



## **Environmental Challenges Related to the Acquisition of the Trans Carpathian Wide Angle Reflection and Refraction Line**

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Complex structures like the Carpathian Orogen and its neighbouring platforms and related inter-orogenic basin system can be understood only by complex integration of complementary investigative tools. Most of regional geoscientific investigations in Romania have targeted the very intricate, high intermediate-depth seismicity, clustered Carpathian Bend Zone: Vrancea. Despite huge geological and geophysical efforts, the area remains a matter of robust debate, at least from the point of view of geodynamic driving mechanisms. However, other areas outside Vrancea remained somehow “orphaned”.

However, a large wide angle refraction and reflection (WARR) survey was carried out in the summer of 2014 by a large international partnership in order to study the transition from the East European Platform to the northern part of the Romanian Eastern Carpathians, Transylvanian Basin and the Apuseni Mountains.

The main scientific objectives of the WARR project relate to three main investigation domains: crustal architecture; affinity of crystalline basement and sedimentary basins architecture. The profile is about 700 km in total, in Ukraine and Romania. Recorders were placed at 1.75 – 2.0 km intervals along an alignment forming the Romanian segment. Recorders used were stand-alone DSS Cubes from the Helmholtz Center of GFZ Potsdam and from the Institute of Geophysics of the Polish Academy of Sciences. The seismic sources were explosives (“Riogel” and “Riodet” by Maxam), with shotpoints spaced at 20 – 65 km with a total of 800 – 1200 kg explosives/site in clusters of drill-holes loaded with 50 kg explosive/hole, average depth of 25 m.

Very complicated and legally-challenging environmental permitting requirements represented a real issue for successful implementation of the project. The main concern of local and central authorities related to potential pollution of sensitive components. Here, we present the strategy, actions and results concluded in order to reach the scientific and technological targets while managing to obey all legal rules and regulations imposed by the decision makers. We finally demonstrate that there is no danger for the environment by this classic form of seismic wave generation if all restrictions, health and safety rules are strictly complied with and are continuously monitored.

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