

Geodynamic development of the Carpathian arc.

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The EUROPROBE/PANCARDI Programme is dealing with Cenozoic geodynamic development of the Carpathian arc, Pannonian basin and Dinaride system. We have used an outstanding opportunity to study the interaction of lithospheric and asthenospheric processes and their mutual dependencies during Miocene subduction and related volcanic arc and fore- and back-arc basin development. The arc is unique in providing a snapshot of still active, soft collision between the Carpatho-Pannonian and Eurasian plates. Intermediate seismicity in the Vrancea zone, Romania, is related to the hanging Dobrogean slab beneath the Carpathians. Seismic tomography showed a near vertical high velocity zone of the slab. It is, however not clear if the slab is an oceanic or continental one. Seismic hazard assessment and earthquake engineering in the Vrancea are parts of the PANCARDI effort.

Miocene to Recent magmatic history of the Carpathians was established. Calc-alkaline and alkaline magmas were intriguingly coupled in time and space. West-to-east progression of magmatic activity corresponds well to progression of deformation along the arc. We try to understand the chemical evolution of the mantle lithosphere and the relative importance of subduction or plume-related processes.

Paleomagnetic and kinematic constraints contribute to the palinspastic restoration of the orogen. Two subplates, the ALCAPA and the Tisa/Dacia filled the interior of the arc during the Miocene. The back-arc extension was surprisingly low and large-scale flow of these subplates into the Pannonian basin area has to be interpreted. The ALCAPA rotated 70° ACW and the Tisa/Dacia 80°-100° CW.