

PALEOGENE AND NEOGENE KINEMATICS OF THE ALPINE-CARPATHIAN FOLD-THRUST BELT AT THE ALPINE-CARPATHIAN TRANSITION

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In our study we analyze the kinematics of a ~300 km long segment of the Alpine-Carpathian orogen using novel outcrop data and regional seismic profiles from the West Carpathians to unravel the kinematics and timing of Eocene to Late Miocene deformation of the fold-thrust belt. Comparison with data from the Eastern Alps and the Vienna Basin lead to an updated tectonic model for the Paleogene and Neogene of the Alpine-Carpathian transition, which includes the following three stages:

(1) Eocene to Early Oligocene NNW-directed foreland-propagating thrusting. Thrusts are directed perpendicular to the strike of the European foreland in Outer West Carpathians (OWC) and sub-parallel to the thrusts observed in the Eastern Alps west of the Vienna Basin. (2) Continued Late Oligocene to Early Miocene NNW-directed foreland-propagating thrusting simultaneous with sinistral strike-slip reactivation of former nappe boundaries in the hinterland of the active thrusts. This deformation corresponds to the early stage of eastward lateral extrusion of the Eastern Alps. The ENE-striking sinistral faults in the OWC are kinematical equivalents of the SEMP fault system in the Eastern Alps, which was active at the same time. The latest stage of thrusting is characterized by SSE-directed out-of-sequence thrusts in the hinterland of the OWC and the reactivation of Variscan basement thrusts in the European foreland as SSE-directed backthrusts.

(3) Formation of (N)NE-striking sinistral strike-slip faults which are kinematically linked to NE-directed out-of-sequence thrusts post-dating NNW-directed thrusting. The sinistral faults formed coeval with the opening of the Vienna pull-apart basin in the Middle to Late Miocene stage of lateral extrusion.

Unlike proposed in previous studies the West Carpathians do not appear to be affected by Oligocene to Early Miocene crustal-scale wrenching in the Pieniny Klippen Belt. Our data show that the deformation of the Klippen Belt is fully in line with the Eocene to Late Miocene tectonic evolution reconstructed for the OWC.