

# Tectonic regimes and basin formation in the Western Carpathians during the Neogene

Michal Kováč<sup>1</sup> & František Marko<sup>1</sup>

<sup>1</sup>*Department of Geology and Paleontology, Faculty of Science, Comenius University, Mlynská dolina G, 84215 Bratislava, Slovakia*

The final stage of the Western Carpathians evolution has been strongly affected by extrusion of the ALCAPA lithospheric fragment from the Alpine collision zone and by the retreating subduction of the flysch basin basement below the front of the orogen. This process led to disintegration of the forearc basin situated on the Central Western Carpathian (CWC) margin and formation of the Outer Carpathians (OC) accretionary prism in compressive tectonic regime. During the Early Miocene, besides northvergent thrust tectonics also backthrust and wrench tectonics appeared, controlling the wrench fault basins formation on the CWC margin.

The following oblique collision of the Western Carpathian orogen with the platform, which led to a change of overriding plate movement, was accompanied by wrenching events on the CWC margin. The Vienna and East Slovakian

Basin were opened by pull-apart mechanism. Rapid subsidence and high sedimentation rate documents the change from transpressional to transtensional tectonic regime during this time.

Due to the fact, that the rate of collision between the North European platform and the Carpathians was lower than the velocity of subduction, a regional extension occurred in the overriding plate and led to the back arc basin development. The crustal stretching, accompanied in places by mantle updoming, forced the Middle Miocene synrift basin subsidence. A wide spectrum of grabens and tilted halfgrabens opened along normal and listric faults.

The Upper Miocene postrift sedimentation was controlled either by active elongation of the Western Carpathians (e.g., Vienna Basin) or by thermal subsidence (e.g., East Slovakian Basin), resulting from cooling of the uprising mantle.

During the Pliocene and Quarternary a tectonic inversion occurred in the Western Carpathians.