A B S T R A C T S

GEOLOGY

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CONDITIONS OF TRAPPED GAS ACCUMULATIONS IN THE COURSE OF SELECTIVE FLOODING OF DEPOSITS

In the given article the authors have analyzed the mechanism of a gas reservoir trapping in the water-flooded areas of deposits in conditions of water drive occurrence under stratal waters income to the gas-saturated pore volume. It has been found out that the mechanism of trapped gas deposits by raising the level of gas-water contact and selective flooding are fundamentally different by volumes of locked gas, the rate of formation and approach to its production.

It has been found out already at the early stages of research that selective water streams intrude into low-power high-permeable layers by section and the area of deposits reducing formation pressure. They dissect the initial gas-saturated pore volume into several volumes, which are hydrodynamically-trapped in varying degrees. That is, it creates a hydrodynamic macroinhomogeneity of megavolumes accumulations, what is the current effective gas-saturated pore volume amounts about 80-95%, and only 5-20% of the volume occupied by the medium stratum water. Due to the layering (volatility) of the pore space in certain areas of the collector layer there are observed "lithological windows", therefore the above and embedded in the section selective water streams are connected and there is the effect of the cut-off and trapping of significant values of gas by stratum water. It is concluded that it is during the selective stratal waters implementation is spread the negative phenomenon of gas accumulations trapped which may be equivalent by volume to industrial deposits. It is suggested that the trapped volumes of gas formed by selectively flooding are called hydrodynamic-trapped gas accumulations. The conditions of their formation are researched on the basis of studying the processes of selective deposits flooding of Timofeevska, Kotelevsky, Berezovsky and other fields.

On the assumption of characteristics of the hydrodynamic-trapped gas accumulations at the expense of selective flooding it is offered in each case in the sequence to determine unflooded gas-saturated deposits intervals and test them for subsequent extraction of dry gas.

Keywords: trapped gas, selective flooding, hydrocarbon deposits.

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THE STATE OF KNOWLEDGE AND RESEARCH PROBLEMS OF THE MOUNT CRIMEA JURASSIC STRATOTYPES

On the basis of published literature and industrial geological reports data analysis of the Mount Crimea Jurassic standard sections state of knowledge has been conducted. The history of the Mount Crimea Jurassic deposits stratigraphic subdivision is traced. Stages in the study of suites stratotypes are distinguished.

First, units of general stratigraphic scale – tiers – have been distinguished in the Mount Crimea. Units of local scale – suites – have been provided after the establishment of tiers. In the 20 th - 60 th years for the first time the local stratigraphic units in the Mount Crimea Jurassic deposits were distinguished. The authors confined to a brief description of units and did not give stratotypical characteristics. In the 70s - 80s the regional stratigraphic scheme of the north-western coast and the shelf of the Black Sea Jurassic deposits by Y.V. Teslenko, etc. was published. There are 19 suites on the scheme, 7 of them have been distinguished for the first time. In 90 - 00 a new scheme of the Mount Crimea Jurassic deposits by V.V. Permyakov, M.N. Permyakova, B.P. Tchaikovsky was presented. There were at first isolated horizons as well as 10 new suites. The Mount Crimea Jurassic deposits key sections depth studies carried out in 1985-1990 by B.P. Tchaikovsky preceded the publication of this scheme. 2nd half of 2000th – a current stage is characterized by a sharp decline in the volume of ongoing geological survey, processing and compilation of accumulated geological information. Some sheets of the State Geological Map of Ukraine – 200 Crimean series were published. According to the view adopted by its compilers and fully supported by the previous scheme, there were distinguished 8 horizons that include 29 suites. Establishment of the Jurassic - Cretaceous boundary in Eastern Crimea is an important scientific achievement at this stage.

Keywords: stratotype, suite, Mount Crimea, Jurassic, regional stratigraphic scheme.

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GEOFLYUIDODYNAMIC SYSTEM OF THE DNIEPER-DONETS BASIN – FORMATION AND DEVELOPMENT

The Dniper-Donetsk cavity (as a basic structure- tectonic element of oil-and-gas bearing province) is an integral part of the complement of the Rifocinum systems of the Eastern Europe platform and is an area of intensive alteration of the earth's crust and overhead mantle.

Up till now within the limits of the cavity more than 200 deposits of oil and gas have been found in a wide stratum range in Jurassic-Devonian and crystalline foundation rocks.

Tectonic activity in time is inferior to certain periodicity. On a background large periods rows are distinguished of more shallow cycles, including the epochs of descending motions with the accumulation of powerful layers of sedimentary rocks and active display of the differentiated ascending motions, attended with erosive interruptions, new intensive deformation of sedimentary rocks by hydrochloric tectonics, crushing of foundation and sedimentary cover.

Dniprovsko-Donetsk Depression is a part of the East European platform. It is an area of intensive dislocation of the crust and the upper mantle.

The components of the given geological structure of the oil- and-gas-bearing basin, i.e. geological structure – rock – water – oil – gas, are in continuous interaction. The availability of hydrocarbon deposits depends on an active dynamic medium and space-time order of certain events and processes that occur when the system develops.

The criteria of the underground mineral synthesis and pulsating flow of hydrocarbons into a sedimentary rock are determined by the distribution of stable isotopes 13 C/12C in the whole variety of hydrocarbons.

Any prospects to find new types of deposits depend on the location of geodynamic layers of oil-and-gas accumulation, as well as on favorable structural and lithofacies conditions of natural reservoirs.

Educed features of isotopic composition of hydrocarbon and thermodynamical calculations of design of the system with C - H in the conditions of high temperatures and pressures allow more reasonably to develop conception of mineral origin of oil and gas.

By the fundamentally new element of model of distribution of beds of hydrocarbon and hydrocarbon deposit in the Dniper-Donetsk cavity there is set about periodic zonality, tectonic exfoliation cut, which is determined by wave fluctuating motions and formation of resonance areas of the dynamic fields of tensions.

Keywords: fluid dynamic system, geological structure, stable isotopes ^{13}C / ^{12}C hydrocarbon system (HC system).

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DISCOVERY OF NEW GAZ AND CONDENSATE BEDS ON VESNYNSK DEPOSIT

According to the results of reconnaissance for seismic works on 3D technology in south and south-east stock areas of Tarasivsk stock and prospecting for new deep holes №№ 200 Tarasivsk, 107 Vesniansk a specified geological model of Vesnynsk deposit has been made on Upper Carboniferous sedimentations (mirroring horizon of Va_1).

In accordance with a structural map on mirroring horizon Va_1 (C_3, Vikoil LTD) south-east stock area of Tarasivsk salt to stock within the limits of Vesnynsk-Karlovsk area are mirrored subparallel to stock by bursting violation and four radial oriented upcasts with amplitudes from 100 to 450-500 m on four block: I is a block of w. № 100/101; II-is a block of hole № 107; III- hole. № 103; IV - hole 105/105 demonstrational.

Mining hole № 107 is located in the elevated block separated from the west by radial to stock with upcast amplitude to 500 m from the tomentous block of w. № 103.

The features of gaz and condensate beds are considered and their geological description is given.

Thus, the results of the bore drilling and test of mining hole № 107 prospecting the industrial gas-bearingness of productive horizon of K-3 (C_3^2) have been analyzed.

Mining hole № 107 opened the absolutely new type of gas and condensate beds in which there is:

– absence of general gas-water contact and, accordingly, elementary, base type of deposits;

– absence of quasiviscous high base type in a roofing bed;

– base type of beds in the combined unroof traps.

Keywords: reconnaissance for seismic works, base pressure, bed, stock, oil, gas, supplies of hydrocarbons

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GEOLOGIC FEATURES OF MULTILAYER HYDROCARBON FIELDS AS BASIC DEFINITION OF CRITERIA FOR ADDITIONAL EXPLORATION

On example of Dnieper-Donets basin northern edge of multilayer fields, which have long development history, the current structure of hydrocarbon reserves analysis has been carried out. The fact, that these hydrocarbon deposits concentrate significant oil and gas reserves that are not involved in development, has been established. In geological study 14% of current reserves, evaluated only by results of geophysical studies of wells, have uncertain commercial value and so require additional exploration. Hydrocarbon reserves of proven commercial value, in other words confirmed by testing, also have sizeable volume practically not involved in development coming to 38%. Thus, within the bounds of Dnieper-Donets depression northern edge, a significant part of total proven reserves of multilayer fields hydrocarbon deposits, over 50 % of them, are not being developed. That question undoubtedly needs thorough study. According to the analysis of structural-tectonic, lithological, facial, petrophysical factors, development data and the current structure of hydro-

carbon reserves geological structural features of multilayer deposits have been established and three key criteria of their additional exploration have been defined. The first is the advisability of additional exploration only of gas reserves with uncertain commercial value. Second - additional exploration of pools with uncertain commercial value together with «commercial» gas reserves, which are practically not involved in development. These criteria are proposed to be applied during gas deposits additional search in Druzhelyubivka, Borysivka, Maksalske, Chkalivka, Vilkhove, Eugenievka, Krujylivka and Yuliivka fields. Third - additional exploration of main deposits, followed by drilling in their underexplored areas.

Keywords: multilayer fields, hydrocarbon deposits, geological features, additional exploration.

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PALEOGEOGRAPHIC ANALYSIS OF CALCAREOUS NANNOPLANKTON DISTRIBUTION IN LATE CRETACEOUS OF SOUTHERN UKRAINE

During the Early Cretaceous of the studied area had open access to thetic water masses and was closed from the north, which has led to the development of thermophilic nannoplankton. In particular, the wide development Nannoconaceaa unknown in boreal sediments.

As a result the Albian transgression since Cenomanian opens access to the boreal water masses through Russian sea that leads to the appearance of individual representatives nanocomplex coldwater communities.

Experiencing the greatest impact northern periphery of the studied areas: the north-west there is a relatively small penetration of boreal species across northern Europe (*Repagulum parvidentatum, Mennerius cornuta, Axopodorhabdus albianus, Prolatipatella multicarinata, Seribiscutum primitivum, Polypodorhabdus madingliensis, Manivitella gronosa, Lucianorhabdus arcuatus, Gaarderella granulifera*) and the northeast through the Konka - Yalynsk depression connection is established with the colder waters of the Russian Sea (*Misceomarginatus plenoporus* and *Repagulum parvidentatum*).

Also in southern territory in the Crimean Mountains in the Upper Cretaceous deposits across single tropical species: *Uniplanarius trifidus, Quadrum gartneri* and *Micula mura*.

For the first time climatic differentiation begins to appear even in Coniacian. Species *Eiffeluthus eximius* become numerous in the south, and the species *Kamptnerius magnificus* prevails in the north.

Climatic zones must be taken into account when drawing up and use of regional stratigraphic schemes.

Keywords: calcareous nannoplankton, Cretaceous, paleogeography, Southern Ukraine.

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UNDERGROUND WATER RESOURCES OF KHARKIV REGION AND STRATEGY OF THEIR USE FOR WATER SUPPLY OF THE POPULATION

The article it relevant to questions of development strategy of resource use of groundwater for drinking in Ukraine as a whole and Kharkiv region, in particular. The problem of providing the population with quality drinking water and sustainable water supply for household and industrial needs is one of the most important issues for each state. Water resources in Ukraine are very unevenly distributed, so different administrative units have insufficient water supply. Surface water as a source of water supply is extremely vulnerable in technogenesis because the reliability of water supply is largely dependent on the degree of groundwater use more protected from negative external influences. Therefore, the main objective of this paper was to develop the basic principles of the strategy of groundwater resource use for drinking water in Kharkiv region. This was reviewed and the analysis of the main features of the state of underground water resources, the main problems of water use and water supply of populated cities in Kharkiv region has been conducted. We have considered and analyzed inferred resources of major groundwater aquifer area used for water supply purposes. A forecast map of production resources and drinking groundwater in settlements of the region has been constructed and analyzed. Types of drinking water intakes of groundwater area and the degree of their content of toxic elements have been developed. The level of water supply of villages in Kharkiv region has been measured to ensure residents of rural areas with drinking water quality regulations. As a final result, the objective strategy on the issue of water resources of underground water - determination and substantiation of ways to expand the use of groundwater for the population of Kharkiv region with quality drinking water to the full or partial transfer of drinking water to more protected water sources from contamination has been developed. The basic principles of the strategy and the main problems the solution of which will ensure effective implementation strategy have been considered.

Insufficient water supply of Kharkiv region from underground sources and lack of financial opportunities for the development of water complex of Kharkiv region require a gradual, sequential and systematic implementation of the principles and strategies of groundwater resource use for drinking water. The mechanism of this strategy implementation involves the development of complex measures to increase the use of groundwater for drinking water supply to Kharkiv oblast state, regional, local and site level organization which must be carried out using organizational, legal, financial, economic and institutional facilities.

Keywords: underground water resources, the quality of drinking water, Kharkiv region, the strategy of using, projected resources, operational resources, withdrawals of groundwater aquifers and complexes, water supply assessment.

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GEOTHERMOBARIC FEATURES OF BORYSIVSKY FIELD AND THEIR CONSIDERATION IN GAS RESERVES CALCULATION

Borisivsky gas condensate field is situated at the northern edge of the Dnieper-Donets basin. Both elision and thermodehydration sections are involved in the lower hydrogeological floor (stage) of the field's cross-section according to the vertical hydrogeological zoning. As a result, differences of reservoirs' pressure aspects are observed in the sections. Deep fluid reservoirs are characterized by abnormal reservoir pressure and another hydrogeological parameters change much as well. Estimation of gas reserves as example was used to show how initial temperature-pressure conditions were defined in reservoirs. Graphic-analytical method of mid-reservoir gas pressure calculation is based on the fact that the reservoir pressure and the water drive system pressure at the gas-water contact are the same. Therefore, it is necessary to know distribution of the water drive system pressures around the field. If data of measured pressure are available, the mid-reservoir pressure can be calculated by the barometric formula.

The definition of initial temperature and pressure conditions of the horizon V-19 showed that both the standard graphic-analytical method and calculated by the barometric formula can be used. Furthermore, these methods do not lead to large errors in the definition of the initial pressure in the reservoir, for the residual thickness of sedimentary strata in the thermodehydration section at the northern edge does not contribute to the formation of reservoirs with abnormal pressure, and gas-water contacts can be located at the basement.

Keywords: initial temperature and pressure conditions, thermodehydration section, estimation of gas reserves.

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GEOLOGIC STRUCTURE AND NEW STRATIGRAPHIC COMPLEXES HYDROCARBON-BEARING PERSPECTIVES OF EASTERN POLTAVA FIELD

Modern drilling results gave possibility to detail Eastern Poltava gas-condensate field geologic structure and discover new productive horizons. Further perspectives are connected not only with research of missed

and weakly studied Carboniferous system of Kasymian and Moscovian deposits, but also with regional productive Permian and Mesozoic complexes.

Eastern Poltava Carboniferous complex has gas-bearing stage reaching 1,3 kilometres in height, low outcontours of underground waters activity and complicated reservoir lithology. Carboniferous psammites has complicated condition of bedding and inconstant lateral and vertical filter capacity. Upper part of Carboniferous system in the area is almost completely gas-saturated formation with large potential of hydrocarbon-recovery, that can effectively be realized using modern influx intensification methods.

In Nykytivka and Sloviansk suites of Lower Permian Asselian stage gas-bearing limestones and dolomites beds were found by means of log in several wells. A few test attempts of these objects on the field till now did not give any positive results, possibly on account of drilling and testing technology problems. Commercial gas-condensate accumulations of this part of stratigraphic section have been proved on closely situated Mashivka field.

Triassic and Jurassic perspective complexes occupy upper oil and gas bearing stages in DDD. On Eastern Poltava uplift they are not covered by any detailed research. In Middle and Lower part of Mesozoic erathem on depth of 1000-2100 m on the structure sand and sandstone reservoirs are widely spread, reliably isolated from infiltrational hydrogeologic laver by thick clay groups of strata. Not far from Eastern Poltava field, in Solokha-Dykanka rampart, mesozoic commercial oil and gas accumulations in Solokha and Runivshchyna field were discovered a long time ago.

Eastern Poltava field has huge potential of commercial gas supply increase. As pointed by contemporary search experience in adjacent fields, oil pools can be discovered here in wide stratigraphic compass.

Keywords: research, horizon, sandstone, deposit, gas.

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GEOLOGIC CONDITIONS OF PROSPECTING AND DEVELOPMENT OF HIGH VISCOCITY OILS AND NATURAL BITUMEN

The current state of study of high-viscosity oil and natural bitumen allows to claim with confidence that they significantly differ from common oil. They differ by the chemical composition, physical and chemical properties, structure of a deposit and a collector, as well as by the structure of a pore space and the structure of liquid saturation. Therefore the methods and approaches used by the searches, exploration and development of the traditional oil pools can't directly be implemented on the deposits of high-viscosity oil and natural bitumen. Thus, it is necessary to develop an evidence-based approach which will consider their specifics for successful searches, exploration and effective development of the deposits of high-viscosity oil and natural bitumen.

Profound study of geological aspects of the bitumen deposits bedding conditions allowed toallocate the expected criteria for the zone and local forecast of oil-bearing. It is established how features of a geological structure of high-viscosity oil and natural bitumen deposits can influence an assessment of their stocks. It is considered that structure of a pore space and the structure of liquid saturation influences a choice of methods in development of the deposits of high-viscosity oil. The result of the conducted research gives the chance to draw a conclusion on inexpediency of high-viscosity oil and natural bitumen deposits development by means of classical flooding and pumping of gaseous agents.

Keywords: high-viscosity oil, natural bitumens, deposit, liquid saturation.

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TAPHONOMICAL FEATURES OF THE UPPER EOCENIAN FAUNAL COMPLEX FROM MANDRYKIVKA BEDS (DNIPROPETROVSK, UKRAINE)

Mandrykivka Beds are treated as a non-uniform taphoherm body formed in different habitats of the littoral, including areas of coral buildings of the Late Eocene basin. The unique systematic diversity of the Mandrykivka faunal association is provided through accumulation and mixing of residues of various ecological niches of littoral and coral habitat representatives. There are lithological variations in the Mandrykivka Beds area: onkoliths' bioherms, beach coral sands, algae thickets, etc. Mandrykivka Beds are studied on more than 2,5 km^2 area in the quarry "Rybalsky" (Dnipropetrovsk) . In the south-eastern slope of the quarry "Rybalsky" deposits of the littoral zone are located. These include numerous remains of "patella"-gastropods, diverse epifauna (Chama, Spondilus, Dymia, Vulsella, Vermetus, Balanus), granite and gerbils pebbles In the southern slope of this quarry the dominant rocks contain the shells remains of the sandy bottom inhabitants (Glycymeris, Arca, Barbatia, Acturellina, etc.) and inhabitants of algae, too (Turritella, Mesalia, Tectus etc.). The representatives of the littoral zone are relatively small. Fossil reefs bodies are not found, but the remains of colonial corals are ubiquitous (at least 22 species). There are other facies of the Upper Eocene too (carbonaceous, dark-colored clay with remnants of Spongia) in the quarry "Rybalsky"apart Mandrykovka Beds.

Keywords: taphonomy, Upper Eocene, Ukraine.

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CONCEPTUAL SYNERGETIC GEOLOGICAL AND HYDROGEOLOGICAL MODEL OF SUFFUSION AND KARST DEVELOPMENT IN CARBONATE ROCKS ON THE TERRITORY OF SVYATOGIRSK MONASTERY

Causes of geodynamic processes of suffusion and karst formation in carbonate rocks have been considered. It has been determined that the main factor in their formation is groundwater with different origins and directions. Their filtering in the array of loamy-Cretaceous rocks is provided by three systems of cracks – exogenous (weathering), lithogenic (diagenetic) and tectogenous. It is shown that suffusion processes that are the result of mechanical activity of groundwater, take place in parallel with the processes of karst formation due to chemical interaction of the components of "rock - water" with different genesis in carbon dioxide. According to the results of isotopic analysis of carbon heavy isotopes in minerals it has been found out that its genesis in epikarst products meets atmospheric, and the matter of aragonite tectonic cracks – depth genesis.

A conceptual synergistic spatial geological and hydrogeological model of suffusion and karst formation in rocks of Upper Cretaceous carbonate "chalk rock" has been built for the first time on which the historical and architectural monuments of Svyatogirsk monastery stand. This model allows to determine possible geological risks to monastic buildings and develop a method to protect them from destructive geodynamic processes.

Keywords: ground water, carbonate rocks, fault, carbon dioxide, filtration, suffusion, karst, geodynamic processes, thermal mass transportation, historical and architectural monuments.

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FEATURES OF GEOLOGICAL STRUCTURE AND PROSPECTS OF GAS CONTENT IN ZMIIV BASEMENT LEDGE

Has been reviewed the geological structure and prospects gas content of Zmiiv the basement. It was found that the nature of degree of saturation of hydrocarbons is depends from structure of traps and lithological structure.

Zmiiv structure is mostly in Zmiiv district of Kharkiv region. Tectonically it is confined to the northern edge of the Dnieper-Donets basin, which is part of Dnieper-Donetsk avlakogen.

Zmiiv basement ledge as a raised unit of the Precambrian basement is a slab, within which no Devonian salt-bearing deposits. Precisely because of this in the sedimentary cover is not enough movably fluid thickness of rock - salt, which could contribute to the oil and gas structure formation.

Lateral movement of gas flow and condensate in the direction of raising layers occurred exactly on the places of discontinuous faults. As a result of obstacles such as deep faults and salt rods, transverse directions of migration formed. The main reasons for the migration is compacting of sediments and squeezing forming fluids in thinning areas. Thus, there was saturation of traps by gas and condensate.

Sedimentary rocks speech presented terrigenous carbonaceous sediments of the Paleozoic, Mesozoic and Cenozoic, are broken faults of different directions and salt rods. This paved the way for the formation of different origin and form hydrocarbon traps. Among them are dominated tectonic- and lithologic-shielded varieties.

Analysis of geological, lithological and tectonic research site features research allowed to define a possible migration route and directions hydrocarbon fluids and place their accumulation in traps not only in the basement rocks Zmiev, but also in the northern part of the near edge zone Dnieper-Donets basin.

Keywords: hydrocarbons, structure, migration, trap, reservoir.

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MESOZOIC SYSTEM OF DDD: PERSPECTIVES, EXPLORATION AND OIL AND GAS BEARING ESTIMATION METHODS

Oil and gas perspective Mesozoic complex in Dnieper-Donets depression includes Triassic, Jurassic and Lower part of Cretaceous systems. Its common thickness can reach one kilometer and much more. The deposit complex widely spread in Preaxial and Northern near-edge zones of Depression. Geologic and log data about potential Triassic and Jurassic rocks hydrocarbons bearing on several of tens local structures, not including here already known Mesozoic fields, there exist missed productive layers and even stratigraphic complexes, point on exclusive interesting character of this exploration direction. The fact is strange and hardly explainable, but since 1960s years systematic study of Mesozoic rocks in Eastern Ukraine has not been executed. Meanwhile, there are no theoretic foundations which contradict to possibility of Mesozoic commercial hydrocarbon pools forming on most part of Eastern Ukrainian oil and gas bearing basin territory, on the contrary, most of its uplifts have favourable genetic, migrational and accumulative terms of Triassic, Jurassic, and probably Cretaceous hydrocarbon pools existence. Triassic and Jurassic systems deposits of DDD characterized by small and middle bedding depth, freandly thermic, pressure and hydrogeochemical environment. Perspective folds and uplifts mostly sityated in areas with convenient search and development infrastructure. Rational searching complex of works, directed on Mesozoic pools discovery and commercial exploitation proposed.

Keywords: log, section, resources, pool, exploration.

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IDENTIFYING RESERVOIRS FOR GEOLOGICAL AND TECHNOLOGICAL RESEARCH IN THE THIN SANDSTONES ON THE EXAMPLE OF THE SOUTHERN ZONE DEPOSITS IN THE BORDER DNIEPER-DONETS BASIN

This work is dedicated to one of the methods for detecting thin sandstones in the example of deposits of Dnieper-Donets Basin. When the thick seams need for detailed study of low power may arise, now the question is very relevant. Thin gas-saturated layers have been repeatedly disclosed with the help of geological and technological research. Geological and technological studies provide an instant solution to the problems regarding the lithology of the well with the specification of physical and chemical properties of rocks, predicting geotechnical complications to update interval of coring control at the opening of gas-bearing horizons, partial monitoring of the wells and surface equipment.

Application of GTR made a positive contribution to the study of lithologic and stratigraphic section well. No wonder these studies are an integral part of the complex methods used to study well because technology research and interpretation of received information must be based on rational integration of geological and technological, geophysical and hydrodynamic methods of research in the interests of effective and prompt exploration of productive strata using all acquired information.

Using complex research methods we were able to establish not only the thin seams of sandstones, which are gas-saturated, but also to set the power and depth of their occurrence.

Keywords: GTR, thin layers, hydrocarbons, deposi, gas indications, well.

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CLARIFICATION OF VILHIVSKYI'S CONDENSATE FIELD DEVELOPMENT INDICATORS BY THE METHOD OF RESERVOIR PRESSURE DROP

The method of reservoir pressure drop as one of the main methods used to address the additional exploration of gas condensate fields (on the example of Vilhivskyi GCM) has been considered. Appropriate calculations were made using this method, which specified the development indicators for the period from 2013 to 2018. The current state of Vilhivskyi gas condensate field deposits development has been analyzed and options for development have been justified. There are I, II, III and IV operating facilities in Vilhivskyi field in industrial design. As of 01.10.2013, on the eastern vault I the object is developed by one borehole, which is currently in the overhaul, the second facility - by the two wells (w. 57, 61), the third object - by one hole (St. 60), the fourth object - by seven wells (w. 51, 52, 53, 54, 55, 58, 84). On the western vault I object was worked out by well 26, which was closed in 1993 due to flooding, II object is being developed by one borehole (w. 9), the third object - by one borehole (w. 81), IV object – by nine wells (w. 59, 62, 63, 64, 65, 70, 80, 82, 83).

Keywords: bedded system, analysis development, productive characteristics, unrecoil, to develop.

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GEOGRAPHY

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SPASE–TIME TENDENCIES OF AIR TEMPERATURE CHANGE IN CLIMATE WARMING PERIOD IN THE TERRITORY OF UKRAINE

The problems of spatial and temporal characteristics of patterns in air temperature changes during the warming climate in Ukraine have been considered. After analyzing the statistics of hydrometeorological data of meteorological stations in Ukraine for 1970-2014, it has been shown that annual temperature for the 100-year period within the territory of the study has changed by 3,1-3,5 °C, and changes in monthly temperatures have showed more tangible fluctuations in air temperature and especially it is typical for the summer months, where the temperature difference between the period of warming and cooling during the months of July and August is 5.3 and 5.1 °C, respectively. Methods of mathematical statistics and, in particular, the analysis of variance indicated a temporary change in the distribution of annual and monthly temperatures and placing them on the hierarchical levels. Analysis of changes in air temperature distribution during the warming period of climate in Ukraine has showed that the average annual temperature from 1970 to 2014 in Lugansk was 8.1 °C, in Kharkov 7,4 °C in Lviv 6,7 °C. If we compare the temperature variation of the air for 40 years with these long-term studies, we arrive at the conclusion that the climate in Ukraine is gradually warming, but in the east of the country it is more pronounced.

The method of spatiotemporal analysis of patterns in air temperature change during climate warming in Ukraine unifies meteorological characteristics of these years, and can be used to solve specific problems in different sectors of the economy.

Keywords: weather, climate, temperature, hydrometeorological conditions, methods of mathematical statistics, analysis.

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ENVIRONMENT AS A FACTOR OF THE SPATIAL ORGANIZATIONS OF THE BIG CITY (ON THE EXAMPLE OF THE CITY OF KHARKIV)

Organization of the big urban spatial system is a difficult process which depends on environment, population, settlement, production specialization, economic activity, etc. Environment, in our opinion, is a primary factor.

The main purpose of the article is the social and geographical analysis of environment of Kharkiv city for definition of their influence on formation of the spatial urban organization.

Relief, river system, climatic conditions, soils, flora and fauna of the area as components of the environment have significant impact on the features of the urban environment formation. The flat city relief in Kharkiv and straight gullies and ravines are favorable factors for creating urban space optimized system. Relatively smooth surface allows construction of any architectural designs without the probability of further destruction due to adverse natural conditions. A large number of rivers in the city have a great influence on the formation of its spatial organization. Rivers in the city are used for drinking, agricultural water supply, fishing, recreation and irrigation. The zone of high pressure of Voyeykov-Brounov crossing the city forms the stable weather and the absence of strong winds, which allows high-rise construction of buildings and reduces the likelihood of natural disasters. Soils territory is favorable for farming in the city and suburban areas. Forest-steppe flora and fauna are changing through human impact.

Natural conditions of the city of Kharkiv allow to generate an optimal urban structure.

Keywords: environment, Kharkiv city, relief, rivers, climate, soil, flora, fauna.

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FORMATION FEATURES OF WARM PERIOD FLOODS ON THE RIVERS OF MOUNTAIN CRIMEA

The article analyzes the conditions of floods formation in the warm period on the rivers of Crimean Mountains. To illustrate the water regime of the rivers in the considered area the runoff hydrographs with pronounced floods in warm period have been built. Their analysis allowed us to determine that the floods of the warm period of the year on the rivers are not observed at one time: on the rivers of the western part of the northern slope of the Crimean Mountains maximum discharges of the warm period are observed more often

in April and July; on the rivers of the southern coast of Crimea - from April to August, and on rivers of the eastern part of the northern slope - in the spring.

In Crimea, 80-85% of the annual precipitation falls as rain. The number of days with rainfall ranges from 80-130 in the steppe regions to 150-170 – in the mountains. In the summer in the Crimea there are no more than 5-10 days with rains in the month. On the rivers of Mountain Crimea rainstorms are causing flooding accompanied by destruction of eroded rocks. In fact, in heavy rainfall not water – but a mix of earth and stones are flowing. Such flows destroy bridges, wash away roads, the fertile soil layer. Rainstorms never cover the entire Crimea. They typically fall in any one area. Most often heavy rains and downpours occur within one day and only in winter are possible within a few days.

Generalization of data on the distribution of the maximal rainfall of warm period have revealed that the most frequently observed maximum rainfall of 71-90 mm (27.3%) is also typical of the formation of floods in warm season rainfall in the range of 31-70 mm (the sum frequency of their occurrence is 40.9%).

Rainfall forming floods tend to increase with the height of the watershed, but the coefficient of this relationship is not significant.

Our study has allowed to determine that a material effect on runoff in the period of catastrophic floods have factors such as karst, watershed area and forested.

Keywords: water regime, rain floods, the maximum flow.

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THE INTANGIBLE NATURAL RESOURCES (INR) IN THE ASPECTS OF NATURAL CAPITAL OF NEW GEOGRAPHY: SOME PERSPECTIVES FOR UKRAINE

Background. Intangible natural resources are properties of nature, whose consumption does not cause exclusion and transformation of substances and energy but provides benefits as an ecological rent in economy, society and personal satisfaction of human needs. To the greatest extent, it concerns the resort and recreation industry, which is becoming more and more significant in the economy of many countries.

Summary of the literature. Attention to non-material aspects of environmental protection and nature management for the needs of economy is increasing. European techniques involve sociological questionnaire apparatus for its evaluation. This process is rather tedious, lengthy and expensive.

Aim. The presentation and analysis of the existing methodology based on quantitative evaluation of the intangible natural resource potential, as well as offering a new way of such evaluation using the subjective component of the complex subject-object approach and geoinformation technologies.

Results. The geosocial advisory service would contain maps of environmental comfort based on the principle of the unity of time and space. The user can evaluate the quality of service time in the places that he visited (places are organized and classified by layers), and he will get personalized recommendations about, first of all, places for tourism and recreation. This service will create a set of axiological reports on classified landscapes.

Conclusions and further work. Service offered in this article can be a modern and effective way for comprehending the importance of nature as a producer of intangible benefits. In coming years, the practical implementation of the proposed service will occur.

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ECOLOGY

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USE OF STOCHASTIC MODEL FOR A LONG-TERM FORECAST OF WATER QUALITY FROM GROUNDWATER AQUIFER OF KHORRAMABAD AND SHIRAZ INTERMOUNTAIN BASINS

Long-term prognosis of groundwater aquifers water quality in Khorramabad and Shiraz basins of western Iran is an important part in evaluation of groundwater operational reserves. Such a forecast (for 1 year or longer) has been proposed based on the study of the laws of fluctuations in water quality in the past, reflecting the impact of the main factors on the water regime and the interaction in the system

Interaction between water-rock occurs during movement of groundwater. In this connection, it seems appropriate to look for in the ranks of such fluctuations legitimate (harmonic) components, which are possible to predict.

The investigated process can be random, i.e. the action is determined by a variety of factors that cannot be currently analytically accounted, and is subject to the normal distribution law. Such a process is characterized by rapidly decreasing normalized correlation function.

The investigated process in addition to the random component may contain one or more periodic components. The normalized correlation function of the number of decays acts much more slowly than in the first case, and must contain the harmonic components with one or another correlation time.

In the first case, the original number of observations does not contain regular components, i.e. is determined by the random component in the second – in the initial data series, there are legitimate components that can be extrapolated to the future.

For the preparation of long-term forecast a stochastic model of hydro-chemical process is proposed, which can be represented by a sum of several harmonic components, complicated by the random component. The model is implemented on a PC using mathematical calculations package MathCAD 2000 Professional. Information is given in the form of discrete data of hydrochemical observations, for example, per diem, monthly average or average value of the mineralization, any chemical element or substance.

Long-term prognosis has been compiled using data on changes in salinity and hardness of groundwater basins of Khorramabad and Shiraz for the past 10 years.

These results show that if the original number of oscillations of mineralization and water hardness is decomposed into periodic components entirely or with a small amplitude residue, the forecast of the changes in the groundwater is not difficult. If after selecting there is a random component with considerable amplitude, it is possible to make the forecast of the general direction of the process.

Keywords: Western Iran, Shiraz and Khorramabad groundwater`s basin, groundwater aquifer, hydrochemical process, water quality, initial data, stochastic model, harmonic components, long-term forecast, the overall thrust of the hydrochemical process.

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TRANSFORMATION OF LIGHT HYDROCARBON ACCUMULATIONS THAT POLLUTE THE GEOLOGICAL ENVIRONMENT

This article considers the laws governing the formation of secondary accumulations of petroleum hydrocarbons in the subsurface. This refers not only to “lenses” of light petroleum hydrocarbons, which for large dimensions, in fact, create a strong impact and cause increasing attention as a source of the threat of environmental pollution, but also “man-made deposits”. No less interesting in theoretical and practical terms are accumulations of hydrocarbons in vadoze zone and below the water table. It should not be restricted to consideration of only the mobile petroleum products. Noteworthy are accumulations of dissolved, sorbed and gaseous hydrocarbons. A typification system of petroleum hydrocarbons accumulations was developed based on the results of the analysis of our exploration on contamination areas in Ukraine and generalization of the known publications. All petroleum products accumulations have the ability to transform the areas of distribution, forms of already existing and change the qualitative composition of the pollutant.

From the authors' point of view, the change of the physical state, chemical composition and the spatial distribution of oil products polluter due to the impact of the natural and anthropogenic factors, means the transformation of pollution sources of the geological environment with oil products.

In this work, the authors limited themselves to only the spatial transformation of the oil products pollution sources and the related processes of the oil pollutant physical state change.

A special table in the article could be an example of the systematization of all these parameters. This technology can be used to plan monitoring research, design remedial actions and implementation of the expert system.

Keywords: light petroleum products, petroleum hydrocarbons, geological environment, hydrogeological conditions, transformation of pollutant accumulations.

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TECHNICAL AND ENVIRONMENTAL AND ECONOMIC PERFORMANCE OF ADVANCED TECHNOLOGIES UTILIZATION OF VALUABLE COMPONENTS FROM LARGE-CAPACITY INDUSTRIAL WASTE

The reasons for the accumulation in Ukraine huge amount of large-capacity metallurgical wastes. The analysis of the formation and distribution of industrial waste in the industrialized regions of Ukraine shows a steady increase in their volumes. It indicates that man-made mineral resources that represent significant value as objects of potential prey, require special geological and economic and technological study. A number of methods to reduce the volume of large-capacity waste and the creation of environmentally friendly production replacing imports of steel products. We describe a systematic approach to assessing the environmental and economic development of technogenic deposits. Peculiarities of economic evaluation is laid in a feasibility study of investments, taking into account the cost of environmental protection measures in the planning of the development of technogenic deposits.

It is noted that the economic feasibility of the use of associated minerals and components of industrial waste is determined by comparing the cost of additional by-products obtained and additional capital and operating costs associated with obtaining such information. As example, the impact of the slurry tank on the environment are considered aspects of the approach to the organization of production of components and the determination of the economic effect of utilization of associated minerals. In this case, the complex fields that have a number of components can be regarded as basic minimum industrial content is calculated according to the content of one of them with a maximum recoverable value in this technogenic deposits. The features of the indicators of environmental pollution. Also given the potential, prevent, compensated, and the remaining liquidated damages. It is shown that special attention should be paid to the separate storage of industrial waste by type of formation of technogenic deposits, which simplifies the process of recycling.

Keywords: natural environment, ecological and economic damage, sludge storage, reclamation, environmental impacts, waste, toxic waste, objects and subjects of influence.

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ESTIMATION OF CENOMANIAN-CALLOVIAN GROUNDWATER COMPLEX OF POTABLE WATER VULNERABILITY IN KYIV BASED ON ISOTOPE- RADIOCHEMICAL DATA

A present-day analysis of ground water conditions use by Kyiv population from well- water supply has been carried out. The results of investigation are directed to reveal the hydrogen radioactive isotope – tritium distribution regularity in the city wells.-rooms By means of geoinformational system ArcGIS the map-scheme of tritium distribution in cenomanian-callovian groundwater complex was constructed. It shows that isotope-radiochemical data can serve as an effective instrument to determine groundwater complex vulnerability to contamination.

One of the dominant sources of potable water supply in Kyiv is cenomanian-callovian groundwater complex. From the point of view of subsurface geology cenomanian-callovian groundwater complex is considered as covered on the right-bank of Dnieper river (apart from Obolon') and as conditionally covered on the left-bank. With the aim to supply the city population with pure water the wide network of well-rooms has been installed since 1997; the number of well-rooms has been constantly growing. The water quality in well-rooms is controlled in order to reveal the exceeding boundary permissible concentrations corresponding to norm, however the present well-rooms water quality control has a local character and doesn't allow to systematically estimate the ground water vulnerability to man-caused influence in area extent. The author has investigated hydrogen radioactive isotope – tritium distribution regularity in cenomanian-callovian groundwater complex as an indicator of ground water vulnerability to man-caused influence. The investigation results give grounds to assert that there is a danger of anthropogenic transformation of underground hydrosphere from the point of view of potable ground water quality changes towards it's deterioration.

Keywords: ground water vulnerability, potable water supply, isotope-radiochemical data, anthropogenic transformation of underground hydrosphere.

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GEOECOLOGICAL MONITORING OF DANGEROUS LOCAL GEOCHEMICAL OBJECTS IN URBAN ENVIRONMENT BY REMOTE SENSING

For historical reasons the city of Donetsk happened to be the territory of intensive mining and beneficiation of coal territory, so it acquired a unique townscape which organically combines urban developments and giant dumps (more than 50) – most of them are man-made relics of the early industrial era and coal mine construction.

The authors examine the correlation between the salinity of refuse dumps of mining industry with their vegetation dynamics and its metamorphosis based on remote sensing data. In this paper data from the satellite system LandSat 5 TM are used for the summer and autumn periods. 11 refuse dumps were selected for the research. The use of satellite data of LandSat 5 TM for estimating landscape-geochemical characteristics

of refuse dumps rocks and processing plants in Donetsk has showed the perspective of this scientific method in relation to other objects that undergo complicated processes of landscape-geochemical transformations. The effectiveness of index calculation Normalized Difference Salinity Index (NDSI) and Salinity Index (SI) was confirmed by calibrated digital images of refuse dumps undergoing geochemical transformations.

Moisture Stress Index (MSI) and Normalized Difference Vegetation Index (NDVI) turned out to be effective. Comparison of indices NDVI, which was calculated for particular refuse dumps on different dates of the summer-autumn period within 15 years, gave an opportunity to establish the trends of overgrowing the refuse dumps with natural vegetation, including those which may indicate the geochemical activity of rocks.

The analysis has showed that refuse dumps with a relatively-reduced salinity are characterized by partial overgrowing, whereby, according to observers, an air-water regime of the substrate is changing, and its moisture content is one of the main conditions for the further development of the vegetation.

Keywords: geoecological monitoring, salinity index, vegetation index.

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APPLICATION OF GEOECOLOGICAL VULNERABILITY ASSESSMENT TO PREVENTION OF EMERGENCIES

The articles analyses prerequisites of development and introduction of modern approach to a problem of the ensuring preventive safety based on methodology of geoecological vulnerability assessment to emergency situations in Ukraine.

It is examined that experience of realization of vulnerability assessment to emergency situations in Ukraine is limited to researches in the field of the social and economic analysis of emergency situations of natural and technogenic character for today. It is necessary to provide active actions in the field of harmonization and the subsequent implementation of the normative legal acts, methodological approaches and separate standards aimed at the development and strengthening of potential of counteraction in emergency situations at the expense of geoecological vulnerability assessment application.

Comparative analysis of an "emergency situation" and "geosystem" characteristics in terms of vulnerability conception allowing to conclude that adaptation of the conception in Ukraine can effectively be solved by the use of research tools of constructive geography and geoecology. Constructive and geographical approach is a backbone to integration of information, analytical and decision-making processes on a uniform

methodological basis. The elaboration of the methodology of estimation of geoecological vulnerability to emergency situations can serve as a powerful impulse for development. The analysis and generalization of various techniques and approaches to an assessment of vulnerability show expediency of development of the generalized integrated methodology. Obligatory elements of an assessment of geoecological vulnerability are: landscape maps as a basis for spatial localization; a set of estimated criteria and indicators in total the landscapes defining degree of vulnerability to emergency situations; analysis of the structurally functional organization of landscape complexes; estimation and classification of landscape complexes by vulnerability degree to emergency situations; development of geoecological recommendations on strengthening of coping capacity to vulnerability.

It is concluded in the article that introduction of geoecological vulnerability assessment methodology will provide transition to a qualitatively new level of management of emergency situations prevention, mitigation of risks and consequences for the account of transition from the model based on collecting, documenting and synthesis of data on emergency situations to the analysis of geoecological prerequisites of their emergence, identification of natural mechanisms of self-control and development of preventive measures.

Keywords: emergency situations, geosystem, geoecological vulnerability, assessment, environment.

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