanent water-dwellers (e.g., elongated fingers and toes, abbreviated vertebral column, structure of sacro-iliac articulation), there are also some striking differences, some of them even used for definition of the families *Palaeobatrachidae* and *Pipidae* (e.g., shape of the vertebral centra – procoelous in the former, whereas opisthocoelous in the latter) in which it is hard to suppose they were derived one from the other. Besides anatomical differences, there are also some paleontological and paleogeographic discrepancies preventing the view that both families are closely related (palaeobatrachid frogs have never been found in former gondwanan continents and in North America; on the other hand, pipids could not invade northern continents after the early Cretaceous when Tethys Sea became inpenetrable for anuran amphibians). Instead, it seems that the *Palaeobatrachidae*, restricted to Europe only, were ecological equivalents of pipid frogs.

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

The deposition fluxes on the reference area of Český kras are strongly affected by an increased presence of dust particles in the atomsphere. This is caused by the lime-mining activitites, and the depositional fluxes of Ca, Sr, Ba (Be) are much higher than their equivalents at the main study site of the Lesní potok (LP) catchment located near Kostelec n.Č.l. Surprisingly, all the depositional fluxes of Mg are higher at LP. Increased depositional fluxes of Mg (and Mn!) in throughfall at LP are perhaps a result of Ca deficiency in the acid Cambisols, which compose the soil cover of the catchment. This leads to an enhanced uptake of Mg (and Mn!) by the forest trees, which increases the throughfall fluxes. The study of the soil composition at LP revealed that soils originating from granite bedrock are characterized by low base saturation (BS, BS = Ca+Mg+K+Na). Relatively high BS 42–92% of the topsoil layers, however, is a result of the litterfall decomposition. The exceptionally high values of BS were found in the soils located in riparian zones of the LP stream. The main cations in the streamwater of the LP catchment are Ca and Mg. The concentrations of exported (lost) Ca and Mg are gradually decreasing due to decreased input of anthropogenic atmospheric acidifiers into the catchment. The decrease of the acidifiers input is a result of better controls of the emmission budgets of the Czech Republic.

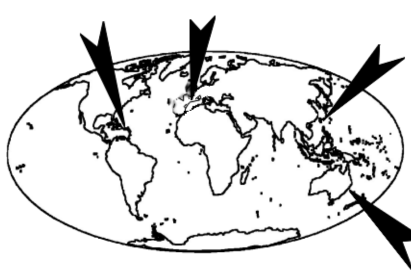
No. A3013209 Weathering products trapped in pure limestone on carbonate platforms: record of climate and early diagenesis (***J. Hladil, P. Bosák, L. Slavík, A. Langrová, P. Pruner, O. Man, A. Galle****, M. Geršl & H. Gilíková, Masaryk University, Brno & Czech Geological Survey, Prague, department Brno*)

Subproject: Impurities trapped in skeletal calcite of benthics and significance of intra-annual records for constraints about past ocean paleogeography (***J. Hladil****, in cooperation with J. Voltr, Czech Technical University, Prague & D. Barnes, Australian Institute for Marine Science, Townsville*)



The short-term variability in skeletal growth of the Devonian benthics is usually biased to greatly fluctuate with changing microenvironments. Particularly, the rapidly growing plankton feeders provide chaotic type of record (such as *Caliapora* or *Actinostroma*, 3.0–8.0 $mm.a^{-1}$). By contrast, skeletons of *Scoliopora* tabulate corals accreted at a low rate 0.4–0.6 $mm.a^{-1}$, in a very stable mode, and are useful for correlation. These are outstandingly throughcoming benthics, which spread from reefs to the middle of slopes, with licking to deep seafloor. This habitat corresponds to the theoretically derived attribute of low metabolism (with ultra-fine suspensions and/or having own sources of bacteria). The short-term variability patterns were correlated across the whole reef to off-reef facies (optical density measurements – ODM, with addition of proton induced X-ray emission methods – PIXE). Research of these scolioporids suggests that the early Givetian and early Frasnian intra-annual bandings are very different. The "best representatives" from these two time windows have been scrutinized (Gi1 *Sc. serpentina–denticulata* from Slavkov-2 borehole and Fr1 *Sc. denticulata beta* from Ochoz-V1a borehole – 1024 optical sections in total). A typical early Givetian "marine year" in Moravia consisted of five major, regular and approximately equal oscillations (within the annual cycle). The high-frequency changes (and noise) are slight. An ideal early Frasnian "marine year" has three different low-frequency oscillations of fuzzy outline, with strong disturbances by high-frequency rhythms. These changes may have mirrored seawater composition and temperature. The possible engine for these major intra-annual changes is seen in geostrophic currents, cf. the presently published documents about 50- to 70-day cycles (Indonesian Throughflow, N of Oahu, or SW Atlantic Ocean). Increased disturbances of ~10day duration correspond to small eddies in shallow and epi-continental seas (nice examples are from the Sea of Japan). Using this present oceanographic experience, the intra-annual variability patterns from the Givetian of Moravia suggest that this old carbonate platform was in close contact with a really big ocean wedge (practically, the only engine for these vigorous 50- to 70-day oceanic cycles). During the Frasnian, the paleogeography was changed with a system of reefbank-barred ocean basins (according to the appearance of numerous short-term eddies and disturbances).

Subproject: Diagenetic origin of tripartite and head-shaped geophysical patterns which modify or directly segment the common "Milankovitch-type records" in carbonate platform sediments (***J. Hladil, P. Bosák, L. Slavík,*** *M. Geršl, Masaryk University, Brno, in cooperation with A. Těžký, Geofyzika Inc., Brno, J.L. Carew, College of Charleston, J.E. Mylroie, Mississippi State University, T. Nakamori, Tohoku University, Sendai & J.S. Jell, University of South Queensland, Brisbane*)



Large comparison of Devonian and Quaternary sections has been carried out to find documents about early diagenetic origin and persistence of gamma-ray and magnetosusceptibility patterns in platform carbonates. The gamma-ray logs from boreholes in the Middle–Upper Devonian carbonate platform of Moravia display tripartite anomalies at locations where lithological and biostratigraphic data suggest the occurrence of 4th-order sedimentary cycle boundaries. Further, where sedimentary boundaries have been changed by later development of caves (usually phreatic caves changed to unroofed caves – erosion), the carbonate infillings in these corroded cycle boundaries are marked by another pattern that consists of a smooth symmetrical peak on gamma-ray activity in vertical section.

The details procured using gamma-ray spectrometric and magnetosusceptibility methods suggest that the upper peak of the tripartite pattern corresponds solely to uranium concentration (flooding surface). The middle peak is marked by a thorium signal and a magnetosusceptibility response from paramagnetic minerals (paleosols). The lower peak corresponds to trapped uranium and microbial magnetite in cemented rock pores (originally dysoxic microenvironments in calcite). The boundaries marked with filled caves display only one broad and symmetrical uranium-related peak, and the thorium peak that is roughly similar to that seen at normal boundaries, but it is shifted slightly downward. At boundaries with caves the magnetosusceptibility peaks are shifted downward considerably, and may even occur within the underlying host rock. The question of whether these patterns are a primary imprint of early diagenetic influence or a much later redistribution that originated during pressure solution and cementation, was answered by study of Late Quaternary sections on San Salvador Island, Bahamas, where the short-term evolution of gamma-ray activity and magnetic features was completely confirmed by means of a pragmatic test. However, the carbonate platforms and reefs in other than "Atlantic-type extension settings" provide these patterns only in rudimentary or largely deformed and incomplete shape (e.g., the Great Barrier Reef, Heron Island – absence of Holocene paleosols with underlying calcite cementation zones, or the Ryukyu island-arc margin reefs, Okinawa – with deep but irregular penetration of paleosol material into porous grainstone/rudstone rocks).

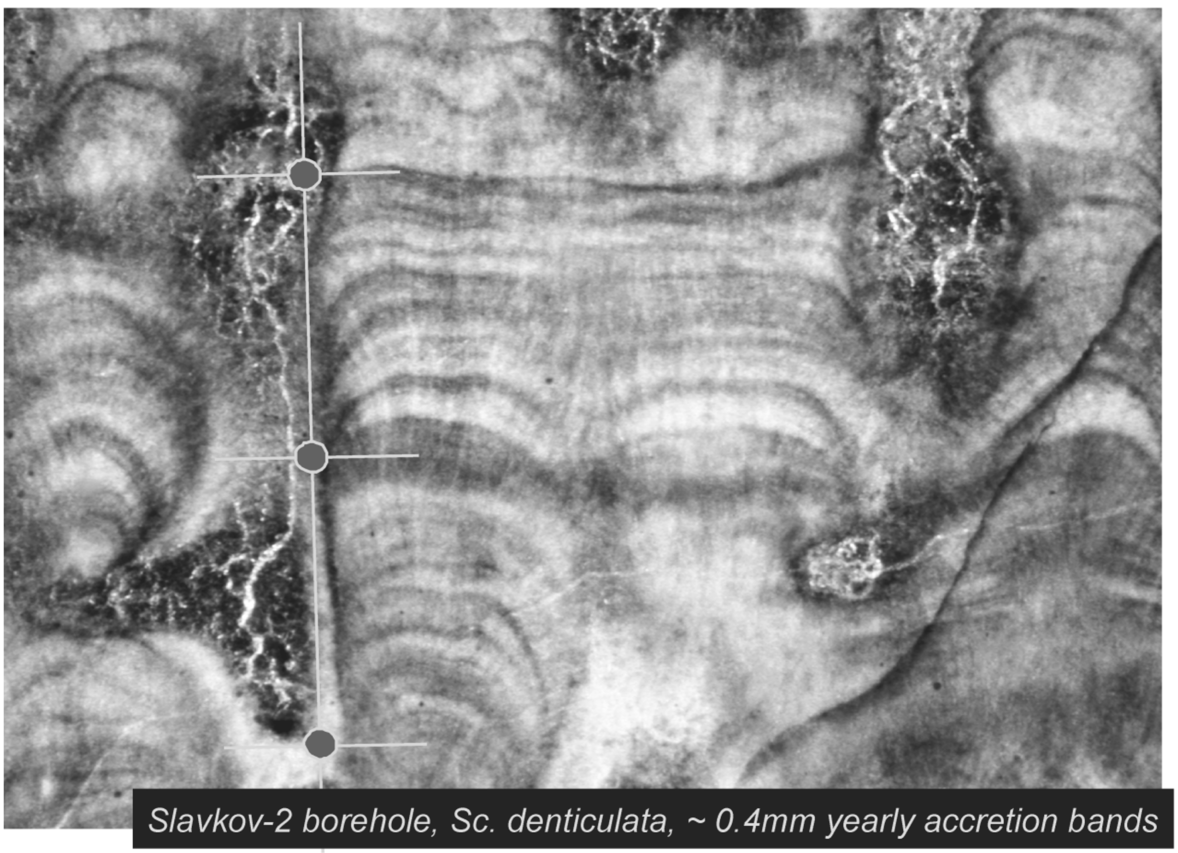
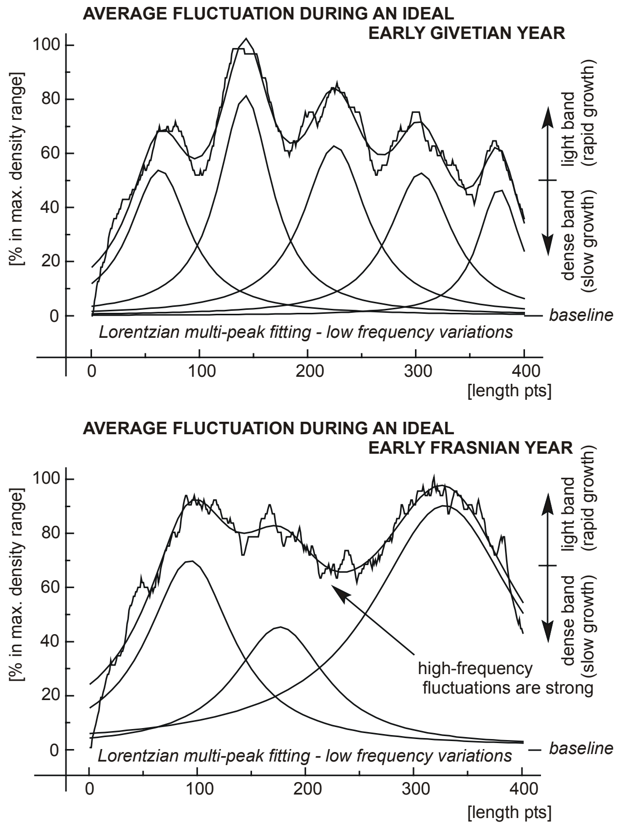


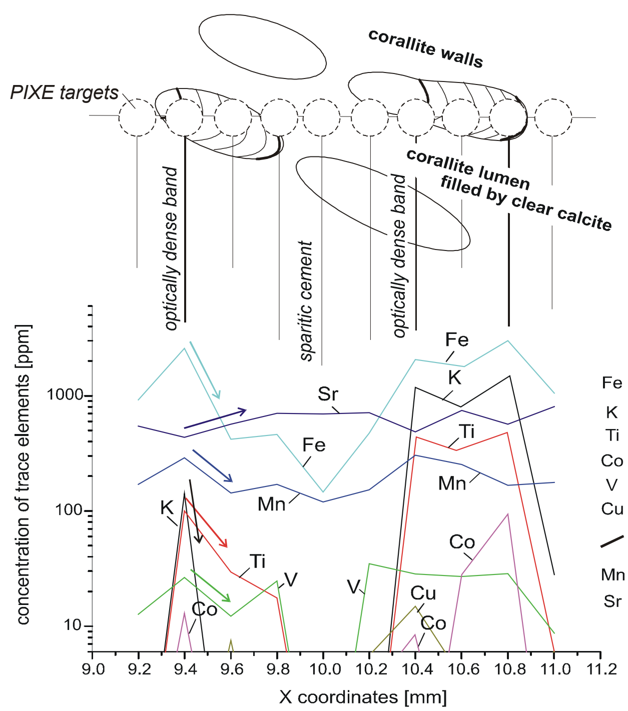
Illustration of fine structured increments of calcite tabulate coral skeleton (bioprecipitated by a Devonian scolioporid from Moravia, E of Brno). This structure exemplify regularly developed intra-annual fabric, which originated during the early Givetian stage. Concurrently, it shows merely good quality of scolioporids as "recorders" (in comparison with chaotic records by active plankton feders). Dense bands marked with dots are years in these increments (spaced 0.4 mm in growth direction) (J. Hladil).



Project A3013209 "Weathering products ... and climates

The visualization of data obtained on the base of more than one thousand optical density sections in selected periods of the Devonian times (J. Hladil).

The Givetian intra-annual climatic variation in paleoseas of "Moravia" (385–390 Ma) was controlled by mighty pulse of ocean reservoirs (comparable to the present 50- to 70-day cycles in many ocean wedges). Besides the nearly kilometre thickness, large extent and depositionary continuity of the carbonate platform, this is an additional indicator of really large ocean mass in close contact with the platform. Note the different intra-annual climatic variation pattern during the Frasnian, when the fluctuating effects of 90- to 140-day cycles were instable and even much disturbed by superimposed 10- to 25-day disturbances. These small eddies typically develop in carbonate platform barred seas or in epicontinental seas (such as the Caribbean Sea or the Sea of Japan today).



The abundance of elements in calcite material of coral growth bands and effects of sparitic cement in original cavities. An example of PIXE section, i.e., analysis of proton indiced gamma-ray emissions. A multielement one-run scanning with high resolution is a big advantage of the PIXE-methods. Preliminary assessment of the first data scanned by J. Voltr on instruments of the Czech Technical University in Prague-Troja (J. Hladil).

No. A3111102/013 Pre-Variscan and Variscan tectonomagmatic development of the West Sudetes: the Ještěd Ridge as an example *(V. Kachlík, Faculty of Science, Charles University, Prague,* ***M. Fajst & F. Patočka****)*

Subproject: Sheared metagranitoids in the Ještěd Range Mts.: the role in the westward propagation of the Variscan orogenic wedge in the West Sudetes *(V. Kachlík, Faculty of Science, Charles University, Prague,* ***M. Fajst & F. Patočka****)*

The Ještěd Range Unit (JRU) is situated on the westernmost margin of the Krkonoše-Jizera terrane (KJT) (West Sudetes, northern margin of the Bohemian Massif). The JRU is the lowermost part of the W- to WNW-directed complex orogenic wedge of the West Sudetes. On the E the JRU is overthrust by the volcano-sedimentary sequence of the South Krkonoše Complex. In the central and eastern parts of the JRU, the paraautochthonous (Early to Late Paleozoic) and allochthonous (Early Paleozoic) domains were distinguished from bottom to top of the structural succession. A set of rather small-scale metagranitoid bodies was identified in the JRU during detailed 1:10,000 mapping survey. Newly found JRU metagranitoids were distinguished into two groups according to structural relations. The first group metagranitoids appear to have intrusive relation to host rocks, and they are supposed to be elements of the autochthonous domain. Rocks of the second group form small and strongly sheared bodies and/or tectonic slices intercalated in various lithologies; they are usually closely related to major thrust planes. The distribution of the above described strained pre-Variscan metagranitoid (orthogneiss) bodies of the Ještěd Ridge Unit and the South Krkonoše Complex support the allochthonous nappe idea of the KJT architecture. According to structural position of the metagranitoid bodies (thrust over the JRU Middle to Late Devonian limestones), the KJT nappe stacking post-dated the Late Devonian and may correspond to Early Carboniferous times. Rheological inhomogenities along boundaries of the metagranitoid bodies and greenschist grade complexes were convenient places ready for initiation and development of the Variscan thrust planes. Access of fluids during the greenschist-facies metamorphism made the deformation of metagranitoids more effective due to deformation softening in higher crustal levels. According to this explanation the metagranitoids in the KJT acted as important horizons for channelling of strain and played an important role during tectonic stacking of the KJT in a regional scale.

Subproject: Geochemical discrimination of metasedimentary sequences in the Krkonoše-Jizera Terrane, West Sudetes, Bohemian Massif: paleotectonic and stratigraphic constraints *(****F. Patočka****, V. Kachlík, Faculty of Science, Charles University, Prague, J. A. Winchester, M. Melzer, C. Nawakowski, Q. G. Crowley & P.A. Floyd, School of Earth Sciences and Geography, Keele University, England)*

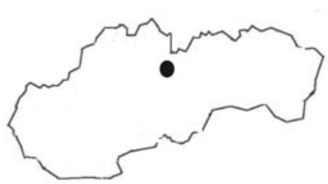
Metamorphosed clastic sediments from three lithostratigraphic groups (the Velká Úpa, Radčice and Poniklá Groups), exposed in a para-autochthonous to allochthonous unit of the Krkonoše-Jizera Terrane (KJT, West Sudetes), were studied in order to discover whether they are chemically distinguishable. Metamorphosed clastics of the Poniklá and Radčice Groups proved to be chemically indistinguishable. As a result, these groups are herein combined within a single Vrchlabí Group of Cambro-Ordovician to Siluro-Devonian age. Precursors of the low- to medium-grade Velká Úpa Group were apparently deposited on a former (Neoproterozoic) active continental margin, which evolved to a passive margin during Cambro-Ordovician extension and rifting. In this proposed paleotectonic scenario the Velká Úpa Group is interpreted to be younger than the Neoproterozoic Machnín Group of the KJT autochthonous unit; it is either older than the Vrchlabí Group or it may comprise coeval clastic material derived from a less dissected area of the Neoproterozoic active margin. Comparison of the metasediment geochemistry, together with the stratigraphic and structural affinities within the KJT, allows the Velká Úpa Group and Vrchlabí Group to be interpreted either as a stratigraphic succession, where the Velká Úpa Group is of the latest

Neoproterozoic/earliest Paleozoic age, or as broadly coeval groups of Cambro-Ordovician to Siluro-Devonian age. The geochemistry of the metasediments reflects the complex paleotectonic evolution of the West Sudetes that started with the Cambro-Ordovician intracontinental rifting and subsequent sea-floor spreading during the marginal fragmentation of Gondwana.

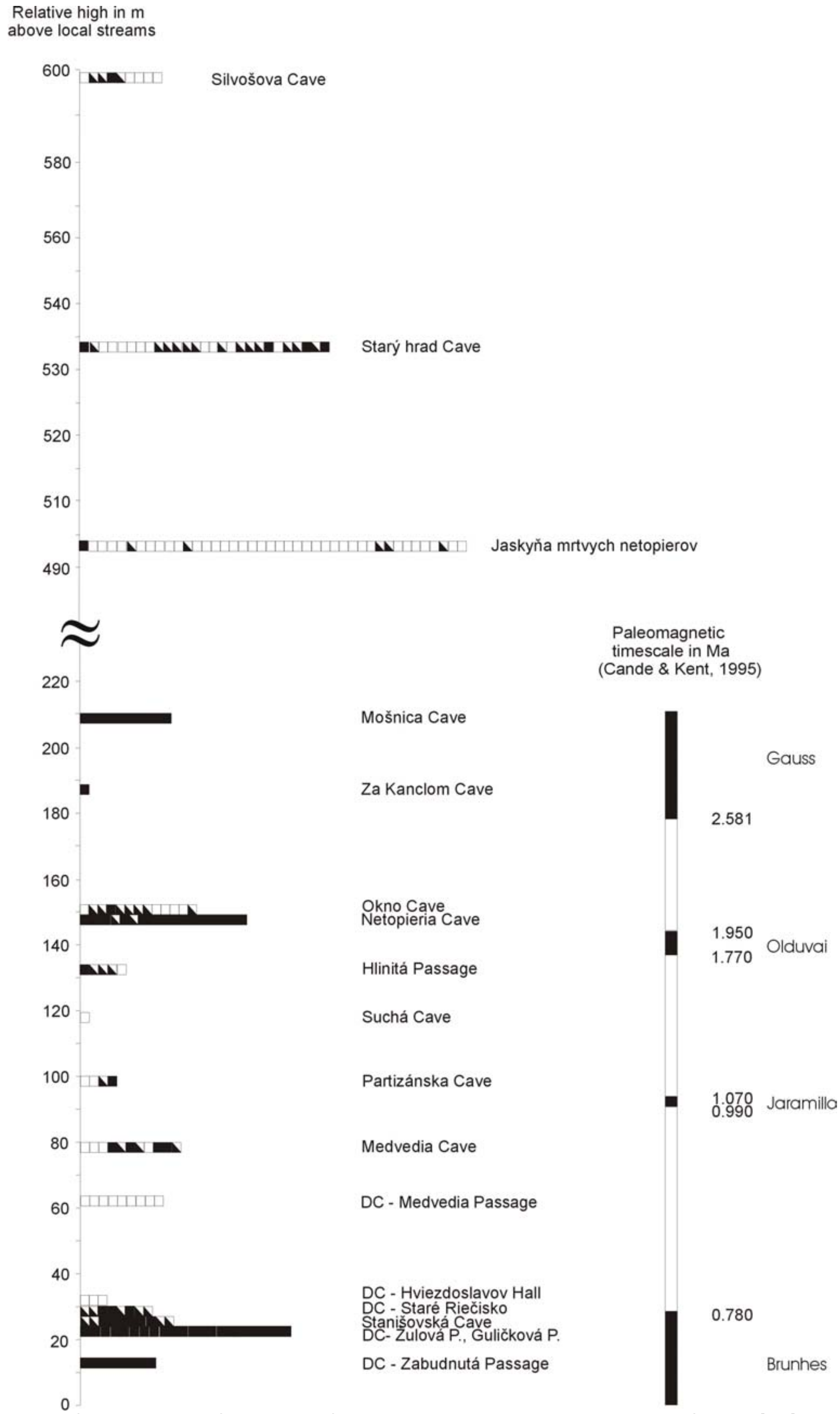
A3013906 Early Paleozoic extension in the Central European realm: sedimentary, volcanic, fossil and paleomagnetic record of the Barrandian (Bohemian Massif) (***P. Štorch, F. Patočka & P. Pruner***)

Geochemical data obtained from Early Paleozoic siliciclastic sediments of the Barrandian (the Teplá-Barrandian unit, Bohemian Massif) provided implications on their provenances and succession of paleotectonic settings. The siliciclastic rocks of the earliest Paleozoic sedimentation cycle, deposited in the Cambrian Příbram-Jince Basin of the Barrandian, were derived from an early Cadomian volcanic island arc developed on Neoproterozoic oceanic lithosphere and accreted to a Cadomian active margin of northwestern Gondwana. Inversion of relief terminated the Cambrian sedimentation, and a successory Prague Basin subsided nearby since Tremadocian. Source area of the Ordovician and Early Silurian shallow-marine siliciclastic sediments corresponded to progressively dissected crust of continental arc/active continental margin type of Cadomian age. Since Late Ordovician onwards both synsedimentary within-plate basic volcanics and old sediments had been contributing in recognizable proportions to composition of the siliciclastic rocks. The siliciclastic sedimentation was replaced by deposition of carbonate rocks throughout late Early Silurian to Early Devonian period of withdrawal of the Cadomian clastic material source. Above the carbonates an early Givetian flysch-like siliciclastic suite completed sedimentation in the Barrandian. Concentrations and ratios of the trace elements (HFS and REE groups and some mantle compatible elements) in both volcanics and siliciclastic sediments suggest that an extensional tectonic setting prevailed in the Teplá–Barrandian unit from Middle Cambrian to the times of the Early/Middle Devonian boundary interval. This proposal is in full accordance with earlier assumptions based largely on sedimentological and paleontological data. The extensional regime was related to Early Paleozoic large-scale fragmentation of Cadomian belt of northern Gondwana and origin of Armorican microcontinent assemblage. The Teplá-Barrandian unit also took part in a substantial periequatorial drift of the Armorican microcontinent assemblage: the respective paleolatitudes of 58°S (Middle Cambrian) and 18°S (Middle Devonian) were inferred for the Barrandian rocks. The Middle Devonian flysch-like siliciclastics of the Prague Basin suggest a reappearance of the deeply dissected Cadomian source area in a proximity of the Barrandian due to early Variscan convergences and collisions of the Armorican microcontinents. Significant paleotectonic rotations are paleomagnetically evidenced to take place during oblique convergence and final docking of the Teplá-Barrandian microplate within the Variscan terrane mosaic of the Bohemian Massif.

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 study has continued in the karst areas of the Nízké Tatry Mts. Sections in cave sediments preserved at high altitudes in the Demänovská, Jánská and Mošnická karst valleys were surveyed and sampled for magnetostratigraphic and mineral magnetic measures. Obtained paleomagnetic polarity data have completed our former stratigraphic results from this karst area (see enclosed Fig.). Bulk magnetic susceptibility and temperature-dependent magnetic susceptibility indicate different sources and weathering processes affecting the investigated Tertiary and Quaternary cave sediments.



Magnetostratigrafhic scheme of the age of cave sediments in cave systems of the Nízké Tatry Mts. (J. Kadlec). Black squares – a specimen with normal polarity; white squares – a specimen with reverse polarity.

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

The joint project is conducted together with the Institute of Archaeology ASCR. The ground-penetrating radar measurements were applied to determine the architecture of Holocene fluvial deposits – both channel and meander and flood-plain sediments. The geophysical interpretation was verified by two excavated test pits 3 m deep. The second one exposed pieces of trunks deposited in fluvial sediments. Two samples of wood were sent to the Radiocarbon Laboratory in Poznan (Poland) for radiocarbon datings to determine an age of fluvial deposition. The trunks are old 5965 ± 35 years BP, 5995 ± 45 years BP (uncalibrated), respectively. Based on the obtained geophysical data, a 270 m shallow archeological trench was excavated. This trench exposed Neolithic artefacts and a Roman Age oven.

No. A301203903 Tectonomagmatic position and evolution of the Permian–Carboniferous volcanism in the Bohemian Massif within the Variscan belt of Europe (***J. Ulrych, P. Bosák, J.K. Novák, J. Adamovič, P. Vítková, J. Pešek*** & *P. Martinec, Technical Univ. Ostrava*)

Subproject: Late Paleozoic volcanics of the Czech part of the Intra-Sudetic Basin, Bohemian Massif: Petrological and geochemical characteristics (***J. Ulrych,*** *F. Fediuk*, ***M. Lang*** & *P. Martinec*)

Two series of Late Paleozoic volcanics were distinguished in the Intra-Sudetic Basin: (I) trachyandesite (latite) [Late Carboniferous] – (^{87}Sr/^{86}Sr)$_i$ = 0.7100; ε_{Nd} (290 Ma) = –6.1, (II) basaltic trachyandesite (shoshonite) – trachyandesite (latite)/andesite – trachyte/trachydacite – rhyolite (partly ignimbritic) [Permian] – (^{87}Sr/^{86}Sr)$_i$ = 0.705 to 0.069; ε_{Nd} (290 Ma) = –2.7 to –3.4. The newly recognized presence of trachytic derivatives indicates rather continuous differentiation of the series than a contrasting bimodal distribution. Both series are in general subalkaline with transitions to alkaline. Problematic calc-alkaline and tholeiitic character of basic and intermediate volcanics reflects in rare presence of orthorhombic pyroxenes. Permian volcanics predominate by their volume substantially. The evolution of magmatic activity took place in recurrent cycles, each starting with acid volcanics and ending with mafic ones. Trace-element geochemistry of mafic rocks reflects probable EM-derived products affected by low crustal contamination during the assimilation-fractional crystallization (AFC) process. Acid derivatives cannot be explained as an ultimate fractionation product of the residual melt in an upper crustal chamber. They are rather associated with the crustal anatexis triggered by heat input from the ascending mafic mantle-derived magma. The Sr-Nd isotope signature confirms a significant crustal contamination. Although the primary magma composition is obscured by pervasive crustal assimilation, DM and/or HIMU sources cannot be neglected as indicated by the isotopic data. The origin of the Late Paleozoic volcanics of individual basins in E and N Bohemia is obviously similar, however, their geochemical peculiarities indicate the evolution in separate small crustal magma chambers.

Subproject: Late Variscan volcanism in continental basins of the Bohemian Massif (Czech Republic): Geochemical characteristics (***J. Ulrych, J. Pešek , P. Bosák,*** *P. Martinec, F.E. Lloyd , V. Seckendorf,* ***M. Lang & J.K. Novák***)

Extensive late Variscan basic/(intermediate) and acid volcanism has been documented from the Bohemian Massif. The Late Carboniferous volcanic episode started at the Duckmantian/Bolsovian boundary and intermittently continued until Westphalian D to Stephanian B producing mainly acid ± basic volcanics in the Central Bohemian and the Sudetic basins. During the Early Permian volcanic episode after the intra-Stephanian hiatus, additional large volume of acid and basic

volcanics was extruded in the Sudetic basins. The volcanics of both episodes range from totally prevailing subalkaline (calc-alkaline to tholeiitic) of convergent plate margin-like type to transitional and alkaline of within-plate character.
Based on their geochemical signatures they can be divided into two groups (i) basic and (ii) acid, derived from parental magmas of different source. No signs of possible common magma were found among the Carboniferous and Permian primitive magmas. Despite the similarities in the geochemical character of volcanics of both ages the sequences differ in the Sr presentation and isotope signatures: positive Sr anomaly, high $^{87}Sr/^{86}Sr$ (0.710) and low ε_{Nd} (–6) are characteristic of the Carboniferous volcanics, while negative Sr anomaly accompanied by low $^{87}Sr/^{86}Sr$ (0.705) and high ε_{Nd} (+3) is typical of the Permian volcanics. Acid volcanic rocks of both episodes are geochemically very uniform. Geochemical signatures are comparable with peraluminous S-type granitoids ε_{Nd} (–6 to –7). Two independent magmas, basic and acid, influencing each other must have existed during the volcanic rock series formation. The Sr-Nd isotope signature confirms a significant lower crustal contamination and a higher probability of DM and/or HIMU sources of basic magma than the EM source indicated by the trace-element data. However, the trace-element geochemistry of the basic and intermediate rocks indicates rather evolution of the magma from the EM source by the AFC process. Partial melts of upper crustal material by the ascending primary basic magma represent a source of the acid volcanism. An anomalous mantle segment with residual phlogopite can be supposed as the source material of original primitive basic magma. The origin of the Late Paleozoic volcanics of individual basins of the Bohemian Massif is obviously similar, however, their geochemical peculiarities indicate the evolution in separate crustal magma chambers.

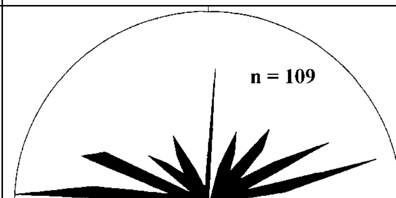
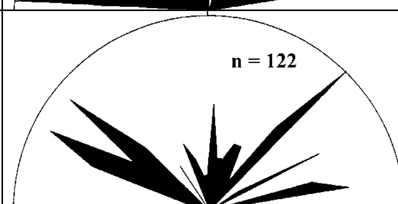
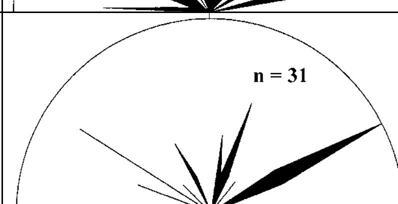
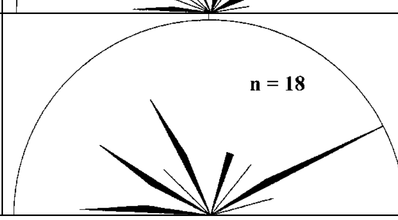
Subproject: Variations in magnetic anisotropy (AMS) and opaque mineralogy along a vertical dyke of syenogranite porphyry at Cínovec, NW Bohemia (*F. Hrouda, AGICO Inc. Brno, M. Chlupáčová, PETRAMAG Praha* & ***J.K. Novák***)

Syenogranite porphyry dykes are the subject of interest because of /i/ successive emplacement between the Teplice rhyolite complex and high-level granite intrusions of the YIC, /ii/ datings as high as 307–309 Ma, and in particular /iii/ because of their conspicuous magnetic properties. The syenogranite porphyry in drillhole E-16 (east of Cínovec) was investigated in the range of 0.5–922.7 m using AMS analysis and opaque mineralogy. It was revealed that it likely consists of two magma pulses which differ in magnetic foliation as well as contents and quality of ferrimagnetic minerals. The upper one in the interval of 200–400 m has almost horizontal magnetic foliation, in particular at its base (i.e., oriented oblique to subvertical dyke walls). This pattern can be interpreted as a consequence of a static vertical compaction of the partially solidified magma and of pressure of ascending lower magma pulse. The lower one has commonly steep magnetic foliation and/or lineation. Bulk susceptibility on the order of magnitude of 10^{-4} to 10^{-2} (SI units) and higher NRM is associated with accessory magnetite, ilmenite with magnetite lamellae, and hemoilmenite, in particular at the depth of 200–400 m. Some methodical aspects of the ASM were explained.

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

Subproject: Dyke swarm emplacement in the volcanic centre of the České středohoří Mts., Eger Rift, and its paleostress background (***V. Cajz & J. Adamovič***)

The Roztoky volcanic centre between Ústí nad Labem and Děčín evidences polyphase magma emplacement, development of crater vents and tectonic movements. One of the characteristic features is the presence of a dyke swarm of lamprophyres and semilamphrophyres. Cretaceous sandstones and marlstones are penetrated here by basaltic intrusions (basanites to nephelinites and tephrites to trachybasalts) representing mostly the subvolcanic or sub-superficial parts of the crater vents. These vents produced basaltic material of superficial volcanic products divided into two lithostratigraphic units. Hypabyssal intrusions are of essexite – monzodiorite – sodalite syenite composition. A body of trachytic intrusive breccia is developed near Roztoky, 3.5 km by 1.5 km in size. The intrusions of massive trachytes and phonolites are developed as smaller bodies inside the trachytic breccia itself. Several other bodies of phonolite are present in the wider area of the centre, e.g., the Kozí vrch Hill laccolith or the possible Choratice-Nebočady sills. Volcanic activity of the centre has been dated to 33–16 Ma. Strikes of the dykes (n = 280) were newly measured. Their statistical evaluation complemented by cross-cutting observations in the field revealed a relatively close structural affinity between dykes of lamprophyres and semilamprophyres, and their considerable structural difference from felsic dykes. The analysis of intrusive geometries of bodies of hypabyssal rocks as well as the difference in strike patterns between lamprophyre dykes on one side and semilamprophyre and basaltic dykes on the other side indicate a change in regional stress field in the Eger Rift area at around 30 Ma: from E–W- to N–S-orientated maximum principal stress. The proved bimodal pattern of semilamprophyre dyke strikes may be caused by filling of previously developed paired fracture systems with magma. Post-emplacement tectonic deformations of the dyke swarm, such as the newly recorded right-lateral displacement along a NW–SE-striking transtensional zone in the Těchlovice area, should be attributed to the Late Miocene to Pliocene period of ENE–WSW extension.

Rock groups	***Proportion (%)***	***Rock types***	***Dyke strikes***
Ulrych and Balogh 2000		*sensu Hibsch 1936*	*Cajz 2002*
lamprophyres	58	camptonite, monchiquite, (mondhaldeite)	
semilamprophyres	27	gauteite, bostonite	
basaltic rocks	6	nephelinite, basanite, tephrite, etc.	
felsic derivatives	9	tinguaite (tinguaite porphyry), syenite porphyry	

The frequency of dyke strikes in the volcanic centre of the České středohoří Mts. depending on rock type (V. Cajz & J. Adamovič).

No. A3048201 Geochemistry of the phonolite-trachyte 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 & P. Vítková***)

Subproject: Vinařická hora Hill Cenozoic composite volcano, Central Bohemia: Geochemical constraints (*Z. Řanda,* ***J.K. Novák,*** *K. Balogh, J. Frána, J. Kučera &* ***J. Ulrych***)

Olivine-poor nephelinite of Vinařická hora Hill substantially differs from both olivine nephelinite and olivine-free nephelinite of the Cenozoic volcanic province of the Bohemian Massif. Vinařická hora Hill represents a volcanic relict 31.0–25.5 Ma in age located in the Bohemian Cretaceous Basin in central Bohemia. The very low Mg-values (46.6–49.7), low contents of compatible elements such as Cr (4.9–23.3), Ni (3–55), Co (39–43), Sc (17.0–18.6) (all data in $\mu g\ g^{-1}$) and the lack of mantle-type xenoliths evidence differentiation of primary mantle magma. Anomalous enrichment in incompatible elements, particularly in ΣREE (523–589), Zr (601–842), U (2.1–3.1), Th (11.6–13.0), Nb (176–188), Ta (10.5–11.2), is associated with magmatic differentiation manifested in crystallization of apatite, Ti-magnetite ± hauyne(?). Olivine-poor nephelinite could be derived from carbonated nephelinite magma with high $CO_2/H_2O + CO_2$ volatile fraction resulting in high viscosity and consequent stopping of magma associated with differentiation and contamination in a crustal reservoir during its ascent to the surface. Such magma could be associated with a highly explosive pyroclast-rich complex volcano of stratovolcanic type. The olivine-poor nephelinite of Vinařická hora Hill belongs to a specific group of nephelinites of the Bohemian Massif characteristically developed in central Bohemia.

Grants of the Charles University, Prague

No. GAUK 197/2001/B-GEO/PřF The age of groundwater aquifers as reflected by isotope composition (^{3}H, $^{18}O/^{16}O$) (*J. Bruthans, Faculty of Science, Charles University, Prague* & ***O. Zeman***)

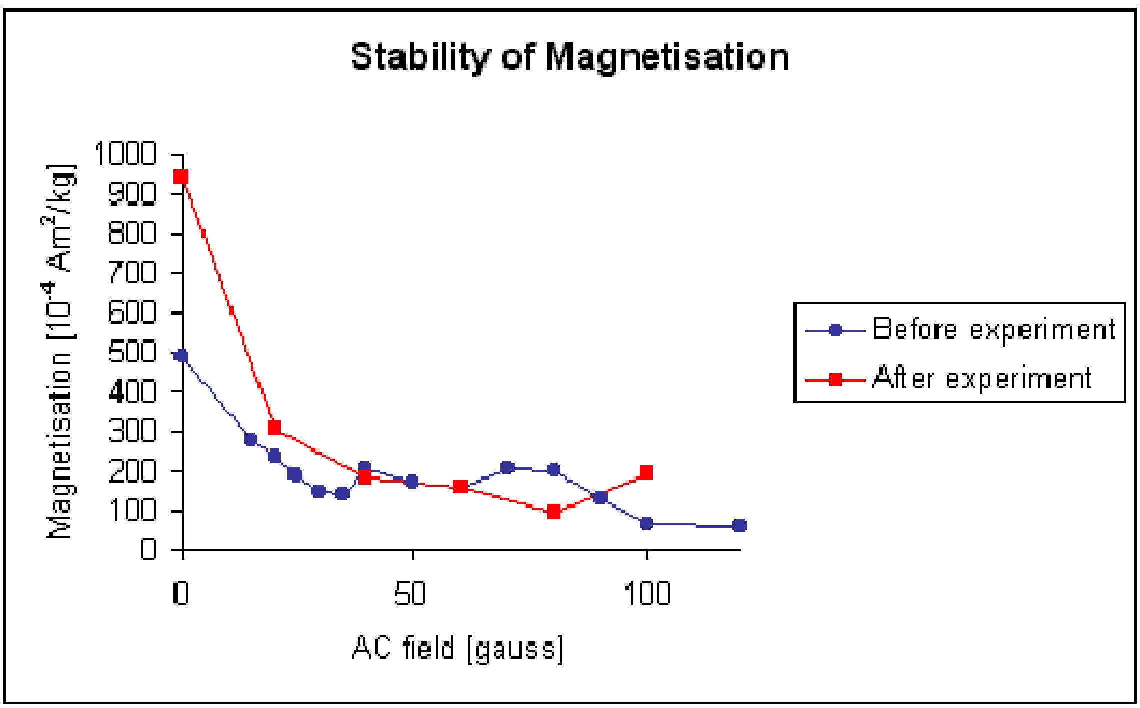
The isotope techniques (tritium, oxygen 18 of groundwater mean residence time in karstic regions) were applied to determine the age of aquifers. Several karst areas characterized by different geology, tectonic setting, morphology and intensity of karstification were selected to determine whether differences exist in mean residence time of groundwater. We sampled eleven karst springs in various areas in the Czech Republic. Each sampling was accompanied by measurement of discharge, temperature and conductivity of spring water. Only preliminary results are available, as the project is still running. Surprisingly, no significant differences were found in mean residence time in different areas. The mean residence time of karst groundwater is on the order of years or few decades for a majority of karst resurgences.

No. GAUK 227/2000/B-GEO/PřF Reconstruction of the environmental changes and the late Variscian development of the eastern part of the Bohemian Massif: Sedimentary and paleontological records of the Boskovice Graben (*K. Martínek, Faculty of Science, Charles University, Z. Šimůnek, J. Drábková, Czech Geological Survey, Prague, S. Nehyba, Faculty of Science, Masaryk University, Brno, S. Štamberg, Regional Museum of Eastern Bohemia, Hradec Králové,* ***J. Zajíc & R. Mikuláš***)

Sections at the localities of Obora, Kladoruby**,** Dolní Pepřík; Neslovice, Rybičková skála provided new sedimentological, paleobotanical, palynological, ichnological, and zoopaleontological data. The older fossil material comes from the localities of Padochov-gas line (collected by the author), Černá Hora-highway (collected by Z.V. Špinar in 1954), and Zbraslavec (collected by Havlata and students in 1969). The faunal assemblage of the locality of Kladoruby, Dolní Pepřík consists of actinopterygians *Paramblypterus* sp., shark teeth *Triodus* sp., amphibians, and acanthodians *Acanthodes gracilis*. Fauna of this locality is suitable for chemical preparation. The native organic matter-rich limestone is well soluble in diluted acetic acid (about 8 to 15 percent). Skeletal elements are fossilized by calcium phosphate which is not soluble in the above mentioned acid. The most appropriate for the chemical preparation are amphibians. The actinopterygian fishes need the special method with concurrent fixation of the skull bones and scales during the dissolution. The typical fauna (valves of *Lioestheria oboraensis*, blattoid wings, actinopterygians *Paramblypterus* sp., and amphibians *Discosauriscus* sp.) was identified at the classic locality of Obora. The locality of Neslovice, Rybičková skála is important by the find of a probably new taxon – an actinopterygian fish of the family Aeduellidae with close connection to French species (Massif Central). Fauna of the locality Padochov–gas line is fragmentary but interesting (e.g., acanthodian labyrinths with otoliths and other well preserved structures of the head and gill chamber). Teeth of the stratigraphic significant shark *Triodus carinatus* (*Acanthodes gracilis* Biozone) were isolated by chemical preparation of the marlstone. The locality of Černá Hora–highway is very similar in species and sediment type to the previous locality. The locality of Zbraslavec is, on the other hand, similar to the locality of Kladoruby, Dolní Pepřík.

No. GAUK 219/2002/B-GEO/PřF Influence of Terrestrial Events on the Magnetic Record of meteorites (*M. Kobr, Faculty of Science, Charles University, Prague* & ***T. Kohout***)

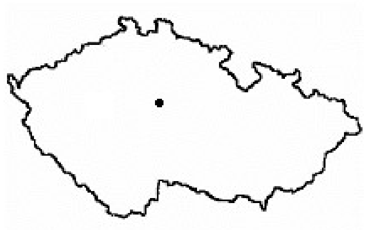
At the moment of meteorite landing, the process of terrestrial weathering commences. Some meteorites are found several days after the fall, some of them spend thousands of years in the polar ice or in the desert. During this exposure time weathering events occur. We decided that the monitor of the magnetization during simulated laboratory weathering would elucidate an important and relatively unknown level of meteorite magnetic record contamination. To simulate meteorite weathering, we bathed our meteorite samples in different salt solutions for periods of three weeks. We used saturated solutions of sodium chloride NaCl, calcium chloride $CaCl_2$ and sodium sulphate Na_2SO_4. After three weeks the samples were removed from the solution, dried and oriented accounting for the orientation in the Earth magnetic field. We AF demagnetized these samples and compared the results with the AF demagnetization data taken before the experiment. The most effective salt solutions in the three weeks magnetic weathering process were NaCl and Na_2SO_4. Magnetizations due to the weathering products resulted in an increase of more then one order of magnitude and were comparable with the NRM prior to AF demagnetization. There was practically no effect observed at samples leached in $CaCl_2$ solution. Meteorite weathering appears to be important as a consideration when interpreting meteorite magnetic records. Chemical weathering can be very rapid under specific conditions with an evident influence on the meteorite magnetic record and the magnetomineralogy. It is important to consider weathering effects during sample selection and magnetic record interpretation. Meteoritic samples must be selected with care to eliminate strongly weathered samples.



Example: Weathering of the Žebrak meteorite in Na_2SO_4. (T. Kohout).

Grants of the state departments

No. CGS 6314 Geomon 2002 *(Project of Ministry of the Environment - Czech Geological Survey, principal investigator D. Fottová, CGS Prague, GLI Order No. 0039, responsible person **P. Skřivan**)*



Long-term monitoring of the chemical composition (and calculated corresponding deposition fluxes, expressed for the individual components in $mg.m^{-2}.day^{-1}$) in bulk precipitation, beech- and spruce throughfall (precipitation below the tree canopies) at the Lesní potok catchment (Černokostelecko region) allowed us to assess several principal deposition characteristics of main atmospheric pollutants. Patterns of the annual deposition fluxes of major anions (SO_4^{2-}, N_{total}, Cl^- and F^-) in bulk precipitation throughout the water years 1993 and 2001 reflect their dominant sources in the atmosphere. The typical prevailingly anthropogenic substances SO_4^{2-}, N_{total} and F^- show gradual decrease in the dependence of their declining emissions from large boilers of the Czech power stations burning low-quality lignite, resulting from their completed desulphurization. The patterns of SO_4^{2-} and F^- are practically identical with the lowest fluxes in 1999 and with a decrease by approx. by 80 %. On the other hand, deposition fluxes of N_{total} involve also the emissions of mobile (vehicular) sources, and the decrease in volatile N- compounds is therefore not so significant. Annual fluxes of volatile atmospheric compounds of S, N and F were the lowest in 1999. Following two years revealed slight gradual increase in all these components, probably due to a temporary shutdown of some of the desulphurization facilities. Similar patterns were also observed both in spruce- and beech throughfall.

MŠMT Project No. G4/2002 (*Ministry of Education Youth and Sports, Masaryk University, Brno; One-year project for supports of PhD. Studies*) The underground cavities as indicators of slope movement dynamics (*Principal investigator I. Baroň, Faculty of Science, Masaryk University, Brno, consultants: R. Melichar, Faculty of Science, Masaryk University, Brno* & ***V. Cílek***).

The subproject coordinated by V. Cilek was focused on the development of rock crusts and clay mineralogy in sliding material. Opal impregnations, salt efflorescences and partly dissolved calcitic crust of probably Early Holocene age were identified. The diverse development of crusts on rock surfaces in landslide area testifies prevailing Late Pleistocene–Holocene age, but some older boulder admixture may be observed as well. The most important result of clay mineral investigation is the presence of smectite mineral (montmorillonite) in the matrix of some landslides where it may represent one of the instability factors due to its volumetric changes under different hydrological conditions.

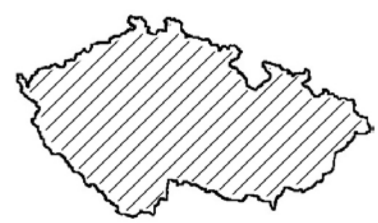
MŠMT Project (Ministry of Education, Youth and Sports)
Stratigraphic architecture of the Cenomanian of the Bohemian Cretaceous Basin: relationships of the sedimentary systems and reactivation of the Cretaceous underlying structures (*principal investigator D. Uličný, J. Laurin, L. Špičáková, Institute of Geophysics AS CR, Prague, S. Čech, Czech Geological Survey, Prague, R. Grygar, Technical University Ostrava, J. Košler, Faculty of Science, Charles University, Prague* & ***M. Svobodová****)*

Subproject No. 0045/02: Palynological analysis from the deposits of the Bohemian Cretaceous Basin – Poděbrady area (***M. Svobodová***)

Palynological investigation of dark claystones of the Peruc-Korycany Formation in the boreholes Hořátev (HP-19), Nymburk (HP-20), Malý Vestec (BPV-1), Kostelní Lhota (BPV-2), Písková Lhota (OP-2), Velim (Ve-1) from the Poděbrady area yielded new biostratigraphic and paleoenvironmental data. Changes in palynomorph assemblages provided the evidence of the fluvial – lacustrine environment in

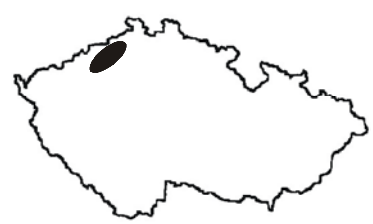
boreholes HP-19, HP-20, BPV-1, BPV-2, and OP-2. Sporomorph association was characterized mainly by pteridophyte spores of, gymnosperm and angiosperm pollen. The presence of zygnematacean aquatic algae of *Ovoidites parvus* and *Chomotriletes minor* confirms the fluvial environment. Halophyte gymnosperm pollen of family Cheirolepidiaceae – *Classopollis classoides,* common inaperturate gymnosperms *Taxodiaceaepollenites hiatus,* and marine microplankton *Circulodinium distinctum, Spiniferites ramosus, Cleistosphaeridium* sp. indicate marsh vegetation in "backswamps" (HP-20, BPV-1, BPV-2, BJ-21). Ceratioid dinocysts of *Odontochitina operculata,* peridinioid cysts of *Paleohystrichophora infusorioides* were determined and characterize the shallow marine environment of the borehole Velim (Ve-1). The age of most of the studied boreholes is Middle Cenomanian, except of the Velim borehole – it corresponds to the Late Cenomanian – on the basis of biostratigraphically important angiosperm pollen of *Complexiopollis* and *Atlantopollis.*

Grant of Ministry of Environment No. OG MŽP 128/630.01: Seismic tomography of the lithosphere in the W part of the Ohře-rift *(Project leader V. Babuška, Geophysical Institute ASCR,* ***J. Fiala & Z. Vejnar****)*



Three topics were followed: (1) Characteristics of the contact between Saxothuringicum and Moldanubicum in W Bohemia show this boundary as a result of Variscan continental collision followed by gravitational and rheological collapses of thickened crust. (2) N–S structural lines in the W Bohemian crystalline complex were followed from ca. 340 Ma (intrusive lines of Kladruby and Bor granite massifs) to ca. 245 Ma (Bohemian quartz lode and related faults). (3) The character of the Karlovy Vary pluton contact with the Svatava crystalline complex dips steeply to the SW with relatively narrow contact aureoles.

Grant of the Ministry of the Environment No. OG MŽP 18/01 Slope movement hazards in the Litoměřice county – scientific research of neovolcanics (*co-ordinated by P. Kycl, Czech Geological Survey, Prague*)
Subproject: Scientific research of neovolcanics (***V. Cajz***)



Slope movement hazards are some of the most important phenomena limiting the regional development in this area. Research was conducted in the area of steep slopes on SE margins of the České středohoří Mts. volcanic range (Verneřické středohoří part). They resulted in the maps of hazards, prepared for use by the local authorities and by the Ministry of the Environment. The volcanic rocks participate in the slope movement hazards by rockfalls and landslides. Solid volcanics, esp. those with irregular and columnar jointing, are more predisposed to rockfall, if exposed by erosion on steep slopes. Volcaniclastics, which are mostly incoherent and primarily argillic (fine-grained hyaloclastites), are highly prone to landsliding. This is particularly the case at the base of the volcanic complex, esp. if they are underlain by Cretaceous marlstones. As erosion exposes the base of the volcanic complex and creates steep slopes, both types of slope movements may occur. Large blocks of the volcanics were identified to be sliding on top of the underlying Cretaceous sediments. Geological, tectonic and geomorphic settings were found to be the most important controls on the generation of slope movements in this area.

Industrial grants

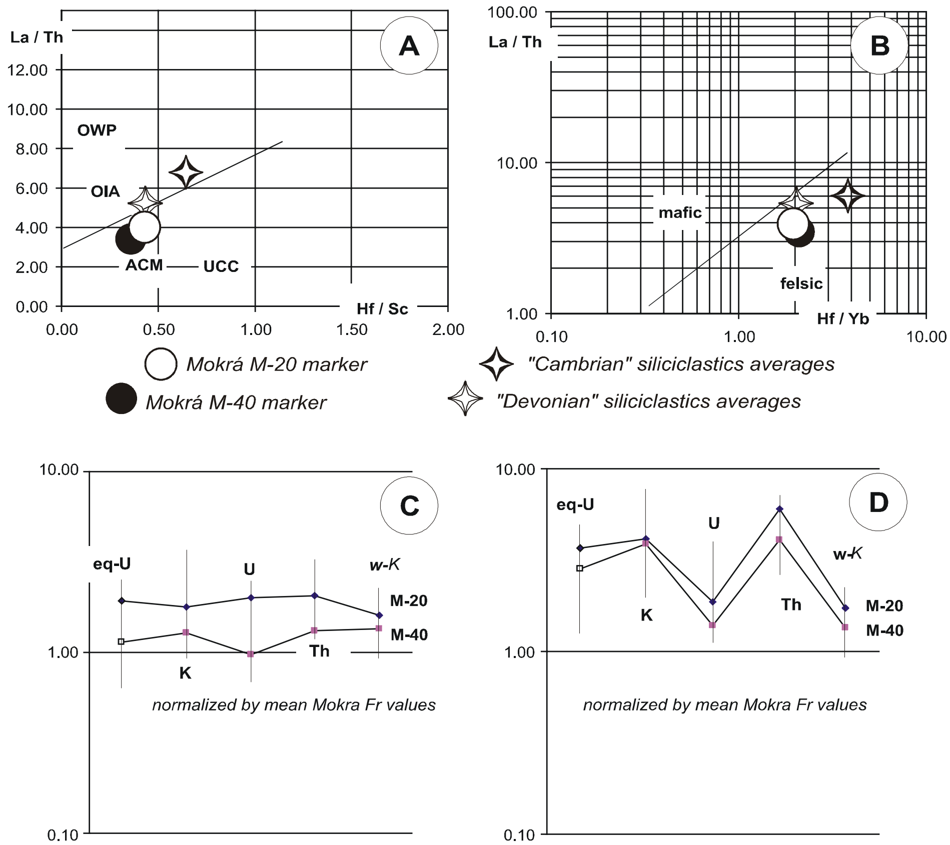
Czech-Moravian Cement Co. (Lime and Cement Works of Mokrá) Project No. CMC4800003148/1110310 Accomplishment of geological investigation – assessment of geophysical rock features in quarry of Mokrá and age determination of sediments from karst cavities in QC of Mokrá. (*Coordinators:* ***J. Hladil & J. Kadlec***)

Subproject 7004: Physical stratigraphy of Paleozoic limestones in Mokrá quarries compared with sedimentary and early diagenetic rock fabrics. (***J. Hladil, F. Patočka*** & ***L. Slavík*** *in cooperation with M. Geršl & H. Gilíková, Masaryk University, Brno, J. Frána, Nuclear Physics Institute, Řež u Prahy & L.F. Jansa, Geological Survey of Canada – Atlantic, Dartmouth*)

Blocks of the Frasnian limestone of Mokrá, tectonically transposed and erosionally dissected, have been exactly correlated using a couple of significant stratigraphic markers. Because of position of these levels 20 and 40 m under the Frasnian/Famennian sequence boundary (pivotal section in the Quarry West), these two markers have been labeled as M-20 and 40, respectively. By gamma-ray spectrometric and magnetosusceptibility correlation with other Moravian sections, the appropriate time-levels are believed to be early *rhenana*–late *rhenana* and *punctata–hassi* biozonal transitions or, alternatively, sedimentary condensations linked to the *5th–6th* and *3rd–4th* "Fr-1Ma-cycle" transitions. Unexpectedly, the major natural boundary within the Frasnian stage (Middle–Late Frasnian, *4th–5th* cycle) was disqualified for exact correlation owing to large thickness and irregularity of the geophysical identification features (particularly *~jamiae* zone equivalent). Unravelling the geophysical-geochemical patterns on these two markers is critical to understanding the development of insoluble residues and the influx of sedimentary or volcanic material from paleogeographic neighborhood. By thin plate of the rock with the marker (0.5 m in thickness), the values normalized by means of the "Mokrá Frasnian average" show excessive abundance of Th, then K, but U values are only moderately increased, ca. x1.5. Magnetic susceptibility values are also increased. The M-20 marker provides all these values higher than M-40. Taking wider intervals into account (3m plate), the normalized data exceed much more on M-20 than M-40. Utilization of this "thick-plate" variant confirms that increased U and κ-values are fixed rather with close offset from the proper marker planes than directly with these hardground-paleosol surfaces. The contents of rare earth elements closely follow the REE distributions for average post-Archaean sediment. It suggests that non-carbonate background sedimentation on this carbonate platform was probably "ultra-fine, well-mixed and averaged". Only M-20 provided little enhancement on Sm and Eu by a problematic drop of Tm values (possible signal of andesite-trachyte volcanic ash). Large scanning of minor and trace elements abundance display excess of Rb, Hf and W (vs. Earth crust averages), apparently in M-40, as well as anomalous abundance of As and Sb, particularly in M-20. However, this overabundance of Rb, Hf, W and As, Sb was not found in Early Paleozoic "Basal Clastic" formations of Moravia.

Subproject 7003: Study of the Cenozoic sediments in caves of the southern part of Moravian Karst (***J. Kadlec***)

Study of the cave sediments deposited during the Middle and Late Pleistocene in the Ochozská Cave continued. The anisotropy of magnetic susceptibility was measured in fluvial cave silts in two sections exposed in the Zkamenělá řeka Passage and in the U kužele Passage. The detailed measurements revealed the paleoflow directions of the streams in the cave system. The flow directions to the S (to the Hlavní dómy Corridor) dominates in the first section. The anisotropy of magnetic susceptibility measured in the second section indicates flow direction out from the cave, i.e., from the Hlavní dómy Corridor to an unknown lower passage.



Toward characteristics of Frasnian stratigraphic markers M-20 and 40 – illustration to industrial grant by Czech-Moravian Cement Co. (J. Hladil).
A : La/Th vs. Hf/Sc from non-carbonate residues. The mixing of both atmospheric deposition and oceanic suspension sources imitate "ACM-related setting". Abbr.: OWP – ocean withinplate, OIA – ocean island arc, ACM – active continental margin, UCC – upper continental crust / cratons and platforms.
B : La/Th vs. Hf/Yb discriminate volcanic composition equivalents; the analysed material slightly tends to "felsic field". The average values for the Devonian and Cambrian siliciclastics of Moravia (for comparison) display offsets to right and up in the diagrams. (Designed by F. Patočka, resp. P.A. Floyd).
C : Normalized average values from 3m thick plates with the correlation marker plane. Abbr.: eq-U – total natural gamma-ray activity, uranium equivalent, K – abundance of potassium, U – uranium, Th – thorium, and w-*K* denotes mass-related magnetic susceptibility of rock. *D* : Similar diagram but based on 0.5m plates on the markers. Note the common Th and K as an evidence for paleosol surface. .

Subproject 7104: Siliceous microfossils and their relationship to rock quality (***P. Čejchan***)

A diverse biota of Lower Carboniferous (Tournaisian–Viséan) Polycystina ("Radiolaria") discovered by the present author in 1985, has been resampled and reinvestigated. Polycystine fossils are preserved as original silica skeletons in phosphatic nodules contained in marine limestone breccia underlying the Březina Shales, cropping out within a well-exposed upper Devonian to Lower Carboniferous marine sequence of the Mokrá Quarry, E of Brno city, Czechia. The recovery of isolated specimens by acid leaching followed by strong oxidation permitted the biota to be studied using the SEM. Although the biota is approximately contemporaneous with those of Nazarov 1975, Nazarov 1980, Nazarov & Ormiston 1987 and Won 1983, its composition apparently differs. The biota is represented by two (? three) main clades: albaillelids, entactiniids, and possibly actinommids (their presence is uncertain as the clade is based on the absence of interior spicula as a shared apomorphic character, which is (the true absence) hard to prove, especially when the preservation of the fossil material is not excellent). The following clades were established within the biota: Entactinia, Astroentactinia, ? Helioentactinia, Haplentactinia, and Ceratoikiscum. Previously established Albaillella, and Stigmosphaerostylus = Variospina were not reascertained as yet. The biota surprisingly lacks pylentonemids, popofskyellids, Eostylodictya, and Paronaella, otherwise so typical for the Lower Carboniferous. Most surprisingly, the biota most resembles the one published from Thailand, in the absence of eostylodictya, and paronaella. This might be easier explained by paleoecological (incl. paleolatitude) rather than paleobiogeographical reasons, although this possibility cannnot be excluded, as the paleogeographical position of both Mokrá and Kabang localities is near the equator, about 70 degrees apart longitudinally.

Velkolom Čertovy schody Quarry Co. Project No. 7814: Čertovy schody Quarry: Biogeochemical monitoring (***I. Dobešová***, contributions: ***P.Skřivan, O. Kvídová & M. Burian***)

Atmospheric deposition fluxes of selected chemical elements were monitored in the broader region of the Bohemian Karst throughout the years 1997–2002. Results obtained in the Karst region were compared with monitored fluxes in a reference rural region of Kostelec n. Č. lesy in Central Bohemia. Main outcomes achieved in 2002 are as follows: The year 2002 was strongly affected by the extraordinary high precipitation rate, abnormally distributed throughout the water year 2002. More thorough wash-out of the atmosphere by heavy rains in summer and autumn generally resulted in the enhancement of deposition fluxes of majority of studied elements and ions, including minor and trace elements. Deposition fluxes of Na, K, Ca, Mg, Cl^-, F^-, SO_4^{2-} and NO_3^- in 2002 generally show considerable similarity to those of 2001, with moderate enhancement. Deposition of Ca, Mg, SO_4^{2-} and NO_3^- in close vicinity of the Čertovy schody quarry showed a predominantly decreasing tendency in 2002, documenting a decrease in dust particles and lower content of strong inorganic acids in the near-surface atmosphere. Preconcentration of samples determined for the analyses of As, Be, Cd, Cr, Cu and Zn brought significant refinements in the determination of deposition fluxes of the elements. Comparison of fluxes calculated in 2002 from the actual analytical concentration values with those derived from estimated values (below the detection limit in previous years) showed both positive and negative deviations, according to the virtual concentration of the particular element in collected samples. Laborious and delicate procedure of the sample preconcentration leads in some cases to ambiguous results (especially in case of Cu) what needs further verification. The already 7 years long monitoring of the deposition of 20 chemical elements and ions at 7 localities inside the Bohemian Karst region, as well as in the reference rural sites near the town of Kostelec n. Č. lesy, registered a considerable decrease in the deposition fluxes in many parameters. The positive changes are explained by the improvements in the electricity supply industry and in other industrial technologies, as well as by the innovation of vehicular engines. In the most recent years with relatively stable degree of atmospheric contamination and deposition of contaminants, we are witnessing the significance of climatic and/or meteorological factors on the deposition characteristics of numerous chemical substances from the atmosphere.

Severočeské doly Ltd.: North Bohemian mines, Bílina Mine: special microscopic analyses of sedimentary sequences (***M. Konzalová***)

In the underlying strata of the Bílina Mine of uncertain age, the assemblage of fern spores and pollen of vascular plants was recorded for the first time. They are altered in size and shape by the fossilization and silicification processes but they point to the Cretaceous/Paleogene strata. The research of the coal seam complex (the Most Formation) was carried out in the outcrop area with mammalian fauna (MN 3 zone) west of the Bílina Mine. Swamp vegetation locally including aquatic plants and freshwater microplancton was recorded. Hydrophytes and monocots of the families *Poaceae* (*Gramineae)* and *Sparganiaceae* point to the presence of aquatic environment and rim vegetation during the sedimentation of the Lower Miocene zone MN 3.

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

The project concentrated on the possibility of correlation of boreholes in Miocene sedimentary and volcanosedimentary fill of the Hroznětín Basin in the Ohře Rift region, floored by granites of the Karlovy Vary pluton. The correlation cannot be based on individual coal seams due to their low lateral stability but on the whole groups of seams. Correlation can be also based on redeposited lateritic weathering products overlying primary kaolin horizons, i.e., kaolinized parts of the porphyritic granites to syenogranites of the Erzgebirge type.

PAL International, a.s
Subproject No. 7026: Applied petrographic study of buried marlstone regolith at Kbely (***J.K. Novák***)

The physical-petrographic study aimed on products of fossil weathering, buried marlstone regolith and local hydrogeology within the area contaminated by chlorinated hydrocarbon solvents and heavy metals has three main implications for the management. First, the marlstone regolith buried below loess peneplain affects the porosity, permeability, subsurface patterns of recharge, groundwater flow direction, and the ability to store pollutants, generally in the upper aquifer. Secondly, the regolith erosion is associated with changes in the buried polygenetic paleo-relief and is responsible for the local drainage and paleochannel rearrangement. Thirdly, common adsorption experiments (CEC for exchangeable cations) combined with acid leaching of heavy metals at pH 2, such as Cd, Cu, Pb, Zn, Ni and Cr, indicated minor mobility in contaminated loess. In contrast, the high dissolved concentrations of the above toxic elements are much higher for glauconite-bearing sandstone. Extraction contains 0.19 $\mu g.l^{-1}$ of dissolved Cd, 36.7 $\mu g.l^{-1}$ Pb, 33.7 $\mu g.l^{-1}$ Ni, 19.7 $\mu g.l^{-1}$ Cu, and 19.8 $\mu g.l^{-1}$ Cr.

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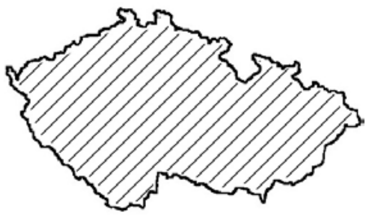
Programme of Advancements in Scientific Research in Key Directions

(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, Institute of Geophysics, Academy of Sciences, Prague*)

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



Summary:
Lithological, lithostratigraphic and isotope studies in the territory of the Bohemicum resulted in the formulation of a model of geotectonic history of this terrane. It started in the Neoproterozoic with the magmatic arc stage along the N margin of Gondwana (568–585 Ma), with a back-arc basin (>585 Ma). Closure of this basin was followed by the arc-continent collision and crustal thickening (Cadomian Orogeny, 550–585 Ma), accompanied by metamorphism. Cadomian history was completed by crustal extension in the Cambrian. This was characterized by plutonic rock emplacement (523 Ma) and formation of troughs with molasse fill. In the Ordovician, the separated microcontinent unit with the Bohemicum terrane drifted generally to the north. In the Silurian and Early Devonian, the lithospheric plate of the so-called Saxo-Thuringian Ocean was subducted beneath the Bohemicum terrane (ca. 400 Ma). The Middle Devonian marks the first exhumation of eclogites in the orogenic wedge, documented by cooling age of 380 Ma. Saxo-Thuringian Ocean was getting closed in the Late Devonian and the microcontinent unit of the Saxo-Thuringicum was becoming underplated beneath the Bohemicum thus giving rise to a crustal duplex. In the axial part of the orogen, pop-up-type structures were formed, being dated by syn-kinematic muscovite (371–373 Ma). The crustal duplex became destabilized at about the Devonian/Carboniferous boundary, gravitational collapse develops, and troughs are formed in the axial part of the megastructure. Non-metamorphosed sediments and volcanics in these troughs were protected from later erosion (342–362 Ma). In the Late Carboniferous, the duplex of the mantle lithosphere was also destabilized, and sank into deeper parts of the asthenosphere as a heavier element, being replaced by hot asthenospheric material. This led to an enormous increase in heat flow by the overlying continental crust, to HT/LP metamorphism, anatexis and relaxation of stress field due to high diffusive creep. This rheological collapse was manifested by rapid uplift of rocks of high metamorphic grade in the Moldanubicum and in a part of the Saxo-Thuringicum, and by syntectonic emplacement of granitic rocks (341–351 Ma). Relative subsidence of the Bohemicum against the surrounding HT/LP units reaches 13 km in western Bohemia. In the late Viséan, the rheological collapse culminated by emplacement of anatectic granites (330 Ma). The front of tectonic thrusting, symmetrically departing from the megastructure axis with the development of the collapse, affects the periphery of the megastructure in the west as well as in the east.
Petrological studies in the Polička and Zábřeh Crystalline Complexes in the NE part of the Bohemian Massif documented PT environments of the formation of three magmatic suites. The oldest basic suite was subjected to metamorphism in the lower amphibolite-facies conditions. Younger emplacement of rocks of the tonalite suite occurred at different depth levels in the accreted island-arc setting. Crystallization took place at pressures of 9–4 kbar and temperatures of 656–785 °C in the south and 5–3 kbar and 559–750 °C in the north. These parameters in both cases correlate with the ambient metapelites. Rocks of the granite suite were formed as the xoungest suite: in their geochemical parameters they fall within the field of syn-collisional granites and come from a mature magmatic source.
Paleomagnetic studies from the contact of the Bohemian Massif and Western Carpathians were this time focused on the region of the Drahanská vrchovina Upland. A trend of magnetic susceptibility increase towards the SE was encountered among Devonian rocks, which may indicate the source area. Paleolatitudes inferred for the individual localities of Devonian rocks lie in the range of –9 to –24°, and tentatively determined paleorotations reach 88 to 133° clockwise. Lower Carboniferous rocks of the same region, however, show high values of paleorotation of 185 to 228°, while inferred

paleolatitudes are similar, ranging between –9 and –16° (southern hemisphere). The studied Lower Carboniferous rocks therefore show larger paleotectonic rotations than older, Devonian rocks. These anomalous results need to be tested on a statistically more significant set of samples to arrive to a reliable interpretation.

In the Barrandian, paleontological studies of conodonts in the Pragian/Zlíchovian stage interval contributed to clarification of stratigraphy. They may pose a key to the definition of the problematic lower boundary of the Emsian.

The Barrandian area was also subjected to studies by a team which has newly developed the fission-track method in apatites. Time-temperature history of the development was studied. Results from Lower Paleozoic rocks indicate maximum warming in the Late Devonian and Early Carboniferous, followed by cooling due to intensive erosion of the Variscan orogen. Thermal stability at relatively low layer temperatures (50–70 °C) was documented for a long period between the Permian and the Cretaceous, which can be interpreted as an effect of a regime with no sedimentation or with moderate erosion. In the Tertiary (40–20 Ma), the rocks were relatively rapidly cooled and uplifted to the surface. This was probably caused by an extensive Tertiary uplift of the Barrandian and the Bohemian Massif as a whole. Thermal history of the Upper Proterozoic rocks underlying the Barrandian shows maximum warming at 300–237 Ma. Their younger post-Variscan thermal history includes two major stages of accelerated cooling, much like that of the overlying Lower Paleozoic rocks. The early cooling stage dates to the Early Carboniferous from temperatures above 120 °C, and resulted from the post-Variscan erosion. The second, less prominent cooling stage, appeared approximately from the Paleogene/Neogene boundary (ca. 40 Ma) onwards and probably reflects the uplift of the Bohemian Massif. This implies that complexes of Proterozoic and Lower Paleozoic rocks evolved separately as a single homogeneous unit starting from the Variscan Orogeny, and gives no support to the idea of tectonically separated nappes.

The method of fission-track study in zircons was tested in collaboration with the Faculty of Science, Charles Univ., employing ICP MS on standards, and applied to the reconstruction of granulite rocks and granites from the southern Moldanubicum of the Bohemian Massif. The data show a range of 215–240 Ma with corresponding temperatures of 230–310 °C. The length distribution of fission tracks documents gradual and slow cooling up to the present erosive cut.

Studies in the Ohře Rift region were aimed at the disclosure of the role of tectonic processes in geological structure and their relation to volcanic activity. New volcanic bodies were found at the intersection of the Ohře Rift structures and the Elbe Zone structures. Indicated post-emplacemnt tectonic deformations confirmed the effect of Late Miocene compressive phase N–S even in further eastern continuation of the Elbe Zone. Studies in the volcanic centre of the České středohoří Mts. documented close genetic relationships between tectonic effects and emplacement of rocks of the dyke swarm.

New results of general research of the Ohře Rift permitted to organize an international symposium (HIBSCH 2002), which provided exchange of ideas of the foremost experts, and commemorated the jubilee of the geologist of global significance, J.E. Hibsch.

<u>SELECTED INDIVIDUAL RESULTS</u>:

<u>Gamma-Ray Spectrometric record of Lower Devonian sedimentary successions in the Barrandian</u>
(L. Slavík)

The previous gamma-ray spectrometric measurement of almost 170 m thick Pragian sequence in the Pod Barrandovem section (Praha–Hlubočepy) was supplemented by conodont data from the Pragian/Emsian boundary interval. The Pragian beds represent a rapidly accumulated calciturbidite sequence, with calcisiltitic, lime-mud and pelagic components. New biostratigraphic investigation of the Pg/Zl interval revealed the following points: The upper limit of the *celtibericus* Zone is defined by the appearance of the first polygnathids – *Po. excavatus* Carls & Gandl and *Po. sokolovi* Yolkin et al. The lower part of the *excavatus* Zone, which may correspond to the upper portion of the former standard *dehiscens* Zone in the sense of Bultynck, is documented herein on the basis of this single occurrence of its name-bearer. A few of the stratigraphically significant taxa of the *Latericriodus* *bilatericrescens* group were recorded in the uppermost part of the "traditional" Pragian (upper parts of the Praha Fm.). Noteworthy is the stratigraphic succession of individual members of this group. Similarly as in the Tafilalt, southern Morocco (Section Jbel Ou Driss), *Latericriodus bilatericrescens gracilis* Bultynck, 1985 occurs at the lowermost position. *Latericriodus b. bilatericrescens* (Ziegler) was documented several metres higher. A mixed conodont assemblage is present immediately below the Chapel Coral Horizon (of Zlíchovian age), combining different forms such as *L. b. bilatericrescens*, *L. b. gracilis*, *L. b.* aff. *multicostatus* (Carls & Gandl), *Ozarkodina steinhornensis miae* (Bultynck) and *C. celtibericus*. Their co-occurrence may be caused by reworking, and exceptional stratigraphical bias is related to small-scale tectonic structures below the base of the Chapel Coral Horizon. However, the most important is the stratigraphic position of *L. b. gracilis.* This form occurs in a similar position also in other Lower Devonian sections of the Barrandian. It may represent a key for the definition of the "enormously problematic" Lower Emsian boundary.

Neoproterozoic to Paleozoic history of an active plate margin in the Teplá-Barrandian unit ***(J. Fiala & Z. Vejnar)***

The geotectonic evolution of the Bohemicum terrane starts in Neoproterozoic as magmatic arc along the N margin of Gondwana (volcanics and granitoids of the Davle Formation 568–585 Ma) with a back-arc basin (basalts of the Kralupy-Zbraslav Group >585 Ma). The basin closure, arc–continent collision and crustal thickening (Cadomian orogeny, 550–540 Ma) accompanied by regional metamorphism (545 Ma on monazite) followed. The Cadomian evolution finished in Cambrian with crustal extension characterised by I-type plutonites (Kdyně and Stod massifs, 523 Ma on zircons) and by graben structures with molasse deposits (Žítec conglomerate). In Ordovician the separated microcontinetal unit with the Bohemicum terrane drifted generally to N. In the course of Silurian and Early Devonian the lithospheric plate of the so-called Saxothuringian ocean is subducted below the Bohemicum terrane lithosphere (the oldest eclogites ca. 400 Ma). In the Middle Devonian eclogites are exhumed firstly within the orogenic wedge (cooling age at 380 Ma). In the Late Devonian the Saxothuringian ocean is consumed and the Saxothuringian continental unit is subducted bellow the Bohemicum under formation of crustal duplex. In the orogene axis the structures of pop-up type formed dated with sinkinematic muscovite at 371–373 Ma. Near the Devonian/Carboniferous boundary the crustal duplex become instable and the gravitative collapse developed. Within the magastructure axial zone the grabens formed in which the unmetamorphosed sediments and volcanics are prevented from further erosion (Prague basin). The muscovite and biotite cooling ages (K-Ar and Ar-Ar data) set the time interval of this phase at 342–362 Ma. In the Early Carboniferous also the mantle lithosphere duplex become instable, sinks as a heavier element into deeper parts of asthenosphere and the hot asthenospheric material penetrates at the base of continental crust. This led to enormous enhancement of the continental heat-flow, HT-LP metamorphism, anatexis and strain relaxation resulting from high diffusion creep. This stage (rheological collapse) is demonstrated by rapid uplift of the high-grade rocks within Moldanubicum and parts of Saxothuringicum. The I-type sinkinematic granitoid dating (zircon) delimited the early phase of this process at 341–351 Ma. The subsidence of Bohemicum in relation to surrounding HT/LP units reached in West Bohemia the value of 13 km. In Late Viséan (330 Ma) the rheological collapse culminates with intrusions of anatectic S-type granites. The thrust tectonics front with collapse evolution getting away from the megastructure axis affects the peripheral zones so on the W (emplacement of the Münchberg thrust sheet) as on the E (the Moldanubian thrust).

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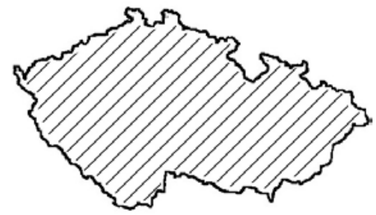
(b) K3046108 Project No. 08: Climatic and human impact on the development of natural environment (*co-ordinator K. Balík, Institute of Rock Structure and Mechanics, Academy of Sciences, Prague*)

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



Holocene climatic conditions (e.g., precipitations, vegetations density) are recorded in calcareous tufa cascades formation and later destruction. Key section of tufa cascade located in the Císařská Gorge (Bohemian Karst) was documented from the lithological point of view. Three samples of carbonate were dated by $^{230}Th/^{234}U$ in the U-series Dating Laboratory in the Institute of Geological Sciences PAS in Warsaw. Carbonate matrix of underlying limestone debris is 5.9 ± 1.5 ka old, the above lying massive tufa layer was probably deposited during the late Atlantic (however, the sample was not possible to date due to strong contamination by clastic material), the youngest sample of carbonate precipitated after destruction of cascade is only 0.3 ± 0.6 ka old.
Periods of fluvial aggradation and flood erosion were determined based on datings of flowstone laminae intercalating fluvial gravels in the Amatérská Cave (Moravian Karst). Three flowstone samples were dated by $^{230}Th/^{234}U$ in the U-series Dating Laboratory in the Institute of Geological Sciences PAS in Warsaw. The fluvial sediments were deposited in the cave channel during the Pleistocene/Holocene transition and the Early Holocene. At the top of fluvial sediments a flowstone cap precipitated 4.75 ± 0.77 ka BP. The Late Holocene fluvial erosion formed a channel in these cave deposits.

SELECTED INDIVIDUAL RESULTS:

Human impact on natural environment (***I. Dobešová, M. Filippi, O. Kvídová, L. Minařík, T. Navrátil, J. Špičková, P. Skřivan & M. Vach***)

Study of the content of IIa group of elements in granitic rocks and weathering products of the Lesní potok catchment revealed strong depletion of soils in Mg and Ca as a result of their leaching by the acid precipitation. The other elements (Be, Sr and Ba) are depleted to a lesser extent. The atmospheric input of all the IIa elements is negligible, compared to their output from the catchment through surface- and subsurface water. Strong internal cycling of Mg, Ca nad Sr through the metabolic uptake by the forest trees represents an important factor in their biogeochemical cycles. On the contrary, the metabolic cycling of Be and Ba is unimportant.

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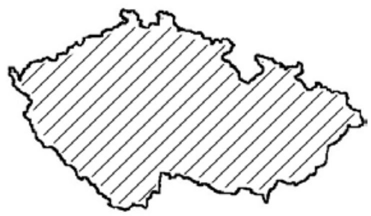
(c) K6005114 Project No. 14: Biodiversity and the function of ecological systems *(Project coordinator: F. Krahulec, Institute of Botany AS CR)*

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

The subproject is focused on the understanding of paleobiological, geological and lithological changes that are taking place during some major reorganisations of the Earth system due to such different aspects as marine water circulation, climate change and the influence of volcanism or even possible impacts of extraterrestrial bodies. We select here one of the whole scope of results to display the general character of studies:

Carbonate cycles in Quaternary terrestrial sediments

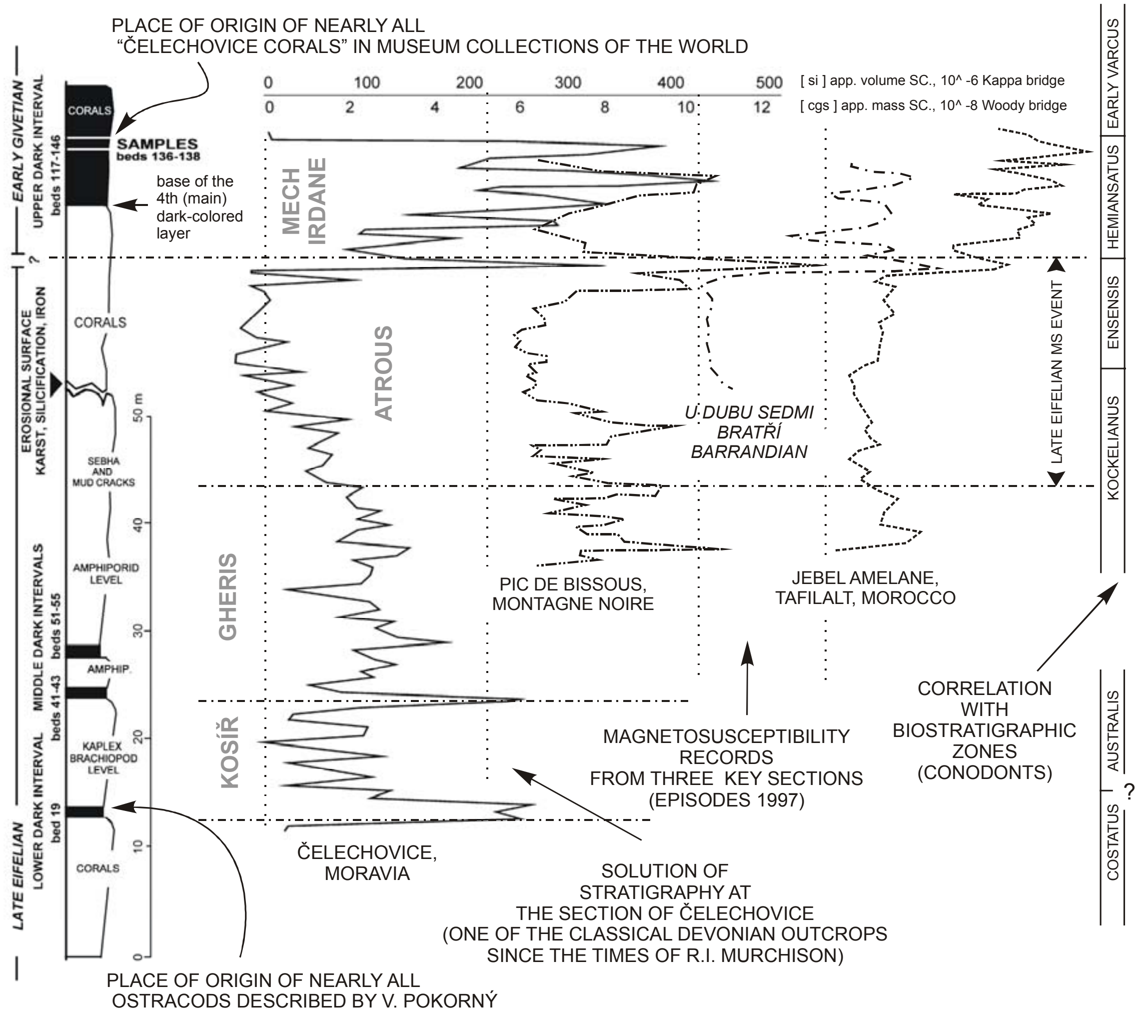


The higher $CaCO_3$ content in Early Holocene soils has been recorded from a number of areas where the presents-day soils are decalcified. Possibly the most significant feature of Holocene strata found under sandstone rockshelters (Late Glacial-Holocene) that are influenced by human activities is the presence of usually 1–3 cm thin, grey calcitic intercalations that contain some 50 wt.% of fine-grained calcite. Geochemical study indicates that the carbonate layers with high phosphorus content and low carbonate $\delta^{13}C$ and $\delta^{18}O$ composition were formed as a result of decomposition of cultural layers rich in organic and bone material. The wood ash is the principal source of carbonate. From a point of calcite and organic carbon content a glacial-interglacial soil cycle can be proposed as follows: 1 – loess and loess-like calcareous aeolian sediments and soils are covering large areas during ice ages. Deep soils capable of storing relatively rich quantities of carbon in organic and carbonate forms develop in the Late Glacial and Early–Middle Holocene. The leaching of soil carbonate and alkalis leads to soil degradation and to partial erosion. Acidification and the change of deciduous oak or beech forest into pine forest is the result. Oligotrophic soils are capable of limited carbon storage (less than 1 % and often less than 0.5 wt.% organic carbon) and thus more CO_2 is released into atmosphere. From the point of greenhouse effect we might even raise a question how much had the recent acidification and degradation of soil influenced the soil reservoir of organic and carbonate carbon and contributed to elevated CO_2 content in the atmosphere.

SELECTED INDIVIDUAL RESULTS:

Magnetic susceptibility proxies to paleoclimates compared with biotic record – the Middle Devonian Kačák crisis at the classic Čelechovice locality in Moravia (***J. Hladil****, in cooperation with* ***P. Pruner****, B.B. Ellwood, Louisiana State University, Baton Rouge, et al.*)

The Čelechovice section ("Státní lom" Quarry) provided an outstanding magnetosusceptibility (ms) record of paleoenvironment of Late Eifelian–Early Givetian times, when a series of Kačák events reflect major mid-Devonian climatic perturbances. The details of this record are ~x10 better perceptible than finest structures in classic ms-curves from Jbel Mech Irdane (magnetostratotype), Morocco, Pic du Bissous, Montagne Noire, or U Dubu sedmi bratří, the Barrandian area. The Kosíř ms-zone (~ uppermost *costatus* to lower part of *australis* conodont zone) is characterized by medium ms-values with extremely strong high-frequency oscillations. Two sharp maxima mark the beginning and end-phases of this zone. In lithology, these ms-maxima correspond to the bases of the 1st and 2nd "black-coloured limestone layers", which are, in fact, flooding surfaces marked by Fe-glauconite, ostracodes and fish microremains. Concurrently with the appearance of these above disturbances, magnetic reversals of "normal in inverted" magnetic polarities occur (the data from Hostim, the Barrandian area). The next ms-zone, the Gheris (~ upper part of *australis* to lower part of *kockelianus*), shows small-amplitude fluctuations on long-run sinusoidal oscillation (~250–300 ka); the mean ms-values have slightly decreasing trend. Onset of these Gheris times is paleontologically marked with abatement of *Kaplex*–*Kosirium*–spongophyllid–"big-hillaeporid" benthics and prevalence of *Amphipora*–green algae carpets. The next development (after the end-peak of the Gheris Zone) is apparently anomalous: all data from the world provide evidence of absolutely unique decrease of climatic oscillation that occurred concurrently with an extraordinary deep and long-term lowering of magnetic susceptibility values. This time interval has been defined by Crick & Ellwood as the Atrous ms-zone (upper *kockelianus* to *ensensis* conodont biozones). At Čelechovice, it means "sabkha facies" with presence of blackish-brown colored laminites, mudcracks and several beds of "small-spiriferid" limestones. Several dolomite layers with opaque mixtures in rock interstices and even major hardgrounds with silicified and ferruginized layers do not correspond to any serious anomalies on the ms-curve (totally uncommon situation). A major turnover developed with the onset of the Mech Irdane ms-zone (*hemiansatus* to lowermost lower *varcus* conodont biozones), where the ms-values abruptly increased worldwide. After a short "chaos", the mean ms-values kept high levels and widely oscillate (~40–50 and 100–150 ka cycles). Concurrently with the onset of the latter ms-zone, the early Givetian benthics (formerly rooted in the Ural Ocean) radiated over the world and dominated also the "classic Čelechovice faunas", in the 4th (or main) "black- or red-coloured limestone layer".



Comparison of several magnetic susceptibility logs of the world in the stratigraphic successions of mid-Devonian Kačák crises – illustration to a partial project within the K6005114 "Biodiversity" framework. (J. Hladil).

The Čelechovice section in Moravia provided one of the best Kačák magnetosusceptibility records. The magnetosusceptibility logging is not only an accurate correlation tool but provides also information about the character of the past climates. The long-living reduction of atmospheric and oceanic deposition of weathering products during the times of Atrous ms-zone (controversially to generally low sea-level stages), being characterized also by reduced variation of environment, is a very rare event in the Earth history (at ~390 Ma).

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9. Organization of conferences and scientific meetings

Conferences and Symposia organized in 2002

International HIBSCH 2002 Symposium, Teplá near Třebenice, Ústí nad Labem, Mariánské Lázně, June 3-8, 2002. Organized by: **Institute of Geology AS CR**; Czech Geological Survey, Prague; Faculty of Science, Charles University, Prague; Faculty of the Environment, J.E. Purkyně University, Ústí nad Labem; Faculty of Science, Masaryk University, Brno; Municipal Museum, Ústí nad Labem; Regional Museum, Teplice; Municipal Museum, Mariánské Lázně; Geological Society of J.E. Hibsch, Ústí nad Labem; Czech Geological Society, Prague; Staatliches Museum für Mineralogie und Geologie, Dresden; Gesellschaft für Geowissenschaften e.V. Berlin; Institut für Mineralogie und Kristallographie, Universität Wien. Organizing committee: **V. Cajz, J. Ulrych, J. Adamovič, J.K. Novák,** N. Krutský, M. Blažková, P. Bouše, F. Fediuk, M. Chvátal, E. Jelínek, V. Kachlík, Z. Kvaček, Č. Nekovařík, F. Pertlik, A. Přichystal, M. Radoň, P. Suhr, H. Walther, T. Wiesner.
Organized at the occasion of the 150th anniversary of birth of European geologist Prof. J.E. Hibsch. A Book of Abstracts and the Excursion Guide (120 p.) were published. Altogether 70 scientists from 10 countries (including overseas) participated in the event and presented 60 papers, concentrated on rift-related topics, mostly. The aim of the symposium was also to evaluate European and global significance of J.E. Hibsch – geologist, naturalist and great personality-humanist – and his legacy for the present time. Proceedings with 25 contributions will be published in 2003 in Geolines 16, Journal of the Institute of Geology AS CR.

International Conference Sandstone Landscapes: Diversity, Ecology and Conservation, Doubice in Saxonian-Bohemian Switzerland, Czech Republic, September 14-20, 2002. Organized by the Institute of Botany AS CR, **Institute of Geology AS CR** (**V. Cílek**), Bohemian Switzerland National Park. Organizing Committee: Jürgen Stein (Saxonian Switzerland National Park); Frantisek Pelc (the Administration of the Protected Landscape Areas of the Czech Republic); Marek Mráz (public Benefit Organization Bohemian Switzerland); Lenka Kopřivová (Conference Secretariat); Zdeněk Patzelt, **Zuzana Vařilová**, Lenka Voříšková, Miloš Trýzna (Bohemian Switzerland National Park); Petr Bauer (Elbe Sandstones Protected Landscape Area; Tomáš Tichý (Institute of Botany).

Conferences and Symposia under preparation

XVIIth Conference on Clay Mineralogy and Petrology, Prague will be organized in 2004 by the Czech National Clay Group in collaboration with some institutions including the Institute of Geology AS CR (co-**K. Melka, P. Bosák**).

4th International Bioerosion Workshop Prague, August 29 – September 4, 2004. Organized by the Institute of Geology AS CR, Prague and National Museum, Prague; Organizing Committee: **R. Mikuláš**, V. Turek (National Museum, Prague. So far 30 preliminarily registered participants from EU Countries, USA and Argentina and the Czech Republic.

Seventh International Congress of Vertebrate Morphology, Boca Raton, Florida, USA, July 27 - August 1, 2004. Organized by the International Society of Vertebrate Morphology. Executive Committee member: **Z. Roček**. ICVM-7 will be hosted on the campus of Florida Atlantic University.

5th World Congress of Herpetology, 2005. Organized by the World Congress of Herpetology. Executive Committee member: **Z. Roček**. The Executive Committee is in the stage of considering bids received from Cape Town (South Africa), Montreal (Canada) and Vancouver (Canada).

9th International Symposium on Fossil Cnidaria and Porifera, Graz, Austria, August 3-7, 2003 *(incl. Moravian Karst, Czech Republic, August 8-11, 2003).* Organized by the Karl-Franzens-University, Graz. Organizing committee: B. Hubmann, W. Piller, M. Rasser, B. Riegl, H. Fritz, G. Csaszar, **J. Hladil,** R. Leinfelder, J. Mello, B. Ogorelec, A. Russo & J. Stolarski. Web address: http://www.paleoweb.net/cnidaria/

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10. Publication activity of the Institute of Geology

In 2002, the Institute of Geology published one issue of **GeoLines** – conference proceedings. Each issue 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.

2002
GeoLines 14 (2002)
Proceedings of the 7th Meeting of the Czech Tectonic Studies Group (held at Zelazno, Poland, May 9-12, 2002). Edited by J. Kadlec.

7th MEETING OF THE CZECH TECTONIC STUDIES GROUP – ŻELAZNO, POLAND: ABSTRACTS

*Jaroslav **AICHLER**, Mojmír **OPLETAL**, Vratislav **PECINA**, Josef **VEČEŘA** & Vladimír **ŽÁČEK***
The Results of the Geological Mapping in a broader surroundings of Šumperk, the Jeseníky Mts, Czech Republic

*Vladislav **BABUŠKA**, Jaroslava **PLOMEROVÁ**, Luděk **VECSEY**, Michel **GRANET** & Ulrich **ACHAUER***
Mantle Lithosphere of the French Massif Central: Three Domains Derived from Seismic Anisotropy

*Nonna **BAKUN-CZUBAROW** (keynote lecture)*
Origin and exhumation of UHPM rocks their tectonic significance

*Grzegorz **BEM** and Stanisław **BURLIGA***
Deformation of Createaceous Complex in the Eastern Part of the Intra-Sudetic Basin and Nysa Graben (SW Poland) – a Geological Map Analysis

*Dawid **BIAŁEK** and Tomasz **WERNER***
AMS and Deformation Patterns in The Jawornickie Granitoids, Rychlebske Hory – Preliminary Data

*Alena **BOUŠKOVÁ**, Josef **HORÁLEK** and Tomáš **FISCHER***
Earthquake Swarms in the Major Focal Zone of the West Bohemia/Vogtland Seismoactive Region

*David **BURIÁNEK** and Milan **NOVÁK***
AMS and Deformation Patterns in The Jawornickie Granitoids, Rychlebske Hory – Preliminary Data

*David **BURIÁNEK**, Monika **NĚMEČKOVÁ** and Pavel **HANŽL***
Petrology of the Plutonic rocks in the Polička and Zábřeh Crystalline Units (NE Bohemian Massif)

*Stanisław **BURLIGA***
Shear-induced Modification of Layering in Rock Salt Complexes

*Vojtěch **DVOŘÁK** and Rostislav **MELICHAR***
Tectonics of the Northern part of the Moravian Karst

*Shah Wali **FARYAD**, Leonid Y. **ARANOVICH** and Georg **HOINKES***
Compositional Zoning in Garnet, a Tool for Understanding of Tectono-metamorphic Evolution of Metamorphic Complexes: a Case Study from Metabasites of the Kraubath Massif (Eastern Alps)

*Ivana **FILOVÁ**, Ján **MADARÁS** and Marián **PUTIŠ***
Layered Metaigneous Complex of the Veporic Basement with Features of the Variscan and Alpine Metamorphism (the Western Carpathians, Slovak Republic)

*Helena **GILÍKOVÁ**, Jaromír **LEICHMANN**, Radek **MIKULÁŠ** and Slavomír **NEHYBA***
Lithological and Sedimentological Evolution of the Cambrian in the Měnín – 1 Borehole

*Jan **GOLONKA***
Latest Precambrian – Carboniferous Plate Tectonics of the Circum-Carpathian Area

*Jan **GOLONKA** and Michał **KROBICKI***
Permian-Early Cretaceous Opening of the Carpathian Basins

*Dagmar **GREGOROVÁ**, Dušan **PLAŠIENKA** and František **HROUDA***
Perpendicular Magnetic Fabrics in Granitic Rocks of the Bratislava and Modra Massifs (Malé Karpaty Mts.) and their Tectonic Origins

*Radomír **GRYGAR**, Ivan **GNOJEK**, František **HUBATKA** and Jan **JELÍNEK***
Brunovistulian Terrane – Synthesis of Morphostructural Analysis and Geophysical Data (Moravo-Silesian Area, Czech Republic)

*Aleksandra **GRZEŚKOWIAK** and Andrzej **ŻELAŹNIEWICZ***
On the Significance of Gneissic Enclaves in the 500 Ma Metagranite, the Lądek-Śnieżnik Metamorphic Unit, the West Sudetes

*Piotr **GUNIA***
Some Petrographic Evidences for Multiphase Deformation of Ultrabasic Rocks from the Sowie Góry Gneiss Block (NE Bohemian Massif)

*Jakub **HALODA** and Patricie **TÝCOVÁ***
The Record of Thermal and Shock Metamorphism in Selected H Chondrites

*Josef **HAVÍŘ***
Orientation of Joints in the Western Bohemia Region, their Role during Post-Variscan Faulting

*Josef **HAVÍŘ***
Variscan and Post-Variscan Paleostresses on the Southeastern Margin of the Nízký Jeseník Region (Czech Republic)

*František **HROUDA**, Marta **CHLUPÁČOVÁ**, Jaroslav **AICHLER**, Petr **MIXA**, Vratislav **PECINA** and Karel **SCHULMANN***
Magnetic Fabric in Granitoid Plutons of the Jeseníky Mts and Timing of their Intrusions

*Pavla **HRUBCOVÁ**, Aleš **ŠPIČÁK** and **CELEBRATION 2000 Working Group***
CELEBRATION 2000: P-Wave Velocity Models of the Bohemian Massif

*František **HUBATKA**, Pavla **PETROVÁ** and Jan **ŠIKULA***
Definition of Delta Body in Northern Closure of the Vienna Basin (Sarmatian, Czech Republic)

*Marian **JANÁK**, Fritz **FINGER**, Dušan **PLAŠIENKA**, Igor **PETRÍK**, Bernhard **HUMER**, Štefan **MÉRES** and Branislav **LUPTÁK***

Variscan High P-T Recrystallization of Ordovician Granitoids in the Veporic Unit (Nízke Tatry Mountains, Western Carpathians): New Petrological and Geochronological Data

*Vojtěch **JANOUŠEK**, Stanislav **VRÁNA** and Vojtěch **ERBAN***
Petrology, Geochemistry and Petrogenesis of a Post-orogenic Variscan Granite: Ševětín Massif, Moldanubian Batholith

*Mirosław **JASTRZĘBSKI***
Tectonometamorphic Evolution of the Krzyżnik Mt. Region, the Lądek-Śnieżnik Metamorphic Unit, West Sudetes

*Filip **JELÍNEK**, Slavomír **NEHYBA** and Jaromír **LEICHMANN***
Sedimentary Petrography and Provenance Study as an Indicator of the Evolution of Sedimentary Basin – Southern Part of the Boskovice Furrow (Czech Rep.)

*Petr **JEŘÁBEK**, Ondrej **LEXA** and Karel **SCHULMANN***
Microstructures and Finite Strain Pattern in Heterogeneous Crustal Extension, an Example from the Vepor Basement of the West Carpathians

*Václav **KACHLÍK**, František **PATOČKA** and Miroslav **FAJST***
Sheared Metagranitoids in the Ještěd Range Mts.: the Role in the Westward Propagation of the Variscan orogenic Wedge in the West Sudetes

*Krystyna **KLIMAS** and Stanisław **MAZUR***
Petrogenesis of Gneiss Mylonites from the Niemcza Zone – New Evidence Based on Morphology and Morphometry of Zircons

*Milan **KOHÚT** and Sarah C. **SHERLOCK***
Laser-probe 40Ar/39Ar Study of Pseudotachylite and its Host Rock from the Tatra Mountains (Western Carpathians, Slovakia)

*Jiří **KONOPASEK**, Stephan **KRÖNER**, Alfred **KRÖNER**, Cees **PASSCHIER**, Karl-Heinz **HOFMANN***
Neoproterozoic High-grade Transpression in the Kaoko Belt (NW Namibia)

*Jana **KOTKOVÁ**, Jaromír **LEICHMANN**, Milan **NOVÁK** and Stanislav **HOUZAR***
Crystalline Rock Clasts from the Visean Conglomerates – the Missing Link in the Evolution of the Moldanubian Zone?

*Martin **KOVÁČIK***
Alpine Metamorphism in the Veporicum Unit: Differences in Reaction Mechanisms between Basement and Overlaying Sediments (Inner Western Carpathians)

*Zuzana **KRATINOVA**, Ondrej **LEXA**, Jan **KOŠLER** and Karel **SCHULMANN***
Syntectonic Emplacement of Leucogranitic Magma during Oblique Transpression: the Boundary between the Vepor and Gemer Units (West Carpathians)

*Zuzana **KRATINOVA**, Karel **SCHULMANN** and Jean-Bernard **EDEL***
Successive Intrusion of Three Calc-alkaline Granites during Oblique Transtension: Central Part of the Vosges (NE France)

*Lenka **KREJZLÍKOVÁ**, Alice **TOMÁŠKOVÁ**, Karel **SCHULMANN** and Pavla **ŠTÍPSKÁ***
Deformation Mechanisms, Mineral Chemistry, and P – Wave Velocity Patterns from Mylonitic Metagabbros Deformed at Amphibolite and Granulite Facies Conditions

*Ryszard **KRYZA**, Jan **ZALASIEWICZ**, Richard J. **MERRIMAN**, Alan S. **COLLINS** and Simon J. **KEMP***
P-T Paths within the Variscan Accretionary Prism Based on Illite Crystallinity and b Dimensions of Micas from Metamudrocks of the Kaczawa Mountains, SW Poland

*Jan **KUČERA** and Marek **SLOBODNÍK***
Regional Extension of Hydrothermal Veins – Result of an Important Deformation Event in the Moravosilesian Paleozoic

*Marek **KULCZYŃSKI** and Stanisław **BURLIGA***
Spatial Relations between Metamorphic and Sedimentary Rock Complexes in the Cieszów Unit Area (Sudetes, SW Poland) – Geophysical Implications

*Leszek **KUROWSKI***
Vertical Facies Variability of the Building Sandstone (Słupiec Formation, Intrasudetic Basin) on Example of the Selected Fragments of the Profile from the Vicinity of Nowa Ruda

*Tomáš **LEHOTSKÝ**, Ondřej **BÁBEK**, Radek **MIKULÁŠ** and Jan **ZAPLETAL***
Trace Fossils as Indicators of Depositional Sequence Boundaries in Lower Carboniferous Deep-sea Fan Environment, Moravice Formation, Czech Republic

*Jaromír **LEICHMANN** and Aleksandra **GAWEDA***
Niemcza Zone Granitoids – Durbachites in the Sudetes

*Marek **LEWANDOWSKI***
Paleomagnetism and its Applications to Tectonics – a Brief Outlook

*Ondrej **LEXA**, Karel **SCHULMANN**, Alan Bruce **THOMPSON** and Josef **JEŽEK***
Strain Distribution and Fabric Development Modelled in Active and Ancient Transpressive Zones <***61***>

*Jitka **LIBERTÍNOVÁ**, Jan **KOŠLER**, Michal **KUČERA** and Paul **SYLVESTER***
Li Isotopic Composition of Foraminiferal Tests and their Host Sediments

*Richard **LOJKA***
Lower Saxonian Alluvial Deposits: Trutnov Fm., Intra-Sudetic Basin, NE Bohemia

*Stanisław **MADEJ***
Geochemistry of the Orthogneisses from the Northern Part of the Lipowe Hills (Eastern Part of the Fore-Sudetic Block)

*Rostislav **MELICHAR***
Visualization of Paleostress Analysis

*Bedřich **MLČOCH** and Karel **MARTÍNEK***
Tectonosedimentary Evolution of NW Bohemia Based on the Digital Elevation Model of Crystalline Basement and Upper Paleozoic Strata: Preliminary Results

*Mentor **MURTEZI***
Tectono-metamorphic Evolution of the Złoty Stok–Trzebieszowice Shear Zone – West Sudetes, SW Poland

*Štěpánka **MRÁZOVÁ** and Roman **SKÁLA***
Fe-Ti Oxides in Selected Volcanic Rocks of the České Středohoří Mts.

*Radmila **NAHODILOVÁ**, Pavla **ŠTÍPSKÁ**, Karel **SCHULMANN** and Ondrej **LEXA***
Structure and Episodic Tectonic Evolution of the Lower Crustal Accretionary Wedge: from Deep Retro-to pro-Wedge Orogenic Fabrics

*Roman **NOVOTNÝ** and Rostislav **MELICHAR***
Paleostress Analysis and Special Slip Indicators on Fault Planes in the Surroundings of Malenovice, W of Zlín town (Rača Unit, Western Carpathians)

*Izabella **NOWAK** and Andrzej **ŻELAŹNIEWICZ***
Metabasites from the Stronie Schists in the Lądek-Śnieżnik Metamorphic Unit, West Sudetes: Geochemistry and P-T-d Path

*Nestor **OSZCZYPKO***
Evolution of the Outer Carpathian Accretionary Wedge

*Igor **PETRÍK** and Marian **JANÁK***
Migmatites and Leucogranites Produced by Muscovite Dehydration Melting on the Example of the Strážovské Vrchy Mts. (Suchý Core), Western Carpathians

*Dušan **PLAŠIENKA***
Early Stages of Tectonic Evolution of the Pieniny Klippen Belt

*Michal **RAJCHL** and David **ULIČNÝ***
Architecture of Deltaic Bodies Affected by Growth Faulting: Examples from the Bílina Delta (Neogene, Most Basin, Czech Republic)

*Jiří **REZ** and Rostislav **MELICHAR***
3D-tectonics of the Devonian rocks near the town of Adamov (the Brno Massif)

*Markéta **ROMANOVÁ** and Pavla **ŠTÍPSKÁ***
The Determination of the PT Conditions during Transition from Steep syn-Extrusional Fabrics to Horizontal: NE Snieznik Domain

*Dorota **SALATA** and Jaromir **LEICHMANN***

Provenance and Diagenesis of the Upper Cretaceous and Paleocene Sandstones of the Magura Nappe: Constraints from Cathodoluminescence Study

*Jiří **SEDLÁK**, Jan **BIMKA**, Harald **GRANSER**, Jan **BIMKA**, Viktória **SZALAIOVÁ** and Branislav **ŠÁLY***

Vienna Basin and Adjacent Tectonic Units: Structural-Tectonic Elements Mapped by Means of the Gravimetry

*Karel **SCHULMANN**, Jaroslava **PLOMEROVÁ**, Vladislav **BABUŠKA** and Ondrej **LEXA***

A Kinematic Model of Structural Development of the Moldanubian Root during the Variscan Orogeny Based on Correlation of Crustal and Mantle Lithosphere Fabrics

*Wojciech **STAWIKOWSKI***

Contacts Between High-P Eclogites and Gneisses in the Lądek-Śnieżnik Metamorphic Unit, the West Sudetes

*Ladislav **STRNAD** and Jan **KOŠLER***

Geochronology of Mid-Devonian Clastic Sediments in the Barrandian, Bohemian Massif

*Aneta **STRUZIK**, M. **ZATTIN** and R. **ANCZKIEWICZ***

Apatite Fission Track Analyses from the Polish Western Carpathians

*Zdeňka **SÝKOROVÁ**, Jan **ŠVANCARA**, Jana **PAZDÍRKOVÁ**, Petr **ŠPAČEK** and František **HUBATKA***

Preliminary Results of Detailed Seismological Monitoring in Hrubý Jeseník Mts.

*Jacek **SZCZEPAŃSKI***

Preliminary Data on P-T Metamorphic Conditions in the Metapelites from the Bystrzyckie Mts (Orlica-Śnieżnik Dome, W. Sudetes)

*Anna **SZYNKIEWICZ**, Anita **WEBER-WELLER** and Mariusz O. **JĘDRYSEK***

Oxygen Isotope Plagioclase-based Paleothermometry and Whole Rock Isotope Dating in the Ślęża Ophiolite Can Be Unreliable

*Jakub **ŠMÍD**, Karel **SCHULMANN** and František **HROUDA***

AMS Fabric of Acid Alkaline Volcanics and Implications to Flow Mechanisms and Emplacement Mode: Examples from České Středohoří Mts. – North Bohemia

*Ladislav **ŠPLÍCHAL** and David **ULIČNÝ***

Application of Gamma-Ray Spectrometry in Outcrop to Subsurface Correlation of Shallow-Marine Sandstones: Jizera Formation (Turonian) of the Bohemian Cretaceous Basin

*Lucie **TAJČMANOVÁ**, Jiří **KONOPÁSEK** and Karel **SCHULMANN***

Hercynite- vs. Kyanite- Bearing Granulites of the Strážek Moldanubicum: Metamorphic and Structural Relationships

*Zuzana **TASÁRYOVÁ***

Sedimentology of the Fluvial Deposits of the Nýřany Member, Kladno-Rakovník Basin, Central Bohemia

*Antek K. **TOKARSKI**, Ania **ŚWIERCZEWSKA**, Leszek **JANKOWSKI**, Antek **WÓJCIK** and **Galicia T. Group***

Structural Development of the Outer Carpathians (Polish Segment): Progress Report

*Čestmír **Tomek**, Ondřej **BÁBEK**, Rostislav **MELICHAR** and Jiří **KALVODA***

An Updated View on the Tectonic Structure of Non-Metamorphosed Variscan Units at the Eastern Margin of the Bohemian Massif

*David **ULIČNÝ** and Lenka **ŠPIČÁKOVÁ***

Stratigraphic Architecture of Cenomanian Paleovalley Fills, Central Part of the Bohemian Cretaceous Basin: Interplay of Base-Level Change and Tectonic Influences

*David **ULIČNÝ**, Karel **MARTÍNEK** and Radomír **GRYGAR***

Syndepositional Geometry and Post-Depositional Deformation of the Krkonoše Piedmont Basin: A Preliminary Model

*Stanislav **ULRICH** and David **MAINPRICE***

Microstructure, EBSD-Measured Texture and Seismic Properties of Mantle Eclogite FRB 1300 from the Premier Mine, Kaapvaal Craton, South Africa

*Kryštof **VERNER**, Karel **SCHULMANN**, František **HROUDA** and Jiří **ŽÁK***

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

11a) Papers published in 2002

* publications in journals with impact factor (IF value according to a list from 2001)

0.167* **Bosák P.**, Bella P., **Cílek V.**, Ford D.C., Herman H., **Kadlec J.**, Osborne A. & **Pruner P.** (2002): Ochtiná Aragonite Cave (Western Carpathians, Slovakia): morphology, mineralogy of the fill and genesis. – *Geol. Carpath.*, 53, 6: 399-410. Bratislava.

0.167* **Mikuláš R.**, Lehotský T. & Bábek, O. (2002): Lower Carboniferous Ichnofabrics of the Culm Facies: a case study of the Moravice Formation (Moravia and Silesia, Czech Republic). – *Geol. Carpath.*, 53, 3: 141-148. Bratislava.

0.167* **Peza L.H. & Žítt J.** (2002): Urgonian (Lower Cretaceous) echinoids of the Mirdita Zone (Albania). – *Geol. Carpath.*, 53: 327-332. Bratislava.

0.959* Čihák R., Královec K. & **Roček Z.** (2002): Developmental origin of the frontoparietal bone in *Bombina variegata* (Anura: Discoglossidae). – *J. Morphol.*, 255, 1: 122-129. New York. On-line publication 23rd October 2002 at: www.interscience.wiley.com.

0.994* Catto N., Chlachula J. & **Kadlec J.** Eds. (2002): Late Pleistocene and Holocene Climate and Geoarchaeology International Conference on Past Global Changes (PAGES) Praha, September 2000. – *Quater. Int.*, 89, 1: 178. Elsevier.

0.994* Chlachula J., **Kadlec J.** & Catto N. Eds. (2002): Late Pleistocene and Holocene Investigations in Europe, International Conference on Past Global Changes (PAGES), Praha, September 2000. – *Quater. Int.*, 91, 1: 152. Elsevier.

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11c) Lectures and poster presentations

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Hladil J.: Intra-annual variability in skeletal growth of the Devonian tabulate coral Scoliopora. *Lecture*. *First International Palaeontological Congr., S-5 Environmental and astronomical records in skeletal material, 6-10 July 2002, Sydney.*

Hlaváč J.: Archaeology and zoology – interdisciplinary co-operation. *Invited lecture*. *Undergraduate Course. Faculty of Humanistic Studies, University of Western Bohemia. 26.11.2002. Pilsen.*

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Kadlec J.: Carlsbadská jeskyně a Mamutí jeskyně. *Lecture*. *Výběrová přednáška: Jeskynní výplně, MU Brno, December 16, 2002. Brno.*

Kadlec J.: Fluviální sedimenty v jeskynních systémech Nízkých Tater, stratigrafická korelace podzemních a povrchových říčních procesů. *Lecture*. *Sedimentologický seminář, Přírodovědecká fakulta UK, December 9, 2002. Praha.*

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Libertín M. & **Bek J.**: *Palaeostachya (Huttonia) spicata* emend. and two new sphenophyllalean cones and their spores from the Upper Carboniferous continental basins of the Czech Republic. Lecture. *6th Europ. Paleobotany-Palynology Conf., August 29th-September 2nd 2002, Athens, Greece*.

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Zajíc J.: Vertebrate biozonation of the limnic Permo-Carboniferous deposits of the Czech Republic in the light of the last fossil finds. Invited Lecture. *53. Berg- und Hüttenmännischer Tag. Workshop Oberkarbon–Untertrias in Zentraleuropa: Prozesse und ihr Timing. June 21-23, 2002. TU Bergakademie Freiberg.*

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Žigová A. (2002): *Pedologické posouzení nevytěženého území stávajícího dobývacího prostoru lomu Kosov pro potřeby zpracování oznámení EIA dle zákona č.100/2001 Sb. na záměr „Těžba v lomu Kosovo po roce 2005"*. – MS Archive Inst. Geol. AS CR: 1-5, půdní mapa 1: 2 000. Praha.

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12. 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.)
MAVACS demagnetizer (1981)
Rotary magnetometers JR-4 (1976, 1981)
Rotary magnetometers JR-5A (1993, 1998)
Astatic magnetometer LAM-24 (<1980)
Astatic magnetometer LAM-22 (<1980)
Magnetometrs ROCOMA (1992, 1993)
Inductors ROCOMA to MAVACS (1999, 1999)
MINOSECAR cutting machines (1992,1993)
KLY 2 (1992)
Demagnetizer KC (1992)
Kappameter KT5 (1992)

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 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)

8. Microscopic laboratory (head Mgr. Michal Filippi)
System for picture analysis: Steromicroscope NIKON SM2-U with adapters and CCD camera JVC TK 1381 (1998)
Polarization microscope ORTHOPLAN Photometr. 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)

Laboratory of exogenic geology (head Doc. Ing. Petr Skřivan, CSc.)
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)
Gamma-Ray Spectrometer GS 256 (1988)
Analytical weights BALANCE 2000G (1999)
Decomposition unit PLAZMATRONIKA SERVICE S.C. (1995)
Set of vacuum lysimeters PRENART (1999)

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13. Financial Report

(in thousands Czech Crowns)

A. INCOMES	
1. From the annual budget of the Academy of Sciences CR	20,017
2. From the Grant Agency of the Acad. Sci. CR (accepted research projects)	3,087
3. From the Grant Agency CR (accepted research projects)	1,451
4. From the internal research projects of the Acad. Sci.	2,479
5. From other state sources (Ministry of Environment, etc.)	883
6. Applied research	1,498
7. Investments (for laboratory facilities)	10,871
8. Investments (for buildings)	702
TOTAL INCOMES	**41,748**

B. EXPENSES	
1. Scientific staff - wages, medical insurance	12,792
2. Research and scientific activites	6,241
3. Administration and technical staff - admin.expenses,wages,medical insurance	5,442
4. General expenses (postage shipping, maintenance of buildings, energies, transport, office supplies, miscellaneous, etc)	4,595
5. Library (subscriptions etc.)	584
6 Editorial activites (Geolines, Annual Report, Journal Czech Geol. Soc.)	268
7 Investments (for laboratory facilities)	10,871
8 Investments (for buildings)	702
9 Profit	253
TOTAL EXPENSES	**41,748**