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).

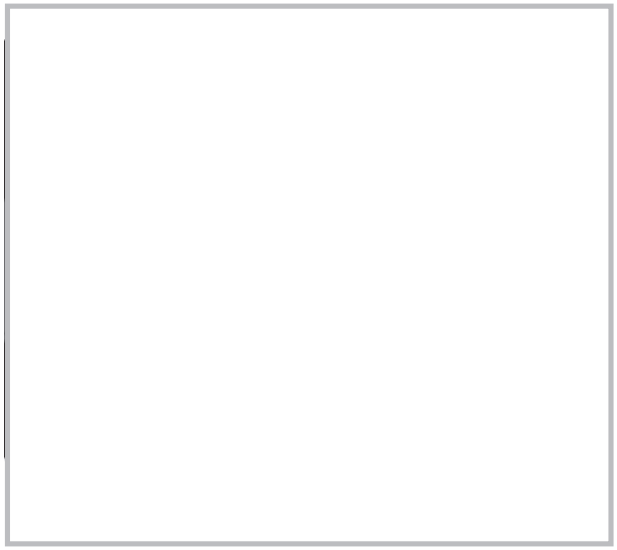

Fig. 1. The sequence of deformations of the Stronie Series in Krzyżnik Mt. region.

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 Si^{4+} content p.f.u. (3.33–3.08 Si^{4+} 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 asymmetric 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

to understand the source areas of the fill and the evolution of the basin.

The eastern limb of the Boskovice Furrow is characteristic of monotonous deposition (the Rokytná conglomerate), which represents typical proximal facies (alluvial fan deposits). Pebbles of Lower Carboniferous graywackes, arkoses, sandstones and shales together with Devonian limestones dominate the pebble composition. The study of arkosic sandstones, graywackes and conglomerates revealed that petrographic character of some groups of these rocks reflect similarities to some facies of the Lower Carboniferous (Culmian) Luleč Conglomerates.

Macroscopically very similar graywacke and conglomerate pebbles were also recognized within the deposits of the western limb of the BF.These pebbles, however, are here in the association with the rock material derived from the Moldanubian and Moravian units (sillimanite, large grains of K-feldspars from durbachite, serpentinized ultramafics). Remarkable differences were observed in the content of rocks revealed "western" vs. "eastern" provenance in the sedimentary profile of the western limb of the basin.

These observations can be interpreted in the way that the distal part of the deposits of the eastern limb of the basin shared in the provenance of the deposits of the western limb of the basin. The cyclicity of this process during the evolution of the basin can be connected with the tectonic processes along the eastern marginal fault of the basin (allocyclicity). Tectonic processes influenced the basin morphology, the gradient of the basin bottom, distribution of depositional environments, etc. Different role of axial and transverse transport within the basin can be assumed.

This model of material redistribution within the basin can also explain some observation of "exotic" pebbles and beds with "mixed" provenance within the BF in slightly untraditional way.

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Microstructures and Finite Strain Pattern in Heterogeneous Crustal Extension, an Example from the Vepor Basement of the West Carpathians

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The Vepor Unit composed of the pre-Alpine basement and Mesozoic cover sequences is one of the major crustal segments incorporated into the Alpine structure of the Central West Carpathians. The basement is mostly composed of high-grade orthogneisses, migmatites and large Variscan calc-alkaline intrusive bodies in the hanging wall and metasedimentary rocks, mainly micaschists, paragneisses and amphibolites in the footwall. It is generally accepted that this superposition results from a southward Variscan nappe stacking (Janák 1994). Two major Alpine deformational events have been recognized in the Vepor unit, the early E-W extensional phase followed by almost orthogonal compression. In this work we concentrated on deformational and metamorphic gradients associated with early extensional phase. The age of this event is confirmed by several $^{40}Ar/^{39}Ar$ cooling ages of micas ranging between 90 to 85 Ma (Kováčik et al., 1996; Maluski et al., 1993).

We distinguish extensional domains marked by an E-W strain and metamorphic gradients. The highly deformed rocks exhibiting the upper greenschist facies overprint often developed in footwall of highly mylonitized lower greenschist Mesozoic cover. Towards the west the metamorphism decreases and deformation becomes confined to an anastomous network of shear zones. These domains are repeatedly developed in E-W direction, but bulk intensity of metamorphism and deformation decreases towards west. In addition, we observe non-systematic alternations of weakly deformed and highly sheared rocks in N-S direction. The strain variations are documented by various finite strain techniques and the metamorphic imprint is studied using standard petrological and microstructural methods. An attempt is made to attribute the spatial distribution of finite strain and metamorphism to global extensional regime associated with development of concave normal shear zones. The decoupling of the Mesozoic cover from the footwall basement is manifested by viscous deformation of the attachment zone experiencing both vertical shear gradient and horizontal shearing along vertical transfer zones.

The second Alpine structure generally results from oblique convergence of the Vepor basement and presumed 'southern continental segment' (Lexa et al., 2002). This deformation in the studied area is manifested by the development of NE-SW trending shear zones, preferentially developed in garnetiferous micaschists and paragneisses. Inside the zone, extensional mylonitic foliations and/or older fabrics are strongly folded and transposed so that new planar and vertical fabric developed. Outside of this shear zone, a weak E-W trending crenulation cleavage affects flat extensional mylonitic foliation.

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