тай) предлагается новая модель возникновения и развития медно-рудной провинции.

Научная новизна. Разработана модель возникновения и развития Цетрально-Казахстанской медно-рудной провинции, объединяющая месторождения разного генезиса, возраста и рудного потенциала в единую рудно-магматическую систему. Модель формирования медно-порфировых месторождений (накопление – транспортировка – садка) идеально объясняет разный генезис Центрально-Казахстанских одновозрастных месторождений.

Практическая значимость. В пределах Центрально-Казахстанской медно-рудной провинции необходимо проводить изотопные исследования. Приоритетным объектом для детального изучения является кальдерная рудно-магматичексая система Бесшоки, на основе того, что, по статистике, около 85 % медно-порфировых и 100 % медно-скарновых руд залегают либо в магматических породах, либо на контакте с ними.

Ключевые слова: *геодинамика, датировка, провинция, магматические породы, Центральный Казахстан*

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TAKING INTO ACCOUNT OF INFLUENCE OF EARTH CRUST FAULTS IN SOLVING GEOLOGICAL AND GEOECOLOGICAL TASKS BY GEOPHYSICAL METHODS

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УРАХУВАННЯ ВПЛИВУ РОЗЛОМІВ ЗЕМНОЇ КОРИ ПРИ ВИРІШЕННІ ГЕОЛОГОРОЗВІДУВАЛЬНИХ І ГЕОЕКОЛОГІЧНИХ ЗАВДАНЬ ГЕОФІЗИЧНИМИ МЕТОДАМИ

In honor of the famous scientist-geophysicist
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Purpose. Application of the New Rotational Hypothesis of Structure Formation in the Earth's Crust, advanced and substantiated by K. F. Tiapkin for solving not only geological exploration problems, but also geoecological ones of technogenically loaded regions of Ukraine.

Methodology. Theoretical and empirical methods of studying tectonic movements in the features of the fault-block structure, as well as modeling and prediction of the modern geoecological situation according to the complex of geological and geophysical methods are used.

Findings. It has been confirmed that almost all movements of the earth's crust are associated with tectonic faults. The nature of these movements can be determined from the geological and geophysical data on the forms of the fault-block structure of the earth's crust. And the faults are not only of structure-forming and ore-controlling importance, but are one of the main factors determining the geo-ecological situation in any region as well.

Originality. The New Rotational Hypothesis of Structure Formation in the Earth's Crust, advanced and substantiated by K. F. Tiapkin in the mid-1980s became one of the most important stages in the study of faults. This hypothesis does not only explain the global patterns (which allow us to successfully predict ore and oil-and-gas deposits in various structural and geological conditions), but it has also become the basis for solving modern geoecological problems of technologically stressed regions of Ukraine successfully.

Practical value. It is shown on the example of the south of Kryvbas, that the New Rotational Hypothesis of Structure Formation in the Earth's Crust by K. F. Tiapkin also works with large-scale geophysical studies of fault-block tectonics of technologically stressed regions. It allows not only determining the complexity of the tectonic structure of the studied territory, but also creating a basis for assessing the "stability" of single sites to dangerous manifestations of modern geoecological processes

Keywords: *faults, geoecological problems, geophysical methods, Kryvyi Rih iron ore basin, New Rotational Hypothesis of Structure Formation in the Earth's Crust, Ukrainian Shield*

Introduction. Modern tectonic movements are diverse in their type, kinematic forms, and the mechanism of occurrence. The intensity and direction of these movements varies in very short intervals. These movements influence the dynamics of the stress state of the Earth's crust, vertical and horizontal movements of the neo-morphostructures, relief forms, modern relief-forming processes, landscapes, modern sedimentation, geophysical fields, geochemical processes, surface water level fluctuations, etc. [1, 2]. These movements, as well as most other geological processes are not always available to direct study because of the long duration. However, they can be studied by the features of the fault-block structure of the Earth's crust, which are the final result of tectonic movements [3, 4]. The study of tectonic faults is one of the key moments of the geological prospecting process. The faults have a structure-forming and ore-controlling value. They are the ways of entering and accumulating ore elements in deposits [5]. Spatio-temporal instability of the stress-strain state of the Earth's crust (which is determined by the tectonic activation of deep faults) has a significant effect on the speed and pathways of hydrocarbon migration, which determines the location of oil-and-gas deposits [6].

Active deep faults in addition to clear "traditional" "stationary" anomalies of potential geophysical fields (steps, linear local anomalies, linear boundaries of changing the pattern of field isolines, irregularities in their behavior) have an anomaly in the variations of the electromagnetic and gravitational fields, as well as in changes in underground concentrations of helium and radioactive gases. Due to various geodynamic processes in the tectonic zones and changes in the concentrations of helium and radioactive gases (radon, thoron) within the faults (both in bedrock and in overlapping sedimentary rocks and soils) the quantitative relationships between the deformations are determined on the basis of analysis of various types stresses, as a result of changes in the Earth's rotational regime, the magnitude of the lunar-solar attraction (Earth tides), atmospheric pressure and other natural factors. The diverse and contrasting geophysical anomalies from the internal structure and the dynamics of faults make it possible to study their modern activity by a complex of geophysical methods successfully [2, 4].

The most important stage in the study of faults was the New Rotational Hypothesis of Structure Formation in the Earth's Crust, advanced and substantiated by K. F. Tiapkin [7, 8]. The main reason for its appearance was the need to clarify the patterns of the spatial location of fault structures within the Ukrainian Shield (USh) on geological and geophysical data. Global regularities (which make it possible to successfully predict the presence of ore and oil-and-gas deposits in various structural geological conditions) have been revealed.

The objective of the article. The purpose of our work is to illustrate the possibilities of expanding the application of the main provisions of the New Rotational Hypothesis of Structure Formation in the Earth's Crust, advanced and substantiated by K. F. Tiapkin, on the solution of modern urgent geoecological problems of technogenically loaded regions of Ukraine.

Presentation. ***Beginning of the New rotational hypothesis of structure formation in the Earth's crust of K. F. Tiapkin.*** Initially, the term "fault" was used by researchers as a generalized concept of discontinuous disruption of rock continuity with insufficient actual data to determine its kinematic characteristics. During the dominance of the concept of geosynclines and platforms, faults in the Earth's crust were taken into account only at the final stages of formation of geosynclinal structures. They did not participate in the formation of these structures, but only violated the basic forms of folding. And only thanks to A. V. Peive from the whole set of faults a special class of deep faults (that take part in the formation of geological structures) was allocated.

Modern concepts of the spatial distribution of faults of the Earth's crust (tectonosphere) are the following. These faults are volumetric interblock structures with a straight line and a considerable width along the laterals. Specific linear folding and secondary processes (zones of crushing, cataclasis and milinitization), as well as small breaks, occur within faults. Faults are arranged involuntarily, but form systems. Each system consists of hierarchically co-ordinated faults in two mutually orthogonal directions. The intersection of these faults forms the corresponding system of blocks. The Earth's crust is ubiquitously shattered by a system of orthogonal cracks into blocks with sizes ranging from centimeters to tens and even hundreds of kilometers. Each system of cracks has a hierarchy – from microcracks to deep faults. And the planes of planetary cracks are mechanically active and motions along them play a significant role in deformation of rocks.

According with the New Rotational Hypothesis of Structure Formation in the Earth's Crust by K. F. Tiapkin – rotational stresses arise and gradually accumulate [7, 8]. When they reach the tensile strength of the rocks of the tectonosphere (10^7 Pa), their discharge and subsequent tectonic activation of the Earth occur [9]. As a result of each such activation, a fault system and the corresponding system of tectonosphere blocks are formed. Thus, faults of the tectonosphere are the parent structures that form the basis for the formation of all other structures in the Earth's crust up to the day surface.

According to Yu.A. Kosygin ~ 84 % of all known postmagmatic ore deposits in the world are found along faults or at their intersections. And according to one of the postulates of the New Rotational Hypothesis of Structural Formation in the Earth's Crust by K.F. Tiapkin – large faults of the same order in each system must have a certain metallogenic specialization. It may be complicated by the process of the participation of faults or their individual fragments in subsequent tectonic activations, and also as a result of mutual crossing of faults by other systems. Both regularities are based on the participation of faults in the formation of magmatic melts in the tectonosphere and subsequent transport of magma (as the main source of ore material) up to the surface of the Earth's crust.

Not only ore, but also oil-and-gas deposits (brachianticline, salt-dome structures, porous reefgenic massifs of carbonate rocks) are spatially closely connected with systems of faults of the Earth's crust, although the genetic nature of these connections is different. The most widespread local structures of the anticlinal type are formed in the sedimentary cover in the process of activation of large fractures of the crystalline basement. In this case, the chipping folding mechanism is realized. The lifting of one of the crystalline basement blocks along the fault and the deformation of the reservoir (up to the flexural form) takes place in the first act. In the next act (when changing the tectonic regime – changing the direction of movement of crystalline basement blocks along the fault) the reservoir is subject to deformation of an opposite nature, but as a result it does not return to the original (horizontal) form. Under the influence of residual deformation, it takes the form of a shallow anticline, with amplitude much less than the amplitude of the original flexure, but this is sufficient to form a reservoir for accumulating hydrocarbons. Structural traps of hydrocarbons of non-anticlinal type are also of great interest for researchers. They are formed in special conditions of sedimentation during the activation of faults in crystalline basement, including a wedging of reservoir strata and facies screening substitutions in reservoirs.

The role of faults of the Earth's crust during the formation of salt diapirs, which screen the reservoirs that they break through, are the following. The faults of the Earth's crust are original channels through which deep heat is supplied to the saline horizons. Heated salt becomes more plastic and is able to move. In addition, activated fractures of the foundation disintegrate the sediment above them and form channels for the movement of salt. And even oil fields in buried coral reefs are also closely related to faults of the Earth's crust, because ancient coral colonies, like modern ones, formed on the border (large faults of the Earth's crust) of the shelf and deep-water parts of the sea basins.

Thus, the spatial-genetic relationship of both ore and oil-and-gas deposits with fault systems of the Earth's crust is the basis for the original and widely used (in the geological prospecting process) technology for local prediction and prospecting of ore and oil-and-gas deposits based on spatio-temporal patterns from the New rotational hypothesis of structure formation in the Earth's crust by K.F. Tiapkin [7, 8].

Geoecological significance of faults of the Earth's crust. Along with the above-mentioned their own "geological exploration significance", faults are one of the main factors determining the geoecological situation in any region. In fact, populated areas and large industrial production are located near rivers. And the river network is completely predetermined by fault systems. Traces of the largest of the faults on the surface of the Earth have a width of several tens of kilometers. Ore deposits on the crystalline shields and local structures in the sedimentary cover of the oil-and-gas regions (traps for hydrocarbons) are also located along the faults, which predetermines the development of the mining and oil-and-gas industry respectively.

Now there is an increasing understanding of the key role of tectonic movements along the faults of the Earth's crust (causing or activating dangerous natural and technogenic processes of various scales) in studies of all geoecological processes on the surface and in the bowels of the Earth [8, 10]. Information on the need to take into account various tectonic conditions, in the main directions of geoecological research, is summarized in Table 1.

Modern activation of faults forms the basic geoecological features of the geological environment. Faults are three-dimensional geological bodies with their internal structure, characterized by a complex of geological, geophysical, geomorphological, hydrogeological, geochemical and other characteristics and accompanied by various natural and technogenic processes on the surface and in the bowels of the Earth. Each "living" fault is the source of regular local stress and strain fields that determine the increased fracturing and water permeability of the rock massifs (both the crystalline basement and the sedimentary cover), the high velocity of modern vertical and horizontal movements of the crust, potential ravine zones, subsidence, landslides and other modern exogenous geological processes. The faults may disrupt the protection of underground aquifers from pollution being pathways for the migration of natural and technogenic chemical elements and compounds (industrial liquid waste, oily fluids, saline water, etc.). Close relationship of landslides with faults should be particularly emphasized – their activation is caused by "skewing" of the blocks of the crystalline basement, covered with rocks prone to slipping. And faults are continuous sources of various gases (helium, hydrocarbons and radioactive gases) and waveguides of physical fields (electromagnetic, thermal, elastic and others) that have a direct effect on a person [10].

Therefore, mapping of spatial features of the tectonic structure of technologically stressed territories occupies a special place among studies of the specific influence of geological factors on the geoecological situation of these territories [11, 12]. The choice of methodological basis for such studies should take into account as follows [13, 14]. Because of the current economic difficulties, geoecological mapping (as an independent type of work) is impossible. Such works on medium and large scale are very expensive and time-consuming. However,

Table 1

The significance of the tectonic factor in the solution of basic geoecological problems

№	The main directions and tasks of geoecological research in conditions of technologically stressed regions	Tectonic conditions					
		Single fault		Intersection of faults close in direction		Intersection of multidirectional faults	
		Active	Passive	Active	Passive	Active	Passive
1	Zoning of territories by the sensitivity of rocks to different types of pollution and obtaining quantitative indicators of the influence of the pollutant on the geological environment	++	++	++	++	++	++
2	Mapping of man-made areolas of contamination with heavy metals (including radionuclides)	++	+	++	+	++	+
3	Determination of the boundaries of pollution and the trends of its changes	++	+	++	++	++	++
4	Mapping of land underflooding, landslide and karst-suffosion processes	++	+	++	+	++	+
5	Prediction and assessment of physical and mechanical properties of the upper part of the geological section	+	+	++	+	++	+
6	Prediction of geological section and stress state of rock massifs within the mining enterprises and the durability of the sides of the designed open pits	++	+	++	+	+	+
7	Search for possible leakage of corrosive waste from slurry tanks and tailing ponds	++	+	++	+	+	+
8	Search for places and study of the filtration process through the dam	++	+	++	+	+	+
9	Prediction of possible places for the breakthrough of buried sewage and mineralized waters into fresh aquifers	++	+	++	+	++	+
10	Monitoring of the state (including corrosion) of underground communications	++	+	++	+	+	+
11	The study of parameters of the upper part of the geological section in the amelioration of farmland	+	+	++	+	++	+

Note. Consideration of the corresponding tectonic situation: "++" – must be considered; "+" – potentially it will increase the efficiency of solving the geoecological problem

the crisis state of the environment in most regions of Ukraine requires prompt action. Therefore, geoecological research is often carried out along with other types of geological exploration – with less completeness, accuracy and reliability, but at a small additional cost. In such conditions, the role of geophysical methods (and especially the so-called "light" methods – gravimetric and magnetic prospecting, which are most effective among geological and geophysical methods in studying the tectonic structure of closed areas) is growing significantly. In addition, a lot of information accumulated by these methods on a significant part of the territory of Ukraine and suitable for solving modern problems of geoecology successfully (without any additional costs) already exists. Thus, geological and geophysical information about fault systems of the Earth's crust may be successfully used for parametrization of features of tectonic structure under geoecological mapping and for subsequent monitoring of technogenically loaded regions of Ukraine.

"Geoecological" parametrization of structural-tectonic structure features. The generally accepted notion that fault crossing zones are more "fragmented" parts of the Earth's surface that are more "susceptible" to the action of dangerous natural-technogenic geoecological processes may be used as a basis for this parametrization. The base of the parametrization is a modified map of fault systems, based on the standard procedure [7, 8].

This modification is a change in the procedure for determining the horizontal width of the faults. In geological exploration, it is important to determine the horizontal boundaries of faults, where mineral deposits are confined. But geoecological studies should focus on tracing the axial fault lines, rather than mapping their boundaries. A more precise definition of these boundaries is possible only to solve a specific problem (mapping of areas with dangerous exogenous geological processes or directions of distribution of emergency pollution, etc.).

The basis of geoecological studies is the spatial summation of the fault indicators of all systems per unit area. An important feature revealed is the discrepancy between the anomalies of the spatial density of even close (in geological time) groups of fault indicators – the relief features of the crystalline basement of USh and the modern relief. The study of the anomalies of the spatial density of specific groups of fault indicators allows us to determine the activation time of these faults. Therefore, in addition to studying the "spatial" features of the fault-block structure, it is possible to refine the results obtained, taking into account the activation of individual fragments of the faults at different intervals of geological time. The criterion for identifying active ("living") faults is the degree of anomaly (the intensity of anomalies and their linear extent) of different groups of their indicators, in which specific stages in the history of fault formation are "encrypted". "Live" fragments of faults have a high anomaly in all groups of indicators [10]. Identified active fragments of faults are located on the study site not arbitrarily, but form anomalous areas. For example, on the territory of the Serednioprydnsprovskyi megablock of USh, the active fragments of faults are concentrated over greenstone structures. Here the correlation between the zones of electrical conductivity of the lower crust and upper mantle and depth to the Mohorovicic surface is based from the data of medium-scale density modeling and two-dimensional modeling of magnetotelluric sounding curves. Analysis of the Mohorovicic surface forms under the main geological structures allows us to establish the relationship between the features of the shape of this surface and the tectonic structures of the Precambrian basement and sedimentary cover.

Below, specific features of the "geoecological" parametrization of the tectonic structure will be considered on the example of the south of the Kryvyi Rih iron ore basin (Kryvbas), the largest old industrialized technogenically loaded mining and metallurgical region of Ukraine.

Kryvbas is a complex natural and man-made system where a long, intensive mining activity, together with the functioning of the industrial and urban agglomeration (without protection and restoration of the environment) led to the depletion of environmental capacity. In the conditions of intense natural and man-made fracturing of Kryvbas rocks, the mineralized waters (from the tailing ponds and storage ponds of mine waters) migrate to aquifers and, as a result, intensify soil salinization and karst activation. The difference in the speed of vertical displacements of neighboring blocks (between which tailings ponds are created) may cause deformation and destruction of dams with catastrophic mudslides. A high probability of natural and technogenic-natural emergencies exists throughout the territory of Kryvbas as a result of interaction of natural geodynamic and technogenic processes. The interconnection of dangerous modern geodynamics with the features of the fault-block structure is defined here. Numerous small faults (dividing the main sub-meridional strata of metamorphic rocks of the Kryvyi Rih series into blocks) were revealed by the results of geological and geophysical studies. The movement of these blocks already in the Precambrian caused considerable fluctuations in the lower boundary of the iron ore strata. In particular, the anomalous (in geoecological and engineering-geological sense) area of intersection of faults close in direction (in the center of which the main objects of the Inhulets Mining-Processing Combine are concentrated) is found in the south of Kryvbas [10]. Here zones of tectonic fracturing are determined by areas of active interconnection of underground and surface waters. Numerous facts testify to the active influence of faults on the dynamics of underground water, changes in the filtration characteristics of water reservoirs, vertical filtration and transit flow between different-level aquifers, etc. As a result of our research near the storage pond of highly mineralized mine waters in the Svistunovo gorge, a direct link between the indicators of tectonic fragmentation and the degree of water abundance of rocks, as well as the connection of high water conductivity to the open tectonic cracks, was revealed. It should be noted that the location of this storage pond by structural geological and hydrogeological conditions is "unsuccessful". The Svistunovo gorge for most of its stretch inherits a regional faulting with clear signs of neotectonic activation. Here, intensive tectonic fragmentation of rocks is the reason for increasing filtration parameters and deterioration of physical and mechanical properties of rocks and, as a result, intensification of suffosion-karst processes. The danger of these processes increases with an increase in the technogenic load (with excessive filling of the storage pond with mine water). The result is abnormal emptying of the pond and contamination of underground water. The location of the dam of the storage pond coincides with a powerful neotectonically active geodynamic zone, which clearly manifests itself in the modern relief (and in aerial and satellite imagery). Thus, all attempts to provide hydraulic stability of the storage pond in the Svistunovo gorge are only temporary. Further operation of this storage pond requires not only the organization of a hydrological and hydrogeological monitoring system, but also the prediction and mapping of possible contamination zones along tectonic zones of increased permeability.

The electrical exploration data of Dnipro geophysical expedition "Dniproheofizyka" in the modification of vertical electric sounding (VES) were analyzed at the first stage of the research. 14 sublatitudinal and submeridional profiles of the VES (with a step – 200 meters and $AB \leqslant 300$ m) were worked out in this area. Linear VES with small spacing were on some profiles for a detailed study of the upper part of the aeration zone. The VES

profiles were worked out with small spacing (which fixed the geoelectric resistance of the first meters of the geological section from the surface) to dismember the upper part of the geological section and establish the depth of the capillary humidification. Repeated (after 4 years) VES were performed on the main profiles to determine the changes in spatial-temporal geoelectric characteristics of rocks due to changes in hydrogeological conditions.

As a result of the joint interpretation of gravimetric, magnetic and electrometric observations, numerous tectonic faults are revealed here. They are most clearly manifested in the gravitational field as numerous zones of elevated horizontal gradients, often coinciding with the anomalous and gradient zones of the geoelectric field. The geoelectric properties of the stratigraphic section of sedimentary rocks were obtained from the interpretation of the VES data. The layers of rocks with different electrical resistance were defined as aquifers or waterproof horizons. Their moistening and the presence of high permeability zones in them were determined by the electrical resistance.

The results of repeated observations showed that the resistivity of the geological section as a whole decreased. Reduction of geoelectrical resistance for 4 years is predominantly in the upper part of the sedimentary cover. This is an indication of the modern moistening of almost all stratigraphic horizons. The main differentiation of geoelectrical resistance is up to a depth of 50 meters.

The constructed tectonic map (based on the interpretation of the local component of the gravitational field) and the geoelectrical resistance change map (from 2008 to 2012) are quite well combined (Figure). On these maps the area of lowering the underground water level (with western and north-western direction) is allocated to the south from the tailing ponds of the Southern Mining-Processing Combine. This area is formed as a result of "keyboard" vertical displacements of small blocks of the crystalline basement, which influence the hypsometic level of aquifers and waterproof horizons. The configuration of this area is due to systems of north-western and latitudinal faults.

Thus, it has been established that not only the tailing ponds of the Southern Mining-Processing Combine but also the mineralized filtration waters from the storage pond in the Svistunovo gorge may be sources of potentially dangerous geoecological impact on the hydrogeological situation in the south of Kryvbas (including settlements near the Inhulets River). Significant filtration of the water flow is from the Svistunovo gorge along the fault systems in the north-west direction to the Inhulets River. This is also evidenced by the presence here of a trough-shaped deflection of the same direction of the waterproofing surface (Kyiv suite clay) [15].

Conclusion. Almost all movements of the Earth's crust are associated with tectonic faults. These movements have a long duration and are slow, so they can be studied only on the basis of final results – the features of the fault-block structure of the Earth's crust.

The diverse and contrasting geophysical anomalies from the internal structure and dynamics of faults are the basis for studying their modern activity by a complex of geophysical methods.

New rotational hypothesis of structure formation in the Earth's crust by K. F. Tiapkin is the most important stage in the study of faults of the Earth's crust. He revealed global patterns for successful prediction of ore and oil-and-gas deposits in various structural geological conditions.

Since faults of the Earth's crust are one of the main factors that determine the geoecological situation in any region, this hypothesis may also be the basis for the successful solution of current geoecological problems of technologically stressed regions of Ukraine.

The results of our studies of the territory of the south of Kryvbas confirm that the New rotational hypothesis of structure formation in the Earth's Crust by K. F. Tiapkin is also valid for large-scale geoecological mapping. Its application allowed determining and localizing (on the basis of a complex of geological and geophysical data) potentially dangerous geoecological impact on the hydrogeological situation of settlements near the Inhulets River the tailing ponds of the Southern Mining-

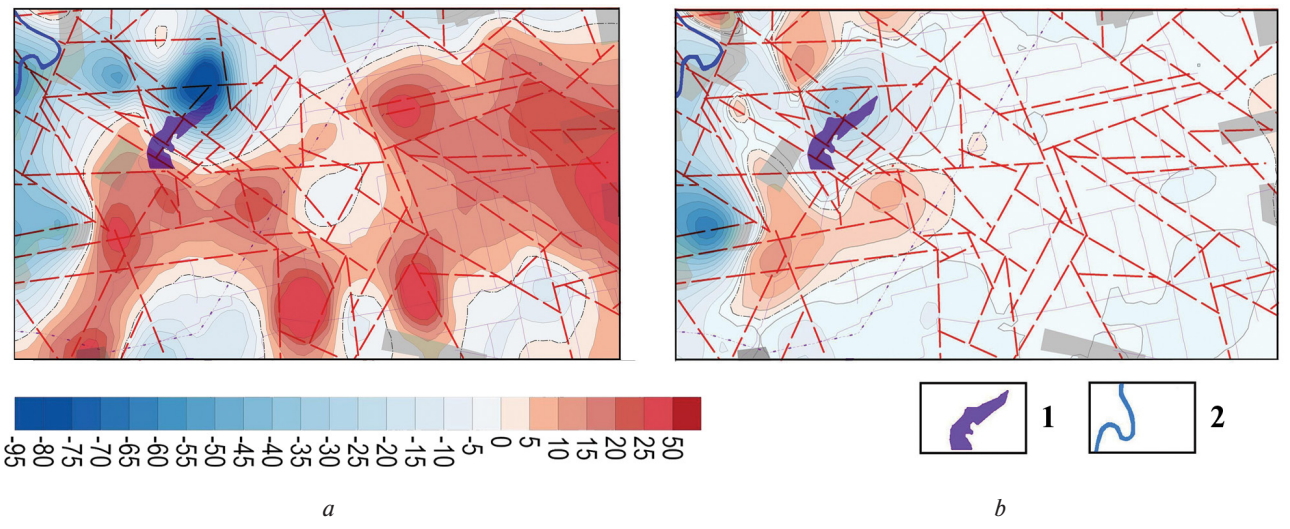

Fig. Combining constructed tectonic map and geoelectrical resistance change (from 2008 to 2012) map: a – AB/2 = 2 m, b – AB/2 = 11 m (1 – storage pond in the Svistunovo gorge, 2 – Inhulets River)

Processing Combine and mineralized filtration waters from a storage pond in the Svistunovo gorge. These waters spread from this gorge along the north-west fault system to the Inhulets River.

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Мета. Застосування Нової ротаційної гіпотези структуроутворення в земній корі, висунутої та обґрунтованої К. Ф. Тяпкіним, для вирішення не тільки геологорозвідувальних, але й геоекологічних проблем техногенно навантажених регіонів України

Методика. Використані теоретичні та емпіричні методи вивчення тектонічних рухів за особливостями розломно-блокової будови, а також моделювання й прогнозування сучасної геоекологічної ситуації за даними комплексу геолого-геофізичних методів.

Результати. Підтверджено, що практично всі рухи земної кори в тій чи іншій мірі пов'язані з тектонічними розломами. Щодо характеру цих рухів можна судити за результатами геолого-геофізичних досліджень форм, відображених у розломно-блоковій будові земної кори. При цьому самі розломи мають не тільки важливе структуроутворююче й рудоконтролююче значення, але й є одними з основних факторів, що визначають геоекологічну обстановку будь-якого регіону.

Наукова новизна. Одним із найважливіших етапів у вивченні розломів стала Нова ротаційна гіпотеза структуроутворення в земній корі, висунута та обґрунтована К. Ф. Тяпкіним у середині 1980-х років. Ця гіпотеза не тільки пояснює глобальні закономірності, що дозволяють успішно прогнозувати наявність рудних і нафтогазових родовищ у різних структурно-геологічних умовах, але й стала базовою для успішного вирішення сучасних актуальних геоекологічних проблем техногенно навантажених регіонів України.

Практична значимість. На прикладі півдня Кривбасу показано, що Нова ротаційна гіпотеза структуроутворення в земній корі К. Ф. Тяпкіна працює й при великомасштабних геофізичних дослідженнях розломно-блокової тектоніки техногенно навантажених регіонів. Вона дозволяє не тільки визначити складність тектонічної будови досліджуваної території, але й створити основу для оцінки „стійкості" окремих ділянок до небезпечних проявів сучасних геоекологічних процесів.

Ключові слова: *розломи, геоекологічні проблеми, геофізичні методи, Криворізький залізорудний басейн, Нова ротаційна гіпотеза структуроутворення в земній корі, Український щит*

Цель. Применение Новой ротационной гипотезы структурообразования в земной коре, выдвинутой и обоснованной К. Ф. Тяпкиным, для решения не только геологоразведочных, но и геоэкологических проблем техногенно нагруженных регионов Украины

Методика. Использованы теоретические и эмпирические методы изучения тектонических движений по особенностям разломно-блокового строения, а также моделирование и прогнозирование современной геоэкологической ситуации по данным комплекса геолого-геофизических методов.

Результаты. Подтверждено, что практически все движения земной коры в той или иной мере связаны с тектоническими разломами. О характере этих движений можно судить по результатам геолого-геофизических исследований форм, запечатленных в разломно-блоковом строении земной коры. При этом сами разломы имеют не только важное струк-

турообразующее и рудоконтролирующее значение, но и являются одним из основных факторов, определяющих геоэкологическую обстановку любого региона.

Научная новизна. Одним из важнейших этапов в изучении разломов явилась Новая ротационная гипотеза структурообразования в земной коре, выдвинутая и обоснованная К. Ф. Тяпкиным в середине 1980-х годов. Эта гипотеза не только объясняет глобальные закономерности, которые позволяют успешно прогнозировать наличие рудных и нефтегазовых месторождений в различных структурно-геологических условиях, но и стала базовой для успешного решения современных актуальных геоэкологических проблем техногенно нагруженных регионов Украины.

Практическая значимость. На примере юга Кривбасса показано, что Новая ротационная гипотеза структурообразования в земной коре К. Ф. Тяпкина работает и при крупномасштабных геофизических исследованиях разломно-блоковой тектоники техногенно нагруженных регионов. Она позволяют не только определить сложность тектонического строения изучаемой территории, но и создать основу для оценки „устойчивости“ отдельных участков к опасным проявлениям современных геоэкологических процессов.

Ключевые слова: *разломы, геоэкологические проблемы, геофизические методы, Криворожский железорудный бассейн, Новая ротационная гипотеза структурообразования в земной коре, Украинский щит*

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