deeper part of the vertical section is strongly shielded here by the near-surface conductive formations. As only two deep MT soundings have been carried out in this very heterogeneous region, the results should be considered preliminary.

According to the AMT soundings (between 4.1 and 2300 Hz 12 frequencies) in about the middle of the seismic profile a very conducting formation (0.1 - 3.6 Ωm) crops out along a shear zone and sinks to about 500 m at the western end of the profile where the resistive granulite (300 - 3000 Ωm) lies on the surface. According to the geologic mapping the so-called "Bunte-Serie" contains graphitic lenses (in some cases with pyrite) with extremely low resistivity values.

The resistivity values with their wide variety along the seismic profile from East to West may be connected - with some caution - to different rocks, such as granulite, rocks of the "Bunte-Serie", Bittescher Gneis and phyllitic mica schist.

ISOTOPIC "GOLDEN SPIKES" IN STRUCTURAL SUCCESSONS IN THE BOHEMIAN MASSIF, CZECH REPUBLIC

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Determination of reference points in the multi-episodic history of the Bohemian Massif is dependent on (1) establishing which isotopic data can be integrated, without ambiguity, into structural successions that constrain the relative times of crystallization of igneous bodies and development of metamorphic mineral growths and (2) using the local structural successions as bases for correlation within and discrimination between tectonic domains. In this way the equivalents of "golden spikes" used in the stratigraphy of sedimentary domains can be put into the deformational - metamorphic - igneous - sequences. However as at least two, and usually more, phases of metamorphism are present in these sequences, interpretation of Rb-Sr as well as K-Ar isotopic data presents problems and, except for the products of late events where metamorphic overprinting is not a factor, unambiguous interpretation is the exception. It is U-Pb data, particularly for zircon and monazite, that has proved to be the most useful but not only is it limited in amount, it also requires integration with the relevant structural succession(s). In practise this has meant that establishing "golden spikes" has followed where collecting for age dating has been governed by geological - structural constraints.

The upper intercept 496 ± 1 Ma U-Pb zircon age for a gabbro pegmatite in the Mariánské Lázně complex in western Bohemia (BOWES & AFTALION, 1991) is integrated into the deformational sequence for the Mariánské Lázně tectonic

domain (BOWES et al., 1992), and much of the latter part of this sequence corresponds to that of the southern Fichtelgebirge tectonic domain in the Saxothuringian zone of the Hercynides (BOWES et al., 1993). Unambiguous interpretation of the age being that of magmatic crystallization in an ophiolitic complex stems from the near concordance of the data points. This indicates that the U-Pb isotopic systems in the zircons (from rock with a relict igneous fabric and no signs of metamorphic foliation) remained nearly closed during subsequent deformational and metamorphic events.

The upper intercept U-Pb zircon age of 373 ± 5 Ma for gneisses from the Staré Sedlo complex that has the gross form of a roof pendant above the Central Bohemian Pluton, together with upper intercept and $^{206}Pb/^{204}Pb$ vs $^{207}Pb/^{204}Pb$ isochron ages of 369 ± 4 and 375 ± 5 Ma, respectively for these and the nearby Mirotice complex gneisses, give the age of crystallization of a plutonic protolith with geochemical features indicative of an arc regime (KOŠLER et al., 1993; KOŠLER & FARROW, 1994). This interpretation is not controversial as oscillatory zoning is common in the zircons and subsequent ductile deformation (before emplacement of the Central Bohemian Pluton) only caused fracturing in them leading to only a small loss of Pb. The interpretation that c. 370 Ma U-Pb age for some zircon in granulites in southern Bohemia reflects a magmatic crystallization age of precursors (WENDT et al., 1994) is consistent with mid-late Devonian granitoid plutonism being a point of reference in at least part of the Bohemian Massif.

While the presence of inherited Pb is a complicating factor in the interpretation of some U-Pb zircon data, it has very limited significance in the interpretation of U-Pb monazite data. Accordingly the 338 ± 2 Ma (near concordant) age of monazite from granulites at Mohelno, southern Moravia, rather than U-Pb zircon ages, establishes the age of the end stage of granulite facies metamorphism there (van BREEMEN et al., 1982). This can be linked to late D_2 in the structural succession (HOPGOOD & BOWES, 1987) and so can be used as a "golden spike". The possibility of correlation with the end stage of granulite facies metamorphism in the Blanský les granulites in southern Bohemia is indicated by both (1) a corresponding (within errors) U-Pb zircon (single crystal) concordant age (AFTALION et al., 1989) and (2) a corresponding position in the local structural succession (VRÁNA, 1979). The greater range of U-Pb zircon ages and Pb-Pb isotope proportions in both granulite assemblages (van BREEMEN et al., 1982; WENDT et al., 1994) points to the complications due to inherited Pb and small Pb losses, respectively.

The demonstration of the post-metamorphic and relatively late stage of development in the local structural succession of muscovite books near Bechyně, southern Bohemia, means that 331 ± 5 Ma (Rb-Sr) represents a crystallization age (van BREEMEN et al., 1982). This and their structural siting in the hinge zones of SE-verging asymmetrical folds means that they represent a potential reference point.

The use of such "golden spike" reference points in the elucidation of the geological history of the Bohemian Massif must take into account the structural complexity resulting from the tectonic interdigitation of different structural domains of

cover and basement rocks during the Hercynian episode, and the potentially large distances that may originally have existed between rock assemblages now geographically in close proximity. However when integrated with structural successions, well-constrained isotopic data that can be interpreted without ambiguity can play a vital role in correlation and in elucidation of geological history.

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EVIDENCE FOR EARLY CARBONIFEROUS DEXTRAL STRIKE-SLIP DISPLACEMENTS AT THE NORTH-EASTERN MARGIN OF THE BOHEMIAN MASSIF (THE INTRA-SUDETIC FAULT ZONE, SW POLAND)

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The Intra-Sudetic fault zone plays an important role in the tectonics of the NE margin of the Bohemian Massif and is interpreted as a common boundary to several terranes (MATTE et al., 1990; ALEKSANDROWSKI, 1990; OLIVER et al., 1993). The present authors have recently completed a structural study of a segment of this fault zone at Pilchowice near Jelenia Góra. The investigations consisted in structural mapping of both sides of the NW-SE trending fault zone: in the Izera gneisses to the SW and in the Kaczawa phyllites to the NE of the fault. The study revealed that the motions on the fault were predominantly of strike-slip type and consisted of two main stages with mutually opposite sense of movement. The fault activity postdated a penetrative ductile sinistral shear fabric in the Izera gneisses (deformational event D_1). The main displacement on the fault (event D_2) was dextral and resulted in a prominent pervasive s-c fabric in the Kaczawa phyllites and ductile to semi-brittle, localized shear zones in the Izera gneisses, superimposed on the older fabric. The subsequent sinistral movement (event D_3)