# Geology and Tectonics of the NE Part of the Komjatice Depression

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The Komjatice Depression is the northeasternmost branch of the Danube Basin. Its geologic and tectonic evolution can be followed since the Middle Badenian. The sedimentary fill of the depression consists of the Neogene megacycle. Depositional environment passes from marine to brackish, kaspibrackish, lacustrine and swamp during the Miocene. The overlying Pliocene cycle is characterized by lacustrine, deltaic and fluvial deposition.

The general NE trend of the axial part of the depositional area was preserved during the entire evolution of the depression. The deposition was controlled by an NW–SE extension. The main control of depocentre development were the NE-striking Mojmírovce and Šurany Fault systems. Brittle faults are probably determined by extensional rejuvenation of the Veporicum Thrust plane (Čertovica line).

# Geochemical Signature of Subduction-related Processes in Composition of Variscan Intrusive Rocks of the Bohemian Massif

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Variscan igneous activity in the Bohemian Massif produced a broad spectrum of magma types. Besides common granitic rocks there are volumetrically significant magmatic suites of predominantly Early Carboniferous age which comprise some mantle-derived mafic members and abundant intermediate plutonic rocks with significant amounts of mantle-derived components.

Except for highly potassic rocks, plutons of hornblende-bearing granitoids with mafic enclaves and spatially related mafic bodies are restricted almost entirely to a belt traversing the Bohemian Massif from ENE to WSW. This tortuous belt comprises the Kłodzko – Złoty Stok Plutonic Complex in southern Poland, the so-called "tonalite dykes" and small massifs in NW Moravia to NE Bohemia, the Nasavrky Plutonic Complex and the most voluminous Central Bohemian Plutonic Complex (CBPC) with satellite bodies and dyke swarms. Perhaps also redwitzites in NE Bavaria can be counted to that zone.

These rocks correspond to the calc-alkaline (CA), high-K calc-alkaline (HK) and shoshonitic (SHO) suites. The K-rich shoshonitic and particularly ultrapotassic (UK) plutonic rocks are widespread at the peri-Moldanubian SE margin of the CBPC and also form separate plutons plus many small bodies within the Moldanubian block itself. Abundant UK dykes are exposed in the area of the CBPC and, less frequently, in other parts of the Bohemian Massif.

Compositional relations of CA to HK members of the CBPC (dated at 351±11 to 346±10 Ma, Holub et al. 1997b) with rocks of supra-subduction magmatic arcs have been already recognized by, e.g., Palivcová (1984), Holub et al. (1995, 1997a), and others. Mid-late Devonian CA orthogneisses are present in the roof of the CBPC (Košler et al. 1993).

All these rocks show distinct LILE enrichment relative to HFSE, high Th/Ta and other characteristics of subduction-related magmas. Compositionally similar CA to SHO magmas are produced in modern magmatic arcs above the downgoing slab in places where its upper surface lies about 100 to 150 km below the surface. The existence of mid-Devonian to Lower

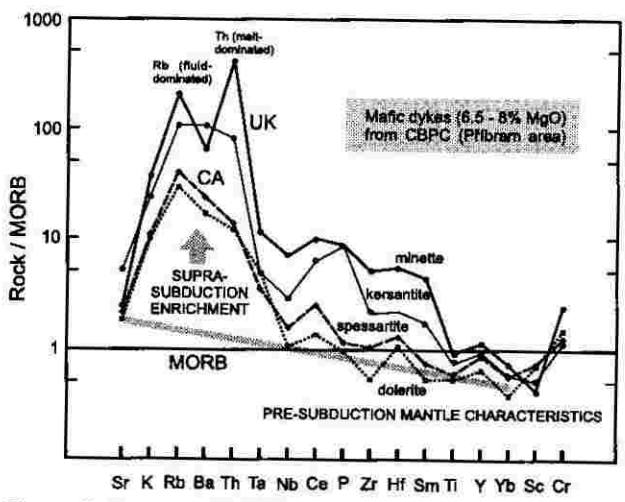


**Fig. 1.** Spidergram of MORB-normalized elemental abundances for calc-alkaline to ultrapotassic dyke rocks from the Příbram area, Central Bohemian Plutonic Complex. These Mg-rich primitive dykes display various degrees of the subduction-related enrichment in most of LIL elements plus Th.

Carboniferous, probably SE- or SSE-dipping subduction zone, above which the CA to SHO magmas were produced at a continental margin during 380–345 Ma, is evident. The geological setting could be similar to that in western French Massif Central where dioritic to tonalitic intrusions of CA suite were produced at around 370–355 Ma (cf. Shaw et al. 1993).

The composition of mafic CA and HK magmas suggests a three-component source involving the depleted mantle wedge, slab-derived fluids and sediment melts. However, the differences between the CA, HK, SHO and UK magmas cannot be ascribed simply to the increasing degree of enrichment superimposed on a common mantle lithology, or to decreasing melting degree. Various magma types should be derived from distinctive, heterogeneous sources with complex histories.

Compositions of the UK rocks (both durbachites and low-Ca minettes with very high Rb, U, Rb/Sr, Cr/V etc.) from the Moldanubian area reflect highly refractory mantle sources, which underwent much stronger and partly different enrichment compared to that of CA rocks. Such sources could have contained unusually high fraction of melted sediments from the downgoing slab plus a strong metasomatic imprint of a distinct fluid component derived from subducting and dehydrating continental (not only common oceanic) crust. On the other hand, the specific geochemical features may reflect involvement of an old, highly anomalous domain of sub-continental lithospheric mantle, which has been re-activated to a large degree above the deep subduction zone. The latter scenario seems to be supported by the presence of small volumes of geochemically similar dykes in other gravimetrically low continental blocks of the Bohemian Massif where their mantle sources could not be explained by the early Variscan subduction activity alone.

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# Geological Distribution of Tremolite Marbles in the Bohemian Massif and CL-study of their Prograde Metamorphic Reactions in the Olešnice Group


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Tremolite marbles represent a specific lithotype of marbles in some crystalline complexes situated particularly along the eastern margin of the Bohemian Massif: Velké Vrbno Unit, Olešnice Group, Vranov Group, Vratěnín Group, Český Krumlov Varied Group and Waldviertel as well. They are typically present in the rock sequences situated along principal tectonic boundaries: Moldanubicum – Moravicum or Lugicum – Silesicum (Högelsberger et al. 1994; Houzar and Novák 1996), and overlying units with the Proterozoic or even older age (Dobra gneiss in Waldviertel, Světlík gneiss in southern Bohemia, Bíteš gneiss in the Moravicum; Fiala et al. 1995; Friedl et al. 1998). The host-rock complexes consist of dominant metapelites (mica schists, gneisses) with locally common intercalations of quartzites, calcite and dolomite marbles, minor metabasites and graphite-rich rocks closely associated with metacarbonates.

Tremolite marbles form relatively thin layers (up to 1 m thick) within large metacarbonate bodies or small individual lenses (up to 10 m thick) located in mica schists. Two distinct compositional types were recognized, calcite- and less abundant dolomite-dominated marbles. The typical mineral assemblages: Cal + Tr ± Phl and Dol + Cal + Tr ± Phl mostly exhibit Tr >> Phl, but locally Tr < Phl. The higher-grade minerals such as forsterite and spinel, known from dolomite marbles in adjacent part of the Moldanubicum (Novák and Houzar 1996), occur only exceptionally in the Český Krumlov Varied Group and in the Moldanubicum of Waldviertel.

Tremolite occurs in several texturally and paragenetically distinct generations. Preliminary chemical data indicate that the early tremolite porphyroblasts (Tr I) vary from tremolite to magnesiohornblende. Further generations of commonly fibrous tremolite are of metasomatic and retrograde origin and their specific mineral reactions and chemical compositions have not been studied in detail yet.

Marbles of the Olešnice Group are good examples for the