Isostatic gravitational modeling and seismic interpretation for the Kerch part of the Black Sea

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Oil and gas exploration is very important for economy of Ukraine. Prykerchenska area is enough perspective for reserves of hydrocarbons (Stovba S. et al., 2009).

Gravity data were taken from the National Geophysical Data Center (www.ngdc.noaa.gov). The closer track line was in South-East shelf of the Black Sea. These data are 1969 from the Oceanographic Institution of the USA. Using of Generic Mapping Tools (GMT) software have given free air-anomalies (FAA) as input data.

Geologic interpretation for water area may be fulfilled through FAA (Nabighian et al., 2005). We have used gravity modeling on basic of isostatic compensation (Ipatenko S. and Ipatenko A., 2002). First stage is calculation the layer thicknesses from for bathymetry with condition of equilibrium for earth crust. Second stage is estimation of layer thickness from anomalous data of FAA.

Length of profile is 270 km. Modeling have been performed for layers. Due to bathymetry were derived thicknesses for sediment-granite, diorite, basalt and mantle layers. Densities were used different for sediment-granite (1.32-2.42), diorite (2.8-2.85), basalt (3.1) and mantle (3.3) in g/cm^3. Given density for anomalous layer is 2.4 and length is 209 km. The most deep is 8 km and thickness is 6.2 km for 121km of profile. Basalt deeps are located between 10-17 km and mantle deeps within 18-32 km. Dip of basalt and mantle layers are observed to end of profile of east part.

Investigated profile traverses through the Sorokin Trough and the Kerch-Taman Trough. Gravitational modeling is confirmed seismic interpretation.

Seismic line was taken closest to gravity line. Integration the seismic data and gravity investigation it gives an opportunity the better understanding and sedimant-granite border and properties. It allows to perform acoustic inversion of seismic data. We used density section and velocity section to invert seismic data into acoustic impedance section.

Reference

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