



High resolution seismics methods in application to fault zone detection

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Surveys were carried out along border line between Outer Carpathians, Inner Carpathians and Pieniny Klippen Belt. Main point of interest was imaging transition zone structured by para-conglomerates, sandstone and clays lenses, crossing in near neighbourhood of Stare Bystre, village in the southern part of Poland. Actually geological works states existence of two hypothetical faults, first at the direction NE-SW and second NNW-SSE. Main aim of geological and geophysical investigation was to prove that mentioned fault has a system of smaller discontinuities connected with previous main fault activity.

Para-conglomerate exposures, which is localized close to discussed fault is cut by visible system of cracks. That fact provide geological evidences that this system could be the effect of previous fault activity so in other words, it has a continuation up to main discontinuities. What is more part of the same formation para-conglomerates is covered by Neogen river sediments, so non-direct detection methods of cracks azimuth must be applied.

Geophysical investigation was located near mentioned exposure and conducted in 3-D variant. Measurements were extremely focused on determining any changes of elevation buried para-conglomerates and velocity variation inside studied sediments. Seismic methods such as refraction and refraction tomography were used to imaging bedrock. Surveys were carried out in non typical acquisition, azimuthal schema. During field works 24- channels seismograph and 4 Hz, 10 Hz and 100 Hz geophones were used. Hypothetical discontinuities were estimated after analysing seismic records and expressed by velocity variation in bedding rocks and additionally evaluated changes in its elevation. Furthermore, in this study attempt of use refraction wave attributes related to loosing rock - para-conglomerates continuity were exposed.

The presentation of geophysical data had a volumetric character what was easier to interpret and better related to assumptions about geological structure of mentioned zone. Correlation between geophysical and geological results seems to be very effective in reconstruction the forming processes of fault zones. Better understanding phenomena, which rules of young fault activities, reduce incorporated hazards and simultaneously bring information about presence geodynamics processes.