DESCRIPTION FOR THE GENERAL PUBLIC

Geophysical surveys (e.g. seismic, magnetic, gravimetric) belong to the basic methods used in the studies of the deep Earth interior. Of particular importance are seismic methods based on the analysis of the elastic waves propagation in the subsurface. The sources of these waves can be natural earthquakes or man-made sources (such as explosions). So far, Poland has been a leader in the investigation of the structure of the crust in Central Europe using so-called deep refraction seismic. Deep refraction seismic allows for tracking changes in the physical properties of the Earth crust on a scale of tens kilometers to depth of 50-60 km. The most precise of seismic methods is so-called reflection seismic, widely used in oil and gas exploration. However, the cost of reflection seismic is much higher than the refraction seismic. As a result of the "gold rush" related to the exploration for shale gas in Poland, in 2012 the PolandSPAN project has been acquired, where 2200 km of new, deep, reflection seismic profiles have been collected. The costs of this project was fully covered by the oil industry, and thanks to special agreement with the ION Geophysical company, these data can be used by the Polish scientists involved in this project free of charge. Therefore, Polish earth sciences are standing in front of an unique opportunity to improve our knowledge about the deep geological structures of a large area of Poland. Poland, as a current leader in the research of the deep crust in Central Europe based on refraction seismic can also become leader in the field of deep reflection seismic studies. The direct objective of this project is the study of the structure of the Earth's crust in northern Poland (East Pomerania and Kaszuby region) using PolandSPAN data supplemented by analysis (modeling) of gravity and magnetic field anomalies, geological data (e.g. from the deep research wells) and other geophysical data. The study area is located in the margin of the East European Craton (EEC) which was the part of the Baltica paleocontinent with the age of the crust reaching 1.8-1.9 billion years. Seismic surveys in the world (e.g. Canadian LITHOPROBE program) recognized that the old crust is inhomogeneous and that the record of various tectonic processes can be found in seismic data (such as collision of old microcontinents). An additional complication here, is the imprint of the younger geological processes, for example Caledonian orogenesis and its expected impact on the current portrait of the crust. Recognition of these deep tectonic processes is one of the most important targets of this project. The project will have impact on different specialties in the field of earth sciences and the results may provide a starting point for future researches using other methods. For example, outcomes of this project should improve our understanding of the relationship between structure of the cratonic crust and episodes of volcanism. Although this project focuses on the basic research and understanding of fundamental geological processes, certain aspects can be used for more practical purposes like understanding of the Paleozoic petroleum system.