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Yuriy STEFANYK, Yuriy HERLYOVSKY, Lesya KULCHYTSKA-ZHYHAILO

**FORMATION DEPTHS OF OIL-LIKE SYSTEMS IN THE BOWELS OF THE EARTH
BASED ON THE RELATION BETWEEN BUTANE AND PENTANE ISOMERS:
AN EXAMPLE OF THE NOVOHRYHORIVSK OIL- AND GAS-CONDENSATE FIELD**

The mineral and aggregate state of the Earth's material is a product of interaction between chemical compounds under natural thermodynamic conditions. Even with a constant element composition of the molecular system its component composition becomes changed with temperature and pressure. In zones of high temperatures caused by a rapid course of chemical reactions the component composition is close to balanced ones and can be determined by laws of thermodynamics.

To determine a depth of formation of oil-like system in the bowels of the Earth one can use varied relationships between the system's components. About two tens of them were cited by I. V. Vysotskiy.

Some relationships allow us to recognize shapes of occurrences of gas accumulations.

To determine depths of formation of oil-like system by the relationship between butane and pentane isomers three tasks should be solved:

1. To develop calculation methods of the pressure and temperature by the relationships between butane and pentane isomers for oil.
2. To determine the distribution of temperatures and pressures in the bowels of the Earth as well as depths that correspond to these thermodynamic conditions.
3. To determine a range of the formation depths of oil in the Novohryhorivsk field.

In spite of some inaccuracy one can assert that by the relationship between butane and pentane isomers oil from the Nova Hryhorivska field was formed at temperature of 1280–1340 K, pressure 1639–3946 MPa and at depths of 54–127 km.

Ihor HONYK, Halyna HAVRYLKO, Olena HONYK

**THE PERSPECTIVES OF HYDROCARBON EXPLORATION
IN DEVONIAN DEPOSITS OF VOLYN-PODILLYA BY ZONED PROGNOSIS RESULTS**

Zoned prognosis of the Devonian oil- and gas-bearing deposits of Volyn-Podillya oil- and gas-bearing region is accomplished repeatedly after 25 years of the period of studying the region. New facts of drilling and geophysical studies have allowed to dismember the section of this complex in detail. The 10 maps of various valuation parameters were constructed and modernized that reflected the thickness and lithofacies of the Upper and Middle Devonian; moreover, were constructed the structure of the bottom and the thickness of dolomite-anhydrite horizon of Lanivska (Velykomostivska) suite of the Middle Devonian, the structure of the surface of the Frasnian stage of the Upper Devonian; the thickness of each individual productive horizons of sandstones or the total thickness of sandstones for all the Middle Devonian complex. The most important criteria of prospects of oil- and gas-bearing of Devonian and the major ways for further exploration work were determined. The present zoned prognosis includes 12 correlative schemes of the sections of the 172 boreholes of VPR and adjacent regions, that discovered Devonian complex entirely or considerable part of it.

The dismembered section of Devonian on carbonate-clay-sand cycles, satisfactory consistency of sand horizons and overlays above them, their hydrodynamic separation in most part of Volyn-Podillya oil- and gas-bearing region, the presence of various kinds of lifts have allowed us to connect the prospects of oil- and gas-bearing potential of this region with the traps of anticlinal type.

Within the Lviv Paleozoic depression the most prospects, medium prospects, prospects, small prospects and with no prospects areas were distinguished. The most prospects areas (preferential for the research) covered the territory in the southerly direction of the Volodymyr-Volynskiy fault. From the east the territory is outlined by the spreading of hydrochemical zones with difficult water exchange, and from the south and southwest – the conditional

boundary of the region with spreading collectors of satisfactory quality. The total thickness of sandstones of the Middle Devonian varies from 20 to 35 m or more.

It is recommended to carry out further searching-prospecting, estimated-parameter drilling and regional, reconnaissance and detailed seismic investigations in the most promising areas for researches of local lifts and detection of gas deposits within Devonian complex.

Svitlana HARASYM

PROSPECTS OF THE VOLYN-PODILLYA OIL AND GAS FIELD IN TERMS OF NON-ANTICLINAL HYDROCARBON TRAPS TYPE

Volyn-Podillya covers the south-western outskirts of the East European Platform. The whole area is composed of the sedimentary cover (up to 9 km), which looks like a wedge, extended to the west and southwest of the Ukrainian Shield. He is made of NeoProterozoic (Riphean, Wendian), Paleozoic (Cambrian, Ordovician, Silurian, Devonian, Carboniferous), Mesozoic (Jurassic, Cretaceous) and Cenozoic sediments. Here were opened two gas fields and one oil pool in the rocks of Devonian age, which made it possible to call this territory Volyn-Podillya oil and gas region. In Devonian, which is currently the only real oil and gas complex, within the region have been established Silurian and Cambrian oil-promising complexes.

In this article the possible types of non-anticlinal traps were considered and defined the perspectives of their oil and gas potential in Volyn-Podillya.

It was found that oil and gas occurrences of Silurian sediments are confined to the reef constructions, which were found in Bahovets, Malynovets and Skalsky, Silurian horizons. Reefogenous Silurian structures are considered high priority for comprehensive geological and geophysical surveys to identify areas for drilling.

The research structure and geodynamic features of Paleozoic sediments of Volyn-Podillya allowed to assert the presence of stratigraphically and disjunctively screened traps sediments in sediments of Cambrian age. Stratigraphic traps of oil and gas are formed by adjoining sand reservoirs (Dominopolska, Lyuboml, Svitiaz suites of the Lower Cambrian, the Middle-Upper Cambrian) by raising to slightly permeable clay rocks of Silurian. The most favourable conditions for formation of such traps are the places of crossing of bands of exposure of sandy horizons of Cambrian into sub-Silurian bank-like uplifts such as Lokachy, Zbarazh and others. It is in these areas the development of not only stratigraphically screened traps, but also of their various combinations is expected.

So, in Volyn-Podillya are present all the main criteria for the prospects of oil and gas occurrence: geotectonic position; geodynamics development, oil and gas traps of both anticlinal and non-anticlinal type, reservoir rocks and poorly permeable horizons. That testifies to the prospects of the given region.

Maria KULYANDA, Oleh HNYLKO

VERIFICATION OF THE STRATIGRAPHY OF NEOGENE MOLASSES OF THE BORYSLAV-POKUTTYA AND SAMBIR NAPPES IN THE NORTH-WESTERN PART OF THE UKRAINIAN PRECARPATHIA

The results of researches of the Neogene molasse stratigraphy of the Boryslav-Pokuttya and Sambir nappes in the north-western part of the Ukrainian Precarpathia are presented. The distribution of foraminifers in the Vorotyshcha and Stebnyk formations and sedimentological features of these deposits were studied in three sections. The first section is located along the valley of the Tysmenytsya River near Boryslav. The second and third sections are located along the Stream Tarnavka (basin of the Vyrva River) near Dobromyl. Based on new biostratigraphic data (foraminifera) the age of the Vorotyshcha and Stebnyk formations was more accurately established.

Stratigraphic column of the Boryslav-Pokuttya Nappe in the region consists of both Cretaceous – Paleogene flysch rocks and Lower-Middle Miocene molasse deposits. These molasse deposits, up to 1000 m thick, are represented by the Vorotyshcha formation which is composed of salt-bearing grey clays, lenses of sandstones, conglomerates and olistostrome debris-flow sediments. The Truskavets (Zahorsk) Conglomerate, up to 40 m thick, characterised by the presence of both the exotic detritus of green or variegated phyllites and the blocks of Carpathian flysch material, forms the middle part of the formation in the section along the River Tysmenytsya. Grey clays contain foraminifers of Karpatian age (complex like zone *Globigerina bollii* with species *Globigerina bollii* Cita et Premoli, *Gl. bulloides* Orb., *Gl. ottangiensis* Rögl, *Globigerinoides trilobus* (Reuss), *Tenuitella brevispira* Subb., *Globorotalia foshi* Cushm. et Ellis., *Gl. scitula* (Brady)) and Early Badenian age (with *Cibicides ungerianus* (Orb.) *ukrainica* Pishv., *Siphonodosaria soluta* (Reuss) *pomuligera* (Stache), *Alabama cf. armellae* Popescu). Our biostratigraphic data showed that the Truskavets conglomerate of the Vorotyshcha Formation belongs to the the boundary between Early and Middle Miocene.

Sedimentary succession of the Sambir Nappe is composed of Lower-Middle Miocene molasse sediments of the Vorotyshcha, Stebnyk, Balych and Berezhnytsa formations. Deposits in the studied sections are represented by the Vorotyshcha and Stebnyk ones only. Vorotyshcha Formation, up to 300 m thick, is represented by grey clays with intercalations of cross-bedded sandstones. These deposits pass up into variegated clays, marls and sandstones of the Stebnyk Formation, up to 600 m thick. Foraminifers were found in the Stebnyk Formation only. They represent the complexes like zones *Globoquadrina langhiana* (*Globoquadrina dechiscens* (Chapm., Parr et Coll.), *Gl. rohri* (Bolli), *Globorotalia squalida* Pishv., *Globigerinella evoluta* Subb.) and *Globigerina bollii* (*Globigerina bollii* Cita et Premoli, *Gl. bulloides* Orb., *Globoquadrina dechiscens* (Chapm., Parr et Coll.), *Globorotalia squalida* Pishv.).

Analysis of foraminifers from the depositional successions of the Boryslav-Pokuttya and Sambir Nappes suggests that the Vorotyshcha and Stebnyk formations are characterized by diachronous boundaries.

Volodymyr REVER

ON THE LOWER EOCENE LITHOLOGY OF THE NORTH-WESTERN BLACK SEA SHELF

Results of drilling on a shelf of the Black Sea and adjoined territories (in particular in Kerch peninsula, the Ukrainian and Bulgarian shelf, and a north-western part of the Caucasus) testify to prospects of oil and gas presence in the Eocene deposits. The territory of researches is placed within Karkinit-Northern Crimea depression, where in connection with small core recovery the Eocene deposits remain insufficiently studied. Therefore for a substantiation of perspective of this sedimentary complex it is necessary to conduct its all-round studying, in particular its lithological peculiarities.

The lithological constructions of the Eocene deposits were realized taking into account mineralogical-petrographical, analytical researches and also results of complex geophysical investigations in deep wells.

Within a north-western shelf of the Black Sea the Eocene deposits are opened in twelve areas. Thickness of these deposits is characterized by considerable changeability: from 20 m to 200–210 m.

On a basis of lithological studying of this complex, three types of lithological sections: carbonate, clay-carbonate and terrigenous are established. Petrography features of the main rock types are studied. Areas of dominating development (in sections) terrigenous (Odessko-Bezimmenna) and carbonate deposits (Flangova, Shmidta, Crimean) are established.

Results are given from studying lithology-facial features of the Lower Eocene deposits of a north-western shelf of the Black Sea is a new actual material for a reconstruction geological paleoceanography of the Carpathian-Black Sea segment of the Tethys Ocean. They give the chance to realize correlation with one-age Tethyian deposits spreading in adjoining regions of the East European Platform and Carpathian orogene.

Tetyana RUDNYTSKA, Nelya TSIZH

**NEW DATA ABOUT LITHOLOGY OF STRIY SUITE'S DEPOSITS
IN SKYBIAN ZONE OF THE UKRAINIAN CARPATHIANS**

Sedimentations of flysch of Late Cretaceous – Early Palaeocene age in the Skybian zone of the Ukrainian Carpathians are singled out into Striy suite. Mineralogical-petrographic structural and textural studies of sediments of Striy suite has allowed allocating in this complex age specific lithofacies, namely: *marly-clay-sandy*, *clay-marly-sandy*, *sandy*, *sand and clay lithofacies*, *sand-siltstone-clay lithofacies* and *lithofacies of gritstones*.

Marly-clay-sandy lithofacies composed alternating thin layers of sandstones, siltstones, mudstones and marls, with tabbed sections of sandstone thickness of 0.25–0.8 m, sporadically up to 1.5 m. Content of carbonates in sediments of lithofacies ranges from 65 to 25 %.

Clay-marly-sandy lithofacies. The thickness of the rocks lithofacies reaches 130 m. Sandstones, siltstones and mudstones make up typical thin rhythms more or less the same thickness. The content of CaCO_3 in rocks lithofacies ranges from 49 to 27 %.

Sandy lithofacies – its thickness is 120–150 m. The sediments of lithofacies represented by alternation of massive sandstones, and thin layers siltstones and mudstones with a clear predominance of psammito-psepholites. In the textural-structural terms, they resemble the so-called “yamnenski” psepholites Paleocene, but unlike them, these terrigenous rocks are characterized by high content of carbonates (14–23 %).

Sand and clay lithofacies. Sediments of lithofacies are represented by alternation of thin layers of sandstones and mudstones. Sandy and clay-sand lithofacies of medium-Striy formation alternated and forms rhythms of different thickness.

Sand-siltstone-clay lithofacies. Rocks of lithofacies make up Late-Striy formation. They are represented by alternating of medium and thin layers of sandstones, siltstones and mudstones.

Lithofacies of gritstones. On the day surface sediments of lithofacies have a slight spread. Deposited mainly in the form of lenses in soleplate of a thick layered clay-sandy flysch. The composite lithofacies mainly are gritstones.

Svyatoslav KUSHNIR, Maria KOST', Ihor DUDOK, Roman PANKIV

**BAROOSMOTIC ANALYSIS OF HYDROGEOLOGICAL CONDITIONS
AT KHIDNOVYCHY GAS FIELD (UKRAINIAN PRECARPATHIA)**

We have conducted a barosmotic analysis of hydrogeological conditions at a gas field of underthrust type. It appears that one can observe edge waters of different origin: metamorphosed sea waters of low and high (up to 62 g/l) mineralization, deep-seated salt brines, condensation waters and closed to them by composition waters of barosmotic flows. More concentrated waters are found in the upper part of the Lower Dashava Subformation (up to LD5), and low-mineralized are distributed throughout all horizons, but are mainly concentrated in LD4 and LD5 and LD7. In addition, brines with $M > 100$ g/l are found at horizons LD1, 2 and 3 only. In waters of the Upper Dashava Subformation (UD 10–13) mineralization ranges within the limits of 28.8–61.9 (average – 43.8 g/l), low-mineralized (1.76 g/l) water is found at the horizon of UD9. Low-mineralized waters are concentrated in localities of slightly permeable deposits and concentrated ones in localities of high-permeable deposits where the relative role of the barosmotic transfer and filtration should be different not only for waters, but for gases too. Results of calculation of barosmotic characteristics of edge waters by horizons have testified to that hydrogeological condition in the same horizon at different localities of the Khidnovychy area of enormous size can differ sufficiently one from another, and this is connected first of all, with different permeability of rocks. Constantly acting deep-seated barosmotic flow of H_2O -molecules (with admixture of NaCl) is found upward the section which gave the chloride-sodium composition, characteristic of these fields only, to most edge waters and sufficient extension of low-mineralized waters in all horizons. The influence of geologically prolonged barosmose in the north-western block of the Khidnovychy structure has appeared to be much stronger than that one in the south-eastern block where permeability of deposits is much higher and simple filtration could play an important role. The existence of

continuous barosmotic flow of H₂O-molecules from the deep-seated structures at the Khidnovychy gas field allows us to suppose the possibility of constant flow of gases from the bowels of the Krukenychy deep through heated unconsolidated sites of clay rocks as a kind of gas osmose manifestation.

Additional studies, executed by us, that concerned the distribution of waters of different mineralization in the Krukenychy field have shown that reversed hydrochemical zonality in waters of the Sarmatian deposits, characteristic of Precarpathia, is not kept here, and a group of boreholes with not very mineralized waters is distinguished throughout the whole section. Formational pressures in water- and gas-bearing horizons of the field are close to conditional hydrostatic pressures, and temperature does not reach 70 °C. Temperature data processing has revealed that geothermal gradient of the field is very high (3.6 degree/100 m). It's quite possible that vertical barosmotic flow of H₂O-molecules has made a considerable contribution to a strong warming of the bowels in the Krukenychy area too. Results of the work show that the method of barosmotic analysis can be successfully used in the greatest part of the gas fields of Precarpathia. Such investigations look especially perspective in the fields surrounding the Krukenychy deep.

Ihor DUDOK, Olha NIKOLENKO

THE MATHEMATICAL MODELLING OF HYDROCHEMICAL REGIME OF SURFACE WATERS OF THE VERESHCHYTSYA AND KOROPETS RIVERS (BASIN OF THE RIVER DNIESTER)

The simulation mathematical models of hydrochemical regime of the ponds of Velykyi Lubin (the basin of the River Vereshchytsya) and Pidhaysi (the basin of the River Koropets) were constructed for identification of opportunities for usage of such models in the practice of water resources quality management in small rivers.

The expeditionary method was used for the study of the ecological state of the basins of the rivers Vereshchytsya and Koropets. All information considering the natural conditions, the contents of nitrogen compounds in water (which were estimated on-site) was gathered during the visits to the research facilities. Analyses of macro- and mesocomponent composition of the natural water basins were accomplished. The processing of information was executed using the mathematical modelling of the hydrochemical regime of the surface water. The computational models for studying changes in the concentration of nutrients, chloride and sulphate ions in the examined objects and forecasting of their ecological condition were created. Development of mathematical simulation models of the hydrochemical regime of the ponds of Velykyi Lubin and Pidhaysi was carried out through direct construction of a chamber model based on the spatial averaging of processes and composed of balance equations. The results of estimation of sulphate and chloride-ions concentrations were used for the evaluation of hydrochemical regime alterations. As a result, the mathematical models for different seasons were formed.

According to our model increase in the content of biogenic substances in the pond of the town of Velykyi Lyubin takes place during the summer and autumn period, and, to be more specific, the content of nitrate-ions in the period from August till November increases significantly, the content of phosphate-, chloride-, sulfate-ions remains relatively stable with the upward tendency for content of sulphate-ions in June and the content of phosphate-ions in November. The pond in the town of Pidhaysi is characterized by the increased content of nitrite-, nitrate- and phosphate-ions in the period from August till September, and chloride- and sulphate-ions from August till November. Such distribution is caused by the specific character of economic activity within a certain territory, viz. availability of pastures (livestock waste) and farms (the use of mineral and organic fertilizers), the growth of fish in ponds. Substantial amounts of nitrite-, nitrate- and phosphate-ions are brought by run-off from the adjacent territories during intense precipitation in summer and autumn months.

The mathematical models of biogenic substances, chloride- and sulphate-ions contents variations indicate that the partial purification of pond waters from pollutants takes place. The processes going on in these geochemical systems (a sedimentation, a sorption, an adsorption etc.) contribute to the clearance. Such systems should be placed under permanent control because a substantial increase of the contents of biogenic substances, for instance, can provoke an intensive breeding of aquatic organisms and, consequently, the acceleration of the eutrophication of water bodies.

Elaboration of mathematical models of the hydrochemical regime of surface waters enables us to forecast the changes in the condition and properties of waters in time and within some specific water reservoirs as well as to take steps to prevent deterioration of the environmental condition of surface waters, and, thus, underground waters.

To optimize the condition of water eco-systems it is recommended to use the methods of mathematical modelling on a wider basis, as they improve reliability of determination of both the very fact of contamination, its scope and origin. The results of mathematical modelling enable us to assess the advantages and disadvantages of each of the alternative solutions relating to protection of water resources within the framework of implementation of environmental programs relating to ensuring the reproducible development, introduction of programs and projects of local, regional and national importance.

Vasyl PAVLYUK

**NEGATIVE CONSEQUENCES OF UNCONTROLLABLE FLOODING
OF THE STEBNYK MINE OF POTASH SALTS
(PRECARPATIA, UKRAINE)**

Intensive technogenic intervention in a habitat within distribution of saliferous sedimentation of Precarpathia has begun after 1950s years of the last century when potash minerals in Stebnyk and Kalush-Golinsky deposits began to be mined. Irrational conducting of works has led to breaking of geological, hydrogeology and geomorphologic conditions in territories of salt bedding with activization of dangerous exogenous geological processes at separate sites. In overwhelming majority of events the circumstances which have caused the negative phenomena (connected with activization of karst processes at ore mines) were consequences of the opening of underground sites and zones with saliferous sedimentations that are hypergenic-changed. The reason of these was not enough level of scrutiny of geological and hydrogeology conditions of deposits.

In this article are allocated negative consequences of out of control flooding of the Stebnyk mine of potash salts. They are connected with features of development of karst processes and with the geological structure of the territory. The survey of the separate phenomena of activization of negative exogenous geological processes and probable scenarios of their development in the Stebnyk deposit of potash salts is made. Within the second mine of potash salts activization of the karst development and connected with it negative exogenous geological processes is noted. The analysis of the allocated processes testifies to their further developments which have here a menacing character, which at the end-point will lead to threat of safety of vital ability in influenced territories. The heaviest of the allocated consequences are the karst catastrophic collapses near Lviv-Truskavets road. And escape of concentrated brines into a water-collecting area of the Dniester River can become too. On a surface as a result of such collapses of soils masses in karst and mines cavities we have developed places of subsidences, wells, swallow-holes and collapse sink-holes. And as a result there are often formed sites of flooding, bogging, lakes of brines. The greatest threat of occurrence of exogenous geological processes will come, when surface soil layers of mines (absolute level 150–200 m), where degree of hypergenic changes in saliferous sedimentation is the highest, will be filled. Till 01, 2011 underground water have flooded potassium mine to absolute level of 120.45 m.

As a result, the following directions of prevention, lessening and stabilization of dangerous exogenous geological processes within possible development of the active technogenic hydrochloric karst are offered:

- flooding space of mines by brines;
- preservation of stability of brines horizon on a surface of “a hydrochloric mirror”;
- lessening or prevention of increasing of water penetration of breeds of gypsum-gley hat;
- in case of renewal of driving it will be limited by dangerous hypergenic changed zones;
- mining of salt upwards with the purpose of authentic estimating of a geological structure before extraction of halogen minerals in upper horizons of mine;
- prohibition of mineral working by an explosive method;
- carrying out of building of underground aquiferous communications under pressure should be according to special norms;

- settlement of surface water currents and planning of a surface with the purpose of discharging sites of activation exogenous geological processes from waters;
- in case of possible bursting of a great volume of the saturated brines in inflows of river Dniester will be necessary to develop the fast scenario of liquidation;
- constant conducting of monitoring works on the state of geological medium in limits of technogenically broken sites of saliferous sedimentation;
- carrying out of an estimation of a state of geological medium on the basis of complex engineering-geohydrological investigations;
- with the purpose of preventing of environmental pollution with brine after full flooding of 2nd mine it is recommended to develop technology of their systematic deletion or usage in economic manufacture.

Ihor UDALOV

ESTIMATION OF INFLUENCE OF COAL MINES ON THE STATE OF SOILS OF LUHANSK REGION

Characterized are changes in the geological environment due to the influence of metallurgical, chemical and coal-mining industry in the Luhansk region. The analysis of the work was performed during the period from 1961 to 2007. The influence of man-made coal-mining complex in the geological environment was studied. The results of the determination of anthropogenic soil pollution areas of industrial and mining enterprises of Luhansk region were cited. The background content of elements in soils was determined for 34 elements. Haloes were identified as industrial pollution of the geological environment. The basic elements of soil contaminants of the study area were substantiated. The total indices of contamination for soil waste coal-producing region of the complex were calculated. Comparison with the natural background of intensity of technogenic anomalies was made. It is established that the maximum contamination is confined to sites bottom of mining and industrial processing plants, refineries, located in the region. Recommendations were given for implementation of the forecast changes in soil and environmental conditions in the region, due to the “wet” coal mines in the conservation area.

Myroslav PAVLYUK, Ihor NAUMKO, Roman MAKITRA, Dmytro BRYK

ON A PROBABLE MODEL OF NATURAL HYDROCARBON FORMATION IN THE EARTH'S LITHOSPHERE

We have suggested a probable model of natural hydrocarbons formation in the Earth's lithosphere in one more principally possible way. It is grounded on analysis and interpretation of experimental studies carried out by professor F. Froind from the University of Köln with colleagues-collaborators. They have carried out the synthesis of hydrocarbons under laboratory conditions while interacting of the free carbon or CO₂ with H₂O at the temperature of 500–800 °C at defects of the crystalline structure of the magnesium oxide accompanied by emission of free oxygen. Such a process serves as the explanation of the mechanism of using of CO₂ and H₂O as sources of carbon and hydrogen during hydrocarbon formation from them. But within the limits of the earth's crust the natural MgO (periclase) may exist only with the low water saturation of a magma that prevents its transformation into brucite as a result of hydrolysis, and its high rate of regeneration of its own mineral by magnesium may be produced with a high ferruginous content of feric minerals, first of all olivine, and then loss of the possibility to bond free oxygen. Therefore conditions required for the passing of the synthesis hydrocarbon process in the Earth's bowels by the suggested mechanism really are able to exist only in deep-seated fault zones of the Earth's lithosphere in a regenerative area of the created by oxidative-regenerative reaction medium of deep-seated high-temperature fluid (silicate melt), at the same time the possibility to join the superfluous oxygen from adopted initial substrata appears in the oxidative area.

Victor GONCHAR

MECHANISM OF NAPPING DURING ACCRETION OF PRECARPATHIAN FOREDEEP BASIN

Characteristic features of structure of East Flysh Carpathians and Precarpathian foredeep basin are performed by zones with different forms of thrust-fold paragenesis: narrow and steep imbricates (Skybian zone), multiple nappes (Boryslav-Pokuttya) and detachment tight folds (Sambir zone). Its development may be understood in context of two basic settings: lateral accretion and napping. As laboratory sand-box experiments show the former is caused by low coefficient of friction at detachment fault and the latter – by high one. Detachment tight fold develops above ductile detachment layer with sufficient thickness and may be regarded as variant of lateral accretion.

The mechanical model is proposed in which the choice of lateral accretion or covering is realized in accordance with reological choice of the system “basement–sedimentary cover” (wedge–underthrust conception). It is proposed to deduce deformation scenario from mechanical state and relief of cover/basement boundary in the underthrust of accretionary wedge on a base of Coulomb friction criterion. The palinspastic model of development of frontal zones of East Carpathians during East Europe plate subduction and cover accretion is presented, in which a nappes formation within Boryslav-Pokuttya zone is regarded as a reaction on the proposed basement relief intensification.

Yosyp SVOREN'

THE ROLE OF CARBON ISOTOPES IN SOLVING PROBLEMS OF MINERAL GENESIS

It was proved that alteration-differentiation of the isotope composition of carbon in hydrothermal carbonates and diamonds depends both upon different chemical activity of its isotopes in relation to different elements, particularly cations of calcium and copper, and duration of a gradual process of the crystal synthesis occurring at minimum entropy of the system under diffusion conditions, that is to say, the greater chemical activity of ^{13}C (heavy isotope of carbon), unknown before, was established in the process of the formation of these carbonates, diamonds and other carbon-containing solid bodies and light isotope of carbon in the process of synthesis of volatile components, methane in particular.

Hard diamonds from kimberlites of the southern diamond-containing regions of Yakutia are related to ultra-basic kimberlite paragenesis, but light diamonds that are usually found in deposits of the northern regions, are related to eclogite paragenesis. During the growth-formation of diamond crystals, the differentiation of carbon isotopes with its heavy growth occurs. By processes of synthesis of crystals of CaCO_3 and $\text{Cu}_2(\text{OH})_2\text{CO}_3$ we have modelled experimentally the differentiation of carbon isotopes in nature.

Methane in form of the existence of $\text{Ca}(\text{OH})_2 \cdot \text{CH}_4$ with water steam and temperature $>580\text{ }^\circ\text{C}$ transfers these and other constituents of fluid at great distances, which:

mineralizes pore spaces, fractures of different size etc., which with decrease in temperature become healed-cemented by carbonates that by their defects trap the carbonate-forming environment itself together with CH_4 . The screens-covers of wasp, in which oil and gas are preserved up to now, are formed-constructed in a similar way;

being transformed adiabatically into sedimentary rocks with a thick layer of organic remains, it exposes them to strong physical-chemical influence from one side-direction, heats them to temperatures $700\text{--}800\text{ }^\circ\text{C}$, at which they are initial stage of heating leave the area of future seam up to the time of coal formation. As methane has come from the fracture, then its concentration in the direction to it should increase and in the final case should be associated with a gas deposit-field. Coal methane itself has a double abiogenic-biogenic nature with pre-dominance of the abiogenic part which in hermetically well cover-mineralized coal seam and newly deposited minerals and rocks can be under abnormally high pressure.

Submitted results and those, non-submitted here, allow us to confirm that the Earth planet was formed in different times from two carbon-containing rock formations of different origin: the first – from a molten part called asthenosphere, and the second – from the lithosphere of the Earth which later wrapped the asthenosphere that together they have created our planet with present parameters in the orbit and favourable conditions for life in it. Such was a will of the creator of the world!

VIII З'ЇЗД УКРАЇНСЬКОГО МІНЕРАЛОГІЧНОГО ТОВАРИСТВА

VIII з'їзд Українського мінералогічного товариства (УМТ) за науковою тематикою “Мінералогія України у XXI столітті: здобутки, проблеми, перспективи” відбувся 4–5 жовтня 2011 р. у м. Києві в Інституті геохімії, мінералогії та рудоутворення імені М. П. Семененка Національної академії наук України (ІГМР НАН України).

Неординарність події для колективу Інституту геології і геохімії горючих копалин (ІГГК) НАН України визначається тим, що близько 40 працівників є членами УМТ, а засновник товариства, корифей мінералогічної науки академік Євген Лазаренко тривалий час (1951–1960) очолював відділ петрографії (петрографії і мінералогії, рудних корисних копалин) Інституту і наголошував на значущості мінералогічних досліджень для нафтогазової геології (які успішно проводяться в Інституті кількома науково-дослідними відділами), справедливо вважаючи, що знання сучасної мінералогії сприятиме вирішенню проблеми походження вуглецю, міграції вуглеводнів та пошуку родовищ нафти і газу.

З'їзд відбувся завдяки коштам та сприянню НАН України, ІГМР НАН України, Всеукраїнської громадської організації (ВГО) “Спілка геологів України”, Київського національного університету імені Тараса Шевченка, Львівського національного університету імені Івана Франка, Казенного підприємства “Південукргеологія”, Північного державного регіонального геологічного підприємства “Північукргеологія”, Київського геологорозвідувального технікуму.

Учасниками з'їзду стали 84 фахівці, 26 із них – це делегати, обрані відповідними відділеннями, а також мінералоги з Росії, Румунії, США, Угорщини.

З'їзд відкрив президент УМТ В. Квасниця на першому пленарному засіданні 4 жовтня 2011 р. Делегатів, учасників і гостей вітали: директор ІГМР НАН України, член-кореспондент НАН України О. Пономаренко, завідувач відділу Державної служби геології та надр України М. Гейченко, заступник голови правління ВГО “Спілка геологів України” Л. Гафич. Вітання надійшло і від Президії Російського мінералогічного товариства.

Традиційно робота складалася з двох частин: звітно-виборної та наукової. Звіт про діяльність УМТ за 2006–2011 рр. виголосив В. Квасниця, який констатував активізацію роботи товариства у звітному періоді. Члени товариства систематично проводили наукові форуми з актуальних питань мінералогії, активно вивчали мінералогію України, розробляли фундаментальні проблеми мінералогічної науки, докладали значних зусиль до розвитку мінерально-сировинної бази України та підготовки фахівців геологічного профілю. Підготували і випустили сучасні підручники та навчальні посібники з мінералогії України й загальної мінералогії, щорічно видавали журнал “Записки Українського мінералогічного товариства”, тематичні мінералогічні календарі. Також з'явилися поштові марки із зображенням мінералів України.

Після звітної доповіді відбулося урочисте відзначення членів УМТ: медаллю академіка Євгена Лазаренка нагороджений перший віце-президент УМТ, доктор геолого-мінералогічних наук А. Вальтер (м. Київ); дипломи Почесних членів УМТ отримали відомі вітчизняні мінералоги – професор О. Платонов і доктор геолого-мінералогічних наук А. Таращан (м. Київ), а також зарубіжні науковці – академік, професор Г. Удубаша (м. Бухарест, Румунія), професор Ш. Сакал (м. Мішкольц, Угорщина), професор А. Булах (м. Санкт-Петербург, Росія); премії імені академіка Є. К. Лазаренка для молодих учених і студентів за 2010 рік удостоєна С. Карпенко (Кривий Ріг) за наукову працю “Топомінералогія Ганнівського залізрудного родовища”.

Перше пленарне засідання з'їзду завершилося виборами керівних органів УМТ згідно зі Статутом. Членами Ради УМТ обрані А. Вальтер, В. Квасниця, Г. Кульчицька, В. Павлишин, О. Пономаренко, Д. Черниш (Київське відділення), Т. Волкова (Донецьке відділення), В. Євтехов (Криворізьке відділення), П. Заріцький (Харківське відділення), О. Матковський, І. Наумко (Львівське відділення), В. Мельничук (Волинське відділення), І. Палкін (Кримське відділення), С. Пастуханова (Закарпатське відділення), М. Рузіна (Дніпропетровське відділення), О. Чепіжко (Одеське відділення). Рада УМТ обрала Президію в такому складі: В. Квасниця – президент товариства, А. Вальтер – перший віце-президент, О. Матковський і Г. Кульчицька – віце-президенти, Д. Черниш – учений секретар, В. Павлишин та О. Пономаренко – члени Президії.

Науковою програмою передбачалося заслухати 24 усні і 52 стендові доповіді. Напередодні в журналі “Записки Українського мінералогічного товариства” (2011, Т. 8) було опубліковано матеріали з'їзду, а також випущено календар на 2012 р. “Мінерали Криму”.

На пленарних засіданнях, на яких по черговою головували В. Квасниця, А. Вальтер, О. Пономаренко, О. Матковський, П. Заріцький, В. Павлишин, В. Євтехов, І. Наумко, В. Чепіжко, В. Мельничук, було заслухано 19 доповідей.

Зокрема, 4 жовтня 2011 р. із доповідями виступили: О. Матковський на тему “40 років Українському мінералогічному товариству”, В. Павлишин – “Мінералогія України у XXI столітті: від теорії до практики”, Л. Галецький – “Мінерально-сировинна база України”, В. Прокопець – “Що може вузівський осередок Українського мінералогічного товариства?”, В. Нестеровський – “Мінералогічні музеї України” (співавтор Л. Волконська), А. Булах – “Петербурзькі й українські архітектори – роботи у камені” (співавтор В. Ісаченко), Г. Удубаша – “Мінерали Румунських Карпат”.

Виступи на пленарному засіданні 5 жовтня 2011 р. також були різноплановими: О. Матковський – “Мінерали і найважливіші мінеральні об’єкти Українських Карпат”, А. Вальтер – “Мінералогічний аспект існування зазвичай рідкісних ізотопів у природно чистому стані”, В. Семененко – “Мінералогія пилової компоненти протопланетної туманності”, В. Мельничук – “Мінералогічні особливості нижньовендських трапових комплексів Волині”, П. Заріцький – “Конкреції як чутливі мінеральні індикатори літогенезу”, П. Білоніжка – “Деякі аспекти термінології і кристалохімії тонкодисперсних шаруватих силікатів”, М. Таран – “Досягнення спектроскопії і кристалохімія високо баричних мінералів”, Л. Степанюк – “Циркон Українського щита: мінералогія та радіогеохронологія” (співавтор О. Пономаренко), С. Кривдик – “Мінерали лужних порід України” (співавтор Д. Возняк), С. Бондаренко – “Мінералогія U-Th-зруденіння Українського щита” (співавтор В. Сьомка, Л. Степанюк), О. Брик – “Властивості фізіогенних біомінералів, локалізованих в організмі людини” (співавтор О. Франк-Каменецька, Н. Дудченко), О. Тищенко – “Мінерали Криму – знахідки 2006–2010 рр.”.

Жваво й зацікавлено обговорювали стендові доповіді (37). На завершальному пленарному засіданні Д. Возняк і М. Ковальчук відзначили різноплановість представлених робіт. Більшість із них стосувалася нових знахідок окремих мінералів або їхніх типоморфних особливостей. Низка дуже гарно ілюстрованих доповідей була присвячена особливостям сучасної діагностики природних і синтезованих ювелірних мінералів, зокрема аметисту і діаманта, а також проблемам технологічної та прикладної мінералогії. Особливу зацікавленість викликали доповіді мінералого-генетичного спрямування.

Паралельно з пленарними засіданнями і стендовими поданнями роботу VIII з’їзду УМТ супроводжували виставки мінералів: “Україна камнебарвна” (колекція Геологічного музею Київського національного університету імені Тараса Шевченка, підготована за сприяння В. Нестеровського); “Агати і яшми із усього світу” (колекція В. Сквороднева); “3 мінералогічної скриньки Кольського півострова” (колекція В. Прокопця і В. Стрижалка), та фотовиставка “Мінералогія у Київському геологорозвідувальному технікумі” (автор В. Прокопець).

На завершальному пленарному засіданні відбулося обговорення доповідей і загальна дискусія, у якій узяли участь С. Кривдик, І. Наумко, В. Павлишин, В. Нестеровський, П. Білоніжка, О. Тищенко, О. Пономаренко, О. Матковський, В. Квасниця, та прийняття ухвали. Позитивно оцінюючи роботу товариства, VIII з’їзд УМТ ухвалив (конспективно): 1) схвалити діяльність Президії і Ради УМТ та редколегії журналу “Записки Українського мінералогічного товариства” за звітний період; 2) покращити ситуацію з виданням “Мінералогічної енциклопедії України”; 3) ініціювати проведення найближчим часом кількох міжнародних і всеукраїнських конференцій з актуальних питань мінералогії та покращення мінерально-сировинної бази України; 4) посилити регіонально-мінералогічні та прикладні дослідження; 5) інтенсивніше популяризувати мінералогічні знання в засобах масової інформації; 6) відгукнутися на ініціативу Мінералогічного товариства Великої Британії із зверненням “Сто найважливіших сучасних питань мінералогії”.

Делегати з’їзду, його учасники і гості, зазначивши, що з’їзд відбувся в кращих традиціях потужних мінералогічних форумів, висловили щире вдячність Оргкомітетові, керівництву ІГМР НАН України та директорові О. Пономаренку за сприяння в організації та проведенні з’їзду, спонсорам – за фінансову допомогу, музейним працівникам та приватним колекціонерам – за організацію виставок мінералів.

Доктор геологічних наук Ігор НАУМКО