The E–W fault pattern is strongly overprinted in the present-day topography by NE-trending fault systems formed under later NW extension and represented by the Krušné hory Fault and Ohře Fault systems.

Current research on the geometries of individual depocentres and depositional patterns within the basin of the Ohře Rift shows that during the main phase of the rift sedimentation, the whole Ohře Rift was dominated by oblique, approximately NNE–SSW extension. The extension vector was derived from comparison of the orientations and geometries of rift faults and depocentres with analogue models of Tron and Brun (1991) and McClay and White (1995).

This palaeostress interpretation is close to that of Peterek et al. (1997) from the Fichtelgebirge Mts., and is in partial agreement with the results of Adamovič and Coubal (1999) who interpreted a N–S extension dominating the emplacement of volcanic rocks between c. 32–24 Ma in parts of the rift system.

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Variscan Granite Plutons along the West Bohemian Shear Zone

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The boundary between the Teplá–Barrandian unit and the Moldanubian Zone is filled in area of the West Bohemian Shear Zone by large Variscan granitic plutons, which close the process of ductile shearing. The largest granite massif in the area of the West Bohemian Shear Zone is the Bor pluton. This pluton forms a SSE–NNW-extending, 35 km long magmatic body parallel to the West Bohemian Shear Zone. In the area of Mariánské Lázně Spa, a small and poorly exposed magmatic body of the Mariánské Lázně granite massif is present in the northern continuation of shear structures. In addition, a small body of the Babylon granite lies in the southern end of the West Bohemian Shear Zone. The Bor pluton is the largest late Variscan granite body within the western Czech part of the Bohemian Massif. The Moldanubian country rocks underwent low-P–high-T metamorphism in late Variscan times, followed by regional cooling at about 330–320 Ma, as evident from K–Ar mineral data. Western part of the Teplá–Barrandian Unit, which passed through amphibolite-facies conditions during the Early Devonian, has a considerable role in gravitational collapse of the Teplá–Barrandian Unit triggered by the process of overthickening. Extensional movements, which accompanied this collapse, are thought to have been synchronous with the intrusion of the Bor pluton. After intrusion of the main magmatic phase of the Bor pluton, extensional, predominantly SSE–NNW-trending zones developed in this magmatic body. These younger shear structures were filled by different types of dyke granites and aplites. A similar system of granite and aplite dykes is also developed in the Marianské Lázně granite massif. The youngest shear zone system is developed on the western border of the Bor pluton. This shear zone, as much as 30 m wide, is filled with uranium mineralization at the Vítkov II and Zadní Chodov uranium ore deposits.

The oldest magmatic rock types of the Bor pluton are granodiorites, tonalites to quartz diorites, which occur mainly in the northern part of this magmatic body. Occasionally, they form xenoliths in the main magmatic phase of the Bor pluton. Hornblende-biotite to biotite granodiorites, tonalites and quartz diorites have massive, at places plane-parallel structure. The texture is hypidiomorphic granular. These rocks, obviously compared with redwitzites in the Oberpfalz, contain biotite, plagioclase (An_{35-45}), K-feldspar and very variable amount of quartz. Magnetite and apatite are abundant accessory minerals, zircon, leucoxene, sphene, rutile, allanite and limonite are rare. The most voluminous rocks in the Bor pluton are coarse-grained, usually porphyritic monzogranites to granodiorites. They contain essentialy K-feldspar, plagioclase (An_{10-35}), biotite (Fe/(Fe+Mg) = 0.57–0.61), quartz and sparse muscovite. Accessory minerals include apatite, zircon and monazite. Dyke granites are fine- to medium-grained biotite-muscovite to muscovite-biotite monzogranites, which are most abundant in the central part of the Bor pluton. The rocks show hypidiomorphic to xenomorphic textures although they occasionally contain smaller phenocrysts of K-feldspar. The matrix consists of variable proportion of K-feldspar, plagioclase (An_{3-10}), quartz, biotite (Fe/Fe+Mg = 0.70), ± muscovite and sillimanite. Accessory minerals include tourmaline, apatite, zircon, garnet (almandine), magnetite and andalusite.

The main magmatic phase of the Mariánské Lázně granite massif is porphyritic monzogranite containing euhedral phenocrysts of microcline–perthite. Medium-grained groundmass contains plagioclase (An_{24-27}), quartz, biotite and accessory minerals (apatite, zircon, ilmenite). Older granodiorites, tonalites to diorites build variable-sized irregular bodies in the Mariánské Lázně granite massif. Their composition is similar to that

of the same rock group in the Bor pluton. The Babylon granite is predominantly K-feldspar–porphyritic biotite monzogranite with medium-grained matrix. The matrix consists of plagioclase (An_{20}), quartz, biotite, K-feldspar, muscovite and accessory zircon and apatite.

The Variscan granites along the West Bohemian Shear Zone have compositions of calc-alkaline magmatic suites. Granites of the Bor pluton range from metaaluminous (the oldest tonalites) through weakly peraluminous (porphyritic monzogranite of main magmatic phase) to middle-peraluminous (dyke granites). The value of ASI (molecular ratios of Al_2O_3/K_2O+Na_2O+CaO) for the oldest tonalites in Bor pluton is 0.73–1.05. This value in the same rock group in the Mariánské Lázně granite massif ranges between 0.88 and 1.28. In granites of the Bor pluton this value ranges between 0.84 and 1.38, in granites of the Mariánské Lázně granite massif between 1.14 and 1.31 and in the Babylon granite between 1.09 and 1.20. In the Bor massif, Sr shows a general decrease and Rb an increase from the oldest tonalites through biotite monzogranites to the youngest dyke granites.

The oldest granodiorites, tonalites and diorites of the Bor pluton and the Mariánské Lázně granite massif are characterzed by higher content of TiO_2, which is very similar in both magmatic bodies. Tonalites and diorites of the Mariánské Lázně granite massif are characterized, relative to the same rock group in the Bor pluton, by higher content of Rb and Ba and lower content of Sr. The highest values of Ba and Sr in the group of biotite monzogranites are characteristic for monzogranites of the Bor pluton, the highest values of Rb for biotite monzogranites of the Babylon granite and granites of the Mariánské Lázně massif. Both small granite bodies also have lower contents of Zr, Th and TiO_2 relative to monzogranites of the Bor pluton. The highest REE abundances were encountered in monzogranites of the Babylon massif and tonalites of the Bor pluton. All types of Variscan granites are characterized by LREE/HREE enrichment, with typical values of $La_N/Yb_N = 27–35$ for monzogranites of the main phase of the Bor pluton. The presented study has been completed using financial support of the Institute of Rock Structure and Mechanics of the Academy of Sciences of the Czech Republic (Project No. 417/99).

AMS Fabric Study of Melt Migration from Metasedimentary and Orthogneiss Migmatites to Crustally Derived Granites: An Example from Southern Vosges

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Complex behaviour of solid-state rocks and granitic melts in fertile region of magma segregation and in domain of granite emplacement is examined in migmatites of the southern Vosges. In the study area, pervasive viscous flow is strongly dependent on lithology, i.e., on mechanical properties of migmatites during the melting and pre-melting anisotropy of solid-state rocks. Regions of metasedimentary metatexites and diatexites tend to be deformed homogeneously regardless of variable proportions of viscous granitic magmas. A complete continuity between pre-rheological critical melt percentage (RCMP) AMS fabrics and AMS fabrics associated with viscous magma flows can be observed.

In contrast, the orthogneisses with strong pre-RCMP anisotropy and low ability to melt behave as rigid bodies during partial melting. Their behaviour is strongly dependent on the amount of granitic liquid, so that in regions with low volume of melts the magma penetrates along planes of main anisotropy in the form of sills. The AMS fabric of solid-state rocks and penetrating granitic magma may be strongly discordant. In domains where the magma proportion is high, the rocks behave as rigid sheet-like bodies passively rotating towards the main direction of pervasive flow in surrounding diatexites and granites. The viscous flow in granites and diatexites is controlled by extensional tectonics which is responsible for complete adjustement of AMS fabrics of diatexites with those produced by homogeneous horizontal flow of granitic magmas. The AMS fabric of rigid, originaly steep orthogneisses is passively rotating in a book-shelf style towards the regional strike of maximum flattening and elongation.

The intrusion of leucogranite penetrates the layer of magma segregation along a regional large-scale vertical elongate zone that is almost perpendicular to the main extensional direction. The ascent of leucocratic magma is oblique with respect to the regional extensional axis and is responsible for modification of flow in diatexites parallel to the emplacement zone direction. The intrusion of this leucogranitic body is syntectonic with sinistral movements and is probably responsible for exhumation of deeper, more molten part of the area studied. The intrusion of leucogranite is thus associated with regional tilting of migmatitic fertile layer and, as a result, several structural levels of anatectic realm can be examined.