GEOCHEMISTRY OF CZECH PART OF THE SOUTH BOHEMIAN PLUTON

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South Bohemian Pluton is southern part of the Moldanubian batholith. The Moldanubian batholith is the largest Hercynian granitoid complex of the Bohemian Massif (about 8000 km^2). It is usually divided into the eastern (Bohemian) and west (Bavarian) branches which are joined in the Waldviertel area in Austria into the South Bohemian Pluton. The western branch begins in the environs of Regensburg (Germany) and extends to the SE as a number of separate granitoid bodies. The eastern branch, called as the »Central Moldanubian Pluton« is more continuous and fills the core of N–S anticlinal zone cutting across the older (Proterozoic ?) metamorphic rocks of the Moldanubian zone.

The granitoids of the western (Bavarian) branches build up several separate bodies cropping out in the central parts of the anticlinal structures in the Moldanubicum of the Šumava and the Bayerischer Wald Mts. In several cases their position is controlled by disjunctive tectonics but their inner structure is conformable with that of the adjacent crystalline complex. The granitoids of the Moldanubian batholith are classically divided into five groups on the basis of relatively age and composition (WALDMANN 1951, FUCHS and THIELE, 1968). Because of the essential predominance of the Eisgarn type in the Czech part of the Moldanubian batholith over the other magmatic groups, it is divided into several separate subtypes on the basis of grain-size, texture and mineral composition (the Mrákotín, Čtrnáctý, Landštejn, Smí types).

FINGER and HÖCK (1987) proposed the division of granitoids of the South Bohemian Pluton into two large groups: the older, usually deformed series (Group 1) and the younger post-tectonic series (Group 2). Within the framework of the two groups, LIEW, FINGER and HÖCK (1989) established four subgroups of granitoids, in accord with the Chappell and White's genetic classification. The division of granitoids is supplemented and modified for Czech part of the Moldanubian batholith by KLEČKA and MATĚJKA (1992, 1995). The older granitoids (Group 1) which predominate in the South Bohemian Pluton originated during the thermal climax of the Hercynian metamorphism and are associated with various types of migmatites (pearl gneisses). The predominant granitoids of the Weinsberg type are mostly coarse-grained biotite granites to granodiorites containing abundant K-feldspar phenocrysts 2–8 cm in size. The granitoids of the Weinsberg type have I- or transitional I/S character and probably solidified at lower crustal levels.

Granitoid plutons of younger group (Group 2) intruded the uplifting and cooling metamorphic complex. Their contact are mostly sharp and discordant. Many of these magmatic bodies there totally undeformed except those in the proximity of some major shear zones where foliation is sometimes developed. Freistadt granite to granodiorite (subgroup 2B) is a fine- to medium-grained rock and consists of plagioclase (oligoclase–andesine), K-feldspar, biotite and secondary muscovite. The fine-grained groundmass encloses idiomorphic phenocrysts of biotite and quartz. Freistadt granite to granodiorite is a typical transitional I/S-granite.

The most common Eisgarn type (subgroup 2C after KLEČKA and MATĖJKA, 1992, 1995) is a coarse-grained to medium-grained sometimes porphyritic two-mica granite. Porphyritic K-feldspar phenocrysts are up to 2 cm large. Quartz, biotite, muscovite and plagioclase (albite–oligoclase) are other components. Biotite and muscovite amounts are almost equivalent. The character of the Eisgarn granite ranges from the I-type through the transitional to the S-type. Subtype Srní differentiated KODYM Jun. et al. (1961) as a special type of granite to granodiorite, which differs from the common Eisgarn type chiefly by the prevalence of biotite over muscovite. The Srní subtype can be grouped with the transitional I/S-types.

The Ba and Sr contents decrease from the oldest (Weinsberg) to the youngest (Eisgarn) granitoids. The granitoids of the Srní subtype exhibited a wide scatter of Ba and Sr amounts, which is obviously associated with the variable amount of biotite they contain. The Freistadt type proved to be characterized by a higher Sr content. The highest Sr contents were assessed in tonalite dykes, which belong to the diorite - tonalite - granodiorite series. A similar trend was observed in the distribution of Rb and Li. The Weinsberg and Freistadt types have the lowest contents of both these elements. The Eisgarn type has shown the widest scatter of Rb and Li values and their highest average contents. The differential trend of the Eisgarn type from the Czech part of the South Bohemian Pluton is well seen also from the Sr–Ba–Rb diagram. Eisgarn type partly belongs in the group highly differentiated granite. Certain differences in the differentiation of the granitoid types of the Moldanubian batholith are also manifest in the changes of TiO_2 and Zr contents. The highest zirconium content was assessed in the Weinsberg type which is explainable by the preferred crystallization of zircon in the early phases of the Hercynian magmatism. The uranium content in the granitoids of the Moldanubian batholith is in general higher than in granitoids even in the upper continental crust, which is typical for the Hercynian granitoids of the European Hercynian fold belt. The widest scatter of U and Th values in the Eisgarn type is in agreement with the previously established great scatter of these elements in the Hercynian muscovite-biotite granitoids of the Bohemian Massif. The gold content in the Moldanubian granitoids of the South Bohemian Pluton is higher than its content in granites and granitoids general. It is controlled particularly by the biotite content and is the lowest in the muscovite-biotite granite of the Eisgarn type.

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