

Flat-ramp-flat thrust geometry in the external Western Carpathians (Palava Hills, Czech Republic)

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The Pavlov Hills are situated in the NW margin of the outer units of the Carpathian Flysch belt. The structure of Pavlov Hills (Klippen Belt) is a result of thrusting of Carpathian accretionary wedge. The hills are formed by Jurassic to Cretaceous preflysch sediments incorporated into nape slices of Carpathian Flysch Belt. In the Jurassic the preflysch sediments are represented by (Malmian), dark grey deep marine claystones (Klentnice Fm.) which are laterally replaced by nodular limestones and light shallow marine limestones (Ernstbrunn Limestones) in the top of the Jurassic carbonate facies of the Ždánice Unit. The Cretaceous sediments consists of glauconitic sandstones (Klement Fm.) and grey claystones (Palava Fm.). Flysch sediments (Maastrichtian to Eggenburgian) are represented by red claystones, brown and green claystones, menilite layers, and typical flysch sediments (rhythmic layers of sandstones, claystones and calcareous pelitic sediments). The Mesozoic rocks were derived from the platform basement during the younger phase of the Alpine orogenesis.

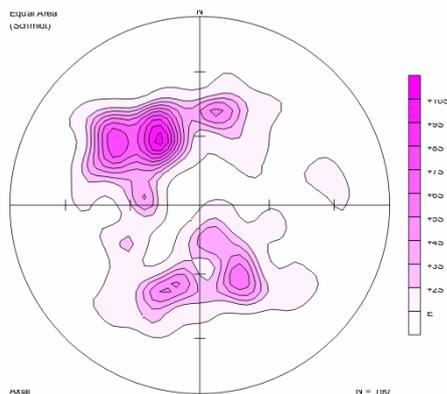


Fig. 1: Orientation of the bedding (Pavlov Hills)

The bedding in the area under study is striking mostly in the NE-SW direction and either to the SE or to the NW (Fig. 1). The opposite dip directions were interpreted as a result of large-scale folding. Two large antiformal structures were recognized at least, the first one in the eastern part of the Mikulov town, and the second one in the northern surroundings of the Klentnice village. As the fold axes are plunging to the NE, it was possible to recognize their prolongation in the seismic cross sections.

These anticlines are associated with thrusts documented by stratigraphic inversion, as the Jurassic and Cretaceous rocks are above Paleogene sediments. Fault-related anticlines indicate location of ramps on these fault planes and unfolded sediments are typical for flat fault geometry. The main detachment (flat) is situated in the basal part of the Klentnice Fm. and the other flats are in the younger “nodular limestones” and above the uppermost part of the Ernstbrunn Limestones as well (Poul & Melichar 2005). Competent parts of the Ernstbrunn Lm. are cross cut by the fault plane forming ramps with angle $\Phi=20^\circ$. This model was confirmed by

compass data, seismic cross-sections and sequences in boreholes with duplicated thicknesses and tectonic slices.

The thrust Jurassic slices were cut by several, but three main dextral strike-slip faults striking in the NW-SE direction. Slipped blocks were rearranged into N-S trending klippen zone, which is, in fact, large-scale en-echelon structure. Using this model a new geological map was completed with new tectonic features. The flat-ramp-flat geometry model of the thrusts is suitable for the arrangement of the Pavlov Hills as well as for another limestone slices incorporated into the accretionary wedge of the External Western Carpathians.

Reference:

Poul, I., Melichar, R. 2005. The new structural model of the Pavlov Hills (Western Carpathians, Czech Republic). *Geolines, Czech Academy of Science*, 17: 96.