LITHOSPHERE MAGNETIC ANOMALIES IN THE TERRITORY OF RUSSIA

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By lithosphere (regional) magnetic anomaly, we understand a homogenous structure of a geomagnetic field of large linear dimensions (*l - length, d - width*), over 200-300 km. For studying the lithosphere magnetic anomalies, digital arrays compiled on the basis of the published map of magnetic anomaly field of Russia at scale 1:5,000,000 (2000) were used. Distinguishing of a regional component of magnetic field associated with deep lithosphere sources, which are restricted at depth by 578-760ºC Curie surface, was accomplished by field revaluation to the altitude of 30, 50 and 100 km. Frequency characteristics of the analytical field continuation upwards is given by $e^{-\omega h}$, where ω is cyclic frequency associated with wavelength λ through the ratio $\omega = 2\pi/\lambda$; h, revaluation altitude.

The accomplished studies testify that at an altitude of 30 km local anomalies 5-10 km across fully attenuate, and the anomalies of 500-800 km are most stationary within the East European and Siberian platforms. This seems to be explained by the presence of major lithosphere heterogeneities, the base of which can reach the Moho discontinuity. At an altitude of 50 km, regional anomalies show up in the Siberian Platform (d =200–500 km, A (amplitude) =100-200 nT), in the Urals (Krasnoufimsk anomaly; d=200 km, A=200 nT), in the Upper Yana-Chukotka, Amur and Kamchatka regions (d=200-500 km, A=100 and more than 200 nT). In the Voronezh Shield, high-amplitude Kursk magnetic anomaly (A> 200 nT) spatially associated with a broad band of near-surface rocks with a high magnetite content is observed. However, it is not improbable that it has deep roots. Low-amplitude anomalies (A=50 nT, d=100 km) are traced in the Baltic Shield, in the Kara and East Siberian Sea regions. At an altitude of 100 km, anomalies of extra-large sizes are recorded (A=50 nT, d more than 500 km), the parameters of which are comparable with those of the anomalies after satellite data. The largest positive regional anomalies are confined to the areas of the Achaean-Proterozoic consolidation. Hydrocarbon basins usually correspond to the development areas of regional negative anomalies. Comparison of attenuation of anomalies of one transverse dimension shows its dependence not only on sizes, but also on the anomaly amplitude and background ratio.

Numerous studies of effective magnetization sections in the sections to a depth of 40 km show that down to an approximate depth of 10 km, the anomaly-forming sources distribution has a discrete character. Down the section, a relatively uniform occurrence of the objects with lateral leveling of magnetization properties is observed.

Obtained results are generally consistent with the notions earlier presented by V. Lugovenko (1974) that the magnetic anomaly field is a piecewise–stationary function, the stationarity of which is retained within large Earth's crust blocks 100-200, 200 - 500, 500-1,000-1,500 km across.