

## Integrated geophysical study of the deep structure of Yenisei-Khatanga regional trough: new results and MTS contribution

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### SUMMARY

The paper presents modern results of integrated interpretation of the data obtained by different geophysical methods in the region of Yenisei-Khatanga regional trough (YKRT) - oil and gas-bearing province located at Taimyr peninsular, the Northern frame of East Siberian platform. The regional stage of the geological-geophysical investigation of this hard to reach, remote but perspective province is going to the end. The goal of our study is to develop an integrated volume model of the deep structure of the trough as a basement for scientific forecasting in hydrocarbon prospecting. Solid ground for this model formation in its turn became the interpretation of the CCP seismic and MT soundings' data of the regional profile network (with attraction of several DSS geotraverses). This profile analysis was based on the results of gravity and magnetic fields' zoning, 2D and 3D geophysical (potential fields and MT) inversions and the classification of the main sedimentary and igneous rock formations by physical properties. This stage was finished by design of the spatial structural framework of the Mz sedimentary cover of the trough as well as underlain consolidated older crustal and upper-mantle layers. Then, this layered construction was endowed with material properties in the course of 3D inversions of gravity and magnetic field, constrained by profile seismic and MT data as well as 3D MT inversion (Slinchuk et al, 2022) results and geological information. Finally, layered distributions of density and magnetization with lateral inhomogeneities, which satisfy the observed potential fields, were restored for all the YKRT. The main instruments for potential fields' quality and quantity analyses were presented by geoinformation system INTEGRO developed in All-Russian Research Institute of Oil Geology RRIOG (Cheremisina et al., 2022), while MT data were inverted with a help of modern efficient open access codes.

The presentation of the course of geophysical YKRT model construction is focused on the contribution of magnetotelluric data to restoring the deep architecture of the through: identification of fault zones, fluidized areas and sedimentary grabens in profile sections, construction of the structural surfaces of the Pz formations and crystalline basement, as well as localization and determination of the morphology of magmatic formations of the period of geodynamic activation of the Pz-Mz boundary - buried intrusives and trap strata.

The information obtained is important for updating the structural-tectonic and geodynamic models of the YKRT – the main products of the regional stage of any oil and gas province investigations. Finally, we discuss the possibilities of using the results of the study as markers of the main stages of the YKRT formation associated with the evolution of the Khatanga local center of the Siberian superplume, as well as in the applied aspect – for searching potential hydrocarbon traps.

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**Keywords:** integrated interpretation of geophysical data, 2D and 3D inversions, deep architecture of oil and gas-bearing provinces, Yenisei-Khatanga regional trough, products of Siberian superplume activity

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