Academy of Sciences of the Czech Republic

Institute of Geology
Annual Report 1997

CONTENTS

Editorial Note: The report is based on contributions of the individual authors; contents and scientific quality of the contributions is on responsibility of respective author(s).
The report was compiled by J. Martínek and finally edited by P. Bosák, V.Cílek.
English version was kindly revised by J. Adamovič.

Published by © the Institute of Geology of the Academy of Sciences of the Czech Republic
Prague, November 1998
Printed by VÍTOŠ, Ltd.
ISBN 80-901904-1-3
150 copies

1. Preface

The Institute of Geology AS CR was founded in 1961 when specialized geological laboratories existing since the foundation of the Czechoslovak Academy of Sciences in 1952 united. In 1964 the Institute of Geochemistry and Raw Materials was included into the Institute of Geology. During the period of 1968 to 1989 the Institute underwent a number of organizational and administrative changes, and in 1990 it was re-established in the present form.

In 1997 the internal structure of the Institute was modified according to results of detailed reevaluation of the Institute´s activity, human resources and organizational symmetry. The structures of five scientific departments were altered and only four departments survived. These changes resulted in tighter relations between scientists with similar and common scientific interests and decreased the need for administrative personnel. The reorganization was accompanied by the stabilization of scientific staff, and a number of young scientists joined the Institute thereby changing the age structure of the active staff. The new X-ray device arrived at the Service Laboratory of Physical Methods.

Pavel Bosák, PhD.
Institute Director

2. General Information

The Institute of Geology of the Academy of Sciences of the Czech Republic (abbr. GLI AS CR) concentrates on research activities in the principal branches of geological sciences. Major research areas most prominently developed in the Institute are 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
- Quaternary geology and landscape evolution
- Paleomagnetism
- Magnetostratigraphy
- Petromagnetism

The research potential of the Institute is divided into 6 units:

Scientific departments

1. Endogenic Geology and Geochemistry
2. Stratigraphy and Paleontology
3. Exogenic Geology and Geochemistry
4. Paleomagnetism

Service units

1. Service Laboratory of Physical Methods
2. Information Center (Library and Computer Network)

The scientific concept of the Institute of Geology and the evaluation of its results are 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 popularization of the most important scientific results in the public media.

***

3. Connections

Institute of Geology
Academy of Sciences of the Czech Republic
Rozvojová 135
CZ-165 02 Prague 6 - Lysolaje
Czech Republic

phone: ++420-2-20922628 (exchange)
++420-2-20922392 (director)
fax: ++420-2-20922670
e-mail: inst@gli.cas.cz

Institute of Geology AS CR
Paleomagnetic Laboratory
CZ-252 43 Průhonice

Information about the Institute of Geology on Internet: http://www·gli.cas.cz

e-mail address book

Name	***e-mail address***
Bek, Jiří	BEK@GLI.CAS.CZ
Bosák, Pavel	BOSAK@GLI.CAS.CZ
Cílek, Václav	CILEK@GLI.CAS.CZ
Čadková, Jana	CADKOVA@GLI.CAS.CZ
Čejchan, Petr	CEJ a@GLI.CAS.CZ
Dobešová, Irena	DOBESOVA@GLI.CAS.CZ
Fiala, Jiří	FIALA@GLI.CAS.CZ
Filip, Jiří	FILIP@GLI.CAS.CZ
Galle, Arnošt	GALLE@GLI.CAS.CZ
Gottstein, Ottomar	TRIFID@GLI.CAS.CZ
Hladil, Jindřich	LUCIE@GLI.CAS.CZ, HLADIL@GLI.CAS.CZ
Houša, Václav	HOUSA@GLI.CAS.CZ
Jeřábek, Karel	KJER@GLI.CAS.CZ
Klímová, Jana	KLIMOVA@GLI.CAS.CZ
Lachmanová, Marie	LACHMANOVA@GLI.CAS.CZ
Lang, Miloš	LANG@GLI.CAS.CZ
Macháčková, Jana	ALEX@GLI.CAS.CZ
Martínek, Jaroslav	MARTINEK@GLI.CAS.CZ
Mikuláš, Radek	MIKULAS@GLI.CAS.CZ
Němečková, Monika	NEMECKOVA@GLI.CAS.CZ
Patočka, František	PAT@GLI.CAS.CZ

Name	*e-mail address*
Pavková, Jaroslava	PAVKOVA@GLI.CAS.CZ
Peza, Liljana	PEZAL@GLI.CAS.CZ
Peza, Luftulla	LHPEZAG@GLI.CAS.CZ
Purkyňová, Helena	KNIH@GLI.CAS.CZ
Reiterová, Michaela	REITEROVA@GLI.CAS.CZ
Roček, Zbyněk	ROCEK@GLI.CAS.CZ
Siblík, Miloš	SIBLIK@GLI·CAS.CZ
Skřivan, Petr	SKRIVAN@GLI.CAS.CZ
Slavík, Ladislav	SLAVIK@GLI.CAS.CZ
Suchý, Václav	SEDIMENT@GLI·CAS.CZ
Svobodová, Jana	JSVOBODOVA@GLI.CAS.CZ
Svobodová, Marcela	MSVOBODOVA@GLI.CAS.CZ
Svojtka, Martin	MSVOJTKA@GLI.CAS.CZ
Štorch, Petr	STORCH@GLI.CAS.CZ
Ulrych, Jaromír	ULRYCH@GLI.CAS.CZ
Vejvalka, Jan	KRYN@NATUR.CUNI.CZ, VEJVALKA@GLI.CAS.CZ
Waldhausrová, Jarmila	WALDH@GLI.CAS.CZ
Žigová, Anna	ZIGOVA@GLI.CAS.CZ
Žítt, Jiří	ZITT@GLI.CAS.CZ
Institute management	INST@GLI.CAS.CZ
Geolines Editorial Board	GEOLINES@GLI.CAS.CZ

***

4. Principal Administrative Changes in 1996

During 1997, the reorganization of the Institute was carried out. The number of scientific departments was reduced from 5 to 4 (the Department of Sedimentology and Stratigraphy was dissolved on November 1, 1997). The remaining departments were modified in their scientific orientation and completed with scientists from the dissolved one. Several researchers left the Institute for other Academy Institutes or for the non academic sphere. At the same time approximately the same number of specialists joined the Institute either from different institutions or from universities after their graduation or postgraduate study. Several specialists retired to pension (see Staff News).

***

5. Staff (as of December 31,1997)

Management

RNDr. Pavel Bosák, CSc.	Director of the Institute
Ing. Ottomar Gottstein, CSc	Vice - Director (finance)
Doc. RNDr. Jaromír Ulrych, CSc.	Vice - Director (research)
RNDr. Petr Štorch, CSc.	Chairman of the Scientific Council

Head Office:

Josef Brožek (photographer)
Ing. Jana Čadková (assistant to the Director)

Ing. Miroslav Fridrich, CSc. (computer specialist)
Karel Jeřábek (garage attendant, driver)
Jaroslav Kratochvíl (technical service)
Petr Vachalovský (technical service)
Martin Mráček (boiler operator)

Scientific departments

Department of Endogenic Geology and Geochemistry

Scientific Staff:

RNDr. František Patočka, CSc. - Head of the Department (petrology, geochemistry)
Mgr. Martin Svojtka - Deputy Head of the Department (geochronology, geochemistry)
Mgr. Jiří Adamovič (basin analysis, tectonics)
Ing. Jiří Fiala, CSc. (structural geology, metamorphic petrology)
RNDr. Miloš Lang, CSc. (igneous petrology, mineralogy)
prom. geol. Jiří Novák (petrology)
Mgr. Monika Němečková (structural geology, tectonics and metamorphic petrology)
RNDr. Edvín Pivec, CSc. (igneous petrology and mineralogy)
Mgr. Jana Svobodová (igneous and metamorphic petrology, geochemistry)
Doc. RNDr. Jaromír Ulrych, CSc. (igneous petrology, geochemistry)
RNDr. Zdeněk Vejnar, DrSc. (structural geology, metamorphic petrology)
RNDr. Jarmila Waldhausrová, CSc. (petrology)

Technical Staff:

Josef Forman (technician)
Ing. Jaroslava Pavková (secretary of the Department, technician)
Jana Rajlichová (technician)
Václav Sedláček (technician)

Department of Stratigraphy and Paleontology

Scientific Staff:

RNDr. Radek Mikuláš, CSc. - Head of the Department (ichnofossils)
RNDr. Marcela Svobodová, CSc. - Deputy Head of the Department (Cretaceous palynology)
RNDr. Jiří Bek (Devonian and Carboniferous spores)
RNDr. Petr Čejchan (paleoecology)
prom. geol. Arnošt Galle, CSc. (Devonian corals)
RNDr. Jindřich Hladil, CSc. (Devonian stratigraphy and reefs)
RNDr. Václav Houša, CSc. (Jurassic and Cretaceous stratigraphy, calpionellids and ammonoids)
RNDr. Magda Konzalová, CSc. (Proterozoic, Early Paleozoic, Jurassic, Cretaceous and Tertiary palynology)
John Malinky PhD (hyolithids)
Doc. RNDr. Luftulla H. Peza, DrSc. (Mesozoic molluscs)
Doc. RNDr. Zbyněk Roček, DrSc. (Origin and evolution of the Amphibia, Tertiary Anura and Sauria)
Mgr. Ladislav Slavík (conodonts - civil military duty)
RNDr. Miloš Siblík, CSc. (Mesozoic brachiopods)
RNDr. Petr Štorch, CSc. (Ordovician and Silurian stratigraphy, graptolites)

RNDr. Milada Vavrdová, CSc. (Proterozoic, Paleozoic and Mesozoic palynology and plankton)
RNDr. Jiří Žítt, CSc. (Cretaceous and Tertiary paleoecology and sedimentology, echinoids and crinoids)

Technical Staff:
Marcela Šmídová (secretary of the Department, technician)

Department of Exogenic Geology and Geochemistry

Scientific Staff:
RNDr. Václav Cílek, CSc. - Head of the Department (Quaternary Geology)
RNDr. Anna Žigová, CSc. - Deputy Head of the Department (pedology, paleosoils)
Ing. Irena Dobešová (geochemistry)
Ing. Ottomar Gottstein, CSc. (geochemistry of magmatic and metamorphic rocks)
Ing. Olga Kvídová, CSc. (exogenic and environmental geochemistry)
Mgr. Marie Lachmanová (sedimentology)
RNDr. Vojen Ložek, DrSc. (Quaternary geology, malacozoology)
Ing. Jaroslav Martínek (exogenic and environmental geochemistry)
Ing. Luděk Minařík, CSc. (geochemistry)
RNDr. Eliška Růžičková (petrology, Quaternary geology)
Doc. Ing. Petr Skřivan, CSc. (exogenic and environmental geochemistry)
Ing. Václav Suchý, CSc. (sedimentology and basin analysis)

Technical Staff:
Jaroslava Bednářová (editorial services - maternal leave)
RNDr. Miloš Burian (chemical analyst)
Miroslav Karlík (technician)
Jana Macháčková (secretary of the Department, technician)

Department of Paleomagnetism

Scientific Staff:
Ing. Petr Pruner, CSc. - Head of the Department (geophysics, paleomagnetism)
Ing. Miroslav Krs, CSc. (geophysics, paleomagnetism)
prom. fyz. Otakar Man, CSc. (geophysics)
Mgr. Jana Slepičková (geophysics)
RNDr. Daniela Venhodová (petrophysics)

Technical Staff:
prom. geol. Otto Čejchan (technician)
Jana Drahotová (technician)
Věra Havlíková (technician)
Jakub Kanta (technician)

Service Units

Service Laboratory of Physical Methods

Ing. Anna Langrová - Head of the Laboratory (microprobe and scanning microscope analyst)
Jiří Dobrovolný (X-ray and thermic analyses)
Jaroslava Jabůrková (maternal leave)
Ivana Konopáčová (preparing of thin sections)
Milena Kozumplíková (microprobe and scanning microscope operator)
RNDr. Karel Melka, CSc. (X-ray and thermic analyses)
Mgr. Jiří Filip (fission track dating)

Information Center and Library

RNDr. Helena Purkyňová - Head of the Department (librarian)
PhDr. Liliana Peza (librarian)

Economic Department

Ing. Ottomar Gottstein, CSc. - Head of the Department
Antonín Čejka (technical service)
Svatava Jandeková (human resources)
Ludmila Jelichová (phone operator)
Jana Klímová (accountant)
Michaela Reiterová (accountant)
Božena Trenzeluková (phone operator)

Scientific Council

RNDr. Petr Štorch, CSc. Chairman since February (Institute of Geology AS CR)
RNDr. Jan Krhovský, CSc. Chairman till February (now with the Ministry of the Environment of the Czech Republic)
Prof. RNDr. Vladimír Bouška, DrSc. (Faculty of Science, Charles University)
RNDr. Václav Cílek, CSc. (Institute of Geology AS CR)
Prof. RNDr. Petr Čepek, CSc. (Faculty of Science, Charles University)
RNDr. Jan Cháb, CSc. (Czech Geological Institute)
prom. geol. Arnošt Galle, CSc. (Institute of Geology AS CR)
RNDr. Jindřich Hladil, CSc. (Institute of Geology AS CR)
Doc. RNDr. Zdeněk Kukal, DrSc. (Czech Geological Institute, Governmental Council for Research and Science)
RNDr. František Patočka, CSc. (Institute of Geology AS CR)
Ing. Petr Pruner, CSc. (Institute of Geology AS CR)
Doc. RNDr. Jaromír Ulrych, CSc. (Institute of Geology AS CR)

Foreign consultants

Prof. Petr Černý (University of Manitoba, Winnipeg, Canada)
Prof. Jaroslav Dostal (Saint Mary's University, Halifax, Canada)

Prof. Peter E. Isaacson (College of Mines and Earth Resources, University of Idaho, U.S.A.)
Prof. Ronald Parsley (Tulane University, New Orleans, U.S.A.)

Note: Czech scientific and pedagogical degrees are equivalents of:

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

***

6. Staff News

January

1.1.1997 prom.geol. Otto Čejchan (technician)
joined the Institute

1.1.1997 Dr. John M. Malinky (paleontologist)
joined the Institute

1.1.1997 RNDr. Miroslav Krůta, CSc. (paleontologist)
left the Institute

1.1.1997 RNDr. Jan Krhovský, CSc. (paleontologist)
left the Institute

February

1.2.1997 Mrs. Božena Trenzeluková (phone operator)
joined the Institute

March

1.3.1997 Mr. Václav Sedláček (technician)
joined the Institute

1.3.1997 Mgr. Jiří Filip (geochronology)
joined the Institute

April

1.4.1997 Mr. Ladislav Slavík (paleontologist)
joined the Department of Stratigraphy and Paleontology

May

1.5.1997 Mrs. Lenka Staňková (accountant)
left the Institute

June

1.6.1997 Mr. Jan Vejvalka (computer specialist)
joined the Institute

July

1.7.1997 Mr. František Bobek
left the Institute

22.7.1997 Mrs. Jaroslava Bednářová (technician)
took up maternal leave

August

1.8.1997 Mr. Jaroslav Švihla (technician)
joined the Institute

1.8.1997 Mgr. Šárka Eckhardtová (sedimentologist)
left the Institute

22.8.1997 Mrs. Anna Sadílková (phone operator)
joined the Institute

September

1.9.1997 Mgr. Monika Němečková (geologist)
joined the Department of Endogenic Geology and Geochemistry

1.9.1997 Ing. Irena Dobešová (geochemist)
joined the Department of Exogenic Geology and Geochemistry

1.9.1997 Mgr. Ladislav Slavík (paleontologist)
started civil military duty in the Institute

October

1.10.1997 Mr. Jakub Kanta (technician)
joined the Institute

1.10.1997 Mrs. Daniela Musilová
joined the Institute

1.10.1997 Mr. Martin Mráček (boiler opetator)
joined the Institute

1.10.1997 Mr. Jaroslav Švihla (technician)
left the Institute

November

1.11.1997 Mgr. Jana Svobodová (petrologist)
joined the Department of Endogenic Geology and Geochemistry

December

1.12.1997 Mgr. Jiří Adamovič (sedimentologist)
joined the Department of Endogenic Geology and Geochemistry

1.12.1997 Doc. RNDr. Pavel Povondra, DrSc. (analyst, mineralogist)
joined the Department of Endogenic Geology and Geochemistry

31.12.1997 Mrs. Daniela Musilová
left the Institute

31.12.1997 p.g. Otto Čejchan (technician)
left the Institute

31.12.1997 Doc. RNDr. Pavel Povondra, DrSc. (analyst, mineralogist)
left the Institute

31.12.1997 RNDr. Antonín Zeman, CSc. (Quaternary geology)
left the Institute

***

7. Undergraduate and Postgraduate Education

Undergraduate and Postgraduate Courses at Universities Given by Staff Members of the Institute of Geology AS CR:

Bosák P.: *Karstology and Paleokarstology*. Postgraduate course, Faculty of Science, Prague.
Cílek V.: *Field course*. Institute of the Fundamentals of Learning, Charles University, Prague.
Cílek V.: *Field Archaeological course - Mesolithic of the Northern Bohemia*. July 1997, Institute of the Fundamentals of Learning, Charles University, Prague.
Cílek V.: *Development of the Mid-European Landscape*. Summer session course, Simon Fraser University, Summer Study abroad, Vancouver, Canada.
Cílek V.: Mind and Landscape. North-Western University, Field School, Evanston, USA.
Houša V.: *Taxonomy and nomenclatorics*. Undergraduate course, Faculty of Science, Charles University, Prague.
Houša V.: *Paleobiogeography*. Undergraduate course, Faculty of Science, Charles University, Prague.
Lachmanová M.: *Essentials of geosciences.* Undergraduate course (seminars), Faculty of Science, Charles University, Prague.
Ložek V.: *Special lecture on Quaternary research for archeologists.* Philosophical Faculty, Charles University, Prague.
Ložek V.: *Development of the Nature during the Quaternary Era*. - Undergraduate course, Faculty of Science, Charles University, Prague.
Martínek J.: *Environmental protection*. Undergraduate course, Faculty of Forestry, Czech Agricultural University, Prague.
Roček Z.: *Evolution of vertebrates*. Undergraduate course, Faculty of Science, Charles University, Prague.
Roček Z.: *System of fossil vertebrates*. Undergraduate course, Faculty of Science, Charles University, Prague.
Roček Z.: *Comparative anatomy of the vertebrates.* Undergraduate course, Faculty of Science, Charles University, Prague.
Roček Z.: *Morphology of animals.* Undergraduate course, Faculty of Science, Charles University, Prague.
Skřivan P.: *Environmental chemistry*. Undergraduate course, Faculty of Forestry, Czech Agricultural University, Prague.
Štorch P.: *Principles and methods of stratigraphy*. Undergraduate course, Faculty of Science, Charles University, Prague.
Ulrych J., Matějka D.: *Geochemistry of volcanic rocks of the Bohemian Massif*. Undergraduate course, Faculty of Science, Charles University, Prague.
Ulrych J.: *Interpretations of mineralogical data*. Undergraduate course, Faculty of Science, Charles University, Prague.
Žigová A.: *Geography of soils of the protected landscape area Železné hory*. Field course, Faculty of Science, Charles University, Prague.

Supervision in Undergraduate Studies

M. Dvořáková, Faculty of Forestry, Czech Agricultural University, Prague (*supervisor P. Skřivan*)
V. Erban, Faculty of Science, Charles University (*supervisor J. Ulrych*)
P. Jarošová, Faculty of Forestry, Czech Agricultural University, *Prague (supervisor P. Skřivan*)
J. Samek, Faculty of Forestry, Czech Agricultural University, Prague (*supervisor P. Skřivan*)

L. Sedláčková, Department of Zoology, Faculty of Science, Masaryk University, Brno (*supervisor Z. Roček*)
L. Slavík, Faculty of Science, Masaryk University, Brno (*supervisor J. Hladil*)
J. Slepičková, Faculty of Science, Charles University, Prague (*supervisor P. Pruner*)
J. Vejvalka, Faculty of Science, Charles University, Prague (*supervisor Z. Roček*)
P. Zajíc, Faculty of Forestry, Czech Agricultural University, Prague (*supervisor P. Skřivan*)

Supervision in Postgraduate Studies

RNDr. J. Bek, Institute of Geology AS CR, Prague (*supervisor M. Vavrdová*)
RNDr. P. Čejchan, Institute of Geology AS CR, Prague (*supervisor J. Žítt)*
Mgr. Š. Eckhardtová, Institute of Geology AS CR, Prague (*supervisor V. Suchý*)
Mgr. Marie Lachmanová, Faculty of Science, Institute of Geology and Paleontology, Charles University, Prague (*external supervisor V. Cílek)*
prom. geol. J. K. Novák, Institute of Geology AS CR, Prague (*supervisor E. Pivec*)
Ing. Radek Píša, Institute of Applied Ecology, Faculty of Forestry, Czech Agricultural University, Prague (*supervisor P. Skřivan*)
Mgr. J. Slepičková, Faculty of Science, Institute of Applied Geophysics, Hydrogeology and Engineering Geology, Charles University, Prague (*co-supervisor P. Pruner*).
RNDr. E. Střelcová, Czech Geological Institute, Branch Brno and Masaryk University, Brno (*scientific consultant V. Suchý*)
Mgr. R. Štorc, Faculty of Science, Institute of Geology and Paleontology, Charles University, Prague (*scientific consultant J. Žítt*)
Mgr. M. Vach, Institute of Applied Ecology, Faculty of Forestry, Czech Agricultural University, Prague (*supervisor P. Skřivan*)
RNDr. Miloš Vater, Zoological Institute of the Slovak Academy of Science, Bratislava (*supervisor Z. Roček*)
Mgr. Jan Vejvalka, Faculty of Science, Institute of Geology and Paleontology, Charles University, Prague (*supervisor Z. Roček*)

RNDr. Jindřich Hladil, CSc. was the member of the Scientific Council of Faculty of Science, Masaryk University, Brno.
RNDr. Jinřich Hladil, CSc. and RNDr. F. Patočka, CSc. were the members of the Board of Postgraduate Studies on Geology, Faculty of Science, Charles University, Prague.

***

8. Department of Endogenic Geology and Geochemistry

Foreign Grants and Joint Projects

Joint Projects of the Geologisch-Pläontologisches Institut der Johann-Wolfgang-Goethe-Universität Frankfurt a. Main, FRG, and GLI AS CR, supported by the Deutsche Forschungsgemeinschaft, Bonn, FRG.

(1) Balance and modelling of a tilted crustal section from the anchizone up to the amphibolite facies, western margins of the Teplá-Barrandian area (Bilanzierung und Modellierung eines angekippten Krustenprofils von der Anchizone bis zur Amphibolitfazies, W-Rand Teplá-Barrandium *(G. Zulauf and G. Kleinschmidt, Geologisch-Paläontologisches Institut Johann-Wolfgang-Goethe-Universität Frankfurt a. M., FRG, **J. Fiala** & **Z. Vejnar**)*

The most striking feature in the Bohemian Massif is the juxtaposition of high-grade metamorphic rocks (Moldanubian Unit, MLD) against greenschist or even subgreenschist facies rocks (Teplá-Barrandian Unit, TB) along steep ductile normal faults, the West (WBSZ) and Central (CBSZ) Bohemian shear zones. Both shear zones dip towards the TB and are kinematically related indicating nearly radial tensional stresses during their formation. The intrusion depth estimate of well dated Early Carboniferous plutons, which emplaced into the TB and MLD close to WBSZ, was used to quantify the considerable amount of normal displacement, suggested by the mentioned contrast in metamorphism. The Mutěnín pluton, which intruded into MLD crust at ca. 342 Ma, shows petrological evidence of emplacement at the depth of about 25 km. The Babylon granite, which intruded into TB crust at ca. 342 Ma, shows considerably lower emplacement depth at maximum of 12 km. This difference suggests 13 km as the minimum normal displacement along the WBSZ. Taking the emplacement ages of the plutons and the individual cooling ages of micas into account, this considerable displacement probably occurred during Early Carboniferous, between 340 and 320 Ma.

(2) Structural and kinematic evolution of the Central Bohemian shear zone (CBS) between Klatovy and Rittsteig (Strukturelle und kinematische Entwicklung der Zentralböhmischen Scherzone (CBS) zwischen Klatovy und Rittsteig *(G. Zulauf, G Kleinschmidt and D. Scheuvens, Geologisch-Paläontologisches Institut Johann-Wolfgang-Goethe-Universität Frankfurt a. M., FRG, **J. Fiala** & **Z. Vejnar**)*

The preliminary U-Pb zircon and K-Ar biotite geochronological data from plutons emplaced in CBS (Central Bohemian Shear Zone) and also in WBSZ (West-Bohemian Shear Zone) during ductile shearing (cf. GLI Ann. Rep. 1996), were further precised and completed.

[1] The WBSZ related plutons: For the Bor granitoid only a range of 315 Ma (=minimum age) to 337 Ma (=maximum age) can be defined according to U-Pb data from zircon fractions. For

the Mutěnín pluton the U-Pb concordant zircon fraction data of 342±2 Ma were interpreted as the age of intrusion. For the Babylon granitoid also only a range of 320 to 342 Ma can be defined according to U-Pb zircon fraction data.

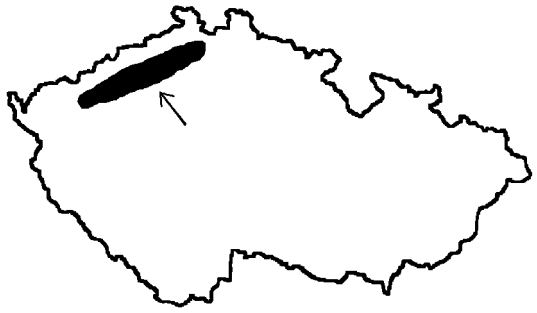
[2] The CBSZ related plutons: Single zircons from the Nýrsko granitoid body define a discordia with an upper intercept age at 341±2 Ma which is interpreted as the intrusive age. Single zircons from the Klatovy granitoid are slightly discordant and define a discordia with an upper intercept age at 349+6/-4 Ma. As the inherited cores are rare, this age is interpreted as a good approximation to the intrusive age of the Klatovy granitoid body.

Plutons of the West- and Central Bohemian shear zones related with Variscan collapse are considered to be emplaced during the Early Carboniferous (337 to 349 Ma).

(3) Magmatic and metamorphic evolution of Early Paleozoic plutonites in a coherent crustal section at the southwestern margins of the Teplá-Barrandian area (Magmatische und metamorphe Entwicklung frühpaläozoischer Plutonite in einem kohärenten Krustenprofil am SW-Rand des Teplá-Barrandiums (*P. Blümel, Institut für Mineralogie der Technische Hochschule Darmstadt, G. Zulauf, Geologisch-Paläontologisches Institut Johann-Wolfgang-Goethe-Universität Frankfurt a. M.,* ***J. Fiala, Z. Vejnar*** *& J. Babůrek, Czech Geological Institute, Prague*)

A range of Early Paleozoic plutons, intruded into the Cadomian basement in the SW part of the Teplá-Barrandian Unit, underwent Variscan thickening, metamorphism and eastward tilting. A series of 14 plutonite and contact rock samples was subjected to separation of zircon, garnet, titanite, primary and secondary hornblende and biotite with the aim to date the tectonothermal history of the selected crustal section using U-Pb and K-Ar methods. Corresponding geochronological analyses are in progress.

IGCP Project No. 369 Peritethyan rift basins: Geochemical and isotope characteristics of carbonates in Cenozoic alkaline volcanites from Bohemia (Project leaders: W.Cavazza, A. Robertson, P. Ziegler; National representative: **J. Ulrych**



Carbonates of Cenozoic alkaline volcanics from northern Bohemia have C of primary magmatic character with a shift to light isotopes, in association with fractionation processes. The O isotopes show equilibration with meteoric - hydrothermal water at low temperatures and reveal the following characteristics:

(i) dolomites associated with melilititic lamprophyres - polzenites of the Osečná Complex are characterized by high REE, high La/Yb ratio, and by $\delta^{13}C‰_0$ values in the primary magmatic range (carbonatite affinity), but with $\delta^{18}O$ ‰ values and $^{87}Sr/^{86}Sr$ ratios corresponding to lower temperature processes and some crustal contamination, (ii) calcites in phlogopitite, originated as alteration product of olivine melilitolite of the Osečná complex by late-magmatic fluids, are characterized by very low REE, low La/Yb ratio, low $\delta^{13}C$ ‰ values and by $^{87}Sr/^{86}Sr$ ratio corresponding to the parental rock; high $\delta^{18}O$ ‰ values indicate lower-temperature origin, (iii) calcites from the

contact zone of polzenite dyke with sandstones of the Bohemian Cretaceous Basin, with geochemical characteristics typical for sedimentary origin, are characterized by low REE, low La/Yb ratio and very high $\delta^{13}C$ ‰, $\delta^{18}O$ ‰ values, and $^{87}Sr/^{86}Sr$ ratios, (iv) rhodochrosite-dolomite-calcite series of post-magmatic hydrothermal origin, associated with base metal ore vein in the Roztoky Volcanic Center of the České středohoří Mts., is characterized by moderate REE contents and Yb/La ratios, high Sr and Ba contents and by $^{87}Sr/^{86}Sr$ ratio reflecting some crustal contamination; $\delta^{13}C$ ‰ values indicate probably minor admixture of sedimentary C in carbon of deep-seated origin, while the O isotope data point to participation of a low $\delta^{18}O$ ‰ fluid of meteoric origin.

Grant Agency of the CR

No. 205/95/0149 - Effect of postmagmatic processes on the mineralogical and petrochemical composition of granitoids from the Krušné hory-Smrčiny anticlinorium (***E. Pivec, J.K. Novák & M. Lang***)

The Late Palaeozoic post-collisional granites and related greisen facies from a composite intrusions of the Krušné hory batholith were studied (Western pluton: Horní Blatná, Přebuz, Rolava, Vykmanov, Horní Slavkov, Krásno and Eastern pluton: Cínovec, Krupka). Postmagmatic feldspathization of the Loket OIC (Old intrusive Complex) monzogranite in JE-83 drillhole (Karlovy Vary area), manifested by enrichment in Rb, LREE, Sn, Nb, F and depletion in Si, Ca, Ba, Sr, Pb was demonstrated including the first described presence of topaz. Geochemical characteristics including the REE patterns of the syenogranite dykes of the YIC (Young Intrusive Complex) Preisselberg type were confirmed within the Telnice monzogranite stock (VN-1 drillhole). Data on major element composition of greisens and parental granites were supplemented by the new 35 analyses including minor and trace element composition. A new program for the modal analyses recalculations based of real mineral composition was used for quantification of the effects of postmagmatic processes in granites. The petrophysical changes (magnetic susceptibility, radioactivity, bulk density and porosity data) caused by greisenization of the YIC granites and of the single granite porphyry dyke were evaluated by statistical methods and by new analytical data. The above mentioned geochemical development was checked by results of crystal chemical changes of the main rock-forming minerals (micas, topaz, tourmaline, feldspars). Tourmaline of schörl-dravite series is limited to more evolved granites of the Western pluton, their pegmatites, greisens and quartz hydrothermal veins only, reflecting the host rock chemistry.

Grant Agency of the Academy of Sciences CR

No. A3013610 - The development of the Early Paleozoic volcanic complexes of the West Sudetes: the Železný Brod as an example. (***F. Patočka & J. K. Novák***)

In the central West Sudetes the East and South Krkonoše, the low- to medium-grade metamorphosed volcanic complexes fringe the Lusatian-Jizera-Krkonoše terrane. The Na-amphibole bearing metabasites, ubiquitous in these complexes, display MORB- and OIB-like geochemistry of protolith and are supposed to be remnants of Ordovician oceanic-type crust.

The metabasite mineral assemblages indicate that the complexes experienced two metamorphic events. In an earlier event the PT conditions corresponded to blueschist facies metamorphism and in the second one to greenschist facies overprint. In the East Krkonoše complex (Rudawy Janowickie-Rýchory Mts.) the HP-LT metamorphic conditions were 0.7-1.0 GPa and 300°-500°C. The ^{40}Ar-^{39}Ar geochronology on the mafic blueschists dated the end of the earlier phase to 360 Ma. The retrograde event followed at 340 Ma. The South Krkonoše complex (Železný Brod region) metabasites usually display lower blueschist facies assemblages documenting an incipient HP-LT metamorphism. However, the jadeite bearing metabasites, in the past reported from the SW exomorphic zone of the Krkonoše-Jizera Pluton, may indicate higher-P conditions.

The metabasites of Early Paleozoic protolith age comprising Variscan HP-LT mineral assemblages, identical to those in the West Sudetes metavolcanics, are described from the Lusatian Anticlinorium and Cadomian Lusatian Pluton, and the Jáchymov Group in the Erzgebirge Mts. The Variscan UHP metamorphics, i.e. continental crust fragments subducted to mantle depths, are known from both the Saxothuringian Zone - Münchberg Massif and Central Erzgebirge - and West Sudetes - Góry Sowie and Orlica-Snieżnik Dome. That is, the rocks with mineral assemblages showing signs of subduction metamorphism seem to be distributed throughout the northern part of the Bohemian Massif. Provided that they mark the dismembered suture zone, once widespread subduction of the early Variscan age may be presumed along the Saxothuringian zone of the Bohemian Massif.

No. A3131410 - Geochemical development of volcanic complex of the central part of the České středohoří Mts. (***J. Ulrych**, **M. Lang, J. K. Novák,** V. Cajz, Czech Geol. Inst., Prague and D. Matějka, Faculty of Science, Charles University, Prague, in cooperation with E. Árva-Sós, Institute of Nuclear Research, Hungarian Acad. Sci., Debrecen, A. Höhndorf, The Federal Institute for Geosciences and Natural Resources, Hannover)*

Sodalite olivine-poor nephelinite of Říp Hill substantially differs both from olivine nephelinite and olivine-free nephelinite of the Cenozoic volcanic province of the Bohemian Massif. Říp Hill represents an erosion-resistant neck 25.6 Ma in age located in the Moldanubian terrane block in contrast to the České středohoří Mts. volcanic complex in the Saxothuringian terrane. The very low Mg-value (48.5), low contents of compatible elements as Cr (79 ppm), Ni (31), Co (32), Sc (21) and lack of mantle-type xenoliths gives evidence of differentiation of primary mantle magma. Anomalous enrichment in incompatible elements particularly in ΣREE (650 ppm), U (3.6), Th (15.6), Nb (154), Ta (12.1) a.o., is associated with late magmatic crystallization (mostly of apatite, Ti-magnetite ± hauyne). ^{87}Sr/^{86}Sr (0.7036-0.7038) and ^{143}Nd/^{144}Nd (0.51278) ratios of the olivine poor-nephelinite are consistent with HIMU OIB from a sublithospheric source; ε^{t}_{Nd} (+3.4) value implies a depleted mantle source. Olivine-poor nephelinite could have been derived from carbonated nephelinite magma with high $CO_2/H_2O + CO_2$ volatile fraction resulting in high viscosity and thus stopping of magma associated with differentiation and contamination in crustal reservoir

during its ascent to the surface. Such magma could have been associated with a highly explosive pyroclast-rich volcano of maar or stratovolcano type. The olivine-poor nephelinite of Říp Hill reveals common features in mineral paragenesis and chemical composition of minerals such as clinopyroxene, (Mg,Al,Ti)-magnetite, barite, ankerite a.o. with carbonated alkaline ultramafic lamprophyres in the vicinity. This fact suggests their mutual genetic association within the Říp Hill volcanic center.

Grants of the Charles University, Prague

No. 241/96/B-GEO/PřF Mechanism of fractional crystallization and emplacement of rocks of the Kdyně Massif, their geotectonic position and geochronology (***J. Svobodová***)

Trace element analysis of 20 samples and microprobe analyses of rock-forming minerals from 7 samples of gabbros to diorites and trondhjemite were finished in 1997. The liquid line determined on the basis of mineral and bulk rock data revealed a great extent of cumulation of already crystallized minerals at the bottom of magmatic chamber represented now by olivine gabbros from the Orlovická hora body. The magma composition was modified mainly by fractional crystallization of clinopyroxene, plagioclase and olivine. High iron enrichment during magma evolution and textural position of iron oxides show typical tholeiitic trend during magma differentiation similar to that observed in the Skaergaard intrusion. Estimation of some trace elements contents in the initial magma resembles those of island-arc or intraplate tholeiites. Cooling of rocks of the Kdyně Massif was slow. Diffusion played a major role in hot rock and led to the formation of typical corones around olivine and plagioclase by nearly isochemical reaction of both minerals with plagioclase. Regional metamorphism caused resolution of ferromagnesian minerals and formation of orthopyroxene, actinolitic amphibole, biotite and chlorite. Metamorphic reactions changed rock composition with a typical increase in FeO/MgO ratio and alkalies contents. The metamorphism was high temperature-low pressure an was probably related to the uplift of whole region. Relation to adjacent regions has been determined on the basis of field observations. Intrusion to the Barrandian unit is evident in the Smržovice quarry. In south - eastern part of the Kdyně Massif, the tectonic contact with the Moldanubian unit can be observed. Zircons of the ferrodiorite from the locality Na Šteflích were dated by evaporating method with results of 528±18, 512±5 and 521±10 Ma (J. Košler, Fac. Sci., Charles Univ.).

RUK No.4239 Application of apatite crystal chemistry on interpretation of genesis of volcanic rocks (*D. Matějka, Faculty of Science, Charles University, Prague,* ***J. Ulrych***, ***E. Pivec***, ***P. Povondra*** *& P. Pazdernik, Erlangen University*)

Apatites of young volcanic rocks of the Bohemian Massif are represented by fluorapatites, and have no expressive substitutions in any of the three main structural positions. The [6] coordinated position is occupied dominantly by P^{5+}, with some heterovalent coupled anion substitutions of C^{4+} (Ca^{2+}, $PO_4^{3-} \leftrightarrow Na^{+}$, CO_3^{2-} and/or S^{6+} ($2P^{5+} \leftrightarrow S^{6+}$, Si^{4+}). These substitutions, usually considered as decisive for confirmation of carbonatite affinity of silicate volcanic rocks, were

not found substantial in the set of volcanic rocks. In comparison to apatites of plutonic (mostly granitic) rocks they contain a characteristic higher concentrations of Sr, Mg, Al, Cl and especially of REE. The apatites are significantly enriched in LREE, depleted in HREE and Y (high La/Yb ratios), display an inconspicuous Eu anomaly and thus reflect the chemical composition of alkaline volcanites of parent rocks with mostly higher temperatures of crystallization.

***

9. Department of Stratigraphy and Paleontology

Foreign Grants and Joint Projects

Deutsche Forschungsgemeinschaft, Bonn.

The stromatoporoid fauna of the Koněprusy reef limestone (Lower Devonian, CR), (Die Stromatoporoidenfauna der Koněprusy Riff-Kalke, Unterdevon, C.R.) (*A. May, Geologisches Institut und Museum, Universität Münster &* ***J. Hladil***)

Stromatoporoids (demosponges, Porifera) of Koněprusy have not been revised for more than ninety years. The present stage of evaluation was preceded by new sampling. The abundance and diversity, both in time and space, increase toward the reef margins. However, the average content of the stromatoporoid skeletons in the rocks of this margin is 0.05%, max. 4% (quadrates 5 to 5 m). It corresponds to the analyses by Flajs – Hüssner (0.06 +/- 0.03%, in thin sections). This percentage in thin section corresponds to 150 ppm weight ratio of the stromatoporoid coenostea in the rock and even less, 15 ppm, for pure stromatoporoid precipitate where microscopic fills of cement were excluded. Ecological substitution of stromatoporoids by bryozoans caused the lack of branching and encrusting stromatoporoid shapes. Revision of the Počta's 1894 collection (Nat. Museum) of "*Clathrodictyon*" *subtile* Poč. and "*C.*" *clarum* Poč. to be synonyms. Eight Počta's species were found again. Finds of "*Actinostroma*" *vastum* Poč. from Plešivec area were assigned to neptunian dykes of Suchomasty Lms. whereas the formerly assumed origin from the Koněprusy Lms. was rejected. Six other species of the new collection have no counterparts in the Počta's collection (*Actinostroma clathratum*, *A. crassum*, *Plectostroma ligeriense*, *Stromatoporella sp.*, *Amnestostroma holmesae* and *Salairella prima*); one species is probably new (*Schistodictyon* sp. nov., aff. *neglectum*). Almost all species documented in the outskirts of the reef extend to the proper reef. On the other hand, *Stromatoporellida* and *Clathrodictyiida* occur exclusively in the central and topmost parts of the reef. A bank with *Atopostroma* „balls“ covers one of the former abrasion terraces. The absence of *Habrostroma* accompanied by the abundance of *Actinostromida* represent the opposite to the situation in eastern North America. The most similar assemblages of stromatoporoids occur in Australian Victoria and in the Canadian Arctic.

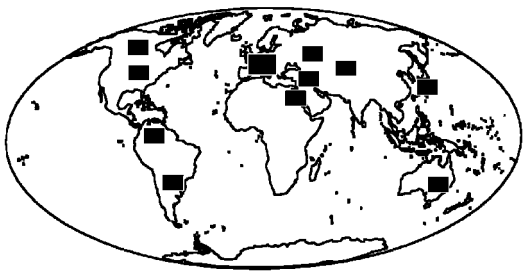
University Research Grant Programs, University of Texas at Arlington.

The development and application of magnetosusceptibility event- and cyclostratigraphy (MSEC): the Devonian system (*R. Crick, B. Ellwood, Earth Sciences, University of Texas at Arlington &* ***J. Hladil***)

MSEC established for the Eifelian-Givetian GSSP sequence at Jebel Mech Irdane (Morocco) was compared with the MSEC record of the Bohemian Kačák sections. The MS profile contains unique peaks for establishing correlations. Because of MS proxies for physical controls (climatic changes resulting from orbital forcing) on the relative amounts of iron introduced into marine sediment, such profiles or curves are fairly independent of organic evolution. Therefore, variations in MS weakly coincide with ultra-fine biozone boundaries. MSEC from different sites of the world document an iron-poor event that began abruptly in the late Tortodus kockelianus Zone and ended in the late Po. ensensis Z. prior to the Eifelian-Givetian boundary as it is now defined. The synchronism of well matching MS patterns in sequences of varying lithology in widely separated basins argues for an extra-regional control of the type produced by orbital forcing cycles. It is likely that the physical controls accelerated important faunal changes. The relationship between the relative iron content of marine sediment, changes in climate, and orbital forcing cycles is a positive one. High density MS profiles contain cycles corresponding to some portion of the orbital forcing cycle spectrum. Fourier analysis of the data revealed a distribution which resembles an eccentricity peak distribution of 3.5 Ma, 2.0 Ma, 1.3 Ma, 600 Ka, and 413 Ka, giving, in this approximation, duration estimates of 9.5 Ma for the Eifelian and 11 Ma for the Givetian. Of course, the absolute durations of these stages are true only if the available astronomical extrapolations to the past and overall cosmological principles are reliable.

International Geological Correlation Programs, UNESCO.

IGCP Project No. 335, Biotic Recoveries from Mass Extinctions (*Project leader D.H. Erwin, Smithsonian Institution Washington, national representatives* ***J. Hladil & P. Čejchan***)

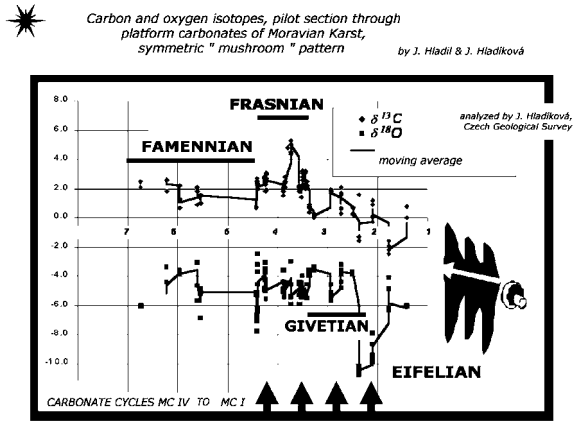


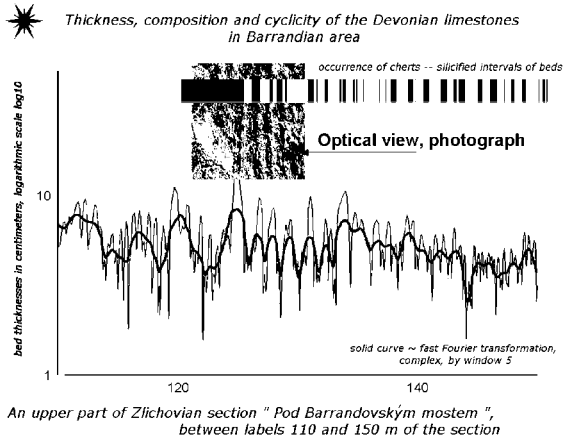
The organization of the final conference Recoveries'97 in Prague: The conference aimed to attract a larger spectrum of scientists - including biologists, environmentalist, system analysts, physicists. The conference was focused on technically precise presentations (high-tech equipment of the new IKEM Center). Virtual presentations on line (WEB-connected people) were the advantage of this conference. Sixty attendants directly represented the continents of America, Europe, Asia, Australia and northern Africa. The main result of the conference is the better understanding of the systems as they are working in complexity. The times of simple causalities "forced in systems" seems to be overcome. The main task for the close future is the "rehabilitation" and better understanding of the biotic evolution. Recommendations for the future investigation involve: The system theory about crises and recoveries on our planet progressed slower the needs of by our technologies. It is advisable to concentrate the aims, capital, and man power in this direction. The Abstract Book, 66 pp., and Field Trip Book, 38 pp., were published by the

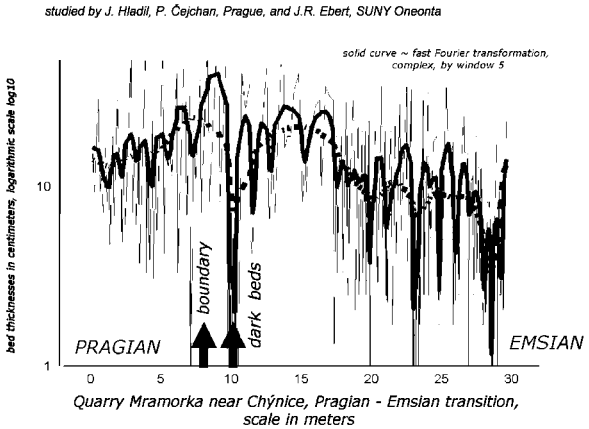
Eurocongress. These two books involve an extensive reference to the Czech scientific results.

IGCP Project No. 386, Response of the Ocean/Atmosphere System to Past Global Changes (*Project leader H.H.J. Geldsetzer, Institute of Sedimentary and Petroleum Petrology, Calgary, national representatives* ***J. Hladil*** *& J. Hladíková, Czech Geological Institute, Prague*)

Relations between the isotope ratios, chemical composition, sedimentological features, eustatic fluctuations and diagenetic history were documented from the reef/basin transition in the Moravian Karst (Křtiny HV-105 borehole). The $\delta^{13}C$ and $\delta^{18}O$ values of Late Devonian limestones are within the ranges for Late Devonian marine sedimentary environment. However, the originally diverse isotopic compositions of the fossils and other rock components were changed in closed marine pore-water/rock systems, under conditions of rapidly decreased permeability. In the studied sequence $\delta^{13}C$ values of 2 to 2.5‰ are characteristic for bioherms, parts of the fore reef to off-reef slope, and offshore lagoons. The $\delta^{13}C$ values close to 0‰ are characteristic for shallow back reef. Low $\delta^{13}C$ values of reef margin developed during the occasional emergence of this facies. A significant anomaly in $\delta^{13}C$ values (up to +5.5‰) was documented at the transition between the proximal and distal fore reef within the Early Frasnian *Pa.* transitans Zone, just before the maximum sea-level rise. This unusual positive excursion of $\delta^{13}C$ values does not correspond to the global-event anomalies. The existence of such anomaly on the slope of the Moravian Karst is tentatively explained by a local III[rd] category upwelling, a result of the diversion of the deeper contour and shallower wind-driven currents away from the shore. This anomaly corroborates the hypothesis of a strong facies control of the ^{13}C content in carbonates.

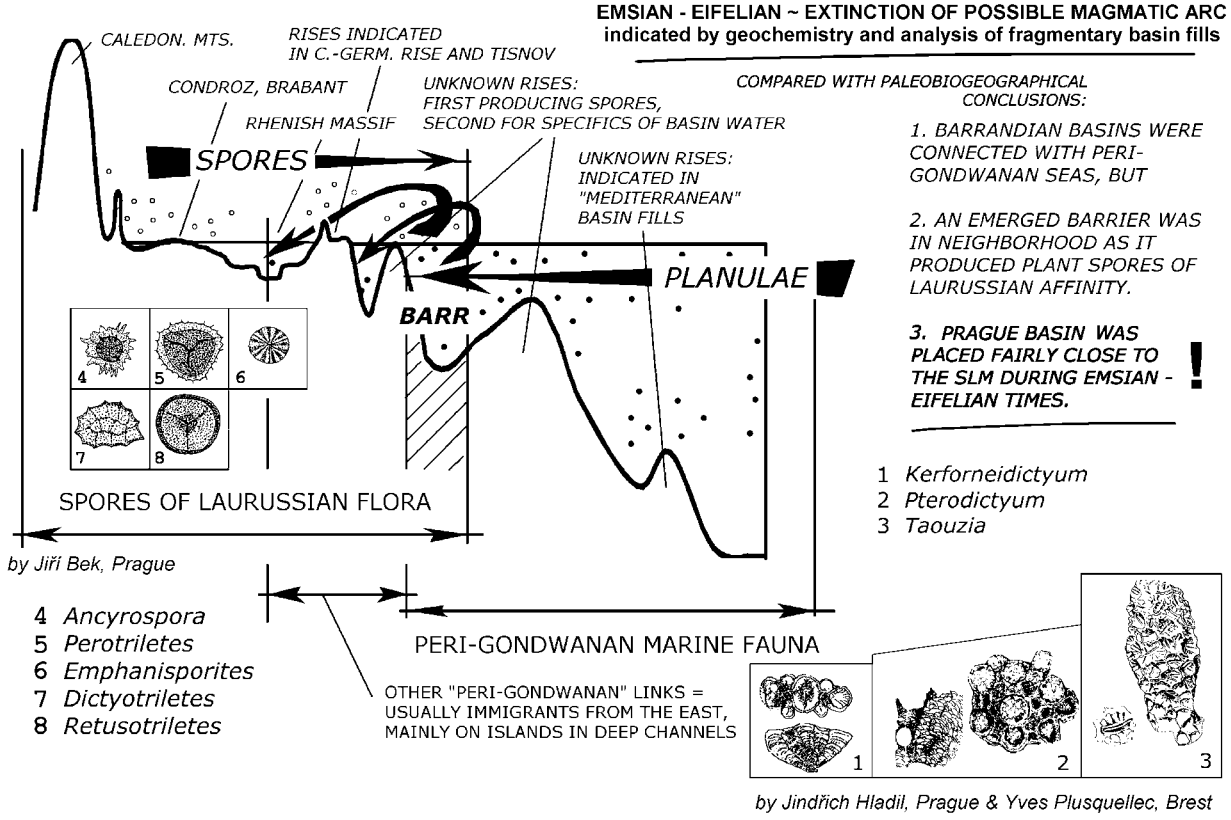






IGCP Project No. 421, North Gondwanan mid-Paleozoic biodynamics (*Project leaders J.A. Talent, McQuaree University, Australia, and R. Feist, Institut des Sciences de l'Evolution, C.N.R.S. Montpellier, national representatives J. Kříž, Czech Geological Institute, Prague,* ***J. Hladil****, I. Chlupáč, Faculty of Science, Charles University, Prague,* ***P. Štorch****, & J. Kalvoda, Faculty of Sciences, Masaryk University, Brno*)

Analytical and geochemical data from basins enable the interpretation of the mid-Paleozoic paleogeography. Our contribution *(J. Hladil & F. Patočka)* dealt with the magmatic-arc/back-arc tectonic settings in the northern part of the Bohemian Massif. The Early Paleozoic evolution was governed by two major extensional processes (Ordovician to mid-Devonian, and Devonian, Emsian to Famennian). In terms of paleogeographical reconstruction, the mid-Devonian closure of the Early Paleozoic back arc and collision of some terranes started the opening of the Rhenish rift-related extensional basins. The obliteration of the magmatic-arc massifs is explained by detachment, dismembering, and isostatic uplift of these light terrane segments during the Late Carboniferous collision of Gondwana and Laurussia; island-arc massifs were mostly erased by deep exhumation of the orogene. Basin analysis and geochemistry of the (meta)volcanic material provided the first evidence of these missing arcs. The magmatic-arc neighboring associations of sediments were discerned in the late Early Devonian basin fills (Vrbno, Rýmařov, partly Tišnov, Branná, Velké Vrbno). The Early Devonian greenschists of the Vrbno



Group provide an evidence for tholeiitic volcanic-arc basalts and low-K calc-alkaline andesites; the associated felsic metavolcanics were calc-alkaline dacites and rhyolites. The geochemical features of late Early Devonian quartzites (Jeseníky and Strzelin) largely indicate intermediate and acid volcanic-arc rocks in the source area; the peneplenized source area could provide them only if eroded segments of Early Devonian arcs were still present.

Other projects

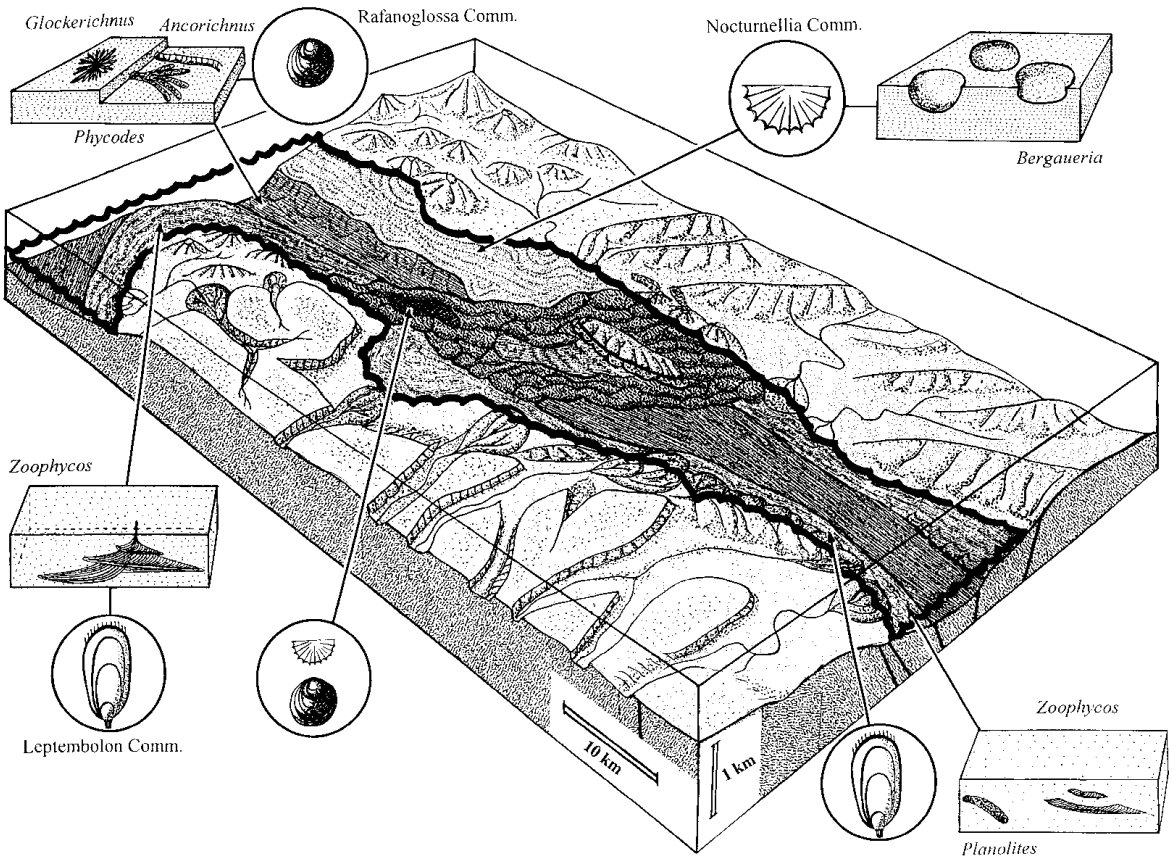
Palynomorphs from the Devonian/Carboniferous boundary in Northern Bolivia (P. *E. Isaacson, University of Idaho, U.S.A.* ***M. Vavrdová*** *&* ***J. Bek***)

Organic-walled microfossils (miospores of terrestrial plants and unicellular marine microplankton) were recovered from selected profiles at following sites: Hinchaka (Late Devonian to Early Carboniferous, glacially influenced sequences, area of Titicaca Lake), Calamarca (Northern Bolivia, Early Famennian), La Yesera (Southern Bolivia, Frasnian), Colquencha (Carboniferous) and Yaurichambi (not yet specified age). Bioprovince of the species *Umbellasphaeridium saharicum* marks the subantarctic belt distributed in Western Gondwana (Peru, Bolivia, Brazil) and other neighboring paleocontinents (Appalachian region of the eastern North America, NW African cratonic basins and western Avalonia).

The Ordovician of the Barrandian area - succession and development of ichnoassemblages (***R. Mikuláš****, The Royal Society, London*)

The Barrandian area situated in central Bohemia was recognized as exceptional in the presence of the sequence of the siliciclastic rocks rich both in body fossils and in trace fossils; this sequence involves almost all the Ordovician. Therefore the obtained data have enabled to formulate more general conclusions on the temporal and spatial structure of the benthic faunal assemblages and ichnoassemblages. The three following factors were used to explain the structure of the ichnoassemblages: 1. taphonomic reasons; 2. difference of effects of local and global changes of the environment on benthic shelly fauna compared to the effects on producers of ichnofossils; 3. differences of extinction and recovery patterns between in-fauna and sessile or vagile shelly fauna.

Figure (see next page): Reconstruction of the Barrandian area, its benthic communities and ichnoassemblages, in the Lower Ordovician (Arenigian).



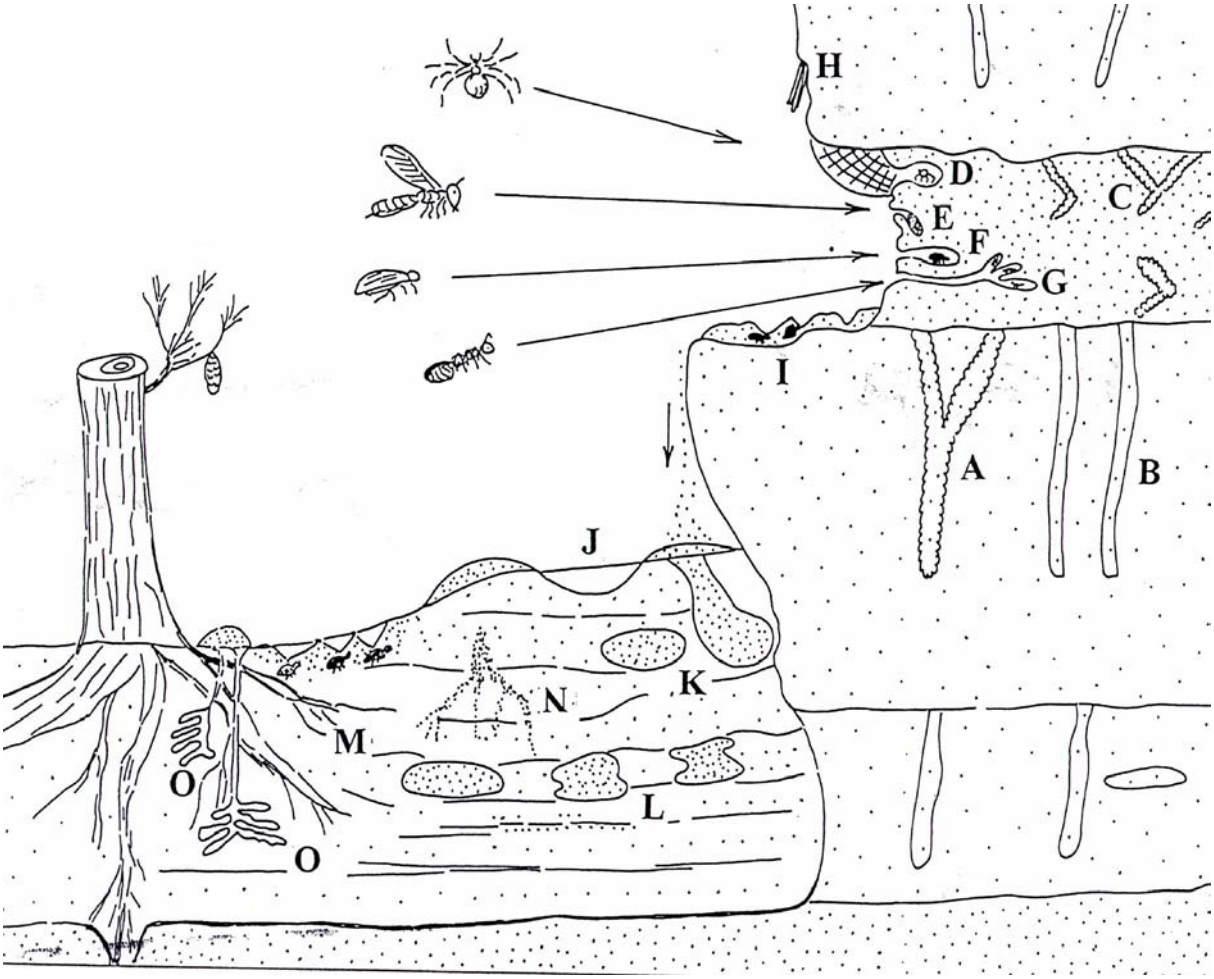
Terrestrial bioerosion and its Recent and fossil ichnological consequences (***R. Mikuláš, PaLSIRP USA***)

The terrestrial bioerosion, i.e. the activity of animals and plants in lithified rocks in subaerial and subsoil settings, may produce distinctive structures recognizable as modern or fossil traces (ichnofossils). Only a little attention has been paid so far to this phenomenon from ichnologists, paleobotanists and paleozoologists, despite it represents a source for evaluation of biogenic effects in overall terrestrial erosion. For this reason, the general review of the problem has been topical.

Evaluation of literary sources and field work in the Barrandian area, in the Upper Cretaceous castellated sandstones, and in the Bohemian Karst, have enabled to propose the first ichnological classification chart of terrestrial bioerosion.

Figure description (see next page): About 25 m high rock pinnacle at Jestřebí (Northern Bohemia) is formed by Upper Cretaceous medium-grained quartzose sandstone. The bioerosion is concentrated mostly into two lenses of less lithified rock. These lenses are rich in the Cretaceous marine ichnofossils *Skolithos* and *Ophiomorpha* (A, B, and C in the figure). The tunnel fill of these traces weathers out in places, leaving an advantageous possibility for bioeroding insects to renew the tunnels in the original course. Small spiders inhabit irregular cavities in the rock (D). The spiders are not expected to be real tracemakers: they occupy

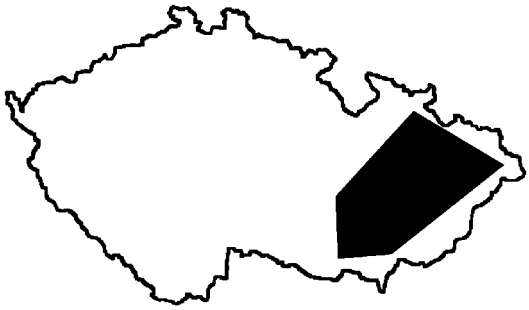
abandoned bee borings (preferably those enlarged subsequently by salt and mechanical erosion). Nesting structures (calichnia) are excavated by the bee species *Colletes daviseanus* (D), which is probably the most active eroding insect of the Bohemian castellated sandstones. Abandoned bee borings are squatted by beetles and ants (F, G). The overhangs, resulting partly from bioerosion, are used by non-eroding insects for breeding (H). A thin layer of shifting sand on a rock ledge has been generated mostly by the bioerosive activity of the bees. It is occupied by larvae of the ant-lion *Myrmeleon europaeus* (I). The sandy talus slope (generated mostly by non-biological processes) bears short-lasting traces of mammals (J), vertebrate burrows (K, L) and root traces (M, N). It is also a subject to insect bioturbation (O) dominated by ants, ant-lions and beetles.



Grant Agency of the Czech Republic.

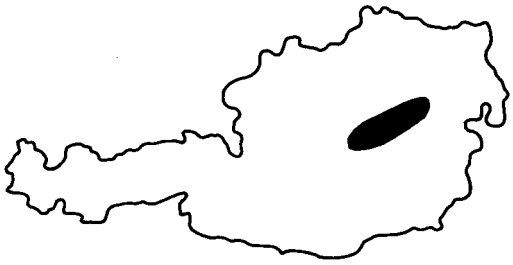
No. 205/95/0066 Morphological reaction of a model species during extinction-recovery of the ecosystem (C. battersbyi). (***P. Čejchan & J. Hladil***)

The quantitative evaluation (J. Hladil) of the intraspecific morphological variability of *Caliapora battersbyi* shows that ranges of variability slowly but continuously decreased during the whole Givetian history of the species. As expected, the variability is well correlated with the age of the colonies. Good but locally imperfect correlation was documented also for the morphological variability and exposure to mechanical factors. The variability is fairly



independent with respect to the diversity of the attendant corallomorphs. The relationship between the morphological variability and biological attacks shows a negative correlation during the early 3/5 of the species history, whereas the final part shows a positive correlation. A slight positive correlation also exists in regard to the density of the population. The levels of recoveries after the crises are marked by populations with the following features: low variability, encrusting and branched colonies, thin and upward shifted squamulae, irregularities in their positioning, and larger spacing of tabulae. This type of morphology points to evolutionary reversals. Documented changes in morphology and intraspecific variability show that control of agitated water/substrate works together with other strong controls, which are likely ecological and evolutionary ones. Neither the documented environmental trends, nor any of their combinations are immediately responsible for the continuously decreased variability of *C. battersbyi*. Thus, the generic, or at least intrinsic factors are likely taking part in the creation of this phenomenon.

No. 205/96/0156 Brachiopod fauna of the lowermost Liassic in the Northern Calcareous Alps (***M. Siblík***)



New collections prepared this year at some important localities (e.g. Fonsjoch, Christlum, Ampelsbach in Tyrol, Mittenwand in Bavaria, Saubachgraben, Hochleitengraben in Salzburg) yielded new Hettangian material that contributes to the better knowledge of the lowermost Liassic brachiopod assemblages. The assemblage represented by *Spiriferina* ex gr. *walcotti, Piarorhynchia juvenis* and *Lobothyris delta* is characteristic of the gray, marly development of Hettagian (mostly Planorbis Zone) whereas the varied assemblages with numerous specimens of *Liospiriferina, Linguithyris aspasia, Cirpa planifrons, Prionorhynchia fraasi, Calcirhynchia plicatissima* and *Zeilleria mutabilis* are characteristic of the limestone development of the lowermost Liassic (mostly Marmorea Zone). After detailed sampling in the Hettangian, it is clear that a fixed idea of the relative impoverishment of the lowermost Liassic fauna of brachiopods existing in the present literature is not justifiable, at least at many localities newly studied.

No. 205/95/1516 - Biotic crises and post-crisis recoveries recorded by Bohemian Silurian graptolite faunas (***P. Štorch***)

Graptolite records and stratigraphic-range charts utilized in the earlier analysis of the Silurian graptolite dynamics in Bohemia were completed by new data and incorporated in global framework. The most recent research was primarily focused on the Lower Silurian sequence which allowed more detailed approach, and on global correlation of extinction and speciation rates and diversity curves. The Bohemian data were plotted in local Lower Silurian graptolite zonal chart, being composed by 27 biozones.

Each of the biozones were further subdivided into a lower and upper part. Thus 54 reference stratigraphic intervals were recognized to locate fluctuations in graptolite diversity as precise as possible. The Bohemian biozones were correlated with the generalized zonal chart employed by the Subcommission on Silurian Stratigraphy in order to get reasonably precise correlation with local zonal charts used in widely separated territories around the world.

Six graptolite mass extinctions (*Acuminatus* Event, *Convolutus* (*Sedgwickii*) Event, *Utilis* Event, *Spiralis* (*Lapworthi*) Event, *Murchisoni* Event, and *Lundgreni* Event) have been recorded from the base of the Silurian system up to the top of Wenlock Series. Although the extinctions are of different magnitude, in every case less than 50 % taxa survived till the end of the reference interval. The data have not been calibrated with respect to zonal duration. Six Lower Silurian graptolite mass extinctions, as well as another four in the Late Silurian (*Leintwardinensi*s Event, *Kozlowskii* Event, *Spineus* Event, *Transgrediens* Event), are prominent enough, and widespread around the world, that they cannot be artifacts of the methodology. At least six of the ten crises are well correlatable with the most significant Silurian drops in global sea level. On the other hand, the mid-Aeronian, basal Telychian, upper Telychian and basal Homerian highs is graptolite diversity correspond with periods of relatively high sea level.

No. 205/97/0075 - Cenomanian plant microfossils from SE Bohemia and New Jersey and their biostratigraphical, paleoecological and paleoenvironmental implications (***M. Svobodová**, G. J. Brenner, State Univ. of New York, New Paltz*)

The aim of the first year of this project was to select and study boreholes and outcrops from the SE part of the Bohemian Cretaceous Basin, especially the Peruc-Korycany Formation in the so-called Malonín-Semanín and Kunštát-Blansko depression, and to start the comparison with the material from the Atlantic Coastal Plain boreholes and outcrops from New Jersey and Maryland (Raritan Fire Clay and Woodbridge Clay of the Patuxent and Raritan Formation). The SE part of the Bohemian Cretaceous Basin is known as the Orlice-Žďár region and is characterized by sandstone progradation cycles of the Cenomanian-Coniacian sequences. Plant microfossils and their changes in time and space as well as the sea-level and climatic changes were used for the investigation of palynofacies.

Cenomanian sediments from the Atlantic Coastal Plain are also zoned by using fossil spores, pollen and microplankton. We applied mainly palynomorphs of palynozone III and IV (Lower and Middle Cenomanian) of the Raritan Formation for the comparison with the palynomorph assemblage from the coeval sediments of the Peruc and Korycany Members.

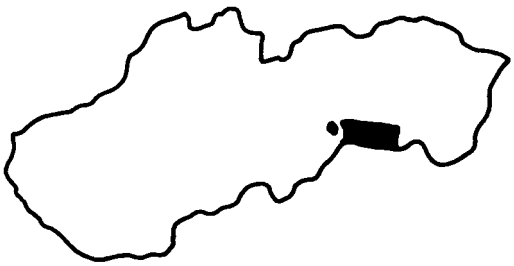
Depositional conditions, fluvial sedimentation and the first records of the marine ingression were studied. Palynological investigations, based predominantly on the angiosperm pollen of the basal claystones pointed out the environmental differences between flora, new paleoclimatological results of the fluvial, marginal marine and open marine sedimentation and the age of selected localities. Many very small representatives of angiosperm group, such as *Tricolpites minutus, T. parvulus,* together with rare tetrads of *Dicotetradites, Ajatipollis* as well as monocolpate pollen of *Liliacidites* were recorded in the fluvial sequence in some of boreholes.

Grant Agency of the Academy of Sciences CR

No. A6013701 - Evolution of amphibian assemblages of Central and Eastern Europe during the Tertiary, in context of paleoclimate and paleogeography (***Z. Roček***)

The revised list of the Tertiary anuran taxa hitherto described from Europe comprises 38 species belonging to 18 genera and 8 families. Moreover, two additional species are classified as incertae sedis because of their state of preservation. The list of tailed amphibian taxa is less accurate because a comparative large number of synonyms is involved which need taxonomic revision. Nevertheless, the list provides a good information on the evolution of amphibian assemblages from the Eocene through Pliocene. It turned out that this evolution is closely correlated with climate, which was first evidenced on the genus *Chelotriton*, hitherto known only from isolated and fragmented bones. The earliest record of this amphibian is from the Middle Eocene of Geiseltal, Germany. The first findings of the complete skeletons in the Upper Oligocene of Enspel, Germany, revealed that these animals were heavily ossified and fully developed, similar to contemporary amphibians from the areas of tropical climate. Starting by the late Oligocene, representatives of this genus were less ossified, and structure of their hyobranchial apparatus indicates that they inclined to neoteny and paedomorphosis, which was proved not only by *Chelotriton*, but also *Brachycormus*, derived from *Chelotriton*. In contemporary amphibians, this phenomenon is always associated with deterioration of climate. Changes in the morphological structure of *Chelotriton* was paralleled by similar changes recognized in the anuran *Latonia*, *Palaeopleurodeles* and *Cryptobranchus*, and are correlated with indications of climatic changes based on other (e.g. paleobotanical) data. The taxonomical revision of all the available material of *Chelotriton* revealed that the pre-Miocene and post-Oligocene forms, respectively, may be considered two distinct species. Current research is focused on the East European localities Gritsev (Ukraine) and Rudabánya (Hungary), as well as Ebnat-Kappel and Le Locle Sous le Stand (Switzerland) and Merkur-Sever (Czech Republic), and is complementary with similar research made in western Europe.

No. A 3013606 - Carnian spiriferid brachiopods of the Slovak Karst and Northern Calcareous Alps. (***M. Siblík***)



The study of the additional material of *Laballa suessi* from the Slovak Karst proved the great external variability of the species. This led to the conclusion that *Cyrtina* (= *Laballa*) *ambigua* described in 1940 by Balogh from the environs of Silická Brezová falls into the synonymy of *Laballa suessi*, and this was confirmed by the study of the type specimen deposited in Budapest. Uncertain generic appurtenance of cf. "*Spiriferina" halobiarum* Bittner was made clear on the basis of transverse sections; the species belongs to *Mentzelia.* At the same time, a new interesting subspecies *Mentzelia halobiarum reversa* ssp. n. was established, characteristic of the upper part of the section near Silická Brezová (Upper Tuvalian) and appears to be of biostratigraphical importance. The determination of the most common but usually not well-preserved specimens of koninckinids could be proved as

Carinokoninckina telleri (Bitt.) as already presupposed by Bystrický in 1964 (as *Koninckina telleri*). To the interesting representatives of the local Carnian fauna belongs *Dioristella indistincta* (Beyrich) found in many specimens. For the first time in the Western Carpathians, the peculiar *Thecocyrtella ampezzana* Bittner was ascertained (in 1 specimen).

No. A3013503 - High-resolution graptolite stratigraphy and correlation of the selected Lower Silurian sequences of the Peri-Gondwanan Europe (***P. Štorch***)

Based on a large amount of biostratigraphical data from Bohemia, Spain, Portugal, Italy (Sardinia), and some data from Germany, France (Corsica) and Austria (Carnic Alps), a standard graptolite biozonal scheme for Lower Silurian of peri-Gondwanan Europe is under preparation. Spanish sections and graptolite faunas from Central Iberian Zone, Western Iberian Cordillera, and Asturia-Leon Zone, especially, were studied during the third year of the project. Several biozones of the late Llandovery and early Wenlock (*lapworthi, insectus, centrifugus, murchisoni*) were recorded for the first time in the Iberian Peninsula. In general, the graptolite faunas of the deeper shelf areas closely resemble graptolite faunas of Bohemia (Barrandian area) and even of Southern Scandinavia. On the other hand, shallow shelf areas of the Iberian Lower Silurian yield rather different assemblages some elements of which are common with graptolite assemblages of epicratonic and intracratonic basins of North Africa. The faunal differences which complicate elaboration and application of a joint zonal scheme may be likely explained by different bathymetry of the individual areas. The true biogeographical differences appear to be unlikely within the peri-Gondwanan Europe. In global scale, the existence of the two principal paleobiogeographical provinces is supposed. The Lower Silurian zonal scheme proposed for the peri-Gondwanan Europe differs from the generalized global graptolite zonal scheme in several points. M. argenteus Zone of the global scheme is not recognizable in the peri-Gondwana. It roughly corresponds with Dem. simulans Biozone of Bohemia. Sp. guerichi Zone of the global scheme is replaced by R. linnaei Biozone in the peri-Gondwana. The latter improves stratigraphic assignment of poorly preserved tectonized and/or metamorphosed sequences in which Sp. guerichi is badly recognizable from its successor S. turriculatus. Str. crispus Biozone is not recognizable in the shallower facies of the peri-Gondwana. Mcl. crenulata Zone of the global scale is replaced by T. tullbergi Biozone in the peri-Gondwana. Former Stom. grandis Biozone of Bohemia is abandoned in favor of widely recognizable Cyrt. lapworthi Biozone. P. dubius Biozone is recognized between the Cyrt. murchisoni and M. belophorus biozones in the peri-Gondwanan Europe. Several subzones missing in the generalized global scheme are recognized in the peri-Gondwanan Europe.

Industrial Grants

Cement Bohemia Praha a.s. Project A/1-3. Facies and stratigraphy of the Devonian limestones, Koněprusy area (***J. Hladil, L. Slavík & A. Galle***)

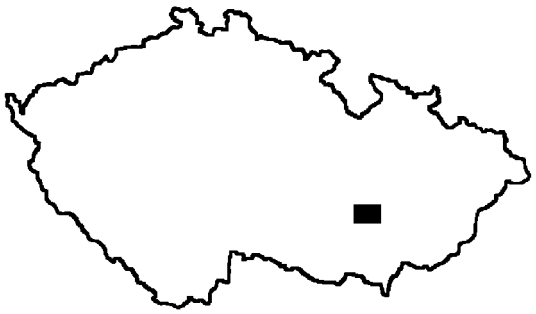
Two studies have been finished: First, a visualization of the Pragian facies has been prepared for the map view of x, y coordinates (J. Hladil, consulted by Mr. E. Burnotte, Lhoist SA). This step was based on 35, 000 registered points. The best reliability was provided by quarried rock faces which yielded series of the sections (80-100%); old bottoms of quarries with a network of boreholes are less reliable (60-80%), and the local insufficiency of drills and borrow-pits causes an exceptional drop to critical values of 50%. This ratio of reliability is

based on the difference between the 1992-1996 data and the new 1997 data. The recent release of a simplified map version enables a comparison with geochemical, physical or paleontological data bases. Twenty-two facies were determined beginning from tongue bodies of breccias, through individual facies of slope, ramp and platform, to diversified pattern of reef period and late Pragian regression.

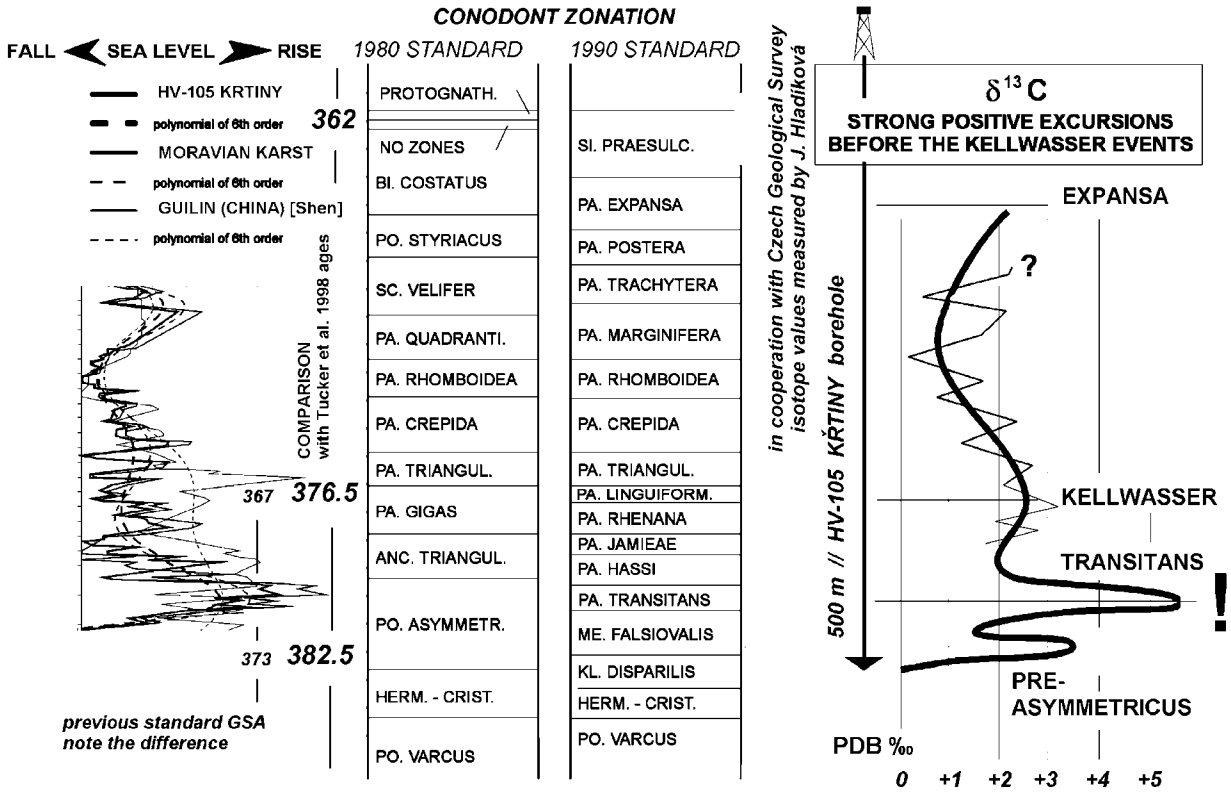
Second, composition and age of the Kačák cave fills were documented in detail (J. Hladil, P. Bosák, J. Bek, A. Langrová & J. Dobrovolný). Large blocks of slightly calcareous clayey siltstone were found in the central part of the Velkolom Čertovy schody-Quarry East. In section, the karst cavities with black fill cut the Pragian limestone and its Emsian fissure fills in oblique direction. Low content of carbonate in this dark fill differs from gray limestone fills of the late Eifelian and Eifelian/Givetian age in eastern neighborhood. Microscopy shows a dominance of fine aggregate, which consists of corroded grains of quartz silt, chalcedony, clay minerals, chips of mica, pyrite and phosphate. Former porosity of 1-3 vol. % was filled by Fe-dolomite. Partly decalcified styliolina shells are involved. Methods of dissolution/ disintegration yield plenty of pyrite-marcasite aggregates. However, chips of mica contrast with the absence of terrestrial heavy minerals. Conodonts *Polygnathus eiflius → denisbriceae* and *Po.* aff. *hemiansatus* document the early Givetian age. Miospores *Retusotriletes distinctus*, *Cymbosporites catillus*, *Aneurospora greggsii*, *Densosporites inaequus*, *Perotrilites* cf. *conatus* and *Hymenozonotriletes* cf. *celeber* confirmed this age determination. EDX analysis found fine alternations of quartz, mica, clay and impurities. Mn, P, Ca and Ti contents considerably fluctuate within a few micrometers. X-ray analysis found quartz, muscovite, kaolinite, and imperfect spectra of illite. K, Mg, and Fe contents of insoluble residue (EDX) may correspond to this amount of illite. This study proved the former assumption about the late Eifelian karstification and Eifelian/Givetian Kačák fills.

CEMO Mokrá a.s. Physical and isotope stratigraphy in the neighborhood of the exploitation plants of Mokrá (***J. Hladil**, J. Hladíková, Czech Geological Institute, Prague & B. Ellwood, Earth Sciences, University of Texas at Arlington, USA*)

A pilot section through 20Ma carbonate sequence of the Moravian Karst was evaluated. *Amphipora* wackestone, algal lime-mudstone and floatstone represent dominant rock types; age of the sequence ranges from Late Eifelian to Early Famennian. The fluctuation of the $\delta^{13}C$, $\delta^{18}O$ values along the section evolves in convergent/divergent way, forming a typical "mushroom" shape of two parallel curves. This pattern characterizes the individual parasequences and minor cycles. A positive shift in $\delta^{13}C$ values of the upper part of each cycle coincides with the negative shift in $\delta^{18}O$ values. Increased amount of ^{13}C in carbonate is explained by rising activity of algae and bacteria, whereas the decreased values of $\delta^{18}O$ (to -5‰ PDB) are ascribed to water of meteoritic origin as well as warm water on the platform (to 35-45 ^{o}C). Stronger depletion in ^{18}O corresponds to repetitive diagenetic changes of the carbonate during the emergence and erosion of the banks between parasequences I and II. The most generalized trends in δ-values rise almost



through the entire sequence, with a depression only in its uppermost part. The mean isotopic compositions for the Moravian Karst $\delta^{13}C$ +2‰ PDB and $\delta^{18}O$ -6‰ PDB differ from the so-called normal or global values of the Devonian carbonates ($\delta^{13}C$ +1‰ PDB and $\delta d^{18}O$ -2‰ PDB). The isotopic sequence pattern was used for correlation of profiles. The industrially utilizable event markers are characterized by a peak in $\delta^{13}C$ (after) in co-occurrence of a large depression in magnetic susceptibility record.



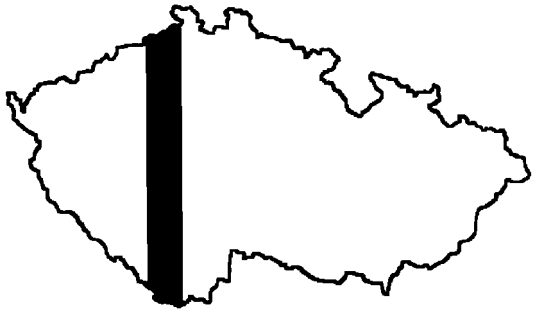
***

10. Department of Exogenic Geology and Geochemistry

Foreign Grants and Joint Projects

Past Global Changes: Pole-Equator-Pole III (*Europe-Africa group - **V. Cílek** national co-ordinator*)

The PEP III group (leader F. Gasse, France) concentrates on paleoclimate profile running through Scandinavia, Central Europe to Africa and Antarctica. The group is divided into several sub-groups and the author participates mostly in the group interested in paleoclimate and paleoenvironmental changes recorded in the loess series. Since funding is low the research work is paid by national grants. The 1997 research was involved in summarizing the results



of Tl-datings (performed by M. Frechen, Cheltenham, U.K. and A. Zander, Universität zu Köln) of the most important Bohemian and Moravian loess deposits. Besides, more complete Holocene paleoclimate data were obtained during the study of tufa mound in Svatý Jan pod Skalou in Bohemian Karst.

Integrierte Bilanzierung der thermischen Geschichte eines paläzoischen Sedimentbeckens am Beispiel des Barrandischen Becken unter spezieller Berücksichtigung der Fluidmigration. (***V. Suchý**, Czech national coordinator, U. Mann, H. Wilkes, H. Volk, Institute für Chemie und Dynamik der Geosphäre, Jülich, Germany, E. Franců, Czech Geological Institute, Brno, I. Sýkorová, Institute of Rock Structure and Mechanics AS CR, Prague*).

Systematic research on geochemistry of natural bitumens embedded in calcite veins of both pre- and post-tectonic origin has documented important regional variations in organic maturity across the Lower Paleozoic Barrandian Basin. Liquid petroleum hydrocarbons that are still commonly preserved in veins of the western part of the basin give way to semisolid yellowish waxy substances ($R_o \cong$ 0.1-0.2 %) which, in turn, grade into hardened brittle anthracite-like substances ($R_o \cong$ 0.8-3.7 %) in the central and eastern part of the basin. These lateral variations essentially parallel those established by means of vitrinite reflectance and illite crystallinity measurements, and were traditionally interpreted in terms of regional variations in the depth of burial and/or heat flow. Our recent observations show, however, that most of the lowest values of organic matter reflectance and small-scale shows of liquid hydrocarbons are in fact concentrated within a 2-3 km wide north-south-striking fault zone between Kosov, Koněprusy and Bykoš, Beroun District. The latter appears to belong to a system a major N-S-striking lineaments of the central part of the Bohemian Massif (see also a report by A. Zeman and V. Suchý, this volume). Such structural control along with a common coexistence of hydrocarbons of contrasting reflectance in some samples, may indicate repeated episodes of fluid migration along the faults and fractures, possibly generated by both pre- and post-dating Variscan thermal event(s).

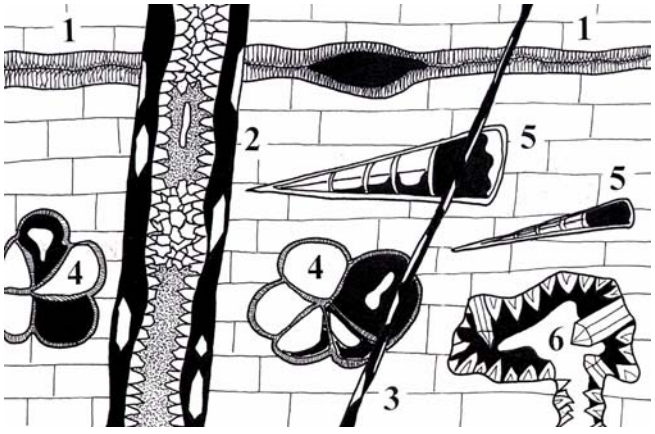


Figure: Schematic sketch showing paragentic relationship between the types of the bitumens enclosed in Barrandian Lower Paleozoic limestones. Essentially all these organic materials appear to be the *migrabitumens* that once migrated along fractures and veins. Whereas most of the bitumens are black solid, hardened substance, semisolid waxy and semiliquid bitumens are also locally common. The latter probably represent comparatively younger paragenetic phase. Not to scale. Adopted from Suchý, Sýkorová et al. (paper in progress). Explanations: 1. Bed-parallel vein of a fibrous “beef calcite”; 2. Late diagenetic, bed-perpendicular vein mineralized with solid bitumen (shown in black), idiomorphic quartz and coarsely crystalline milky calcite. Semisolid waxy substance (shown in dots) is locally present in central parts of the veins; 3. Late-stage tectonic fracture coated with

a thin bituminous blanket; 4. Lobolithe (floating organ of crinoids), partly filled with bitumen; 5. Cephalopod shell partly filled with bitumen; 6. Hydrothermal cavity coated with saddle dolomite, quartz and bitumen.

Advanced IES program for basin time-temperature modeling was applied to the deepest cored borehole in the Barrandian Basin Tobolka-1 to simulate its burial and thermal history. From the mathematical evaluation of three contrasting stratigraphical and paleogeothermal scenarios it follows that the sedimentary sequences of Tobolka-1 must have been exposed to considerably higher temperatures and/or overburden in the geological past than at present (see also GLI '96 Annual Report for more details).

International Project IGBP Past Global Changes - PAGES – Stream I and Stream II (***A. Zeman & E Růžičková***)

The program of the 3rd International workshop "Reflection of paleoclimate in representative terrestrial sediments of the Last glaciation and Holocene and in historical record" was prepared in 1997. The Workshop will be held in the town of České Budějovice in autumn 1999. Main scientific topics are as follows: (1) paleoclimatic record in loess and fossil soils of the last interglaciation and glaciation; (2) reflection of variations in Holocene climate in the fluvial and lacustrine sediments and peat, and (3) records of the climate during the last 1, 000 years in dendrochronological, astronomical, geophysical and historical data.

Petrophysical and Geochemical Characteristics of Loess Deposits From Selected Localities of Eastern Asia and Western Europe (International project of the Institute of Geology of the Academy of Sciences of the Czech Republic and the Institute of Geophysics of the Chinese Academy of Sciences, Beijing (***A. Zeman & V. Suchý***)

The aim of this project is to make a paleoclimatic reconstruction of the last interglacial and glacial periods on the territory of West Europe and Central China. In 1997, we have launched correlative studies in two representative loess sections in the Czech Republic and China. In both sections, we found identical sequences of fossil soils intercalated with loess deposits. This implies that the number of fundamental paleoclimatic fluctuations that controlled the deposition of loess sequences were the same at both localities. However, the manifestation of solifluction processes in loess sections in West Europe that developed under humid climatic conditions was more prominent than in correlative continental environments of central China.

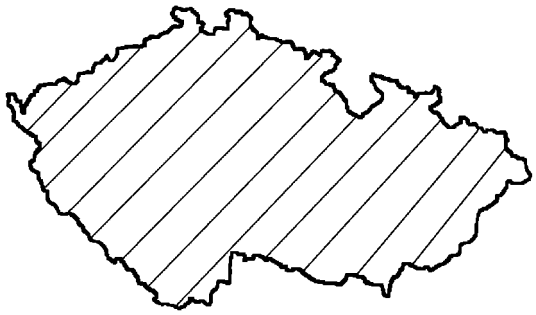
Grant Agency of the Czech Republic

No. 205/96/0011 - Geochemical, biological and anthropogenic mobilization factors of selected minor and trace elements in the course of the rock weathering (***P. Skřivan****, D. Fottová, Czech Geological Institute, Prague,* ***J. Martínek, M. Burian, O. Kvídová, L. Minařík & A. Žigová****)*

Remaining data necessary for the evaluation of mobilization factors of studied elements were collected in 1997 in both experimental landscapes, i.e. in: (1) the Lesní potok catchment area

(LP) with the bedrock composed of Říčany granite, and (2) a part of the Bohemian Karst in surroundings of the Koněprusy Caves (KJ) with Devonian limestones as a bedrock. Fluxes of As, Be, Cd, Cu, Mn, Pb, Sr and Zn in bulk atmospheric precipitation (LP, KJ), beech/hornbeam- and spruce throughfall (LP), KJ), and in the surface discharge (LP) are available for the hydrological year 1997. Stem wood and bark of spruce- and beech were sampled and analyzed from trees growing in both the studied areas to obtain data for the mass balance evaluations. It was found that the distribution pattern of Be, Cd, and Sr throughout the soil profiles (LP) is mostly affected by acid atmospheric precipitation. On the other hand, metabolic activity of trees was evaluated as the most significant distribution factor of Mn in soil of both studied sites. The distribution pattern of Pb proved its poor mobility in both types of soil and demonstrated the significance of the atmospheric input of vehicular emissions of lead. On the other hand, the long-lasting systematic monitoring of atmospheric fluxes proved the lowering trend of Pb immissions. In the broader surroundings of the LP catchment (locality Truba near Kostelec nad Černými lesy), continuing moderate decrease in the input of atmospheric protons (gradual increase of pH in the atm. precipitation) was observed throughout the years 1993 to 1997. Nevertheless, the high input of atmospheric protons brings about the gradual impoverishment of the main soil buffering cations (Ca, Mg) which results in growing Al concentrations in the corresponding surface water.

No. 205/95/0841 - Structural and textural characteristics of the main genetic types of clastic Quaternary sediments in the Czech Republic (***E. Růžičková &*** *M. Růžička, Czech Geological Institute, Prague*)



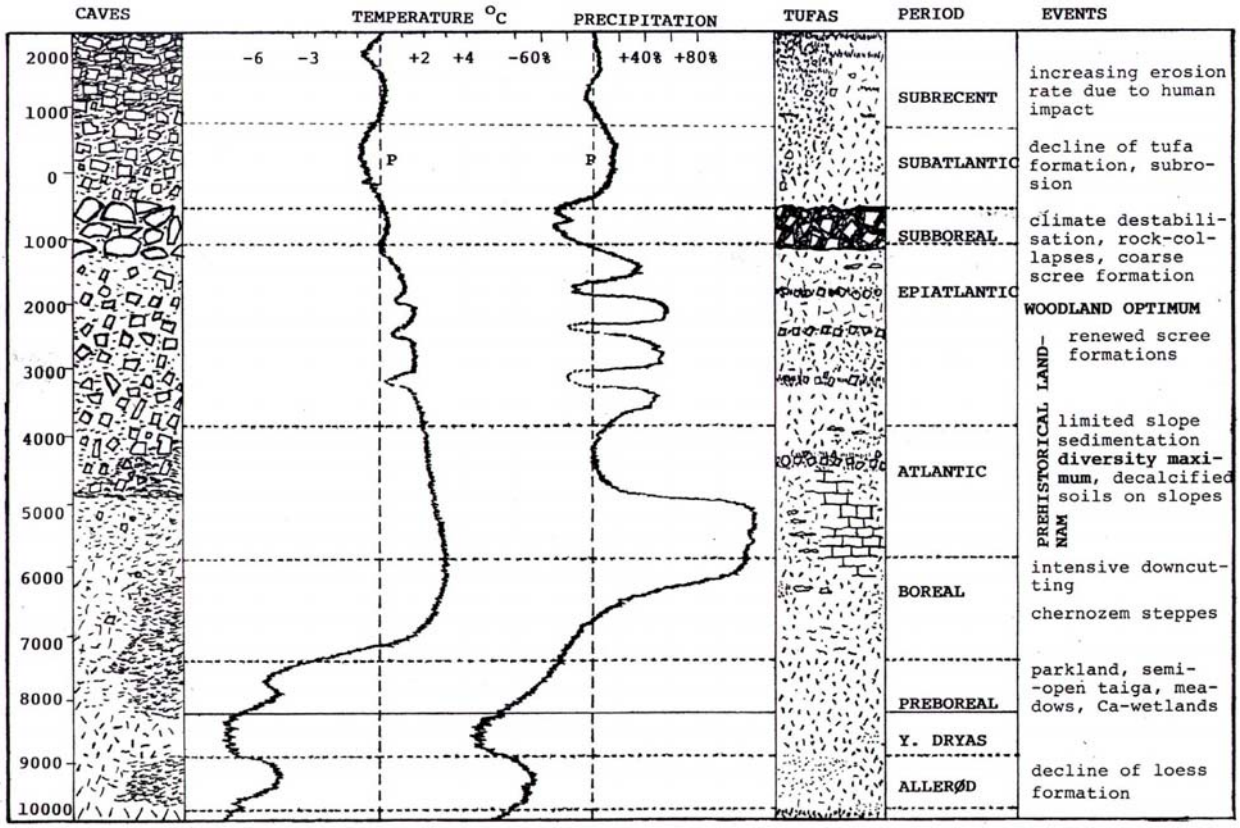
Field work was completed in 1997. Many sections were documented and new information on Quaternary sediments was collected (e.g. finds of till types not found previously, finds of rhythmites within fluvial sediments etc.). Laboratory studies (thin sections evaluation, grain surface studies, grain size distribution) were completed as well. The final result will be published in the form of the atlas of textural and structural characteristics of six main genetic groups (fluvial, eolian, glacial, colluvial, lacustrine and cave) of Quaternary sediments in the Czech Republic. The aim of the atlas is to summarize the most important characteristics of individual types, subtypes and facies of sediments to give criteria for recognition of their sedimentation conditions, to add information on the Quaternary sediments useful for mapping geologists, engineering geologists and other Earth science researchers and students who come to contact with them. The most important textural characteristics described are: grain-size distribution, shape and roundness of clasts, both being the main criteria for sediment description and classification. Structural features such as bedding, fabric, surface of clasts, deformation are criteria for the interpretation of the genesis and environmental conditions during the deposition. All these features are documented by both macro- and microphotographs and diagrams from sediments from the territory of the Czech Republic.

No. 526/96/1041 - The effect of soil cover erodibility on surface water contamination (*M. Janeček, Research Institute for Soil and Water Conservation, Prague,* ***P. Skřivan, I. Dobešová*** *&* ***M. Burian***)

Laboratory experiments in 1997 were oriented on the determination of the course of interactions between the runoff solid phase and the corresponding solution. Distributions of As, Cd, Cu, Pb, and Zn were studied using two types of artificial runoff: strongly anthropogenically contaminated (the Příbram region) and that derived from the non-contaminated agricultural soil (Jílové near Prague). The following information can be derived from the laboratory experiments: (1) runoff originating from the heavily contaminated soils represents serious hazards for surface waters; (2) sudden and significant change in the conditions of the system (pH, concentration of the dissolved forms of elements, ratio of the solid and liquid phases) is accompanied with fast processes of the redistribution of elements between the solid and liquid phases. The processes are promoted by the physical adsorption, ion exchange, possibly by the value of the solubility product of reactants. These processes are followed by additional slow changes in the redistribution, resulting mainly from the change in pH of the system. These changes are caused by the hydrolytic reactions of the principal components of runoff with the solution; (3) with the exception of As it holds that the studied elements are less adsorbed in more acidic environment under otherwise comparable conditions and in the examined pH range of the system, and (4)values of the distribution coefficient of elements ($K_D=C_S/C_L$) manifest considerable accumulation of studied elements in the solid phase of both types of the experimental runoff.

No. 205/95/1392 - Dry climatic phases of the Middle Holocene - correlation of the isotopic and biostratigraphic methods (*J. Hladíková, Czech Geological Institute, Prague,* ***V. Cílek*** *&* ***V. Ložek***)

The borehole was drilled to Pleistocene sediments attaining the total thickness of the Holocene tufa body up to 17 m. According to radiocarbon data, the sedimentation started 9, 300 - 9, 500 y. B. P. and ceased at around 2, 500 y. B. P. The most important result - the paleotemperature curve for Mid-European Holocene is given as text figure (see next page). The monograph about geology, hydrology, malacostratigraphy and paleoclimatology of the site is prepared for the print.



Grant Agency of the Academy of Sciences of CR

A3 013 603 - Biogeochemical cycles of trace elements, their sources and redistribution in a catchment with granitic bedrock: a model study (***P. Skřivan**, Department of Ecology, Faculty of Forestry, Czech Agricultural University, Prague, J. Bendl, Analytika Co. Ltd., Prague, **J. Martínek, M. Burian, O. Kvídová, L. Minařík & A. Žigová***)

Biogeochemical study of several less common trace elements in the model catchment are of the Lesní potok Brook with bedrock composed of Říčany granite (see Annual Report 1996) was extended to the determination of their content in selected types of tissue of the most common speciess of forest trees. Results of the study in 1997 show that: (1) the cycles of Rb and Cs (as well as those of Mn and Sr) are (under given conditions) significantly affected by the metabolic activity of the forest vegetation; (2) relatively high concentrations of dissolved forms of REE in the surface water of the catchment result from low pH ($4.7 < pH < 5.2$) and from high concentration of the complexing F^- ion ($350 < ppb < 1040$); (3) the relative abundance of REE in the surface stream shows the enrichment in REE with higher atomic number (HREE); (4) the Nd/Sm ratio in soil samples and in the underlying rock is remarkably constant; (5) the geochemical behavior of Y is (at given conditions) similar to that of REE; (6) all the monitored fluxes (bulk atmospheric precipitation, throughfall and surface discharge) are considerably

high in Br, whose most likely sources are the oceanic spray and the vehicular emissions (Br is used as Pb scavenger).

No. A3012703 Thermal History of Sedimentary Basins of the Czech Republic and its Relationship to Tectonic Processes. (*J. Šafanda, Geophysical Institute AS CR, Prague,* ***V. Suchý****, I. Sýkorová, Institute of Rock Structure and Mechanics AS CR, Prague, M. Stejskal, Institute of Chemical Technology, Prague*).

During 1997, principal research effort was concentrated on tectono-thermal and diagenetic evolution of the Barrandian Basin (Lower Paleozoic) of central Bohemia that represents one of the key terrane units of the Bohemian Massif. Recent integration of geochemical, sedimentological, seismic and structural data provides evidence that Barrandian sedimentary units have undergone at least three major stages of fracturing and extensive fluid migration that may have been related to tectonic and/or thermal events.

Early Silurian thermal input associated with basin-wide tectonic extension and intrusion of numerous basaltic dykes was reponsible for geologically “instantaneous” elevated maturation of sedimentary strata close to igneous bodies. Rather unusual aspect of this contact metamorphic alteration is a locally abundant presence of hydrocarbon liquids resembling diesel fuel or “hydrothermal petroleum” that were generated in adjacent immature sediments by metamorphic heat and entrapped in vein minerals as microscopic fluid.

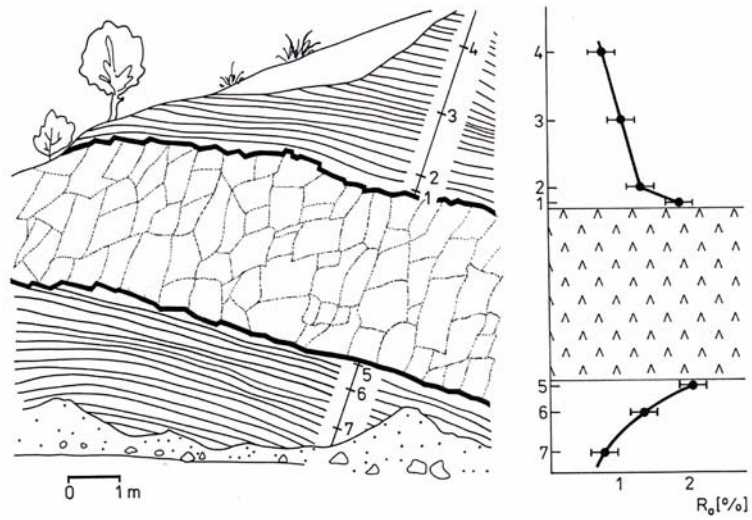


Figure: Field sketch to show a thick diabase sill penetrating Silurian organic matter-rich shales at Kosov Quarry, Beroun County. Contact alteration of solid organic matter adjacent to the sill, measured by graptolite reflectance, is also plotted. Microscopic droplets of “hydrothermal petroleum” generated from enclosing sediment by metamorphic heat were entrapped as inclusions in vein minerals that heal numerous fractures inside this igneous body. Adopted from Suchý et al. (1997).

Relatively younger set of systematic subvertical, orthogonal veins mineralized with calcite and quartz that widely penetrate Silurian and Devonian strata evidences a later stage of basinal evolution associated with deeper burial and fracturing. Fluid inclusion research on petroleum inclusion-rich vein quartz crystals indicates precipitation within the oil window zone, between 50-100 °C and 36-80 °C for NW-SE and N-S-oriented vein sets, respectively (Dobeš, Suchý et al. 1997).

Subsequent stage of syn- to post-tectonic basin development was characterized by the development of thick, bed-normal, north-south-striking veins mineralized with massive coarse crystalline calcite, chalcedonic silica, dolomite, and a variety of manganese species. The veins probably precipitated from ascending basinal fluids of variable salinity (0.35 to 22.4 wt. % NaCl equiv.), at 55-115°C (Zeman, Suchý, Dobeš et al., 1997). These warm saline fluids containing traces of petroleum hydrocarbons were also responsible for the development of extensive dissolution porosity and caves in Barrandian limestone sequences (see also complementary research report "Geological salvage research in the area of Čertovy schody Quarry", by A. Zeman and V. Suchý, this volume, for more details).

Grants of the Ministry of Environment

No. 610/6/96 - Stability of the sandstone Pravčice Arc (*J. Zvelebil, Institute of the Rock Structure and Mechanics, AS CR, Prague &* ***V. Cílek***)

The 23 m wide sandstone arc represents the largest natural bridge in Europe. Due to the enhanced SO_x emissions from power plants (brown coal burning), abundant salts, mostly gypsum and K-Al sulfates originated as a neutralization products of acid rains, intensive salt weathering takes place and foliated rock crust up to several cm thick tends to fall down. The sandstone surface is at the same time hardened by silica incrustation to the form of "armored" rock crusts. The natural erosion can be described as mostly gradual "grain by grain" removal while anthropogenically enhanced erosion is characterized by salt weathering taking place under rock crusts and thus larger pieces of sandstone are being removed. The research of salt weathering and rock crust formation is accompanied by detailed long-term (4 years in 1997) monitorng of slow mass movements performed by J. Zvelebil.

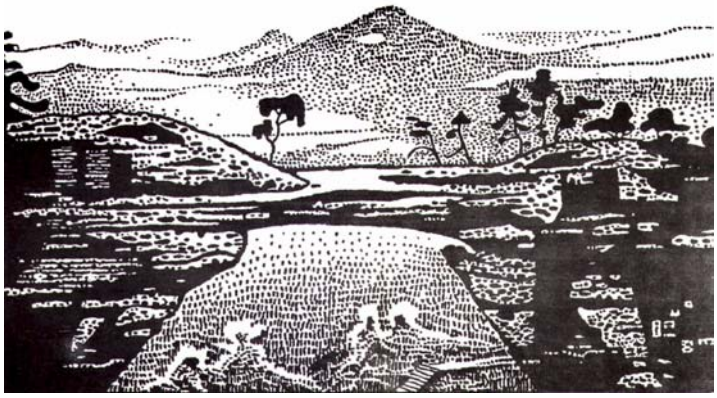
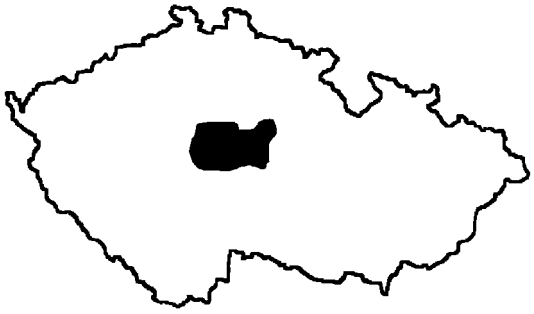


Figure: Pravčice natural arch, Elbe Sandstones National Park.

No. VaV/610/2/96-56/03/15 - Constitution of an integrated network of protected geological localities (***V. Cílek***)



The first geological sites (Peklo, Panská skála and others) became protected in 1895 and the list gradually increased. However the majority of protected areas were established as botanical and in less commonly as zoological reserves. In 1992, the group of geologists of Czech Geological Institute proposed the integrated network of geological localities containing about 2,000-2,500

objects of interest in the area of the Czech Republic. The report covering about 60 sites located in three districts - Praha-východ, Kolín and Kutná Hora - is considered to be the first step and "show example" how to create the integrated system from several independent points based on the locality list of the Czech Geological Institute. Almost all sites on the list should be listed as the "important landscape element" while some of the most valuable localities (e.g. Přezletice, Velká propadlina na Kaňku) should be protected in a higher hierarchy of nature monuments. As a complementary landscape feature to the World Heritage historical monument of Kutná Hora medieval city, Nature Park of Kaňk was proposed. The park covers the important medieval mining localities including a 14th century silver mine, Upper Cretaceous localities of Na vrších, Velká propadlina and Turkaňk and abandoned loess pit of Sedlec.

Mollusks of the Labské Pískovce Protected Landscape Area (***V. Ložek***)

Continuation from 1996: Mollusks as indicators of various anthropogenic impacts on natural or semi-natural ecosystems.

Industrial Grants

Cement Bohemia Praha a. s. - Biogeochemistry monitoring (***J. Martínek, P. Skřivan, M. Burian, O. Kvídová & I. Dobešová***)

Monitoring of the bulk chemical composition and of selected minor and trace elements content in the atmospheric precipitation has been in progress since November 1996 in the close proximity of the Velkolom Čertovy schody Quarry, Koněprusy area. The purpose of the study is to assess the impact of mining activities in the quarry, limestone processing, and lime production on the overall chemistry of the surrounding environment. Monitored chemical parameters of the atmospheric precipitation were compared with the corresponding data collected in a rural landscape (locality of Truba, near Kostelec nad Černými lesy) approx. 30 km SE of Prague. Results of the study in hydrological year 1997 show that: (1) terrigeneous dust containing mostly fine-grained limestone affects the deposition in the area of the quarry and in its close neighborhood. It is manifested by the enhanced concentrations of Ca, Mg, and Sr and by its neutralization effect towards the acidic precipitation (mean pH in the reference locality Truba reaches 4.2, the Koněprusy samples are neutral); (2) long-range transport from the industrial centers and in particular from the Beroun basin is documented mainly in NO_3^- concentrations; (3) operation of the lime kiln affects most probably the content of SO_4^{2-} and F^-. Concentrations of vehicular Pb below the local road connecting Koněprusy and Suchomasty were found to be higher than those along the local communication inside the quarry, and (4) contents of selected environmentally sensitive trace elements (As, Be, Cd, Cu, Cr, Zn) are comparable with the reference locality and correspond to the surficial, moderate contamination of the entire area of the central Bohemia.

Cement Bohemia Praha a.s. - Geological salvage research in the area of the Velkolom Čertovy schody Quarry (***A. Zeman & V. Suchý***)

Preliminary succession of sediments in karstic solution pipes was described. Most of the depressions are of circular cross-section and about 10 meters in diameter. The highest part

of the succession is composed of Lower Miocene sand and gravel at 450–465 m a.s.l., with subhorizontal bedding. At approximately 422-450 m a.s.l, there is a set of collapse syncline structures. The upper part of these synclines is composed of thick brown and reddish clay and sandy sediments. The lower part consists of glauconite-rich sandstones and marlstones. At the level of 420–422 m a.s.l., there is a set of gray clayey sediments. In the interval of 405–422 m a.s.l., there is a sedimentary fill of unstratified formation of gray to green-gray clay silts. Paleontological investigation of the upper part of this formation was unsuccessful. At 375–405 m a.s.l., the sedimentary filling of the solution cavities has a special order. It is vertically concentric, e.g., the central part the of cavity is filled with gravel and the space between the wall of the cavity and the gravel is filled with sandy clay. At the level of 395 m a.s.l. we found a fragment of Cenomanian glauconite-rich sandstone, which is coincident with the Upper Cretaceous glauconite-rich sandstone that occurred in autochthonous position at 435 m a.s.l.

In 1997, we continued the study of the origin of solution cavities that appear to be linked to north-south-striking hydrothermal veins in the area of the quarry. Regional context of these veins and fractures was examined using an integrative analysis of remote sensing information.

Interpretation of the remote sensing data has shown that both the sedimentary and crystalline units of the Bohemian Massif are cut by a series of major north-south-striking linear structures (see Figure, next page). Some of these lines represent photolineaments but some other probably correspond to major faults. Present–day earthquakes and localities of tectonically deformed Quaternary and Tertiary sediments appear to be concentrated also along these prominent structural trends and provide an evidence that at least some of the lineaments are still tectonically active. We propose that the above outlined system of major faults and tectonic fractures played an important role in focusing and transporting warm fluids. Although the principal stages of fluid mobilization and migration probably occurred during or after the Variscan Orogeny, the transient episode of fluid activity may have locally persisted until the present time. The most convincing evidence of an extensive post–Variscan fluid movements has now been recognized in the Lower Paleozoic Barrandian Basin of central Bohemia (Beroun District). Hydrothermal activity is signified by a number of generally north-south-striking bed-normal veins mineralized with calcite, dolomite, chalcedonic silica, manganese minerals and asphaltic pyrobitumen. Numerous caves that are spatially linked to these hydrothermal calcite veins are also thought to have been formed by rising warm fluids. The caves typically exhibit spherical niches in the upper parts of passages and dissolved and etched carbonate rock surfaces.

Following the lineaments to the south, similar phenomena characteristic of hydrothermal karstification are also developed in metamorphosed carbonate rock of the Moldanubian unit. Furthermore, to the north of the Barrandian Basin, the occurrences of recent hot springs in the area of Teplice spa and enigmatic saline brines concentrated in deeply buried Carboniferous sediments around the city of Slaný seem to be also controlled by one of the most prominent north-south-striking lineaments. Explosive kimberlite pipes of the Třebenice area and the carbonate tufas tracing Tertiary volcanic occurrences NNE of Prague (Říp Hill) can serve an additional evidence of an ancient fault-controlled fluid migration.

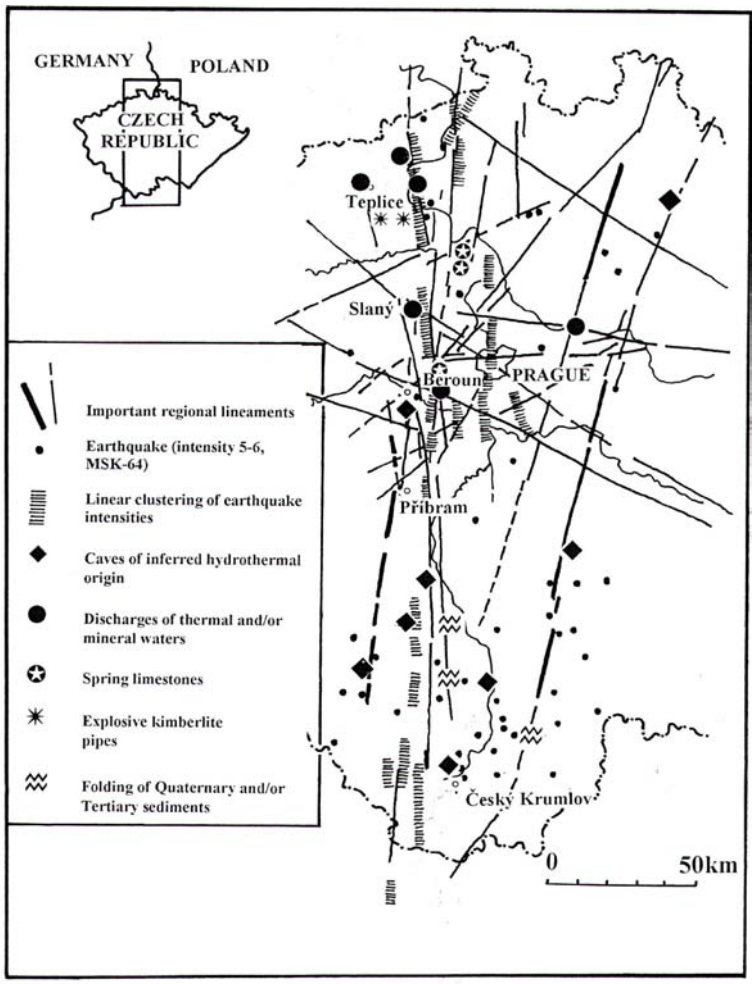


Figure: Schematic presentation of prominent lineaments of the central part of the Bohemian Massif (modified after Lysenko, 1986). Various spatially linked phenomena that may be due to circulating and/or discharging fluids of deep origin are also plotted.
Adopted from Suchý and Zeman: Episodic Post-Variscan Fluid Flows and Hydrothermal Karstification in the Bohemian Massif, Czech Republic: A Preliminary Note. – 15th International Sedimentological Congress, Alicante 1998, Book of Abstracts, pp. 747-748.

***

11. Department of Paleomagnetism

Foreign Grants and Joint Projects

Methodology and attempts of dating of karst fillings in the Classical Karst region (Slovenia) by means of paleomagnetism (***P. Pruner, P. Bosák, O. Man, D. Venhodová***)

To solve the tasks, the suitable laboratory procedures and sampling mode of oriented loose samples had to be verified. Assuming the age of rocks less than 0.73 Ma being characterized by normal polarity (Brunhes zone), paleosecular variations could be tentatively tested. Rocks older than 0.73 Ma can be correlated considering normal and reverse polarity zones (Brunhes, Matuyama, Gauss, Gilbert) and subzones (Jaramillo, Olduvai, Reunion, etc.). Three sections were sampled in a karst fill composed of loose

sands with variable portion of clay at three localities (Divača, Divaška Jama and Trhlovca Cave). During the laboratory investigations, the progressive thermal demagnetization on the MAVACS apparatus was carried out up to 450°C on 13 samples from the Divača locality. Samples showed extremely high thermal instability and generally low unblocking temperatures of minerals - carriers of remanent magnetization. A pronounced phase changes were found around 280°C. Consequently, all other samples from three profiles were subjected to progressive AF demagnetization in 13 fields up to 1,000 Oe. Generally, the AF demagnetization procedure was more effective than the thermal one due to phase changes of magnetically active minerals during thermal treatment. All samples showed two-components of remanence. The A-components are carried by minerals of low unblocking temperature. Viscous and magnetically very soft properties are typical for A-components representing up to 90%, and even more, of the natural remanent magnetization. The harder B-components were clearly revealed by AF procedure within the intervals of 200 to 250 up to 300 to 1,000 Oe. The following results were obtained: (1) Divača, a section close to motorway: samples are low magnetic, 16 tested samples showed normal (N) and reverse (R) polarities of the B-components, while samples with R polarity prevail, (2) Divaška Jama: altogether 13 moderately magnetic samples were AF demagnetized, the B-components showed predominantly R polarity, and (c) Trhlovca Cave: samples are low magnetic, 16 samples tested by AF procedure showed again N and R polarities, while samples with N polarity prevail.

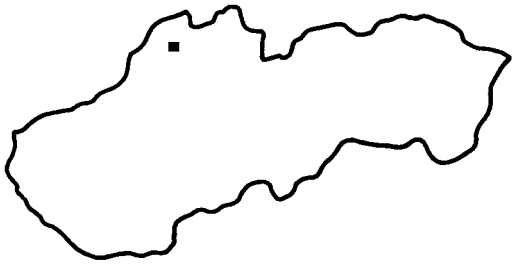
Investigations of three profiles defined normal and reverse polarity magnetozones and showed correlation between the sections in the Divaška Jama and Trhlovca Cave. The narrow normal magnetozones probably correlate with the Jaramillo polarity event (0.90 to 0.97 Ma) of the Matuyama epoch. Those data indicate the substantial age of cave in which the last phase of filling started before 0.97 Ma and finished before the Brunhes/Matuyama boundary, i.e. around 0.73 Ma. Magnetostratigraphic data of the Divača section detected two narrow normal magnetozones in the long reverse polarity zone which probably correlate with Olduvai and Reunion polarity events (about 1.67 to 1.87 Ma) of reverse Matuyama epoch or with some of normal magnetozones (about 3.8 to 5.0 Ma) within reverse Gilbert epoch. Data indicate the possibility that the cave originated during the Messinian period characterized sea-level fall and evolution of deep karst in the Mediterranean Basin.

Grant Agency of the Czech Republic

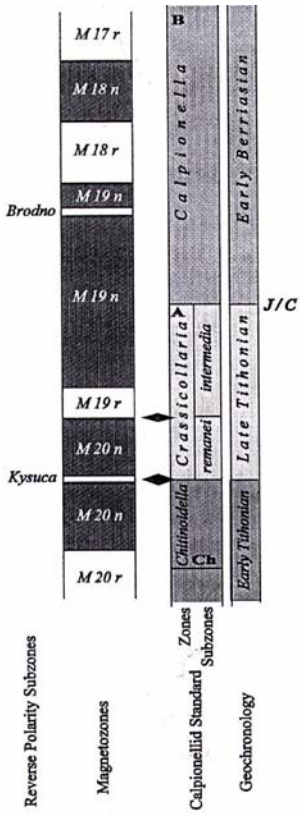
No. 205/97/0063 - Magnetostratigraphic investigation and correlation of key sections of Jurassic - Cretaceous boundary formations in the Tethyan realm (Río Argos, Spain; Brodno, Slovakia) (***P. Pruner, V. Houša, M. Krs, D. Venhodová, O. Man & J. Slepičková***)

(a) Sub-project "Magnetostratigraphy in the Río Argos" (*in collaboration with Ph. J. Hoedemaeker, Leiden, the Netherlands and J. M. Parés, Barcelona, Spain*). The section of the Early Cretaceous strata in the Río Argos (Province Murcia, SE Spain) was selected for magnetostratigraphic investigations due to its importance, detailed geological and paleontological documentation and good exposure of the individual strata. Altogether 361 oriented hand samples were collected covering the Berriasian, Valanginian, Hauterivian, Barremian and the Early Aptian (see the Annual Report 1996, GLI AS CR). In 1997, twenty pilot samples were tested for the anisotropy of magnetic susceptibility (by Mr. J. M. Parés). A majority of samples show three components of

remanence. A-components are of viscous or chemoremanent origin, they were derived in temperature intervals (during laboratory thermal demagnetization procedures) below 100°C. B-components were mostly inferred in temperature intervals of 100 to 400°C. They were derived at a high level of confidence, consequently, they could be subjected to fold tests. C-components were reliably derived only in samples with higher values of moduli of remanent magnetization. C-components of extremely low values (oscillating within few tens of 10^{-6} A/m) show too big dispersion and were not applicable to fold tests. Altogether 84 samples were found totally remagnetized in the Neogene as was evidenced by the mean paleomagnetic directions (with both the N and R polarities) and the calculated pole position. Apart from few samples totally weathered and from those totally remagnetized during the Neogene, the samples from the whole Río Argos section indicate a syn-tectonic remanent magnetization. This conclusion was derived from the study of the precision parameter *k* or of the semi-vertical angle of the confidence cone at the 95% probability level in dependence upon different dip angles of strata. B-components of syn-tectonic remanent magnetization indicate a clockwise paleotectonic rotation, while B-components of samples totally remagnetized in the Neogene indicate a clear post-tectonic magnetization. Limestones from the Río Argos macroscopically display no signs of thermal, hydrothermal, chemical, dynamometamorphic or other alterations and analogous cases could doubtlessly pose a certain danger during routine magnetostratigraphic studies.



b) Sub-project "Magnetostratigraphy in Brodno near Žilina". This locality has been subjected to systematic magnetostratigraphic investigations since 1992. Condensed sampling carried out at the Brodno locality and subsequent laboratory investigations of petromagnetic and paleomagnetic parameters resulted in delineation of magnetozones M17 to M21 and in high-resolution magnetostratigraphic data within magnetozones M19 and M21. The delineation of two narrow subzones with reverse polarities is of a special significance, one located approximately in the middle part of the normal zone M20 and another one in the uppermost part of the normal zone M19. Within a sample of thickness of 2 cm, two fossil components of remanence with normal and reverse polarities were found in the transitional zone between the lower boundary of the upper part of the normal polarity magnetozone M20 and the upper boundary of the reverse polarity subzone. With respect to the expected sedimentation rate and the thickness of the sample it may be interpreted that the transition of the main geomagnetic dipole field from the reverse to the normal polarity occurred within the limits of ±5, 000 years. This number represents also the relative accuracy with which the reverse subzones can be correlated with similar reverse subzones in the marine (M - Mesozoic) magnetic anomalies sequence. For next easy references, the narrow reverse polarity subzones were proposed to be named as "Brodno" and "Kysuca" subzones (see Figure). Detection of such narrow subzones, high-fidelity petromagnetic and paleomagnetic data, precise detection of magnetozones M19 to M21, as well as additional data



accumulated in 1997 range the Tithonian-Berriasian magnetostratigraphic profile at Brodno near Žilina to high-resolution magnetostratigraphic profiles suitable for an accurate correlation with biostratigraphic zones. Recently, O. Man has proposed an additional procedure applicable to processing of magnetostratigraphic data - each sample is assigned to belong either to normal or reverse polarity class according to the direction of the separated component of remanent magnetization. Although this can be done on the basis of paleodeclination and paleoinclination data, such an approach may be not always the optimum one. Instead, an angular deflection from the most frequent direction of separated remanence components provides the best basis for discrimination between both the classes. Delineation of two narrow subzones and derivation of high-resolution magnetostratigraphic data close to the Jurassic/Cretaceous boundary strata at Brodno represent a unique continental profile so far derived.

***

12. Program of Advancements in Scientific Research in Key Directions persued at the Academy of Sciences CR

(12a) K1-012-601 Project No. 5 Geophysical processes and structure of the Earth (with special reference to Bohemian Massif).

Subproject: Paleozoic evolution of the Bohemian Massif terranes integrated into the history of the European Variscides (***F. Patočka, J. Fiala, J. Filip, J. Hladil, M. Konzalová, M. Krs, J.K. Novák, P. Pruner, M. Svojtka, M. Vavrdová, Z. Vejnar & J. Waldhausrová***).

GENERAL RESULTS

The pre-Cadomian and Cadomian phase of lithosphere evolution is recorded in the Teplá-Barranian Unit (TBU) of the Bohemian Massif. According to geochemistry and petrology of volcanic rocks, the TBU Late Proterozoic basin was developed in the tectonic setting related to the subduction of oceanic lithosphere beneath active continental margin. The Cadomian age of the classical Barrovien metamorphism of the TBU was recognized. The TBU (as an integral part of Armorica microplate) began to be rifted off Gondwana supercontinent in Early Cambrian, and experienced an intense transtension throughout the process. The West Bohemian granitoids ca. 520 Ma in age intruded during the transtension. Mafic rocks of the Kdyně Massif show the same age.

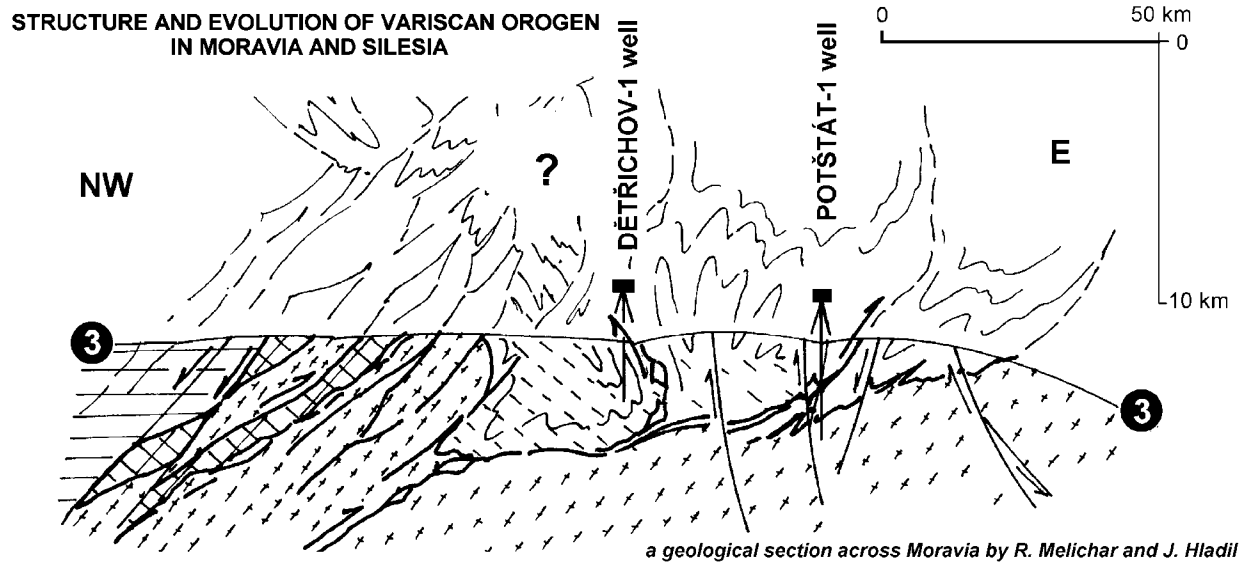
The peri-Gondwanan units of the Variscan Europe do not show unequivocal differences in the scale of paleobiogeographic provinces. However, on the SE margin of the Bohemian Massif the acritarchs were found in marine clastic sediments (underlying Devonian strata) which (1) are an evidence of the host rock Early Cambrian age, and (2) seem to indicate a relation to Fennosarmatia. As the Baltica related seem to be also the Silurian deep shelf graptolite faunas of Iberia and Barrandian, both being quite similar to fauna of the Southern Scandinavia.

Mafic (meta)igneous rocks, abundant in the Early Paleozoic complexes of the northern Bohemian Massif (Saxothuringian Zone, West Sudetes), show almost uniform WPB- and MORB-like geochemistry. These features are interpreted as an evidence of Ordovician-?Silurian ensialic rifting and the continental break-up followed by the generation of oceanic-type lithosphere. However, the geological environment of the metabasites seems to indicate emplacement in an extensional (back-arc?) basin rather than in a strictly oceanic regime. The

scarce magmatic-arc type volcanics, isolated HP-LT and UHP metamorphic rocks, and metamorphosed arc-derived clastics, showing close ages of origin, which are distributed along the northern periphery of the Bohemian Massif, suggest that subduction and magmatic arc development may have occurred contemporaneously with the Early Paleozoic ensialic rifting and extensional (back-arc) basin generation in these realms. The Early Variscan termination of blueschist facies metamorphism in the West Sudetes may be identified with closure of the basin.

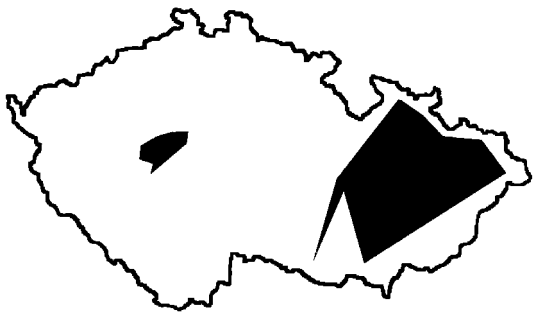
The final phases of the Variscan cycle in the Bohemian Massif corresponded to the final deformation of the south Moldanubian granulite bodies (ca. 320 Ma) related to the Early Carboniferous Gföhl nappe emplacement.

The interpretation of paleomagnetic data suggested a significant paleotectonic rotations of pre-Variscan and early Variscan complexes of the Bohemian Massif. The proximity to the Trans-European Suture Zone (TESZ), separating the Variscan Belt terranes from the Precambrian Fennosarmatia, gives a reasonable explanation. The changes in paleogeographic latitudes and paleotectonic rotations were identified both in the Moravo-Silesian Zone and in the Barrandian (since Early Cambrian to Devonian). The Stephanian waning stages of the Variscan Orogeny are paleomagnetically recorded in the West Bohemian limnic coal-bearing basins.



INDIVIDUAL RESULTS

(a) Recognizing the mid-Paleozoic basin attributes from the Variscan terrane segments *(**J. Hladil**).*



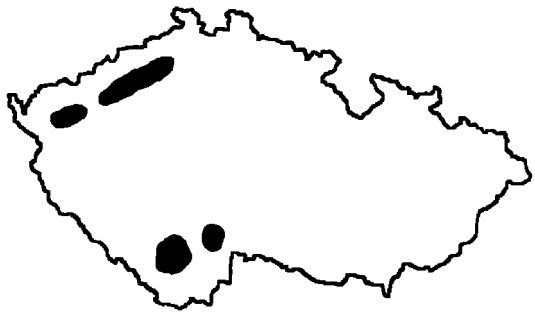
Several Devonian sequences of the Bohemian Massif were analyzed. The Koněprusy area was situated on open shelf elevation, segments of the Barrandian Basin were lying on carbonate shelf slope (both NGM), the Moravian Karst represented an extensionally sinking platform (within SLM). Two other sequences were reconstructed: (1) the transitional facies representing the shelf slope, and (2) the Horní

Benešov facies deposited alongside a tholeiitic basalt ridge (both SLM). Estimates of sea level stands result from the thickness of sediment per a conodont zone plus height of free water column, which was calculated from the lateral balances by alternative methods. The values seem to be 90%-reliable within ±30% error, where empirically introduced deviations are iteratively bound in a series. The tectonic influence is visible if real curves are compared with an updated global eustatic curve. Thus, the evolution of the Devonian in the central Bohemia shows increasing number of tectonic disturbances from the terminating Pragian up to Givetian. An overall upward shallowing trend is in contrast to the evident differentiation of the morphology of relief (frequently alternating elevations and depressions, reflecting the strike slip and pull-apart kinematics). Curves constructed for the Moravian Karst are disturbed until the Middle Givetian, then a period of stability occurred, which terminated within a strong load of irregularities beginning from the Middle Frasnian (again rapidly changing elevations and depressions, reflecting the strike slips, thrust and pull-apart kinematics). Very independent behavior of the transitional and basinal facies of Moravia indicates similar processes (mainly transtensional/transpressional wedging episodes).

(b) Investigation of the Lečice Member of the Barrandian Upper Proterozoic. (***M. Konzalová***)

In the previous research, thin-walled spherical vesicles of unicellular organisms have been found in the Lečice Member, some of them possessing low rod-like outgrowths. These morphological features could be, but were not linked with the forms near to the Phanerozoic assemblages according to the old concepts. After the thorough research in the non-metamorphosed rock complexes, especially in Siberia, a perfectly preserved assemblages were isolated from Precambrian rocks, which contained forms with more complex vesicles ornamented with processes, already in Neoproterozoic and as early as in the Late Riphean - Neoproterozoic. In contrast, the Lower Cambrian and uppermost Neoproterozoic assemblages are composed of rather monotonous assemblages with two prevailing elements - spherical vesicles of unicells and filamentous Cyanobacteria, as it is evident from the last investigations. It seems likely probable that the provincialism and environmental control are two crucial points that must be taken into consideration also for the evaluation of rarely preserved microfossils of the Lečice Member.

(c) Tertiary of the Bohemian Massif. (***M. Konzalová***)

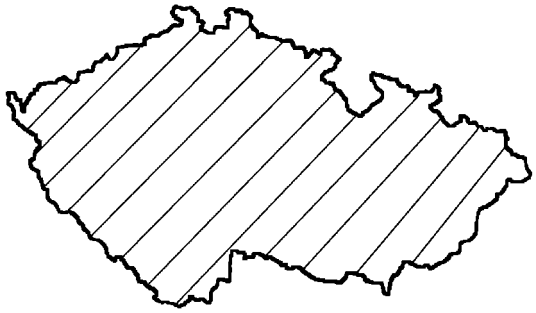


Conifers represent a group of vascular plants which can be traced in fossil pollen records from the Mesozoic up to the Recent, with very wide range of species in the Tertiary. Therefore, the research concentrated on its main representatives, the families of Pinaceae and Taxodiaceae-Cupressaceae, comprising significant environmental markers. The new records and evidence of several representative genera, *Pinus*, *Picea* and *Cedrus* (fam. Pinaceae) and *Cunninghamia* and *Sequoia-Cryptomeria* (Taxodiaceae, Cupressaceae) were evidenced as early as in the Bohemian Upper Cretaceous (recently in marine Upper Turonian to Coniacian). They are fully represented in the Tertiary volcanic complex and especially in the basinal sediments. At the

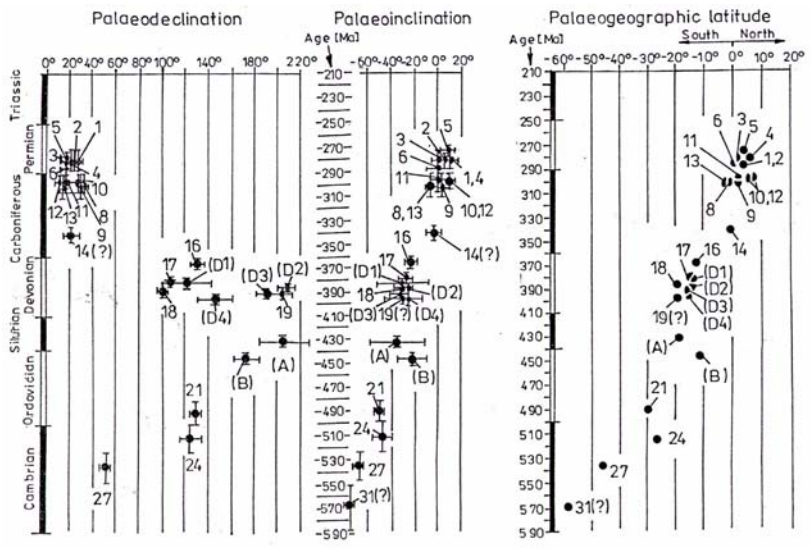
taxonomic level, they are well comparable with the conifers recorded in the Carpathian Paleogene, where Pinaceae are especially very frequent within the offshore facies. Due to the pollen morphology, Pinaceae bisaccate pollen testify well the high redox potential environment, being rich in sulfides, precipitated by pollen spherical bodies. A good example was ascertained in the Upper Cretaceous of the Teplice area (North Bohemia).

In general, all the mentioned conifers and especially Pinaceae are widely spread and well recorded especially in the Oligocene forest vegetation, in both the Bohemian Tertiary and West Carpathians.

(d) Paleomagnetic investigations aimed at global-tectonics interpretations, paleogeography of Paleozoic rocks and Variscides in Europe (***M. Krs, P. Pruner, D. Venhodová, O. Man & J. Slepičková***)



Paleomagnetic data from the Triassic to the Devonian were statistically evaluated for the territories to the North of the Alpine tectonic belt, to the West of the Urals up to Great Britain. Data clearly document the consolidation of the European lithospheric plate in the Early Permian as a part of the formation of the Pangea supercontinent. Due to the continental drift, the entire Bohemian Massif as a part of the European Plate, moved from the equatorial position in the Early Permian to the present one under continuous clockwise rotation. The Trans-European Suture Zone (TESZ) represents a pronounced paleo-lithospheric boundary dividing the western Variscan and pre-Variscan mobile belt from the East European Craton. Blocks older than Early Permian and located to the SW of the TESZ show paleotectonic rotations of variable values, both in the Western and Southwestern Europe (incl. the territories within Great Britain and Bohemian Massif). Extremely high values of paleotectonic rotations (around the vertical axis) are shown by Early and Middle Carboniferous rocks in the West-European Variscides, the same feature was found for the Devonian rocks both in the Moravian Zone and the Barrandian area. Early Silurian, Late Ordovician and Late Cambrian rocks from the Barrandian show also pronounced paleotectonic rotations with prevailing clockwise sense.

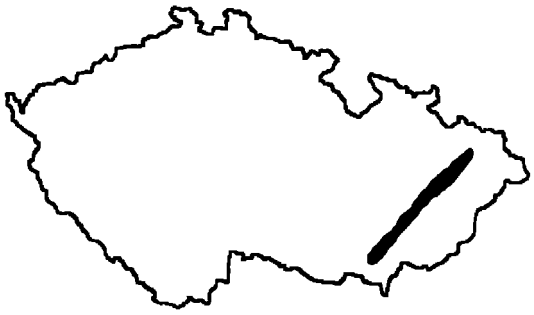


The Figure shows dependence of paleomagnetic declinations (paleodeclinations), paleomagnetic inclinations (paleoinclinations) and paleogeographic latitudes on geological age studied in the Bohemian Massif. Data were predominantly derived from paleomagnetic pole positions, those derived from virtual pole positions are given in brackets. Figure clearly shows anomalous aleodeclinations indicating pronounced

horizontal paleotectonic rotations, predominantly in clockwise sense, due to paleotectonic rotations of Early Variscan and pre-Variscan formations. The most pronounced paleolatitudinal drift occurred during the Cambrian, the drift later decelerated. However, it must be emphasized that the data from Early Permian, Late Carboniferous and Devonian rocks were studied on numerous localities and on a variety of rock types, while Early Cambrian, Ordovician and Silurian data have to be completed by additional studies.

The Bohemian Massif: values of palaeodeclination, palaeoinclination and palaeogeographical latitude derived on rocks of the Early Permian through Early Cambrian ages. 1 - Blanice Furrow, N., Aut., red beds; 2 - Blanice Furrow, S., Aut., red beds; 3 - Boskovice furrow, S., Aut., red beds; 4 - Boskovice Furrow, cent. part, Aut., red beds; 5 - Krkonoše Piedm.Basin, L. and M. "Rotliegendes", red beds; 6 - Krkonoše Piedm. Basin, E. "Rotliegendes", red beds; 8 - Plzeň Basin, Westph. C - Steph., red beds; 9 - Kladno-Rakovník Basin, Westph. C - Steph., red beds; 10 - Blanice Furrow, N., Steph., red beds; 11 - Boskovice Furrow, S., Steph., red beds; 12 - Krkonoše Piedm. Basin, Steph., red beds; 13 - Intrasudetic Basin, Westph. B - Steph., red beds, tuffs; 14 - Moravo - Silesian region, L. Visean, predominantly roofing shales; 16 - Moravian Zone (eastern margin of the BM), Křtiny, Famen., limestone; 17 - Moravian Zone, Josefov, Givet., limestone; 18 - Moravian Zone, Čelechovice, Eifel., limestone; 19 - Barrandian, Prague Basin, E. Devon., limestone; 21 - Barrandian, Prague Basin, E. Ordov., silicite; 24 - Křivoklát-Rokycany Complex, Late Cambrian, andesite, partly rhyolite, dacite; 27 - Barrandian, Skryje-Týřovice region, M. Cambr., Jince Member, graywacke; 31 - Barrandian, Brdy Mts., Příbram syncl., E. Cambr., (Krs, Krsová and Pruner 1997). (D1) - Barrandian, U dubu sedmi bratří, E. Givet., limestone; (D2) - Barrandian, Hostim, M. Eifel., limestone; (D3) - Barrandian, quarry Prastav, L. Ems. through E. Eifel., limestone; (D4) - Barrandian, Branická skála, E. Ems., limestone; (A) - Barrandian, Karlštejn, quarry Kosov, E. Silur., black shales from the contact margins; (B) - Barrandian, Hlásná Třebáň, Levín, L. Ordov., limestone and claystone from contact margins (unpublished data).

(e) Paleomagnetic investigations aimed at the contact regions of the Bohemian Massif and the Western Carpathians (***P. Pruner, D. Venhodová, O. Man & J. Slepičková***)



Paleomagnetic investigations were carried out on Middle Devonian to Early Carboniferous rocks in the Moravo-Silesian region. Pilot samples from two localities of Jesenec and Slavoňov investigated previously showed physical properties suitable for paleomagnetic analyses. Additional samples were collected in 1997. Middle Devonian to Early Carboniferous organodetrital limestones were sampled at Jesenec 8 site; pyrrhotite was found as carrier of remanent magnetization. Middle Devonian shales were sampled at Slavoňov 6 site, in which primary hematite with unblocking temperature about 660^{o}C was proved. Additional pilot samples were collected from another five localities (Újezd near Boskovice, central Moravia, and four localities near Jevíčko, Western Moravia). Devonian limestones from Újezd near Boskovice yielded data proving a high stability of primary magnetization. The viscous component is of low value, the primary magnetization is carried by minerals with a wider spectrum of unblocking temperatures ranging 200 to 500^{o}C (due to different Fe-oxides) and up to 675^{o}C (due to hematite). Middle Devonian and Early Carboniferous graywackes and siltstones from the sites close to Jevíčko show unstable properties due to the content of pyrrhotite as the principal carrier of remanent magnetization.

Only one locality from those near Jevíčko yielded Middle Devonian graywacke samples with a wider spectrum of unblocking temperatures, from 100 to 580°C.

(f) Carboniferous (Namurian) deformation in the Blanský les massif, southern Bohemia: the U-Pb zircon evidence (***M. Svojtka***)

The structural features of the Blanský les massif (South Bohemian Moldanubian granulites) show evidence of multiple deformational phases. The ductile deformation phase D1 forms foliation S1 of the original granulite fabrics. The foliation generally dips to the NW. The second D2 stage of deformation mostly transposes the older structures S1. The S2 planes are on the average oriented in N-S direction and banded structures are related to recrystallization of the quartz-feldspar matrix into fine bands in the granulites. The D3 deformation phase constitutes flat "biotite" foliation S3. This stage is characterized by retrogressive changes of replacing garnet→biotite, kyanite→hercynite or sillimanite. Foliation S3 is defined by biotite bands foliation dipping to W.

On the easternmost edge of the Blanský les granulite massif, foliation S3 in the retrogressed granulites (Q+Kfs+Plg+Grt+Bt±Ky±Sill) dips W, being parallel to the deformed Varied Group of metasediments. Retrogressed (Grt-Bt) granulites and paragneisses are discordantly cut by slightly deformed granite dikes near the valley of the Křemže River. The granite is light gray, medium-grained with mineral assemblage (Q+Kfs+Bt+Mu+Plg). The texture is granoblastic to lepidogranoblastic and the medium-grained matrix contains small quartz agglomerates in subparallel layers. Slight deformation of granite took place together with determinative foliation in the Varied Group of paragneisses and retrogression in the granulites.

Zircons separated from slightly deformed granite were clear or brownish. The zircon size fraction 70-140 mm of the equant, prismatic (stubby) and euhedral (needles) morphological variety was abraded. The back-scatter and electron microprobe study was carried out on these zircons. The U-Pb conventional isotopic data were presented in the Concordia diagram. The zircons generate a discordia line with Concordia intercepts at ca. 320 Ma and 979±30 Ma, 1, 219 ± 30 Ma and 1, 533 ± 44 Ma, respectively. The precise lower intercept was interpreted to reflect the magmatic age of zircons (or loss of radiogenic Pb* from existing older inherited zircons). The upper intercepts probably reflect the older age of inherited cores.

On the basis of U-Pb dating and structural analyses we conclude that the age 320 Ma may reflect the minimum age of final (D3) deformation in the Blanský les granulite massif related to the uplift of granulite (Gföhl) nappe.

(g) Geochemistry and mineral chemistry of the Proterozoic volcanics: a contribution to the Barrandian Upper Proterozoic stratigraphy (Bohemian Massif, Czech Republic) (***J. Waldhausrová***)

The low-grade metamorphosed volcanics are almost ubiquitous rocks in the Late Proterozoic Teplá-Barrandian region that belongs to the Bohemicum, one of the major geological units of the Bohemian Massif. The Teplá-Barrandian region comprises several NE-SW trending volcanic zones, each of them showing special geochemical characteristics. The volcanic piles

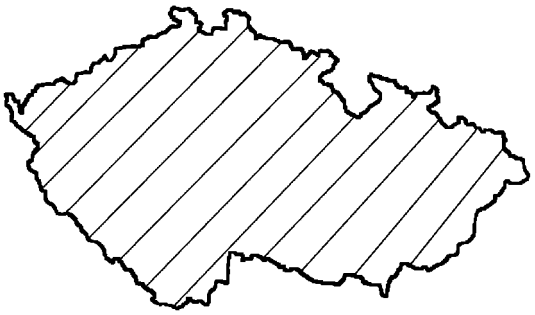
are intercalated with sedimentary rocks, pyroclastics and tuffites. Geochemical features of the rocks confirm the presence of three main volcanic suites: (1) subalkaline, geochemically primitive suite corresponding to the ocean-floor basalts (OFB) and island-arc tholeiites (IAT), (2) alkaline one, represented by mugearites, and (3) transitional suite between subalkaline and alkaline ones, represented by various types of transitional basalts. In comparison with geology and lithostratigraphy, the geochemical and mineral chemistry data show the following volcanic succession (or its part) from the bottom to the top: (1) geochemically primitive tholeiites (OFBs and immature IATs), (2) high-Al basalts, and transitional basalts between subalkaline and alkaline types, and (3) alkaline volcanics of the trachybasalt - trachyte suite. The recent geochemical results enable us to consider the Barrandian Proterozoic area to be a basin with developed oceanic crust and operating subduction zones during its early development stage. During the Late Proterozoic (and Early Paleozoic, too), this basin was gradually filled by a vast volcanosedimentary pile. Some volcanics from the younger volcanosedimentary sequence show within-plate features.

(12b) K1-042-603 Project No. 6: Atmospheric and lithospheric processes with special reference to the territory of the Czech Republic.

Subproject: Dynamics of lithospheric processes (***V. Suchý, Š. Eckhardtová, J. Fiala, J. Filip, A. Galle, J. Hladil, V. Houša, M. Konzalová, M. Lachmanová, R. Mikuláš, J. K. Novák, L. Peza, P. Pruner, M. Svobodová, P. Štorch, M. Vavrdová, A. Zeman & J. Žítt***)

INDIVIDUAL RESULTS

(a) Statistical evaluation of the Paleozoic assemblages of the Bohemian Massif, paleogeography of the Variscides *(**A. Galle**)*

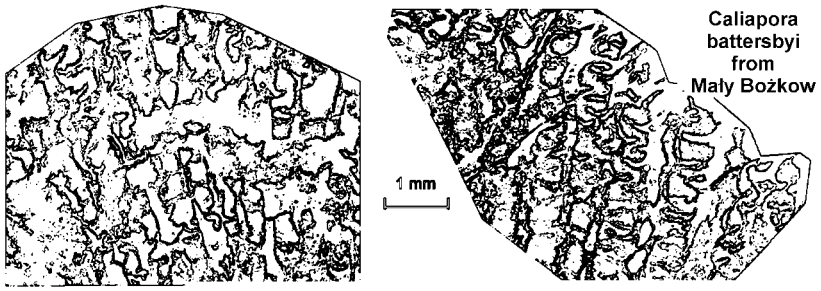


Interpretations of the statistical evaluation of the similarities of Paleozoic assemblages support the hypothesis about the peri-Gondwanan origin of the Saxothuringia and about original geographical proximity of the Saxothuringicum and Barrandian. Givetian features of the Acanthopyge Limestone assemblage appeared as early as in Eifelian: this indicates migration of the Givetian assemblages from Gondwana. It also supports the earlier ideas about the migration from the east based on similarities with the Urals and Sayan Mts. assemblages. Assemblages of the Frasnian localities from Moravia and Poland show differences indicating separation of these basins. The graphic outputs of the PAUP - processed data show the proximity of all the Moravian localities close to Laurussian terranes. It contradicts the opinion on possible peri-Gondwanan origin of the Cadomian basement of the Moravian Paleozoic. On the other hand, it confirms the opinions on its origin close to the Fennosarmatian craton. These opinions were recently confirmed by the find of Lower Cambrian palynomorphs of the Fennosarmatian type in the sedimentary cover of the Brno Massif.

(b) Relicts of sedimentary fabric and fossils in slightly metamorphosed rocks *(**J. Hladil**)*

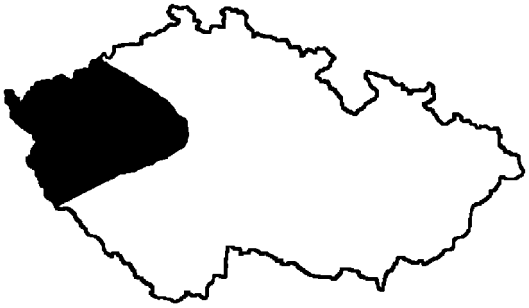
The geological evolution of central Sudetes was interpreted according to several stratigraphical points. The Silurian age of metamorphosed Mały Bożków limestone served as the main presumption during several decades. Although Devonian caliaporids and alveolitids have been known since 1970s, the importance of fauna was disguised by putative finds of *Angopora* and *Pilophyllum*. Reinvestigation of the outcrops (J. Hladil, S. Mazur, J.R. Ebert)

results in the revision of the previous interpretation (Wenlock-Ludlow). The new estimate of the age is Early Givetian. The main evidence of this age is an excellent collection of *Caliapora battersbyi*, which is a cosmopolitan species of exclusively Givetian age. Formerly assumed *Angopora* is, in fact, *Rhapidopora* from the group of chaetetids. Early Givetian alveolitids are abundant: *Alveolites (Tetralites) praetenuissimus*, *A. strigosus cusanorum*, *Platyaxum (Roseoporella) gradatum* and *P. (R). taenioforme*. Accompanying tabulate corals, stromatoporoids and heliolitids are undoubtedly Givetian, or at least Devonian (for example *Scoliopora denticulata*, *Clathrocoilona spissa* and *Heliolites porosus*→"*intermedius*"). The revision of rugose corals is more complicated because their assemblage is partly unusual (A. Galle). However, the preliminary investigation of the Wroclaw collections (by courtesy of the Geological Museum, S. Mazur, J. Kryza, I. Wojciechowska and T. Gunia) supports other new results. For example a specimen of *Calceola* was discovered in this material. The Givetian age of coral-stromatoporoid (meta)floatstone-bindstone of Maly Bożków provides a new prospective for the evaluation of the tectonic history of the Kłodzko area.



DETERMINATION OF DEVONIAN AGE REFUTES "CALEDONIAN" DEFORMATION

(c) Selected groups of Bivalvia and Gastropoda in the Bohemian and Albanian Cretaceous (***L. H. Peza***)



Nerineacean gastropods are described from the Cenomanian, Lower/Middle Turonian and Coniacian of the Bohemian/Saxonian Cretaceous Basin. The basin represents the northernmost extension of the Tethyan realm in the Upper Cenomanian/Coniacian interval. Tethyan assemblages developed on paleo-highs, while assemblages of deeper portions of the basin were Boreal. The change from Tethyan to Boreal in the water column occurred within 20 m. The Bohemian/Saxonian Basin was a part of the Tethyan realm and Tethyan assemblages settled under suitable conditions. Eight species and one new are described in the paper: *Archimedia ernesti* (Parona, 1909), *Nerineacean* indet., ?*Diptyxis cottai* (Geinitz, 1874), *Italoptygmatis geinitzi* (Stoliczka, 1863), *Haploptyxis requienianus* (d´Orbigny, 1842), *Parasimploptyxis* aff. *buchi* (Munster, 1829), *Eliatorella longissima* (Reuss, 1846), *Eliatorella radovesnica* n. sp., *Oligoptyxis ornatissima* (Weinzettl, 1910), and *Vernedia carinata* (Reuss, 1845).

Based on material from the Barremian-Aptian of Albania, the nerineacean *Adaptyxis* n. gen. is described. It possesses high turriculate shells with concave whorls of moderate height. Because of the hollow columella it is assigned to the Umboniidae Lyssenko and Aliev. The columella is hollow. Of the internal plaits, the adapical columellar plait is very small. The other

columellar plait, the palatal plait and the arietal plait are strong. Because of the internal morphology, *Adaptyxis* is considered as transitional between the genus *Affiniptyxis* Lyssenko and Aliev and *Plesioplocus* Pchelintsev. Two new species *Adaptyxis lavdaris* nov. sp. and *Adaptyxis carinatus* nov. sp. are described.

Diptyxis luettickei (Blanckenhorn), *D. munellae* n. sp. and *D. mirditae* n. sp. are described from Barremian to Aptian beds of Albania. Tectonically, they are part of the Mirdita zone. *Diptyxis* species possess one columellar plait and one parietal plait. This morphologic character also occurs in the Cretaceous Campanilidae. Stratigraphically, *Diptyxis* ranges from the Sequanian to the Upper Cenomanian.

Nine species of the genus *Vaccinites* Fischer are known from the Upper Cretaceous of Albania, most of them from the Mirdita zone. *Vaccinites cornuvaccinum* (Bronn, 1831), *Vaccinites atheniensis* (Ktenas, 1907), *Vaccinites boehmi* (Douville, 1897), *Vaccinites gosaviensis* (Douville, 1891), *Vaccinites inaequicostatus* (Munster, 1840), *Vaccinites sulcatus* (Defrance, 1821), *Vaccinites taburni* (Giscard, 1964) and *Vaccinites* sp. were found in the Santonian-Lower Campanian deposits of the Mirdita zone (east Albania). *Vaccinites inferus* (Douville, 1890), indicating a Turonian age is known in the Sazani zone (west Albania).

(d) Paleomagnetic and paleogeographic investigations in the Barrandian area and the Western Carpathians (***P. Pruner, M. Krs, D. Venhodová, O. Man & J. Slepičková***)

Analysis of paleomagnetic pole positions (if a sequence of pole positions is considered which was derived from rocks of different ages) may result into derivation of Apparent Polar Wandering (APW) path. But this is applicable only in case that we are dealing with pole positions derived from rocks from areas within a rigid lithospheric plate. Due to the present knowledge of the history of the geomagnetic field and accumulation of paleomagnetic data on the territories of both the stable and mobile regions in Europe, the geomagnetic polarity reversals should not introduce any ambiguity in construction of an APW path. But in the case of mobile zones characterized by a complex tectonic evolution, this ambiguity can be avoided only if sufficient amount of paleomagnetic data is available. Numerous paleomagnetic data so far accumulated for the Western Carpathians and the Barrandian area allow to carry out the comparative studies of paleotectonic model interpretations which seem to be typical for collisional zones both in the Alpine and Variscan Belts.

The interpretation of the geodynamic model for Western Carpathians is based on evaluation of paleomagnetic data from Outher Carpathian flysch belt, from limestones of the Klippen Belt and from volcanic and sedimentary rocks of Inner Carpathians (Permian to Neogene). Counterclockwise paleotectonic rotations round the vertical axis are typical for Western Carpathians in Slovakia, East Moravia and North Hungary, except for Jurassic rocks of the Križná nappe with typical clockwise and counterclockwise rotations. A specific distribution of poles due to rotation and combined with drift can be explained using a model in which the

movements are partitioned into two components: the first round a distant pole of rotation (due to continental drift), and the second due to rotation round approximate pole of rotation (rotation of smaller-scale blocks, nappes and nappe systems during Alpine collision). The principal contribution of the proposed theoretical model is the explanation of specific distribution of pole positions in a collisional zone allowing the separation of components of tectonic rotation.

Basic paleomagnetic data were summarized for the Bohemian Massif, with a special reference to paleogeographic reconstructions of pre-Variscan formations in the Barrandian area. The specific distribution of paleomagnetic and virtual pole positions derived from pre-Variscan formations in the Barrandian area fits well with the theoretical model of paleotectonic rotations. The similarity of model interpretation of the paleotectonic rotation of pre-Variscan formations in the Barrandian area due to Variscan Orogeny and of Permian to Neogene formations in the Western Carpathians due to Alpine Orogeny is striking, but needs geological explanation.

(e) Biostratigraphy of clayey accumulations in the Štramberk Limestone (Plaňava Formation) (***M. Svobodová***)

More or less well-preserved plant microfossils, marine plankton, scolecodonts and microforaminifers were studied from the Lower Cretaceous sediments in the Štramberk Limestone bodies (Tithonian) at Štramberk. Marine gray to dark gray and brown claystones and marls contain mostly poorly preserved palynomorphs due to the prevailing calcareous environment. Most probably two main assemblages will be distinguished: first yielded stratigraphically important dinoflagellate species - *Batioladinium longicornutum, Muderongia staurota* - which can confirm Hauterivian age of the studied deposits, and second one with *Odontochitina operculata,* a species which is known from Barremian deposits. No angiosperm pollen were observed in samples.

(f) Late Cadomian crustal tilting and Cambrian transtension in the Teplá-Barrandian unit (Bohemian Massif, Central European Variscides). (*G. Zulauf, Geologisch-Paläontologisches Institut Johann-Wolfgang-Goethe-Universität Frankfurt a. M., FRG, W. Dörr, Institut für Geowissenschaften Justus-Liebig-Universität Giessen, FRG,* ***J. Fiala*** *&* ***Z. Vejnar****)*

The Cadomian basement of the Teplá-Barrandian unit is characterized by a classic Barrovian-type metamorphism, the grade of which increases considerably towards the west reaching amphibolite facies conditions in the Domažlice Crystalline Complex (DCC). The number and volume of plutons also increases westwards. The emplacement ages of the Těšovice granite and the Mračnice trondhjemite have been determined at ca. 521 Ma and ca. 523 Ma, respectively, applying conventional U-Pb analyses of zircons. Pervasive HT prolate fabrics and north- northwest-dipping, dextral oblique-slip shear zones within the Mračnice trondhjemite suggest a synkinematic melt emplacement within an Early Cambrian transtensional setting. Transtension is probably related to early-stage rifting that introduced the separation of the Teplá-Barrandian unit (as a part of Armorica) from the

Gondwana. Structural and petrological data of the country rocks show that the Barrovian-type metamorphism and two deformation stages (D_1 with unknown kinematics and D_2 top-to-the-north shearing) are older than the melt emplacement, and thus can be attributed to the Cadomian Orogeny. The intrusion depth of both plutons is nearly the same (ca. 7 km), although the degree of Barrovian-type metamorphism differs significantly within country rocks. This suggests the Late Cadomian eastward tilting of the metamorphic isograde planes. The weak post-plutonic, lower-greenschist to subgreenschist facies folding and thrusting result from Variscan NW-SE compression.

(g) Taphonomy and paleoecology of selected groups of invertebrates (Echinodermata, Bivalvia) in the Late Cretaceous sequences (Bohemian Cretaceous Basin) (***J. Žítt & L. Peza***)

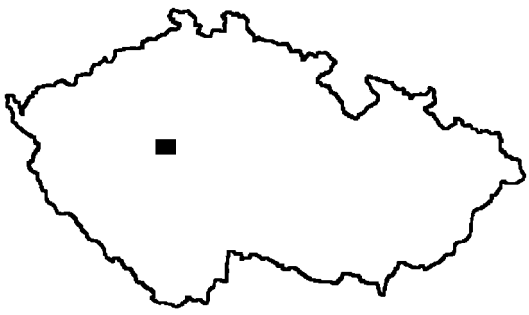
Taphocoenoses of the Číčovice-Černovičky, Předboj, Kuchyňka near Brázdim, Černá skála and Martinov localities were studied from the point of view of species distribution, sedimentology and age of respective deposits. Two Late Cenomanian cycles are apparent. The deposition on the Unhošť-Tursko paleoelevation during both the two Late Cenomanian and Early Turonian cycles is probable. The taphocoenose of Kuchyňka site shows the presence of Roveacrinids (the second Late Cenomanian cycle; not known until now); taphocoenose of the Černá skála locality proves strong phosphogenic processes belonging probably to the first Late Cenomanian sedimentary cycle (Actinocamax plenus Zone).

(12c) K1-017-602 Project No.22: The influence of climate and anthropogenic factors on biosphere and geosphere

Subproject: Climatic oscillation and environmental changes of the recent geological past (***V. Cílek, J. Martínek, A. Zeman & A. Žigová***)

INDIVIDUAL RESULTS:

(a) Origin and evolution of fossil soils (***A. Žigová***)



The Quaternary research from the point of view of the evolution of soil cover lead to the recognition of several important sites where undisturbed and very probably never agriculturally affected soils occur. These localities deserve more attention from both points - their Holocene history and as a standard suitable for monitoring of recent and future changes. The proposed criteria and procedures are summarized in the following steps: (1) to choose soil profiles formed in a natural conditions and if possible without any human impact changing the ecosystem of a landscape. The selection of localities is oriented towards the protected regions; (2) the selection of standard profiles has to be focused on protected areas where malacozoological research was already done; (3) the record of soil units in several geomorphological positions will be used as a lasting standard for observation of changes and for comparison with similar agricultural soils and with fossil soils whose evolution passed with no human influence; (4) to select - as the possibilities allow -

- localities for age determination, and (5) the detailed soil research concentrates on soil evolution within paleoenvironmental framework carried at several time slices. These steps will result in a synthesis of local Holocene environments (biosphere evolution, models of weathering) and in detailed characteristics of soils (micromorphology, clay mineralogy, humus, grain-size composition, parent rock, etc.).

In the Bohemian Karst, the travertine mound at Svatý Jan pod Skalou was studied for the purpose of Holocene stratigraphy. The upper part of the travertine mound consists of three fossil rendzinas in an autochthonous position, and one fossil rendzina in paraautochthonous position. The soil cover of Bacín Hill is evaluated as the locality with an occurrence of soils of terra fusca on the basis of the preliminary study.

***

13. Organization of conferences and scientific meetings

Conferences and Symposia organized in 1997

The Final Conference of the IGCP No. 335 "***Biotic recoveries from mass extinctions***" ***Recoveries´97***, Eurocongress Center and IKEM Medical Center, Prague, September 11 to 16, 1997. (D.H. *Erwin, Smithsonian Institution, Washington,* ***J. Hladil*** *- in cooperation with E.G. Kauffman, Dpt. Geology, University of Boulder,* ***P. Čejchan****,* ***V. Cílek,*** *S. Čech, Czech Geological Institute, Prague,* ***P. Štorch.****,* ***R. Mikuláš****, P. Budil, Czech Geological Institute, Prague,* ***J. Filip, J. Pavková*** *&* ***L. Slavík***).

The conference was dealing with biotic crises on the Earth to summarize a five-years concentration of the world science in this direction. Understanding of extinctions and recoveries of the past serves as a tool for understanding of the recent controlling mechanisms. To some extent, this conference was a part of inspiration for any scientist who is working with ecosystems, problems of nature, systems in general, natural risks or pollution hazards. This conference was focused mainly on life strategies and evolutionary processes which were used by organisms for restoration of sufficient abundance and diversity after natural catastrophes. Essentials: Rather unusual concept of the conference was based on high technology of the IKEM Medical Center which allowed the virtual participation from distant places of the world (on-line WEB connections, lectures and discussion). Eighty representatives from almost all continents were personally attending this conference, more than one hundred authors contributed the abstract book. The conference was under the auspices of Institute of Geology, Academy of Sciences CR, by the Eurocongress Centre Ltd. Scientific organizers were J. Hladil and P. Čejchan from Prague, D. Erwin and E. Kauffman, Washington and Boulder on behalf of the IGCP. During the field trips, the following sites served as examples of updated geological and paleobiological information: Pecínov Quarry near Nové Strašecí, Kněživka near Prague (Cenomanian - Turonian, Cretaceous), Svatý Jan between Karlštejn and Beroun, tufa mound (Subboreal, Holocene, Quaternary), Levín (Hirnantian glacio-eustatic event, Ordovician), Litohlavy (utilis extinction event, Silurian), Všeradice (late Homerian extinction event, lundgreni event, Wenlock/Ludlow boundary, Silurian), Hlubočepy and Karlštejn - U dubu sedmi bratří (Kačák event, Eifelian / Givetian, Devonian), Loděnice - vineyard (upper Berounian, upper Caradocian, Ordovician), Mramorka near Chýnice (basal Emsian - Zlichovian - event, Devonian), Koněprusy skeletal accumulation, evolution of reef facies (Lochkovian to Emsian, especially Pragian, Devonian). Limited number of the abstract and field-trip books is still available from Eurocongress Centre, compare http://www.gli.cas.cz (item News).

Third World Congress of Herpetology, August 2-10, 1997, Prague, Czech Republic (***Z. Roček****, congress director*).

Institute of Geology of the Academy of Sciences was the main organisation centre of the Third World Congress of Herpetology, held by the World Congress of Herpetology, an international non-governmental organisation founded to support herpetology and palaeoherpetology world-wide. More than 850 representatives from 58 countries took part. Palaeoherpetology was represented by sessions "Paleozoic Amphibia" and "Early Reptiles", and by a half-day symposium "Mesozoic Amphibians and Reptiles". About a dozen of contributions dealt also with post-Mesozoic fossil record of amphibians and reptiles. Associated dominant topics represented at the congress were evolution, phylogeny and systematics. Several sessions and symposia were held during the congress, such as "Evolution and Systematics of Anura" and "Evolution of Caudata", "Evolution and Systematics of Reptilia", "Evolution and Systematics of Snakes", and more specialized "Phylogeny and Systematics of the Viperidae". Ten one-day excursion routes were offered to participants, among them one to the Permo-Carboniferous Krkonoše Piedmont Basin and another to the Tertiary Most Basin. The abstract book "Herpetology '97" containing about 770 abstracts with addresses of authors and Subject Index was published.

Conferences and Symposia under preparation

3rd meeting of the Czech Tectonic Studies Group *(Česká tektonická skupina)*, Malá Úpa, April 15-19, 1998. The field trip to Krkonoše and Kaczawa Mts. located in a region which is of key significance for unravelling the evolution of the Variscan orogeny in Central Europe. (***M. Svojtka*** *- in cooperation with J. Cháb, Czech Geological Institute, Prague, K. Schulmann, Z. Venera, Charles University, P. Hanžl, Czech Geol. Inst., Brno, P. Mixa, Czech. Geol. Inst., Jeseník,* ***J. Hladil****,* ***F. Patočka****, R. Kryza, P. Alexandrowski & S. Mazur, University of Wroclaw*).

The Final Session of Subproject 2a of IGCP Project No. 369 - Workshop ***"Magmatism and Rift Basin Evolution"***. Liblice, Czech Republic, September 7-11, 1998. (**J. Ulrych**, *V. Cajz, Czech Geological Inst. The organizing committee:* ***J. Adamovič****,* ***P. Bosák****,* ***J. Filip****,* ***J. K. Novák****, M. Růžička, Czech Geological Inst., Prague, I. Bilik, L. Eötvös University, Budapest, A. Přichystal, Masaryk University, Brno, D. Matějka, E. Jelínek Charles University, Prague, P. Pazdernik, Friedrich-Alexander University, Nürnberg-Erlangen*).

***

14. Publication activity of the Institute of Geology

In 1997, the Institute of Geology edited the fifth volume of ***Geolines***, a series of monographs and monothematic volumes of extended conference abstracts.

Articles in English on primary research in any field of geology (geochemistry, geophysics, petrology, stratigraphy, paleontology etc.) will be considered. Each number is thematically consistent, containing several papers on joint topic or, preferably, one large paper or monograph. More comprehensive systematic and regional descriptions of wider interest will be appreciated. Monothematic volumes of extended abstracts from specialized workshops and conferences will be considered as well.

Only original papers will be accepted which have been neither published previously not currently submitted for publication elsewhere.

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 will be preferred. The papers are subject to reviews.

1997

Sarjeant W.A.S. & **Vavrdová M**: Taxonomic reconsideration of *Multiplicisphaeridium* Staplin, 1961 and other acritarch genera with branching processes. *Geolines, Occas. Pap. Earth Sci.*, 5, 1-52. Inst. Geol. AS CR, Prague.

***

15. Publication activity of the members of the Institute of Geology

15a) Papers published in 1997

***** publications in journals with impact factor

Bendl J., **Patočka F.** & **Pivec E.** (1997): The ^{87}Rb-^{86}Sr isotope geochemistry of the blueschist and greenschist metavolcanics of the Rýchory Mts. crystalline complex, West Sudetes, Bohemian Massif. *Geol. Sudetica*., 30, 3-20. Krakow.

Bendl J. & **Skřivan P.** (1997): Trace elements contents and lead isotopes ratios in a forest area with granitic bedrock measured by ICP-MS. *Proc. Int. Conf. "Analyses for geology and environment 97". Spišská Nová Ves, Oct. 1997, Slovakia*, p. P17.

Beran M., Dolanský V., Flašar J., Flíček J., Fuka Z., Lippl L., **Ložek V.**, Novák V., Sádlo J., Štorm V. & Vydrová A. (1997): Národní přírodní rezervace Vyšenské kopce. *Sdružení pro duchovní a hmotnou obnovu a rozvoj CHKO Blanský les s podporou MŽP ČR, Správa CHKO Blanský les a RŽP OÚ Český Krumlov*, 32 pp. Český Krumlov.

Bosák P. (1997): Comments to the morphology of broader surroundings of Koněprusy (Bohemian Karst, Czech Republic, in Czech, Engl. summ.). - *Čes. Kras (Beroun)*, 23, 19-32.

Bosák P., Ed. (1997): Czech Speleological Society 1993-1997. Czech Speleol. Soc., 52 pp. Praha.

Bosák P. (1997): Speleogenesis in the Koněprusy region (Bohemian Karst, Czech Republic): new data and ideas. *Guide-booklet for the excursions and abstracts of papers, 5th Int. Karstolog. School, Classical Karst - Caves*: 16. Speleol. Assoc. of Slovenia and Karst Res. Inst. ZRC SAZU. Postojna.

Budil P., **Hladil J.** & **Čejchan P.** (1997): Kačák (otomari) event-Hlubočepy in outskirt of Prague and sites in neighborhood of Karlštejn (W of Prague). *Field Trip Book, UNESCO-IGCP Project #335 "Biotic Recoveries from Mass Extinctions", Final Conference "Recoveries'97"*, 21-25. Press Malák Co. Říčany u Prahy. Eurocongress Centre. Praha.

Cílek V., Ed. (1997): Archeologie a jeskyně. Knih. Czech Speleol. Soc., 29, 182 pp. Praha.

Cílek V. (1997): Birnessit , kaolinit a opál z Bozkovských dolomitových jeskyní. *Příroda*, 9, 86-87. Praha.

Cílek V. (1997): Fullereny in na Pravčické bráně? *Vesmír*, 76(11), 628-629. Praha.

Cílek V. (1997): Hloubkový průzkum Hranické propasti. *Vesmír*, 76(3), 148-149. Praha.

Cílek V. (1997): Kaňon Labe mezi Děčínem a hranicí. *Vesmír*, 76(11), 638-642. Praha.

Cílek V. (1997): Krasové procesy. In V. Matoušek (Ed.): *Člověk a jeskyně Českého krasu, Ilustrovaný průvodce pravěkem I*., 12-13. Národní muzeum. Praha.

Cílek V. (1997): Mid-Holocene dry spells in Bohemia, Central Europe. In N. Dalfes, G. Kukla & H. Weiss (Eds.): *Third millenium BC climate change and Old World collapse, NATO ASI Series 49*, 309-319. Springer-Verlag.

Cílek V. (1997): Mineralogie a povrchová morfologie lehké frakce ze sprašového profilu v Dolních Věstonicích. *Geol. Výzk. na Moravě a ve Slezsku v Roce 1996*, 2-4. Brno.

Cílek V. (1997): O původu druhů ve Viktoriině jezeře. *Vesmír*, 76(7), 370-371. Praha.
Cílek V. (1997): Okrové jeskyně dolu Václav v Bližné v Pošumaví. *Speleofórum 97*, 23-25. Praha.
Cílek V. (1997): Paměťová struktura krajiny a památné kameny. *Ochr. Přír.,* 52(6), 163-166. Praha.
Cílek V. (1997): Podzemí. In D. Broncová (Ed.): *Kniha o Praze 9*, 108-111. Milpo. Praha.
Cílek V. (1997): Podzemí. In J. Němec & V. Ložek (Eds.): *Chráněná území ČR 2-Praha*, 12-13. AOPK ČR. Praha.
Cílek V. (1997): Relikty říční terasy ve výkopu plynovodu u Tobolky nedaleko Koněprus v Českém krasu. *Čes. Kras (Beroun),* 23, 59-64.
Cílek V. (1997): Revitalizace vytěžených lomů. *Silikátový zpravodaj, 1/97*, 32-38. Praha.
Cílek V. (1997): Těžké minerály ve sprašovém profilu v Dolních Věstonicích. *Geol. Výzk. na Moravě a ve Slezsku v Roce 1996*, 4-6. Brno.
Cílek V. (1997): Výběrová bibliografie Koněpruských jeskyní z pera Viktora Palivce. *Čes. Kras (Beroun),* 23, 69-75.
Cílek V. & **Hladil J**. (1997): Tvorba postindustriální krajiny: lomy. Příkladová studie koněpruské oblasti. *Knih. Čes. speleol. spol.*, 29, 160-174. Praha.
Cílek V. & Krhovský J. (1997): Cosmic and Terrestrial Microspherules in the Sedimentary Sequences of the Bohemian Massif. A Review. *Spherula,* 1(1), 27-31. Budapest.
Cílek V. & **Skřivan P.** (1997): Antropogenní karbonátové kůry v okolí Radotínské cementárny. *Čes. Kras (Beroun),* 23, 58-59.
Cílek V., Žák K. & Hladíková J. (1997): Quaternary: Subboreal, the biggest Holocene catastrophe. Tufa mound Svatý Jan pod Skalou between Karlštejn and Beroun. In P. Čejchan & J. Hladil (Eds.): *Unesco IGCP Project 335 "Biotic Recoveries from Mass Extinctions". Field trip book*, 7-13. Institute of Geology AS CR. Praha.
Crick R.E., Ellwood B., El Hassani A., Feist R. & **Hladil J.** (1997): Magnetosusceptibility Event- and Cyclostratigraphy (MSEC): Its use in Characterizing the Eifelian-Givetian Boundary Sequence, the Kacak-Otomari Event, and in Determining the Duration of the Eifelian and Givetian. *The Amadeus Grabau Symposium, International Meeting on Cyclicity and Bioevents in the Devonian System, Abstract Book. University of Rochester, July 20-27, 1997*, p. 23. Rochester, NY.
*****Crick R.E., Ellwood B.B., El Hassani A., Feist R. & **Hladil J.** (1997): MagnetoSusceptibility Event and Cyclostratigraphy (MSEC) of the Eifelian-Givetian GSSP and associated boundary sequences in north Africa and Europe. *Episodes*, 20(3), p. 167-175. Beijing.
Čejchan P. & **Hladil J.**, eds. (1997): *Abstract Book, UNESCO-IGCP Project #335 "Biotic Recoveries from Mass Extinctions", Final Conference "Recoveries'97"*, 63+3 Appendix pp. Press Malák Co. Říčany u Prahy. Eurocongress Centre. Praha.
Čejchan P. & **Hladil J.**, Eds. (1997): *Field Trip Book, UNESCO-IGCP Project #335 "Biotic Recoveries from Mass Extinctions", Final Conference "Recoveries'97"*, 38 pp. Press Malák Co. Říčany u Prahy. Eurocongress Centre. Praha.
Čech S., Uličný D. & **Žítt J.** (1997): Cretaceous: Cenomanian/Turonian events, Transgressive tract of the Cenomanian-Turonian, anoxic event, Pecínov Quarry near Nové Strašecí. *Field Trip Book, UNESCO-IGCP Project #335 "Biotic Recoveries from Mass Extinctions", Final Conference "Recoveries'97"*, 1-4. Press Malák Co. Říčany u Prahy. Eurocongress Centre. Praha.
Dobeš P., **Suchý V.**, Sedláčková V. & Stanišová N. (1997): Hydrocarbon fluid inclusions from fissure quartz: a case study from Barrandian Basin (Lower Paleozoic), Czech Republic (extended abs.). In M.C. Boiron & J. Pironon (Eds.): *Proc. XIVth Europ. Current Res. on Fluid Inclusions, volume de resumes), CNRS-CREGU, Nancy, France*, 86-87. Nancy.
Dobroruka V., **Cílek V.** & Storchová Z. (1997): *Přírodopis pro 6. ročník základní školy*. Sciencia, 128 pp. Praha.

Dörr W., **Fiala J.**, Schastok J., Scheuvens D., Wulf S., Zulauf G., Ahrendt H., & Wemmer K. (1997): Dating of fault related plutons along terrane boundaries in the Bohemian Massif. *EUG 9 Abstracts, 07/1P09*, 100. Strasbourg.

Dörr W., Zulauf G., **Fiala J.**, Schastok J., Scheuvens D., Wulf S., **Vejnar Z.**, Ahrendt H., & Wemmer K. (1997): Dating of collapse related plutons along the West- and Central Bohemian shear zones (European Variscides). *Terra Nostra,* 97(5), 31-34. Köln.

Eckhardtová Š., **Suchý V.**, Sýkorová I., Dobeš P. & Stejskal M. (1997): Contact metamorphism of graptolite-rich black shales by basaltic sills : Implications for the origin of hydrothermal petroleum (abs.). *EUG 9 Symposium 59 "Hydrothermal Systems, Alteration, and Ore Deposition., European Union of Geosciences 9th Meeting, Strasbourg, France, 23-27 March 1997, Book of Abstracts*, 547. Strasbourg.

Galle A. & **Hladil J.** (1997): Functional morphology analysis of the tabulae in *Favosites* sp. from the Emsian/Eifelian boundary interval in Barrandian, Czech Republic. *Coral Res. Bull.*, 5, Dresden.

*****Geyer G. & **Malinky J. M.** (1997): Middle Cambrian fossils from Tizi N´Tichka, the High Atlas, Morocco. Part I. Introduction and trilobites. *J. Paleontol.*, 71(4), 620-637. Lawrence.

González Clavijo E., Gutiérrez-Marco J.C., Jimenéz Fuentes E., Moro Benito M.C. & **Štorch P.** (1997): Graptolitos silúricos del sinforme de Alcañices (prov. de Zamora, Zonas Centroibérica y Galaico-Transmontana).- In A. Grandal d Anglade, J.C. Gutierréz-Marco & L. Santos Fidalgo (Eds.): *XIII Jornadas de paleontología, 5 Reunión International del Proyecto 351 del PICG, 16-18 de Octubre 1997*, 71-74. La Coruña.

Gutiérrez-Marco J.C., Rábano I. & **Štorch P.** (1997): Fósiles ordovícico-silúricos de Galicia.- In : Grandal d Anglade A., Gutierréz-Marco J.C. & Santos Fidalgo L. (eds) *XIII Jornadas de paleontología, 5 Reunión International del Proyecto 351 del PICG, 16-18 de Octubre 1997*, 10-16. La Coruña.

Gutiérrez-Marco J.C. & **Štorch P.** (1997): Graptolitos silúricos del sinclinal de Castrillo (Zona Asturoccidental-Leonesa, NO de España): revisión del yacimento descubierto por Casiano de Prado en 1855. *Geocaceta*, 22, 95-98. Madrid.

*****Hladíková J., **Hladil J.** & Kříbek B. (1997): Carbon and oxygen isotope record across Přídolí to Givetian stage boundaries in the Barrandian Basin (Czech Republic). *Palaeogeogr., Palaeoclimatol., Palaeoecology,* 132, 225-241. Amsterodam.

Hladíková J., **Hladil J.** & Zusková J. (1997): Discrimination between facies and global controls in isotope composition of carbonates: carbon and oxygen isotopes at the Devonian reef margin in Moravia (HV-105 Křtiny borehole). *J. Czech Geol. Soc.*, 42(1-2), 1-16. Praha.

Hladíková J., Kadlec J., Žák K., **Cílek V.** & **Ložek V.** (1997): Climatic changes during the Holocene: comparison between stable isotope, biostratigraphical and lithological climate records in fresh water calcareous tufa. *J. Czech Geol. Soc.*, 42(3), 82. Praha.

Hladil J. (1997): Bohemian (NGM) and Moravian (SLM) Devonian: General Features and Windows for Finer Scaling. *The Amadeus Grabau Symposium, International Meeting on Cyclicity and Bioevents in the Devonian System, Abstract Book. University of Rochester, July 20-27, 1997*, 31. Rochester, NY.

Hladil J. (1997): Lower Devonian open-sea elevation of Koněprusy: evolution of reef facies. *Field Trip Book, UNESCO-IGCP Project #335 "Biotic Recoveries from Mass Extinctions", Final Conference "Recoveries'97"*, 31-36. Press Malák Co. Říčany u Prahy. Eurocongress Centre. Praha.

Hladil, J. (1997): Rock evidence from the Rychory Mts: Are the opinions about history and structure of the northern part of the Bohemian Massif suffering a change? (in Czech). *Vesmír*, 76(7), 395-402. Prague.

Hladil J. & **Čejchan P**. (1997): Tissue-to-tissue competition between caliaporids and stromatoporoids: related skeletal features and possible strategies. [Competitción tejido a tejido entre caliapóridos y stromatopóridos: características esqueléticas relaticionadas y posibles estrategias]. *Bol. Real Soc. Española Hist. Natural, Sect. Geol.*, 91(1-4), 273-283, Madrid.

Hladil J. & Hladíková J. (1997): Obsah izotopů ^{13}C a ^{18}O v devonských karbonátech Moravského krasu: specifický sekvenční vzor. [Content of the ^{13}C and ^{18}O isotopes in Devonian carbonates of the Moravian Karst: a specific sequence pattern]. *Geol. Výzk. na Moravě a ve Slezku v Roce 1996*, 4, 57-63. Brno.

Hladil J., Hladíková J. & Zusková J. (1997): Strong positive excursion in $d^{13}C$ values in the time-equivalent of the Pa. transitans Z. (Frasnian, Moravia): a local facies control is suggested. *Subcommission on Devonian Stratigraphy*, *Newsletter*, 13, 33-36. Arlington.

Hladil J. & Kalvoda J. (1997): A short range anomaly in the earliest Emsian sedimentation of the Barrandian: possible reflection of widely controlled or global event. *Subcommission on Devonian Stratigraphy, Newsletter*, 13, 37-38. Arlington.

Hladil J. & Kalvoda J. (1997): Basal Emsian (Zlíchovian) event: dark, graptolite-bearing interval close above the first occurrence of Po. dehiscens-"Mramorka" Quarry near Chýnice. *Field Trip Book, UNESCO-IGCP Project #335 "Biotic Recoveries from Mass Extinctions", Final Conference "Recoveries'97"*, 28-30. Press Malák Co. Říčany u Prahy. Eurocongress Centre. Praha.

***Hladil J.** & Kalvoda, J. (1997): Dark, Graptolite-Bearing Level within the Earliest Emsian Beds of the Barrandian [394 Ma]: Possible Event Correlation. *Terra Nova*, 9, 282. Strasbourg.

Hladil J. & **Slavík L.** (1997): Facie a stratigrafie koněpruských vápenců (Koněprusy, Velkolom Čertovy schody, spodní devon, stupeň prag). [Facies and stratigraphy of the Koněprusy limestones (Koněprusy, Čertovy schody Quarry, Lower Devonian, Pragian stage)]. *Čes. Kras (Beroun)*, 23, 5-18.

Hoedemaeker P.J., **Houša V.**, **Krs M.**, **Man O.**, Parés J.M., **Pruner P.** & **Venhodová D.** (1997): Magnetostratigraphic and petromagnetic studies of the Jurassic/Cretaceous limestones from the Río Argos (Caravaca, SE Spain), Carcabuey (S Spain) and the Bosso Valley (Umbria, central Italy). *Mineralia slov.*, 29(4-5), 308-310. Bratislava.

Houša V. (1997): Magnetostratigraphic and calpionellid biostratigraphic scales correlation in the Jurassic/Cretaceous boundary strata. *Mineralia slov.,* 29(4-5), 296. Bratislava.

Houša V., **Krs M.**, Krsová M., **Man O.**, **Pruner P.** & **Venhodová D.** (1997): High-resolution magnetostratigraphy across the Jurassic-Cretaceous boundary strata at Brodno near Žilina, Western Carpathians, Western Slovakia. *Mineralia Slovaca*, 29(4-5), 312-314. Bratislava.

***Houša V.**, **Krs M.**, Krsová M., **Man O.**, **Pruner P.** & **Venhodová D.** (1997): High-resolution magnetostratigraphy across the Jurassic-Cretaceous boundary strata in the Tethyan realm: results and prospects. *Ann. Geophys.*, 15(1), 108. Vienna.

Chlupáč I. & **Štorch P.** (1997): Zásady české stratigrafické klasifikace (3. vydání). *Bull. Czech Geol. Surv.*, 72(2), 193-204. Praha.

Jeník J. & **Ložek V.** (1997): Bílé Karpaty - nová biosférická rezervace České republiky. *Živa*, XLV, 98-100. Praha.

Kollmann H. A. & **Peza L. H.** (1997): *Adaptyxis* n. g. (Umboniidae, Nerineacea, Gastropoda) from the Mirdita zone of Albania; remarks on the early phylogeny of the Nerineacea. *Ann. Naturhist. Mus.*, 98 A, 1-15. Wien

Kollmann H. A., & **Peza L. H.** (1997): *Diptyxis* Oppenheim (Nerineacea, Gastropoda) from the Lower Cretaceous of Albania. On the distribution of the genus *Diptyxis. Ann. Naturhist. Museum*, 98 A, 17-33. Wien.

Kollmann H. A., **Peza L. H.** & Čech S. (1997): Upper Cretaceous Nerineacea of the Bohemian/Saxonian Basin and their significance for Tethyan environments. *Mineralia slov.*, 29(4-5). Bratislava.

Konzalová M. (1997): A new records and evidence of the family Pinaceae and Taxodiaceae within the marine sediments of the Bohemian Upper Cretaceous and Paleogene of Western Carpathians (Nové záznamy čeledi Pinaceae a Taxodiaceae v marinních sedimentech severočeské svrchní křídy a paleogénu Západních Karpat). *Geoscience Research Reports for 1996*,73-74. Prague.

Konzalová M. (1997): Turnover in the Precambrian and Early Paleozoic (mainly Cambrian) microbiotas: an example of the Bohemian Massif. *Acta Univ. Carol., Geol.*, 40(3-4) 1996, 463-473. Praha.

Kröner A., O'Brien P.J., Pidgeon R.J. & **Fiala J.** (1997): Three distinct metamorphic stages for HP-ht granulites from the Moldanubian Zone of S. Bohemia but still only one zircon age despite state-of-the-art sample preparation. *Terra Nostra*, 97(5), 98-99. Köln.

Krs M., Krsová M., **Man O.** & **Pruner P.** (1997): Globálně tektonické interpretace paleomagnetických dat odvozených na horninách Českého masívu a Západních Karpat (Synopsis). In J. Zachariáš (Ed.): *Sborník prací ze semináře k 75 letům profesora Zdeňka Pouby, Ústav geochemie, mineralogie a nerostných zdrojů Přírodovědecká fakulta UK, Praha, 1997*, 60 - 71.

***Krs M.**, **Man O.** & **Pruner P.** (1997): Alpine and Variscan paleotectonic deformations interpreted paleomagnetically, comparison of results from the Western Carpathians and the Bohemian Massif. *Ann. Geophys.*, 15, Suppl. 1, 108. Berlin.

***Krs M.**, **Man O.** & **Pruner P.** (1997): The role of the Trans-European Suture Zone in the distribution of Variscan and pre-Variscan paleomagnetic pole position. *Ann. Geophys.*, 15, Suppl. 1, 108. Berlin.

Krs M., Pešek J, **Pruner P.**, Skoček V. & **Slepičková J.** (1997): The origin of magnetic components of Westphalian C to Stephanian C sediments, West Bohemia: a record of waning Variscan tectonism. In R. Gayer & J. Pešek (Eds.): *European Coal Geology and Technology*, Geol. Soc. London, Spec. Publ. 125, 29 - 47 London.

Krs M. & **Pruner P.** (1997): Petromagnetic and paleomagnetic investigations of Jurassic-Cretaceous limestones aimed at magnetostratigraphy in the Mediterranean area. *Mineralia slov.*, 29(4-5), 324-325. Bratislava.

Lachmanová M. (1997): Kvartérně-geologické poměry okolí Mnichova Hradiště ssv. od Mladé Boleslavi. *Zpr. geol. Výzk. v Roce 1996*, 32-33. Praha.

Lachmanová M. (1997): North Bohemian Pleistocene alluvial basins: sedimentary enviroments and tectonics controls. *18th IAS Regional European Meeting of Sedimentology, Abstract Supplement*, 212. Heidelberg.

***Lachmanová M.** (1997): Sedimentation and tectonics in north Bohemian alluvial basins during Middle Pleistocene: a case study of Jizera and Mohelka rivers. *Terra Nova*, 9, 242. Edinburgh.

Langrová A., Šrein V., Šťastný M. & Šreinová B. (1977): Tourmaline from Měděnec (CZ) and Pöhla (D), Krušné hory Mts. *TOURMALINE 1997 Int. Symp. on Tourmaline, Abs.*, 101-102. Moravian Museum Brno, University of Manitoba, Winnipeg, Canada.

*Loydell D.K., **Štorch P.** & Bates, D.E.B. (1997): Revision of the Silurian graptolite genus Retiolites. *Paleontology*, 40 (3), 747-762. London.

Ložek V. (1997): Development of Sediments, Soils, Erosional Events, Molluscan and Vertebrate Assemblages in Connection with Human Impact in Central Europe During the Time Span 3,000-5,000 BP. In H. Nüzhet Dalfes, G. Kukla H. & Weiss (Eds.): *Third Millenium Bc Climate Change and Old World Collapse*. NATO ASI Series, Series I: Global Environmental Change, 49, 551-554. Springer Verl. Berlin-Heidelberg.

Ložek V. (1997): Malakofauna NPR Hrdzavá (Molluscan fauna of the National nature reserve Hrdzavá). In. M. Uhrín (Ed.): *Výskum a ochrana prírody Muránskej planiny*, 75-79. Revúca.

Ložek V. (1997): Nálezy z pískovcových převisů a otázka degradace krajiny v mladším pravěku v širších souvislostech (Malacological records from Sandstone Rock-

shelters and the Problem of Late Prehistoric Landscape Degradation in Wider Aspects). *Ochr. Přír.*, 52, 146-148. Praha.

Ložek V. (1997): O přirozené vegetaci Křivoklátska (Jak by vypadala krajina, kdyby v ní hospodařila sama příroda). - *Vesmír*, 76, 582-583. Praha.

Ložek V. (1997): Povodně na Litavce a ochrana přírody. In. J. Němec (Ed.): *Krajinotvorné programy. Sborník příspěvků z konference s mezinárodní účastí 4.-6. 11. 1997 Příbram*, 171-172. Praha.

Ložek V. (1997): Říční fenomén ve Svatojánských proudech. *Živa*, XLV, 46-47. Praha.

Ložek V. (1997): Souborné vyhodnocení malakofauny z profilu Laskár-břeh Turca (Collected evaluation of mollusks from the Laskár profile- the Turiec River bank). *Zborník prispevkov zo seminára "30 rokov ochrany rieky Turiec" a odbornych prispevkov z povodia rieky Turiec*, 125-126. MŽP SR, Bratislava.

Ložek V. (1997): Vřetenatka česká (Alinda biplicata bohemica) (The Bohemian Clausilia). *Ochr. Přír.*, 52, 112-113. Praha.

*****Maluski H. *&* **Patočka F.** (1997): Geochemistry and ^{40}Ar - ^{39}Ar geochronology of the mafic metavolcanics from the Rýchory Mts. complex (W Sudetes, Bohemian Massif): paleotectonic significance. *Geol. Mag.*, 133, 703-716, London.

*****Marek L., **Malinky J. M.** *&* Geyer G. (1997): Middle Cambrian fossils from Tizi N´Tichka, the High Atlas, Morocco. Part 2. Hyolitha. *J. Paleontol.*, 71(4): 638-656. Lawrence.

Marek L., Parsley R. L. *&* **Galle A.** (1997): Functional morphology of hyoliths based on flume studies. *Věst. Čes. geol. Úst.*, 72(4), 351-358, Praha.

Melchin M. J., Koren` T. N. *&* **Štorch P.** (1997): Radiation events and global diversity of Silurian graptolites.- In P. Čejchan & J. Hladil (Eds.): *UNESCO IGCP Project 335 "Biotic Recoveries from Mass Extinctions", Final Conference "Recoveries 97" - Abstract Book*, 8. Praha.

Méon H., Pacltová B. *&* **Svobodová M.** (1997): Palynologická charakteristika anoxické facie české křídy a vokontské pánve. *Zpr. geol.Výzk. v Roce 1996*, 162. Praha.

Mikuláš R. (1997): Difference in distributional patterns between benthic shelly fauna communities and ichnoassemblages (Ordovician, Czech Republic), and possible consequences for faunal stability models. In P. Čejchan & J. Hladil (Eds.): *UNESCO IGCP Project 335 "Biotic Recoveries from Mass Extinctions", Final Conference "Recoveries 97" - Abstract Book*, 6-7. Praha.

Mikuláš R. (1997): Distributional patterns of Upper Berounian (Upper Caradocian) benthic shelly fauna communities and ichnoassemblages - 'Loděnice-vineyard'. *In P. Čejchan and J. Hladil (Eds.): UNESCO - IGCP Project 335 "Biotic recoveries from mass extinctions", Final Conference Recoveries '97 - Field Trip Book*, 26-28, Praha.

Mikuláš R. (1997): Ethological interpretation of the ichnogenus *Pragichnus* Chlupáč, 1987 (Ordovician, Czech Republic). *N. Jb. Geol. Paläontol., Mh.*, H.2, 93-108. Stuttgart.

Mikuláš R. (1997): Padesát let ediakarské fauny. *Vesmír*, 76(1), 16-18. Praha.

Mikuláš R. (1997): Železné klády - výjimečné skalní útvary v křídových pískovcích Ralské pahorkatiny. *Ochr. Přír.*, 52(4), 117-118. Praha.

*****Mikenda W., Pertlik F, Povondra P. *&* **Ulrych J.** (1997): On zeophyllite from Radejčín, České středohoří Mts.: X-ray and IR-investigations. *Mineral. Petrol*. 61, 199 - 209.

Minařík L., **Burian M.** & **Novák J.K.** (1997): Experimental acid leaching of metals from biotite of the Říčany monzogranite. - *Věst. Čes. geol. Úst.*, 72(3), 239-244. Praha.

Němec J. , **Ložek V.** et al. (1997): *Chráněná území ČR 2-Praha*. Agentura ochrany přírody a krajiny, Consult, 154 pp. Praha.

Novák J. K. & **Konzalová M.** (1997): A new evidence on tectonic segmentation of the Teplice thermal spring line near Pravřídlo (NW Bohemia) (Nové důkazy o tektonické segmentaci teplické zřídelní struktury u Pravřídla). *Zpr. geol.Výzk. v Roce 1996*, 55-57. Praha.

Novák J. K. & Tvrdý J. (1997): Feldspathization in the Loket monzogranite: possible influence of granites of the Younger Intrusive Complex (Karlovy Vary Intrusion). *J. Czech Geol. Soc.*, 42(3), 66. Praha.

***Patočka F.**, Dostal J. & Pin Ch. (1997): Early Paleozoic intracontinental rifting in the central West Sudetes, Bohemian Massif: geochemical and Sr-Nd isotopic study on felsic-mafic metavolcanics of the Rýchory Mts. complex. *Terra Nova*, 9, 144-145. Strasbourg.

Patočka F. & **Hladil J.** (1997): Indications of possible magmatic-arc/back-arc tectonic settings in the northern part of the Bohemian Massif during the Early Paleozoic. *First International Conference on North Gondwanan Mid-Palaeozoic Biodynamics (IGCP Project 421), Vienna, 17-21 Sept. 1997, Abstracts*, 45-46. Wien.

Patočka F. & **Novák J. K.** (1997): The Na-amphibole bearing metabasites of the W Sudetes: dismembered Variscan suture zone in the Bohemian Massif? *J. Czech Geol. Soc*., 42(3), 67. Praha.

Patočka F. & Smulikowski W. (1997): Petrology and geochemistry of metabasites of the Rýchory Mts. - Rudawy Janowickie Mts. crystalline complex (West Sudetes, Bohemian Massif). *Pol. Tow. Mineral. - Prace spec.*, 9, 146-150. Kraków.

Patočka F. & Szczepanski J. (1997): Geochemistry of quartzites from the eastern margin of the Bohemian Massif (the Hrubý Jeseník Mts. Devonian and the Strzelin Crystalline Massif): provenance and tectonic setting of deposition. *Pol.Tow. Mineral. - Prace spec.*, 9, 151-154. Kraków.

Pek I. & **Mikuláš R.** (1997): Neobvyklé fosilní stopy činnosti živočichů na listech svrchnokřídového stáří u Maletína. *Moravskoslez. vlastivěd. Listy*, 8, 1-3. Moravská Třebová.

Pek I., **Mikuláš R.** & Lysáková G. (1997): Boring ichnofossils on mollusc shells from the Late Badenian at Rohožník (Malé Karpaty Mts., Slovakia). *Zemní Plyn Nafta*, 42(1), 47-55. Hodonín.

Peza L. H. & **Novák J. K.** (1997): Bauxites from the Kruja Zone (Albania): Position, origin, composition and environment. *Travaux du comité international pour l´étude des bauxites, de l´alumine et de l´aluminium (ISCOBA)*, 8, 74-83, Milan.

Peza L. H., **Novák J. K.**, **Minařík L.** & **Burian M.** (1997): The rehabilitation strategy of karst environment around bauxite depositions of the Kruja zone (Albania). *The AAGG National Conf. "Geological Hazards and the Environment". 17-19. 11. 1997*, unpaged. Tirana.

Peza L. H. & Peza E. (1997): The North Albanian Alps during Late Cretaceous and Early Paleogene. *Gaea heidelbergensis, 3, 18th Int. Assoc. Sedimentologists Reg. European Meeting of Sedimentol., Abs*., 272. Heidelberg.

Pivec E., Štemprok M., **Novák J. K.** & **Lang M.** (1997): Chemické složení turmalínů krušnohorského batolitu a jeho pláště. *Zpr. geol. Výzk. v Roce 1996*, 172 - 174. Praha.

Pivec E., Štemprok M., **Novák J. K.** & **Lang M.** (1997): Composition of tourmaline from the granites of the Krušné hory-Erzgebirge batholith and its immediate vicinity *TOURMALINE 1997 Int. Symp. on Tourmaline, Abs.*, 76-77. Moravian Museum Brno, University of Manitoba, Winnipeg, Canada.

Pivec E., **Ulrych J.**, **Lang M.**, Árva-Sós E. & Nekovařík Č. (1997): Trachybazalt - ryolitová vulkanická série z Tepelské vrchoviny. *Zpr. geol. Výzk. v Roce 1996*, 174-176. Praha.

Povondra P., **Lang M.**, **Pivec E.** & **Ulrych J.** (1997): Tourmaline from Přibyslavice peraluminous granite, Czech Republic. *TOURMALINE 1997 Int. Symp. on Tourmaline, Abs.*, 82-83. Moravian Museum Brno, University of Manitoba, Winnipeg, Canada.

Roček Z. (1997): Fossil amphibians and reptiles of the Czech Republic. In P. Nečas, D. Modrý & V. Zavadil (Eds.): *Czech recent and fossil amphibiants and reptiles. An atlas and field guide*, 15 - 19. Edition Chimaira, Frankfurt a. M.

***Roček Z.** (1997): Neoteny and paleomorphosis as evolutionary factors in Tertiary Amphibia. *J. Morphol.*, 232(3), 315.

Roček Z. (1997): Origin of species: An example, the European salamandrid *Triturus*. In Z. Roček & S. Hart (Eds.): *Herpetology '97. Abstacts of the Third World Congres of Herpetology, Prague 1997*, 175. Prague.

Roček Z. (1997): The salamandrid amphibian *Cheotriton* (Amphibia: Salamandridae) and related forms from the Tertiary of Europe. In Z. Roček & S. Hart (Eds.): *Herpetology '97. Abstacts of the Third World Congres of Herpetology, Prague 1997*, 175. Prague.

Růžičková E., Růžička M. & **Zeman A.** (1997): Výsledky studia struktur a textur kvartérních klastických sedimentů na území České republiky. *Zpr. geol. Výzk. v Roce 1996*, 178 - 179. Praha.

Růžičková E. & **Zeman A.** (1997): Holocenní sedimenty Labe mezi Nymburkem a Tišicemi. - *Zpr. Geol. Výzk. v Roce 1996*, 179 - 180. Praha.

Sarjeant W.A.S. & **Vavrdová M.** (1997): Taxonomic reconsideration of Multiplicisphaeridium Staplin, 1961 and other acritarchs with branching processes. *Geolines*, 5, 1-52. Praha.

Sedláčková V., Stejskal M., **Suchý V.** & Kubelka V. (1997): The occurrence and analysis of crude-oil indicia in the Barrandian Basin (abs.). *J. Czech Geol. Soc.*, 42(3), 72. Praha.

Siblík M. (1997): Carnian spiriferid brachiopods (in Czech). *Zpr. geol. Výzk. v Roce 1996*, 75. Praha.

Siblík M. (1997): New information on the Liassic brachiopod fauna from the North Calcareous Alps (in Czech). *Zpr. geol. Výzk. v Roce 1996*, 181. Praha.

Skřivan P., Fottová D., **Martínek J.**, **Minařík L.**, **Kvídová O.** & **Burian M.** (1997): Biogeochemical fluxes of manganese in a Central - Bohemian forested catchment on granite bedrock. *J. Conf. Abs.*, 2(2 June 1997), 300. Cambridge Publ.

Suchý V. (1997): Předběžné výsledky sedimentologického studia přídolského souvrství (svrchní silur) Barrandienu (Sedimentological research on the Přídolí Formation (Upper Silurian), the Barrandian Basin: preliminary results). *Zpr. geol. Výzk. v Roce 1996*, 131-132. Praha.

Suchý V., Frey M. & Wolf M. (1997): Vitrinite reflectance and shear-induced graphitization in orogenic belts: A case study from the Kandersteg area, Helvetic Alps, Switzerland. - *SEDAbstracts, September 1997*, 14. Elsevier, Amsterdam.

***Suchý V.**, Frey M. & Wolf M. (1997): Vitrinite reflectance and shear-induced graphitization in orogenic belts: A case study from the Kandersteg area, Helvetic Alps, Switzerland. - *Int. J. Coal Geol.*, 34(1-2), 1-20. Amsterdam.

Suchý V., Rozkošný I. & Dobeš P. (1997): Organic Maturity, Conditions of Veining and Hydrocarbon Migration in the Barrandian Basin (Lower Paleozoic), Czech Republic. *1997 AAPG International Conference & Exhibition, September 7-10, 1997, Vienna, Austria. Official Abs. and Programe*, A56. Vienna.

Suchý V., Sýkorová I., Eckhardtová Š., Dobeš P. & Stejskal M. (1997) : Kontaktní metamorfóza silurských černých břidlic ložní žílou diabasu: studie z lomu Kosov u Berouna, Barrandien (Contact metamorphism of Silurian black shales by a basaltic sill: a case study from the Kosov Quarry near Beroun, Barrandian area). *Zpr. geol. Výzk. v Roce 1996*, 133-134. Praha.

Suchý V., **Zeman A.**, **Bosák P.**, Dobeš P., Hladíková J. & Jačková I. (1997): Hydrothermal calcite veins and the origin of caves in the Lower Paleozoic of the Barrandian Basin, Czech Republic: evidence of extensive (post ?) Variscan fluid flow (abs.) *Gaea heidelbergensis, 3, 18th IAS Reg. Europ. Meeting of Sedimentology, Heidelberg, September 2-4, 1997, Book of Abs.*, 325. Heidelberg.

Suchý V., **Zeman A.** & Dobeš P. (1997): Hydrothermal Veining and Karstification in the Barrandian Basin (Lower Paleozoic), Czech Republic: A Preliminary Survey (abs.). *EUG 9 Symposium 59 "Hydrothermal Systems, Alteration, and Ore Deposition"., European Union of Geosciences 9th Meeting, Strasbourg, France, 23-27 March 1997, Book of Abs.*, 554. Strasbourg.

Svobodová J. (1997): Mathematical modelling of fractional crystallization and mineral cumulation in the formation of plutonic rocks. *Terra Nova Abstract Supl.,* 9, 506. Strasbourg.

Svobodová M. (1997): Mid-Cretaceous palynomorphs from the Blansko Graben (Czech Republic): affinities to both Tethyan and Boreal bioprovinces. *Proc. 4th Europ. Paleobot. Palynol. Conf.*, 149-156. Haarlem.

Svojtka M., Košler J. & Vokurka K. (1997): Carboniferous (Namurian) deformation in the Blanský les massif, southern Bohemia: U-Pb zircon evidence. *J. Czech Geol. Soc.*, 42(3), 25. Praha,

Svojtka M., Košler J. & Vokurka K. (1997): Namurská deformace v granulitovém tělese Blanského lesa: U-Pb datování na zirkonech - *II. seminář České tektonické skupiny, abstrakt*, 74. Ostrava.

Sýkora M., **Siblík M.** & Soták J. (1997): The Limestone with *"Spirigera" deslongchampsi* Suess in the Tertiary Conglomerates near Chvalové village, Southern Slovakia. In: D. Plašienka et al. (Eds.): *Alpine Evolution of the West Carpathians and related areas. Abstracts*, 43-44. Bratislava.

Šrein V., Litochleb J., Sejkora J., Šreinová B. & **Pivec E.** (1997): Fibrous dravite from quartz lode near Krašovice in Central Bohemia (CZ) *TOURMALINE 1997 Int. Symp. on Tourmaline, Abs.*, 99-100. Moravian Museum Brno, University of Manitoba, Winnipeg, Canada.

Šťastný M. & **Růžičková E.** (1997): Studium jílové frakce sedimentů kontinentálního zalednění v České republice. - *Zpr. geol. Výzk. v Roce 1996*, 182. Praha.

Štemprok M., Chlupáčová M., **Pivec E.**, **Novák J.K.** & **Lang M.** (1997): Chemické a petrofyzikální změny při greisenizaci žul krušnohorského batolitu. - *Zpr. geol. Výzk. v Roce 1996*, 183-186. Praha.

Štemprok M., Chlupáčová M., **Pivec E.**, **Novák J.K.** & **Lang M.** (1997): Petrochemical and petrophysical changes of granites caused by greisenization in the younger granites of the Krušné hory batholith (Czech Republic). In H. Papunen (Ed.): *Mineral Deposits, Research and Exploration Where Do They Meet?*, 679-682. A. A. Balkema/Rotterdam/Brookfield.

Štorch P. (1997): "Late Homerian extinction event" (lundgreni event) and subsequent recovery, Wenlock/Ludlow boundary-Všeradice. *Field Trip Book, UNESCO-IGCP Project #335 "Biotic Recoveries from Mass Extinctions", Final Conference "Recoveries'97"*, 16-20. Press Malák Co. Říčany u Prahy. Eurocongress Centre. Praha.

Štorch P. (1997): Late Ordovician (Hirnantian) glacioeustatic event: initiation of a glacial period - Levín. *Field Trip Book, UNESCO-IGCP Project #335 "Biotic Recoveries from Mass Extinctions", Final Conference "Recoveries'97"*, 14-1528-30. Press Malák Co. Říčany u Prahy. Eurocongress Centre. Praha.

Štorch P. (1997): Lower Silurian graptolite faunas of the peri-Gondwanan Europe: biostratigraphy, paleobiogeography and environmental interpretation.- In: R. Feist (Ed.) *IGCP Project Nr. 421, First International Conference on North Gondwanan mid-Paleozoic biodynamics, 17-21 Sept. 1997*, *Meeting Program and Abstracts*, 55-56. Vienna.

Štorch P. (1997): Lower Silurian graptolite faunas of the peri-Gondwanan Europe: biostratigraphy and correlation, paleobiogeography,environmental interpretation.- In A. Grandal d Anglade, J.C. Gutierréz-Marco & L. Santos Fidalgo (Eds.): *XIII Jornadas de paleontología, 5 Reunión International del Proyecto 351 del PICG, 16-18 de Octubre 1997*, 115-117. La Coruña.

Štorch P. (1997): Survival and recovery after the "utilis extinction event". *Field Trip Book, UNESCO-IGCP Project #335 "Biotic Recoveries from Mass Extinctions", Final Conference "Recoveries'97"*, 15-1628-30. Press Malák Co. Říčany u Prahy. Eurocongress Centre. Praha.

Štorch P., **Mikuláš R.**, **Hladil J.**, Budil P. & **Čejchan P.** (1997): Post-session field trip to the Paleozoic of Barrandian area.- In P. Čejchan & J. Hladil (Eds.): *UNESCO IGCP*

Project 335 "Biotic Recoveries from Mass Extinctions", Final Conference "Recoveries 97" - Field Trip Book, 14-35. Praha.

*****Uličný D., Hladíková J., Moses J. Attrep, Čech S. & **Svobodová M.** (1997): Sea-level changes, global and local geochemical anomalies: Cenomanian-Turonian boundary at Pecínov, Bohemia. *Palaeoclimatol., Palaeogeogr., Palaeoecology*, 132, 265-285. Amsterdam.

Ulrych J. (1997): Informace o vytvoření České zeolitové skupiny v rámci Společnosti pro výzkum a využití jílů. *Minerál*, 5, 295. Brno.

Ulrych J. (1997): Ještě k natrolitu z Českého středohoří jako ozdobnému kameni. *Minerál*, 5, 288-289. Brno.

Ulrych J. (1997): Josef Emanuel Hibsch - syn sopečného pohoří. - *Vesmír*, 76, 632-634. Praha.

Ulrych J. (1997): Rakouský státník Josef Jüstel litoměřickým rodákem. *Severočeské noviny - Deník Litoměřicka*, 5(174), 2. Litoměřice.

Ulrych J. (1997): Současný pohled na výskty třebenických diamantů. *Český granát*, 4, 10-11. Třebenice.

Ulrych J. (1997): Von Bauernsohn zum Geologen. *Landes-Anzeiger*, **3**, 23.10. 1997. Prag.

Ulrych J. (1997): Zpráva o činnosti České zeolitové skupiny v roce 1997. *Informátor*, 14, 1. Společnost pro výzkum a využití jílů. Praha.

Ulrych J. & **Langrová A.** (1997): K původu ilmenitu ve štěrcích Třebenicka a Jizerské louky. *Bull. Min. Petr. Odd. Nár. Mus*., 3, 206-210. Praha.

Ulrych J. & **Pivec E.** (1997): Kontrastní série alkalických vulkanitů v severních Čechách. *Zpr. geol. Výzk. v Roce 1996*, 61-62. Praha.

Ulrych J. & **Pivec E.** (1997): Two contrasting alkaline volcanic series in North Bohemia. *J. Czech Geol. Soc*., 42(3), 16. Praha.

Ulrych J. & **Pivec E.** (1997): Age-related volcanic series in North Bohemia*. Chem. Erde*, 57, 311-336. Jena.

Ulrych J., **Pivec E.** & Povondra P. (1997): Síra a Mn-oxyhydroxidy z trachytu vrchu Špičák u Teplé. *Sbor. Mineral. Petrogr. Odd. Nár. Muzea v Praze*, 3, 210-212. Praha.

Ulrych J., **Pivec E.**, Povondra P. & Bendl J. (1997): Geochemical and isotope characteristics of representative carbonates in young alkaline volcanites from northern Bohemia. - *J. Czech Geol. Soc*., 42, 26-32. Praha.

Vavrdová M. (1997): Akritarcha kambrického stáří z bazálních klastik v podloží Moravského devonu (vrt Němčičky - 6) (Acritarchs of Cambrian age from the terrigenous sediments underlying Moravian Devonian (borehole Němčičky - 6). *Zemní Plyn Nafta*, 42(1), 31-32. Hodonín.

Vavrdová M. & Isaacson P.E.(1997): Affinities of Late Devonian acritarchs from the Madre de Díos Basin, Northern Bolivia: Palynological evidence for the plate/tectonic interaction between Eastern Laurentia and Western Gondwana. *Acta Univ. Carol., Geol.*, 40(1), 683-693. Praha.

Zeman A., **Suchý V**., **Bosák P**., Dobeš P., Hladíková J., Jačková I. (1997): *Odhalování geologické historie Českého krasu: Nové nálezy ve Velkolomu Certovy schody u Koneprus [Disclosing geological history of the Bohemian Karst: New findings in the Certovy schody Quarry, Beroun County].* Occasional publication, GLI AS CR, 17pp. Praha. (in Czech)

Zeman A., **Suchý V.**, Dobeš P., Hladíková J., Jačková I. & **Bosák P.** (1997): Hydrotermální kalcitové žíly a předkřídové korozní tvary v prostoru Velkolomu Čertovy schody (první výsledky) (Hydrothermal Calcite Veins and Pre-Cretaceous Corrosional Forms in the Čertovy schody Quarry (Beroun District, the Bohemian Karst): First results). - *Čes. Kras (Beroun)*, 23, 33-40. (in Czech, English abs.).

Zeman A., **Suchý V.**, **Melka K.** (1997): Složení a původ černých kůr na stěnách krasových dutin ve Velkolomu Čertovy schody u Koněprus (Composition and origin of black coatings on the walls of dissolution cavities in the Čertovy schody Quarry

near Koněprusy, Bohemian Karst). *Zpr. geol. Výzk. v r. 1996*, 138-140. Praha (in Czech).

Zulauf G., Dörr W., **Fiala J.** & **Vejnar Z.** (1997): Lower Carboniferous lift tectonics in the Bohemian Massif: a special kind of gravitational collapse in thickened orogenic crust - *Terra Nostra*, 97/5, 216-218. Köln.

*****Zulauf G., Dörr W., **Fiala J.** & **Vejnar Z.** (1997): Late Cadomian crustal tilting and Cambrian transtension in the Teplá-Barrandian unit (Bohemian Massif, Central European Variscides). *Geol. Rdsch*, 86, 571-584. Stuttgart.

Zulauf G., Dörr W. & **Vejnar Z.** (1997): 13 km normal displacement along the West Bohemian shear zone - Evidence for dramatic gravitational collapse in the Bohemian Massif (Central European Variscides). - *EUG 9 Abstracts, 07/1P43,* 107. Strassbourg.

***Žigová A.** (1997): Initial stage of pedogenesis on terraced slopes*. Plant Prod.*, 43(3), 101 - 105. Praha (in Czech).

Žigová A., **Martínek J.**, **Skřivan. P.** & **Burian M.** (1997): Influence of acidic deposition on the characteristics of soil in Nature State Reserve “Voděradské bučiny" from the point of view of the trace elements content. *Proc. of the Int. Conf. ENVIWEATH 97 Bratislava 23. - 26. 11. 97, Book of abs.*, 63-65. Bratislava.

Žítt J. & **Čejchan P.** (1997): Rocky coast facies of the Cenomanian-Turonian boundary interval. *Field Trip Book, UNESCO-IGCP Project #335 "Biotic Recoveries from Mass Extinctions", Final Conference "Recoveries'97"*, 4-6. Press Malák Co. Říčany u Prahy. Eurocongress Centre. Praha.

Žítt J. & Nekvasilová O. (1997): New data on nearshore environments of the Bohemian Cretaceous Basin (Tuchoměřice-Pazderna locality; late Cenomanian-early Turonian). *Bull. Czech geol. Surv.*, 72(4), 359-365. Praha.

Žítt J., Nekvasilová O., **Bosák P.**, **Svobodová M.**, Štemproková D. & Šťastný M. (1997): Rocky coast facies of the Cenomanian-Turonian Boundary interval at Velim (Bohemian Cretaceous Basin, Czech Republic). First part - *Věst. Čes. geol. Úst.*, 72(1), 83-102. Praha.

Žítt J., Nekvasilová O., **Bosák P**., **Svobodová M**., Štemproková D., Šťastný M. (1997): Rocky coast facies of the Cenomanian- Turonian Boundary interval at Velim (Bohemian Cretaceous Basin, Czech Republic). Second part - *Věst. Čes. geol. Úst.*, 72(2), 141-156. Praha.

15b) Addenda 1996

Houša V., **Krs M.**, Krsová M. & **Pruner P.** (1996): Magnetostratigraphic and micropaleontological investigations along the Jurassic/Cretaceous boundary strata, Brodno near Žilina (western Slovakia). *Geol. Carpathica*, 47(3), 135-151. Bratislava.

Houša V., **Krs M.**, Krsová M. & **Pruner P.** (1996): Magnetostratigraphy of Jurassic-Cretaceous limestones in the Western Carpathians. In A. Morris & D.H. Tarling (Eds.): *Paleomagnetism and Tectonics of the Mediterranean Region*, Geol. Soc. London, Spec. Publ. no. 105, 185-194. London.

Houša V. & Vašíček Z. (1996): Spodnokřídoví amoniti obalových formací štramberských vápencových těles. *Zpr. geol. Výzk. v Roce 1995*, 95-96. Praha.

Ložek V. (1996): Biostratigrafie jeskyně Podvojná pod Zadní Kopaninou (Biostratigraphy of the Podvojná Cave near Zadní Kopanina). *Speleo (Praha)*, 22, 7-9. Praha.

Ložek V. (1996): CHKO Kokořínsko ve světle výzkumu měkkýšů (The Kokořínsko Protected Landscape Area in the light of malacological research). *Příroda*, 7, 169-180. Praha.

Ložek V. (1996): Měkkýši v Řevnických hřebenech. *Zprav. Ochránců přírody okresu Praha-západ*, XVII, 41-42. Praha.

Ložek V. (1996): Nádrže pod Pálavou z ptačí perspektivy. *Vesmír*, 75, 681-682. Praha.

Ložek V. (1996): Přírodní poměry na jižním svahu Zlatého Koně během holocénu (Environmental conditions on the south-facing slope of the Zlatý Kůň during the Holocene). *Bohemia Centralis*, 25, 127-137. Praha.

Ložek V. (1996): Výzkum kvartérní malakofauny v horských oblastech Čech (Investigation of Quaternary Malacofauna in Mountainous Areas of Bohemia). *Zpr. geol. Výzk. v Roce 1995*, 122-123, ČGÚ Praha.

Ložek V., Culek M. a kol., Eds. (1996): *Biogeografické členění České republiky*. Enigma: 347 pp. Praha.

Shkupi D., **Peza L. H.**, Bicaj Z. & Nikolla M. (1996): Sedimentary mineralisations of F-Pb-Zn in Triassic deposits of Alpine belt and the possibility to find them in Northern Albania (Shkodra region). *Bul. Shkencave Gjeoligjike*, 1-2, 51-74. Tirana.

Vavrdová M., **Bek J.**, Dufka P. & Isaacson P.E. (1996) : Palynology of the Devonian (Lochkovian to Tournaisian) sequences from the Madre de Díos Basin, northern Bolivia. *Bull. Czech Geol. Soc*., 71(4), 333-350. Praha.

Zeman A. & Růžičková E. (1996): Výzkum látkového složení malt. *Technologia artis*, 4, 93-97. Nár. galerie Praha.

Žigová A., **Skřivan P.**, **Kvídová O. & Burian M.** (1996): Sources and fluxes of selected microelements in a Central Bohemian forest ecosystem with granitic bedrock. *I8th Int. Symposium "Heavy Metals in the Environment", Extd. Abs. Proc. Pushchino*, 190. Puschchino.

Žítt J. (1996): Cyathidium Steenstrup (Crinoidea) in the Upper Cretaceous of Bohemia. *J. Czech Geol. Soc.*, 41(3-4), 233-239. Praha.

15c) Papers in press and rewiews or submitted papers

Böhm F., Ebli O., Lobitzer H., **Siblík M.** & Rakús M.: Fauna, Sedimentology and Stratigraphy of the Hettangian-Sinemurian (Lower Jurassic) of Adnet (Salzburg, Österreich). *Jb. Geol. Bundesanst*. Wien.

Bosák P.: Pre-Upper Cretaceous karstification (Carboniferous to Cenonanian) in the Barrandian (Czech Republic). *Čes. Kras (Beroun)*, 24.

Bosák P.: Variscan hydrothermal paleokarst and calcite veins in the Velkolom Čertovy schody-Quary East (Bohemian Karst, Czech Republic). *Čes. Kras (Beroun)*, 24.

*****Buatois L.A., Mangano M.G., **Mikuláš R.** & Maples C.G: The ichnogenus *Curvolithus* revisited. *J. Paleontol*.

Cílek V., **Skřivan P.** & **Martínek J.**: Antropogenní karbonátové a sulfátové kůry z okolí Králova Dvora. *Čes. Kras (Beroun)*.

*****Dostal J., **Patočka F.** & Pin Ch.: Early Paleozoic intracontinental rifting in the central West Sudetes, Bohemian Massif: trace element and Sr-Nd geochemistry of metavolcanic rocks of the Rýchory Mts. complex. *J. Geol. Soc*. London.

Fatka O. & **Vavrdová M.**: Early Cambrian Acritarcha from sediments underlying Moravian Devonian (borehole Měnín - 1). *Bull. Czech Geol. Soc*. Praha.

*****Gutiérrez-Marco J.C. & **Štorch P.**: Graptolite biostratigraphy of the lower Silurian (Llandovery) shelf deposits of the Western Iberian Cordillera, Spain. *Geol. Mag.* 135, 1. Cambridge.

Havlíček V. & **Štorch P.**: Silurian and Lochkovian communities in the Prague Basin (Barrandian, Czech Republic).- In A.J. Boucot & J.D. Lawson (Eds.): *Final report, Project Ecostratigraphy*. Cambridge University Press. Cambridge.

Hladil J., Bosák, P., Bek J., Langrová A.: Devonian paleokarst in the Velkolom Čertovy schody-Quarry East. *Čes. Kras (Beroun)*, 24.

Hoedemaeker P.J., **Krs M.**, **Man O.**, Parés J.M., **Pruner P.** & **Venhodová D.**: The Neogene remagnetization and petromagnetic study of the Early Cretaceous limestone beds from the Río Argos, (Caravaca, Province Murcia, SE Spain). *Geol. Carpathica.* Bratislava.

***Houša V., Krs M., Pruner P., Man O., Venhodová D.**, Cecca F., Nardi G. & Piscitello M.: Correlation of high-resolution magnetostratigraphic and micropaleontological

data across the J/C boundary strata in Brodno (W. Carpathians, W. Slovakia) and the Bosso Valley (Umbria, Central Italy). *Annales Geophysicae*. Abstract. Nice.

***Knobloch E.** & **Konzalová M.**: Paleogene Flora in Bohemia and Germany. A Comparison of Communities. - *Rev. Palaeobot. Palynol.* Amsterodam.

Kollmann H. A., **Peza L. H.** & Čech S.: Upper Cretaceous Nerineacea of the Bohemian Basin (Czech Republic) and Saxonian Basin (Saxony, Germany) and their significance for Tethyan environments. *Abh. Stat. Mus. Min. Geol. Dresden* 43/44, 151 - 172. Dresden.

Konzalová M. & Hrabal J.: Microfossils from the graphitic phyllites of the NW Bohemian Crystalline Complex. *Bull. Czech Geol. Surv.* Praha.

Krs M., Krsová M. & **Pruner P.**: Paleomagnetism and Paleogeography of the Variscan and pre-Variscan Formations of the Bohemian Massif: a brief review. In S. Vrána & V. Štědrá (Eds.): *Geological model of Western Bohemia in relation to the KTB borehole in FRG. Sbor. Čes. geol. Úst.* Praha.

***Krs M.**, Krsová M., **Pruner P., Man O. & Venhodová D.**: Geodynamic evolution of Permian to Neogene rock formations in the W. Carpathians based on summary of previously and recently derived paleomagnetic data. *Annales Geophysicae*. Abstract. Nice.

Kvídová O.: Okruh environmentálních témat, řešených v oddělení geochemie Geologického ústavu AVČR. *"Seminář k uctění památky prof. J. Bauera a prof. A. Ondřeje". VŠCHT Praha, 18.června 1997*. Praha.

Kvídová O., **Skřivan P.** & Bendl J.: Biogeochemické cykly stopových prvků, jejich zdroje a redistribuce v povodí s granitickým podložím, modelová studie. *Sborník "Semináře k uctění památky prof. J. Bauera a prof. A. Ondřeje", VŠCHT.* Praha.

Lachmanová M.: Nález podkrkonošského chalcedonu u Radotína. *Čes. Kras (Beroun)*, 24.

Martínek J., **Cílek V.** & **Skřivan P.**: První rok systematického monitoringu chemického složení atmosférické depozice v koněpruské oblasti. *Čes Kras (Beroun)*, 24.

Martínek J., **Žigová A.**, **Skřivan. P.** & **Burian M.**: Factors affecting the trace element distribution in a soil developed on granite bedrock in Central Bohemia (Czech Republic). *Geol. Carpathica, Clays*. Bratislava.

Melchin M.J., Koren` T.N. & **Štorch P.**: Global diversity and survivorship patterns of Silurian graptoloids. In E. Landing & M.E. Johnson (Eds.): Silurian Cycles: linkages of dynamic processes in the atmosphere and oceans.- *N.Y. St. Mus. Bull.,* 491. Albany.

Mikuláš R.: Bioeroze a jeskyně. *Speleo*, Praha.

Mikuláš R.: Gigantická hvězdicovitá ichnofosilie spodnodevonského stáří z Cikánky u Radotína: objev a ztráta dosud jediného nálezu. *Čes. Kras*, Beroun.

Mikuláš R.: Nad knihou: Richard G. Bromley: Trace fossils - biology, taphonomy and applications. 2. přepracované vydání, Chapman & Hall, Londýn, 361 str. *Vesmír*. Praha.

Mikuláš R.: "Paleopseudokras" - nesmysl nebo skutečnost? *Speleo*, Praha.

Mikuláš R.: Ordovician of the Barrandian area: Reconstruction of the sedimentary basin, its benthic communities and ichnoassemblages. *J. Czech geol. Soc*. Praha.

Mikuláš R.: Pískovcový fenomén a jiné geobiologické fenomény: úvaha nad srovnáním "nového červeného pískovce" ve střední Anglii s českými skalními městy. *Vesmír*. Praha.

Mikuláš R.: Pískovcový fenomén Skalské tabule. *Ochr. Přír.* Praha.

Mikuláš R.: Plešivecká brána a skalní kanci, neboli pár poznámek k pískovcovému fenoménu Dubských skal. *Speleo*, Praha.

Mikuláš R.: Protective function of vegetation as a mechanism of origin of modern traces on surfaces of weakly lithified rocks (Hilbre Islands, Wirral Peninsula, Great Britain). *Ichnos*, Amsterodam.

Mikuláš R.: Poznámky k pískovcovému pseudokrasu Máchova kraje. *Speleo*, Praha.

Mikuláš R.: Spor o Darwina (úvaha o chybějících mezičláncích). *Vesmír*. Praha.

Mikuláš R.: Subaerial animal and plant bioerosion in sandstone castellated rocks (Pleistocene to Recent, Czech Republic). *Bulletin of the Geol. Soc. of Denmark*, Copenhagen

Mikuláš R.: Two different meanings of the term "bioglyph" in the geological literature: history of the problem, present-day state, and possible way out. *Ichnos*, Amsterodam.

Mikuláš R.: Vrtavá činnost živočichů v pískovcových skalních městech, její geologický a biologický význam. *Živa*. Praha.

Mikuláš R.: Vrtavá činnost hmyzu ve skalních městech Českého ráje. *Vlastenecký sborník od Ještěda k Troskám*. Turnov.

Mikuláš R. & **Cílek V.**: Terrestrial insect bioerosion and possibilities of its preservation (Holocene to Recent, Czech Republic). *Ichnos*, Amsterodam.

Mikuláš R. & Pek I.: Ichnofosilie z jílových břidlic stínavsko-chabičovského souvrství (devon) od Stínavy. *Geol. Výzk. na Moravě a ve Slezsku v r. 1997.* Brno.

Mikuláš R. & Pek I.: Trace fossils of animal-plant interactions and "pseudointeractions" from Maletín (Bohemian Cretaceous Basin, Czech Republic). *Ichnos*, Amsterodam.

***Minařík L.**, **Žigová A.**, Bendl J., **Skřivan P.** & Šťastný M.: The behaviour of rare-earth elements and Y during the rock weathering and soil formation in the Říčany granite massif, Central Bohemia. *Sci. Total Environment*. Amsterdam.

Pivec E., Šrein V., **Ulrych J.**, Bendl J., Dobeš P. & Žák K.: Epithermal Tertiary Pb-Zn-Cu (Ag, Te) mineralization in the Roztoky volcanic centre. *Geol. Carpathica.* Bratislava.

Pivec E., Štemprok M., **Novák J. K.** & **Lang M.**: Distribution of phosphorus in the granitic rocks of the Czech part of the Krušné hory-Erzgebirge batholith. *Miner. Ind. Int..* London.

Pivec E., Štemprok M., **Novák J. K.** & **Lang M.**: Tourmaline as a late magmatic or postmagmatic mineral in granites of the Czech part of the Krušné hory-Erzgebirge batholith and its contact zone. *J. Czech Geol. Soc*. Praha.

Pivec E., **Ulrych J.** & Had J.: Lapidifikovaná struska od Svojkova u České Lípy. *Sbor. Severočes. Muz. v Liberci.* Liberec.

Pivec E., **Ulrych J.**, Höhndorf A. & Rutšek J.: Melilitic rocks from northern Bohemia: geochemistry and mineralogy. - *N. Jb. Mineral., Abh.* Stutgardt.

Pivec E., **Ulrych J.**, **Lang M.**, Árva-Sós E. & Nekovařík Č.: Weakly alkaline alkali basalt, rhyolite series from the Teplá Highland, Western Bohemia: Geochemical constraints. *Geol. Bavarica*. München.

Povondra P., **Lang M.**, **Pivec E.** & **Ulrych J.**: Tourmaline from the Přibyslavice peraluminous alkali feldspar granite, Czech Republic. *J. Czech. Geol. Soc*. Praha.

Rage J.C. & **Roček Z.**: Tertiary Anura of Africa. In H. Heatwole & R. Carroll (Eds.): *Amphibian Biology, Vol.4 - Paleontology*. Surrey Beatty & Sons.

Rage J.C. & **Roček Z.**: Tertiary Anura of Asia. In H. Heatwole & R. Carroll (Eds.): *Amphibian Biology, Vol.4 - Paleontology*. Surrey Beatty & Sons.

Roček Z.: 3. Světový kongres herpetologie Praha, 2. - 10. srpna 1997. *Živa*. Praha.

Roček Z.: Der Messeler Salamander. In W. v. Koeningswald & G. Storch (Eds.): *Messel - Ein Pompeji der Paleontologie*. Jan Thorbecke Verlag, Sigmaringen.

Roček Z.: Stammesgeschichte und Evolution der Amphibien. In E. Hofrichter (Ed.): *Amphibien*. Salzburg.

Roček Z. & Rage J.C.: Tertiary Anura of Europe. In H. Heatwole & R. Carroll (Eds.): *Amphibian Biology, Vol.4 - Paleontology*. Surrey Beatty & Sons.

Roček Z. & Wake M.: Third World Congres of Herpetology, 2-10 August 1997, Prague, Czech Republic. *Herpetol. Rev.* Univ. of California, Berkeley, California, U.S.A.

Růžička M. & **Růžičková E.**: Základní klasifikace svahových sedimentů. *Zpr. geol. Výzk. v Roce 1997.* Praha.

Růžičková E. & **Růžička M.**: Strukturní a texturní znaky svahových sedimentů (Textural and structural characteristics of colluvial sediments. *Zpr. geol. Výzk. v Roce 1997.* Praha.

Senowbari-Daryan B., Bernecker M. & **Siblík M.**: Contribution to the sedimentology and biostratigraphy of the Oman Upper Triasic. *Paläont. Z*. Frankfurt/M.

Siblík M.: Bericht 1995/1996 über paläontologische Untersuchungen von der Brachiopodenfauna des Hierlatzkalkes auf den Blättern 66 Gmunden, 93 Berchtesgaden, 96 Bad Ischl, 97 Mitterndorf und 98 Liezen. *Jb. Geol. Bundesanst*. Wien.

Suchý V. & **Zeman A.**: Episodic Post-Variscan Fluid Flows and Hydrothermal Karstification in the Bohemian Massif, Czech Republic: A Preliminary Note. *15th International Sedimentological Congress, Alicante, Spain, April 1998 (abs.)*.

Suchý V. & **Zeman A**.: Hydrothermal karst processes along a major seismotectonic zone: an example from the Bohemian Massif (abs.). In *Karst & Tectonics, Colloque International, Han-sur-Lesse, Belgique, 9-12 mars 1998. Volume de resumes*. Han-sur-Lesse.

***Suchý V.**, **Zeman A.** & Sýkorová I.: Multiple episodes of fluid migration across the Bohemian Massif: evidence from bitumen reflectivity and hydrothermal karst. *Ann. Geophys.,* 16, Suppl. 1*, Abstracts of European Geophysical Society XXIII General Assembly, Nice, 20-24 April 1998 (Abs.).*

Sýkora M., **Siblík M.** & Soták J.: The limestone with *"Spirigera" deslongchampsi* Suess in the Tertiary Conglomerates near Chvalové village, Southern Slovakia. *Geol. Carpathica.* Bratislava.

*****Szczepanski J. & **Patočka F.**: The Early Devonian quartzites from northeastern Bohemian Massif (the Hrubý Jeseník Mts. Devonian and the Strzelin Crystalline Massif): provenance and paleotectonic implications. *Geol. Rdsch*. Kiel.

*****Šafanda J. & **Suchý V**.: Thermal effect of the Central Bohemian pluton on the diagenetic history of the Barrandian Basin (Czech Republic). *Ann. Geophys.,* 16, Suppl. 1*, Abstracts of European Geophysical Society XXIII General Assembly, Nice, 20-24 April 1998 (Abs.).*

Štorch P.: New data on Upper Llandovery (Silurian) graptolites of Spain.- *J. Czech Geol. Soc.* Praha.

Štorch P. & Leone F.: Upper Ashgill (latest Ordovician) graptolites in south-western Sardinia, Italy.- *Boll. Soc. Paleont. Ital.* Modena.

Uher P., Breiter K., Klečka M. & **Pivec E.**: Zircon in highly evolved Homolka granite, Czech Republic: Indicator of magma source and petrogenesis. - *Geol. Carpathica.* Bratislava.

*****Uličný D., Kvaček J., **Svobodová M.** & Špičáková L.: Record of paleoenvironmental changes related to high frequency sea-level fluctuations, Cenomanian, Bohemia. *Palaeoclimatol., Palaeogeogr., Palaeoecology*. Amsterdam.

Ulrych J.: 70 let Hibschovy naučné stezky na Dlouhém vrchu u Žitenic v Českém středohoří. - *Naší přírodou.* Praha.

Ulrych J. & **Pivec E.**: Geochemie a mineralogie trachybazalt-ryolitové série vulkanitů Tepelské vrchoviny. *Abstrakta, Seminář Prof. J. Bauera, VŠCHT, Praha 1997.* Praha.

Ulrych J., **Pivec E.** & **Lang M.**: Podhorní vrch volcano in Western Bohemia: Olivine nephelinite with ijolitic segregations. - *Acta Geol. Hungarica.* Budapest.

Ulrych J., Povondra P., Pertlik F. & Mikenda W.: Minerals of reyerit-zeophyllite group in the Českém středohoří Mts. *Abstracts, Workshop Zeolite II, Turnov, May 1997.*

***Vavrdová M.**: Provincialism of Late Ordovician acritarchs. *Rev. Palaeobot. Palynol*. Amsterdam.

Waldhausrová J.: Geochemistry of volcanics (metavolcanics) in the western part of the TBU Precambrian and their original geotectonic setting. In S. Vrána & V. Štědrá

(Eds.): *Geological model of Western Bohemia in relation to the KTB borehole in FRG. Sbor. Čes. geol. Úst.*, Praha.

Zeman A. & **Růžičková E.**: Vztah zříceniny hradu Mudlovary u Nymburka k holocénním fluviálním sedimentům Labe. *Zpr. geol. Výzk. v Roce 1997.* Praha.

Zeman A. & **Suchý V**.: Indications of north-south deep linear tectonics in the central part of the Bohemian Massif, Czech Republic: geological implications (abs.). *Geolines*. Praha.

Žítt J., Nekvasilová O. & Hradecká L.: Contribution to the knowledge of the rocky coast facies and taphocoenoses west of Prague (late Cenomanian-early Turonian, Czech Republic). *Bull. Czech geol. Surv*. Praha.

15d) Unpublished lectures and poster presentations

Bosák P.: *Kras kopalny Republiki Czeskiej (Fossil Karst in the Czech Republic).* Instytut Nauk Geologicznych, Nov. 10, 1997. Warszawa.

Bosák P.: *Speleogenesis in the Koněprusy region (Bohemian Karst, Czech Republic): new data and ideas.* 5th Int. Karstolog. School, Classical Karst-Caves, Speleol. Assoc. of Slovenia and Karst Res. Inst. ZRC SAZU, June 1997. Postojna.

Cílek V., **Hladil J.** & **Čejchan P.**: *Catastrophes in nature: Why we need them? Are they predictable? When we recover from them?* Lecture given at Meeting of the European Club, April 24, 1997, Academy of Sciences CR, Prague.

Crick R.E., Ellwood B., El Hassani A., Feist R. & **Hladil J.**: *Magnetosusceptibility Event - and Cyclostratigraphy (MSEC): Its use in Characterizing the Eifelian-Givetian Boundary Sequence, the Kacak-Otomari Event, and in Determining the Duration of the Eifelian and Givetian.* Lecture given at The Amadeus Grabau Symposium on the Devonian System, July 20, 1997. University of Rochester, NY, USA.

Dobeš P., **Suchý V.**, Sedláčková V. & Stanišová N.: *Hydrocarbon fluid inclusions from fissure quartz: a case study from Barrandian Basin (Lower Paleozoic), Czech Republic.* XIVth ECROFI (European Current Research on Fluid Inclusions), European Research Conference, Nancy, France, 1997, poster presentation.

Eckhardtová Š., **Suchý V.**, Sýkorová I., Dobeš P., Stejskal M. & **Lachmanová M.**: *Contact metamorphism of graptolite-rich black shales by basatic sills: implications for the origin of hydrothermal petroleum.* European Union of Geosciences EUG 9, Strasbourg 23 - 27 March 1997, poster presentation.

Hladil J.: *Bohemian (NGM) and Moravian (SLM) Devonian: General Features and Windows for Finer Scaling.* Invited lecture, The Amadeus Grabau Symposium on the Devonian System, July 21, 1997. University of Rochester, NY, USA.

Hladil J.: *Reef limestones of the German Devonian: facies belts and time specific facies.* Lecture given at Workshop of the Paleont. Dept. Charles University, March 19, 1997, Charles University, Prague.

Hladil J.: *Tectonic rotation of Moravia: evidence and implications (incl. clockwise rotation of the Barrandian about 180 degrees).* Lecture given at the Workshop for Paleont., Stratigr. and Geology, 65-anniversary Prof. Ivo Chlupáč, January 23, 1997, Charles University, Prague.

Hladil J. & Hladíková J.: *The ^{13}C and ^{18}O isotopes in carbonates of the Moravian Karst: a specific sequence pattern.* Lecture given at the conference Moravian Paleozoic 1997, February 5, 1997, Masaryk University. Brno.

Hladil J. & **Patočka F.**: *Indications of possible magmatic-arc / back-arc tectonic setting in the northern part of the Bohemian Massif during early Paleozoic: basin analysis and geochemistry.* Lecture given at First International Conference on North-Gondwanan Mid-Paleozoic Biodynamics, IGCP 421, September 17, 1997, Geologische Bundesanstalt, Vienna.

Hoedemaeker P.J., **Houša V.**, **Krs M.**, **Man O.**, Parés J.M., **Pruner P.** & **Venhodová D.**: *Magnetostratigraphic and petromagnetic studies of the Jurassic/Cretaceous limestones from the Río Argos (Caravaca, SE Spain), Carcabuey (S Spain) and the*

Bosso Valley (Umbria, central Italy). UNESCO, Final Meeting of the Project No.362, "Tethyan/Boreal Cretaceous Correlation", Stará Lesná, Slovakia.

Houša V., **Krs M.**, Krsová M., **Man O.**, **Pruner P.** & **Venhodová D.**: *High-resolution magnetostratigraphy across the Jurassic-Cretaceous boundary strata at Brodno near Žilina, Western Carpathians, Western Slovakia.* UNESCO, Final Meeting of the Project No.362, "Tethyan/Boreal Cretaceous Correlation", Stará Lesná, Slovakia.

Krs M., Krsová M., **Man O.** & **Pruner P.**: *Globálně tektonické interpretace paleomagnetických dat odvozených na fanerozoických horninách Českého masívu a Západních Karpat.* Odborná konference u příležitosti 75 let profesora Zdeňka Pouby. Ústav geochemie, mineralogie a nerostných zdrojů, Přírodovědecká fakulta University Karlovy.

Krs M., **Man O.** & **Pruner P.**: *Alpine and Variscan paleotectonic deformations interpreted paleomagnetically, comparsion of results from the Western Carpathians and the Bohemian Massif.* XXII General Assembly, EGS, 21.- 25.4.1997, Vienna (poster).

Krs M. & **Pruner P.**: *Petromagnetic and paleomagnetic investigations of Jurassic-Cretaceous limestones aimed at magnetostratigraphy in the Mediterranean area.* UNESCO, Final Meeting of the Project No.362, "Tethyan/Boreal Cretaceous Correlation", Stará Lesná, Slovakia.

Martínek J., **Žigová A.**, **Skřivan P.** & **Burian M.**: *Influence of acidic deposition on the characteristics of soil in Nature State Reserve "Voděradské bučiny" from the point of view of the trace elements content.* Int. Conf. ENVIWEATH 97 Bratislava 23. - 26. 11. 1997, poster presentation.

Méon H., Pacltová B. & **Svobodová M.**: *La limite Cénomanien-Turonien, Palynologie et Evénements anoxiques: Comparaison entre les Bassins Bohémiens (République Tschéque) et Vocontien (France).* XV. Symposium de l ´association des Palynologues de Langue Francaise, 1. - 3. 9. 1997, Lyon, poster presentation.

Mikuláš R.: *Difference in distributional patterns between benthic shelly fauna communities and ichnoassemblages (Ordovician, Czech Republic), and possible consequences for faunal stability models.* IGCP Project 335 Final Conference Biotic recoveries from mass extinctions", Praha, 12. 9. 1997.

Novák J. K.: *Mixed-layer kaolinite/smectite in the Teplice diatreme, Czech Republic.* 11th Int. Clay Conference, Carlton University, Ottawa, Ontario, June 11-21, 1997, poster presentation..

Otava J., Kalvoda J. & **Hladil J.**: *Evolution of synorogenic basins and their tectonic setting.* Invited lecture, 2nd Workshop of Czech Group for Tectonic Studies, Sedimentary and Tectonic Evolution of Synorogenic Basins, April 25-27, 1997, Technical University. Ostrava.

Patočka F. & **Novák J. K.**: *The Na-amphibole bearing metabasites of W Sudetes: dismembered Variscan suture zone in the Bohemian Massif?* 10th MAEGS, Sept. 1-5, 1997, Karlovy Vary, poster presentation.

Povondra P., **Lang M.**, **Pivec E.** & **Ulrych J.**: *Tourmaline from Přibyslavice peraluminous granite, Czech Republic.* - Tourmaline Symposium, Nové Město, 1997.

Sedláčková V., Stejskal M., **Suchý V.** & Kubelka V. : *The occurrence and analysis of crude-oil indicia in the Barrandian Basin.* Challenges to Chemical Geology, An International Conference, Karlovy Vary, 1997, poster presentation.

Skřivan P., Fottová D., **Martínek J.**, **Minařík L.**, **Kvídová O.** & **Burian M.** (1997): *Biogeochemical fluxes of manganese in a Central - Bohemian forested catchment on granite bedrock.* BIOGEOMON. 3rd International Symposium on Ecosystem Behaviour, June 1997, poster presentation.

Slepičková J.: *Paleomagnetismus devonských a karbonských hornin moravskoslezské oblasti.* Konference Moravsko-slezské paleozoikum, pořádané na Přírodovědecké fakultě MU v Brně.

Suchý V., Rozkošný I. & Dobeš P.: *Organic Maturity, Conditions of Veining and Hydrocarbon Migration in the Barrandian Basin (Lower Paleozoic), Czech Republic.*

American Association of Petroleum Geologists Annual Convention. An international Conference and Exhibition, Vienna, 1997.

Suchý V., **Zeman A.**, **Bosák P.**, Dobeš P., Hladíková J. & Jačková I.: *Hydrothermal calcite veins and the origin of caves in the Lower Paleozoic of the Barrandian Basin, Czech Republic: evidence of extensive (post ?) Variscan fluid flow.* 18th IAS Regional European Meeting of Sedimentology, an international conference, Heidelberg, Germany, 1997.

Svobodová M.: *Palynology of Cretaceous in the Czech Republic.* University of Utrecht, Netherlands, April 1997.

Sýkora M., **Siblík M.** & Soták J.: *The limestone with "Spirigera" deslogchampsi Suess in the Tertiary Conglomerates near Chvalová village, Southern Slovakia.* ALEWECA conference 10. - 14. 9. 1997, Bratislava, poster presentation.

Ulrych J., Povondra P., Pertlik F. & Mikenda W.: *Minerals of the reyerit-zeophyllite group in the České středohoří Mts.* Workshop Zeolite II, Turnov 1997.

15e) Unpublished reports

Bosák P., Hladil J., Helešicová K., Těžký A. & Jansa L.F. (1997): *Assessment of Regional and Eustatic Sea-Level Changes at the Devonian Carbonate Platform Bordering Southeastern Edge of the Bohemian Massif.* Project proposals and substantiations, 40 pp., Prague.

Hladil J. (1997): *Pebbles from the Culm of Korenec, a coral Ortholites, Late Tournaisian* (in Czech). Conribution to project Microfacies Studies of Culm Pebbles, Masaryk University, 2 pp., Brno.

Hladil J. (1997): *Petrography of the pilot samples of conodont stratigraphy, Koněprusy.* Cooperation on the Project Koněprusy, Masaryk University, 15 pp., Brno.

Hladil J., Ed. (1997): *Physical and isotope stratigraphy in neighborhood of the exploitation plants of Mokrá* (in Czech). CEMO Inc., 37 pp., Brno.

Hladil J., Hladíková J., Frýda J. & Janoušek O. (1997): *Evolution of the Devonian sedimentary environments in Barrandian basins using isotopic compositions of carbon, oxygen and strontium in brachiopod shells.* Project proposals and substantiation, 55 pp., Prague.

Lachmanová M. (1996): *Geologie mezi Loukovem a Novou Vsí u Bakova se zvláštním zřetelem na terasy Jizery.* - MS Dipl. Práce Přírodověd. fak. Univ. Karlovy, str. 1-60, Praha.

Pašava J. & **Hladil J.** (1997): *Summary Report 1997. The Czech National Committee for Int. Geol. Correl. Programs, affiliated to Czech. Geol. Soc.*, 11 pp., Prague-Paris.

Pruner P. & **Venhodová D.** (1997): *Paleomagnetický a paleogeografický výzkum v oblasti Tatrika, Manínské a Križňanské jednotky.* Závěrečná zpráva pro Geological Survey of the Slovak Republic, Bratislava. Geol. ústav AV ČR, Paleomagnetická laboratoř Průhonice.

Pruner P., **Venhodová D.** & **Slepičková J.** (1997): *Paleomagnetický výzkum pilotních vzorků vybraných hornin Tatrika, Manínské a Križňanské jednotky.* Zpráva pro Geological Survey of the Slovak Republic, Bratislava. Geol. ústav AV ČR, Paleomagnetická laboratoř Průhonice, 1997.

Vavrdová M. (1997): *Proterozoické buližníky: stiriolity nebo silicifikované mikrobiální krusty?* Zpráva pro MŽP, projekt: Výzkum karbonátových hornin středočeského proterozoika a možnosti jejich využití pro ekologii.

***

16. Financial Report

(given in thousands Czech Crowns)

A. INCOMES	
1. From the annual budget of the Academy of Sciences CR	11 428
2. From the Grant Agency of the Acad. Sci. (accepted research projects)	686
3. From the Grant Agency CR (accepted research projects)	1 142
4. From the internal research projects of the Acad. Sci.	3 007
5. From other state sources (Ministry of Environment, etc.)	679
6. Applied research	260
7. Investments (for laboratory facilities)	2 038
TOTAL INCOMES	19 240

B. EXPENSES	
1. Scientific staff - wages, medical insurance	6 262
2. Research and scientific activites	5 818
3. Administration and technical staff - admin. expenses, wages, medical insurance	3 155
4. General expenses (postage shipping, maintenance of buildings, energies, transport, office supplies, miscellaneous, etc.)	1 390
5. Library (subscriptions etc.)	393
6. Editorial activites (Geolines, Annual Report)	94
7. Investments (for laboratory facilities)	2 128
TOTAL EXPENSES	19 240

Notes