



Spatial correlation of mantle heterogeneities beneath the south-western part of the East-European platform with oil-gas deposits and basic-ultrabasic magmatism.

L. Shumlyanska

Institute of geophysics of the National Academy of Ukraine, Kyiv, Palladina ave. 34, Ukraine (lashum@ukr.net)

Velocity model of mantle beneath the south-western margin of the East-European platform demonstrates its heterogeneous structure. Accordingly to the crustal structures above mantle heterogeneities were defined as: Volyno-Podolian, Ros-Bug, Ingulo-Middlednieper, Periasov, Volyno-Podolian plate, Peridnister, Peri-Blacksea, Chernigov, Dnieper, Donetsk, Eastern-Blacksea, Crimea, Western-Blacksea. These blocks are defined as regions differing in the depth of the bottom of the velocity layers that characterize velocity structure of the mantle and in the velocity characteristics of these layers. Layer boundaries are defined as intersection with 1-d reference model. Areas with residuals >0.0 km/s are considered as high-velocity while areas with residuals <0.0 km/s are defined as low-velocity.

There is a spatial correlation between boundaries of mantle blocks and location of oil-gas deposits and basic-ultrabasic magmatism. Some of the mantle blocks (Peri-Blacksea, Eastern-Blacksea, Crimea, Western-Blacksea, Periasov, Volyno-Podolian plate, Peridnister) that situated beneath margin of the platform and others (Chernigov, Dnieper, Donetsk) that situated beneath the Dnieper-Donetsk depression display spatial correlation with crust-seated oil-gas provinces - Crimean, Volyno-Podolian, Pericarpathian, and Dnieper-Donetsk, correspondingly. Oil-gas field have a propensity for boundaries of mentioned above mantle blocks. Those mantle blocks (Volyno-Podolian, Ros-Bug, Ingulo-Middlednieper, Periasov) that located under the Ukrainian shield display spatial correlation with basic-ultrabasic magmatism that confined to the blocks boundaries. Age of this magmatism varies from Paleoproterozoic to Neoproterozoic.

Velocity model of the south-western part of the East-European platform obtained by the method of seismic tomography employing methodology of the Taylor's approximation of the solution of the task of seismic tomography of the times of arrivals of P-waves developed by V.S. Geyko [1]. Solution is represented as a series of horizontal and vertical sections. Vertical (latitudinal and longitudinal) sections represented to the 850 km depths with 1 [U+F0B0] step as residuals relative reference 1-D model that was obtained due to solution of the seismotomographic task for Eurasia. Horizontal sections are imagined as true velocities at depths from 50 to 850 km with step 25 km [2].

[1] V.Geyko General theory of seismic tomography of travel time// Geophysics journal. – 2004.-№2. – .3-32.

[2] V.Geyko, T.Tsvetcova, L.Shumlyanska, I.Bugaienko, L.Zaiets Regional 3-D velocity model mantle of Sarmatia (southern-western Eastern-European platform)// Geophysics journal. – 2005.-№6. – .927-939.