Seismicity of the Western Bohemia - Period 1990-1997

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This seismic swarm region includes a western part of the Czech Republic and adjacent areas of Germany. It is located at the contact of two regional geological units, the Moldanubian and the Saxothuringian (Dudek 1987), (Fig.1). Historical earthquakes in this region were reported since 1552. The largest known seismic activity was in a period 1896-1909 (Grünthal 1989). After the last intensive swarm (December 1985-January 1986), the first permanent local digital three-component station in our territory near its epicentral area in Nový Kostel (Horálek et al. 1987) was established. The seismic networks KRASLICE (Skácelová et al. 1995) and WEBNET (Hampl et al. 1995) have been operating in West Bohemia recently in co-operation with the German station VIEL and VOGTLAND (Neunhöffer and Güth 1989) and the KTB networks (Dahlheim et al. 1993). This paper presents a summary of seismic energy release in this area since 1990 based on observations from all these permanent and temporal seismic stations (Fig. 2).

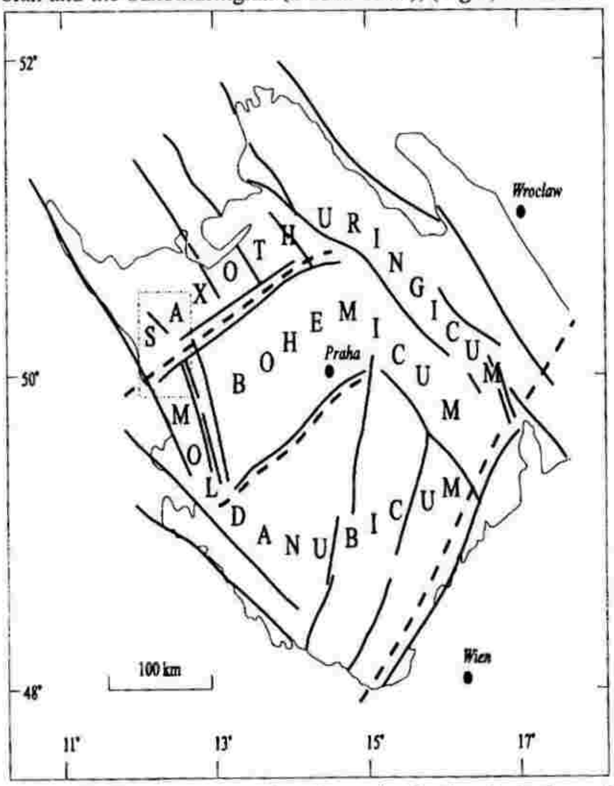

Fig. 1. Position of the investigated area in the Saxothuringian and Moldanubian units.

One of the most significant phenomena in this region is the swarm nature of seismic energy release. Based on number of micro-earthquakes recorded since 1986 we can show that the micro-earthquake activity mostly of a swarm-like character persists in the intervals between macroseismically observed swarms. The micro-earthquake swarms last for a few days, and several tens to hundreds of micro-earthquakes, mostly with magnitudes $M_L < 2$, are generated in the course of them. The foci of most of the micro-earthquakes cluster in several main focal zones (Horálek et al. 1996). This zones differ in size, seismic activity, depth of foci and focal mechanism. A dominant position in the seismicity of the whole region has Nový Kostel focal zone, where about 80 % of local tectonic events occurred.

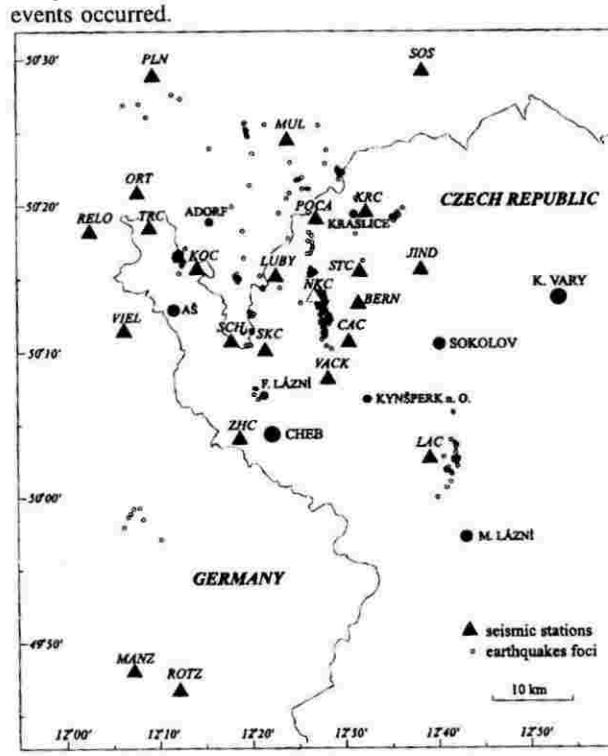

Fig. 2. Digital seismic stations in the West Bohemian seismic swarm region.

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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_{CO2} 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