Definition of Delta Body in Northern Closure of the Vienna Basin (Sarmatian, Czech Republic)

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Structural reinterpretation of the earlier reflection seismic profiles and drill logs was performed during geological mapping 1:25,000 on the map sheet 34-223 Hodonín. This area is situated in northern part of the Vienna basin in the Moravian Central depression close to Slovak and Austrian borders. On the basis of seismic profiles, drill logs and lithological profiles of boreholes a large delta body was recognised in Sarmatian sediments. The delta body is characteristic of higher values of electrical resistance and spontaneous polarization in electrical well logging diagram and also by character of wave field of reflex seismic profile.

Sarmatian sediments belong to the Bílovice Formation (Čtyroký, 2000). The lowering of sea level in the Central Paratethys in Lower Sarmatian caused regression (Jiříček, 1990) and the Vienna Basin changed into a system of lakes and deltas in the Sarmatian. Later during Sarmatian a new transgression of brackish water flooded into the Uherské Hradiště trough. Jiříček (1990) also mentioned delta sediments near Hodonín.

We present the structural map of the basis of Neogene sediments with the boundary of delta body. It is situated near to Steinberg Fault system that represents the important extensive structure in the area and has a character of "flower structure".

Using combined geological, logging and seismic data the an interpretative geological-geophysical cross-section was constructed. It runs from NW to SE and connects boreholes Mutěnice – 1, 2, 5, 6 and Kapřiska – 2. A complex of flysch sediments (Zlín Formation) and sediments of Middle and Upper Badenian (Hrušky Formation), Sarmatian (Bílovice Formation) and Pannonian (Bzenec, Dubňany and Gbely Formation) was distinguished in reflection seismic profile and also in geological profile. The profiles show complicated development of the northern part of the Vienna Basin (synsedimentary faults, "wrench faults", "flower structures", etc.).

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Variscan High P-T Recrystallization of Ordovician Granitoids in the Veporic Unit (Nízke Tatry Mountains, Western Carpathians): New Petrological and Geochronological Data

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New petrological and geochronological data from metagranitoids and associated metapelites and metabasites (metagabbros) of the pre-Alpine, polymetamorphic basement in the northern part of the Veporic unit (Nízke Tatry Mountains, Western Carpathians) are presented.

Metagranitoids – a felsic, granitic gneiss (orthogneiss) have preserved their primary magmatic texture to varying extent. They consist dominantly of perthitic K-feldspar, plagioclase (oligoclase) and quartz. Due to deformation, the feldspars and quartz show dynamic recrystallization and grain-size reduction. Metamorphic garnet forms coronas around relict Ti-rich biotite and or along the boundaries between biotite and plagioclase. Small poikiloblastic garnets contain inclusions of kyanite, rutile and quartz. Larger polygonal garnets have developed by a coalescence and coarsening of numerous small grains. Primary plagioclase is replaced by fine intergrowths of kyanite, zoisite (clinozoisite) and quartz. Phengitic white mica has developed between the grain boundaries of recrystallized feldspars or at rims of high-Ti biotite. Kyanite is partly transformed to sillimanite that is intergrown with low-Ti biotite and low-phengitic white mica. Calculated P-T conditions indicate peak metamorphic equilibration at 700–750 °C and 10–11 kbar followed by decompression to 650–700 °C and 6.5–7 kbar.

Associated paragneisses (metapelites) contain abundant garnet, kyanite, biotite, plagioclase, rutile and quartz with minor muscovite. Garnet forms porphyroblasts with inclusions of kyanite, Na-rich plagioclase, phengitic white mica, rutile, epidote and quartz. Calculated metamorphic peak P-T conditions are similar to those in metagranitoids, i.e. 700–750 °C and 10–11 kbar. Formation of retrograde chloritoid, chlorite and margarite due to partial breakdown of biotite and kyanite occurred in domains of probably Alpine deformation.

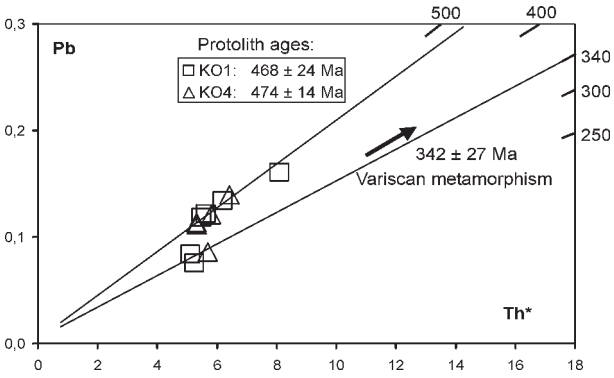

Fig. 1. Diagram of PbvsTh*plot.

Metabasites (metagabbros) have partly well-preserved their primary cumulate texture and minerals: olivine, clinopyroxene, orthopyroxene, Cr-spinel and An-rich plagioclase (Méres et al., 1996). Metamorphic parageneses in the metabasites include garnet, clinopyroxene, amphibole, rutile, plagioclase and quartz. Calculated pressure and temperature from the inferred peak assemblage garnet + clinopyroxene (diopside with a low-jadeite componente) + plagioclase (andesine) + quartz ± hornblende are 750–850 °C and 12–14 kbar. Symplectic intergrowths of slightly more jadeitic clinopyroxene with more sodic plagioclase indicate the pseudomorphs after omphacite. This suggests an earlier eclogite facies stage followed by a re-equilibration at high-pressure granulite P-T conditions in the metabasites. Several generations of amphibole and formation of epidote (clinozoisite), biotite and titanite are evidence of a widespread retrograde overprint at amphibolite facies conditions.

The method of chemical Th-U-Pb dating of monazite by means of the electron microprobe has been applied to two samples of metagranitoids. The preliminary results can be taken from the total-Pb vs Th* diagram in Fig.1. Two generations of monazite can be clearly distinguished. An older- Ordovician (c. 470 Ma) monazite is interpreted to be magmatic. A younger-Carboniferous (c. 340 Ma) one forms new independent grains as well as overgrowth rims on older monazite and is obviously related to the high-grade metamorphic recrystallization and growth phase.

These new petrological and geochronological data suggest:

1. An important pre-Variscan phase of granitoid magmatism in the Western Carpathians during the Ordovician time.
2. High-pressure/high-temperature recrystallization of these Ordovician magmatic rocks during Variscan orogeny in the Carboniferous time.
3. Lower-temperature Alpine metamorphic overprint, not effective for recrystallization and growth of monazite in the investigated metagranitoids.

Reference

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Petrology, Geochemistry and Petrogenesis of a Post-Orogenic Variscan Granite: Ševětín Massif, Moldanubian Batholith

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In the Central Europe are widespread volumetrically rather small post-orogenic calc-alkaline metaluminous and, more rarely, peraluminous granitoid plutons whose emplacement was connected with brittle tectonics (strike-slip and extensional faulting) developing at the twilight of the Variscan orogeny. Granitoids of this type (c. 310–290 Ma old group 4 of Finger et al., 1997) are relatively abundant in the Alpine-Carpathian realm, effectively rimming the southern flank of the orogen. In Bohemian Massif they occur within the Sudetes (e.g., the Liberec granite) and as members of the Mauthausen Group in the Austrian part of the Moldanubian Batholith (Finger et al., 1997 and references therein); analogous petrographic and geochemical character has been also ascribed to the Pavlov and Ševětín granites (e.g., Klečka and Matějka, 1996; Matějka and Janoušek, 1998; René et al., 1999).

In the composite Ševětín Massif (20 km N of České Budějovice) three main granite pulses can be distinguished: (1) the oldest, two-mica Deštná granite with cordierite ± andalusite (SE part of the massif), (2) biotite-muscovite Ševětín granite (BMG), constituting most of the granite pluton, and (3) fine-grained biotite Ševětín granite (BtG) forming only minor bodies. While the two-mica Deštná granite is likely to be a member of the older, Eisgarn clan (~ 327–318 Ma: see review in Gerdes, 1997) with petrologic and whole-rock geochemical character compatible with dehydratation melting of mature Moldanubian metasediments, the Ševetín granites are probably fairly late, with indirect evidence suggesting their age comparable with Mauthausen Group in Austria (~300 Ma?: see review in Gerdes, 1997). This is in line with occurrence of Ševětín granites next to late Drahotěšice fault forming a part of the late Variscan Blanice Graben. Moreover, the shallow intrusion level and rapid cooling are indicated also by the morphology of minute, long-prismatic zircon and apatite crystals as well as the Ab-Qz-Or normative plot.

The Ševětín granites (BtG and BMG) have transitional I/S type character. The whole-rock geochemical signature of the BtG is less evolved than that of the BMG. The former shows lower SiO_2, Na_2O, K_2O and A/CNK accompanied by higher TiO_2, FeO^t, MgO, Al_2O_3 and CaO. The BtG is also characterized by higher contents of Rb, Sr, Cr, Ni, La, LREE, Eu and Zr than the BMG. The initial Sr isotopic ratios for four of the samples of Ševětín granites are nearly uniform regardless their petrology, disclosing fairly evolved character of the parental magmas ($^{87}Sr/^{86}Sr300 = 0.70922–0.70950$) but BR484 is even more radiogenic ($^{87}Sr/^{86}Sr300 = 0.71290$). The initial ϵ Nd values are highly negative ($\epsilon^{300}Nd = -7.4$ to -8.0; BR 484: