

## **INTEGRATED GEOPHYSICAL STUDIES OF BARYATINO MAGNETIC ANOMALY AREA**

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Baryatino magnetic anomaly is situated in the central part of the East-European craton, approximately 300 km to the south-west from Moscow. It is caused by ferrous quartzite bodies, occurring within the metamorphic basement. The basement is covered by sedimentary complex with total thickness of 500 m and more, which makes mining of iron ore impractical. However, studies of Baryatino area can provide information about the internal structure of the Archean-Proterozoic basement, which is still poorly understood.

In 1992 a geophysical training ground for students of Moscow State University and other universities was established in Alexandrovka village, close to Baryatino area (Khmelevskoy et al., 1999). Since then electromagnetic, electrical, magnetic and gravity measurements are performed in the region. Besides, geological and geophysical information, previously obtained in the area, was collected and analyzed (for example, first magnetic exploration was performed here in 1934).

The key method of deep investigations is magnetotellurics (MT). More than a hundred of MT soundings were performed in the region. They allowed to trace the top of metamorphic basement and revealed a conductive anomaly in the consolidated crust. Presumably, it is a northern continuation of Kirovograd crustal anomaly, traced from the Black sea to the North of the Ukraine. Currently, MT soundings are performed in the area between Ukraine and Baryatino anomaly to verify this hypothesis (Varentsov et al., 2008).

Controlled-source electromagnetic and electrical methods were applied to study the sedimentary cover. In the lower part there is a conductive Devonian complex, consisting of terrigenous rocks, saturated by high-mineralized water. Above there is a resistive, mainly carbonate Carboniferous complex. Near-surface rocks are conductive quaternary moraine sediments, formed during the ice age.

Magnetic and gravity measurements along several profiles revealed intensive anomalies: magnetic ones reach 28 000 nanoTesla (Brodovoy et al, 2000). They are caused by Proterozoic ferrous quartzite and chlorite schist bodies, opened by deep borehole near Baryatino town. Density and magnetic susceptibility models of the upper part of metamorphic basement were constructed.

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