Exploration of structure peculiarities and geodynamics of the Carpathian zone on the Ukraine territory

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The geophysical experiment to investigate litosphere structure in the Ukrainian part of the Carpathian region is proposed. Modern knowledge of local crustal deep structure is limited mainly to the results of seismic study, carried out in the region along the three profiles crossing the Carpathian arc perpendicularly to its extension. Two of them: profile I–I (Czop–Lučok) and profile III–III (Rakhiv–Terebovlya) were worked out by the refracted wave method. Seismic cross-sections were revealed up to 20 km depths here. The structure of the Earth's crust along the II International geotraverse (Berehovo–Vyshnevets) was investigated up to 70 km after deep seismic sounding and complex geophysical model was worked out. These profiles are to be newly observed and more carefully interpreted to reveal litospheric structure at greater depths. The complex of geophysical investigations including seismological regime observations, microseismic investigations, mathematical modeling of the lithosphere structure, anomaly field dynamics and electromagnetic investigations is offered. We propose to start the investigations of the Carpathian zone on the territory of Ukraine from the profile I–I, which is the nearest to Poland, where projects of lithosphere structure investigation are in active phase. It will give the possibility to reveal the peculiarities of the Carpathian lithosphere structure and extend explorations from the Polish boundary to the South–East. One hundred twenty or more stations may be used in the experiment. Profiles I–I, II–II, III–III would serve as the base of the seismic station network. After the maintaining of observations along these profiles with the help of stations that will be located with the step of 10 km, after the obtaining necessary materials and technical support, seismic network would be condensed between main profiles. Optimal dimension of elementary network link may be 10 km. Three-component automatic seismographs of DAS–02 or similar type would be used. Earthquakes from the Vrancea zone and North-West part of Romania (Satu Mare, Baya Mare, Karey regions) with the events taking place 15–20 times per year and from the far sources of Atlantic and Pacific regions would be processed. The reinterpretation of our recent magnetotelluric observations along the profiles I–I, II–II, III–III is foreseen. Magnetotelluric sounding physical modeling of the hole investigated territory accounting the results of investigations of Poland and West Europe territory is proposed. Institute of Geophysics (Carpathian Division) has certain practice of magnetotelluric fields modeling in the Carpathian region. The observation routine is planned to start in 1997.