Origin of granitoids of the South Bohemian batholith (Bohemian Massif)

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The South Bohemian Batholith (SBB) is part of the Saxo-Danubian granite belt, a significant part of the Central European Variscan granite belts. The granitoids of the SBB can be grouped into three main suites: coarse-grained K-feldspar-phyric I/S-type biotite granites of the Weinsberg type, S-type two-mica granites of the Eisgarn type, and younger fine-grained I/S-type biotite granites to granodiorites of the Mauthausen/Freistadt type. The individual intrusive suites of the SBB are clustered in two nearly perpendicular segments oriented ~NNE–SSW and ~WNW–ESE. While the ~WNW–ESE Bavarian segment is defined by a number of separate smaller plutons that involve all the granite suites, the ~NNE–SSW segment is chiefly made up of the Eisgarn-type granites.

For biotite granites of the Weinsberg type is significant enrichment in Ba (291–3920 ppm), Sr (100-378 ppm) and Zr (221–685 ppm). Melts of these granites were generated by low-pressure partial melting of lower crust rock sequences (metagreywackes, amphibolites) at temperatures in the range of 643–902 ºC. Two mica granites represent the most significant rock type of the SBB. Three main geochemical varieties of two-mica granites could be distinguished there: the low-Th Deštná granites, the intermediate-Th Mrákotín/Číměř granites and the high-Th Lipnice/Steinberg granites. All these varieties were emplaced at shallow levels (equivalent to 100–200 MPa) and at relatively reducing fO_2 conditions. Differences in the CaO/(FeO + MgO + TiO_2) ratio between these three varieties indicate partly different original source of granite melts. The Číměř/Mrákotín and Lipnice/Steinberg granites were probably derived from metagreywackes and/or mafic metapelites by partial melting at temperatures in range of 830–850 ºC, whereas the Deštná granites were derived from felsic, muscovite enriched metapelites by partial melting at temperatures in range of 670–750 ºC. For biotite granitoides of the Freistadt type is significant enrichment in Ba (441–2580 ppm) and Sr (153–258 ppm). Melts of these granitoids were generated by low-pressure partial melting of lower crust sequences at temperatures in the range of 709–817 ºC. The work was carried out thanks to the support of the long-term conceptual development research organisation RVO: 67985891.