Contribution to Variscan Paleoposition and Rotation of the Moravosilesian Zone

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The evident zoning of the Devonian limestone facies (e.g. Hladil 1992) in the Moravosilesian branch of the Lugosilesian orocline indicates a distinct polarization between both the paleonorthern stable foreland and the advanced accretionary wedge of active Variscan orogen since the Lower Devonian already. Moreover, also Lower Devonian siliciclastic facies on the Brunovistulian foreland (continental Old Red-like sandstones and conglomerates) differs from those in the Silesicum (littoral and sublittoral mature marine sandstones, interfingering with mostly with graphitic shales and acid or intermediate volcanites). Along with the occurrences of Silurian rocks near the village of Stínava in the axial zone of the Moravosilesian flysh foredeep, these indicate the existence of a different, "mobile ", deeper-marine Drahany facies of the Devonian and of Rhenohercynian suture zone getting closed later, mainly during the Lower Carboniferous.

An early Variscan approach of advanced orogenic front to the Brunovistulian foreland terrane, already previously docked to the southern promontory of Baltica, caused an oblique rifting of the foreland - transtensional faulting of the brittle pre-Variscan crust of the Brunovistulicum. A divergent type of syn-rifting volcanism, well known from the Moravosilesian zone (e.g. Přichystal 1990, 1993), also exemplified the initial rifting stage.

The origin of the Brunovistulian terrane s.l. (including Upper Silesian and Malopolska "Massifs" as well as the Lysogory terrane) is still an open question, which needs a separate synthesis from a wider point of view. Most probably, Brunovistulicum s.l. is not only one complex terrane (also Belka et al. 1998). The position and significance of the Cracow Zone and Holy Cross Mts. mobile zones represent suture-like domains with complex Early Paleozoic history. However the dilemma of a possible original link between the Malopolska terrane and the Ukrainian Shield promontory of Baltica (in the sense of Grygar 1988) pose a less unresolved question today. The provenance data (ages of detrital muscovites – Belka et al. 1998) and the fauna show that these domains represent Gondwana-derived terrane, accreted to the southern margin of Baltica during Early Paleozoic times.

Nevertheless, the most significant point for the further Devonian and Carboniferous kinematic history of the Moravosilesian zone was the presence of a stable, consolidated terrane (microcontinent) in the foreland of a top-to-NNW drifting and simultaneously accreting early Variscan orogenic accretionary prism. This configuration caused the initial pre-collisional transpressional paleostress regime of the Early Variscan orogenic front. The mentioned stress scenario caused transtensional brittle deformation regime along southern promontory of the Brunovistulian mature terrane. New half-horst mobilised domain (megaboudins, e.g. in the sense of Schulmann and Gayer 1998) was derived and gradually drifted to the paleo-northwest, along the Moravosilesian shear domains, which predetermined half-graben mobile subbasins. The present Keprník and Desná pre-Devonian core units of the Silesicum could have originated due to this early syn-collisional oblique rifting. Contemporaneous clockwise rotation by more than 90° of the Brunovistulian terrane was interpreted earlier by Grygar (1993), Grygar and Vavro (1995) and currently confirmed by paleomagnetic investigations of Krs et al. (1995) and Tait et al. (1996).

The bud of Lugosilesian orocline raised in the above mentioned early collisional stage of the inner Variscan mobile domains with the southern promontory of the Brunovistulian foreland. From the point of view of the significant role of the indentation of northern foreland our explanation similar is to that published earlier by Lorenz and Nicholls (1984).

The present final framework of the orocline flexure, visible from the geological map, resulted above all from two factors:

- Dextral transpressional shearing and oblique thrusting on the originally more NNW-SSE striking (in relation to their present post-rotational NNE-SSW position) shear zones along structural ramps of the tectonically loaded and sediment-loaded Brunovistulian foreland and
- Dextral wrench faulting along the Sudetic (WNW-ESE) transcurrent shear zones.

References

BELKA Z., AHREND H., FRANKE W., SCHÄFER J. and WEMMER K. 1998. Early Paleozoic accretion of Gondwana-derived terranes at the margin of Baltica: evidence from K/Ar ages of detrital muscovites and faunistic data, *Acta Univ. Carol. Geologica* 1998, 42, 211-212.

GRYGAR R. 1988. Some aspects of geotectonical development of the Moravo-silesian region of the Bohemian Massif. In Z. KUKAL (ed.): Proceed. 1st Inter. Conf. Bohemian Massif, , 101-111.

GRYGAR R. 1993. Strukturní vývoj a geotektonická pozice hornoslezské pánve v rámci variského orogénu, *1. česko-polská konference o sedimentologü karbonu hornoslezské pánve, 15-17. 9. 1993 v Ostravě*, 3-8.

GRYGAR R. and VAVRO M. 1995. Evolution of Lugosilesian Orocline (North-eastern periphery of the Bohemian Massif): Kinematics of Variscan deformation, *Journal of the Czech Geological Society*, 40, 1-2, 65-90.

HLADIL J. 1988. Zonality of the Devonian carbonate sediments in Moravia (ČSFR). In KUKAL Z. (ed.). *Proceedings of the 1st International Conference on the Bohemian Massif*, 121-126.

KRS M., HLADIL J., KRSOVÁ M. and PRUNER P. 1995. Paleomagnetický doklad pro variskou paleotektonickou rotaci moravských devonských hornin, *Geol. výzk. Mor. Slez. v r. 1994*, 2, 53-57.

PŘICHYSTAL A. 1990. Hlavní výsledky studia paleozoického vulkanismu ve šterbersko-hornobenešovském pruhu (Nízký Jeseník), *Sbor.geol.věd, ř. Ložisk. geol., miner.*, 2, 41-66.

PŘICHYSTAL A. 1993. Vulkanismus v geologické historii Moravy a Slezska od paleozoika do kvartéru, In PŘICH-

YSTAL A., OBSTOVÁ V. and SUK M. (ed.): Geologie Moravy a Slezska (Sbor. Příspěv. 90. Výr. Naroz. prof. dr. K. Zapletala), 59-70.

SCHULMANN K. and GAYER R. 1998. A Model for an Obliquely Developed Continental Accretionary Wedge: NE Bohemian Massif, *Geolines* 6, 54.

TAIT J.A., BACHTADSE V. and SOFFEL H. 1996. Eastern Variscan fold belt: Paleomagnetic evidence for oroclinal bending. *Geology*, 24, 10, 871-874.

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