

The Direction of Thrusting of the Silesian Nappe (Polish Segment of the Outer Carpathians)

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The Polish segment of the Western Outer Carpathians is a north-verging fold-and-thrust belt mainly composed of Lower Cretaceous to Lower Miocene flysch sediments (Książkiewicz, 1977). The belt comprises several nappes. One of them, the Silesian nappe, extends along the whole belt. This nappe is convex towards NNE (Fig. 1). The study area is located in the central part of the Silesian nappe.

The rocks of the study area are deformed by numerous small thrusts. The direction of thrusting varies from NW across N to NE. Two groups of thrusts were identified: (1) thrusts formed in horizontal beds and (2) thrusts formed in inclined beds. The directions of thrusting from NW to N are very common in the first group of thrusts, while the directions from N to NE characterize the second group of thrusts. Cross-cutting relationships between the thrusts suggest either clockwise (CW) rotation of the regional stress field or counter-clockwise (CCW) rotation of the rocks in a stable regional stress field.

Regional folds are mostly inclined, with vergences towards the north. The northern limbs of the anticlines are mostly cut by thrusts. The hinge lines of anticlines and thrust traces trend

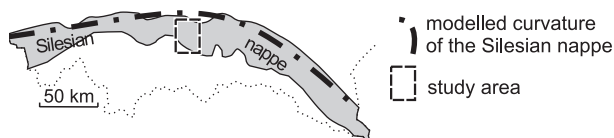


Fig. 1. The modelled curvature of the Silesian nappe based on the northern boundary of the Silesian nappe. The shape of the Silesian nappe after Książkiewicz (1977).

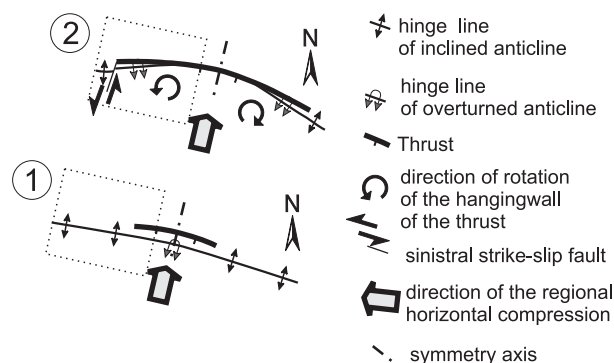


Fig. 2. A sketch of the structural evolution of the regional anticlines in the study area. The study area is marked by dotted rectangles.

WNW–ESE to WSW–ENE. The described orientation of anticlines results from the CCW rotation of the hangingwalls of the western part of thrusts (Fig. 2). Small thrusts could be also CCW-rotated. As suggested by the location of the study area, the rocks underwent also CCW rotation as a part of the western segment of the Silesian nappe arc (Fig. 1). It is therefore postulated that the Silesian nappe was thrust exclusively to the NNE.

Reference

- KSIAŹKIEWICZ M., 1977. The tectonics of the Carpathians. In: Geology of Poland, vol. 4 Tectonics. Geol. Inst.: 476-669

Outline of the 3D Structure in the Mokrá Quarries

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Three quarries in the limestones of the Moravian Karst were studied in order to constrain the 3D tectonics. These quarries are located on the eastern edge of the village of Mokrá–Horákov, about 10 km east of Brno. The rocks are represented by the Vilémovice Lst. (Givetian–Frasnian, light grey, massive limestones), and the Křtiny Lst. and Říčka Lst. (Famennian–Tournaisian, dark grey, well bedded limestones). The most promising for the 3D study is the area between the central quarry and the eastern quarry.

The limestones are deformed by two systems of folds, with the older-system folds trending ENE–WSW being refolded by the younger-system folds trending NNW–SSE (Fig. 1). The folds are asymmetric and disharmonic, mostly recumbent. Limestones

are also affected by brittle fracturing of several generations as well as ductile to brittle-ductile failures (*en echelon* arrays of carbonate veins, ductile shear zones accompanied by pressure solution, etc.). These phenomena make the interpretation of the 3D structure more difficult.

Very interesting and important are thrust faults subparallel to bedding, the cores of which are marked by a black ultracataclase layer. These thrusts belong probably to the earliest deformation phases, because they are folded together with the bedding and are masked by the numerous eye-catching younger faults.

A detailed field observation revealed the presence of several deformation phases: D1 – the first phase of thrusting subpar-