thickness of a sedimentary cover from 2,5—4 km above ledges of the base up to 5,5—6,0 km above the immersed blocks. The Dnieper-Donetsk graben extends in a southeast direction from 75—90 km up to 110—130 km, being correlated with increase of a sedimentary cover in board zones from 3—4 km in the west up to 6—7 km in the east, and along an axial zone — from 6 up to 18 km in the same direction.

4. The bottoms of paleorifts ("rift valleys") are formed by "the breccia of rubbing" arisen under influence of transcontinental shift and consisting mainly from different sizes products of grinding blocks of crystalline rocks from basement and vulcanites. The range of the sizes of these "products" is very wide: from blocks in volume in hundreds cubic kilometers up to boulders and pebbles. A filler of these breccia are products of erosion and drift from onboard sites (mainly clastits), endogenous materials (effusive and halogens), chemic- and biogenic materials (carbonates). The same initially not consolidated deposits provided noncompensated filling of paleorifts.

Proceeding from the above stated representations, and taking into account an idea about of structure (fractality) and "geoblock divisibility" of the earth's crust [Krasnyi, 2005; Zankevich, 2006], the structure of paleorifts (their board`s and bottom) can be represented as system of relatively stable weakly deformed ("rigid") blocks divided by labile (unstable) zones of "hummocking". Stable blocks under influence of transregional shift deformations exercise some progress-rotary movement, and labile zones compensate superfluous pressure, playing a buffer role between blocks. Indicators of labile zones are anticlinal folds and chains of positive structures in a sedimentary cover. The majority of structures have attributes of imposed folding (dragging, squeezing, etc), complicated by halokinesis. Within the limits of labile zones the salt domes, often built in rhythmical chains or ring formations are located all. The overwhelming majority of oil and gas fields containing the lion's share of oil-gas provinces is related to labile zones.

Thus, the new approach is outlined in the tectonic zoning of the Pripyat-Dnieper-Donetsk oil-gas province and allocation on this basis of perspective zones of oil-gas accumulation that should raise a level of a scientific substantiation of accommodation of volumes of exploration.

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Constraining the composition, density and thermal state of the lithospheric mantle of the Siberian craton from inversion of seismic data

© *O. Kuskov, V. Kronrod, A. Prokofyev, 2010*

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Quantitative estimation of the temperature distribution in the Earth's mantle is a key problem in petrology and geophysics. In this study, we discuss the method of estimating temperature, composition, density and thickness of the subcontinental lithospheric mantle beneath the Siberian craton from absolute seismic velocities. The phase composition and physical properties of the lithospheric mantle were modelled within the Na_2O-TiO_2-CaO-FeO-MgO-Al_2O_3-SiO_2 system including the non-ideal solid solution phases. For the computation of the phase diagram for a given chemical composition, we have used a method of minimization of the total Gibbs free energy combined with a Mie-Grüneisen equation of state. Our forward calculation of phase diagram, seismic velocities and density and inverse calculation of temperature includes anharmonic and anelastic parameters as well as mineral reaction effects, including modes and chemical compositions of coexisting phases. Sensitivity of density and velocities to temperature, pressure and composition was studied. Inverse code computes the temperature distribution in the upper mantle from seismic and compositional constraints. The output results contain the self-consistent information on phase assemblages, densities and velocities. The approach used here requires a small number of thermodynamically defined parameters and has important advantages over earlier procedures, which contain no information about entropy, enthalpy and Grüneisen parameter. We inverted for temperature the recent velocity models of the Siberian craton as well as the IASP91 reference Earth model. Several long-range seismic profiles were carried out in Russia with Peaceful Nuclear Explosions (PNE). The velocity models from PNEs recorded along these profiles were used to infer upper mantle temperature profiles beneath the Siberian craton. The seismic profiles were inverted on the basis of low and high temperature xenoliths of garnet peridotites from kimberlite pipes of the cratons in order to gain insights into the temperature sensitivity to variations in the composition and mineralogy of xenoliths. Such a test can provide constraints on the compositional (vertical and lateral) heterogeneity of the upper mantle. 1D and 2D thermal and density profiles of the lithospheric mantle for the Siberian craton are discussed. We derive a lithosphere thickness of roughly 300 km for the Siberian craton by the intersection of the calculated temperature profile in the conductive region with the potential mantle adiabat.

Surface heat flow and thermal structure modelling of the Lithospere in the Black Sea region

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The Black Sea Basin is a deep marginal depression within the Alpine belt. It is surrounded by tectonic features of different ages from pre-Cambrian to Neoalpine whose major elements mainly extend to the Black Sea shelf.

Low heat flow density (20—40 mW/m^2) dominates in the Black Sea. The lowest (< 30 mW/m^2) values have been recorded in central parts of the Western and Eastern Black Sea Basines with maximal sediment thickness. The area of low values occupies the most Western Black Sea Basin, where the “granitic” layer of the crust is absent. The thermal field is slightly differentiated. In the Eastern Black Sea Basin the thermal field is more differentiated. Here several high and low heat flow anomalies are distinguished. Low heat flow covers the most part of the Eastern Black Sea depression, slopes of the Andrusov and Shatsky elevation. A series of limited low (20—30 mW/m^2) heat flow anomalies are identifiable along the Crimea and Caucasian coast. Several high heat flow anomalies are distinguished in the central, northern and southern parts of the depression.

On the periphery of the Black Sea depression the heat flow changes mainly in the range of 20—150 mW/m^2. Abnormal heat flow density tends to occur mainly along the zones of active faults, mud volcano, mud diapirism, fluid and gas fluxes.

On the continental slope and shelf zone of the Black Sea a distribution of heat flow is influenced by land features. Its variation is controlled by geodynamic peculiarities and geological history of adjacent tectonic feature on land. Significant variations in heat flow indicate different ages of tectonic elements and/or repeated tectonic rejuvenations at different time. Heat flows increase from older struc-