

–9.2) and this is reflected by high two-stage Nd model ages ($T_{Nd}^{DM} = 1.60\text{--}1.75$ Ga).

Both the Ševětín granites are coeval; their Sr-Nd isotopic compositions and whole-rock geochemistry correspond to a quartz-feldspathic (?metapsammitic) parentage (Sylvester, 1998) or, more likely, may reflect a mixing between: (1) a relatively primitive component (having low time-integrated Rb/Sr and Sm/Nd ratios, with $^{87}\text{Sr}/^{86}\text{Sr}_i \leq 0.705$ and $\text{eNd Nd} > -7$; e.g., undepleted or slightly enriched mantle-derived melts or metabasic rocks) and (2) a material geochemically matching the mature Moldanubian metasedimentary rocks or their melts ($^{87}\text{Sr}/^{86}\text{Sr}_i > 0.713$ and $\text{eNd} < -9.5$). Both BtG and BMG can be linked by up to c. 10% of (nearly) closed system biotite-plagioclase fractional crystallization (Janoušek et al., in print). The observed minor Nd isotopic heterogeneity could be explained by an influx of slightly isotopically and geochemically different melt batch(es) into periodically tapped and replenished magma chamber (RTF – O'Hara, 1977).

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Tectonometamorphic Evolution of the Krzyżnik Mt. Region, the Łądek-Śnieżnik Metamorphic Unit, West Sudetes

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The Łądek-Śnieżnik Metamorphic Unit (LSMU), the Sudetes, is composed of the varied Stronie series of Late Proterozoic – Middle Cambrian age and Cambro-Ordovician gneisses, of which some contain UHP eclogite and granulite bodies (Don et al., 1990; Bakun-Czubarow, 2001). The supracrustal Stronie series is composed of MP mica schists intercalations of marbles, quartzites, and acid and basic metavolcanogenic rocks. Published data suggest differences in metamorphic and deformation history of the LSMU rocks and it is unknown which of them have undergone P-T-d path(s) similar to that of eclogites and granulites. These uncertainties demand testing of the various views and further studies. The Krzyżnik fold area is a suitable subject within the Stronie series, because of relatively well-exposed interlayers of marbles and mica schists with well-preserved deformation structures focusing detailed structural and petrologic investigations (Oberc, 1966; Don, 1976; Grzechnik, 1989). However, the earlier studies did not consider relations between metamorphism and deformation. This work relates meso- and microstructures to polyphase metamorphic evolution inferred from changing mineral assemblages and thermobarometric calculations.

The earliest deformation structures can be observed as small-scale isoclinal intrafolial folds F1. During D1, the first metamorphic axial plane foliation S1 was produced, mostly parallel

to the bedding. The stage D2 is characterized by development of similar, tight, non-cylindrical plane folds F2 in foliation S1. F2 fold axes exhibit orientation from 330/15 to 40 /40 with maximum of 345/20. Several centimetres to several meters large, asymmetric, parasitic folds occur in limbs of the major structure, the Krzyżnik synform. Its tight geometry and the well-defined new axial planar foliation S2, shallowly dipping toward the NE, are the result of an intense E-W shortening and flattening taking place in ductile synmetamorphic conditions. During that stage the oldest recognizable and weakly visible lineation L2f, produced by the flexural slip on the S1, surface was developed. Parallel to the F2 fold axes a well-preserved lineation L2 is defined by the intersection of S1 and S2 foliations. During the uplift and progressive subvertical flattening, rodding lineation L3 marked by elongate quartz and carbonate clasts was formed. Lineation L3 plunging toward the NNE at moderate angles was developed on the S2(S1) surface. S-C fabric, s and d type structures indicating top-to-the-N shear sense have been found in thin sections. A rare occurrence of L3 structures in the study area suggests that the D3 strain was zonally localized. The D4 gave open, vertical, concentric or kink folds F4. Their axes and a crenulation lineation L4 plunge toward NE at moderate angles. The axial planes of F4 folds are developed as complementary surfaces – 330/60 and 120/70 seldom forming

distinct crenulation cleavage S4. D4 structures were formed in still less ductile conditions during NW-SE shortening. The last folding stage D5 is characterized by NW-SE trending vertical kink folds caused by NE-SW shortening under ductile-brittle conditions (Fig. 1).

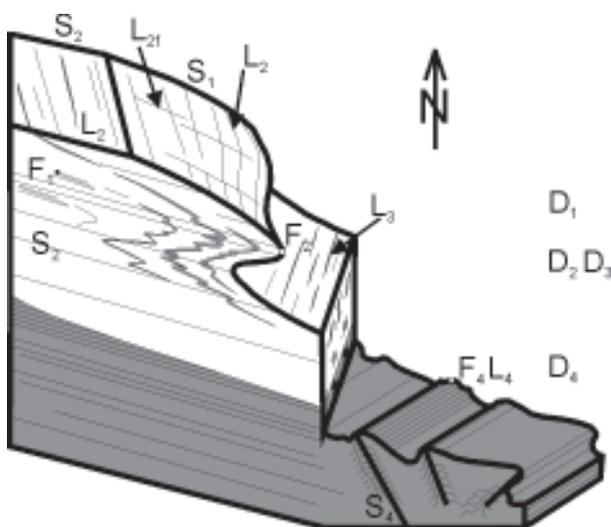


Fig. 1. The sequence of deformations of the Stronie Series in Krzyżnik Mt. region.

Calcite-dolomite marbles usually reveal granolepidoblastic structure parallel to the axial planes of F2 defined by parallel arrangement of flattened dolomite and needle-shaped tremolite blasts. Calcite-dolomite thermometry yields temperatures of 560 °C for carbonates arranged parallel to the S2 foliation. The obtained temperature stays with agreement the value calculated by Koszela (1997). Relics of S1 foliation in surrounding mica schists are preserved as spiral shaped trails of chloritoid, muscovite and quartz inclusions within garnet blasts syntectonic with D2. The inclusion trails apparent in garnet cores disappear towards the rims in favour of rare staurolite blasts. Idioblastic garnets show normal zoning, which is characterized by increasing Fe and Mg and decreasing Mn and Ca from core to rim. Presence of staurolite inclusions within rims of prograde garnets suggests that the peak mineral assemblage ky-st-grt-bt-ms-pl represented by matrix was generated during the last stages of garnet growth. Temperatures that are obtained from the matrix coupled with prograde garnet rim analyses are consistent with those determined using calcite-dolomite thermometry and yield

570 ± 25 °C. Pressures calculated by means of geobarometers basing on equilibrium of net-transfer reactions for mica schists yield 7.7 ± 0.7 kbar. Subsequent D2-D4 stages were characterized by growth of white micas with decreasing Si⁴⁺ content p.f.u. (3.33–3.08 Si⁴⁺ p.f.u.), reflecting a pressure drop after peak of metamorphism.

The structural, petrographic and microprobe data reveal that marbles and mica schists of the Stronie Series in the Krzyżnik Mt. region underwent from ductile, medium-grade metamorphic conditions to low-grade and more brittle conditions. The Krzyżnik fold was produced by intense crustal E-W shortening and flattening during thermal progression (D2). The temperature of the peak metamorphism reached 570 ± 25 °C under pressure of 7.7 ± 0.7 kbar. During progressive flattening weak and infrequent shear zones were formed with top to the N kinematics. Further deformations occurred at still lower temperatures and were connected first with NW-SE, and then NE-SW shortening. A strong difference between the recognized medium P-T conditions of prograde metamorphism of the Stronie Series in Krzyżnik Mt. region and UHP events recorded in the eclogites confirms that the eclogite are the tectonically incorporated bodies into the LSMU gneisses (Don, 2001).

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Sedimentary Petrography and Provenance Study as an Indicator of the Evolution of Sedimentary Basin – Southern Part of the Boskovice Furrow (Czech Rep.)

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Boskovice Furrow (BF) is an elongate asymmetrical basin oriented in SSW-NNE direction, filled with Permian-Carboniferous deposits. The basin can be classified as an extensional half graben with several stages of development. Strongly asym-

metric distribution of sedimentary facies and depositional environments is typical of opposite (E-W) limbs of the BF. The study of deposits of both eastern and western limbs of the southern part of BF provide some new data, which can help