GEOLOGICAL MODEL OF WESTERN BOHEMIA IN RELATION TO THE DEEP BOREHOLE KTB IN GERMANY

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The project "Geological model of western Bohemia in relation to the deep borehole KTB in the FRG" was co-ordinated by the Czech Geological Survey in 1991–1994. A special volume of the Journal of Geological Sciences, series Geology (published by the Czech Geological Survey, Prague) presents the results of the project in 21 chapters on specialized topics, prepared by 50 co-authors from several geoscience institutions in the Czech Republic. The volume should appear approximately at the time of MAEGS-10 or later in 1997.

Insights into the structure and evolution of the Earth's crust in the western Bohemian Massif and formulation of a new geological and geophysical model of the region were the common denominator of all the specialized studies of the project. It used, in addition to new data, geological and geophysical information amassed over several decades. Some regions not covered by the previous programs of geophysical survey, namely a belt along the state border in the W and SW Bohemia, were studied.

Geophysical methods provided information on the region studied and on physical properties of the Earth's crust. These methods included regional gravimetry, airborne magnetometry and radiometry, and a 220 km long 9HR seismic profile. Gravimetry, and partly also magnetometry, gave quantitative information on subsurface extension of many contrasting plutons, intrusions, and horizons of basic metavolcanic rocks, necessary for a 3-D structural study of the Earth's crust. Deep reflection seismics was used as the main geophysical tool for recognition of the crustal structure. The 9HR line started in German Klingenthal, 2.7 km from the Czech border, continuing through Kraslice to Prachatice in southern Bohemia. In terms of the technique used, it was the first major seismic profile in the interior of the Bohemian Massif aimed at characterization of the internal crustal structure. The most important information obtained included: position of the Mariánské Lázně Complex and its subsurface continuation to the SE (beneath the Teplá–Barrandian Unit, TBU), determination of the base of the Karlovy Vary granite pluton (= 9 km below surface), structure of the south-eastern part of the Saxothuringian Zone, the internal structure of the TBU with numerous SE-dipping reflecting horizons extending down through much of the crustal thickness, and the probable continuation of the TBU nearly 30 km SE of the Central Bohemian Suture, beneath the Moldanubian Zone.

The geological chapters outline main features of the individual tectonic units of the central European Variscides (from NW to SE): the Saxothuringian Zone (its SE part), the Mariánské Lázně Complex, the Teplá–Barrandian Unit (= Bohemicum), and the Moldanubian Zone. Included are new geochemical and thermobarometric data on the Mariánské Lázně Complex, which can be correlated with the Erbendorf–Vohenstrauss Unit and parts of the Münchberg Massif in Bavaria, all characterized by palaeo-Variscan high-pressure metamorphism. The Kladská Unit, structurally dipping under the Mariánské Lázně Complex, is recognized as a marginal part of the Saxothuringian Unit. Research in the Teplá–Barrandian Unit resulted in recognition of regional metamorphic zoning patterns of Cadomian and Variscan age, age determinations of several felsic intrusions in the Teplá Crystalline Unit, which were recognized as Cadomian intrusives transformed to orthogneisses during the Variscan events, and geochemical characterization of Upper Proterozoic basaltic–andesitic volcanic rocks. Study in the Moldanubian Zone contributed to characterization of this unit as a heterogeneous assemblage of several segments which were assembled during the Variscan evolution and then underwent late-Variscan periplutonic metamorphism. The properties of the Moldanubian crust contrast with those of the Teplá–Barrandian Unit on the whole crustal scale.