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Geodynamics of the SE Carpathians by GPS, seismic attenuation and reflection profilling

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The Carpathian arc marks the locus of Cenozoic closure of a major embayment of the Tethys ocean. The Carpathians also are the continent–continent collisional belt between the intra-arc mobile terranes of the Pannonian and Transylvanian Basins, and a composite of stable continental units, the Moldavian part of the East European Platform, the Scythian Platform, and the Moesian Platform which surround the arc. The Carpathian arc is also the site of very active intermediate depth (70 to 200 km) seismicity of the Vrancea zone, and of late Cenozoic mafic alkaline, calk-alkaline, and shoshonitic volcanism. A long-term debate on the origin of the unusual high seismic activity beneath the Carpathian Bending Zone keeps geoscientific efforts at high level in this area. The nature of processes involved is intricate and could be eventually related to several hypothesis, like: (1) subduction of an oceanic lithosphere (and eventually a remnant of this is just now detaching from the continental lithosphere of the East European Platform and Moesian Platforms, (2) the oceanic slab subduction ended sometimes in late Miocene and then a part of the continental lithosphere of the mentioned platforms has been delaminated. Various models of the lithosphere – astenosphere system take into account for example the seismic attenuation and share wave splitting. Different geometry of the lithosphere – astenosphere system as well as the mantle flow around the “slabs” generate intriguing questions. We try to add other constraint to the various methodological approaches by taking into account the kinematics of the crustal blocks as suggested by robust outcomes of the satellite geodesy. We will integrate results of seismic attenuation, mantle anisotropy, seismic reflection profilling and GPS studies in order to test the deep feedback to the Tethyan closure,

including the astenosphere – lithosphere system, trying to explain the very unusual high seismicity withing the European continental lithosphere.