1. Gföhl unit (granulite complex)
2. Variegated unit (in part Drosendorf unit)
3. Monotonous unit

The stratigraphic age of important members of these units is variably considered as Upper Proterozoic and Lower Paleozoic. At the same time, there is increasing evidence, coming mainly from U–Pb studies on zircon and Sm–Nd isotopic work, for a significantly heterogenous nature of the Moldanubian complex in terms of age. Examples include the following units:

1. Světlík orthogneiss and correlatives near Český Krumlov in southern Bohemia – U–Pb zircon age of the tonalitic to dioritic magmatic protolith 2 050 to 2 104 Ma, (Wendt et al., 1993).
2. Dobra orthogneiss, Lower Austria, U–Pb zircon age near 1 380 Ma (Gebauer–Friedl, this volume); Dobra gneiss was suggested as basement to the Variegated unit by Fuchs (1976) on geological grounds.
3. Winklarn unit carrying granulites, eclogites, and peridotites equilibrated/cooled at about 430 Ma, is thus distinct from the Variscan granulite–eclogite–peridotite assemblage as it is represented in Lower Austria, W Moravia and southern Bohemia.
4. The Sušice Variegated unit in SW Bohemia Moldanubian, occurring SW of the fossiliferous Lower Paleozoic in the roof pendants ("islets") on the Central Bohemian Pluton and showing a comparable lithology, can be interpreted as of Lower Paleozoic age (Chlupáč 1992).

Recognition of several older crustal segments in the Moldanubian Zone points to a limited validity of division of the Moldanubian to Gföhl, Variegated, and Monotonous units. The newly recognized Světlík eclogite belt, localized in the upper structural level of the Monotonous unit SW of Český Krumlov and just below the base of the Lower Proterozoic Světlík orthogneiss (overlain in turn by the Variegated unit) (Vrána 1989) represents a major suture sited several km below the so–called "Main Moldanubian Thrust" shown by Matte et al. (1990) at the base of the Blanský les granulite massif.

These relations and the above data indicate the scope of the newly emerging stratigraphic and tectonic complexity of the Moldanubian Zone and the need of further geochronological, tectonic, and petrological studies.

Some aspects of the polyphase nature of deformation and metamorphism, abundance of upper mantle segments intersliced in the crustal units, and the multitude of granulite P–T–t trajectories exhibited by various occurrences will also be discussed.

PROJECT 2100 – GEOLOGICAL MODEL OF WESTERN BOHEMIA IN RELATION TO THE DEEP BOREHOLE KTB IN THE FRG

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The project has been formulated in 1990 for the period 1991–1994 and works commenced in January 1991 as a program financed through the Ministry for Environment of the Czech Republic. The project including cooperation of the institutions in the Czech Republic is aimed at formulating a model of the Earth crust in W Bohemia using also all relevant geological and geophysical data which issue from the program KTB in Northern Bavaria, FRG. As the KTB is located near the CR–FRG border, the aspect of exchange of information on all geological units around the KTB location is of a practical importance. The cooperation is formulated within the program of scientific and technical cooperation "Erkundung und Modellierung der mitteleuropäischen Erdkruste im Umfeld des Kontinentalen Tiefbohrprogramms der Bundesrepublik Deutschland (KTB)", supported by a bilateral agreement on the government level and signed by representatives of Niedersächsische Landesamt für Bodenforschung, Hannover and of Český geologický ústav, Praha.

Scientific and technical results of this project will be also significant for decisions with environmental impacts, affecting the Earth crust in W.Bohemia, including aspects of groundwater reserves and their protection, seismic stability and stress state of the crust, potential of geothermal energy and others.

Following cooperating organizations participate in the project : Czech Geological Survey – coordinating organization; Geofyzika Brno a.s.; Geophysical Institute, Czech Academy of Science; Geological Institute, Czech Academy of Science; Faculty of Science, Charles University; Aquatest a.s.;

Institute of Raw Materials, Kutná Hora; and Gematrix a.s., Černošice.

This abstract can give only a brief review of major topics:

Geophysics

A. Deep seismics – the reflection, refraction profile 9HR (Horaždovice – Kraslice) was measured in 1991. The profile has transected several major geotectonic units – Moldanubian Zone, Teplá–Barrandian unit (Bohemicum), Mariánské Lázně complex, and Saxothuringicum. It provides information on the structure of the Earth's crust, including information on allochtonous position of several units of regional extent, vertical position of the Klatovy fault separating the Moldanubian Zone from the Teplá–Barrandian unit, etc. Twelve km long reflection profile across the Mariánské Lázně fault zone was measured in 1992. SE continuation of the profile 9HR was measured in 1993.

B. Seismology – the Kraslice region that is recently seismically active has been studied using a network of stations. . Interpretation of data will result in definition of recently active faults in W Bohemia and in asessment of seismic risks in the Kraslice region.

C. Gravimetry – two regions not covered by previous gravimetric surveys, i.e. Žatec – Doupovské hory region and Sušice region, have been measured.

D. Airborn geophysical survey – included regional magnetometry and spectrometrry. During 1991 and 1992 about 10 km wide belt, defined by locations Aš and Kvilda–Zdíkov, along the international boundary between ČR and FRG, has been measured for the first time and filled the information gap. This work allows tie–up of the existing regional information for Bavaria and interior Bohemia. (Geofyzika Brno).

E. Measurements of petrophysical properties of a set of rock samples collected in a network covering W Bohemian regions specified sub A to D; the information is needed for interpretation of the above methods (Geofyzika Brno).

F. Tie–up of detailed gravimetric data from the area of the KTB borehole with those for W Bohemia.

G. Evaluation of data from geophysical works in W Bohemia conducted during the last two decades and preparation for integrating with the newly obtained data sets. Preparation for production of integrated 1:100,000 scale geophysical maps.

H. Specialized geophysical topics and methods :

- calculation of 2–D non–stationary models simulating influence of neovolcanic activity in the Ohře rift region on the regional heat flow;
- analysis of magnetovariation and magnetotelluric data from 10 stations in W Bohemia applied to modelling crustal anisotropy;
- anisotropy of P–wave velocity, variation with hydrostatic pressure to 400 MPa;
- variation in remanent magnetisation of rocks (50 samples) under increased hydrostatic pressure and axial pressure;
- variation in magnetic susceptibility with pressure measured on samples from the KTB borehole;
- variation in electric conductivity of rock samples with temperature.

The seismological part of the program continuously monitors the seismically active region around Kraslice and will result in definition of a network of recently active faults and in characterization of probable mechanisms of the seismic events.

Geology, Tectonics, Petrology and Geochemistry

- geochemistry and geotectonic environment of the Upper Proterozoic volcanites;
- compilation of 5 sheets of geological and structural maps on the scale 1:25,000 near the Moldanubian Zone–Saxothuringicum junction along the ČR – FRG boundary;
- studies of paleomagnetism of Paleozoic, Permian and Proterozoic rocks;
- structural analysis of the Čistá granite massif;
- geochemistry of metabasic rocks of the Kladská unit, its relations to the Saxothuringicum;
- regional distribution and relative age classification of dyke rocks in the SW part of the Central Bohemian Pluton;
- geology and mineralogy of Al–rich horizon in the Dyleň unit;
- regional metamorphic zoning, P–T conditions and metamorphic evolution in time of Barrandian Upper Proterozoic;
- geochemistry and geotectonic position and significance of orthogneisses in the region;
- regional geochemistry and evolution of pre–Variscan and Variscan granitoids in the region;
- geothermobarometry of garnet amphibolites of ML complex;
- regional evaluation of epigenetic mineralization;
- regional petrochemistry of neovolcanic rocks and volcanology of the Doupovské hory

stratovolcano;
- mineral assemblages of gabbroic rocks of the ML complex, including study of opaque and heavy minerals;

Isotope studies and Geochronology
- geochronological dating of several rock types;
- study of stable isotopes in several rock units and characterization of processes by stable isotopes;

Paleofluids and fluid inclusions
- study of paleofluids in granulites of S Bohemia and in granitoid rocks of the Krušné hory Mts.;

Hydrogeology
- compilation of regional database on 5,000 hydrogeological boreholes and wells in region I (SE of Klatovy) and region II (20 km wide belt between Nepomuk and Kraslice, along the profile 9HR), including filtration parameters and a map of transmissivity. The data will be interpreted, in combination with geophysical data and regional fault network, in prognostic maps of groundwater reserves.

Synthesis of geological, tectonic, geophysical and geochemical data from W and SW Bohemia, in combination with data produced by the KTB program, resulted in completely new information on age, tectonic positions (and their changes in time), age of tectonothermal events of several major units in the region.

Complete review of results is presented in annual Abstract volumes distributed by the Czech Geological Survey, and extended results will be presented in the Final Report (1994).

DIAGENESIS OF UPPER CARBONIFEROUS ROCKS IN THE OUACHITA FORELAND SHELF IN THE MID-CONTINENT OF USA: WIDESPREAD EFFECTS OF THE VARISCAN-EQUIVALENT OROGENY

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Middle and Upper Pennsylvanian (Upper Carboniferous) sandstones and limestones of southeastern Kansas have experienced regional diagenesis at temperatures higher than expected from reconstructed depths of burial at normal geothermal gradients. These effects appear to be related to widespread invasions of heated brines that were also important in developing MVT base-metal deposits in Lower Carboniferous and lower Paleozoic rocks elsewhere in the US Mid-continent (Fig.1).

Uplift of the Ouachita Mountains to the south in Oklahoma and Arkansas may have caused artesian flow of heated brines northward across the Arkoma foreland basin. Flow was most likely through regional aquifers in the Ordovician and Mississippian (Lower Carboniferous) rocks of the region. Our work concentrates on the effects of this brine invasion on Pennsylvanian rocks in the Cherokee and Forest City basins in the shelf region of southeastern Kansas and western Missouri covering an area approximately 250 by 100 km.

Upper Carboniferous rocks of the US Mid-continent characteristically consist of cyclothems. Upper Middle Pennsylvanian rocks (lower Desmoinesian Series) in the Cherokee Group are predominantly shale with about 20% sandstone. Most sandstones are fluvial or estuarine valley-filling sequences, some are shoreline sandstones that form the uppermost component of progradational or regressional intervals. Overlying rocks of the Marmaton, Kansas City, and Lansing groups (upper Desmoinesian and Upper Pennsylvanian Missourian series) show alternations of limestone and shale, again with sandstone valley fills. Transgressive limestones are characteristically about 1 m thick and consist of wackestones and carbonate mudstones. Regressive, or progradational, limestones are commonly 3–5 m thick, consisting of lime mudstones and wackestones overlain by packstones and grainstones. In places, regressive limestones include phylloid algal mounds that are up to 10's of meters thick. The Desmoinesian and Missourian series total 400 m thick.

Sandstone diagenesis included formation of siderite cement, development of quartz overgrowths, a widespread episode of dissolution of feldspar and carbonates, followed by minor precipitation of Fe-calcite, and precipitation of pore-filling kaolinite and sub-poikilotopic Ca-ankerite. Actual duration of precipitation episodes of minerals overlapped (Fig. 2). Clay coatings are not visible in most