

3D resistivity image of the Ilmen crustal conductive anomaly obtained from MT-data

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SUMMARY

The Ilmen Geodynamic Intersection zone is considered as convergence zone for major segments, aulacogens, faults, and suture zones of the East European Platform (EEP). Since 2020 magnetotelluric/magnetovariation (MT/MV) soundings has been carried out in the junction area of large segments of the East European Platform (Fennoscandia, Sarmatia and Volga-Uralia) by researchers from the Geological Faculty of Lomonosov Moscow State University and the Geoelectromagnetic Research Center, Branch of the Schmidt Institute of Physics of the Earth, Russian Academy of Sciences (GEMRC IPE RAS). The area of ILMEN project is located between the areas of the previous long-standing SMOLENSK and LADOGA projects.

The major goal of this research is to identify crustal conductive anomalies confined to the Precambrian suture zones of the central part of EEP, to search for recent activation signs, and to clarify regional trends in the distribution of the sedimentary basins conductance.

The acquisition of MT data was carried out in range from 0.0005 Hz to 1 kHz using MARI-Pro equipment (Nord-West Ltd., Russia) and IMS-010 induction coils (Vega Ltd., Russia). Spacing between sites was 10 or 15 km. The number of sites currently is 170. Sites are located along 5 lines.

This study presents the result of analysis and inversion of MT data including the resistivity image of Ilmen crustal conductive anomaly obtained from 3D inversion. The resistivity image contains both sediments and crust conductive anomalies. Transcrustal high-conductivity zones interpreted as the Ilmen–Ladoga anomaly were identified within the depth range of 10–40 km.

These conductivity anomalies are attributed to the deep subsidence of heavily tectonized and metamorphosed sedimentary rocks initially saturated with organic and carbonate matter.

Keywords: magnetotellurics, crustal conductive anomalies, 2D and 3D inversion, convergence zone
