Tectonics of the Northern Part of the Moravian Karst

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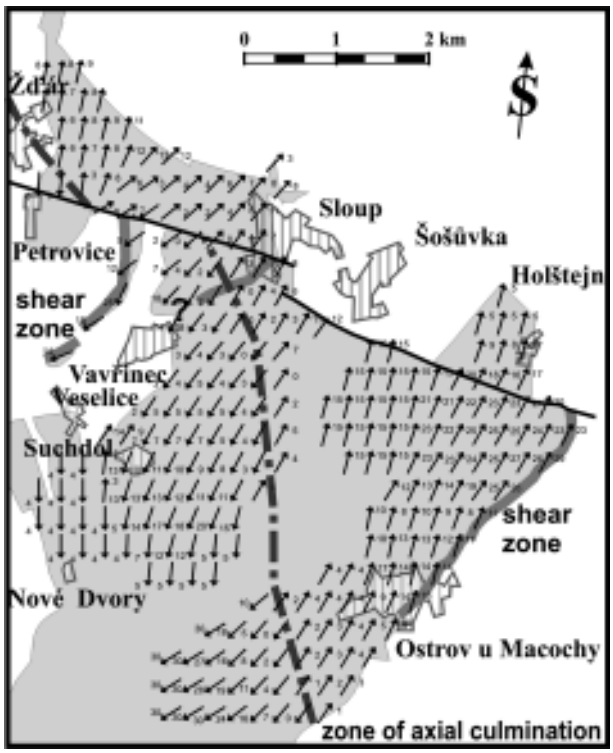

Fig. 1. Map of the northern part of Moravian Karst with averaged lineation, axial culmination and main shear zones.

A quite complex tectonic structure of the northern part of the Moravian Karst is also reflected in papers of various authors. The latest investigations in the northern part of the Moravian Karst indicate the presence of a polyphase thrust tectonics.

No small-scale structures corresponding with the oldest phase were discovered because of their difficult identification and because of significant presence of the younger phase of thrusting. It is accompanied by formation of brittle-ductile cleavage or ductile foliation. This planes strike NNE-SSW, their dip ranges from moderate to steep. An exception is an area north of Holštejn village and another area in the surroundings of Petrovice village where the cleavage turns into the N-S strike. NNE-SSW lineation, which corresponds to movements on Moravian shear zone (Moldanubian thrust), usually accompanies the foliation.

In the framework of tectonics related to the younger phase of thrusting, we can neglect several highly strained zones with NNE-SSW strike and with sense of movement to NNE (Fig. 1):

1. The first one is approximately 1.5 km long zone west of Vavřinec village. This west-dipping zone forms a sheet incorporated into granodiorites of the Brno massif. Devonian limestones were strongly mylonitized, low-temperature plastic flow of the rocks is documented by development of significant foliation and stretching lineation, isoclinal folding and boudinage of shells, which indicates extension more than 300%.
2. The second zone with subhorizontal ductile foliations was found S of the Sloup village. This zone is accompanied by close-to-isoclinal and sheath folds.
3. The third shear zone is situated at the eastern margin of the Moravian Karst at the contact with the Culm (close to Ostrov village). Limestones bedding in this brittle-ductile shear zone is overturned and cut by spaced cleavage, so originally bedded limestones look like nodular rocks. Cetral part of the shear zone is cut by large fault and the strained Devonian rocks are thrust over the Culmian siliciclastic rocks.

The trend of maximal stress ó1 could be estimated from the interval N-S to NE-SW.

The subsequent brittle deformations pass in several phases. One of them, development of nearly symmetrical pairs of kink bands whose axes form angles of 30°, is connected with compression NE-SW (type D, Ramsay and Huber, 1987). Later phases of fragile deformations were accompanied by the development of undeformed veins and stylolites.

The change of plunge/trend of the structural cylindricity axe and the corresponding lineation are an interesting problem to deal with discuss. In the northern and northeastern part of the studied area the lineation plunges mainly to NNE, while SSW dip prevails in the southwestern part. The parts with different plunge/trend are separated by zone of axial culmination with horizontal lineation and cylindricity axe (Žďár–Ostrov, see Fig. 1). Similar axial culmination is in the surroundings of Vratikov village (Melichar and Kalvoda, 1997). Its origin is related to the development of the Valchov trough (halfgraben), where bedding of Cretaceous sandstones was rotated together with Variscan tectonic basement (anomalous plunge to the south). Similary, we can use the same model to explain the described axial flexure with the neotectonic origin of the Blansko trough.

This work was supported by GA ČR grant 205/00/0356.

References

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