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Earth's Crust and Upper Mantle Density Model of the Offshore-Onshore Geotransect "East Siberian Sea – Chukchi-Kolyma Region – Okhotsk Sea"

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Earth's Crust and Upper Mantle Density Model to a depth of 80 km was constructed along the Geotransect of 4,000 km long, which integrates a series of offshore and onshore seismics profiles. The Geotransect crosses (north-south) the Novosibiria-Chukchi plate, Chukchi-Kolyma fold area, and Okhotsk Sea back-arc basin. Field experiments included seismic (DSS, MRS) and gravimetric two-dimensional survey. The initial data for model creation were: the Bouguer (2.67 g/cm^3) gravity anomaly map, gravity data of two-dimensional surveys, bathymetry, seismics and petrophysical data. Technologically, the density model is a sum of two components: the local density distribution model and the "standard" model – the model of the general gradient increase of density with depth. The former was based on the 3D gravity inversion in the spectral range with subsequent transformation on the basis of a priori information. The construction of the latter – the "standard" model is more complicated. It was based on generalized DSS velocities and petrophysical data. The resulting cross-section is a three-layer (sedimentary cover, consolidated crust, upper mantle) heterogeneous gradient density model. The cross-section shows a higher average crustal density of the Chukchi-Kolyma fold area ($\approx 2.85 \text{ g/cm}^3$) as compared to the Novosibiria-Chukchi plate, and the Okhotsk Sea back-arc basin ($\approx 2.78 \text{ g/cm}^3$) excluding the crust beneath deepwater basins: the North Chukchi Trough and the South Okhotsk Trough. Density parameters of the upper mantle show another tendency: mantle density decreases from the north to the south from the northern passive margin of Eurasia to the active margin and the junction zone with the Pacific Plate.

