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## Integrated magnetotelluric and gravity survey; case studies from the Polish Outer Carpathians

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The Outer Carpathians are a zone of very complex tectonics formed by intense folding, faulting and overthrusting. The structures of overthrust basement are targets of oil and gas prospection. A lot of gas deposits were found inside autochthonous Miocene complex. Mesozoic and Paleozoic formations are considered as prospective for oil accumulations. Recognizing the sub-orogenic basement is difficult as complex structure of the flysch cover lowers the efficiency of the reflection seismic method. Therefore, the magnetotelluric and gravity methods were used to support seismic data interpretation and distinguish objects for detailed geophysical recognition.

As a result of the complex interpretation, a geological model of the Carpathian basement was proposed. Based on MT data interpretation, structural outlines of major high-resistivity horizons were obtained. Resistivity boundaries are correlated with the tops of sub-Miocene basement and Upper Devonian and Lower Carboniferous carbonate complex and crystalline Precambrian basement. Low-resistivity complexes are related to of the Upper Permian and Triassic and Lower Paleozoic sediments. Based on comprehensive interpretation of MT and gravity data, a geological cross-section and tectonic scheme were obtained.

Maps of maximum gravity field horizontal gradients and resistivity distribution at depth slices were used to recognize and interpret tectonic boundaries. The sub-Miocene basement is cut by at least two regional strike-slip fault zones with NW-SE and SW-NE directions. Faults divide the area into several tectonic blocks. Geological cross-sections were obtained based on 1D/2D interpretation of magnetotelluric data and 2D gravity modelling and show the relations between the Carpathian overthrust and autochthonous Miocene and sub-Miocene basement.

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