Large-Scale Fold Architecture of the Stronie Formation, the Orlica-Śnieżnik Dome, West Sudetes

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The metasedimentary Stronie formation, composed of mica schists and subordinate marbles, quartzites, and metavolcanic rocks, is considered to be the structurally higher part in the core of the Orlica-Śnieżnik Dome (OSD) (e.g. Don et al. 2003). Its lower parts consist of ortho- and paragneisses enclosing several high-pressure eclogite and granulite bodies. A recognisable tectonometamorphic evolution of the Stronie formation began with the E-W subhorizontal shortening and generally upright folding (D1), which led to crustal thickening. As a result of the subsequent gravitational subvertical flattening, the originally steep structural planar surfaces (S1) were deformed to form tight, strongly inclined to recumbent folds F2. In the metapelites, on the microscopic scale, this is documented by the flattened inclusion trails in garnet porphyroblasts and the subhorizontally disposed external axial plane schistosity S2. Chemical zoning of white micas as well as calculations of average P-T conditions carried out by THERMOCALC software show that this event occurred at the temperature peak and decreasing pressure connected with the onset of uplift. Under the peak conditions, the original flat arrangement of metamorphic isograds was developed. Subsequently, the S2 planes were zonally reactivated as S3 foliaton during the top-to-NW(N) shearing (D3). Spatial orientations of the S2||S3 foliations differ over the OSD area, considerably varying even in the neighbouring areas, according to their position within the superposed macroscopic folds F4. On the stereographic projections, poles to the axial plane foliation S2 in NW parts of the Lądek-Śnieżnik and Orlica-Bystrzyca metamorphic units form a pattern of belts of great circles with common girdle axes near 330/15. Poles to the S2 planes, orientations of which were measured in the SW part of the OSD, form locally a belt with the axes at the maximum of 40/40. D4 folding was caused by the NW-SE and NE-SW shortening under low-ductile conditions. Major D4 folds are accompanied by open, upright, concentric mesofolds. In S and E of the OSD the NE-plunging concentric folds dominate, being toward NE replaced by the NW-plunging ones, which conforms to the girdle axes of the foliation belts on the stereographic projections.

In mica schists, the S2 axial plane foliation consists of different mineral assemblages, the distribution of which indicates decreasing metamorphic conditions toward the NW/W. The *garnet-staurolite*–in zone (547–637 °C, 7.5–8.0 kbar) is dipping under the *garnet-staurolite*–out zone (506–532 °C, 5.7–6.7 kbar) in NW part of the Lądek-Śnieżnik Unit and SE part of the Orlica-Bystrzyca Unit and the *biotite-chlorite*–in, *garnet*-out zone at the NW edge of the OSD. Such a pattern of decreasing metamorphic conditions in mica schists is also valid for metamorphic assemblages observed in marbles. Furthermore, the observed pattern of the diopside and tremolite isograds in marbles of the SW part of the OSD is roughly consistent with the boundary between the gneisses of lower structural level and the rocks of the Stronie formation. The major NW-plunging folds F4 have folded not only S2 planes but also metamorphic isograds. Differences in P-T conditions noted over the studied area could be explained by the reorientation of the isotherms around axes plunging similar the NW-SE trending folds. This event occurred at final stages of Variscan consolidation. In the OSD, a domal region was produced with NW/W-ward dipping slopes, at the centre of which the lowest structural level (with HP rocks) has been exposed.

References

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Neotectonic Rejuvenation of Variscan Structures in Relation to Tracing of Methane Escape: Preliminary Note (Upper Silesian Coal Basin, Moravosilesian Area, Bohemian Massif)

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The Moravosilesian zone of the Bohemian Massif consists of two accretion wedges (Variscan and Alpine) lay above pan-African Brunovistulian terrane (microcontinent). The older Variscan allochton was thrusted top-to-E up to SE and younger Alpine wedge in opposite direction top-to-NW up to N. The covered part of Variscan basement (first of all represented by Upper Silesian Coal Basin – USCB) was influenced by a sedimentary loading of Inner Carpathian molasses and Outher Badenian molasses, just as by tectonic