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Linear discontinuous deformations in the light of investigations performed with using electrical resistivity method

Abstract

The article presents an example of using the electrical resistivity tomography method to assess the condition of shallow rock mass layers in the area of linear discontinuous deformations created in the past due to underground mining activity. The research concerned the mining area of one of the Upper Silesian Coal Basin mines, where intensive mining operations have been conducted for several decades. In the considered area, linear discontinuous deformations were created in the form of terrain steps. Their location is related to the characteristic layout of deposit accessing excavations and associated with it exploitation fronts in several coal seams. The article analyzes the geological structure, tectonics of the deposit and the state of deformation of the rock mass caused by mining operations. In order to evaluate the hitherto impacts, appropriate calculations of the extraction influence were performed, assuming different views on the summation of horizontal strain in long time intervals. The calculations were carried out using the theory of W. Budryk - S. Knothe. Theoretical considerations were supplemented with geophysical surveys performed with using the electrical resistivity tomography. The investigations were carried out using several different electrode arrays: Wenner, Schlumberger and Dipol - Dipol. Obtained results of the near-surface layers penetration have been presented in the form of ERT profiles.