

Investigation of the Pannonian–Carpathian zone utilizing seismological data

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Taking into account the large scale of investigations of the Pannonian–Carpathian–Dinaride system lithospheric structure, we state that the Ukrainian part of Carpathian Arc remains poorly investigated yet. Although, all attempts to imagine the asthenospheric and lithospheric processes in the region connected with the collision between the Pannonian–Carpathian and Eurasian plates and to develop geodynamic models of PANCARDI evolution are insufficient without an extension of investigations to that region. Thus, one of the important questions, connected with the exploration of deep structure and reconstruction of lithosphere processes developing in the Central Europe is a prolongation of the Carpathian zone detailed study to the South–East from territory of Poland. The last have a great importance not only for the investigation of the Earths deep structure, but for the understanding of the processes in the Pannonian massif — Carpathian mountains and their framing formation. Going out of the essential necessity of the structural re-interpretation of the Pannonian–Carpathian zone in the West Ukraine and adjacent territories, further investigations must be oriented to the reproducing of the medium volume model up to the

300 km depth using devices and numerical methods that have been tested on the territory of the Central Europe. In this situation we propose our contribution into fulfilling of the program in the form of material, technical, personnel, informative and organizing, executive help in providing of special seismological observations in order to investigate the Earths deep structure in the West regions of Ukraine with the aim of prolongation of Pannonian–Carpathian zone study from Polish part onto the South–East direction. Model experiments would be carried out in Ukraine and neighbor countries with the aim to improve computer model results and to deliver data of modeling experiments to the colleagues. Algorithms of solution of the direct-inverse dynamical seismology problem that use the matrix method, finite element method, damped least-square technique method utilizing experimentally registered seismograms are elaborated by our group. Matrix method give the possibility to analyze wave types and multiples in seismic fields. With the help of finite element method we model the areas with complex lithosphere structure: unelasticity and nonlinearity. Complex of two methods developed will give the possibility to investigate the lithosphere structure in great depth. In this connection experimental observations were used to compare with the results of the mathematical modeling to examine the proposed methods on the Ukrainian territory.