

THE BRNO MASSIF: VARISCAN REACTIVATION OF A CADOMIAN ACTIVE CONTINENTAL MARGIN

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The Brno massif is a complex of mostly Cadomian magmatic rocks that was incorporated into the structure of the eastern margin of the Bohemian Massif during the Variscan orogeny. The Brno massif is formed by the Eastern and Western granodiorite areas which are tectonically separated by the Metabasite zone. Both granodiorite areas are formed by Cadomian calc-alkaline, metaaluminous rocks, which slightly differ in their composition. The granodiorites to tonalites of the Eastern area have higher K/Rb and Na₂O/K₂O ratios, very low Nb and relatively high Zr abundances. These features as well as a low Rb/Sr ratio and relatively low and homogeneous REE abundances could represent the plutonic association of a primitive magmatic arc. The geochemistry of the Western granodiorite area represented by granite–granodiorite–tonalite is more variable and corresponds to more evolved rocks of a magmatic arc. Relatively higher Nb and lower Zr abundances together with low K/Rb ratios correspond to the values in the upper crust. The very variable REE abundances could reflect a contamination by the wall rocks or a later metasomatic or hydrothermal alteration. Abundant roof pendants occur in the Western area. In the West, metasedimentary rocks prevail, while basic calc-alkaline rocks with altered cumulate bodies (serpentinite, hornblendite) form a relatively independent diorite belt along the eastern margin of the area.

Both granodiorite areas of the Brno massif are tectonically separated from each other by the N–S trending Metabasite zone, built mainly by basalts metamorphosed under greenschist facies conditions. This metamorphism took place during a sinistral strike slip, connected with thrusting of the Metabasite zone over the Devonian basal clastics (including Givetian limestones) in the Babí lom zone and over the Eastern granodiorite area. The protolith age of these basalts is still unknown, and is only assumed to be Late Precambrian or Early Palaeozoic. Relics of tuffitic, amygdaloidal or glass structures as well as rare pillow lavas indicate subaquatic conditions of the extrusions. The basalts have a tholeiitic composition, trace elements abundances correspond to those of MORB or low-K tholeiites. Also the normalised REE patterns are similar to those of the N-MORB.

The Brno massif represents a profile through a Cadomian active continental margin with the maturity increasing from the East to the West. The Metabasite zone, that could represent the relic of a back-arc basin, played an important tectonic role during the Variscan orogeny when both granodiorite areas were brought together along it.

