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

study of metamorphic reactions producing tremolite. Using transmitted light and CL, several mineral reactions producing early tremolite I (Tr I) were found:

(1) 5 Tlc + 6 Cal + 4 Qtz → **3 Tr** + 6 CO_2 + 2 H_2O

(2) 2 Tlc + 3 Cal → **Tr** + **Dol** + CO_2 + H_2O

(3) 5 Dol + 8 Qtz + H_2O → **Tr** + **3 Cal** + 7 CO_2.

Participation of reaction (1) is supported by the textural relations of early calcite (Cal I), with characteristic deep orange colour in CL image, associated with relics of quartz Qtz (blue CL) and grains of Tr I. Both Cal I and Tr I underwent brittle deformation and their angular grains are rimmed and healed by younger Cal II (bright orange CL). Formation of Cal II is very likely not related to reaction (1), but rather represents a recrystallization of Cal I. Rare equilibrium assemblage Tr I + Dol (red CL) suggests mineral reaction (2). Rare relics of Dol (dark red CL) and Qtz (blue CL) found in large porphyroblasts of Tr I also indicate a participation of mineral reaction (3) (e.g., Olešnice and Jobova Lhota). Rare diopside (green CL) in rims around Tr I was observed in marbles near their contact with the higher-grade Moldanubian Zone. It was formed by the reaction: Tr + 3 Cal + 2 Qtz = 5 Di + 3 CO_2 + H_2O. The latest Cal III (pale yellow CL) commonly fills cracks in some silicates, e.g. in retrograde Tlc, and originated during the latest metamorphic stage or in the zone of weathering.

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Magnetic Fabric and Magma Flow in Some Mafic Dikes of the Central Bohemian Pluton and its Surroundings

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Creation and propagation of dikes is one of the important mechanisms of the mass transport within the Earth's crust. Details of this mass transfer can be advantageously studied using anisotropy of magnetic susceptibility (AMS) which is a rapid and efficient geophysical (petrophysical) method for investigation of the preferred orientation of magnetic minerals (magnetic fabric) in rocks. The purpose of the present contribution is to investigate the AMS of mafic dikes occurring in the Central Bohemian Pluton and its surroundings from the point of view of tracing magma motion in dikes.

Magnetic fabric in six mafic dikes was investigated. The oriented specimens were drilled using portable drilling machine and oriented using geological compass mounted on special orientating fixture. The AMS was measured with the KLY-3S Kappabridge. In order to obtain a statistical evaluation of the AMS in individual localities and in whole geological bodies, recourse was had to the ANISOFT package of programs, which enable a complete statistical evaluation of a group of specimens to be carried out.

Mostly, the magnetic foliation is roughly parallel to the dike plane and the magnetic lineation is horizontal and rarely vertical. This magnetic fabric originated through magma flow in which the larger surfaces of the magnetic minerals are oriented parallel to the dike plane and their longer dimensions are parallel to the magma flow. In two localities, the so called inverse fabrics were found in which the maximum and minimum susceptibility directions are interchanged. This is probably due to presence of very small single domain magnetic particles in these dikes.