

Three-dimensional crustal structure in the western part of Romania from local earthquake data

Bogdan Zaharia, Bogdan Grecu, Mihaela Popa, Eugen Oros, and Mircea Radulian
National Institute of Earth Physics, Magurele, Romania (bzaharia@infp.ro)

The inner part of the Carpathians in Romania belongs to the Carpathians-Pannonian system bordered by the Eastern Carpathians to the north and east, Southern Carpathians to the south and Pannonian Basin to the west. It is a complex tectonic region with differential folding mechanisms, post-collisional kinematics, rheology and thermal properties, including within its area the Apuseni Mountains and the Transylvanian Basin. The purpose of this study is to map the 3-D structure of the crust over the western part of Romania on the basis of local earthquake data. A large part of input data comes from the recordings obtained during the South Carpathian Project (2009–2011), a successful collaboration between the Institute of Geophysics and Tectonics from the University of Leeds (UK) and the National Institute for Earth Physics (Romania). An array of 32 broadband seismic stations (10 CMG-40T, 8 CMG-3T and 14 CMG-6TD) was installed across the western part of Romania (spaced at 40 to 50 km intervals). In addition, 25 stations across eastern Hungary and Serbia were considered. P- and S-wave arrivals are identified for all the selected events (minimum 7 phases per event with reasonable signal/noise ratio). All the events are first relocated using Joint Hypocentre Determination (JHD) technique. Then the well-located events were inverted to determine the crustal structure using LOTOS algorithm. The lateral variations of the crustal properties as resulted from the tomography image are interpreted in correlation with the station corrections estimated by JHD algorithm and with the post-collisional evolution of the Carpathians-Pannonian system.