SUMMARY FOR THE GENERAL PUBLIC

The aim of the project is the determination of seismic structure and anisotropy of the lithosphere (Earth's crust and part of the upper mantle) and lithosphere-asthenosphere boundary (*LAB*) in the Carpathian-Pannonian area.

One of the main goals of the seismic research is to determine the distribution of the velocities of the seismic *P*- and *S*-waves, as they are important parameters not only characterizing elastic properties of rocks, but also providing indications about their chemical and mineral composition as well as their structure (micro cracks, porosity etc.). Another geophysical property of rocks, important for studies of the lithospheric structure and evolution, is the anisotropy of the seismic wave velocity. The seismic anisotropy phenomenon is defined as a dependence of the velocity on the direction of their propagation. Most of the minerals constituting the Earth's crust and upper mantle manifest more or less distinct seismic anisotropy, due to anisotropy of the crystalline lattice (intrinsic anisotropy). If the rock consists of coherently aligned mineral crystals (*CPO* – crystal preferred orientation), it exhibits anisotropy measureable by seismic means. Another causes of seismic anisotropy of rock massifs involve the presence of coherently aligned cracks or thin layering of rocks, but for lower crustal and upper mantle rocks the mechanism of intrinsic anisotropy due to *CPO* dominates. Therefore, seismic observations documenting a directional dependence of the velocity of longitudinal waves (*P*) and shear waves (*S*) and the *S*-wave splitting phenomenon provide the information about the orientation of the crystallographic axis of minerals and about rocks composition. Variability of the parameters of seismic anisotropy can be due to differences in composition, to variation of the direction tectonic movements or of the stress field in the studied area. It allows for discrimination between lithospheric blocks with different petrological composition and different tectonic evolution based on *in situ* measurements of seismic anisotropy.

The determination of the seismic anisotropy of the crust and upper mantle requires a use of methodology based on seismological observations of the seismic wave propagation in the Earth (recordings of the seismic waves from earthquakes). The data will be records of seismic waves from local, regional and teleseismic earthquakes. This data will be used to build anisotropic models of the structure of the lithosphere. Registrations will be continuously operated using 30 modern high-sensitivity and high resolution seismic broadband stations by the end of 2021. The modelling results will be used to determine the composition of rocks building anisotropic layers of the structure and tectonic evolution of the area.