DON J., 1990. The differences in Paleozoic facies-structural evolution of the West Sudetes. *N. Jb. Geol. Paläont., Abh.*, 179: 307-328.

HLADIL J., MAZUR S., GALLE A. and EBERT J., 1999: Revised age of the Mały Bożków limestone in the Kłodzko metamorphic unit (Early Givetian, late Middle Devonian): implications for the geology of the Sudetes. *N. Jb. Geol. Paläont., Abh.*, 211(3): 329-353.

OLIVER G. J. H., CORFU F. and KROGH T. E., 1993. U-Pb ages from SW Poland: evidence for a Caledonian suture zone between Baltica and Gondwana. *J. Geol. Soc. London*, 150: 355-369.

Case Study of the Cone-in-cone Structure Based on Czech and Crimean Samples

Rostislav MELICHAR[1] and Yuriy D. SHKOVIRA[2]

[1] *Department of Geology and Paleontology, Faculty of Science, Masaryk University, Kotlářská 2, 611 37 Brno, Czech Republic*

[2] *Department of Geology and Hydrogeology, Faculty of Geology and Geography, Dnepropetrovsk State University, prospekt Karla Marxsa 36, Dnepropetrovsk, Ukraine*

Cone-in-cone is a small-scale structure in sediments, mainly in shales and slates containing some amount of carbonate (or gypsum). The usual plane bedding cleavage changes to conical, making a series of cones packed inside of each other. Hard cones consisting of fibrous carbonate (or other minerals) are commonly separated by a narrow clay film. The surface of this clay film is always ribbed transversely (semi-annular depressions and ridges filled with clay) and often fluted or grooved lengthways (polished surface). Cone-in-cone structures are either made up of rims of concretions or separated layers.

The samples studied were concretion rims from Ordovician shales in the Barrandian (Vokovice, Prague, Czech Republic) and cone-in-cone layers from Triassic-Jurassic shales in the Crimean complex (from the area around Bakhchisaray, Crimea, Ukraine). Some other samples were from the Czech Republic – Silurian sediments (Barrandian, Králův Dvůr), Devonian (Stínava-Chabičov Fm., Stínava), Paleogene pelosiderites (West Carpathians, Frenštát pod Radhoštěm) – and from other European localities as well. Based on these samples, the following facts were ascertained:

- The cone-in-cone structure is usually developed in a shale complex composed of insoluble minerals within the cone-in-cone structure and in its surroundings seems to be similar.
- Cone-in-cone structures are always developed at contact with competent body and the cone apex is always oriented toward a competent material (the hard center of concretion, sandstone bed, etc.).
- The apical angle of a cone changes during its evolution (from wide to sharp).
- Carbonate fibres in cones are parallel to cone axes and parallel to fibres of associated fibrous veins (beef structure), e.g. the direction of extension.
- The sense of shear on clay films indicates the sliding of the cone core outwards, the sense of shear in small transversal clay ridges is compatible and indicates the same direction of extension as the fibres (e.g. parallel to cone axes).

The origin of cone-in-cones depends on bedding cleavage and the crystallization of carbonate or other soluble minerals. The first (or the most exterior) small carbonate vein is usually parallel to a bedding cleavage. The presence of different mechanics on both sides creates instability and the origin of cone nucleus. One cone series is made by dozens of these veins. Some volumetric overpress is created during the growth of older veins. This stress forms young veins and cones into a final shape with sharper and sharper apical angles. The geometry of cones indicates a rotational geometry of the strain ellipsoid with the longest axes oriented perpendicular to the surface of the nearest competent body. If the cone-in-cone structure is developed along competent bed, the marginal cones are asymmetrical (extension is not perpendicular to a competent surface) and narrow shear zone is formed on the contact. The sense of shear indicates the radial movement of the growing cone-in-cone layer in comparison to competent base.

This model presents cone-in-cone structure as a compression equivalent of columnar structure or mud cracks (volumetric extension) with asymmetry determined by the mechanic asymmetry of the two sides. Using this model, it is clear why it is not possible to distinguish either the direction towards the superincumbent bed or the directions of the tectonic stresses base on orientation of the cone apex.

Is there any Mechanical Paradox in Thin-Skinned Thrusting? A Case Study from the Muráň Nappe (Central Western Carpathians)

Rastislav MILOVSKÝ[1], Vratislav HURAI[2] and Dušan PLAŠIENKA[3]

[1] *Geological Institute of Slovak Academy of Sciences, Severná 5, 974 01 Banská Bystrica, Slovakia*

[2] *Geological Survey of Slovak Republic, Mlynská dolina 1, 817 04 Bratislava, Slovakia*

[3] *Geological Institute of Slovak Academy of Sciences, Dúbravská 9, 842 26 Bratislava, Slovakia*

Mechanisms of thin-skinned thrusting belong to frequently discussed questions since the thrusts were recognised in nature. Most satisfying explanation of this phenomenon is offered in articles by Hubert & Rubey and Rubey and Hubert (1959) where the authors consider the mechanical effect of the fluid on the basal nappe plane: since the pressure in fluid acts isotropically, p_{fluid}