

ABSTRACT

The Ph.D. thesis focuses on an analysis of the structural record and geochronology of selected calc-alkaline plutons emplaced in the rocks of the eastern periphery of the Moldanubian Zone (eastern margin of the Bohemian Massif). In addition, it includes an analysis of the tectonic and metamorphic record of the host rocks of the Polička and Zábřeh Units. The results revealed a number of important implications regarding the geodynamic evolution of the north-eastern part of the Bohemian Massif. The rocks of the Zábřeh Unit were metamorphosed under middle temperature and lower pressure conditions (T: 660 °C, P: 0.6 Gpa). The structural record is defined by the superposition of regional steep E-W trending metamorphic fabric (S_1) which was variably obliterated by means of intensive folding into S_2 flat-lying foliation. This unit is in the northern part intruded by calc-alkaline rocks of the Zábřeh Intrusive Complex (354±4Ma, U/Pb on zircons) with calculated P-T crystallisation conditions of 706–795 °C and P: 0.3–0.4 Gpa. A contact metamorphic event took place within the host rocks in the proximity of the intrusion (T: 599–663 °C, P: 0.4 Gpa). The internal fabric of the Zábřeh Intrusive Complex exhibits a magmatic to submagmatic gradient and the orientation of the intrusive contacts and magmatic foliation respects the S_1 foliation of the host rocks. The second area studied, the Polička Unit, consists of a metamorphosed volcanosedimentary complex. The P-T conditions of the metamorphism of the central and northern parts of the unit (which feature calc-alkaline intrusions) have been estimated at T: 620–680 °C and P: 0.6 Gpa and 585 ± 80 °C and 0.39 ± 0.22 Gpa respectively. This unit displays complex structural and metamorphic pattern from greenschist to granulite facies. The structural record of the Polička Unit is defined by the superposition of three distinct fabrics: the oldest NW-SE steeply to moderately dipping S_1 fabric which bears gently plunging lineations and indicators of right-lateral kinematics; the S_2 NE-SW trending foliation of the northern and eastern parts of the unit, and flat-lying S_3 foliation occasionally associated with indicators of normal kinematics. The Budislav Pluton (346±6 Ma, U/Pb on zircons, T: 655–730 °C, P: 0.4–0.6 Gpa) intruding the central part of the Polička Unit reflects internal emplacement processes within its structures and the formation of S_1 regional tectonometamorphic fabric. The final intrusion studied, the Měretín Pluton (346±6Ma, U/Pb on zircons), intruded the northern part of the Polička Unit during the formation of S_2 foliation within the host rocks. The P-T conditions of magma crystallisation have been estimated at T: 653–681 °C, P: 0.29–0.43G Pa. Subsequent brittle cleavage is connected with normal faulting along the boundary of the

Polička and Hlinsko Units. The regional metamorphic processes of the Polička and Zábřeh Units under middle temperature and low to middle pressure conditions were connected with the formation of early-Variscan tectonometamorphic fabrics. The origin of these fabrics was related to right-lateral transpressive shearing that took place in the space between the Moldanubian lower crust and the Western Sudetes. The emplacement of the calc-alkaline plutons studied was synchronous with regional deformation and the formation of S_1 fabric within host rocks. The crystallisation age of 354 to 346 Ma (U/Pb on zircons) limits the time span of the formation of the WNW (NW) – ESE (SE) trending right-lateral shear zone. The end of the shearing process was post-dated by the emplacement of the Miřetín Pluton at 345.9 Ma. The intrusion of calc-alkaline plutons in the mid- to upper-crustal level rocks reflects the initiation of the so-called Elbe Zone of the Bohemian Massif which was active in the mid- to upper-crustal rocks of the Teplá-Barrandian Unit between Moldanubian Zone and Western Sudetes reflecting the regional NW-SE stress field.