



Heterogeneity of an earth's crust of oil-and-gas zones

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The study of magnetic anomaly field structure of the Barents Sea water area along seismic and extended profiles intersecting known fields is carried out. Geomagnetic and density sections down to 40 km depth are constructed. This allowed the estimation of heterogeneities of the Barents Sea water area deep structure. The analysis of geomagnetic and density sections along extended profiles showed the confinedness of oil-and-gas bearing provinces to deep permeable zones characterized by reduced magnetic and density features. Based on the analysis of permeable zones, regional diagnostic features similar to those obtained earlier in oil-and-gas bearing provinces in other regions, for example, in Timan-Pechora, Volga-Urals and Siberian, as well as in the Northern and Norwegian seas water areas, are revealed.

The analysis of magnetic and gravity fields over the region area allowed the delineation of weakened zones as intersection areas of weakly magnetic areals with reduced density. Within the Barents Sea water area, permeable areas with lenticular-laminated structure of the upper and lower Earth's crust containing weakly magnetic areals with reduced rock density within the depth range of 8-12 and 15-20 km are revealed. Such ratio of magnetic and density heterogeneities in the Earth's crust is characteristic for zones with proved oil-and-gas content in the European part of the Atlantic Ocean water area.

North Kildin field on 1 AR profile is confined to a trough with thick weakly magnetic stratum discontinuously traced to a depth of 6-10 km. At a depth of approximately 15 km, a lens of weakly magnetic and porous formations is observed.

Ludlov field in the North Barents trough is confined to a zone of weakly magnetic rocks with reduced density traced to a depth of 8-9 km. Deeper, at =15 km, a lenticular areal of weakly magnetic formations with reduced density is observed.

The profile transecting the Stockman field shows that it is located in the central part of a permeable zone. Ledovoe field is in the northern margin of the same zone.

SPAN calculations of magnetic and gravity fields in areal option allowed obtaining the distribution of permeable weakly magnetic zones in the Barents Sea water area. The most significant ones are confined to Franz-Victoria trough, Severnaya depression, Malygin saddle, Bjarmeland syncline, Murmansk-Kurentsovo monocline, Southern Lunin trough and depression, Northern Stockman depression, and Southern Barents syncline.