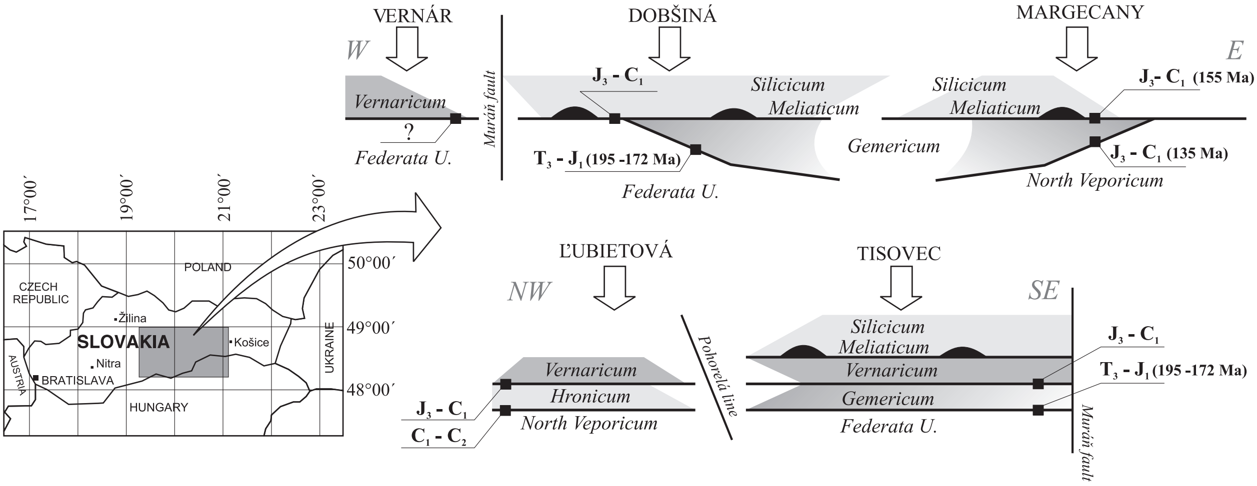


**Fig. 1.** Arrangement of different tectonic units in investigated areas. Explanation ($T_3 – J_1$ : Late Triassic – Early Jurassic, $J_3 – C_1$ : Late Jurassic – Early Cretaceous, $C_1 – C_2$ : Early Cretaceous – Middle Cretaceous)


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# Petrogenetic Diversity and Petrographic Convergence of Some Spheroidal Structures in Mafic Intrusive Rocks


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Several distinct types of spheroidal structures or textures occur in mafic igneous rocks of volcanic, dyke and also plutonic origin. They are termed globular, variolitic, ocellar, spherulitic and amygdaloid but terminology confusions of these terms are common and petrogenetic interpretation may be difficult (cf. Phillips, 1973). Comparative study of these structural phenomena was focused on problems of some dyke rocks and plutonic masses in the Central Bohemian Plutonic complex (CBPC) and its surroundings both in the Barrandian and Moldanubian blocks. For the better understanding of origin and evolution of some spheroidal textures, also selected volcanic rocks of various ages from Upper Proterozoic to Tertiary were studied.

Spherulitic crystallization of K-feldspar is common in some potassic lamprophyres of the minette group. Typical localities are, e.g., in Prague, Příbram, Kozárovice and Krásná Hora. Based on microstructural criteria these spherulites can be interpreted as "primary", i.e. as products of fast crystallization from scarce nuclei in hydrous feldspathic melt or hot glass under high cooling rates and strong undercooling. Distribution of macrospherulites within relatively thick dykes where these textures occur in some distance from the contacts can serve as another piece of evidence for such an origin. Varioles, common in some spilitized basalts of the Upper Proterozoic ages in the Barrandian (Bohemicum) and formerly interpreted as quenched droplets of a felsic immiscible liquid (Fiala 1967), may represent another case of spherulitic crystallization under different conditions. They can be best interpreted in terms of "secondary" devitrification of glass during post-magmatic processes of hydration and albitization during spilitic reactions.

The so-called felsic ocelli in lamprophyric dykes are of three genetic types: (1) more or less modified quartz or, less frequently, feldspar xenocrysts, (2) segregations vesicles filled with residual liquids and partly also condensed fluid-phase solutes, and (3) globulae of immiscible melts rich in felsic components and volatiles. The first and second types are common, whereas the third one is rare and dubious in lamprophyres from the Bohemian Massif. Evolution of the first type of ocelli involves development of clinopyroxene, i.e. anhydrous reaction rims (sometimes secondarily amphibolized) and, during final stages of interaction, dense clusters of clinopyroxene crystals. The process is similar to interaction of quartz xenocrysts with alkaline mafic magmas under volcanic conditions where, however, presence of glass is quite common. The second type is typically polycrystalline, composed of quartz, K-feldspar, albite, carbonates, etc., and may or may not be rimmed with tangentially oriented biotite (in minettes; see, e.g., Losert, 1962) or hornblende (in spessartites; see Kašpar, 1930). These rims are typically “wet”.

Various structural phenomena in mafic plutonic rocks and microgranular enclaves in granitoids of the CBPC were misinterpreted by several authors as relict varioles, amygdules, quartz-filled pseudomorphs after decomposed olivine phenocrysts, and quartz-rich microxenoliths in recrystallized, significantly older volcanic rocks (see, e.g., Palivcová et al., 1992, Palivcová and Ledvinková, 1997, and references therein). New investigation has shown that these spheroidal structures and their crystallization evolution are well comparable with ocelli of the first and second types in dyke rocks, i.e., xenocrysts and segregation vesicles.

Quartz xenocrysts are common in mafic plutonic rocks along their contacts with those types of granitic rocks that were in the stage of “crystal mush” when the two contrasting magmas came into contact. Typical examples can be observed in the area of the “marginal” granite type of the Central Bohemian Plutonic Complex with relatively small masses of mafic quartz-dioritic to gabbroic rocks and, in some parts, innumerable mafic enclaves.

Polycrystalline felsic segregation ocelli occur frequently in mafic rocks along their primary contacts with granitoids of the same rock association and also of the calc-alkaline rock suite of tonalite-granodiorite and gabbro-quartz diorite, both in the E vicinity of Příbram. In the latter case the quartz xenocrysts are absent as the tonalitic magma did not crystallize quartz early in its crystallization history before coming into contact with mafic magma batches. Less frequent but well developed are felsic segregation ocelli in some varieties of microgranular enclaves in other rock types of the CBPC, namely in the Říčany granite, Sedlčany granite, and in the durbachite (Čertovo břemeno) rock suite.

Both the two types of felsic ocellar structures in mafic plutonic rocks are related to thermal and compositional interactions of (hydrous) mafic magma batches with co-existing granitic magmas and can be well recognized namely in chilled margins and other relatively rapidly cooled parts of the mafic bodies. However, interpretation of similar phenomena may be much more difficult in slowly cooled inner parts of mafic bodies due to prolonged thermal re-equilibration, readjustment of grain boundaries and late-magmatic to postmagmatic replacement of some minerals. Complex ocelli in quartz gabbros from CBPC, well documented by Palivcová and Ledvinková (1997), can illustrate some kind of convergence in petrographic character of reacted quartz xenocrysts and quartz-rich segregation vesicles. However, presence of relics of originally anhydrous mafic rims can reveal the xenocrystic origin of them.

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# Ground Penetrating Radar Profile Measurements above the Seismoactive Area at the Eastern Margin of the Cheb Basin, Western Bohemia

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The West Bohemia geodynamically active area is characterized, among others, by the occurrence of earthquake swarms concentrated namely in the focal zone Nový Kostel near the eastern margin of the Cheb basin. Recent seismic studies show that the earthquake hypocenters are situated on a narrow fault zone striking N-S and dipping steeply toward west. Most of the events were localized to the depth interval 6–11.5 km (Fischer and Horálek, 2003, Nehybka et al., 2003). Based on the focal mechanism studies, sinistral movement is assumed along the N-S running seismically active structure (Havíř, 2000).