

A Ramp-and-Flat Geometry of Thrust Faults in the Pavlov Hills, Western Carpathians, Czech Republic

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The Pavlov Hills are situated in the westernmost part of the West Carpathians at their contact with the Eastern Alps. The Jurassic to Cretaceous pre-flysh sediments form slices incorporated in the Paleogene flysh nappe (Ždánice unit). The Upper Jurassic part consists of dark gray deep marine claystones to limestones (Klentnice Formation), which prograde into light shallow-marine limestones (Ernstbrunn Limestone). The Cretaceous mostly siliciclastic sediments overlie these limestones. The structure of Pavlov Hills was produced by thrusting in the Carpathian accretionary wedge during the younger phase of the Alpine orogenesis (lower Miocene).

During our tectonic research in the Pavlov Hills the orientation of bedding in sedimentary rocks was studied. Two main maxima of bedding orientation were recognized. The bedding planes were buckled into several upright anticlines with fold axis very gently plunging to NE. Very well documented large brachyanticline is situated in the eastern part of Mikulov (Svatý kopeček). This structure was recognized during the new reinterpretation of seismic sections under the surface.

New geological mapping (with more detailed stratigraphic division) and compass data together with the data in old boreholes (Nové Mlýny-3) show several thrusts with stratigraphic inversions and tectonic duplications of the Jurassic formations. Thrusts are marked by high-strain zones with large amount of small tectonic slices of different age (Jurassic, Cretaceous, Paleogene).

The anticline structure is accompanied by duplexes. Thrusts are usually subparallel to bedding and mostly striking in NE-SW direction and dipping to the SE. Detachments are distinguished in the Klentnice Formation, in the "nodular limestones" (middle Tithonian) and at the top of the Ernstbrunn Limestone. Some more steep parts situated in the Ernstbrunn Limestone are interpreted as ramps. The angle Φ between the flats and the ramps is 20° . This value was obtained by the weighted average of friction angles of the failure-tested Jurassic rock using Mohr-Coulomb failure model?

The anticlines were formed in a ramp-and-flat geometry regime, so the balanced cross-section could be constructed based on seismic data across the Pavlov Hills.

Late Neogene Tectonic Activity of the Central Part of the Carpathian Foredeep, South Poland

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Normal faults of different orientations appear to be the youngest manifestations of faulting in the Polish Outer Carpathians, composed of the Lower Cretaceous through Lower Miocene strata, and the related Carpathian Foredeep which is filled with the Lower to Middle Miocene sediments. In the Outer Carpathians, the folds and thrusts produced by accretion-related shortening were formed between the Palaeocene and early Late Miocene. The origin of normal faults is still debatable, since it is not known whether these faults were a result of multidirectional extension produced in a single collapse event, or differently oriented extension proceeding in a series of successive events.

Structural studies of the Late Miocene-Pliocene(?) fresh-water molasses of the Witów Series and the overlying Pleistocene loessial complex provide a possibility to reconstruct the Late Neogene – Pleistocene (to Recent?) stress field in the central part of the Polish Carpathian Foredeep and, indirectly, in the central part

of the Polish Outer Carpathians. The strata of such an age are unique features in the Polish Carpathian Foredeep, providing thereby a key record of structural deformation during the latest stages of orogenic evolution of the Carpathian orogen. The molasses are cut by joints, and normal and strike-slip faults which were formed in two successive events: (1) a syn-depositional one for the molasses (Late Miocene-Pliocene?), proceeding under NNW-SSE to N-S oriented horizontal compression, possibly coeval with reactivation of a NE-striking sinistral fault of the Kurdwanów-Zawichost Fault Zone in the basement; (2) a post-depositional one for the molasses (Pliocene to Middle Pleistocene) during N-S to NE-SW-oriented extension, and (3) both syn- and post-depositional ones for the loessial complex (Late Pleistocene).

In the first event, reactivation of the NE-striking sinistral fault led to formation of N-S-oriented joints, as well as NW-striking dextral, and NNW-trending normal faults. This event was pro-