

THE KINEMATICS OF OLIGOCENE-MIOCENE LATERAL EXTRUSION AND FORELAND IMBRICATION IN THE EASTERN ALPS AND THE OUTER WESTERN CARPATHIANS

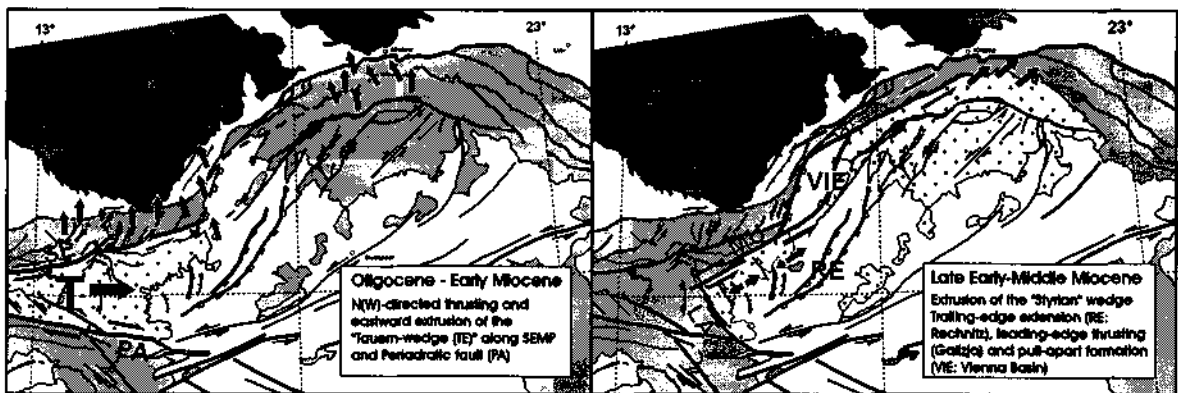
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Oligocene-Miocene post-collisional shortening in the Eastern Alps and the adjacent Western Carpathians are characterized by contemporaneous foreland imbrication, east-directed lateral extrusion, crustal extension and the tectonic exhumation of metamorphic domes in the Central Eastern Alps. New tectonic data from the Polish Carpathians of Galicia, the Vienna Basin-Mur-Mürz transform fault, and from the western part of the Styrian Basin suggest that lateral extrusion evolved through two distinct stages:

Oligocene to Early Miocene shortening was compensated by the combination of NNW-directed thrusting in the Northern Eastern Alps/Outer Western Carpathians and by the eastward motion of the Central Eastern Alpine „Tauern Wedge“ between the SEMP- and the Periadriatic fault system. NNW-directed thrusting affected the nappes of the Calcareous Alps, the Rhenodanubic Flysch and the Molasse in the Northern Eastern Alps as well as the entire nappe pile of the Outer Western Carpathians. There, consistent thrust data come from the Andrychów Klippen, from the floor thrusts of the Subsilesian, Silesian, Fore-Magura, and Magura unit. Soft-sediment deformation structures in Oligocene flysch sediments and regional comparison indicate that NNW-directed thrusting lasted from the Eocene/Oligocene up to the Early Miocene.



Late Early Miocene to Middle Miocene tectonics were characterized by the termination of NNW-directed thrusting, the deactivation of the SEMP and the Periadriatic fault system, and by the initiation of a new extruding wedge which moved between the new-formed sinistral Mur-Mürz-Vienna Basin-transform system and the dextral Lavanttal system. These new-formed faults crosscut older extrusional structures like the SEMP and the Periadriatic fault. The initiation of the Mur-Mürz-Vienna Basin- and the Lavanttal fault system is dated by the subsidence of pull-apart basins along the faults which started during the Otnangian/Karpatian. Deformation of the new-formed „Styrian wedge“ combined trailing-edge extension and detachment faulting in the Styrian Basin area, strike-slip faulting along the Mur-Mürz-Vienna Basin transform system, and thrusting at its leading edge in the Outer Carpathians. The Mur-Mürz-Vienna Basin transform can be traced to the NE into the Western Outer Carpathians where it splits up into several NE-striking shear zones which overprint the nappe contacts between the Silesian and Magura nappe, and the floor thrust of the Bystrica nappe within the Magura unit. Sinistral faulting along the Silesian-Magura contact linked up with NE-directed out-of-sequence thrusts farther east. There, a number of Subsilesian windows crop out in front of the NE-directed floor thrust of the Magura nappe.