A B S T R A C T S

GEOLOGY

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SPECIFICATION OF GEOLOGICAL MODELS OF EXPLOITATIVE OBJECTS DURING DEVELOPMENT (ON EXAMPLE OF BELSK FIELD)

During geological exploration, from the opening and to further development of typical hydrocarbon deposits significant discrepancy between existing geological model and available data development is observed.

A similar situation occurred in 2014-2015 during development of Visean horizons of Bel'sk field - the results of gas condensate deposits development of horizons B-14-16 noticeably diverge between projected and actual figures, this indicates that the existing structural and tectonic model of the deposit does not meet the results of development and complicates the process of extracting hydrocarbons.

Based on the analysis of the data on operational facilities of horizons B-14, B-15b, B-16 a structural and tectonic model of Uppervisean deposits, Bel'sk field was corrected. In the western part of the field, based on the analysis of reserves drained by wells and comparing them with pore volumes, it has been proved that fault in the tectonic blocks 1b and 1c is absent.

Location of faults that split western part of Bel'sk field on the blocks 1b and 1c as well as the tectonic blocks 1a and 1c was established. Results of faults tracing fully meet the results of gas-bearing horizon B-14 development by wells 160, 162, 165, 166. In addition, the article presents evidence that indicates the absence of tectonic disturbances, which divides the eastern part of the structures on the blocks 2a and 2b. The results emphasize the need for continuous monitoring of current data development of operational facilities with the aim to adjust the structural-tectonic models and increase their credibility.

Keywords: faults, the development of deposits, drained reserves of hydrocarbon, pore volume, reservoir pressure, tectonic blocks

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FEATURES OF THE GEOLOGICAL STRUCTURE AND DISTRIBUTION OF HYDROCARBON TRAPS IN SALT STRIKE-SLIP STRUCTURES (SSSS) OF THE DNIEPER-DONETS GRABEN

There were studied structural features of the local shifts of second order in salt strike-slip structures (SSSS), the conditions of formation and regularities of the spatial distribution of hydrocarbon traps in these

structures. Depending on the shift direction, the location of the secondary shifts and the position of stoke salt relative to the main axis of the shift, there are modifications of geodynamic regimes, contributing to the formation of different morphogenetic types of SSSS and their associated hydrocarbon traps.

Results:

1. The results of analysis of drilling and 3D seismic on Kotlyarovsky, Eastern Medvedovskaya and Melihovskaya squares (Mashevsky-Efremov depression) for the first time proved the existence of horizontal strike-slip.

2. A new type of local tectonic structures related to salt diapirism process – salt strike-slip structures.

3. Developed a method to identify salt strike-slip structures and selected structural drawings characteristic shifts according to the materials of 3D seismic.

4. It is determined that the specific features salt strike-slip structures are divided into 5 types: Kotlyarovskaya (structure "tree"), Eastern Medvedovskaya (structure "flower"), Melikhovskaya (the structure of the "duplex compression"), Vesnyanskaya (structure "palm tree") and Kochubeevskaya (structure "horse tail") types of SSSS.

In the process of forming the structure of the horizontal strike-slip occurs a full cycle of development of SSSS: from primary (Vesnyanskiy type) and intermediate (East-Medvedevskiy, Melikhovskiy types) to the end (Chutivskiy type) stage.

Keywords: deposit, horizon, consediment washing away, trust, strike-slip, salt- strike-slip structure (SSSS).

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PLACEMENT CRITERIA OF OIL AND GAS DEPOSITS IN DNEPR-DONETSK CAVITY TAKING INTO ACCOUNT HYDROCHLORIC TECTONICS

There is a question at the search of hydrocarbon deposits: why in one regions does mainly find oil, and in other gas deposits? This article has an object on the basis of present actual material and analysis of different hypotheses and looks to ground the vision and solution of this question in the conditions of the Dniper-Donetsk depression (DDD).

Hydrocarbons migrate to the places of the accumulation through the layers of sedimentary rocks. The ways of migration of hydrocarbons, changing of their phase state, speeds of passing through the layers of sedimentary rocks, are considered in the article, the question about age of hydrocarbons that are presently in traps was highlighted.

As a result of the conducted researches and analysis of existent presentations the criteria of location of oil and gas deposits are identified in the conditions of the Dniper-Donetsk depression and temporal interval of hydrocarbons formation.

The developed deposits of hydrocarbons are formed in recent (less than 87 thousand of years), in a geological calculation, time.

A size and safety of deposits depend on a difference between speed of passing of barrier and speed of receipt of fluid in a trap, and also by a time interval, past from the moment of formation of barrier-trap.

In DDD the presence of hydrocarbons deposits is determined the presence of salt tectonics which provides:

- it is impulse-permanent supply of mantle fluid through the weakened zones of salt stocks.

- a salt tectogenesis is one of gel-forming factors at forming of anticlinal traps for the accumulation of hydrocarbons.

- intensive growth of salt stocks in Permian time provided forming of reliable salt overlay on greater part of central part of DDD.

Location of oil and gas deposits is determined:

- in areas with a newtectonic activity by the amount of tectonic movement, intensity of salt tectogenesis and in less degree quality of collectors in the moment of fluid filling.

- in districts with low tectonic activity mainly by quality of collectors.

Location of oil and gas deposits on a lateral depend on:

- the presence of reliable overlay (in DDD – development of early Permian salt. If it is absent, large gas depositi are not saved).

- the presence of newtectonic activity and salt tectogenesis, which are instrumental in entering hydrocarbon fluid in sedimentary cover.

- long way and the speed of passage of aggressive originally methane fluid in main oil formation stage`s zone for the generation, dissolution and removal (emigration) from the rocks of heavy hydrocarbons (by passing aggressive fluid through the rocks, which are already converted to the stage of deep katagenesis and higher generation of heavy hydrocarbons not happening)

Keywords: hydrocarbon fluid, oil, gas, tectonic activity, the salt stock, emigration, migration, accumulation, deposit, field.

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COASTAL-MARINE SEDIMENTATION CHANGES WITHIN LITHODYNAMIC UNIT OF BERDYANSK SPIT CAUSED BY ANTHROPOGENIC IMPACT

The abrasive areas of Berdyansk lithodynamic unit have been investigated. It is revealed that cliffs are composed with rocks of IV and V class in their ability to resist abrasion and therefore are characterized by high destruction rates (1.2 to 3.2 m/year).

Taking into account the relevant abrasion rate, the coastal lithologic structure and certain layers of rocks, which are the source of the greatest number of coastal-marine sediments were analyzed.

The field studies of the coastal zone of Berdyansk lithodynamic unit were conducted in the period from 2007 to 2013. The body of Berdyansk spit and adjacent sites of indigenous coast have been examined. During the research the modern morphometry, morphodynamic and lithodynamic of the coastal zone have been analyzed and the anthropogenic landforms and their impact on the geological environment have been described, too.

The anthropogenic structures of shore protection and port destination within the coastal zone of Berdyansk lithodynamic unit were investigated. Geographical location of these structures, their qualitative and quantitative characteristics allowed us to identify areas with varying degrees of human transformation along the coastal zone of the studied region. The selected areas are characterized with local effects on certain parts of the coastal zone and transformation impact on the coastal area of Berdyansk lithodynamic unit.

More detailed studies have shown that at the present moment the internal alongshore sediments flow is greatly transformed and does not affect the dynamics of the spit. The external front sediments flow is weakened, and the distal sediments flow of biogenic material is intensively discharged within shore protection complex, consequently, this creates conditions for unequal distribution of clastic material along the middle and far parts of the spit.

It is determined that Berdyansk spit loses 34 618 – 140 110 m^3 of coastal-marine sediments per year under various hydrometeorological conditions, that leading to destructive mode of the spit development.

Keywords: sedimentation, lithodynamic unit, alongshore sediments flow, “Azov” type spits, outcrops, coastal-marine sediments, saturation flow, anthropogenic impact.

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MICROPALEONTOLOGICAL CHARACTERISTICS OF THE CAMPANIAN-MAASTRICHTIAN SEDIMENTS IN THE OSKOL RIVER BASIN

Complexes of calcareous nannoplankton, foraminifera and ostracods in the Campanian and Maastrichtian sections were investigated in Kupyansk and Kamenka (Dvurechansky district). The rocks are presented by light gray chalk with a large admixture of clay. Ihnotextures are presented by a variety of the mud-eaters holes. The chalk is covered with Oligocene siltstone (Mezhigorskiy regional stage).

The microfossils are diverse: 40 species of the calcareous nannoplankton, 39 - foraminifera and 13 – ostracods have been determined. The stratigraphic position of species has been traced.

The most common nannofossils are large *Broinsonia parca subsp. constricta* Hattner et al., *Broinsonia parca subsp. parca* (Stradner), *Arkhangelskiella cymbiformis* Vekshina, *Kamptnerius magnificus* Deflandre, *Micula staurophora* Gardet. The complex of foraminifera mainly consists of species *Gyroidina turgida* (Hagenow), *Parrella cordieriana* (Orb.), *Cibicides gancinoensis* Neckaja, *Dentalina filiniformis* (Orb.), *Anomalina* sp., *Bifarina regularis* Keller, that were found in large quantities in all samples.

The majority of species refers to the benthic forms and only about 10% of the planktonic ones, namely *Archaeoglobigerina blowi* Pessagno, *Archeoglobigerina cretacea* (Orb.), *Hedbergella delrioensis* (Karsey), *Gumbelina globulosa* (Ehrenberg).

The ostracods are mainly represented by *Krithe simplex* (Jones et Hinde), *Krithe vanveenae* Derro, *Cytherella obovata* Jones et Hinde species.

UC15 and UC16 zones of the upper Campanian and UC17 of the lower Maastrichtian have been identified for calcareous nannoplankton. LC19 zone which belongs to the Upper Campanian has been identified for foraminifera. The layers with Krithe simplex have been identified for ostracods in the Upper Campanian. Changes in the complexes for certain groups of microfossils do not coincide.

The nannofossils complex is found in the boreal region. The depth of sediment accumulation is defined by the ratio of planktonic and benthic foraminifera and ostracods complexes located at the depth 25-50 m.

Keywords: Campanian, Maastrichtian, nannoplankton, foraminifera, ostracods, biostratigraphy.

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DETERMINATION METHOD OF THE OPEN POROSITY AND PORES COMPRESSION RATIO UNDER BEDDED CONDITIONS

Existing regulations (guidelines, instructions SRC) provide for obligatory identification of the main capacitive-filtration properties under bedded conditions, but so far we have not any specific methods for determining these properties and clearly articulated requirements necessary for this equipment. The aim of this work is to develop methodology and a set of minimum necessary equipment, that allows to determine open porosity and the static compression ratio at the temperature and pressure of formation conditions on the basis of any geological profile production laboratory.The principle is that the pre-saturated with liquid sample is exposed to the full crimping in the core holder, as result of the compressibility of the sample part of fluid is squeezed out of it and goes into the measuring tube. Knowing the initial volume of liquid in the pores of the

sample and the volume of the liquid squeezed out of it, you can calculate the change of porosity in the sample located at formation conditions temperature and pressure. After completing a few cycles "charge-discharge" and deleting inelastic deformation, you can determine the static compression of pore. The developed method could be used to determine these parameters at any stage of geological exploration, in the preparation of development projects, in the interpretation of well logs, verifications of parameters for reserves calculation. Information about changes in the pore space under the influence of in-situ temperature and pressure conditions will increase the quantity and accuracy of the results obtained during complex laboratory research and all complex of oil and gas works.

Keywords: core studies, reservoir properties, methods of determination, compressibility, porosity, reservoir thermobaric conditions.

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COMPARATIVE CHARACTERISTICS OF DRINKING WATER QUALITY STANDARDS IN SOME COUNTRIES

The regulation of drinking water is a complex process that develops and is closely linked with the achievements of science and technology. The formation of valuation (regulation) of drinking water is a long historical process of facts accumulation, their synthesis and interpretation using the achievements of related sciences at the appropriate stage of development. The purpose of this study was a comparative analysis of approaches to the regulation of quality indicators of drinking water in the world and in our country, largely due to the need to harmonize national requirements for drinking water with European and international standards, approaches and numerous proposals for such harmonization.The article provides comparative characteristic standards of drinking water quality in various countries of the world and the EU Directive and estimates the number of monitored indicators of water quality for individual countries in the world. It has been proved that the quality of drinking water can be improved by an integrated solution of some problems, the main of which is the development of new technologies of water treatment and maximum harmonization of the national regulatory framework governing drinking water quality, and standards of the developed countries, particularly the EU and WHO recommendations. Lack of sufficient water resources leads to a deficit in drinking water for the population of these countries. This, in turn, determines the difference between the water supply systems and the capital intensity of the water sector in water scarce regions.

Keywords: quality of drinking water, regulation of quality indicators of water quality standards, European and international standards, human health, water quality monitoring.

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MAIN PREREQUISITES OF GROUNDWATER QUALITY DECLINE IN THE CRETACEOUS WATER INTAKES OF THE EASTERN UKRAINE

The article deals with the problem of reducing the quality of potable groundwater in the marly-cretaceous aquifer of the Eastern Ukraine. Some facts related to the given problem are considered. Investigation of the chemical composition of groundwater is considered on the example of three most representative water intakes: Kharkivskyi, Svitlichanskyi, Zhytlivskyi. It is common practice that water intakes are exploited for economic and drinking water supply of large cities, small towns and villages of the Eastern Ukraine. The information about geological and hydrogeological characteristics of the studied intakes is presented.

It has been established that the groundwater quality of the investigated water intakes is affected not only by natural, but also anthropogenic processes that are typical for the territories where those water intakes are situated. Particular attention is paid to the anthropogenic processes that affect the quality of drinking underground waters, which are exploited by the studied water intakes. Due to the fact that water intakes are located within settlements, areas of their supply are almost completely urbanized; in case of insufficient natural protection for a long time they are threatened by groundwater pollution. This directly affects water quality of the intakes.Extraction of large volumes of water is seen as a powerful anthropogenic factor that contributes to the changes in the spatial-temporal characteristics of the water intakes and leads to changes in chemical composition of groundwater. Water quality monitoring at existing intakes will help to improve its quality.

Keywords: marly-cretaceous aquifer, the Cretaceous water intakes, potable groundwater, groundwater pollution, the quality of drinking groundwater, drinking water supply.

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RAISING RESERVOIR PRESSURE IN THE GAS CONDENSATE DEPOSIT AS A FACTOR OF ITS DEVELOPMENT EFFICIENCY INCREASE

Raising the initial reservoir pressure in the gas-condensate deposits has never been carried out hitherto - neither in Ukraine, nor in the world. At first glance, it can be considered an absurd phenomenon and loss of marketable gas or another reagent that should be pumped into the reservoir prior to the development of the field. However, it should be noted that raising the reservoir pressure in the exhaust gas condensate deposits

occurs in the formation and operation of the underground gas storage facilities. This technology of gas injection into the reservoir has been worked out on thirteen underground gas storage facilities in Ukraine and in the fields, which were developed in the mode of cycling processes: Novotroitsk, Tymofiivka, Kotolevsk and Kulychihinsk.

Now a question arises how the raising of reservoir pressure in the gas condensate deposit may affect the efficiency of its development? According to the authors, two areas of efficiency can be selected: the first (geological) - specification of gas and condensate reserves; the second – augmentation of condensate production in the cycling process by raising the reservoir pressure in the deposit prior to its development.

As to the first direction, there are several ways to determine the reserves of natural gas in gas-condensate beds and deposits. There are two main methods to calculate gas reserves : 1) volume method of calculating gas reserves; 2) calculation of gas reserves by pressure drop in the reservoir. Each of these methods has its advantages and disadvantages.

Volumetric method allows to estimate gas reserves at the early stages of exploration and development of beds and deposits, and its accuracy mainly depends on the number of drilled wells and the adequately determined calculation parameters, gas content area, efficient gas-saturated thickness, porosity, gas saturation, reservoir pressure.

Calculation method of gas reserves by reservoir pressure drop is possible after the extraction of some amount of gas from the deposits and its reliability is higher, the bigger this amount is. With this only some amount of drained gas is determined.

In this paper the possibility to evaluate gas reserves prior to their development by raising reservoir pressure by injecting foreign gas, has been shown. In fact, this is the use of reverse algorithm method of estimating gas reserves on reservoir pressure fall.

As for the other direction – it is a pioneer method and has never been used in practice.

Keywords: bed, gas, reserves, reservoir pressure, condensate production

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ROZTOCHIA'S TRANSPORT IN THE CONTEXT OF RECREATIONAL DEVELOPMENT OF THE REGION

The history of Ukrainian Roztochia's transport development includes its transport-geographical position, natural-geographical, historical, demographical, economical and recreational conditions.

Roztochia's transport-geographical situation can be assessed as the advantageous with the developed borderland infrastructure and transport network.

Natural-geographical pre-conditions are ambiguous and create some problems of Roztochia's transport networks. These problems arise from the hilly relief.

History of Roztochia's transport development embraces a large period, including times of Kievan Rus, Kingdom of Galicia–Volhynia, Austrian monarchy, XX century and modernity.

Demographic pre-conditions of Roztochia's transport developemnt are determined by the near location of metropolis – a regional center of Lviv, and district centers – Zhovkva and Yavoriv.

The economic pre-conditions for the development of transport are determined by the orientation of Roztochia on transborder transportations.

Recreational pre-conditions for the development of transport arising from the presence of the renowned spa centers (Shklo, Nemyriv, Bryukhovychi), tourist and pilgrimage centers (Zhovkva, Krekhiv, Stradch), and in recent years the areas of green tourism.

Roztochia's region is characterized by a relatively good transport networks between the towns of the region: Zhovkva and Yavoriv, a small town Dubliany, Rawa-Ruska, Kulykiv and Mageriv as well as townships: Ivano-Frankove, Krakovets, resorts of Shklo, Nemyriv, although the conditions of peripheral highways are not satisfactory.

The network of highways includes the roads of all types (international, national, regional, territorial and local). Alongside international transport corridors pass through Roztochia. The main centers of transport-logistic activity in freight transportations are Malekhiv, Zhovkva, Novo-Yavorivsk, Yavoriv. The biggest working international border-check points are "Rava-Ruska" and "Krakivets".

Keywords: Roztochia's transport network, roads, railways, tourism and recreational development, transport of passengers, thoroughfares.

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PERIPHERAL AREAS OF CAPITAL REGION, THEIR FUNCTIONAL CERTAINTY UNDER SOCIAL TRANSFORMATION (ON THE EXAMPLE OF KYIV REGION)

Research of the periphery at the regional level, in a natural and ecological and socio-economic environment is important. Interaction between the center and the periphery is a major regional development. The socio-economic growth of the capital and peripherals depends on its solution.

The features of social and economic development of peripheral districts in relation to the capital city of Kyiv under the conditions of market transformations and influence of globalization have been considered in the article. The causes of their functions changes and their role in the territorial structure of economy and in the system of population settlement in the region are highlighted. The main formation and development factors of peripheral districts of Kyiv area are revealed. The demographic situation, migratory activity of population and community network is assessed. On the basis of the specified methodology the social and geographical research of peripheral districts has been estimated and the economic level and demographic situation of peripheral districts of Kyiv region, territorial differences there have been detected. Basic social problems of these districts are outlined. Directions of increasing level of social and economic development of the peripheral districts of Kyiv region, considering the influence of the capital, are worked out.

Keywords: peripheral areas of the capital, specialization, economic activity, industry, agriculture, migration, employment sphere.

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SPATIAL AND TEMPORAL ANALYSIS OF POPULATION TRADE SERVICE IN KHARKIV REGION FOR PARAMETERS OF SOCIAL AND GEOGRAPHICAL SYSTEM TRAJECTORY MOTION

The article deals with spatial and temporal features of population trade service of Kharkiv region. The study has been implemented from the point of view of the system approach to human geography and the definition "social and geographical system" has been given. For the qualitative human-geographical analysis the parameters of social and geographical system trajectory have been selected. They include: cosine of an angle between social and geographical system trajectory and optimal trajectory; distance traveled by social and geographical system in multidimensional feature space (L); distance between the current point and the minimal development point (coordinates beginning) (L0); distance from the current point to the maximum development point (end point) (L1); progress coefficient. Cosine of an angle between social and geographical system trajectory and optimal trajectory characterize trajectory motion direction, others – linear indicators. Districts distribution for these parameters showed that the most economically developed districts (Kharkivs'kyy, Krasnohrads'kyy, Derhachivs'kyy, Zmiyivs'kyy, Balaklis'kyy, etc.) are characterized by the greatest advancement in development (progress coefficient, distance between the current point and the minimal development point); the worst developed, farthest from the regional center – correspondingly, the worst advancement. The indicator of distance from the current point to the maximum development point is inversely proportional to the distance from the coordinates origin to the current point. In dynamics the trend for increasing the indicators during the studied period is observed in the economically developed districts, and decrease in motion intensity is observed in the worst developed districts. Among the towns of regional subordination the city of Kharkiv is highlighted.

Keywords: social and geographical system, trajectory, progress coefficient, consistency, coordinates origin, end point, trade service, local classifications.

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ANALYSIS OF THE TWO-LEVEL URBOGEOSYSTEMS BY GIS-TOOLS

The authors provide the urban geosystem concept both within some details of its theory, and with a few examples of its practical applications. Our paper recognizes this conceptual research approach concerning the GIS-tools of urban data geoprocessing, modeling and visualizing on the base of either *O-D* urban data, or data extracted by *LiDAR*-technology remote sensing. A strong spatial aspect of the urban research implies the GIS tools involvement that has been considered in details. Two levels of the urban geosystem entity have been introduced - an external level (a set of cities), and an internal one (a set of parts for an individual city). To present urban data reliability it should be coupled with a powerful GIS-technology in the strategic urban study goal: various data integration and visualization. It is accepted that the spatial hierarchy of urban geosystem can be abstracted as three main constituents: a set of point objects, containing attributes of a single city; a set of line objects, indicating the interaction patterns that exist among the cities; a set of areas, indicating the city impact on the territories nearby. Such urban geosystem understanding completely coincides with the GIS basic object outline of a point, a line and a polygon. The algorithmic modeling consequence, which unites the geographic "gravity" model and a GIS model of an urban geosystem, has been built within the introduced framework. The regional example of the *external* urban geosystem modeling has been introduced. As far as an *internal* urban geosystem is concerned, the approach introduced in the paper has been employed for this system's architectural dynamic analysis. The GIS-interface and specialized original software functionality have shortly been considered in the mentioned respect of urban geosystem analysis. In addition, the analysis results obtained through *LiDAR*-technology and GIS-tools have been examined briefly.

Keywords: urban research, two levels of an urban system, external and internal urban geosystems, subject area "gravity" model, geoinformation system, interface and functionality of GIS-software, *LiDAR*-technology.

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THE PLACE AND ROLE OF SOCIO-ECONOMIC FACTORS IN FORMATION OF CARPATHIANS REGION'S ECONOMIC POTENTIAL

Each region of Ukraine has its own development factors and opportunities for the effective use of resources. The aim of this article is to identify the main socio-economic factors that determine their role in the formation of the economic potential of the Carpathian region. Its economic potential is defined by complex exogenous and endogenous factors. The interrelated combination of all the factors (socio-demographic, labor resources, scientific and technical, information, technological, investment, ecological and economic) provides development services in the region. Each factor can be considered as one of the development potentials of the economic system and as a component of overall capacity development in the region. It should be stated that as a result of a non-complex approach to the organization of production, poor economic policies and

misguided environmental activities in the Carpathian region have formed a distorted system of economy. Socio-demographic potential of the region is getting worse: the mortality rate is increasing, natural increase is reducing, the population is aging and migrates from villages to towns and to other regions. The region has a surplus manpower, it is the donor of unskilled workers to Western Europe. The Carpathian region is industrial-agrarian, with over 80% of the total commodity output accounted for by industrial production. In the sectoral structure of the economy it is dominated by resource-and energy-intensive industries: mining and chemical, wood chemical, wood processing, chemical, pharmaceutical, food. Agriculture and resort sector are also developing. The region has the ramified structure of productive capacity which is due to the richness of the resource potential. But the socio-economic structure of the region is characterized by the imbalance of production: 51% of the rural population produces 14.5% of GDP. There are territorial disparities in the development of productive forces; they occur in hypertrophied development of the plains and socio-economic backwardness of the mountain regions. Since 2013 there has been a decline in investment activity of regions of the Carpathian region. The share of industrial enterprises introducing innovation is less than 10 percent. Environmental and economic factors important for the region are: the landscape, the geographical location, climate, resources of mineral waters. The Carpathian region is a relaxation wellness area. Ecological and economic factors are favorable for the development of green tourism. We believe that a system of socio-economic factors forms the strategic potential of the region's economic complex.

Keywords: Carpathians region, economic potential, socio-economic factors, resources.

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YOUTH AND CHILDREN'S TOURISM: THE ESSENCE AND CLASSIFICATION BY AGE

This article is devoted to the study of children's and youth tourism. In particular, the classification of tourists depending on travelers' age. In practice, there is no jointly determined differentiation of tourist and standard terminology depending on travelers' age in legal acts and scientific literature. Definitions of children's and youth tourism by scientists from different fields were analyzed and summarized. Setting age limits corresponding to the concept of "youth" and "youth tourism" was separately justified. My own options to determine the definitions of "children's tourism" and "youth tourism" taking into account the previous studies of various scientists, Laws of Ukraine and the current state of the industry were offered.

We formulated the following interpretation of children's and youth tourism as a species (forms) of tourism, depending on the tourists' age: "children's tourism is an organized recreational activity for persons under 18 years outside their permanent place of residence and study related to the use of extracurricular time for recreational, educational, cultural, cognitive, local history and sports activities"; "Youth tourism is the recreational activity for young people between the ages of 18 and 35, associated with the cognitive, recreational, sports, cultural and entertaining activities outside the permanent place of residence and study, without the purpose of making a profit at the location."

We also set the most important functions of children's and youth tourism as one of the best methods of teaching and local history work that promote patriotic and cultural education of the younger generation, the ability to enhance their intellectual and cultural level, the development of observation, elimination of physical fatigue, psychological tension and stress.

Keywords: types of tourism, tourist age, children's tourism, youth tourism.

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CHANGING ROLE OF TOWNS IN KHARKIV REGION - A RETROSPECTIVE ANALYSIS

This article provides a retrospective analysis of urban settlement development changing role in the network of Kharkiv region and determines that resettlement network of the region has a long history of specific formation. The city emerged from the influence of geographical, historical and economic factors, development of the territory was determined by its social and transport position. It has been found out that the basis of resettlement network of Kharkiv region is mostly the city, so it is important to study the role of urban settlement system of Kharkiv region.

According to the hypothesis of «Zipf-Medvedkov» we studied the formation and further development of growth poles in Kharkiv region in modern administrative boundaries, synthesis and analysis of geographical data network of historic settlements of the region and revealed their influence on the modern system of resettlement.

The relationship between specific population of the city and its serial number (rank), the degree of decrease of population in the cities has also been studied.

Key features and disparities in the resettlement network of Kharkiv region, deviation causes of the towns' distribution in the settlement system of rules "rank-size" such as mono-centricity, historical and geographical aspects of economic development have been considered and prospects for their further development have been identified.

The calculated theoretical population number of the towns in the region can be used to build a model of polycentric settlement of Kharkiv region.

Keywords: settlement system, administrative-territorial reform, the carcass settlement, "growth poles", urban settlement, polycentric development, theoretical population.

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METRIZATION OF THE INHABITED LANDSCAPES OF VOLYN REGION

The article presents the results of Volyn region's inhabited landscapes metrization. As a result of Volyn available land structure analysis, the anthropogenic landscape class was singled out – built-up area that is an inhabited landscape itself, characterized as one of the most dynamically growing.

The research work was carried out at the administrative microlevel with singling out key areas. The keys for Volyn region were chosen within the bounds of the local councils.

Processing of fund data (including Zem-6 certificate, topographical maps of different time segments) by means of GIS-tecnologies combined with modern IT-programmes let us analyse the correlation of area and structure of inhabited built-up landscapes usage with matrix approach. As a result of matrix analysis both territorial and structural differences in correlation of inhabited built-up share in Volyn region were found out.

Quantitative assessment and dynamics analysis of inhabited landscape pattern which is characterized by distinguished boundaries were carried out by means of metric approach. Landscape contour division coefficient, circular index was defined.

The territory of Volyn region upland area is determined to have higher contour division coefficient in comparison to Polissya territory, which is explained by a variegated landscape pattern with well-planned and divided into streets and blocks development. A number of map charts, diagrams, matrixes were constructed according to the results of the research work

Keywords: built-up area, inhabited built-up landscapes, pattern of the landscape, contour division, metrization of the inhabited landscapes.

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STFNDARDIZATION IN LAND EVALUATION

The paper studies the main tasks mentioned in the national standardization in the field of land valuation. The research includes analysis of current legislative, regulatory support of standardization in the field of property valuation and property rights, including land. Estimation of the land in any country is a profession that is regulated by a system of related standards. In Ukraine, the most influential are national and international valuation standards. Valuation of property and property rights is essential for the functioning and development of civilized market relations. World experience shows that development of the market system in the country gradually began to increase the need in professional evaluation that would ensure the existence of different market segments.The authors considered some major factors that affect the value of land, the main ones are legal, spatial, market, quantitative, qualitative, economic and technological. It has been established that the national standards in land valuation do not reflect all gained national and international experience and the estimates do not include changes in the latest edition of the International Valuation Standards, which summarizes the best estimated practice. Modern conditions of appraisal activity in Ukraine lead to compliance with International Valuation Standards applicable to national standards. Based on international experience, adjustment to the International Valuation Standards help national assessors to correctly identify their land value, reasonably defend its position during the evaluation. We consider the most important objective factors of pricing.

Keywords: market value, national standards, evaluation activities, international standards, methods of assessment, property rights, knowledge base, the principles of valuation.

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ISSUES AND DEVELOPMENT PROSPECTS OF THE PASSENGER TRANSPORT IN THE CITY OF KHARKIV: SOCIOLOGICAL AND GEOGRAPHICAL ASPECT

Passenger transport is a most important part of Kharkiv transport system. Each of modern modes of transport – with their own features and infrastructure – functions as a whole system, while there is a range of problems encountered in the field.

Metro carries the largest number of passengers in Kharkiv, which is attributable to its advantages: it faces no traffic congestion; it operates equally efficiently in any time or season of the year. This mode faces such issues as relatively low trains' speed, limited branching around the city. Motor vehicle takes the second place based on the transportations number. The major advantage is its mobility, and disadvantages include considerable impact on ecology, enlarged number of vehicles and enlarged congestion on city roads. Trolleybus transport is the least hazardous for the environment. The disadvantages include limited mobility, exhausted rolling stock, catenary system, and road surface. Trams occupy the last place by the number of passengers carried in Kharkiv. It has the following advantages: eco-friendly, costs cheaper in use, its technical lifespan is longer. It faces the following issues: tram lines are expensive in laying and service, need rational ways of laying, rolling stock is scarcely repaired or replaced.

Having studied the public transport main modes in Kharkiv, we provide recommendations to this system optimization. Premetro is proposed as an alternative to the tram. It is separated from the traffic flow and allows for saving on the rolling stock. Among disadvantages, there is less capacity as compared to the metro, and higher construction costs compared to the tram. It is reasonable to introduce premetro on the perspective areas of metro building. We find single rail transport to be promising. It does not overload automobile roads, and congestion has no effect on it, it gathers great speed and produces little noise, its construction takes less time, it is five to ten times cheaper in building compared to the metro, and two to three times cheaper than

city automobile overpasses. It has its disadvantages as well. There are higher servicing costs,passengers get locked in a train if an unplanned stop takes place. Single rail transport is perspective to unite end metro stations.

Keywords: urban electric transport, metro system, automobile transport, tramway transport, premetro, monorail.

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FEATURES OF THE ATMOSPHERIC PRECIPITATION DISTRIBUTION IN THE TERRITORY OF KHARKIV REGION

Distribution of atmospheric precipitation on the Earth is a consequence of global warming. An atmospheric precipitation is a major source of agricultural crops moistening. Knowledge of the moistening mode is used in carrying out agrarian works, determination of terms and ways of crops. On the other hand, torrential rain leads to crops lodging, prevents agricultural work. Insufficient amount of precipitation forms droughts. The agricultural feature is seasonality of works that depends on heat, changes of air temperature and rainfall. These factors define agroclimatic resources of the territory.

Formation of rainfall is the result of difficult circulating processes. In the article the dynamics of atmospheric precipitation changes has been studied at the meteorological station (MS) of Rogan (the test field KNAU) during the year and seasons for a period of 2000-2015. The mode of atmospheric precipitation loss is characterized by large variability in a month, year and decade. Increase in precipitation amount during the cold period of the year (winter) and in the autumn has been recorded. Reduction of an atmospheric precipitation is observed during the warm period of the year (spring-summer). In general, the tendency of precipitation amount reduction during the period November - March has been traced. The MS of Rogan belongs to the area with unstable moistening where the average annual amount of precipitation is 500 – 600 mm. The continental type of annual rainfall change has been observed where the maximum of precipitation falls in the warm period of the year. The set mode of moistening is coordinated with the changes in modern circulation of the atmosphere.

Keywords: atmospheric precipitation, moistening mode, climatic norm, tendency, global warming, climate changes.

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ANALYSIS AND EVALUATION OF ECOLOGICAL AND ECONOMIC CONDITION OF RIVNE REGION LANDS

Since the use of the environment by mankind inevitably leads to anthropogenic transformation of landscapes, the main purpose of the study is to analyze the structure of the land and determine the environmental and economic balance of the Rivne region territory.

Research has been carried out by means of the statistical data, mathematical, comparative- geographical and maps modelling methods, general statistical information of the Central Derzhheokadastr Office as for the suitability of lands and their distribution according to the areas of economic significance, the types of economic activity and materials of nature-reserve fund.

The analysis of the land areas structure based on the degrees of anthropogenic pressure and the dynamics of their changes in time has been carried out. Ecological and economic status of the territory and the degree of natural landscapes balance of individual administrative districts of Rivne region has been estimated. The results of the evaluation have shown that the most optimal environmental and economic balance is in the administrative districts of Polissya part of the region characterized by low environmental-economic pressure and high rates of ecologically protected areas. Much worse situation is in its southern areas with extreme human pressure, which is not counterbalanced by environmental potential and the bad condition of natural protection area.

Keywords: anthropogenic pressures, ecological and economic balance, forest cover, plowing, the ecological and economic tension coefficient of the area condition, the ratio of natural protection.

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METHODOLOGICAL BASIS OF ECONOMIC GEOGRAPHY (part 1)

By the middle of the 60-s years of the XX century, a theory of economic geography occupied a leading position in geographical science and was recognized by the world community of geographers. Scientists were assured that science would be perspective for the future. At that time, the original methods of research were developed, economic and geographical division into districts of the country were carried out, which was used in government plans for future economic development.

However, in the 70-s years of the XX century, the situation has changed and economic geography suffered sharp and informed criticism for scholastic nature of theoretical analysis, narrow regional studies, developed pseudo efficiency, a sharp falling behind the world level. The crisis in economic science began spreading rapidly. In the 20 years of the last century, some scientists had even begun to refer the economic geography to economics.

The crisis had matured a long time from the terrible extermination of the geographical elite in the 30-s-50-s years of the XX century, and in the 60-s after the period of the «Khrushchov thaw» in the science, occasional people who generated dressing, protectionism, sectionalism, corruption that led to deep crisis of the economic geography «rushed» into it.

Economic geography has formed an uncertainty situation of its status: today, some geographers affirm that economic geography no longer execute its function as an independent science and has became an addition to other sciences. After a long and emotional discussion «the fate» of economic geography was determined – it had become part of other sciences, «social geography» and «social and economic geography». However, new sciences cannot do without economic geography. Therefore, there was a problem to ascertain the current status of economic geography in the system of geographical sciences. In fact, it is a self-sufficient science. To prove this statement, we have determined the ways for further research.

Keywords: economic geography, social, socio-economic, social geography, relationships and influences.

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APPLICATION OF ECOLOGICAL FOOTPRINT METHODOLOGY IN A CONSTRUCTIVE AND GEOGRAPHICAL RESEARCH

The article identifies the aspects of using the ecological footprint (EF) methodology in constructive and geographical research while doing environmental impact assessment in Ukrainian regions. It analyzes how the methodology considers the complexity of environmental impacts, what spatial patterns can be determined, and how EF can be useful in decision-making.

The theoretical foundation of the research are publications of the recognized environmentalists retrieved from the Science Direct. The calculations for further analysis are made based on data available at the State Statistics Service of Ukraine and the State Service of Ukraine for Geodesy, Cartography, and Cadastre.

The research includes three stages: 1) analysis of the strengths and weaknesses of the EF methodology; 2) calculation of EF and biocapacity in Ukrainian regions in 2000-2012 and identification of the trends; and 3) consideration of usefulness of the methodology for making decisions.

In the scope of the study, EF is successfully used to assess the environmental impact of the Ukrainian population. It allows to draw the conclusion that the current consumption patterns determine the unstable use of natural resources and ecosystem services. Thus, the difference is imported from other territories, so the citizens become recipients of natural goods produced outside the country.

Two patterns were identified as a result of the regional EF and biocapacity trends: 1) the values change in different directions and 2) unidirectionally. The latter pattern is important for decision-makers because they should take action when the regional biocapacity decreases, while the environmental pressure rises, which is true for 7 Ukrainian regions in the studied period.

Keywords: ecological footprint, biocapacity, decision-making, region, Ukraine.

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ASSESSMENT OF WATER QUALITY IN THE RIVER LOPAN WITHIN THE BOUNDARIES OF KHARKIV REGION

The actuality of this article is in the implementation of a systematic approach to the study of natural water quality of the river Lopan (within Kharkiv region).

Assessment of water quality in the rivers has been studied by such scholars as O.O. Alexin, A.M. Gorev, V.M. Zhukynsky, F.F. Kirkov, A.M. Nikanorov, A.V. Ogievsky, O.P. Oksijuk, N.P. Puzyrevsky, V.D. Romanenko, V.K. Khilchevsky, A.P. Yatsyk, et al. But they all studied mainly large river basins, and we propose to investigate changes in the chemical composition of an average river that flows in the industrialized region.

The research has been conducted on the methodology of environmental assessment of surface water quality according to the respective categories, in three blocks: salt, trophy-saprobiological, and the block of specific toxic action substances.

The results of the research have shown that according to the salt block water in the river is saline; according to the trophy-saprobiological block water in the rivers is the most heavily polluted with phosphate phosphorus, which often leads to significant eutrophication of the reservoirs, nitrite and nitrate nitrogen, low water clarity; according to the block of specific substances – with phenols; according to the environmental index surface water quality of the river Lopan virtually did not change during 1980-2014, 2-3 grade (water is quite clean, slightly contaminated), but in recent years there has been no improvement in water quality of the river.

In previous years industry was the main source of water pollution of the river Lopan, but in recent years it is municipal services, industrial enterprises and agriculture. The river Lopan was the most polluted in 1990, the least - in 2010. The biggest pollutants in the river Lopan were nitrite nitrogen, nitrate nitrogen, phosphorus and phosphate phenols.

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ESTIMATING ECOLOGICAL DAMAGE CAUSED BY SURFACE WATERS OF ATMOSPHERIC ORIGIN (based on housing subsystem)

The article offers an algorithm to estimate ecological damage caused by surface waters of atmospheric origin that are formed within the housing subsystem of the urban landscape geosystem of the River Udy basin. Borders and areas of subsystems in terms of their functions and morphology of their position were established. The obtained results show that the area of the housing subsystem is considerable. Volumes of various types of wastewaters formed in the waterproof area of the housing subsystem have been calculated. The greatest volume is produced by thaw water. The source data for the research are the authors' own field investigations. The chemical composition of approximately 20 water samples of the surface waters was studied. Suspended matter and solid residue were estimated by using the gravimetric method; pH, biological oxygen consumption, and oxidization – by using the acid and base titration method and indicators; polyphosphates, petrochemical products, surfactants (synthetic surface active agents) – by using the U-like oscillating tube and the extraction photometric method, heavy metals – with the help of the atomic absorption spectroscopy method.

The chemical analysis of the waters conditions revealed high content of suspended matter, presence of heavy metals and petrochemical products. All the above mentioned results of the study were used to estimate ecological damage caused by surface waters. Environmental charges for petrochemical products, suspended matter, biological oxygen consumption and chemical oxygen consumption were calculated. Cost estimates reveal unbalanced usage of the surface flow.

Keywords: cost estimating, ecological damage, housing subsystem of the urban landscape geosystem, surface waters of atmospheric origin.

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