

The western part of the Pieniny Klippen Belt: An example of inclined transpression zone

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The Pieniny Klippen Belt (PKB) represents the recent surface contact between the Outer Western Carpathians (OWC) – Neoalpine accretionary wedge and the Central Western Carpathians (CWC) – the Palealpine nappe pile. During the Miocene collision of the European Platform and the CWC, the lithotectonic units of the OWC, PKB as well as the CWC have been integrated into the bivergent structure. The different tectonic position of PKB in this structure has been determined. In the northern part of the PKB (Varín-Orava segment), the rock sequences of the PKB and adjacent portion of the OWC were thrust to the south. The elements of the CWC are strongly affected by the south vergent tectonics. The axis of the bivergent structure is situated externally from the recent position in this part of the PKB. Different situation is in the westernmost part of the PKB (Podbranč-Drietoma segment). The rock sequences of the PKB, OWC and the part of the CWC units are altogether thrust to the north. The axis of the bivergent structure here is situated internally from the recent position of the PKB.

The recorded structural data represent complex fold-and-thrust system with top to the S–SE as well as top to the N–NW thrusting related to reverse, normal and strike-slip displacements. The conspicuous feature of the deformation in the PKB units is a heterogeneous assemblage of recumbent, upright and high curvilinear folds. The resulting geometry and mutual relationship of the fault and fold structures indicate their origin under the inclined/triclinic transpression conditions. The process of inclined transpression can be defined in terms of simultaneous contraction with strike-slip and dip-slip shearing in an obliquely convergent thrust wedge. Origin and deformation of the PKB is a result of sinistral inclined transpression during the Early Miocene with continual attenuation of tectonic activity.

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