D. (ed.): *Earthquake Swarm 1985/86 in Western Bohemia*, 226-235. IG CSAS, Praha.
HORÁLEK J., BOUŠKOVÁ A., HAMPL F. and FISCHER T. 1996. Seismic Regime of the West Bohemian Earthquake Swarm Region: Preliminary Results. *Studia Geophysica et Geod.*, 40, 398-412.
NEUNHÖFER H. and GÜTH D. 1989. Local Stations and Local Network. In BORMANN P. (ed.): *Monitoring and Analysis of the Earthquake Swarm 1985/86 in the Region Vogtland/Western Bohemia*, 43-50. Akad. der Wissensch. der DDR, Potsdam.
SKÁCELOVÁ Z., NEHYBKA V. and SÝKOROVÁ Z. 1995. Earthquake swarm Nový Kostel 4.-5.12.1994. *Exploration Geophysics, Remote Sensing and Environment II.1.*, 10-14.

Metamorphism of Sporadic Marbles from the Metamorphic Mantle of the Brno Massif from Želešice

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The Brno massif, a part of Upper Proterozoic unit (Brunovistulicum), consists mainly of granitoids and metamorphic mantle (metadiorites, metaultrabasites and gneisses). Studied marbles are localised in the complex of the basic metamorphic rocks which consists of several types of amphibolites, and actinolite, chlorite-actinolite to chlorite schists. The marbles are situated in the western part of the Želešice village, 2 km south of Brno. At least three metacarbonate lenses are embedded in actinolite schists which are characterised by the epizonal postkinematic assemblage Ab+Act+Ep±Chl±Q. Studied marble consists of primary dolomitic rock massively penetrated by irregular tremolite veins. Small tectonic clasts of primary dolomitic rock are mostly partially dedolomitised at their margins. This process is connected with chemical reaction between SiO_2-rich fluid and dolomites during epizonal metamorphosis: dolomite + quartz = tremolite + calcite.

The veins and nests with tremolite are rimmed by completely dedolomitised calcite zone. Some small flakes of talc and Mg-chlorite occur and coexist with pure tremolite in the veins. The marbles were affected by a metasomatic process caused by the solutions derived from surrounding rocks. The equilibrium temperature of the new mineral association in marbles was estimated to be higher than 400°C at X_{CO_2} more than 0.05.

Deformational History of the Stara Kamienica Schist Belt from Microstructural Study of Mylonites in the Czerniawa Section (the Izera-Karkonosze Block)

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The Czerniawa Zdrój profile provides almost a continuous section through a sequence of intra-schist gneisses (derived from the 515 - 480 Ma old Izera granite) and metapelitic mica schists (cover of the Izera granite of unknown age). The meso- and, mainly, microstructural studies indicate that intra-schist gneisses and mica schists were deformed together, during 4 episodes of Variscan ductile deformation.

D_1 in gneisses took place as normal faulting with "top-to--the-north" kinematics, under lower amphibolite facies conditions. Although the mica schists lack the structures which can be related to D_1 in gneisses, during this event they must have been emplaced into their present tectonic position: during D_2 - D_4 both gneisses and mica schists were deformed in the same kinematic frameworks and metamorphic conditions. D_2, sinistral shearing "top-to-the-west" and D_3, dextral shearing "top-to-the-east", both in the strike-slip regime, took place in advancing greenschist facies retrogression. D_4, sinistral shearing "top-to-the-south-west" in the oblique thrusting regime took place at the lower limits of the greenschist facies conditions. The general structural pattern (N-dipping mylonitic foliation) was established during D_1 and remained unchanged during following deformations.

The most common quartz c-axes microfabrics, regardless of lithology or degree of deformation, are Type II crossed girdles with strong maxima III and weak joining girdles or one of the girdles stronger populated. Some diagrams may be interpreted as small circles around the foliation poles, some are unreadable or represent nearly random distribution. One sample (bearing D_1 structures) yielded Type I crossed girdle with strong maxima II.

The deformational structures and quartz c-axes microstructures display both orthorhombic and monoclinic symmetry with respect to the foliation. On the basis of quartz c-axes microfabrics and occurrence of boudinaged feldspar porphyroclasts, it is interpreted as resulting from the general shearing with coaxial component ranging from plain strain to moderate flattening. The exact strain path is impossible to reconstruct, since the older structures were overprinted by the younger ones, produced by deformations of opposite kinematics. Moreover, it is impossible to assess the amount of strain accomplished by particular deformational processes: dynamic recrystallisation and recovery, pressure - solution, microboudinage, slip on {001} phyllosilicates crystallographic planes and grain-boundary sliding. This variety of deformation mechanisms could be responsible for ambiguous and unreadable quartz c-axes microfabrics.

References

KORYTOWSKI A., DÖRR W. and ZELAZNIEWICZ A. 1993. U-Pb dating of (meta)-granitoids in the NW Sudetes (Poland) and their bearing on tectonostratigraphic correlation. *Terra Nova*, 5, 331-332.

LAW R. D. 1990. Crystallographic fabrics: a selective review of their applications to research in structural geology. In KNIPE R. J. and RUTTER E. H. (ed.): *Deformation Mechanisms, Rheology and Tectonics*, 335-352. *Geol. Soc. London Special Publication 54.*

LISTER G. S. 1977. Crossed - girdle c-axis fabrics in quartzites plastically deformed by plane strain and progressive simple shear; *Tectonophysics*, 39, 1-3, 51-54.

MACCREADY T. 1996. Misalignment of quartz c-axis fabrics and lineation due to oblique final strain increments in the Ruby Mountains core complex, Nevada. *J. Struct. Geol.*, 18, 6, 765-776.

PASSCHIER C. W. AND TROUW R. A. J. 1996. *Microtectonics*, Springer - Verlag.

PHILIPPE S., HAACK U., ZELAZNIEWICZ A., DÖRR W. and FRANKE W. 1995. Preliminary geochemical and geochronological results on shear zones in the Izera-Karkonosze Block (Sudetes, Poland). *Terra Nostra*, 8/95, 122.

SCHMID S. M. and CASEY M. 1986. Complete fabric analysis of some commonly observed quartz c-axis patterns; *Mineral and Rock Deformation: Laboratory Studies, Am. Geophys. Union, Geophys. Monogr.*, 36, 263-286.

TULLIS J. and WENK H. R. 1994. Effect of muscovite on the strenght and lattice preferred orientations of experimentally deformed quartz aggregates. *Materials Science and Engineering*, A175, 209-220.

Thermal State of the Bohemian Massif

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Terrestrial heat flow (HF), defined as a product of temperature gradient and thermal conductivity, is a measure of the amount of heat transferred from deeper portions of the earth's crust to the surface. 136 HF values determined in the Bohemian Massif (BM) form a basis for description of main thermal characteristics of this tectonic unit: the mean HF 67±24 mW·m^{-2} is consistent with Variscan age of the Bohemian Massif. Low HF (40±14 mW·m^{-2}) has been recorded in the stable central-southern part (Moldanubian block), HF maxima (> 80 mW.m^{-2}) are situated in tectonically active zones at the north and west (Ohře graben and Bohemian Cretaceous Basin). Surface HF together with information on heat production and thermal conductivity distribution in the crust (both derived from seismic data) were used for modelling a temperature field in the crust and upper mantle. Temperature at MOHO ranges from less then 400°C in the Moldanubian segment to about 650°C in the two mobile zones. Depth to the base of the lithosphere inferred from thermal data is biggest bellow the Moldanubian zone (120-140 km) and attains only ~ 80 km below the northern and western part of BM. All models of crustal temperatures were based on the assumption of a steady state thermal regime. However, this needs not to be valid in the surroundings of the Ohře graben which is affected by Tertiary volcanism. A broad variety of models were compiled from geological data and used to asses the effect of volcanic activity on the present thermal state. Most of them suggest that the transient component of temperature field degraded below noise level by now.

Geochemistry and Petrology of the Early Palaeozoic Železný Brod Volcanic Complex (W Sudetes, Bohemian Massif): Geodynamic Interpretations

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The crystalline rock sequence of the Železný Brod region is situated in the SE margin of the Krkonoše-Jizera crystalline unit, constituting the W part of the W Sudetes (NE Bohemian Massif). The low-grade metamorphosed metavolcanics are present in abundance there, dominated by mafic rocks (subaquatic lavas, tuffs and tuffites); felsic metavolcanics as well as their pyroclastic equivalents are rather subordinate. The metavolcanic rocks are associated with small bodies of metadiabases-metagabbros and metagranitoids. Several thin intrusive bodies of the serpentinised ultrabasites are also known there.