



Deep structure and seismicity in the SE Carpathians and Focsani depression

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The lithosphere of the SE Carpathians and their foreland is the place where a high seismicity at intermediate depth and a moderate crustal seismicity are located. Many studies were focused on this region to connect the observed seismicity to the local geology. The intermediate depth seismicity is located in the range 60-180 km, in a well confined epicentral area - the Vrancea region. 3D tomography models have tried to define the physical structure of this seismogenic body. The crustal seismicity is spread on a larger area including both SE Carpathians and their foreland, and extends from the near surface down to beyond 50 km. In this wide region the seismic studies provided crustal models which can be correlated at least partly with the seismicity. The crustal model of the seismic line Vrancea 2001 points out three crustal blocks from the East to West: the North Dobrogea, Moesian and Transylvanian blocks. They are characterized by different thicknesses and seismic wave velocities. The contact of Moesian block with the other two blocks is marked by the Peceneaga-Camena crustal fault (PCF) at East while at West the contact is masked by the Carpathian nappes. On the seismic section Vrancea 2001 the western contact could be located in a very narrow area where the interfaces of crustal layers change suddenly their dip from quasi-horizontal to steep. While the PCF is weakly seismically evidenced, the western contact is confirmed by a large number of small-to-moderate earthquakes located from 5-6 km depth down to 40-50 km along a plane dipping NW. About 50 km to SE another seismic active fault is well marked by small-to-moderate events, from the bottom of Focsani Depression (8-10 km depth) down to about 50 km in the Focsani-Ramnicu Sarat area. This very active zone originates periodically earthquake sequences and clusters; in the last 40 years about 20 clusters occurred, displaying main

events with magnitude M_w up to 5.6, followed by tens of smaller shocks. The focal mechanisms of the main shocks and aftershocks emphasize a NE-SW orientation of the rupture plane, parallel to the Carpathian Arc and transverse to the PCF. The fault plane solutions point generally an extensional stress field in the whole study region. The normal and strike slip faulting types are observed in the entire zone. The reverse faulting occurs only in the Ramnicu Sarat crustal area, which could be interpreted as a transition zone between the prevalently reverse faulting of the subcrustal Vrancea region and the extensional stress of the rest of extra-Carpathians.