Contribution to Understanding the Igneous Activity During Later Stages of the Variscan Orogeny: Preliminary Results of Petrological, Geochemical and Structural Study of the Plechý Pluton (Moldanubian Batholith, Bohemian Massif)

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In this study we describe new petrological, geochemical and structural data from the Plechý pluton (PP) within the W branch of the Moldanubian (South Bohemian) batholith. The PP, about 120 km^2 in area, is situated in the Šumava (Bohemian Forest) Mts. (40 km W of Český Krumlov). This research was conducted in the context of geological mapping of the map sheet Nová Pec 32-142 and Nové Údolí 32-141, as a part of Project No. 6201 of the Czech Geological Survey – Geological mapping of the Bohemian Forest – National Park.

The PP (~320 Ma) corresponds to a late stage of the Variscan igneous activity in the Moldanubian zone and intruded older Variscan granitoids. We have studied its roughly concentric-like structure and distinguished three mapable granite varieties: the Třístoličník (Dreisessel), Plechý (Plöckenstein), and Marginal types (Fig. 1). The Třístoličník type is strongly porphyritic, medium-grained two-mica granite, largely enriched in accessory minerals (mostly monazite and zircon). It is predominantly composed of K-feldspar (Or_{92-96}) followed by plagioclase of albite to oligoclase composition (An_{1-13}) and quartz aggregates. The Plechý type is a coarse-grained, weakly porphyritic biotite-muscovite granite. Compared with the Třístoličník type, the Plechý granite is richer in sodic plagioclase and poorer in K-feldspar and accessory minerals; its biotite has higher Al^{IV} content. The Marginal type is medium-grained two-mica granite containing subordinate amounts of garnet (Alm_{90}).

Major oxide contents in the three granite types vary within relatively narrow ranges: 71–74% SiO_2, 0.2–1.1% FeO, 0.1–0.4% MgO, 0.4–0.8% CaO, 2.5–4% Na_2O, 4–6% K_2O and 0.2–0.45% P_2O_5. More pronounced differences among the three granite types are revealed in the trace element contents. The marginal type is significantly more fractionated, as can be easily recognized from its low TiO_2, low Sr, Zr, REE, Th, etc. contents. However, its Rb contents (200–250 ppm) are also lower than in the Plechý granite (predominantly in the range 300–350 ppm) and we suggest that the parental magmas of these granite types were not of the same composition. The chemical compositions of the Plechý and Třístoličník types partly overlap. The Plechý and Třístoličník types are slightly more variable in their composition. However, the Třístoličník type has higher Rb (370–450 ppm), Zr, Th, U and LREE contents, in accord with presence of accessory monazite.

Our structural study of the PP resulted in recognition of magmatic fabrics with variable intensity. This is defined by the alignment of large (1–4 cm in length) tabular K-feldspar and smaller plagioclase phenocrysts, and/or mica and quartz aggregates. In all the three granite types, we identified two magmatic fabrics which are discordant to the regional structures: (i) an older, steeply dipping magmatic foliation (in variable intensity) corresponding to the concentric shape of the pluton and geometry of the internal contacts of the magma type; (ii) a younger, weak and located subhorizontal foliation.

Our results can be summarized as follows: (i) The Plechý pluton is a polyphase, post-tectonic diapiric-like intrusion comprising three types of petrologically and geochemically distinct granite varietes. (ii) The degrees of magma differentiation vary and the Marginal type displays the geochemical characteristics of highly fractionated granites. (iii) Magmatic fabrics preserved in the pluton reflect internal magma processes and strain increments during a late stage of the pluton cooling. All the granite types were probably emplaced within a very short time span during the formation of the older (subvertical) fabric.

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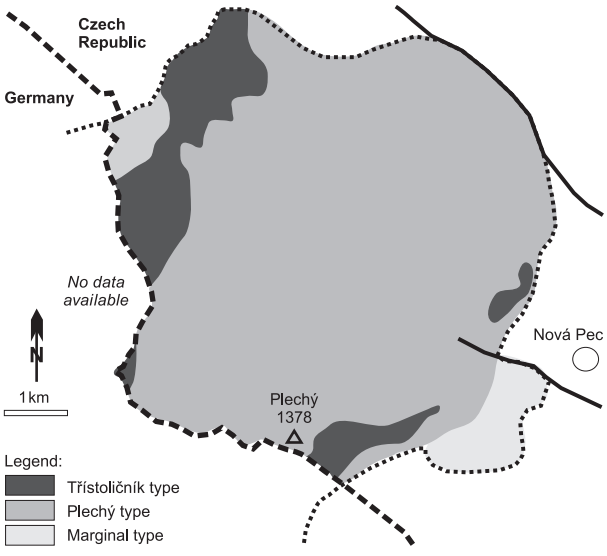

■ **Fig. 1**