Summaries

UDC 551.242.7(571.1/5)

Vasiliev B.D., Gumerova N.V., Falk A.Yu., Mezentseva O.P.
ON LOCATION TIME OF INTERMOUNTAIN TROUGHS IN ALTAI-SAYAN FOLDED AREA

Find of Late Silurian sea infauna in lower strata of volcano-sedimentary Byskar series of Minusinsk trough indicates the beginning of volcanism in troughs in Late Silurian but not in Devonian. The birth time of intermountain troughs in Altai-Sayan folded area is determined by the age of the earliest deposits preserved in these troughs. Terrigenous-carbonate deposits (Shishtyk suite and its analogues) with sea fauna of Late Silurian (Ludlow Age) preceding volcanism are such deposits. Sedimentation in troughs took place in S_2–P_2; in this case, the thickness of accumulated sediments achieved 9 km in Kuznetsk trough and 6 km in Minusinsk one. At the same time (S_2–P_2) Hercynian Kolyvan-Tomsk geosynclinal folded zone was formed and developed to the west.

UDC 551.324:556.55

Rusanov G.G.
LATE PLEISTOCENE ICE-DAMMED LAKE IN ABAYSK SINK AND HIGH KOKSA VALLEY

The possibility of forming and existence of ice-dammed lakes in Abaysk sink of Gorny Altay and High Koksa valley for the time of last glacial period has been considered. It was shown that at the initial stage of glacial period a lower part of the sink may be occupied by glacial ice-dammed lake not joint with Uimonsk sink; the latter fell into glacier alimentation area, froze and turned into icing body (ledoyom) at its level growth. At the stage of glacier degradation in Abaisk sink and in the valley of upstream of the river Koksa the ice-dammed lake not less than 42,5 km^3 occurred twice. It was shown that there was no of lake water runoff through the drainage divide spillways from the Abaisk sink into the Ust-Kansk one.

UDC 553.411

Korobeinikov A.F.
SCIENTIFIC BASIS OF PREDICTIVE-MINEROGENIC AND EXPLORATORY NOBLE METAL MINERALIZATION RESEARCHES

New models of occurrence and development of mantle magma-thermo- fluid dynamic and in-crust granitoid-hydrothermal-metasomatic ore-forming systems at their oscillatory-relay self-development have been proposed on the basis of the concept of Earth oscillatory geological self-development. Optimal variants of regional and local predictive-search criteria and indices as well as typical predictive-search complexes on noble-metal mineralization of economic value were developed. They include predictive-minerogenic researches of ore-bearing areas on the basis of remote sensing and land techniques of physics-geological and special mineral-geochemical mapping at a scale of 1:200000–1:25000 (I stage); predict-appraisal survey including mineral-geochemical special mapping at a scale of 1:50000–1:10000 (II stage); prospect evaluation survey at a scale of 1:10000–1:1000 (III stage).

UDC 553.411+551.311.231

Martynenko I.V., Mazurov A.K.
ZONALITY AND MINERAL-GEOCHEMICAL COMPOSITION OF RESIDUAL SOIL PRODUCTS OF OLKHOVSK-CHIBIZHEK REGION

The structure, zonality and mineral-geochemical features of residual soil of Olkhovsk-Chibizhek region (the Eastern Sayan) have been studied. It was determined that gold high concentration is coordinated to the upper part of the formed crust.

UDC 553.411.071:553.078.2

Kucherenko I.V., Gavrilov R.Yu.
STRUCTURAL-DYNAMIC MODES OF FORMING GOLD-SULPHIDE-QUARTZ MINERALIZATION IN SULBAN GOLD-ORE ZONE (BASIN OF MID-CHANNEL OF THE RIVER VITIM) P. 1. KARALON ORE FIELD

The data on geological position and geological structure of northern flank of deep fault Sulban zone – the similar gold-ore zone as a part of Karalon and Urjah ore fields have been introduced. It was shown that the ore containing rupture structures of two kinematic types – pitching shift-overfaults of shear type and sub-horizontal different-scale faults and cracks formed by the break type, were formed in granitoid bodies in deformation influence area of ore-control Main Sulban and Karalon depth fractures among the lateriphean volcanic rocks of Kelyansk and carbon terrigene shale of dividing suites. The frame of ore containing steep- and flat pitching structures is formed at the pre-ore stage under conditions of tangential compression which was discharged along the surfaces of maximum shear strain and along the up oriented axis of maximum tension stress. The abundance of minor sub-horizontal raptures made by gold-sulphide associations in massive early products of hydrothermal process quasi-isotropic by mechanic properties – quartz, quartz-carbonate veins, beresite deposits proves the recurrence of pre-ore stage at force field ore stage and, therefore, oscillatory mode of tectonic deformations preceding ore-formation process and accompanying it. The materials on Karalon ore field are introduced in the first part of the article and in the second part there are the materials on the Urjah ore field. In the second part the results are discussed and the general conclusions are stated.

UDC 553.411.071+552.322

Kucherenko I.V., Gavrilov R.Yu.
BASIC DIKES OF SULBAN GOLD-ORE ZONE (BASIN OF MID-CHANNEL OF THE RIVER VITIM)

The data on the modes of occurrence, age, mineral-chemical composition, hydrothermal changes of basic dikes in northern flank of Sulban gold-ore zone have been introduced; pre-ore and inter-ore medium-alkali high-potassium high-titanium ferruginous dolerites have been singled out among them. The correctness of dike species identification was substantiated. The conclusion was drawn on dike accessory to Late Paleozoic konkuder-mamansk antidromic granite-diorite-dolerite complex – ore-producing like the other similar complexes in gold-ore regions of southern Siberia at the late basaltoid stage of its establishing in geodynamic mode of intracontinental rifts.

UDC 549.324.31:553.41

Mikhailova E.M., Voroshilov V.G., Pshenichkin A.Ya.
REFLECTION OF SUKHARINSK ORE FIELD ZONALITY IN PYRITE TYPOMORPHIC FEATURES

Pyrites of ores and wallrock metasomatites of skarn-magnetite Sukharinsk ore field (Mountain Shoria) with superimposed gold-sulphide mineralization have been studied. Pyrite typomorphic features: crystal morphology, thermoelectric properties, reflective power, chemical composition were studied. Zone change of pyrite typomorphic properties by ore field extension was determined.

UDC 549.51:549.761.62

Novoselov K.L.
INHOMOGENEITY OF INTERNAL STRUCTURE AND CHEMICAL COMPOSITION OF ACCESSORY WOLFRAM-BEARING COLUMBITE-TANTALITE OF KOLYVAN MASSIVE GRANITOIDS (NOVOSIBIRSK PRIOBIE)

Internal structure of accessory columbite-tantalite grains of Kolyvan massive leuco-granites has been studied. Grain texture has complex dissociation structure of three-component isomorphous mixture introduced by columbite-tantalite wolfram phases. Accessory columbite-tantalite of Kolyvan massive leuco-granites occurred the main mineral-accumulator of wolfram from magmatic melt.

UDC 550.8.053

Ivanchenkov V.P., Kozlov A.A.
CLASSIFICATION OF GEOLOGICAL RECORD TYPES BY THE METHODS OF CLUSTER ANALYSIS BY THE DATA OF SEISMIC OBSERVATIONS

The issues of developing the algorithm of predicting the geological record type by the results of phase-time analysis of seismic observations and applying the methods of cluster analysis for these purposes have been considered.

UDC 550.8.053

Vylegzhanin O.N., Rybalka S.A.
REFLECTOR IMAGING BY THE OBSERVED TIME-DISTANCE CURVE OF THE REFLECTED WAVES USING GRADIENT MODEL OF SUPERINCUMBENT MEDIUM

The calculation technique of reflecting boundary points by the materials of vertical seismic profiling method has been proposed. The method is based on ray approximation of acoustic ray propagation, velocity model of gradient superincumbent medium, and supposition on reflecting plate levelness. It was shown that the problem may be reduced to the sequence of optimization problems. The algorithm implementing the proposed method was developed. The example of reflecting boundaries calculation at processing the materials of vertical seismic profiling obtained at one of the potential areas of Tomsk region was given.

UDC 550.834.05

Zimina S.V., Tischenko G.I., Smirnova K.Yu., Eliseeva O.D.
APPLYING AMPLITUDE-INTERPRETATION COMPLEX FOR DETERMINING OIL AND GAS PROSPECTIVE OBJECTS (EAST OF TOMSK REGION)

A number of geological problems has been fulfilled on the basis of geology-geophysical exploration degree of eastern areas of Tomsk region. Prognostic oil-and-gas promising territories were zoned by anomalous seismic effects in Mesozoic deposits. It was ascertained that the developed technique applying new technologies of predicting hydrocarbon deposits may be used at geological exploration for further territory research. The conclusion was drawn on arrangement of prognostic-prospective localized areas on the territory of investigation.

UDC 550.832

Oshlakova A.S.
THE ANALYSIS OF GEOPHYSICAL AND SERVICE DATA OF LOW-RESISTIVITY PAYS

The problem of pay low-resistivity has been considered and the criteria of their release in well logs have been determined. The comparative analysis of determining in different ways the low-resistivity pay saturation was introduced. Porosity and permeability and performance parameters were compared. The conclusion was drawn that pay low-resistivity is conditioned by argillaceous mineral electrical conductivity.

UDC 622.24.051.001.5

Ryabchikov S.Ya.
OPTIMIZATION OF OPERATING PARAMETERS AT WELL DRILLING BY HARDENED DIAMOND ROCK-BREAKING TOOL

The influence of operating parameters on drilling rate of penetration at hole boring by hardened diamond rock-breaking tool has been studied. Optimal combination of axial load on rock-breaking tool and its rotation frequency providing maximum drilling velocity was determined. The technique of determining reduction coefficients for setting rational values of axial load to the hardened rock-breaking tool was developed.

UDC 544.723.237

Evseev V.D.
IMPLEMENTING ROCK DELAYED FRACTURE AT INDENTATION AND ITS LIQUID STIMULATION

The possibility of implementing rock delayed fracture under the action of constant contact pressure of indenter pressed into rock and this fracture liquid stimulation has been considered. Fracture at different value of contact pressure was experimentally studied; the influence on development of fracture liquid of different nature (water, oil, ethanol, tetrachloromethane) was determined. Fracture is connected with rock creep development under the contact patch.

UDC 624.131

Strokova L.A.
ADVANCED DATA PROCESSING OF SOIL COMPRESSION TEST FOR DETERMINING ELASTO-PLASTIC MODEL PARAMETERS

The comparative analysis of Russian and foreign standards on processing soil compression tests data showed that soil pre-stress parameters are not almost used by domestic companies in calculating engineering construction base but they occur everywhere in software of leading west engineers. The results of determining the advanced parameters of compression tests required for numerical simulation of soil behavior are introduced.

UDC 552.578.2.061.4:551.72:551.8(571.5)

Dankina T.A., Fomin A.M.
LITHOLOGIC STRUCTURE OF ULAKHANSK OIL AND GAS HORIZON IN THE NORTH-EAST OF NEPA-BOTUOBA ANTECLISE

The data on lithology and reservoir porosity and permeability of Ulakhansk oil and gas horizon of terrigenous vend in Northern-East part of Nepa-Botuoba anteclise have been introduced.

UDC 551.3:553.98

Vologin S.V., Kudamanov A.I., Skachek K.G.

RECONSTRUCTION OF VASYUGAN SUITE DEPOSITIONAL CONDITIONS IN CENTRAL PART OF WESTERN SIBERIA (BY THE EXAMPLE OF VATJEGANSK DEPOSIT)

Callovian-Oxfordian deposits were rhythmically sedimentated in central part of western Siberia in western and northern-western direction. Deposits of productive pay zones SE_t^2 and SE_t^{16} were formed in two regressive stages. In the west of the area the desalted lagoons

existed occasionally, and coastal-marine conditions existed in the north. The productive pay zone SE_1^{1a} is the result of relief removal, beach destruction and precipitation redistribution in the form of alongshore banks, bars and barrier islands before the regional «Georgievsk» transgression.

UDC 553.982

Yashchenko I.G., Polishchuk Yu.M.
GEOGRAPHY OF HIGH RESINOUS OILS AND FEATURES OF THEIR PHYSICO-CHEMICAL PROPERTIES

Geographical distribution regularities of world reserves of high resinous oils as an important source of hydrocarbon stock in future have been considered. It is shown that one third of oil-bearing basins in the world involves high resinous oils reserves. Two thirds of their world reserves are in Canada. About 90 % of all Russian reserves of high resinous oils are in three basins – Timan-Pechorian, West-Siberian and Volga-Ural ones, the latter contains half of high resinous oils reserves of Russia. High resinous oils by its physico-chemical properties are at the average heavy, high-viscosity, sulfur, mean-paraffinic and mean-asphaltenic.

UDC 553.98.061.33

Khromovskikh A.Yu., Voloshchuk G.M.
THE FEATURES OF FORMING UPPER JURASSIC OIL DEPOSITS IN THE SOUTH-EAST OF WESTERN SIBERIAN PLATE

It was ascertained that one of the most important factors controlling hydrocarbon generation rate is the process of their primary migration. The carried out analysis of Bazhenov formation generation potential by the Kaimysov arch deposits showed that the determined geological deposit oil reserves may be generated by the Bazhenov formation deposits embedded within the oil-drainage boundary. It was shown that at dividing powerful impermeable layer between the source rock and reservoir bed the hydrocarbon migration process is excluded and oil accumulation is not formed in traps. The conclusion was drawn that upper Jurassic accumulation formation due to oil lateral migration from submerged zones of adjacent areas is impossible but it occurs, mainly, owing to hydrocarbons generated in the Bazhenov formation directly at deposits at their vertical downward migration. Lateral migration may occur in very limited sizes at oil redistribution within deposit pore space.

UDC 622.276.031.011.43:53.091

Anop A.A., Schemelinin Yu.A., Razdobreeva N.I., Ledovskaya T.I.
ELASTIC CHARACTERISTICS OF RESERVOIRS OF KRAPIVINSKOE DEPOSIT IN TOMSK REGION

The results of the laboratory experiments on determining in reservoir conditions the elastic waves propagation rate, Young modulus, formation compressibility and Poisson ratio for reservoirs of Krapivinskoe deposit in Tomsk region have been considered. The correlation relationship of the studied characteristics from the effective porosity was obtained.

UDC 550.81:553.048:553.98:552.5

Naimushin D.G., Popov A.A.
SELECTING THE VARIANTS OF DEVELOPING LAYERS WITH HYDROCARBON TIGHT RESERVOIRS BY THE EXAMPLE OF MAYSK DEPOSIT

The approach to developing tight reservoirs has been considered by the example of the layers of low-Middle Jurassic age of Tyumen and Peshkov suites of Maysk deposit in Tomsk region. Geologic and hydrodynamic models were designed on the basis of the data of seim interpretation, core studies, interpretation of geophysical and hydrodynamic studies of wells. The variants of layer development were designed and the most perspective variants and test fields for introduction were selected by these models. The selected variants were tested at the test fields. The original method of oil field development by horizontal well drilling with multi-level hydraulic fracs was proposed.

UDC 553.98;550.4

Korzhov Yu.V., Isaev V.I., Zhiltsova A.A.
THE PROBLEMS OF PETROSEARCH GEOCHEMISTRY AND GENERALIZED DIAGRAM OF HYDROCARBON FLUID MIGRATION

The review of traditional and modern ideas on mechanisms of hydrocarbon ascending migration from oil and gas deposits has been introduced. Classic and recent methods of petrosearch geochemistry were examined. The conclusion was drawn on methodological bases of understanding hydrocarbon fluids migration processes, on stable subsurface geochemical deposit detectors. The conceptual diagram of ascending migration of «abiogenous» hydrocarbons and hydrocarbons of sedimentary rock kerogen was proposed. The diagram assumes functioning in Earth crust the mechanism of constant fluid and/or energy «feeding» of gas and oil deposits, forming background geochemical scatter bands and anomalous values of geochemical parameters of over-productive deposits.

UDC 532.542

Strekalov A.V.
THE MODEL OF RESERVOIR PRESSURE MAINTENANCE SYSTEM

The possibilities of increasing the level of controlling and managing the reservoir pressure maintenance systems developing and using the unified model have been considered. The model allows controlling an arbitrary hydro-system and predicting reactions of hydraulic modes of its elements at any engineering changes. Practical application of the proposed model allowed extending energy saving in hydro-systems and increasing accuracy of conformity to technological modes of flooding due to the complex optimization.

UDC 550.46

Shvartsev S.L., Domrocheva E.V., Rasskazov N.M.
GEOCHEMISTRY AND FORMATION OF KUZBASS SODA WATERS

The problems of propagation, composition, genesis and formation of soda waters have been considered by the example of Kuzbass. It was shown that such waters occupy the majority of geological cross-section, developed in the area of slow water exchange, characterized by salinity of 0,6...9,0 g/l and и pH 7,5...10,3. It was ascertained that soda waters are equilibrium with calcite and at the same time with clay minerals montmorillonite, illite, kaolinite, in some cases with analcite and albite, but they are always non-equilibrium with anorthite, forsterite, microcline, i.e. the system water-rock has equilibrium-non-equilibrium character. It was shown on the basis of the complex analysis of soda water formation conditions that they are the product of a certain stage of aluminosilicate weathering, which starts from the moment of ground water achieving the equilibrium with calcite. The time of the latter is controlled by water-exchange intensity.

UDC 550.42:57.4 (571.1)

Savichev O.G., Lgotin V.A.
THE TECHNIQUE OF ESTIMATING THE TOM RIVER WATER LEVELS AT ICE DAMS AND ICE JAMS NEAR TOMSK (WESTERN SIBERIA)

The techniques of a rough estimation of water levels of the Tom river near Tomsk at ice dams and ice jams have been developed and approved depending on hydraulic characteristics of a stream and ice dam factor, ice formation accumulation concerning channel capacity. It is shown that owing to the environment of formation of water and ice condition of the Tom river on the site of its bottom current a high probability of flood because of ice dams and ice jams is supported. The ways of solving the problem of flood in the bottom current of the river Tom are considered.

UDC 556.3 (571.1)

Savichev O.G.
THE TECHNIQUE OF DESIGNING MAXIMUM RIVER WATER DISCHARGE IN THE TAIGA ZONE OF WESTERN SIBERIA

The technique of defining the maximum water discharge of the taiga zone rivers in Western Siberia without observation data has been developed. The technique allows, in comparison with the existing techniques, taking into account better conditions of maximum runoff formation and reducing the time of hydrological calculations. The field of application of the technique is the analysis of variants of arranging the objects of construction, mathematical modeling and the forecast of the rivers maximum runoff. The technique test showed that about a half of air humidity layer for December – May (a snow cover during the winter period and rains in April – May) takes part directly in formation of maximum water discharge of a spring flood at mid-rivers of the examined territory and a half of August atmospheric precipitation takes part in formation of summer-autumn flood maximum. The difference between atmospheric precipitation and a reference layer of a surface runoff is close to average evaporation for a certain settlement period.

UDC 556.314

Ivanova I.S., Lepokurova O.E.
CHEMICAL COMPOSITION OF UNDERGROUND DRINKING WATERS IN SOUTH-WEST PART OF TOMSK REGION

The results of studying chemical composition of underground drinking waters in Tomsk region have been introduced. Vertical zonality in iron distribution at depth was studied. It was shown that maximum iron content is coincided with the depth of 40...120 m, namely, Paleogene deposits waters.

UDC 504.3.52.003.1(571.51)

Savichev O.G., Kopylova Yu.G., Khvashchevskaya A.A.
ECOLOGICAL AND GEOCHEMICAL CONDITION OF THE ANGARA RIVER AND ITS FEEDERS ON THE SITE FROM UST-ILIMSK UP TO BOGUCHANY (EAST SIBERIA)

The results of estimating ecological-geochemical condition of Angara river waters and its feeders on a site from Ust-Ilimsk to Boguchany (Eastern Siberia) have been introduced. It is shown that river waters are characterized by excess of the established specifications under concentrations of Fe, Mn, Cu, Zn, NO_2^-, NH_4^+, PO_4^{3-} and organic substances (CCO, BCO5, contents of hydrocarbons, phenols, pesticides). It allows referring them to «polluted». In case of concentration of Fe, NH_4^+ and CCO it is considerably connected to marsh waters income into river system, land particles and transformation products of organic material of natural origin from water-modular territories. Pesticides and a significant part of hydrocarbons and phenols come to the rivers from anthropogenic sources.

UDC 502.33

Nevidimova O.G., Yankovich E.P.
ESTIMATING WATER CONSUMPTION RISKS IN THE TERRITORY OF TOMSK REGION

Climatic and hydrologic situation in the territory of Tomsk region have been analyzed from the perspective of water consumption risks. It was ascertained that water consumption risk may be referred to mass risk by the degree of occurrence in the territory of Tomsk region. As a result of complex analysis of climatic, hydrologic and social-economic intensity a general estimation of water consumption risk was obtained. Spatial differentiation of the territory was carried out by the degree of water consumption risks subject to social-economic factor.

UDC 556.555:550.42:546.8(571.16)

Ivanov A.Yu.
URANIUM AND THORIUM IN BOTTOM SEDIMENTS OF STAGNANT BASINS IN THE SOUTH OF TOMSK REGION

Geochemistry of U and Th in bottom sediments of stagnant basins in the south of Tomsk region has been discussed. 289 basins in the territory of Tomsk, Asino, Krivosheino, Kozhevnikovo, Zyryanskiy, Bakchar and Shegarskiy regions were examined. Uranium average content in bottom sediments is higher than in other Siberian region. The laws of changing Th and U content in lake bottom sediments depending on their mineral composition were determined. It was determined that uranium anomalous concentrations have generally the original nature of accumulation.

UDC 504.06;519.876.5

Polishchuk Yu.M., Tokareva O.S.
METHODOLOGICAL ISSUES OF MAPPING ECOLOGICAL RISK AREAS OF OIL PRODUCTION EFFECT ON VEGETATION COVER

The issues of estimating and mapping ecological risk areas of air chemical pollution effect on vegetation cover of oil producing territory connected with gas flaring have been considered. The estimation of ecological risk is based on using environmental emergency criterion subject to sensitivity of different vegetation communities to air pollution and features of vegetation cover space structure defined on the basis of satellite data. Mapping ecological risk areas is shown by the example of gas faring effect in the territory of Priobskoe deposit in western Siberia.

UDC 55(920)

Evseev V.D., Ryabchikov S.Ya., Khramenkov V.G.
LIFE JOURNEY OF THE GEOLOGIST VLADIMIR IVANOVICH BRYLIN

The main chronologies of life journey of geologist Vladimir Ivanovich Brylin: from student of geological survey department at Tomsk polytechnic institute to the deputy headmaster of the Institute of geology and oil and gas engineering of correspondence study have been considered. The history of developing geological researches in Tomsk polytechnic university (institute) from 1965 to 2010: from the department of exploration technique of mineral deposits of geological survey department to the department of well drilling of the Institute of natural resources were examined.