Apatite-Fission Track dating on sandstones of the Petrosani Basin

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The Cretaceous nappe system of the Southern Carpathians is dismembered by orogen-parallel wrenching during the Paleogene showing subcrustal deformation. Simultaneous to dextral translation along the Cerna-Jiu strike slip fault system, the Petrosani Basin subsided on top of a negative flower structure. Sedimentological investigations show a brackish shallow-water facies during the Oligocene to the Lower Miocene. This environment led to the deposition of coal, followed by sandy to argillaceous successions. Due to uplift and erosion at the end of the Egerian, subsidence shifted toward the northeastern part of the basin, simultaneously the marine influence retreated towards the Transylvanian basin. This compression in the inner part of the South Carpathians is even documented by subsidence in the foreland depression of the Dacian basin.

During the Middle Miocene, a gap in sedimentation implies a change of subsidence due to tectonic deformation. The structural analysis shows a change of the stress field during the Badenian and Sarmatian within the South Carpathian orogen. The right lateral movement along the Cerna Ciu fault-system is cut off during the Middle Miocene by the dextral Baia de Arama fault. Along the northern rim of the Petrosani basin the Cerna Jiu fault has been reactivated by a left lateral movement. The reactivation seems to coincide with the inversion of the Petrosani Basin due to a NW–SE trending stress field during the Sarmatian. After basin inversion during the Malvensian, coarse grained clastic material and crystalline conglomerates accumulated in the eastern part of the Petrosani basin. This debris, reached from the flanks of the surrounding mountains, was deposited in high energy sedimentation systems and prove a steep relief within the orogen of the Southern Carpathians. The Apatite Fission Track studies should enlighten the evolution of the Petrosani basin during the formation of the Southern Carpathians. Vitrinite reflections as well as a higher rank of the coal prove an increased heat flow after sedimentation. In case of a postsedimentational thermal overprint of the strata within the Petrosani basin, the Apatite grains should reveal the time of reset, which is suppose to coincide with the tectonical inversion and folding of the Oligocene sediments. In case of a low thermal alteration, the Apatite-Age-population method will give information about the uplift of the source area. The close distance between source area and deposition centre, combined with the stratigraphic correlation of sedimentation and structural data allows it to confine the timing of internal deformation processes within the active orogen of the Southern Carpathians.