whereas along southern transect display both oblate and prolate shapes.

Based on our structural and AMS data we propose the following emplacement scenario for the Jihlava pluton. Uniform petrography and small textural variation suggest that the entire pluton was emplaced as a single magma batch. Our structural analysis indicates that the intrusion is independent from and very likely postdates sealing of the Gfohl Unit and Montonous Unit, since it does not follow the westerly deep-level thrust boundary between both units. We assume, that syenitoid magmas intruded syntectonically along a major shear zone and were emplaced into a dilational pull-apart jog. This dilational domain was opened as a result of local dextral transtension along the transcurrent shear zone which operated synchronously during pluton ascent. At the time of pluton emplacement, the high grade rocks of mostly lower crustal origin were already brittle, this fact indicates that the emplacement of plutons took place after exhumation and cooling of high grade rocks in shallow crustal levels. Our model is kinematically consistent with magma emplacement into pull-apart voids associated with transcurrent tectonics. (e.g. D´Lemos et al, 1992; de Saint Blanquat et al., 1998; Olazabal et al., 1999).

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Geological Position of Metabasites of the Kłodzko Metamorphic Unit

Irena WOJCIECHOWSKA

Instytut Nauk Geologicznych, Uniwersytet Wrocławski, Wrocław, Poland

The Kłodzko metamorphic unit occurs south of the Sowie Góry gneiss block. The pre-metamorphic sedimentary series were likely represented by tuffogenetic-sedimentary rocks associated with effusive-magmatic ones. The sedimentary sequence started with sandy and silty deposits which were subsequently metamorphosed into sericite phyllites having intercalations of graphite phyllites, metalydites and quartzites. The thickness of this sequence is unknown but certainly greater than 600 m. The sandy-silty deposits were overlain by 400–600 m thick sequence of sedimentary-pyroclastic-effusive deposits, which during regional metamorphism were transformed into chlorite, chlorite-epidote and epidote-amphibole slates, amphibolites with numerous interlayers of crystalline limestones, porphyroides and metarhyolites. This assemblage was in turn covered with (400–600 m) thick sequence of metadiabases, accompanied locally by metarhyolites, and graded northwestwards into gabbroid rocks (gabbro--amphibolite assemblage). Hence subaerial volcanism was accompanied by hypabyssal volcanism.

Mineral parageneses point to metamorphic transformations under conditions of greenschist facies (of Barrowian type?). A degree of metamorphism increases west- and southwards as manifested by the presence of almandine-amphibolite facies mineral assemblages (presence of garnet-bearing amphibolites – Wojciechowska, 1966). Recently, the petrological study of the Kłodzko metamorphic unit are provided by Kryza and Mazur (2001).

The geochemical studies of metabasic rocks of the Kłodzko metamorphic unit indicate that just within this metavolcanic complex represent a preserved fragment of submarine initial rift series (Fe, Ti-rich alkali basalts – Narębski, 1981; Narębski et al., 1988, 1989).

Examination of tectonic mesostructure (foliation, mesofolds, lineation) allowed to distinguish their mutually superposing generations. This indicates successive stadial development of deformations of successive phases D1-D4 (Wojciechowska, 1970, 1979). The age of metamorphism in the Kłodzko metamorphic unit can be determined indirectly as pre- Upper Devonian because in the eastern margin of the unit nonmetamorphosed Upper Devonian deposits are directly transgressively overlapping the crystalline basement (Bederke, 1924; Wojciechowska, 1966, 1979; Gunia, 1977). In the bottom part, these sediments contain a conglomeratic horizon consisting of poorly rounded and unsorted fragments of rocks of crystalline basement.

Three separate members were described in the crystalline basement of the Kłodzko metamorphic unit (Wojciechowska, 1966), each probably of different age: the lower member consists of blastomylonitic gneisses and amphibolites with distinct marks of diaphtoresis; to the intermediate member belong the sedimentary-pyroclastic-effusive deposits; and the youngest member includes the granitoids represent elements of the lower and intermediate member rejuvenated by granitization.

The Kłodzko metamorphic unit is cut by a number of dislocations that bear a character of overthrust or normal faults, which subdivide unit into a number of separate blocks (Wojciechowska, 1966). Among the more important dislocation lines distinguished in the Kłodzko metamorphic unit are the overthrust of Ścinawka, where the dynamic deformations have been partly affected by later blastesis; and overthrust of Łączna-Pagórek.

The sedimentary-pyroclastic-effusive deposits of the Kłodzko metamorphic unit correlate well with Silurian/Devonian rock series of the Central Europe. Good correlation of the Kłodzko metamorphic unit rock sequences with Barrandien and Ponikla Group of the eastern cover of the Karkonosze granite is especially important for any paleographic reconstruction. In recent data the pyroclastic-effusive sequence (Fe, Ti-rich alkali basalts) suggests the existence of a regional W-E running zone, probably boundary zone (suturing) between the Moldanubian zone and the Saxothuringian zone of the north-eastern flank of the Bohemian Massif (Wojciechowska, 1988).

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•ulová Batholith: A Post-Orogenic, Fractionated Ilmenite – Allanite I-Type Granite

Kateřina ZACHOVALOVÁ[1], Jaromír LEICHMANN[1] and Jan ŠVANCARA[2]

[1] *Department of Geology and Palaeontology, Faculty of Science, Masaryk University, Kotlářská 2, 611 37 Brno, Czech Republic*

[2] *Institute of Physics of the Earth, Masaryk University, Tvrdého 12, 602 00 Brno, Czech Republic*

•ulová Batholith forms a triangular body approximately 20 km cross at the northeastern margin of the Bohemian Massif, close to the Czech-Polish border. The Ar-Ar geochronological data (Maluski et al., 1995) on amphibole (292 ±3 Ma) and biotite (290 ±3 Ma) from granites and U-Pb data on monazite from a pegmatite vein (304 Ma) Novák et al. (submitted) indicate, that the •ulová Batholith ranks among to the youngest granite intrusions in the Bohemian Massif.

The major-element chemistry as well as mineralogy indicate that •ulová Batholith could be classified as a fractionated I-type granite. The interpretation of gravity data indicates a fair homogeneity of the batholith. The high amount of allanite and low abundance of monazite are typical for I-type granites as well. The high content of ilmenite and decrease of xMg in biotite with increasing total silica content are typical attributes of an ilmenite series batholith (Ishihara, 1981). The presence of ilmenite instead of magnetite, which is normally more common in I – type granites, could be explained by intrusion of the I-type magma in graphite -bearing rocks (Branná or Velké Vrbno groups) serving as a reducing agent (Ishihara, 1981).

The negative correlation between SiO2 and xMg, and Sr/Rb ratio, but positive correlation SiO_2 – K/Ba, increase in the magnitude of negative Eu anomaly with SiO_2 indicate a substantial role of fractionation processes in the evolution of •ulová Batholith. The whole-rock geochemical data are supported by the compositional evolution of individual minerals: Biotites from granites have much lower xMg, compared to those from tonalites. K-feldspar from tonalites is richer in Ba, and contemporaneously K-feldspars from granites exhibit much more complex internal structure, documenting a role of fractionation. Plagioclase from granites has a similar complex structure and is more albitic in composition than plagioclase from tonalites.

Nevertheless the observed cumulate structures affecting the mafic minerals and some accessory minerals e.g. apatite, biotite, titanite, zircone, allanite and xenotime indicate, that processes of crystal accumulation play an important role in the earliest stages of the evolution. Therefore we interpret the mafic enclaves as cumulates, which were trapped and disrupted by granitic melt. The accumulation of accessory minerals controlled the distribution of REE and HFS elements. Cumulates are strongly enriched on REE, Y, Zr, Nb, Ti and P, and granites are depleted in these elements. The genetic interpretations of tectonic diagrams like the Y/Nb plot seem to be misleading because Y and Nb were preferably concentrated in the cumulates and later granites are therefore strongly depleted in these elements.

The composition of parental magma was probably granodioritic, because it has to allow forming mafic tonalite cumulates together with fractionated granites. Since the ratio between cumulate and fractionated products could not have been established in the field due to a possible influence of erosion, the precise composition of parental magma remains uncertain. How-