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Geomodel constructs of the Earth's crust for water continuation of the Korotaikha depression from gravity and magnetic data for revealing promising areas of oil and gas accumulation

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The paper considers the results of re-interpretation of geophysical data within the water continuation of the Korotaikha depression. To solve the issue of identifying promising areas of oil and gas accumulation in the region, magnetic and gravity materials were reprocessed: digital maps of potential fields at 1: 500 000 scale were compiled on a frame network of seismic lines (3 lines on land and 3 lines in water area) made by reflection-CDP, density models to a depth of 20 km by solving the direct problem of gravity prospecting in GM-SYS module (Geosoft) in 2D formulation were constructed. Deep reflection-CDP seismic sections specified according to the deep wells were used as starting models. Correctness of the selected density models was controlled by comparing the theoretical curve with the values interpolated on the profile line from the digital model of gravity anomaly (Bouguer, density of the intermediate layer of 2.67 g/cm3). Magnetic modeling was performed using geometry of blocks from the obtained density models to a depth of 20 km and is based on selection of local anomaly sources in the upper section (in the Triassic strata). Blocks of the Precambrian basement were used as sources of regional magnetic anomalies in the considered models.

Modeling constructs show the defining role of the topography of terrigenous and carbonate complex boundary within the Paleozoic section as a source of gravity anomalies for the region under study. These findings are confirmed by comparison of gravity and seismic data (maps of local gravity anomalies and structural maps of reflecting horizons) and additionally substantiated by analysis of the nature of local magnetic anomalies distribution. The latter are associated with the Triassic basalt horizons at the top of the terrigenous complex and thus also reflect structures of the sedimentary cover, which are registered independently by gravity data.