

The Southern Carpathians - wrench-fault corridor on the Western Margin of the Moesian Platform

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The Southern Carpathians mark the northwestern continuation of the Balkan orocline, forming an almost 100 km wide wrench fault corridor on the western margin of the Moesian platform. Their large-scale geometry proofs a transpressional nappe system due to collision in the Cretaceous and fragmentation due to dextral transpression since the Oligocene. Mylonites within the Danubian nappe show Late Cretaceous ductile shear, recording oblique collision and translation of the Transylvanian block towards the NE around Moesia (Ratschbacher et al. 1993).

Dextral strike slip movement on a NE trending fault system penetrates the Romanian Southern Carpathians. It was active at least since late Oligocene showing brittle deformation. A major tectonic lineament, the Cerna-Jiu-Cisnadie fault system, cuts convex across the Southern Carpathians from S to NE, showing a dextral offset of 35 km (Berza & Draganescu 1988). Along it's northern section the Petrosani basin was opened in Upper Oligocene as a negativ flower structure, whereas transpressional features are common west of the Godeanu massif. Southeast of the Cerna-Jiu fault the Mehedinți nappes were thrust simultaneously.

Due to the beginning of retreating subduction (Royden 1993) along the northern boundary of Moesia, NE directed motion of the Transylvanian block became E directed. The eastward movement was partially compensated by the E striking dextral Bistra-Lotru-Cozia fault system showing a dextral displacement of at least 10 km. Along this fault system the Hateg basin was opened as a pull apart basin showing mainly Sarmatian subsidence.

A re-organisation of tectonics in the western Southern Carpathians is proved during the Badenian due to extension in the Pannonian realm (~16.5 to ~14 Ma). Mostly along the contact between Danubian unit and Getic/Supragetic unit Sichevita-, Bozovici- and Caransebes-Mehadia basin subsided. The Getic/Supragetic block W of these intramontane basins was transported towards the Pannonian basin by at least 1 km. Subsidence dies out successively, starting with the Sichevita and Bozovici basin during the Sarmatian (~13 Ma) and ending with the Caransebes basin in the Pannonian (~8.5 Ma).

S of the Cerna-Jiu-Cisnadie fault strike slip tectonics were active throughout the Miocene and major displacement shifted from the Cerna-Jiu-

Cisnadie fault to the dextral Baia de Arama-Severin-Timok fault system translating an paleozoic ophiolite 50km towards North. Along this major fault the Timok basin subsided (~ 16.5 Ma).

Tertiary subduction mechanism of the Carpathian-Pannonian region

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During the Late Cretaceous-Eocene, the future Karpathian orogen was part of the Alpine-Karpathian orogen formed by known southeastward subduction (135-55 Ma) of the Penninic realm and collision of European and Adriatic continents. While the Eocene Alps were at the converging (collisional) fronts, the remnant Eocene Karpathian Flysch Basin (rCFB) experienced subduction. The subduction in the Alpine region ended by delamination of subducting oceanic lithosphere from the light continental one and related magmatism (42-25 Ma).

During the Late Oligocene-Early Miocene, the rCFB was experiencing ongoing subduction, that formed the free interface for the East Alpine extrusion from the "Alpine collisional node". The oceanic plate underlying rCFB subducted southwestwards, later westwards while northeastward and eastward migration velocity of the accreting plate boundary was decreasing through the time. Slower subduction rates caused steeper dip of the subduction zone, Eggenburgian onset (22-19 Ma) and following duration of hinterland extension accompanied by asthenosphere elevation, onset of crustally derived volcanism above elevated asthenosphere and younger mantle-derived volcanism, progressively less contaminated by crustal material, all contemporaneous with shortening in frontal, accretionary, parts of the Carpathians.

Subduction of the rCFB led during the end of the Early Miocene to a collision with continental margin at the westernmost part of the present Carpathian arc. Northeastward, later eastward subduction roll-back of the subducting slab of the rCFB under the advancing Inner Carpathians, oblique closure of the basin, progressive change of subduction to collision from the west to the east along the Carpathian arc drove delamination of the remaining oceanic slab. Delamination has started in the west of the Carpathian Arc since Early Miocene, ran along the arc to its present onset position in the bend area between the East and South Carpathians. The delamination lateral