ANALYSIS OF GEOLOGICAL ENGINEERING CONDITIONS OF CHELYABINSK REGION

Gleb Olegovich Zhbankov, postgraduate student/Master's Degree student

Dmitriy Vladimirovich Ulrich, Candidate of Science (Engineering)

Mikhail Nikolaevich Bryukhov, postgraduate student/Master's Degree student

Sergey Egorovich Denisov, Doctor of Science (Engineering)

South Ural State University, **Russia**

ANNOTATION

Geological engineering conditions of the region are peculiar of a great variety which is specified by its structural geomorphologic characteristics of the territory, lithological composition of reservoirs, hydrological conditions and different physical geological processes and significant industrial impact on geological environment.

Keywords: peaty areas, loamy soil, residual and talus deposits, relief, open-cut mining.

ANDESITES – A RAW MATERIAL USED FOR MANUFACTURING THE MILLSTONES IN THE EARLY NEOLITHIC FROM HUNEDOARA COUNTY, ROMANIA. PRELIMINARY RESULTS

Lecturer Ph.D. Eng. Csaba Lorinţ[1]

Archaeologist Ph.D. Ioan Alexandru Bărbat[2]

[1] University of Petroşani, Mining Faculty, Department of Management, Environmental Engineering & Geology, Petroşani, **Romania**
[2] Museum of Dacian and Roman Civilisation, Deva, **Romania**

ABSTRACT

The aim of this article is to put into circulation a group of ground stone artefacts such as millstones, which were analyzed by thin section and later completed with XRF method. The purpose is to identify the raw materials used by the Early Neolithic communities – Starčevo-Criş in manufacturing the querns and grinders. The artefacts were found during the archaeological investigations to the Highway project Deva – Orăştie, in the autumn of 2011, near the limit of Şoimuş village, in the point named *Teleghi*, Hunedoara County, Romania. The results of interdisciplinary analysis together with the location of the archaeological site Şoimuş – *Teleghi* in the vicinity of the Neogene age volcanic rocks which belongs to the South of Apuseni Mountains and to the North of Poiana Ruscă Mountains, lead us to suppose that the Starčevo-Criş communities exploited andesites, for making polished stone tools, such as grinders and querns.

Keywords: preventive archaeological research, Starčevo-Criş cultural complex, polished stone tools, Neogene volcanism, physical and chemical analysis

CARBONATE POSTSEDIMENTATION PROCESSES STUDIES BY ELECTRON PARAMAGNETIC RESONANCE

N.M.Nizamutdinov[1], N.M.Khasanova[1],

R.A.Khasanov[1,2], R.I.Salimov[1]

[1] Kazan federal university, IG&NGT, Kazan, **Russia**
[2] Central Research Institute for Geology of Industrial Minerals, Kazan, **Russia**

ABSTRACT

The purpose of this study was to show possibilities of the electron paramagnetic resonance (EPR) method on the example of carbonate rocks Lodemskoy area Zimnebrezhnogo diamond district by separating inhomogeneities in them and identifying indicators going changes. In calcite ions Mn^{2+} replace Ca^{2+}, and in dolomite occupy positions as Ca^{2+} as well as Mg^{2+} positions. Although the basic form of the iron presence in carbonates is Fe^{2+}, but with an increase in the medium oxidation potential some part of the impurity iron as Fe^{3+} is included a Ca^{2+} position in calcite and position Mg^{2+} in dolomite. EPR spectrometer X-band PS 100X (ADANI, Minsk) for recording the spectra at room temperature was used with including $Al_2O_3:Cr^{3+}$ crystal in the side hole of the cavity as internal standard lines.
Postsedimentary processes carbonates may be explained by the fact that in this area developed ultrabasic rocks (kimberlitic), which is a hotbed for ions Cr, Mn, Fe, Mg which migrate as a true solution and diffuse into the structure of the carbonates, the cations occupying the position that resulted in neoplasm of calcite and dolomite.

Keywords: calcite, dolomite, electron paramagnetic resonance, organic matter, annealing

CONNECTION OF WESTERN BALKAN COUNTRIES WITH TRANS ADRIATIC PIPELINE

Vladimir Puka[1], Engjell Prenjasi[1*],
Spiro Thodhorjani[1], Luan Arapi[1]
[1] Polytechnic University of Tirana, Albania, *Corresponding author

ABSTRACT
Considering limited recoverable natural gas reserves, nowadays daily production, as well as actual and future increasing requirements for gas consumption in Albania put forward two challenges: Increasing gas production from existing fields and exploration works for discovering new ones, as well as connection of existing gas pipeline of Albania with the European network through Trans Adriatic Pipeline. Also regarding seasonal fluctuations for gas consumption, as well as needs of Kosovo and FYROM for gas supply, it's compulsory to think about alternatives of opening underground gas storages in the Dumre region and extending gas pipeline to these neighboring countries.

Keywords: gas, storage, target, supply

CONTACT ZONE GYPSUM - CARBONATE SEDIMENTS BY ELECTRON PARAMAGNETIC RESONANCE

Assoc. Prof. Nailia M.Khasanova, Prof. Nazim M. Nizamutdinov[1],

Assoc. Prof. Ravil A. Khasanov[2], Roustem I. Salimov[1]

[1] Kazan federal university, Kazan, **Russia**
[2] Central Research Institute for Geology of Industrial Minerals, Kazan, **Russia**

ABSTRACT

The purpose of this work is to study geochemical features in the contact zone of gypsum - carbonate deposits by the electron paramagnetic resonance (EPR) method on the example of the typical core samples Syukeevskogo field. Choosing the annealing temperature of 350, 600 and 950 ^{0}C is associated with decomposition of organic matter and carbonates. Five different kind contact zones of gypsum-carbonate strata Syukeevskogo field along the borehole were selected. Quantitative changes of the EPR parameters: Mn^{2+}, Fe^{3+}, Cr^{3+}, α and radicals caused by thermochemical effects on the rock and organic matter are presented in the diagram forms. Geochemical features installed in the contact zones such as a manganese increase in the newly formed calcite, a decrease α in sample oil-saturated, a reason of calcium excess or magnesium deficiency at increase alpha are discussed.

Keywords: EPR, gypsum, dolomite, calcite, thermal annealing

CRYSTALLOCHEMICAL FEATURES OF CHLORITES OF THE EARTH CRUST DEEP HORIZONS

Assoc. Prof. Dr. Lyalya M. Sitdikova

Kazan Federal University, **Russia**

ABSTRACT

This article analyzes finely dispersed matter in the deep horizons of the Earth's crust - the crystalline basement destruction zones of the East Russian Plate. In these areas, the complex of clay minerals is formed. The work describes in detail crystallochemical features of chlorites, which differ on the specifics of ions Fe^{3+}, Fe^{2+} entering in structurally nonequivalent positions.

Keywords: drilling, basement, destruction zones, chlorite, polytype

DISTRIBUTION AND PROVENANCE OF DETRITAL HEAVY MINERALS OF ALLUVIAL SEDIMENTS FROM NEAGRA ȘARULUI RIVER, EASTERN CARPATHIANS, ROMANIA

Cătălina Ciortescu[1], Ovidiu Gabriel Iancu[1], Ciprian Popa[2]

[1]"Al. I. Cuza" University of Iaşi, Department of Geology, Iaşi, **Romania**
[2]INAF- Osservatorio Astronomico di Capodimonte, Napoli, **Italy**

ABSTRACT

The present work focuses on the analyses of a selection of heavy mineral assemblages sampled from the Neagra Șarului River alluvial sediments, in order to determine their provenance and distribution, using their geochemical and physical characteristics. The study area is along a river, located in the north-western part of the Eastern Carpathians, whose bedrocks in its drainage basin are constituted mainly by igneous rocks from Călimani Volcanic Complex in the west, and a small area of low to medium grade metamorphic rocks, part of Crystalline-Mesozoic Zone, in the east. In order to trace the source of the heavy mineral species, the samples were prepared via field separation and subsequent laboratory sieving using 8 different size fractions. An electromagnetic separator (Frantz Isodynamic) was used to separate and classify the heavy minerals species, according to their magnetic susceptibility. Thus prepared, more than 500 grains per sample (from 0.5-1 mm size fraction) were mounted on thin sections and analyzed using electron microprobe with an EDX system. The classification of the minerals and the nature of their inclusions are derived from the major element compositions computed from SEM-EDX analysis. Furthermore, a stereo microscope was used in order to determine complementary properties of the grains, such as: color, degree of roundness and degree of alteration. In order of abundance, the main heavy minerals are magnetite, hematite, pyroxene, pyrite, manganese oxides, garnet, apatite, titanium oxides (ilmenite, titanite and rutile/anatase), chlorite, olivine, epidote, biotite and rhodochrosite. A particularity of the studied area is the presence of an altered magnetite caused first by the hydrothermal alteration and strong weathering of the source rocks and second by the river's acidity. Manganese oxides are present only in grain fractions greater than 0.25 mm due to higher susceptibility to weathering and dissolution of the manganese aggregates in the river bed. Despite low distribution of the metamorphic units in the river's studied basin, the garnet's almandine (Alm 13-88%) and spessartine (Sps 0.5-87%), specific to the medium grade metamorphic rocks, have a relative high frequency. In this study, heavy mineral assemblages generally reflect the composition of primary (augite, almandine) and accessory minerals present in source rocks. The last ones are both primary (apatite) and secondary, which are mainly derived from hydrothermal deposition (e. g. pyrite) and from supergene alterations (e. g. manganese, iron oxides/ hydroxides, and other altered products of magnetite). Therefore, the mineral analyses were not limited only to track the source of each mineral species, but they also revealed the characteristics of their parent rocks.

Keywords: Neagra Șarului, alluvial sediments, heavy mineral, Călimani Volcanic Complex, distribution, provenance

ECLOGITIC GARNETS FROM UPPER TRIASSIC DIAMONDFIFEROUS SEDIMENTARY-VOLCANOGENIC DEPOSITS, NORTHTEASTERN SIBERIAN PLATFORM

Anastasiya Biller

Alexander Smelov

Diamond and Precious Metal Geology Institute, Siberian Branch, Russian Academy of Sciences (DPMGI SB RAS), **Russia**

ABSTRACT

A unique association of placer diamonds has been reported from the northeastern Siberian Platform, which includes a peculiar variety diamonds (with light carbon isotopic ratio) not found in any of the Yakutian kimberlite pipes. The nature of the bedrock source for this placer deposits and the conditions of its formation are still unknown. According to recent data, the diamondiferous horizon is made of tuffites dated at 226-228 Ma (U-Pb zircon dating). The tuffites contain large amounts of the diamond associate minerals such as garnets and chromium spinel.

The paper presents the results of studying eclogitic garnets from the carnian tuffites. Garnets were separate to "crustal" and "mantle-derived" groups, according to major element classification scheme of Schulze (2003). Numerous mineral inclusions were obtained in both groups garnets. The inclusions are made of rutile, ilmenite, apatite, shaped-form quarts, srilankite, zircon and pyroxene. Needle-like rutile and ilmenite are oriented in the structure of garnet, sometimes they occur as ingrowths. In some cases rutile and ilmenite preserve significant concentration of ZrO2 (up to first wt. %). Srilankite forms irregular aggregates in rutile. Composite polymineral inclusions occur and consist of rutile, ilmenite, apatite, and unusal phase (majoritic garnet?, pfu Si 3.32-3.62). The presence in the garnets of oriented Ti-bearing needle inclusions has resulted, according to some researchers, from decompositions of the original super-titanic garnet and indicative of high-pressure conditions of garnet formation. This is also supported by the finds of majoritic garnet and coesite in the inclusions from placer diamonds in the region. These data are indicative of a deep sublitosheric source for the placer diamonds and their associated minerals. High contents of rutile, ilmenite and Zr-bearing phases inclusions in garnets strongly suggest an episode of metasomatism for their mantle source.

Keywords: eclogitic garnets, oriented inclusion in garnet, diamond placers, Siberian platform

FLINT RESEARCH PROCEDURE FOR COMPARATIVE STUDIES OF THE STONE AGE TOOLS

PhD student, Liga Zarina

Prof. Dr. Valdis Seglins

University of Latvia, **Latvia**

ABSTRACT

The material cultural evidences of the Stone Age mainly are stone tools made of flint. They are studied with a wide range of macroscopic evaluations and different analytical methods. However, so far the results are not always satisfactory. In recent years, many technical and technological difficulties of analytical research results extraction and problems of ambiguous interpretations have been solved. Also many non-destructive methods for detection of flint physical properties and chemical composition have become available. Still, the results are difficult to compare due to the flint natural diversity and their interpretations inhere significant subjectivity. The study was expanded from the assessments in visible light to the observations in ultraviolet (UV) light range, thereby improving recognition of many different flint structural elements and heterogeneity.

Keywords: flint and chert, flint structure and cracks, fluorescence, RGB colours

FLINT X-RAY FLUORESCENCE ANALYSIS FOR GEOARCHAEOLOGICAL APPLICATION

PhD student, Liga Zarina[1]

Juris Kostjukovs[2]

Prof. Dr. Valdis Seglins[1]

Juris Burlakovs[3]

[1] University of Latvia, Faculty of Geography and Earth Sciences, Department of Geology, **Latvia**

[2] University of Latvia, Faculty of Chemistry, **Latvia**

[3] University of Latvia, Faculty of Geography and Earth Sciences, Department of Environmental science, **Latvia**

ABSTRACT

Flint studies in geoarchaeology mainly are related to the Stone Age artifacts. Previous studies indicate the needs for sufficiently sensitive and non-destructive research methods and possibility to make relatively numerous measurements for data mathematical processing and subsequent interpretation. Considering these restrictions, an appropriate is X-ray spectrometric method (XRF). In the study flint samples from Northern Europe were analyzed. The certain procedure for sample surface area selection before chemical composition determination was carried out and the obtained chemical analysis data were mathematically analyzed.

The study results demonstrate that flint XRF analysis can be usefully performed for samples from various locations found in different geological formations, as those have distinct trace elemental signatures. However, the methodology for use in geoarchaeological studies should be developed.

Keywords: flint chemical analysis, XRF spectrometry, flint trace elements, Stone Age tools

FORECASTING PRIMARY SOURCES OF THE GOLD-PLATINOID FORMATION IN THE LENA-VILYUI INTERFLUVE AREA (EASTERN SIBERIAN PLATFORM)

Nikiforova Z.S., Kazhenkina A.G.

Diamond and Precious Metal Geology Institute, Siberian Branch, Russian Academy of Sciences (DPMGI SB RAS), **Russia**

ABSTRACT

The established mineralogical-geochemical features of placer gold from different streams in the Lena-Vilyui interfluve area permit forecasting the presence, within the limits of the Suntar uplift, of primary sources for the gold-platinoid formation, which is likely related to basic rocks of Early Proterozoic and younger age.

Keywords: placer gold, gold-platinoid formation, primary sources, mineralogical-geochemical features.

FORMS AND DISTRIBUTION OF SULPHUR AND SULPHUR-CONTAINING MINERALS AS RELATED TO THE ENVIRONMENTS OF COAL DEPOSITION IN EASTERN PART OF THE UPPER SILESIAN COAL BASIN – POLAND

Dr. Sławomira Pusz

Centre of Polymer and Carbon Materials, Polish Academy of Science, Zabrze, **Poland**

ABSTRACT

Detailed knowledge about quantity and modes of occurrence of sulphur in coals makes possible the choice of proper cleaning and conversion technologies and can help in reconstruction of geological history of coal deposits.

The general aim of this study was to provide detailed characteristics of the nature (quantity, distribution and modes of occurrence) of sulphur, iron sulphides and sulphates in low rank bituminous coals from the seams of Laziskie Beds of the Upper Silesian Coal Basin in Poland. The following methods were applied to study the coal samples: optical microscopy, scanning electron microscopy (SEM), X-ray diffraction, Mossbauer spectroscopy and chemical and technical analyses and low temperature ashing (LTA). Based on the results of these investigations, two different regions were distinguished in the studied area, the eastern and the western, differentiated by the character of both the mineral and the organic matter. Two stages of sulphur mineralization: syngenetic and epigenetic were observed in the coal seams. In the eastern region coals are clearly less metamorphosed with greater amount of total sulphur and sulphur minerals, *i.e.* Fe-sulphides as well as sulphates, mostly of the epigenetic origin. In the western area the rank of coal is higher and sulphur minerals, predominantly pyrite, are less abundant and rather of the syngenetic origin. Thus, the character of differentiation of sulphur mineralization in the eastern and western part of the studied area is mainly the effect of epigenetic stage of the development of coal deposit.

Clear relationship was found between geological structure of coal deposit, forms of occurrence of sulphur minerals and rank of the coals studied. It revealed that the differentiation of the subsidence rate in the eastern and western part of the area under investigation began at the end of the syngenetic stage of development.

Keywords: bituminous coal, sulphur, iron sulphides

GENETIC ASPECTS OF TALC-CHLORITE FORMATION IN CENTRAL SARDINIA, ITALY: METAMORPHISM, HYDROTHERMALISM AND Mg-METASOMATISM: THE CASE OF SA MATTA AND SU VENOSU MINES

Dr. Sandro Fadda

Dr. Maddalena Fiori

Dr. Ing. Carlo Matzuzzi

I.G.A.G., Istituto di Geologia Ambientale e Geoingegneria, Consiglio Nazionale Ricerche, C.N.R. - **Italy**

ABSTRACT

In Central Sardinia the talc-chlorite minerals were already being mined in the 1930's, and they still play a very important role in the social life and regional economics. The importance of both the mining and the exploration activities call for further geological studies and geochemical investigation of these raw materials to better define the genetic environments, thereby assisting in finding new deposits. The source of magnesium during the mineralising event is of major importance. Dissolution of quartz during Na-metasomatism of granitoid rocks by Na-rich hydrothermal fluids, implies an enrichment in Mg of the albitizing fluids. Prograde Na-metasomatism was pervasive on enormous rock volumes and huge quantities of metals were released including Mg that gradually reached sufficient activity in the flowing ore forming solution for retrograde Mg-metasomatism of both feldspar of the original granitoids and albitized rocks. At Sa Matta and Su Venosu mines in the Ottana-Orani district, continuous transgression from the hostrock mineralogy into talc-chlorite is ubiquitous. Because of the close spatial relation of the feldspar and the talc deposits, the possibly consanguineous origin of the albite and phyllosilicates mineralisations is discussed and is one of the major tasks of the current investigations. Analytical data show that the Fe/Fe+Mg ratio distinguishes the talc of metamorphic origin in the carbonate rocks from the talc originating from metasomatic and hydrothermal alteration.

Keywords: talc-chlorite, metamorphism, hydrothermalism, Mg-metasomatism, Sardinia

GEOCHEMICAL AND ISOTOPE CHARACTERISTICS OF INTRUSIVE TRAPS IN THE EASTERN SIBERIAN PLATFORM

M.D. Tomshin, A.G. Kopylova, A.E. Vasilyeva, A.I. Zaitsev

Diamond and Precious Metal Geology Institute, Siberian Branch of the Russian Academy of Sciences (DPMGI SB RAS), **Russia**

ABSTRACT

The paper presents the results of geochemical and isotope studies of intrusive traps in the upper Vilyui River. Three petrochemical groups of rocks are recognized there: I – traps with a moderate Ti content (~1.5TiO_2), II – low-Ti traps ($TiO_2 \leq 1\%$) with minimal HFSE and REE values, and III – traps enriched in TiO_2 and FeO_{total}, with high alkalies and incompatible elements contents and a low concentration of coherent Ni and Cr. The model age of the mantle protolith for the basites is 800-1000 Ma as estimated from their Sr-Nd-Pb-Hf systematics.

Keywords: Traps, Siberian platform, east of Tunguska syncline, trap and trace element geochemistry, trap isotopy

GEOCHEMISTRY OF DETRITAL GARNETS FROM ALLUVIAL SEDIMENTS OF THE BISTRIȚA AURIE RIVER, ROMANIA

Cătălina Ciortescu[1], Gabriel O. Iancu[1], Ion Sandu[1], Viorica Vasilache[1], Gheorghe Jigău[2]

[1]"Al. I. Cuza" University of Iaşi, Iaşi, **Romania**
[2]Moldova State University, Chisinau, Republic of **Moldova**

ABSTRACT

The current study focused on the composition of detrital garnets from sediments of the Bistrița Aurie River, located in the Eastern Carpathians, Romania. A number of eight samples, collected from meanders and gravel bars, have been in situ separated with a gold pan. Garnets with a size between 0.5 and 1 mm were selected from the alluvial concentrates and mounted in epoxy resin, followed by polishing and carbon coating. So, 96 garnets and their inclusions have been used to determine the major element compositions with a SEM-EDX, in order to characterize the forming conditions and to track their sources. Additional investigation on the garnet grains were performed with a stereo microscope.

Garnet crystals are the most abundant heavy minerals from the Bistrița Aurie River deposits. They often contain solid inclusions as: ilmenite, rutile, titanite, zircon, monazite, allanite, apatite, quartz and graphite. All the analyzed grains represent a mixture of four components: almandine, grossular, spessartine and pyrope. Mostly, according with the chemical composition, garnets from alluvial deposits can be divided in four groups with different sources. The first one is rich in almandine and (more than 75 %) has a low content of grossular or spessartine and pyrope. The second one has a high almandine component, moderate grossular (15-30 %), and low pyrope. These two groups have, as source, low and medium metamorphic rocks from the Bretila and Rebra Metamorphic Units belonging to The Crystalline-Mesozoic Zone. Not very frequent, the third group has a high spessartine (25-60 %), moderate almandine and very low pyrope. The source of this group is the low grade metamorphic rocks from Tulghes Metamorphic Unit. The most problematic were few garnet grains with high content in pyrope component (from 25 to 40%) and low grossular, sampled from three different areas of the Bistrița Aurie upper basin. This type of garnets, belonging to the 4th group, is believed to be derived from high-grade rocks with granulitic character. In the hydrographic basin of the Bistrița Aurie, metamorphic formations with such a high content of pyrope have not been described thus far. This could testify isolated high-temperature metamorphic events in the metamorphic history of the Crystalline-Mesozoic Zone, presumed also by other authors.

Keywords: garnet, alluvial deposit, source, pyrope, high-grade metamorphic rocks

GEOCHEMISTRY OF OLIGO-MIOCENE COALS IN GELIBOLU PENINSULA, NW TURKEY

Ferdi Demirtaş[1]

Assoc. Prof. Dr. Erdal Koşun[1]

Assoc. Prof. Dr. Mustafa Bozcu[2]

[1].Department of Geology, Akdeniz University, Antalya, **Turkey**
[2] Department of Geology, Çanakkale Onsekiz Mart University, Çanakkale, **Turkey**

ABSTRACT

The concentrations and distributions of major and trace elements, including potentially hazardous trace elements, in coals from two coal beds in Gelibolu Peninsula, NW Turkey, have been determined in this study. Coal-bearing sequences are located in Oligocene and Miocene formations. Major and trace element concentrations of the thirteen coal samples were determined by inductively coupled-plasma mass spectrometry (ICP-MS) and inductively coupled plasma-atomic emission spectroscopy (ICP-AES). In order to determine the enrichment of trace elements, comparisons are made to Turkey and world coals. Si, Al and Fe are the most abundant elements detected in the both coal seams. They are probably associated with clay minerals, quartz and pyrite. The most abundant trace elements are Ba and Sr with an average concentration of 209 ppm and 162.1 ppm, respectively, followed by As, Ni and Zr, which have average concentrations above 50 ppm. The remaining elements have average concentrations below 50 ppm. Some of the potentially hazardous trace elements including As, Ni, Th, and V have concentrations higher than the range of world coal averages. Compared to two coal seams (Oligocene and Miocene), they have similar concentration of trace elements, however, Zn, Ni, Y, Cs and Rb are more abundant in Oligocene coals, whereas, As, U, Mo, and W are more abundant in Miocene coals.

Keywords: Trace elements, Geochemistry, Coal, Environment, Turkey.

GEOCONSERVATION IN S. PEDRO DA COVA-COUCE (NORTH PORTUGAL): AN EDUCATIONAL AND SCIENTIFIC-TOURISTIC TRAIL

Assoc. Prof. Dr. Helena Couto[1]

Prof. Dr. Alexandre Lourenço[2]

[1] Universidade do Porto, Faculdade de Ciências, Departamento de Geociências, Ambiente e Ordenamento do Território e Centro de Geologia da Universidade do Porto, Porto, **Portugal**

[2] Reitoria da Universidade do Porto, Praça Gomes Teixeira e Centro de Geologia da Universidade do Porto, Porto, **Portugal**

ABSTRACT

The proposal of creating the geotrail S. Pedro da Cova - Couce, linking Gondomar (S. Pedro da Cova) to Valongo (Couce) with educational and touristic purposes arises from the fact of being an interesting trail with a great geodiversity, representing a relevant part of the Earth history from Cambrian to Carboniferous (about 250 millions of years). Besides that, traces of mining works related with coal or gold exploitation can be observed. Along the geotrail rocks of different ages arises allowing to observe variations in sedimentary environments (marine and continental) since about 540 millions years ago. Some particular rocks occur along the geo-trail showing for instance the existence of two seas, the evidence of a rift related with the opening of the Rheic Ocean 485 millions years ago, the existence of a beach in the area of Valongo and Gondomar 480 million years ago, submarine volcanic activity 475 million years ago related with the auriferous mineralization or the presence of icebergs 445 million years ago. The tectonic activity is evidenced by the presence of folds and faults. In what concerns the geomorphology we highlight the relief inversion of the Valongo Anticline that can be observed in the top of Santa Justa Mountain near the end of the trail. It is also possible to observe the paleobiodivertity and evolution of the life during the Palaeozoic Era based on the fossil record, with spotlight in marine fauna of Middle Ordovician, or the existence of an equatorial forest with large trees and ferns populated by insects. Concerning geomining heritage, the geotrail begins next to S. Pedro da Cova coal mine that worked since the end of XVIII century till 1974. Regarding the auriferous mineralizations, the mining activity for gold began in Roman Times, and some mining works can be observed. The geotrail finish in Couce a small and typical rural village located in the Ferreira valley.

Keywords: Palaeozoic; geodiversity; geotrail; Valongo; Gondomar

GEOLOGICAL AND ECONOMIC EVALUATION OF IRON ORE DEPOSITS OF PRAVOBEREZHNY AREA (UKRAINE)

Assoc. Prof. Dr. Mariia Kurilo[1]

Dr. Oleksandr Plotnikov[2]

[1] National Taras Shevchenko University of Kyiv, **Ukraine**
[2] Kryvyi Rih National University, **Ukraine**

ABSTRACT

Main criteria of commercial significance of iron ore deposits of Pravoberezhny area were studied: distribution regularities of iron ore, mineral composition of ferruginous quartzites, mining conditions of development. We have been evaluated iron ore deposits of Pravoberezhny area for purposes of high-quality metallurgy. Important indicators of suitability for high-quality metallurgy are predominantly magnetite ore composition, homogeneity and chemical purity of ore mineral, ability of separation by economically rational schemes to predominantly mono-mineral concentrates free of harmful impurities. Within Pravoberezhny area there are three, perspective for commercial development, deposits by resources and reserves value - North Lozovatske, Chervonofedorivske and Nikolaevske. They are characterized by high degrees of geological, technical and economic study.

Keywords: iron ore deposits, magnetite quartzites, reserves evaluation, Ukraine

GEOLOGICAL AND ECONOMIC EVALUATION OF QUARTZ FROM THE REPUBLIC OF KARELIA, RUSSIA

Prof. Vladimir Shchiptsov,

Senior research worker Lybov Scamnitskaya,

Research worker Tatyana Bubnova

Institute of Geology Karelian Research Centre RAS, Petrozavodsk, **Russia**

ABSTRACT

Quartz is a mineral widely used nowadays. High purity quartz is a very rare form of quartz. The main ways of applicaions for the production of high-pure and ultra-pure quartz concentrates are technical silicon, ferrosilicium, quartz grit, crystals, polysilicon, silicons, aluminium, steel, fused silica, brewing quartz, pezoelektronika, monocrystalline silicon, multicrystalline silicon, light engineering, semiconductors, optics, crucibles, fiber optics, glass, building materials, sitall, ceramics, solar panels. As rule, The IOTA QUARTZ is being used in the manufacture. For successful high purity raw quartz resource identification detailed analysis and appropriate process technology selection is essential.

The Republic of Karelia, Russia, is part of the Karelian-Kola quartz-bearing province. The geological evolution and formation of certain geological-facies complexes are responsible for the distinctive features of quartz occurring as big mesostructures such as the Belomorian mobile belt, the Karelian craton and the Svecofennian domain. The pegmatitic, silexitic, veined, quartzitic and pebbly geological and industrial types of quartz were identified. The characteristic mineralogical, petrographic and geochemical features of various genetic types of quartz units were revealed. Special attention was given to analysis of trace elements, structural impurities and microinclusions (mineral and fluid) as an essential typomorphic feature responsible for the technological properties of quartz.

Analysis of the various types of Karelian quartz as raw materials, differing in the percentage of trace elements, on the most essential characteristics of quartz, has revealed the purest raw material – recrystallized granulated veined quartz and intensely recrystallized veined quartz. However, the latter is most heavily saturated with gas. Big gas-liquid inclusions (GLI) can be removed by technological conversion. Small GLIs in quartzites are most difficult to remove.

Quartz, containing finely dispersed mineral impurities, and bitumens which are not removed upon enrichment are hard to enrich.

An integrated approach to the study of the typomorphic properties of various types of quartz makes it possible not only to describe the characteristics of the initial raw material but also to predict the quality of quartz concentrates.

The Republic of Karelia is a promising region for common and high-quality quartz production.

Keywords: quartz, genetic type, typomorphism, high-purity concentrates

GEOLOGICAL AND GEOGRAPHICAL FEATURES OF THE REGION AS FACTOR FORMING THE PLACE NAMES (ON THE EXAMPLE OF INGERMANLAND)

Assoc. Prof. Maria Tsinkoburova

National Mineral Resources University, **Russia**

ABSTRACT

The toponymy as science arose rather recently, on at the turn of linguistics, history and geography. Natural features of the district have considerable impact on formation of place names. Therefore, studying distribution of the toponyms in connection with geological and geographical features of the region, it's possible to determine some general consistent regularities that will help to resolve an issue of an origin of toponyms and in disputable situations.

Ingermanland – the ethnocultural and historical region in the territory of the Leningrad region. By the author was analysed over 100 geographical names in the former Ingermanland's territory for which is proved the connection with natural features of the district. The analysis of geological and geographical features was accompanied by studying of cartographic and archival materials for the purpose of identification of an initial pronunciation of toponyms.

The established connection can not only be a key to understanding of the toponym's origin, but also represent the indirect testimony of the paleolandscape's character in the region in historical time (a question which geologists usually don't concern).

Keywords: Ingermanland, Leningrad region, geographical names, toponymy, geological features

GEOLOGICAL CHARACTERISTICS OF THE VAŞCĂU PLATEAU - PROTECTED AREA

Assoc. Prof. Dr. Levente Dimen ,
Assoc. Prof. Dr. Nicolae Ludușan
"1 Decembrie 1918" University of Alba Iulia, **Romania**

ABSTRACT

The paper presents the main geological features of the Vaşcău Plateau and physico-geographical components with main focus on underground karst morphology which consists of a series of karst forms (sinkholes, Uvala, Sohodol-type valleys), that allow and direct rainwater underground, and a network of caves and potholes which are alignments of karst underground water drainage infiltrates from the surface.
The genesis, the evolution and the current status of karst systems in Vaşcău Plateau represent the result of collaboration and interdependency of several factors: geological, morphological and topographical; hydrological and climatic factors, combined in the last period with the increasing influence of anthropological factors.

Keywords: Karstic area, geological features, Vaşcău Plateau.

GEOLOGY AND MINERALOGY OF CARBONATE-HOSTED Au-Ag±Pb-Zn DEPOSITS IN THE MADEN VILLAGE (ULUKISLA), NIGDE, SE TURKEY

Asist. Prof.Dr. Asuman Kahya[1], Dr. Ercan Kuscu[2],
Asist. Prof. Dr. Oya Cengiz [3], Asist. Prof. Dr. Mustafa Yıldız [4]

[1,2] General Directorate of Mineral Research and Exploration, Ankara, **Turkey**
[3] Süleyman Demirel University, Geology Department, Isparta, **Turkey**
[4]Aksaray University, Geology Department, Aksaray, **Turkey**

ABSTRACT

The study area is located in the Bolkar mountains which are part of the Tauride platform, includes lower Paleozoic to Upper Cretaceous recrystallized limestone, dolomite, marble, and calc-schist. The deposits hosted in the Upper Triassic Bolkar Mountains carbonate rock and structurally controlled by E-W/36-45 S faulted, younger fault and related karstification. Primary sulfide ores are observed between the contact of quartz porphyry and carbonate rocks and in the fault breccia. After the primary mineralization occured in the contact between carbonate and quartz porphyry, second mineralization which formed of the oxidation of the primary sufide minerals and settlement it in the fracture and karst cavity. Ore minerals which in occur as fractures and karst fills, observed two main groups as sulfide and oxide / hydroxide. Sulfide minerals are galena, sphalerite, tetrahedrite, pyrite, arsenopyrite, boulanjerit, pyrrhotite, linneit and millerite. Oxide and hydroxide minerals are pyrolusite, psilomelane, manganite, chalcophanite, cerusite, anglesite, covellite, goethite, lepidokrokit, hemimorphite, perovskite, mimetit and korkit, rutile, magnetite, chromite. These paragenesis indicate that origin of the deposit develeped in the oxidation-cementation zone as a result of supergene enrichment.

Keywords: Geolgy, mineralogy, Maden village, Au-Ag±Pb-Zn, Ulukısla, Turkey

INFORMATIVE LUMINESCENT PROPERTIES OF MINERALS FROM THE OXIDATION ZONE OF THE RUBTSOVSK BASE-METAL DEPOSIT, ORE ALTAI, RUSSIA

Assoc. Prof. L.A. Zyryanova[1]
PhD N.N. Boroznovskaya [1]
Dr. I.V. Pekov [2]

[1] Geology and Geography Faculty,Tomsk State University, Tomsk, **Russia**
[2] Faculty of Geology, Moscow State University, Moscow, **Russia**

ABSTRACT

Rubtsovskoye deposit on geological-industrial characteristics can be seen as a typical representative of polymetallic deposits of Rudnoaltaysky type with a pronounced zone of oxidation. The research focused copper and silver iodide, basic sulphates of lead, copper and which represents the number of industrial interest and barite, as well as non-metallic minerals of the clay, affecting the technological properties of ores. New data on the luminescent properties of these minerals. X - ray luminescent analysis (XRL) is the main method applied in this study.

Keywords: zone of oxidation, luminescence, iodides, barite, clay-like formations

MARWIT EL-SWEIQAT QUARTZ DEPOSITS- QUALIFICATION AND TECHNICAL APPLICATIONS IN HI-TECH INDUSTRIES

Assoc. Prof. Dr. Mohamed G. Shahein[1]
Dr. Ahmed M. Zayed[1]
Dr. Ali Q. Selim[1]
Prof. Dr. Suzan S.Ibrahim[2]
Msc student. Mostafa R. Abd El Wahab[1]
[1]Geology Department, Faculty of Science, Beni Suef University, **Egypt**
[2]Central Metallurgical R&D Institute, P.O. Box 87, Helwan, **Egypt**

ABSTRACT

The present study deals with the geology, petrology, geochemistry and technical qualifications of the quartz deposits of Marwit El-Sweiqat area in the Eastern Desert, Egypt. Marwit El Sweiqat area is blessed with huge reserves of quartz deposits which meet geologic resources of approximately 4,173,750 tons. These deposits are marked by high silica content ranges from 99.72 – 99.92% and low content of Al_2O_3, TiO_2, Fe_2O_3, MgO, CaO, Na_2O and K_2O. These qualifications nominate the quartz deposits of Marwit El-Sweiqat area as a potential source of high purity quartz (HPQ), and qualify them, even without beneficiation or with minor beneficiation, to be used in hi-tech industries such as optical lenses, fused silica, ferrosilicon alloys, and Aluminium alloys, as well as silicon metal industry.

Keywords: high purity quartz, hi-tech industries

MECHANISM OF FORMATION OF PORES AND VOIDS IN UNCONVENTIONAL RESERVOIRS AT GREAT DEPTHS IN THE CRYSTALLINE BASEMENT OF THE EAST RUSSIAN PLATE

Assoc. Prof. Dr. Lyalya Sitdikova

Kazan Federal University**, Russia**

ABSTRACT

This article considers formation mechanism of unconventional reservoirs void-pore space of the East Russian Plate basement. These processes are associated with geodynamic processes, the formation of destruction zones and latter studies of low-temperature crystalline basement rocks of the East Russian Plate.

Keywords: deep drilling, basement, destruction processes, unconventional reservoirs, pores

METALLOGENIC ZONES OF HYDROTHERMAL TERTIARY DEPOSITS, WITHIN SERBIA-KOSOVA-MACEDONIA METALLOGENIC PROVINCE

Engr. PhD student. Sali Mulaj
Msc.Xhavit Raci
Mr.Sc,Rrahim Kelmendi

Indenpendant Commission for Mines and Minerals (ICMM), Prishtina, **Kosovo**

ABSTRACT

Complex Geo-tectonic and metallogenic developments in the Kosovo territory have influenced the formation of polymetallic deposits located in various metallogenic provinces. The most important polymetallic mineral deposits, particularly lead and zinc mineralizations are found in the northern and eastern part of Kosovo. They belong to the so-called Serbia-Kosova-Macedonia (SKM) metallogenic province. These lead-zinc mineralizations extend, for over 80km from north to northeast part of Kosovo including numerous mines and mineral occurrences. To reach clear understandings on metallogenic areas, for this work except historical studies, we have used: Airborne geophysical survey (2006–2007 and 1978), Mineral and Metallogenic map of Kosova (Beak Consultants 2006-2008), Geochemistry of river and stream sediments (2006-2012) etc. In addition, in this paper are analyzed geochemical and geophysical parameters in order to obtain new ideas regarding metallogenic zones of hydrothermal polymetallic deposits within the SKM metallogenic province. This paper shows that within the SKM metallogenic province could be outlined two metallogenic zones that contain Tertiary polymetallic hydrothermal deposits which we have named as: Trepça and Artana metallogenic zone. Processing of these data has enabled the achievement of ideas that are more or less different from other authors.

Keywords: Metallogenic zone, metallogenic province, deposit, geochemical, geophysics.

MINERAL RAW MATERIALS BASE OF HIGH-ALUMINA ORES OF THE REPUBLIC OF KARELIA, RUSSIA

Prof., DSc Vladimir Shchiptsov

Institute of Geology Karelian Research Centre RAS, Petrozavodsk, **Russia**

ABSTRACT

Considerable clusters of high-alumina rocks are confined to the Meso-, Neoarchean and Paleoproterozoic complexes of the Fennoscandian Shield. Examples in Karelia are sillimanite (kyanite and andalusite)-, corundum-, staurolite-, anorthosite- and nepheline syenite-group deposits and occurrences.

High-alumina industrial minerals consist of highly altered rocks produced by the metamorphism and ultrametamorphism of volcanogenic, volcanic-sedimentary and sedimentary rocks and intrusive magmatism. The origin and distribution of metamorphogenetic ores depend on on their genetic relation to one or another type of regional metamorphism, associated magmatism and hydrothermal-metasomatic alterations. Various metamorphogenetic complexes of high-alumina composition are widespread in Karelia, especially kyanite ores in the Belomorian mobile belt and in the North Karelian greenstone belt, where they were formed in polymetamorphic complexes under favourable metamorphic conditions corresponding with the Belomoriam-Lapland, high-pressure kyanite-sillimanite and Belomorian high-pressure kyanite types of metamorphism (after V.A.Glebovitsky). The Khizovaara kyanite field is an example of a big unit. Associated with the alumina formation of the Svecofennian folded region are the andalusite and staurolite occurrences of the Pälkjärvi suite, Ladoga series (Kalevian).

The corundum occurrences of the Belomoriam mobile belt form two types, depending on their being confined to rocks of various lithological compositions: type 1 – corundum-bearing rocks in the kyanite-garnet-biotite plagiogneisses of the Chupa paragneiss complex (Khitostrov and Varatskoe); type 2 – corundum-bearing rocks in metabasic rocks (Dyadina Gora and Notozero).

Of great practical importance is the Kotozero anorthosite massif of the Belomorian mobile belt. The main ore-forming mineral is plagioclase which varies in composition from An_{52} to An_{74} and its concentration ranges 70 to 95%. Miaskite-type alkaline and nepheline syenites are common to the central part of the Yeletozero pyroxenite-gabbro alkaline massif, where they constitute a body which covers an area of 10 km^2.

Thus, the potential of the area, where several types of alumina raw materials occur, is considerable.

Keywords: high-alumina complex, industrial minerals, Precambrian, Fennoscandian Shield.

MINERALOGICAL ANALYSIS OF BARITE AND SULFIDE BEARING BARITE MINERALIZATON IN THE TAURUS BELT, SOUTH TURKEY

Assist. Prof. Dr. Oya Cengiz

University of Suleyman Demirel, **Turkey**

ABSTRACT

Barite and sulfide bearing barite mineralization are located at eleven different sites in a 100km long and 15km width zone of NW-SE trending between Antalya and Mersin regions of the Taurus Belt. Whereas some locations are rich only in barite, others are rich in barite-galena and sulfide minerals. The mineralization occurred in the epimetamorphic and carbonate rocks of Cambrian-Devonian, Permian, and Triassic in the Antalya and Alanya Naps of Central Taurides. The ores formed mostly as vein, though stratiform, lens, dissemination, stockwork, and karst filling may occur. Mineral assemblage includes barite, galena, pyrite, chalcopyrite, tetraedrite, marcasite, sphalerite, digenite, bornite, and supergene and gangue minerals. Mineral determinations show two barite stages. First stage barite has tabular form, cleavage, and locally massive. Second stage barite has euhedral-subhedral and locally individual, locally combination with solution to each other. Based on the relations with host rocks of the mineralization, deposition forms, paragenesis, textures and the forming succession of minerals, the mineralization is epigenetic and of hydrothermal origin. It occurred at medium-low temperature of probably 100-200^{o}C, and formed from mixing fluids of different waters with interacted with host rocks.

Keywords: Taurus-Turkey, barite-sulfides, deposition forms, mineralogy, epigenetic

MINERALOGICAL AND GEOCHEMICAL PROPERTIES OF HYDROTHERMAL ALTERATIONS: DARIDERE AREA, ISPARTA, SW TURKEY

Assistant Betul Coskun Onal[1]

Assistant Prof. Dr. Oya Cengiz[2]

[1]University of Firat, **Turkey**
[2]University of Suleyman Demirel, **Turkey**

ABSTRACT

In the study area, the volcanic rocks of Miocene-Pliocene Golcuk formation have undergone intense alteration. Due to alteration, the rocks have become losing primary compositions and have an appearance of gray, white, beige, brown, and greenish-yellow. Alteration types of the study area are argillation, alunitization, silicification, and limonitization. Mineral contents of the alterations are feldspar, illite, simectite, kaolinite, jarosite, quartz, amorphous silica, opal, dolomite, hematite, limonite, pyrite, gypsum, and calcite. The alterations show the enrichment for Al_2O_3, Na_2O, and K_2O. Mineralogical analyses indicate that high values may be come from feldspar, illite, kaolinite and zeolite of Al_2O_3, feldspar and clay minerals of Na_2O and K_2O, opal, quartz and amorphous silica of SiO_2. Ba-Sr, Ni-Co and Pb-Cu-Zn-As contents of the alterations have a weak enrichment. The mineral assemblage and trace element contents of alterations suggest the solutions of hydrothermal origin. The alterations have derived from commonly felsic and locally mafic volcanic rocks of Golcuk formation. In addition, it may be considered as enriching on locations of volcanic rocks that the elements such as Ba, Sr, Ni and Co from basic-ultrabasic rocks of Gokcebag Complex, transporting by various effects.

Keywords: Isparta-Turkey, hydrothermal alteration types, mineral content, element enrichments, original rocks

MINERALOGICAL-GEOCHEMICAL FORECASTING METHOD OF THE TYPES OF GOLD-ORE DEPOSITS IN PLATFORM AREAS

Dr. Zinaida Nikiforova

Diamond and Precious Metal Geology Institute, Siberian Branch, Russian Academy of Sciences (DPMGI SB RAS), **Russia**

ABSTRACT

For the first time, at the eastern Siberian platform, synthesis on mineralogical-geochemical features of placer gold was carried out, that allowed forecasting formation of Precambrian ore-gold deposits of gold-quartz-lowsulfide, gold-ferruginous-quartzite, gold-copper-porphyric and gold-platinoid formations, as well as gold-silver and gold-sulfide-quartz one, caused by Mesozoic tectonic-magmatic activation. Developed methods and approaches of the study of mineralogical-geochemical features of placer gold can be successfully used to forecast ore-gold deposits at other platforms.

Keywords: placer gold**,** formation types, mineralogical-geochemical, method, Siberian platform

MINERALS WITH HYDROGEN BONDS AND THE POSSIBILITY OF THEIR PRACTICAL IMPORTANCE

Associate Professor Farida Rafikova,
Professor Edward Khakimov,
Associate Professor Elena Kubyshkina
Kazan (Volga) Federal University, **Russia**

ABSTRACT

The article briefly presents the facts detection of hydrogen bonds in minerals, showing the abundance and diversity of these links in different classes of minerals and examining the use of these minerals in various industries

Hydrogen bonds are widely distributed in nature, organic and inorganic compounds. Hydrogen bonds are marked in different classes minerals. The composition of minerals in the hydrogen form may include ammonium ion, hydroxyl ion and water. Minerals with hydrogen bonds are widespread in nature and may form an intermediate between inorganic and organic matter.

The hydrogen bond is a bond that is formed between the hydrogen atom of one molecule and atom of the element (O, N, F) of another molecule. Hydrogen bonds are also formed in the compound molecule, which atoms are bonded inside strong covalent bond with other molecules of water [1].

The mechanism of the hydrogen bond is partially electrostatic nature, partly donor-acceptor.

The hydrogen bond is weaker than ionic or covalent bond but stronger than usual intermolecular interaction. According to its energy (3-8 kcal / mol), hydrogen bond occupies an intermediate position between the van der Waals interactions (shares kcal / mol) and typical chemical bonds (tens of kcal / mol) [3].

Keywords: Minerals, hydrogen bonds, zeolite, silicates, hydroxides

NANOMINERAL COMPLEXES OF BURIED WEATHERING CRUST OF THE EAST OF THE RUSSIAN PLATE

Assoc. Prof. Dr. Lyalya M. Sitdikova

PhD Elena U. Sidorova

Kazan Federal University, **Russia**

ABSTRACT

In the deep horizons of the East of the Russian plate the formation of buried weathering crust - a prospective reservoir zone - is developed. This work is devoted to the studying of features of forming of nanomineral complexes of the clay minerals which form the hollow space of this formation.

Keywords: weathering crust, nanominerals, aggregates, clusters, clay minerals

NEOTECTONICS INFLUENCE ON THE SAFETY OF URANIUM TAILINGS WITHIN DNIPRODZERZHYNSK INDUSTRIAL SITE IN THE DNIPROPETROVSK REGION OF UKRAINE

Junior Researcher Yuliia Yuskiv,

Doctor of Geology, Valentin Verkhovtsev

Institute of Environmental Geochemistry of National Academy of Sciences of Ukraine (Kyiv), **Ukraine**

ABSTRACT

The results of large-scale (1:25 000) neotectonics mapping within Dniprodzerzhynsk industrial site in the Dnipropetrovsk region of Ukraine are given. Neotectonic mapping was made on the basis of morphosructural methods. The active linear and ring structures at the latest stage of development and summary amplitudes of late Pliocene-Quaternary vertical crustal movements are specified and characterized. Neogeotectonic study of this area allows to determine the degree of influence of recent activity geostructures features and their activation impact on rock properties (physical, mechanical, filtration and other) on which objects of study are located. Therefore it allows to identify possible direction of radionuclides and toxic compounds migration in groundwater aquifers and mines. The location area safety of tailings facilities and uranium production waste of the Dneprodzerzhinsk industrial site by neotectonic criteria is evaluated.

Keywords: neotectonics, linear and ring structures, summary amplitudes of late Pliocene-Quaternary vertical crustal movements, tailings.

NEW DATA ON SEISMIC DEFORMATIONS OF SHARGA DEPRESSION (THE MONGOLIAN ALTAI)

Dr. Sofya Platonova

Institute for Water and Environmental Problems, Russian Academy of Sciences, Siberian Branch, **Russia**

ABSTRACT

The paper presents the data on the modern morphogenesis of Sharga depression located in the southeastern end of the Mongolian Altai. The morphometric and morphological studies of the Sharga fault zone were made in the northern part of the depression. As a result, the data specifying denudation processes rates in this part of the Mongolian Altai were obtained. To determine the age of a strong earthquake that gave rise to the formation of the ancient buried tectonic scarp of 9860±185 years, radiocarbon dating was used.

Keywords: seismic deformations, Mongolian Altai

NEW GEOCHRONOLOGICAL DATA FOR THE KAZDAG GROUP IN KAZDAG MASSIF (NW TURKEY) AND THEIR SIGNIFICANCE IN THE REGION

Assist. Prof. Dr. Ayten Çalık

Assoc. Prof. Dr. Mustafa Bozcu

Çanakkale Onsekiz Mart University, Faculty of Engineering, Department of Geological Engineering, Terzioglu Campus, Çanakkale **Turkey**

ABSTRACT

We provide new isotopic data from the Kazdag Massif which is the metamorphic basement of the Sakarya Zone, a micro continental fragment in NW Anatolia, which substantiate the presence of a Precambrian basement tectonically overlain by a Palaeozoic oceanic crust assemblage consisting of meta – ultramafic rocks. The Kazdag metamorphic rocks are divided into two groups: the Kazdag group (the lower unit) and the Ayıdere group (the upper unit). The Kazdag group consists of gneisses with marble and amphibolite intercalations, overlain tectonically by metaophiolitic rocks. Metaophiolitic rocks are mainly represented by metadunite, metapyroxenite, layered metagabbro, serpentinite and amphibolite. The Ayıdere group consists of marble and schist lithology sequence at the base and upward amphibolite, metagranite, and metapelitic rocks.

LA – ICP –MS dating of the zircons from samples (A10- A11-A12) of amphibolite of the Kazdag group yielded $^{206}Pb/^{238}U$ age of 546.0±8.1 Ma and 548 ± 7.3 Ma. The internal structure as revealed from CL images and overall high Th/U (up to 1.16) suggest their magmatic origin. LA – ICP –MS dating of the zircons from two samples (A7 and A27) of amphibolite of the Kazdag group yielded $^{206}Pb/^{238}U$ age of 73.3±1.7 Ma (A7) and 149±0.87 Ma (A7). The internal structure as revealed from CL images and overall low Th/U (0.02-0.4) suggest their metamorphic origin. These we interpret as Late Precambrian - Early Cambrian ages of original rock formation (crystallization), its subsequent Jurassic and Cretaceous metamorphism in ages. This Paleozoic oceanic crust might be remnant of the Paleo Tethys Ocean in the region.

Keywords: Kazdag metamorphic rocks, metaophiolite, the Kazdag group, north-western Turkey

NEW RESULTS OF MINERALOGICAL RESEARCH OF THE MOST BASIN AREA - BRAŇANY LOCALITY

RNDr. Michal Řehoř, Ph.D.[1],
ing. Pavel Schmidt[1],
Zdeněk Dvořák[2]
[1] Brown Coal Research Institute, j.s.c., Most, **Czech Republic**
[2] North Bohemian Mines, j.s.c., Chomutov, **Czech Republic**

ABSTRACT

New results of mineralogical research of the Most Basin area between Ústí nad Labem and Klášterec nad Ohří cities are the object of the article. Main attention is dedicated to new locality Braňany. We collected 30 samples, their X – Ray diffraction analyses realised in the Brown Coal Research Institute laboratory gave lots of interesting findings. We identified ankerite, dolomite, aragonite, barite, goethite, opal, calcite, quartz and phillipsite. The discovery of high quality samples of rare mineral melanophlogite was the main result of our research.

Keywords: research, geology, mineralogy, melanophlogite

ORE-BEARING METASOMATIC FORMATIONS IN AREAS OF DEEP-SEATED FAULTS

PhD Yelena Glushkova

Diamond and Precious Metal Geology Institute, Siberian Branch, Russian Academy of Sciences (DPMGI SB RAS), **Russia**

ABSTRACT

Ore metasomatites, which occur widely in the regional fault zones and are genetically unrelated to magmatic formations, seem to have a significant metallogenic potential. One can assume that ore-bearing hydrothermal-metasomatic rocks are common not only within the limits of shields but also in platform areas with a thick sedimentary cover, where regional fault zones confined to intracontinental paleorifts are promising for the discovery of ore metasomatites.

Keywords: metasomatite, deep-seated fault, gold content, Siberian platform

RELATIONSHIP ELEMENTAL COMPOSITION AND FORMATION OF PHASES IN THE ORES OF THE NORILSK TYPE

Assoc. Prof. Dr. Anatoly Mashukov
Assoc. Prof. Dr. Alla Mashukova
Svetlana Ponomareva
Svetlana Bistryakova
Siberian Federal University, **Russia**

ABSTRACT

Using the methods of X-ray and Mössbauer spectroscopy, scanning electron microscopy, there were studied the samples of Norilsk ore types in order to identify compounds containing Cu, Ni, Co. The presence of native elements and intermetallic show a reducing mode of ore formation processes. The magnetic phase has the spectrum composed of two six-linear spectrums. The peaks on the spectrum borders show the oxide presence. Most of the bulk of Cu, Ni is not dissipated in the crystal lattices of the ore, but it is part of the ore sulphides. The presence of the characteristic structures of the solid solutions decomposition shows a wide temperature range of sulphide crystallization.

Keywords: ores of the Norilsk type, X-ray, Mössbauer spectroscopy, scanning electron microscopy.

RESULTS OF STUDY THE RARE METAL ORE MINERALIZATION OF THE SELECTED AREAS IN CENTRAL AFRICA

Dr. Kulyash Dyussembayeva

Dr. Adilkhan Baibatsha

Dr. Aimkhan Kassenova

Master Erkhozha Mamanov

Dr. Saltanat Assubayeva

Kazakh National Technical University named after K.I Satpayev in Almaty, **Kazakhstan**

ABSTRACT

The areas of the rare metal ore mineralization (Burenge, Nyanza, Majuri, Santa Maria, Perimeter Ammg) are located on the territory of the Republic of Burundi in 250 km from the capital city Bijumbura (Central Africa). For a preliminary assessment of these areas on the tantalum-niobium ore mineralization have been selected placer samples and studied. Their prospects on the rare metal ore mineralization are revealed.

Keywords: rare metal ore mineralization, minerals of tantalum and niobium, rare earths

ROLE OF ANCIENT WEATHERING CRUSTS OF THE EAST OF THE RUSSIAN PLATE IN STUDYING OF THE DEEP HORIZONS

PhD Elena U. Sidorova

Assoc. Prof. Dr. Lyalya M. Sitdikova

Kazan Federal University, **Russia**

ABSTRACT

Due to the prospects of hydrocarbons content of the deep horizons of the east of the Russian plate the study of the mineral-geochemical features of the rocks of the basement is actual. The great information is given by carrying out deep drilling and analysis of the core material of the bore holes, which revealed the buried weathering crusts on the border of the sedimentary cover and the basement.

Keywords: weathering crust, crystalline basement, deep horizons**,** minerals

SEDIMENTATION CONDITIONS AND PETROGRAPHIC COMPOSITION OF ORE-BEARING ROCK STRATA OF DEPOSITS ZHESKAZGAN

Prof. Baibatsha A.B.[1]

Prof. Mushinsky A.[2]

Dr. Bekbotayev A.T.[1]

PhD-student Bekbotayeva A.A.[1]

[1]Kazakh National Technical University named after K.I.Satpayev in Almaty, **Kazakhstan**

[2]Adam Mickevich University in Poznan, **Poland**

ABSTRACT

Ore-bearing stratum of Zheskazgan ore district has a cyclic structure. Each cycle begins layers of coarse-grains rocks, sandstones and finely ends dispersed clastic rocks. Detailed petrographic studies of ore-bearing rock strata showed a mixed composition. The main parameters of the sedimentation conditions include physical conditions: the density and viscosity of sediment-environment, pool depth, speed, direction and stability of the flow. By chemically sediment conditions are redox reaction, salinity and temperature of the medium. Tectonic activity area and climate are also important factors of depositional area.

Keywords: Gray and red colored sandstones, Zhezkazgan deposit, underwater delta

SOLAR-TERRESTRIAL RELATIONS IN CENTRAL ASIA PALEOARCHIVES

Dr. Dmitriy Ovchinnikov[1]

Dr. Alexandr Mordvinov[2]

Dr. Ivan Kalugin[3]

Dr. Andrey Darin[3]

Dr. Vladimir Myglan[4]

[1] Institute of Forest SB RAS, Krasnoyarsk, **Russian Federation**
[2] Institute of Solar-Terrestrial Physics SB RAS, Irkutsk, **Russian Federation**
[3] Institute of Geology SB RAS, Novosibirsk, **Russian Federation**
[4] Siberian Federal University, Krasnoyarsk, **Russian Federation**

ABSTRACT

A solar-terrestrial relations were examined using millennium-scale paleoclimatic data from the Central Asia mountain region. The paleoclimatic data were based on non-varved lake sediments of the Teletskoye lake and temperature-sensitive long tree-ring width chronologies from the Altai region (Altai Mountains, South Siberia, Russia) in the late Holocene (2000 years). Also a solar-activity during late Holocene was used to analyze. Core of the bottom sediments from the Teletskoe lake (Altai Mountains) were investigated using scanning X-ray fluorescent analysis method with synchrotron radiation (spatial resolution is 0.1 mm). A method ensemble empirical mode decomposition (EEMD) was used to extract low-frequency variability from all presented paleoarchives. The results obtained for paleodata indicate palaeoclimatic oscillations in the range of the de Vries (Suess) (~200-year) solar cycles through the late Holocene. Evidence of the influence of solar activity on global climatic processes and terrestrial ecosystems is discussed.

Keywords: ensemble empirical mode decomposition (EEMD), lake sediments, tree-ring width chronologies, solar-terrestrial relations

THE INTERNAL STRUCTURE OF THE THIRD TERRACE OF THE RIVER GAUJA AND IMPLICATIONS OF ITS INTERPRETATION ON PALEOHYDROLOGICAL RECONSTRUCTIONS

Māris Krievāns

University of Latvia, **Latvia**

ABSTRACT

The main outlines of the drainage network in Latvia results from the retreat of the last Scandinavian Ice Sheet. Studies in evolution of the largest river valleys and their comprehensive geomorphological analysis started in sixties and early seventies of the previous century. Some later major focus was directed on modern alluvial processes. Geological and geomorphological research in smaller valley forms was not systematic and was paid less attention. Only in the last decade an analyses of smaller river terraces, channel profiles and litofacies in the lower reaches, particularly in their junction with a main river are proceed.

This paper presents series of results which were obtained from several outcrops of the River Gauja valley span, known as the Gauja spillway. Field observations were combined with mapping of terrace levels, gullies and tributaries. In order to understand the internal structure of terraces hand-drilled boreholes were made, lithological composition and textures of sediments were studied, and lithofacies analysis of the sediment units was performed in outcrops. The detailed environmental reconstruction was based on all available data combined into lithofacies description and interpretation.

Lithological composition, textures and facies analysis of some outcrops give evidence on accumulation of sediments in basin, supposedly in glaciolacustrine environment but not alluvial origin as it was interpreted in previous studies. Still uncertain is question about genesis of River Gauja terrace III. In previous studies both highest terraces of the lower complex (terrace III and II) were correlated to levels of the stage Bgl II and phase Bgl IIIb of the Baltic Ice Lake. Sediment depositional environment was interpreted as oxbow lake and floodplain members. The latest studies of the outcrop exposing internal structure of the "riser" of terrace III on the right bank of the river north of the farmhouse "Dukuļi" testifies sediment deposition in palaeobasin contacting with dead ice. Such interpretation is also supported by evidence of supraglacial till lenses located in the lower part of the outcropped section. Only upper part of the cross section testifies sediment accumulation environment as alluvial or alluvial-lacustrine which was produced as a result of the water drainage from meltwater basin. After palaeobasin leaking, the River Gauja valley cutting and erosion terrace formation started. According to geological and geomorphologic evidences, then river cut and its bed gradually narrowed.

Keywords: Fluvial architecture, Alluvial deposits, Late-glacial, geomorphology

THE KAPELKA SILVER PROSPECT: GEOCHEMICAL STRUCTURE AND CHARACTERISTICS OF ORE FORMING PROCESS

PhD Ildar Kalko[1]

PhD Evgeny Vlasov[1]

Dr. Vsevolod Prokofiev[1]

Dr. Yury Nikolaev[1]

PhD stud. Yulia Sidorina[1]

PhD stud. Ilya Bugaev[1]

Chief Geol. Viktor Usenko[2]

[1] Lomonosov Moscow State University, **Russia**
[2] LLC Regional Mining Company, **Russia**

ABSTRACT

The Kapelka Ag-Au prospect is located in the Western Chukchi Peninsula, Russia. The mineralization is hosted by Upper Cretaceous volcanic rocks of the Okhotsk-Chukchi Volcanic Belt (OChVB). Wallrock alteration and ore bodies are associated with NE and NNE trending faults.

The LS and base metal types of mineralization are predominant at the Kapelka prospect. Ore bodies occur as stockwork and veinlet systems. Major alteration types are propylitic, argillic and secondary quartzite. High grades of main components were determined in ore samples: 1.5% Ag, 12% Pb, 2.2% Cu, 0.8% Zn and 27 ppm Au; gold silver ratio is from 1:100 to 1:3500. The anomalous geochemical field is widespread. The composition of secondary halos is corresponding to the one of primary ore.

Propylites are composed of epidote, chlorite, K-feldspar, quartz. The main minerals of argillic rocks are tosudite, montmorillonite, dickite and quartz. Propylitic and argillic rocks were formed at the temperature of 330-365 and 110-300°C respectively (the Cathelineau thermometer [1]). Gangue minerals include quartz, adularia, sericite and others. Ore minerals are pyrite, arsenopyrite, galena, sphalerite, chalcopyrite, bornite, electrum, polybasite-pearceite, acanthite and tetrahedrite-tennantite. Native silver, acanthite, anilite, brochantite, anglesite, cerussite, malachite, azurite and wulfenite represent supergeneous assemblage. Homogenization temperatures of fluid inclusions vary from 167 to 353ºC, salinity is within the range of 0.2-1.4 wt. % NaCl equiv. Pressure estimated for fluid boiling at the temperature of 353ºC is 16MPa corresponding to the ore formation depth of 0.6 km.

According to geology, wallrock alteration and composition of geochemical anomalies, the closest analogue of Kapelka is the Zhilny prospect nearby the large Au-Ag epithermal Valunistoye deposit, the Eastern Chukchi Peninsula. Future exploration will clarify the parameters of the ore bodies and economic prospects of Kapelka.

Keywords: silver, gold, Chukchi Peninsula, ore forming process, geochemical prospecting

THE PERMIAN-TRIASSIC GOLD MINERALISATION OF THE NORTH-WESTERN ALTAI-SAYANY FOLDED REGION

Dr. Alexandr I. Chernykh

Siberian Research Institute of Geology, Geophysics and Mineral Resources, **Russia**

ABSTRACT

The Altai-Sayany folded region is characterized by a long history of exploration and mining of gold. Here several metallogenic zones and clusters of gold mineralization are distinguished, varying in formation conditions and age. Based on analysis of the isotope-geochronological, geological and metallogenic data one can distinguish five metallogenic epochs in the formation of gold ore potential within the Altai-Sayany folded region. The gold mineralization of Permian-Triassic age is the least studied within the Altai-Sayany region. The Permian-Triassic age of gold mineralization is determined in those areas, where the gold mineralization is superimposed on a relatively young rocks of Late Paleozoic and Early Mesozoic ages. There are several sites (Kundel, Konyukhta, Legostaevo) with established Permian-Triassic gold mineralization. The article presents the characteristics of the such sites containing the Permian-Triassic gold mineralization. The conclusion is made about the widespread gold mineralization in the Altai-Sayany folded region. This type of mineralization takes its regular position in a number of different mineralization types of this metallogenic epoch. The formation of such mineralization probably is concerned with plume mantle-crustal basic and granitoid magmatism.

Keywords: gold, metallogeny, Permian, Triassic, Altai-Sayany folded region

THE RESULTS OF ANALYTICAL METHODS APPLIED IN THE STUDY OF ORGANIC MATTER CONTAINED IN THE CARBONIFEROUS CLASTIC SEDIMENTS

Ing. Miloš Duraj, Ph.D. [1],

Ing. Silvie Heviánková, Ph.D [2],

prof. Dr.Ing. Miroslav Kyncl [2],

Assoc. Prof. Ing. Marian Marschalko, Ph.D [1],

Prof. Dr. Isik Yilmaz [3]

[1] VŠB-Technical University of Ostrava, Faculty of Mining and Geology, Institute of Geological Engineering, Ostrava, **Czech Republic**
[2] VŠB-Technical University of Ostrava, Faculty of Mining and Geology, Institute of Environmental Engineering, Ostrava, **Czech Republic**
[3] Cumhuriyet University, Faculty of Engineering, Department of Geological Engineering, Sivas, **Turkey**

ABSTRACT

The objective of the work is to determine the total percentage of organic matter in the coal deposit sediments. Such obtained data provides important information, for example, about the conditions under which the deposit originated. In practice, the information may be used in the decision-making about particular uses of the surrounding rocks as well as about the use of the raw materials. Using a variety of methods, measurements were carried out with different representatives of clastic sediments. Samples were drawn from the Saddle Member of the Karviná Formation within the Czech part of the Upper Silesian Basin.

Keywords: coal substance, coal, Carboniferous, Saddle Member, Upper Silesian Basin, Czech Republic

THE STRATIGRAPHY OF THE CRETACEOUS DEPOSITS IN THE REGION OF RAHOVEC

Suka Q
Kelmendi Rr
Raci XH
ICMM (Independent Commission for Mines and Minerals), Prishtina, **Kosova**

ABSTRACT

After Neogene, Cretaceous covers the most part of the surface of Rahovec Region. It includes part of the Internal Dinarides and External parts of the Vardar zone. Cretaceous formation has a wider spread with diverse representation facies formed in different bathymetric environmental settings. Based on the presence of members of the Cretaceous, their unequal position in relation to older depositions and their different facial characteristics we have separated the two tectonic-stratigraphic belts of the Cretaceous deposits developments in the study area. Stratigraphy of Cretaceous deposits consists from:

1. Cretaceous carbonates of western belt (bauxite bearing): Spreading around of mountains Gremnik-Llapçeva -Shkoza-Pagarushë and Zatriq country. The Cretaceous period in this area is presented in two series: The Lower/Early Cretaceous and the Upper/Later Cretaceous. By the point of facial view, depositions of the Cretaceous series consist of: carbonate sediments of shallow waters, reef, Sub-reef sediments (Carbonate Turbidity), littoral and pelagic limestone. The higher spreads have the deposits of the Upper/Later Cretaceous than the Lower/Early Cretaceous: Based on the studies of the biostratigraphy and the features of the lithofacies of some outcrops of selected cross sections we have distinguished these divisions of facial disposal.
2. Cretaceous carbonate-clastic of the eastern belt (non-bauxite bearing): Are spread widely from Pograde in the North, towards Southeast in Panorc village, finishing in Rahovec city. The Sferka transfers tectonic detachment separates Eastern Belt in the two sectors: southern sector, where they meet the older facies of the Lower Cretaceous Barrem-Apt and Alb - Senomanian and Turonian-Senonian facies of the Upper Cretaceous. (Lonqareviq 1978, [4] Elezaj, Kodra 2008) [1] Noted the presence of the break among the turon neritic limestone and pelagic sediments of the senonian /marly/.

   In the North and East sector, there were missing the Lower Cretaceous facies and it is noticed the transgressive placement of the senonian pelagic limestone directly above the ultrabasic rocks.

Keywords: Stratigraphy, deposits, cross section, belts and fossil.

THE VISEAN - SERPUKHOVIAN BOUNDARY DEPOSITS AND FORAMINIFERA'S SECTION AKTOBE IN BIG KARATAU (SOUTH KAZAKHSTAN)

Prof. Adilkhan Baybatsha[1]
PhD-student Sezim Mustapayeva[1]
Dr Valentina Zhaimina[2]
Prof. Zdislaw Belka[3]

[1]Kazakh National Technical University named after K.I Satpayev in Almaty, **Kazakhstan**
[2]Institute of Geological Sciences named after K.I Satpayev in Almaty, **Kazakhstan**
[3]Adam Mickiewicz University in Poznan, **Poland**

ABSTRACT

M. Marfenkova was the first scientist who recognizes foraminiferal zones in the Big Karatau Mountains in 1991. Paleontologist V. Zhaimina recognized foraminiferal zones in the same region in 2006. Those researches were continued by S.N. Mustapaeva, V. Zhaimina, A. Baybatsha and J. Belka in 2012.

In the Aktobe section, the lower part of the Upper Viséan interval composed of alternating wackestone, packstone and grainstone beds (Baktysay Formation) contain debris flow breccia with corals and brachiopods. Wackestones contain conodonts. The middle part of this interval contains an algal buildup with brachiopods (boundstone). This is part of the Akuyuk reef complex. The Upper Serpukhovian interval is composed of packstone-grainstone alternating with wackestones and containing a breccia bed. The section is capped by the Akuyuk reef complex composed of algal-bryozoan boundstone with foraminifers, brachiopods and corals.

Both shallow and deep-water facies contain assemblages of Upper Viséan and Lower Serpukhovian foraminifers. The base of the Serpukhovian is currently drawn at the level of the first appearance of *Janischewskina delicate*. The research group found new results on foraminifers *Janischewskina delicata* in Aktobe section in the Big Karatau Mountains. Local correlation of deep and shallow carbonate facies is based on species of *Neoarchaediscus* and *Janischewskina*.

Keywords: *Janischewskina delicata*, serpukhovian, visean, Big Karatau, Aktobe section.

TRACE METALS IN STREAM SEDIMENT OF KOSOVA BASED ON STATISTICAL ANALYSIS OF LEAD, ZINC, COPPER, NICKEL, CHROMIUM AND COBALT

Prof. Asoc. Dr. Naser Peci[1], Prof. Dr. Zenun Elezaj[1],
MSc. Ramiz Krasniqi[2], MSc Berat Sinani[2], MSc. Selim Berisha[3]

[1] Faculty of Geosciences - University of Mitrovica, **Kosovo**

[2] Independent Commission for Mines and Minerals (ICMM), **Kosovo**

[3] Exploration geologist, **Kosovo**

ABSTRACT

The studies presented in this paper dealing with trace metals in stream sediments and are intended to selecting promising areas in which to prospect for metalliferous ore bodies. Geochemical exploration for ore deposits and metalliferous regions is based on the concept that the products of weathering and erosion of rocks are mainly distributed in local soils, plants and stream sediments.

Results of stream sediment geochemical analysis were taken by the Independent Commission for Mines and Minerals (ICMM) and comprise entire territory of Kosovo. Within the surveyed area a total of 3240 samples of stream sediment were collected and analyzed. In this paper are taken in consideration results for the trace metals lead, zinc, copper, nickel, chromium and cobalt.

The concept of a geochemical anomaly as a concentration level above some arbitrarily chosen background or "threshold" value for a particular element cannot be applied rigorously to regional variations over a large area encompassing different geologic regions with widely different rock types. Consequently, we adopted the procedure of determining the frequency distribution for each trace metal and of defining anomalies in terms of the statistics.

The geochemical results were explored using a range of common statistical techniques including descriptive summary statistics, statistical distribution and correlation analysis for selected trace metals.

Statistical analysis and interpretation the geochemical results from stream sediment sampling for trace metals lead (Pb), zinc (Zn), copper (Cu), chromium (Cr), nickel (Ni) and Cobalt (Co) indicates that there are potential areas for increased exploration on these metals. It is recommended to continue the presented investigations by verification activities including mapping, litho-geochemistry, trenching, drilling.

Keywords: geochemical exploration, stream sediments, trace metals, geochemical anomaly, statistical analysis

WHISKERS AND SPHEROCRYSTALS, AS RARE FORMS OF NATIVE GOLD FROM OCCURRENCE NIYAKHOYSKOE-2 IN THE POLAR URALS, RUSSIA

Assoc. Prof. Dr. Tatyana Mayorova[1,2]

Senior geologist Tatyana Arteyeva[3]

Senior researcher Vasily Philippov[1]

[1]Institute of geology Komi SC, Ural branch of RAS, **Russia**
[2]Syktyvkar State University, **Russia**
[3]ZAO "Gold Minerals", **Russia**

ABSTRACT

The study is devoted to the problem of mineralogy gold-bearing weathering crusts and oxidation zones on the Niyakhoyskoe-2 ore occurrence in the Polar Urals. Along with the typical gold crystals and anhedral particles electron-microscopic analysis showed rare and unique forms of gold – whiskers and spherocrystals in oxidized ore. The structure of whiskers and their aggregates is described in the paper. Electron-microscopic and X-ray analysis' data allowed to determine "spherical" gold particles as spherocrystals formed as a result of continuous splitting of whiskers. Gold whiskers and spherocrystals are new growth in conditions of oxidized ores.

Keywords: gold, whiskers, spherocrystals, the Polar Urals.

ANALYSIS OF GEOLOGICAL ENGINEERING CONDITIONS OF CHELYABINSK REGION

Gleb Olegovich Zhbankov, postgraduate student/Master's Degree student

Dmitriy Vladimirovich Ulrich, Candidate of Science (Engineering)

Mikhail Nikolaevich Bryukhov, postgraduate student/Master's Degree student

Sergey Egorovich Denisov, Doctor of Science (Engineering)

South Ural State University, **Russia**

ANNOTATION

Geological engineering conditions of the region are peculiar of a great variety which is specified by its structural geomorphologic characteristics of the territory, lithological composition of reservoirs, hydrological conditions and different physical geological processes and significant industrial impact on geological environment.

Keywords: peaty areas, loamy soil, residual and talus deposits, relief, open-cut mining.

ANDESITES – A RAW MATERIAL USED FOR MANUFACTURING THE MILLSTONES IN THE EARLY NEOLITHIC FROM HUNEDOARA COUNTY, ROMANIA. PRELIMINARY RESULTS

Lecturer Ph.D. Eng. Csaba Lorinţ[1]

Archaeologist Ph.D. Ioan Alexandru Bărbat[2]

[1] University of Petroşani, Mining Faculty, Department of Management, Environmental Engineering & Geology, Petroşani, **Romania**
[2] Museum of Dacian and Roman Civilisation, Deva, **Romania**

ABSTRACT

The aim of this article is to put into circulation a group of ground stone artefacts such as millstones, which were analyzed by thin section and later completed with XRF method. The purpose is to identify the raw materials used by the Early Neolithic communities – Starčevo-Criş in manufacturing the querns and grinders. The artefacts were found during the archaeological investigations to the Highway project Deva – Orăştie, in the autumn of 2011, near the limit of Şoimuş village, in the point named *Teleghi*, Hunedoara County, Romania. The results of interdisciplinary analysis together with the location of the archaeological site Şoimuş – *Teleghi* in the vicinity of the Neogene age volcanic rocks which belongs to the South of Apuseni Mountains and to the North of Poiana Ruscă Mountains, lead us to suppose that the Starčevo-Criş communities exploited andesites, for making polished stone tools, such as grinders and querns.

Keywords: preventive archaeological research, Starčevo-Criş cultural complex, polished stone tools, Neogene volcanism, physical and chemical analysis

CARBONATE POSTSEDIMENTATION PROCESSES STUDIES BY ELECTRON PARAMAGNETIC RESONANCE

N.M.Nizamutdinov[1], N.M.Khasanova[1],

R.A.Khasanov[1,2], R.I.Salimov[1]

[1] Kazan federal university, IG&NGT, Kazan, **Russia**
[2] Central Research Institute for Geology of Industrial Minerals, Kazan, **Russia**

ABSTRACT

The purpose of this study was to show possibilities of the electron paramagnetic resonance (EPR) method on the example of carbonate rocks Lodemskoy area Zimnebrezhnogo diamond district by separating inhomogeneities in them and identifying indicators going changes. In calcite ions Mn^{2+} replace Ca^{2+}, and in dolomite occupy positions as Ca^{2+} as well as Mg^{2+} positions. Although the basic form of the iron presence in carbonates is Fe^{2+}, but with an increase in the medium oxidation potential some part of the impurity iron as Fe^{3+} is included a Ca^{2+} position in calcite and position Mg^{2+} in dolomite. EPR spectrometer X-band PS 100X (ADANI, Minsk) for recording the spectra at room temperature was used with including $Al_2O_3:Cr^{3+}$ crystal in the side hole of the cavity as internal standard lines.
Postsedimentary processes carbonates may be explained by the fact that in this area developed ultrabasic rocks (kimberlitic), which is a hotbed for ions Cr, Mn, Fe, Mg which migrate as a true solution and diffuse into the structure of the carbonates, the cations occupying the position that resulted in neoplasm of calcite and dolomite.

Keywords: calcite, dolomite, electron paramagnetic resonance, organic matter, annealing

CONNECTION OF WESTERN BALKAN COUNTRIES WITH TRANS ADRIATIC PIPELINE

Vladimir Puka[1], Engjell Prenjasi[1*],
Spiro Thodhorjani[1], Luan Arapi[1]
[1] Polytechnic University of Tirana, Albania, *Corresponding author

ABSTRACT
Considering limited recoverable natural gas reserves, nowadays daily production, as well as actual and future increasing requirements for gas consumption in Albania put forward two challenges: Increasing gas production from existing fields and exploration works for discovering new ones, as well as connection of existing gas pipeline of Albania with the European network through Trans Adriatic Pipeline. Also regarding seasonal fluctuations for gas consumption, as well as needs of Kosovo and FYROM for gas supply, it's compulsory to think about alternatives of opening underground gas storages in the Dumre region and extending gas pipeline to these neighboring countries.

Keywords: gas, storage, target, supply

CONTACT ZONE GYPSUM - CARBONATE SEDIMENTS BY ELECTRON PARAMAGNETIC RESONANCE

Assoc. Prof. Nailia M.Khasanova, Prof. Nazim M. Nizamutdinov[1],

Assoc. Prof. Ravil A. Khasanov[2], Roustem I. Salimov[1]

[1] Kazan federal university, Kazan, **Russia**
[2] Central Research Institute for Geology of Industrial Minerals, Kazan, **Russia**

ABSTRACT

The purpose of this work is to study geochemical features in the contact zone of gypsum - carbonate deposits by the electron paramagnetic resonance (EPR) method on the example of the typical core samples Syukeevskogo field. Choosing the annealing temperature of 350, 600 and 950 ^{0}C is associated with decomposition of organic matter and carbonates. Five different kind contact zones of gypsum-carbonate strata Syukeevskogo field along the borehole were selected. Quantitative changes of the EPR parameters: Mn^{2+}, Fe^{3+}, Cr^{3+}, α and radicals caused by thermochemical effects on the rock and organic matter are presented in the diagram forms. Geochemical features installed in the contact zones such as a manganese increase in the newly formed calcite, a decrease α in sample oil-saturated, a reason of calcium excess or magnesium deficiency at increase alpha are discussed.

Keywords: EPR, gypsum, dolomite, calcite, thermal annealing

CRYSTALLOCHEMICAL FEATURES OF CHLORITES OF THE EARTH CRUST DEEP HORIZONS

Assoc. Prof. Dr. Lyalya M. Sitdikova

Kazan Federal University, **Russia**

ABSTRACT

This article analyzes finely dispersed matter in the deep horizons of the Earth's crust - the crystalline basement destruction zones of the East Russian Plate. In these areas, the complex of clay minerals is formed. The work describes in detail crystallochemical features of chlorites, which differ on the specifics of ions Fe^{3+}, Fe^{2+} entering in structurally nonequivalent positions.

Keywords: drilling, basement, destruction zones, chlorite, polytype

DISTRIBUTION AND PROVENANCE OF DETRITAL HEAVY MINERALS OF ALLUVIAL SEDIMENTS FROM NEAGRA ȘARULUI RIVER, EASTERN CARPATHIANS, ROMANIA

Cătălina Ciortescu[1], Ovidiu Gabriel Iancu[1], Ciprian Popa[2]

[1]"Al. I. Cuza" University of Iaşi, Department of Geology, Iaşi, **Romania**
[2]INAF- Osservatorio Astronomico di Capodimonte, Napoli, **Italy**

ABSTRACT

The present work focuses on the analyses of a selection of heavy mineral assemblages sampled from the Neagra Șarului River alluvial sediments, in order to determine their provenance and distribution, using their geochemical and physical characteristics. The study area is along a river, located in the north-western part of the Eastern Carpathians, whose bedrocks in its drainage basin are constituted mainly by igneous rocks from Călimani Volcanic Complex in the west, and a small area of low to medium grade metamorphic rocks, part of Crystalline-Mesozoic Zone, in the east. In order to trace the source of the heavy mineral species, the samples were prepared via field separation and subsequent laboratory sieving using 8 different size fractions. An electromagnetic separator (Frantz Isodynamic) was used to separate and classify the heavy minerals species, according to their magnetic susceptibility. Thus prepared, more than 500 grains per sample (from 0.5-1 mm size fraction) were mounted on thin sections and analyzed using electron microprobe with an EDX system. The classification of the minerals and the nature of their inclusions are derived from the major element compositions computed from SEM-EDX analysis. Furthermore, a stereo microscope was used in order to determine complementary properties of the grains, such as: color, degree of roundness and degree of alteration. In order of abundance, the main heavy minerals are magnetite, hematite, pyroxene, pyrite, manganese oxides, garnet, apatite, titanium oxides (ilmenite, titanite and rutile/anatase), chlorite, olivine, epidote, biotite and rhodochrosite. A particularity of the studied area is the presence of an altered magnetite caused first by the hydrothermal alteration and strong weathering of the source rocks and second by the river's acidity. Manganese oxides are present only in grain fractions greater than 0.25 mm due to higher susceptibility to weathering and dissolution of the manganese aggregates in the river bed. Despite low distribution of the metamorphic units in the river's studied basin, the garnet's almandine (Alm 13-88%) and spessartine (Sps 0.5-87%), specific to the medium grade metamorphic rocks, have a relative high frequency. In this study, heavy mineral assemblages generally reflect the composition of primary (augite, almandine) and accessory minerals present in source rocks. The last ones are both primary (apatite) and secondary, which are mainly derived from hydrothermal deposition (e. g. pyrite) and from supergene alterations (e. g. manganese, iron oxides/ hydroxides, and other altered products of magnetite). Therefore, the mineral analyses were not limited only to track the source of each mineral species, but they also revealed the characteristics of their parent rocks.

Keywords: Neagra Șarului, alluvial sediments, heavy mineral, Călimani Volcanic Complex, distribution, provenance

ECLOGITIC GARNETS FROM UPPER TRIASSIC DIAMONDFIFEROUS SEDIMENTARY-VOLCANOGENIC DEPOSITS, NORTHTEASTERN SIBERIAN PLATFORM

Anastasiya Biller

Alexander Smelov

Diamond and Precious Metal Geology Institute, Siberian Branch, Russian Academy of Sciences (DPMGI SB RAS), **Russia**

ABSTRACT

A unique association of placer diamonds has been reported from the northeastern Siberian Platform, which includes a peculiar variety diamonds (with light carbon isotopic ratio) not found in any of the Yakutian kimberlite pipes. The nature of the bedrock source for this placer deposits and the conditions of its formation are still unknown. According to recent data, the diamondiferous horizon is made of tuffites dated at 226-228 Ma (U-Pb zircon dating). The tuffites contain large amounts of the diamond associate minerals such as garnets and chromium spinel.

The paper presents the results of studying eclogitic garnets from the carnian tuffites. Garnets were separate to "crustal" and "mantle-derived" groups, according to major element classification scheme of Schulze (2003). Numerous mineral inclusions were obtained in both groups garnets. The inclusions are made of rutile, ilmenite, apatite, shaped-form quarts, srilankite, zircon and pyroxene. Needle-like rutile and ilmenite are oriented in the structure of garnet, sometimes they occur as ingrowths. In some cases rutile and ilmenite preserve significant concentration of ZrO2 (up to first wt. %). Srilankite forms irregular aggregates in rutile. Composite polymineral inclusions occur and consist of rutile, ilmenite, apatite, and unusal phase (majoritic garnet?, pfu Si 3.32-3.62). The presence in the garnets of oriented Ti-bearing needle inclusions has resulted, according to some researchers, from decompositions of the original super-titanic garnet and indicative of high-pressure conditions of garnet formation. This is also supported by the finds of majoritic garnet and coesite in the inclusions from placer diamonds in the region. These data are indicative of a deep sublitosheric source for the placer diamonds and their associated minerals. High contents of rutile, ilmenite and Zr-bearing phases inclusions in garnets strongly suggest an episode of metasomatism for their mantle source.

Keywords: eclogitic garnets, oriented inclusion in garnet, diamond placers, Siberian platform

FLINT RESEARCH PROCEDURE FOR COMPARATIVE STUDIES OF THE STONE AGE TOOLS

PhD student, Liga Zarina

Prof. Dr. Valdis Seglins

University of Latvia, **Latvia**

ABSTRACT

The material cultural evidences of the Stone Age mainly are stone tools made of flint. They are studied with a wide range of macroscopic evaluations and different analytical methods. However, so far the results are not always satisfactory. In recent years, many technical and technological difficulties of analytical research results extraction and problems of ambiguous interpretations have been solved. Also many non-destructive methods for detection of flint physical properties and chemical composition have become available. Still, the results are difficult to compare due to the flint natural diversity and their interpretations inhere significant subjectivity. The study was expanded from the assessments in visible light to the observations in ultraviolet (UV) light range, thereby improving recognition of many different flint structural elements and heterogeneity.

Keywords: flint and chert, flint structure and cracks, fluorescence, RGB colours

FLINT X-RAY FLUORESCENCE ANALYSIS FOR GEOARCHAEOLOGICAL APPLICATION

PhD student, Liga Zarina[1]

Juris Kostjukovs[2]

Prof. Dr. Valdis Seglins[1]

Juris Burlakovs[3]

[1] University of Latvia, Faculty of Geography and Earth Sciences, Department of Geology, **Latvia**

[2] University of Latvia, Faculty of Chemistry, **Latvia**

[3] University of Latvia, Faculty of Geography and Earth Sciences, Department of Environmental science, **Latvia**

ABSTRACT

Flint studies in geoarchaeology mainly are related to the Stone Age artifacts. Previous studies indicate the needs for sufficiently sensitive and non-destructive research methods and possibility to make relatively numerous measurements for data mathematical processing and subsequent interpretation. Considering these restrictions, an appropriate is X-ray spectrometric method (XRF). In the study flint samples from Northern Europe were analyzed. The certain procedure for sample surface area selection before chemical composition determination was carried out and the obtained chemical analysis data were mathematically analyzed.

The study results demonstrate that flint XRF analysis can be usefully performed for samples from various locations found in different geological formations, as those have distinct trace elemental signatures. However, the methodology for use in geoarchaeological studies should be developed.

Keywords: flint chemical analysis, XRF spectrometry, flint trace elements, Stone Age tools

FORECASTING PRIMARY SOURCES OF THE GOLD-PLATINOID FORMATION IN THE LENA-VILYUI INTERFLUVE AREA (EASTERN SIBERIAN PLATFORM)

Nikiforova Z.S., Kazhenkina A.G.

Diamond and Precious Metal Geology Institute, Siberian Branch, Russian Academy of Sciences (DPMGI SB RAS), **Russia**

ABSTRACT

The established mineralogical-geochemical features of placer gold from different streams in the Lena-Vilyui interfluve area permit forecasting the presence, within the limits of the Suntar uplift, of primary sources for the gold-platinoid formation, which is likely related to basic rocks of Early Proterozoic and younger age.

Keywords: placer gold, gold-platinoid formation, primary sources, mineralogical-geochemical features.

FORMS AND DISTRIBUTION OF SULPHUR AND SULPHUR-CONTAINING MINERALS AS RELATED TO THE ENVIRONMENTS OF COAL DEPOSITION IN EASTERN PART OF THE UPPER SILESIAN COAL BASIN – POLAND

Dr. Sławomira Pusz

Centre of Polymer and Carbon Materials, Polish Academy of Science, Zabrze, **Poland**

ABSTRACT

Detailed knowledge about quantity and modes of occurrence of sulphur in coals makes possible the choice of proper cleaning and conversion technologies and can help in reconstruction of geological history of coal deposits.

The general aim of this study was to provide detailed characteristics of the nature (quantity, distribution and modes of occurrence) of sulphur, iron sulphides and sulphates in low rank bituminous coals from the seams of Laziskie Beds of the Upper Silesian Coal Basin in Poland. The following methods were applied to study the coal samples: optical microscopy, scanning electron microscopy (SEM), X-ray diffraction, Mossbauer spectroscopy and chemical and technical analyses and low temperature ashing (LTA). Based on the results of these investigations, two different regions were distinguished in the studied area, the eastern and the western, differentiated by the character of both the mineral and the organic matter. Two stages of sulphur mineralization: syngenetic and epigenetic were observed in the coal seams. In the eastern region coals are clearly less metamorphosed with greater amount of total sulphur and sulphur minerals, *i.e.* Fe-sulphides as well as sulphates, mostly of the epigenetic origin. In the western area the rank of coal is higher and sulphur minerals, predominantly pyrite, are less abundant and rather of the syngenetic origin. Thus, the character of differentiation of sulphur mineralization in the eastern and western part of the studied area is mainly the effect of epigenetic stage of the development of coal deposit.

Clear relationship was found between geological structure of coal deposit, forms of occurrence of sulphur minerals and rank of the coals studied. It revealed that the differentiation of the subsidence rate in the eastern and western part of the area under investigation began at the end of the syngenetic stage of development.

Keywords: bituminous coal, sulphur, iron sulphides

GENETIC ASPECTS OF TALC-CHLORITE FORMATION IN CENTRAL SARDINIA, ITALY: METAMORPHISM, HYDROTHERMALISM AND Mg-METASOMATISM: THE CASE OF SA MATTA AND SU VENOSU MINES

Dr. Sandro Fadda

Dr. Maddalena Fiori

Dr. Ing. Carlo Matzuzzi

I.G.A.G., Istituto di Geologia Ambientale e Geoingegneria, Consiglio Nazionale Ricerche, C.N.R. - **Italy**

ABSTRACT

In Central Sardinia the talc-chlorite minerals were already being mined in the 1930's, and they still play a very important role in the social life and regional economics. The importance of both the mining and the exploration activities call for further geological studies and geochemical investigation of these raw materials to better define the genetic environments, thereby assisting in finding new deposits. The source of magnesium during the mineralising event is of major importance. Dissolution of quartz during Na-metasomatism of granitoid rocks by Na-rich hydrothermal fluids, implies an enrichment in Mg of the albitizing fluids. Prograde Na-metasomatism was pervasive on enormous rock volumes and huge quantities of metals were released including Mg that gradually reached sufficient activity in the flowing ore forming solution for retrograde Mg-metasomatism of both feldspar of the original granitoids and albitized rocks. At Sa Matta and Su Venosu mines in the Ottana-Orani district, continuous transgression from the hostrock mineralogy into talc-chlorite is ubiquitous. Because of the close spatial relation of the feldspar and the talc deposits, the possibly consanguineous origin of the albite and phyllosilicates mineralisations is discussed and is one of the major tasks of the current investigations. Analytical data show that the Fe/Fe+Mg ratio distinguishes the talc of metamorphic origin in the carbonate rocks from the talc originating from metasomatic and hydrothermal alteration.

Keywords: talc-chlorite, metamorphism, hydrothermalism, Mg-metasomatism, Sardinia

GEOCHEMICAL AND ISOTOPE CHARACTERISTICS OF INTRUSIVE TRAPS IN THE EASTERN SIBERIAN PLATFORM

M.D. Tomshin, A.G. Kopylova, A.E. Vasilyeva, A.I. Zaitsev

Diamond and Precious Metal Geology Institute, Siberian Branch of the Russian Academy of Sciences (DPMGI SB RAS), **Russia**

ABSTRACT

The paper presents the results of geochemical and isotope studies of intrusive traps in the upper Vilyui River. Three petrochemical groups of rocks are recognized there: I – traps with a moderate Ti content (~1.5TiO_2), II – low-Ti traps ($TiO_2 \leq 1\%$) with minimal HFSE and REE values, and III – traps enriched in TiO_2 and FeO_{total}, with high alkalies and incompatible elements contents and a low concentration of coherent Ni and Cr. The model age of the mantle protolith for the basites is 800-1000 Ma as estimated from their Sr-Nd-Pb-Hf systematics.

Keywords: Traps, Siberian platform, east of Tunguska syncline, trap and trace element geochemistry, trap isotopy

GEOCHEMISTRY OF DETRITAL GARNETS FROM ALLUVIAL SEDIMENTS OF THE BISTRIȚA AURIE RIVER, ROMANIA

Cătălina Ciortescu[1], Gabriel O. Iancu[1], Ion Sandu[1], Viorica Vasilache[1], Gheorghe Jigău[2]

[1]"Al. I. Cuza" University of Iaşi, Iaşi, **Romania**
[2]Moldova State University, Chisinau, Republic of **Moldova**

ABSTRACT

The current study focused on the composition of detrital garnets from sediments of the Bistrița Aurie River, located in the Eastern Carpathians, Romania. A number of eight samples, collected from meanders and gravel bars, have been in situ separated with a gold pan. Garnets with a size between 0.5 and 1 mm were selected from the alluvial concentrates and mounted in epoxy resin, followed by polishing and carbon coating. So, 96 garnets and their inclusions have been used to determine the major element compositions with a SEM-EDX, in order to characterize the forming conditions and to track their sources. Additional investigation on the garnet grains were performed with a stereo microscope.

Garnet crystals are the most abundant heavy minerals from the Bistrița Aurie River deposits. They often contain solid inclusions as: ilmenite, rutile, titanite, zircon, monazite, allanite, apatite, quartz and graphite. All the analyzed grains represent a mixture of four components: almandine, grossular, spessartine and pyrope. Mostly, according with the chemical composition, garnets from alluvial deposits can be divided in four groups with different sources. The first one is rich in almandine and (more than 75 %) has a low content of grossular or spessartine and pyrope. The second one has a high almandine component, moderate grossular (15-30 %), and low pyrope. These two groups have, as source, low and medium metamorphic rocks from the Bretila and Rebra Metamorphic Units belonging to The Crystalline-Mesozoic Zone. Not very frequent, the third group has a high spessartine (25-60 %), moderate almandine and very low pyrope. The source of this group is the low grade metamorphic rocks from Tulghes Metamorphic Unit. The most problematic were few garnet grains with high content in pyrope component (from 25 to 40%) and low grossular, sampled from three different areas of the Bistrița Aurie upper basin. This type of garnets, belonging to the 4th group, is believed to be derived from high-grade rocks with granulitic character. In the hydrographic basin of the Bistrița Aurie, metamorphic formations with such a high content of pyrope have not been described thus far. This could testify isolated high-temperature metamorphic events in the metamorphic history of the Crystalline-Mesozoic Zone, presumed also by other authors.

Keywords: garnet, alluvial deposit, source, pyrope, high-grade metamorphic rocks

GEOCHEMISTRY OF OLIGO-MIOCENE COALS IN GELIBOLU PENINSULA, NW TURKEY

Ferdi Demirtaş[1]

Assoc. Prof. Dr. Erdal Koşun[1]

Assoc. Prof. Dr. Mustafa Bozcu[2]

[1].Department of Geology, Akdeniz University, Antalya, **Turkey**
[2] Department of Geology, Çanakkale Onsekiz Mart University, Çanakkale, **Turkey**

ABSTRACT

The concentrations and distributions of major and trace elements, including potentially hazardous trace elements, in coals from two coal beds in Gelibolu Peninsula, NW Turkey, have been determined in this study. Coal-bearing sequences are located in Oligocene and Miocene formations. Major and trace element concentrations of the thirteen coal samples were determined by inductively coupled-plasma mass spectrometry (ICP-MS) and inductively coupled plasma-atomic emission spectroscopy (ICP-AES). In order to determine the enrichment of trace elements, comparisons are made to Turkey and world coals. Si, Al and Fe are the most abundant elements detected in the both coal seams. They are probably associated with clay minerals, quartz and pyrite. The most abundant trace elements are Ba and Sr with an average concentration of 209 ppm and 162.1 ppm, respectively, followed by As, Ni and Zr, which have average concentrations above 50 ppm. The remaining elements have average concentrations below 50 ppm. Some of the potentially hazardous trace elements including As, Ni, Th, and V have concentrations higher than the range of world coal averages. Compared to two coal seams (Oligocene and Miocene), they have similar concentration of trace elements, however, Zn, Ni, Y, Cs and Rb are more abundant in Oligocene coals, whereas, As, U, Mo, and W are more abundant in Miocene coals.

Keywords: Trace elements, Geochemistry, Coal, Environment, Turkey.

GEOCONSERVATION IN S. PEDRO DA COVA-COUCE (NORTH PORTUGAL): AN EDUCATIONAL AND SCIENTIFIC-TOURISTIC TRAIL

Assoc. Prof. Dr. Helena Couto[1]

Prof. Dr. Alexandre Lourenço[2]

[1] Universidade do Porto, Faculdade de Ciências, Departamento de Geociências, Ambiente e Ordenamento do Território e Centro de Geologia da Universidade do Porto, Porto, **Portugal**

[2] Reitoria da Universidade do Porto, Praça Gomes Teixeira e Centro de Geologia da Universidade do Porto, Porto, **Portugal**

ABSTRACT

The proposal of creating the geotrail S. Pedro da Cova - Couce, linking Gondomar (S. Pedro da Cova) to Valongo (Couce) with educational and touristic purposes arises from the fact of being an interesting trail with a great geodiversity, representing a relevant part of the Earth history from Cambrian to Carboniferous (about 250 millions of years). Besides that, traces of mining works related with coal or gold exploitation can be observed. Along the geotrail rocks of different ages arises allowing to observe variations in sedimentary environments (marine and continental) since about 540 millions years ago. Some particular rocks occur along the geo-trail showing for instance the existence of two seas, the evidence of a rift related with the opening of the Rheic Ocean 485 millions years ago, the existence of a beach in the area of Valongo and Gondomar 480 million years ago, submarine volcanic activity 475 million years ago related with the auriferous mineralization or the presence of icebergs 445 million years ago. The tectonic activity is evidenced by the presence of folds and faults. In what concerns the geomorphology we highlight the relief inversion of the Valongo Anticline that can be observed in the top of Santa Justa Mountain near the end of the trail. It is also possible to observe the paleobiodivertity and evolution of the life during the Palaeozoic Era based on the fossil record, with spotlight in marine fauna of Middle Ordovician, or the existence of an equatorial forest with large trees and ferns populated by insects. Concerning geomining heritage, the geotrail begins next to S. Pedro da Cova coal mine that worked since the end of XVIII century till 1974. Regarding the auriferous mineralizations, the mining activity for gold began in Roman Times, and some mining works can be observed. The geotrail finish in Couce a small and typical rural village located in the Ferreira valley.

Keywords: Palaeozoic; geodiversity; geotrail; Valongo; Gondomar

GEOLOGICAL AND ECONOMIC EVALUATION OF IRON ORE DEPOSITS OF PRAVOBEREZHNY AREA (UKRAINE)

Assoc. Prof. Dr. Mariia Kurilo[1]

Dr. Oleksandr Plotnikov[2]

[1] National Taras Shevchenko University of Kyiv, **Ukraine**
[2] Kryvyi Rih National University, **Ukraine**

ABSTRACT

Main criteria of commercial significance of iron ore deposits of Pravoberezhny area were studied: distribution regularities of iron ore, mineral composition of ferruginous quartzites, mining conditions of development. We have been evaluated iron ore deposits of Pravoberezhny area for purposes of high-quality metallurgy. Important indicators of suitability for high-quality metallurgy are predominantly magnetite ore composition, homogeneity and chemical purity of ore mineral, ability of separation by economically rational schemes to predominantly mono-mineral concentrates free of harmful impurities. Within Pravoberezhny area there are three, perspective for commercial development, deposits by resources and reserves value - North Lozovatske, Chervonofedorivske and Nikolaevske. They are characterized by high degrees of geological, technical and economic study.

Keywords: iron ore deposits, magnetite quartzites, reserves evaluation, Ukraine

GEOLOGICAL AND ECONOMIC EVALUATION OF QUARTZ FROM THE REPUBLIC OF KARELIA, RUSSIA

Prof. Vladimir Shchiptsov,

Senior research worker Lybov Scamnitskaya,

Research worker Tatyana Bubnova

Institute of Geology Karelian Research Centre RAS, Petrozavodsk, **Russia**

ABSTRACT

Quartz is a mineral widely used nowadays. High purity quartz is a very rare form of quartz. The main ways of applicaions for the production of high-pure and ultra-pure quartz concentrates are technical silicon, ferrosilicium, quartz grit, crystals, polysilicon, silicons, aluminium, steel, fused silica, brewing quartz, pezoelektronika, monocrystalline silicon, multicrystalline silicon, light engineering, semiconductors, optics, crucibles, fiber optics, glass, building materials, sitall, ceramics, solar panels. As rule, The IOTA QUARTZ is being used in the manufacture. For successful high purity raw quartz resource identification detailed analysis and appropriate process technology selection is essential.

The Republic of Karelia, Russia, is part of the Karelian-Kola quartz-bearing province. The geological evolution and formation of certain geological-facies complexes are responsible for the distinctive features of quartz occurring as big mesostructures such as the Belomorian mobile belt, the Karelian craton and the Svecofennian domain. The pegmatitic, silexitic, veined, quartzitic and pebbly geological and industrial types of quartz were identified. The characteristic mineralogical, petrographic and geochemical features of various genetic types of quartz units were revealed. Special attention was given to analysis of trace elements, structural impurities and microinclusions (mineral and fluid) as an essential typomorphic feature responsible for the technological properties of quartz.

Analysis of the various types of Karelian quartz as raw materials, differing in the percentage of trace elements, on the most essential characteristics of quartz, has revealed the purest raw material – recrystallized granulated veined quartz and intensely recrystallized veined quartz. However, the latter is most heavily saturated with gas. Big gas-liquid inclusions (GLI) can be removed by technological conversion. Small GLIs in quartzites are most difficult to remove.

Quartz, containing finely dispersed mineral impurities, and bitumens which are not removed upon enrichment are hard to enrich.

An integrated approach to the study of the typomorphic properties of various types of quartz makes it possible not only to describe the characteristics of the initial raw material but also to predict the quality of quartz concentrates.

The Republic of Karelia is a promising region for common and high-quality quartz production.

Keywords: quartz, genetic type, typomorphism, high-purity concentrates

GEOLOGICAL AND GEOGRAPHICAL FEATURES OF THE REGION AS FACTOR FORMING THE PLACE NAMES (ON THE EXAMPLE OF INGERMANLAND)

Assoc. Prof. Maria Tsinkoburova

National Mineral Resources University, **Russia**

ABSTRACT

The toponymy as science arose rather recently, on at the turn of linguistics, history and geography. Natural features of the district have considerable impact on formation of place names. Therefore, studying distribution of the toponyms in connection with geological and geographical features of the region, it's possible to determine some general consistent regularities that will help to resolve an issue of an origin of toponyms and in disputable situations.

Ingermanland – the ethnocultural and historical region in the territory of the Leningrad region. By the author was analysed over 100 geographical names in the former Ingermanland's territory for which is proved the connection with natural features of the district. The analysis of geological and geographical features was accompanied by studying of cartographic and archival materials for the purpose of identification of an initial pronunciation of toponyms.

The established connection can not only be a key to understanding of the toponym's origin, but also represent the indirect testimony of the paleolandscape's character in the region in historical time (a question which geologists usually don't concern).

Keywords: Ingermanland, Leningrad region, geographical names, toponymy, geological features

GEOLOGICAL CHARACTERISTICS OF THE VAŞCĂU PLATEAU - PROTECTED AREA

Assoc. Prof. Dr. Levente Dimen ,
Assoc. Prof. Dr. Nicolae Ludușan
"1 Decembrie 1918" University of Alba Iulia, **Romania**

ABSTRACT

The paper presents the main geological features of the Vaşcău Plateau and physico-geographical components with main focus on underground karst morphology which consists of a series of karst forms (sinkholes, Uvala, Sohodol-type valleys), that allow and direct rainwater underground, and a network of caves and potholes which are alignments of karst underground water drainage infiltrates from the surface.
The genesis, the evolution and the current status of karst systems in Vaşcău Plateau represent the result of collaboration and interdependency of several factors: geological, morphological and topographical; hydrological and climatic factors, combined in the last period with the increasing influence of anthropological factors.

Keywords: Karstic area, geological features, Vaşcău Plateau.

GEOLOGY AND MINERALOGY OF CARBONATE-HOSTED Au-Ag±Pb-Zn DEPOSITS IN THE MADEN VILLAGE (ULUKISLA), NIGDE, SE TURKEY

Asist. Prof.Dr. Asuman Kahya[1], Dr. Ercan Kuscu[2],
Asist. Prof. Dr. Oya Cengiz [3], Asist. Prof. Dr. Mustafa Yıldız [4]

[1,2] General Directorate of Mineral Research and Exploration, Ankara, **Turkey**
[3] Süleyman Demirel University, Geology Department, Isparta, **Turkey**
[4]Aksaray University, Geology Department, Aksaray, **Turkey**

ABSTRACT

The study area is located in the Bolkar mountains which are part of the Tauride platform, includes lower Paleozoic to Upper Cretaceous recrystallized limestone, dolomite, marble, and calc-schist. The deposits hosted in the Upper Triassic Bolkar Mountains carbonate rock and structurally controlled by E-W/36-45 S faulted, younger fault and related karstification. Primary sulfide ores are observed between the contact of quartz porphyry and carbonate rocks and in the fault breccia. After the primary mineralization occured in the contact between carbonate and quartz porphyry, second mineralization which formed of the oxidation of the primary sufide minerals and settlement it in the fracture and karst cavity. Ore minerals which in occur as fractures and karst fills, observed two main groups as sulfide and oxide / hydroxide. Sulfide minerals are galena, sphalerite, tetrahedrite, pyrite, arsenopyrite, boulanjerit, pyrrhotite, linneit and millerite. Oxide and hydroxide minerals are pyrolusite, psilomelane, manganite, chalcophanite, cerusite, anglesite, covellite, goethite, lepidokrokit, hemimorphite, perovskite, mimetit and korkit, rutile, magnetite, chromite. These paragenesis indicate that origin of the deposit develeped in the oxidation-cementation zone as a result of supergene enrichment.

Keywords: Geolgy, mineralogy, Maden village, Au-Ag±Pb-Zn, Ulukısla, Turkey

INFORMATIVE LUMINESCENT PROPERTIES OF MINERALS FROM THE OXIDATION ZONE OF THE RUBTSOVSK BASE-METAL DEPOSIT, ORE ALTAI, RUSSIA

Assoc. Prof. L.A. Zyryanova[1]
PhD N.N. Boroznovskaya [1]
Dr. I.V. Pekov [2]

[1] Geology and Geography Faculty,Tomsk State University, Tomsk, **Russia**
[2] Faculty of Geology, Moscow State University, Moscow, **Russia**

ABSTRACT

Rubtsovskoye deposit on geological-industrial characteristics can be seen as a typical representative of polymetallic deposits of Rudnoaltaysky type with a pronounced zone of oxidation. The research focused copper and silver iodide, basic sulphates of lead, copper and which represents the number of industrial interest and barite, as well as non-metallic minerals of the clay, affecting the technological properties of ores. New data on the luminescent properties of these minerals. X - ray luminescent analysis (XRL) is the main method applied in this study.

Keywords: zone of oxidation, luminescence, iodides, barite, clay-like formations

MARWIT EL-SWEIQAT QUARTZ DEPOSITS- QUALIFICATION AND TECHNICAL APPLICATIONS IN HI-TECH INDUSTRIES

Assoc. Prof. Dr. Mohamed G. Shahein[1]
Dr. Ahmed M. Zayed[1]
Dr. Ali Q. Selim[1]
Prof. Dr. Suzan S.Ibrahim[2]
Msc student. Mostafa R. Abd El Wahab[1]
[1]Geology Department, Faculty of Science, Beni Suef University, **Egypt**
[2]Central Metallurgical R&D Institute, P.O. Box 87, Helwan, **Egypt**

ABSTRACT

The present study deals with the geology, petrology, geochemistry and technical qualifications of the quartz deposits of Marwit El-Sweiqat area in the Eastern Desert, Egypt. Marwit El Sweiqat area is blessed with huge reserves of quartz deposits which meet geologic resources of approximately 4,173,750 tons. These deposits are marked by high silica content ranges from 99.72 – 99.92% and low content of Al_2O_3, TiO_2, Fe_2O_3, MgO, CaO, Na_2O and K_2O. These qualifications nominate the quartz deposits of Marwit El-Sweiqat area as a potential source of high purity quartz (HPQ), and qualify them, even without beneficiation or with minor beneficiation, to be used in hi-tech industries such as optical lenses, fused silica, ferrosilicon alloys, and Aluminium alloys, as well as silicon metal industry.

Keywords: high purity quartz, hi-tech industries

MECHANISM OF FORMATION OF PORES AND VOIDS IN UNCONVENTIONAL RESERVOIRS AT GREAT DEPTHS IN THE CRYSTALLINE BASEMENT OF THE EAST RUSSIAN PLATE

Assoc. Prof. Dr. Lyalya Sitdikova

Kazan Federal University**, Russia**

ABSTRACT

This article considers formation mechanism of unconventional reservoirs void-pore space of the East Russian Plate basement. These processes are associated with geodynamic processes, the formation of destruction zones and latter studies of low-temperature crystalline basement rocks of the East Russian Plate.

Keywords: deep drilling, basement, destruction processes, unconventional reservoirs, pores

METALLOGENIC ZONES OF HYDROTHERMAL TERTIARY DEPOSITS, WITHIN SERBIA-KOSOVA-MACEDONIA METALLOGENIC PROVINCE

Engr. PhD student. Sali Mulaj
Msc.Xhavit Raci
Mr.Sc,Rrahim Kelmendi

Indenpendant Commission for Mines and Minerals (ICMM), Prishtina, **Kosovo**

ABSTRACT

Complex Geo-tectonic and metallogenic developments in the Kosovo territory have influenced the formation of polymetallic deposits located in various metallogenic provinces. The most important polymetallic mineral deposits, particularly lead and zinc mineralizations are found in the northern and eastern part of Kosovo. They belong to the so-called Serbia-Kosova-Macedonia (SKM) metallogenic province. These lead-zinc mineralizations extend, for over 80km from north to northeast part of Kosovo including numerous mines and mineral occurrences. To reach clear understandings on metallogenic areas, for this work except historical studies, we have used: Airborne geophysical survey (2006–2007 and 1978), Mineral and Metallogenic map of Kosova (Beak Consultants 2006-2008), Geochemistry of river and stream sediments (2006-2012) etc. In addition, in this paper are analyzed geochemical and geophysical parameters in order to obtain new ideas regarding metallogenic zones of hydrothermal polymetallic deposits within the SKM metallogenic province. This paper shows that within the SKM metallogenic province could be outlined two metallogenic zones that contain Tertiary polymetallic hydrothermal deposits which we have named as: Trepça and Artana metallogenic zone. Processing of these data has enabled the achievement of ideas that are more or less different from other authors.

Keywords: Metallogenic zone, metallogenic province, deposit, geochemical, geophysics.

MINERAL RAW MATERIALS BASE OF HIGH-ALUMINA ORES OF THE REPUBLIC OF KARELIA, RUSSIA

Prof., DSc Vladimir Shchiptsov

Institute of Geology Karelian Research Centre RAS, Petrozavodsk, **Russia**

ABSTRACT

Considerable clusters of high-alumina rocks are confined to the Meso-, Neoarchean and Paleoproterozoic complexes of the Fennoscandian Shield. Examples in Karelia are sillimanite (kyanite and andalusite)-, corundum-, staurolite-, anorthosite- and nepheline syenite-group deposits and occurrences.

High-alumina industrial minerals consist of highly altered rocks produced by the metamorphism and ultrametamorphism of volcanogenic, volcanic-sedimentary and sedimentary rocks and intrusive magmatism. The origin and distribution of metamorphogenetic ores depend on on their genetic relation to one or another type of regional metamorphism, associated magmatism and hydrothermal-metasomatic alterations. Various metamorphogenetic complexes of high-alumina composition are widespread in Karelia, especially kyanite ores in the Belomorian mobile belt and in the North Karelian greenstone belt, where they were formed in polymetamorphic complexes under favourable metamorphic conditions corresponding with the Belomoriam-Lapland, high-pressure kyanite-sillimanite and Belomorian high-pressure kyanite types of metamorphism (after V.A.Glebovitsky). The Khizovaara kyanite field is an example of a big unit. Associated with the alumina formation of the Svecofennian folded region are the andalusite and staurolite occurrences of the Pälkjärvi suite, Ladoga series (Kalevian).

The corundum occurrences of the Belomoriam mobile belt form two types, depending on their being confined to rocks of various lithological compositions: type 1 – corundum-bearing rocks in the kyanite-garnet-biotite plagiogneisses of the Chupa paragneiss complex (Khitostrov and Varatskoe); type 2 – corundum-bearing rocks in metabasic rocks (Dyadina Gora and Notozero).

Of great practical importance is the Kotozero anorthosite massif of the Belomorian mobile belt. The main ore-forming mineral is plagioclase which varies in composition from An_{52} to An_{74} and its concentration ranges 70 to 95%. Miaskite-type alkaline and nepheline syenites are common to the central part of the Yeletozero pyroxenite-gabbro alkaline massif, where they constitute a body which covers an area of 10 km^2.

Thus, the potential of the area, where several types of alumina raw materials occur, is considerable.

Keywords: high-alumina complex, industrial minerals, Precambrian, Fennoscandian Shield.

MINERALOGICAL ANALYSIS OF BARITE AND SULFIDE BEARING BARITE MINERALIZATON IN THE TAURUS BELT, SOUTH TURKEY

Assist. Prof. Dr. Oya Cengiz

University of Suleyman Demirel, **Turkey**

ABSTRACT

Barite and sulfide bearing barite mineralization are located at eleven different sites in a 100km long and 15km width zone of NW-SE trending between Antalya and Mersin regions of the Taurus Belt. Whereas some locations are rich only in barite, others are rich in barite-galena and sulfide minerals. The mineralization occurred in the epimetamorphic and carbonate rocks of Cambrian-Devonian, Permian, and Triassic in the Antalya and Alanya Naps of Central Taurides. The ores formed mostly as vein, though stratiform, lens, dissemination, stockwork, and karst filling may occur. Mineral assemblage includes barite, galena, pyrite, chalcopyrite, tetraedrite, marcasite, sphalerite, digenite, bornite, and supergene and gangue minerals. Mineral determinations show two barite stages. First stage barite has tabular form, cleavage, and locally massive. Second stage barite has euhedral-subhedral and locally individual, locally combination with solution to each other. Based on the relations with host rocks of the mineralization, deposition forms, paragenesis, textures and the forming succession of minerals, the mineralization is epigenetic and of hydrothermal origin. It occurred at medium-low temperature of probably 100-200^{o}C, and formed from mixing fluids of different waters with interacted with host rocks.

Keywords: Taurus-Turkey, barite-sulfides, deposition forms, mineralogy, epigenetic

MINERALOGICAL AND GEOCHEMICAL PROPERTIES OF HYDROTHERMAL ALTERATIONS: DARIDERE AREA, ISPARTA, SW TURKEY

Assistant Betul Coskun Onal[1]

Assistant Prof. Dr. Oya Cengiz[2]

[1]University of Firat, **Turkey**
[2]University of Suleyman Demirel, **Turkey**

ABSTRACT

In the study area, the volcanic rocks of Miocene-Pliocene Golcuk formation have undergone intense alteration. Due to alteration, the rocks have become losing primary compositions and have an appearance of gray, white, beige, brown, and greenish-yellow. Alteration types of the study area are argillation, alunitization, silicification, and limonitization. Mineral contents of the alterations are feldspar, illite, simectite, kaolinite, jarosite, quartz, amorphous silica, opal, dolomite, hematite, limonite, pyrite, gypsum, and calcite. The alterations show the enrichment for Al_2O_3, Na_2O, and K_2O. Mineralogical analyses indicate that high values may be come from feldspar, illite, kaolinite and zeolite of Al_2O_3, feldspar and clay minerals of Na_2O and K_2O, opal, quartz and amorphous silica of SiO_2. Ba-Sr, Ni-Co and Pb-Cu-Zn-As contents of the alterations have a weak enrichment. The mineral assemblage and trace element contents of alterations suggest the solutions of hydrothermal origin. The alterations have derived from commonly felsic and locally mafic volcanic rocks of Golcuk formation. In addition, it may be considered as enriching on locations of volcanic rocks that the elements such as Ba, Sr, Ni and Co from basic-ultrabasic rocks of Gokcebag Complex, transporting by various effects.

Keywords: Isparta-Turkey, hydrothermal alteration types, mineral content, element enrichments, original rocks

MINERALOGICAL-GEOCHEMICAL FORECASTING METHOD OF THE TYPES OF GOLD-ORE DEPOSITS IN PLATFORM AREAS

Dr. Zinaida Nikiforova

Diamond and Precious Metal Geology Institute, Siberian Branch, Russian Academy of Sciences (DPMGI SB RAS), **Russia**

ABSTRACT

For the first time, at the eastern Siberian platform, synthesis on mineralogical-geochemical features of placer gold was carried out, that allowed forecasting formation of Precambrian ore-gold deposits of gold-quartz-lowsulfide, gold-ferruginous-quartzite, gold-copper-porphyric and gold-platinoid formations, as well as gold-silver and gold-sulfide-quartz one, caused by Mesozoic tectonic-magmatic activation. Developed methods and approaches of the study of mineralogical-geochemical features of placer gold can be successfully used to forecast ore-gold deposits at other platforms.

Keywords: placer gold**,** formation types, mineralogical-geochemical, method, Siberian platform

MINERALS WITH HYDROGEN BONDS AND THE POSSIBILITY OF THEIR PRACTICAL IMPORTANCE

Associate Professor Farida Rafikova,
Professor Edward Khakimov,
Associate Professor Elena Kubyshkina
Kazan (Volga) Federal University, **Russia**

ABSTRACT

The article briefly presents the facts detection of hydrogen bonds in minerals, showing the abundance and diversity of these links in different classes of minerals and examining the use of these minerals in various industries

Hydrogen bonds are widely distributed in nature, organic and inorganic compounds. Hydrogen bonds are marked in different classes minerals. The composition of minerals in the hydrogen form may include ammonium ion, hydroxyl ion and water. Minerals with hydrogen bonds are widespread in nature and may form an intermediate between inorganic and organic matter.

The hydrogen bond is a bond that is formed between the hydrogen atom of one molecule and atom of the element (O, N, F) of another molecule. Hydrogen bonds are also formed in the compound molecule, which atoms are bonded inside strong covalent bond with other molecules of water [1].

The mechanism of the hydrogen bond is partially electrostatic nature, partly donor-acceptor.

The hydrogen bond is weaker than ionic or covalent bond but stronger than usual intermolecular interaction. According to its energy (3-8 kcal / mol), hydrogen bond occupies an intermediate position between the van der Waals interactions (shares kcal / mol) and typical chemical bonds (tens of kcal / mol) [3].

Keywords: Minerals, hydrogen bonds, zeolite, silicates, hydroxides

NANOMINERAL COMPLEXES OF BURIED WEATHERING CRUST OF THE EAST OF THE RUSSIAN PLATE

Assoc. Prof. Dr. Lyalya M. Sitdikova

PhD Elena U. Sidorova

Kazan Federal University, **Russia**

ABSTRACT

In the deep horizons of the East of the Russian plate the formation of buried weathering crust - a prospective reservoir zone - is developed. This work is devoted to the studying of features of forming of nanomineral complexes of the clay minerals which form the hollow space of this formation.

Keywords: weathering crust, nanominerals, aggregates, clusters, clay minerals

NEOTECTONICS INFLUENCE ON THE SAFETY OF URANIUM TAILINGS WITHIN DNIPRODZERZHYNSK INDUSTRIAL SITE IN THE DNIPROPETROVSK REGION OF UKRAINE

Junior Researcher Yuliia Yuskiv,

Doctor of Geology, Valentin Verkhovtsev

Institute of Environmental Geochemistry of National Academy of Sciences of Ukraine (Kyiv), **Ukraine**

ABSTRACT

The results of large-scale (1:25 000) neotectonics mapping within Dniprodzerzhynsk industrial site in the Dnipropetrovsk region of Ukraine are given. Neotectonic mapping was made on the basis of morphosructural methods. The active linear and ring structures at the latest stage of development and summary amplitudes of late Pliocene-Quaternary vertical crustal movements are specified and characterized. Neogeotectonic study of this area allows to determine the degree of influence of recent activity geostructures features and their activation impact on rock properties (physical, mechanical, filtration and other) on which objects of study are located. Therefore it allows to identify possible direction of radionuclides and toxic compounds migration in groundwater aquifers and mines. The location area safety of tailings facilities and uranium production waste of the Dneprodzerzhinsk industrial site by neotectonic criteria is evaluated.

Keywords: neotectonics, linear and ring structures, summary amplitudes of late Pliocene-Quaternary vertical crustal movements, tailings.

NEW DATA ON SEISMIC DEFORMATIONS OF SHARGA DEPRESSION (THE MONGOLIAN ALTAI)

Dr. Sofya Platonova

Institute for Water and Environmental Problems, Russian Academy of Sciences, Siberian Branch, **Russia**

ABSTRACT

The paper presents the data on the modern morphogenesis of Sharga depression located in the southeastern end of the Mongolian Altai. The morphometric and morphological studies of the Sharga fault zone were made in the northern part of the depression. As a result, the data specifying denudation processes rates in this part of the Mongolian Altai were obtained. To determine the age of a strong earthquake that gave rise to the formation of the ancient buried tectonic scarp of 9860±185 years, radiocarbon dating was used.

Keywords: seismic deformations, Mongolian Altai

NEW GEOCHRONOLOGICAL DATA FOR THE KAZDAG GROUP IN KAZDAG MASSIF (NW TURKEY) AND THEIR SIGNIFICANCE IN THE REGION

Assist. Prof. Dr. Ayten Çalık

Assoc. Prof. Dr. Mustafa Bozcu

Çanakkale Onsekiz Mart University, Faculty of Engineering, Department of Geological Engineering, Terzioglu Campus, Çanakkale **Turkey**

ABSTRACT

We provide new isotopic data from the Kazdag Massif which is the metamorphic basement of the Sakarya Zone, a micro continental fragment in NW Anatolia, which substantiate the presence of a Precambrian basement tectonically overlain by a Palaeozoic oceanic crust assemblage consisting of meta – ultramafic rocks. The Kazdag metamorphic rocks are divided into two groups: the Kazdag group (the lower unit) and the Ayıdere group (the upper unit). The Kazdag group consists of gneisses with marble and amphibolite intercalations, overlain tectonically by metaophiolitic rocks. Metaophiolitic rocks are mainly represented by metadunite, metapyroxenite, layered metagabbro, serpentinite and amphibolite. The Ayıdere group consists of marble and schist lithology sequence at the base and upward amphibolite, metagranite, and metapelitic rocks.

LA – ICP –MS dating of the zircons from samples (A10- A11-A12) of amphibolite of the Kazdag group yielded $^{206}Pb/^{238}U$ age of 546.0±8.1 Ma and 548 ± 7.3 Ma. The internal structure as revealed from CL images and overall high Th/U (up to 1.16) suggest their magmatic origin. LA – ICP –MS dating of the zircons from two samples (A7 and A27) of amphibolite of the Kazdag group yielded $^{206}Pb/^{238}U$ age of 73.3±1.7 Ma (A7) and 149±0.87 Ma (A7). The internal structure as revealed from CL images and overall low Th/U (0.02-0.4) suggest their metamorphic origin. These we interpret as Late Precambrian - Early Cambrian ages of original rock formation (crystallization), its subsequent Jurassic and Cretaceous metamorphism in ages. This Paleozoic oceanic crust might be remnant of the Paleo Tethys Ocean in the region.

Keywords: Kazdag metamorphic rocks, metaophiolite, the Kazdag group, north-western Turkey

NEW RESULTS OF MINERALOGICAL RESEARCH OF THE MOST BASIN AREA - BRAŇANY LOCALITY

RNDr. Michal Řehoř, Ph.D.[1],
ing. Pavel Schmidt[1],
Zdeněk Dvořák[2]
[1] Brown Coal Research Institute, j.s.c., Most, **Czech Republic**
[2] North Bohemian Mines, j.s.c., Chomutov, **Czech Republic**

ABSTRACT

New results of mineralogical research of the Most Basin area between Ústí nad Labem and Klášterec nad Ohří cities are the object of the article. Main attention is dedicated to new locality Braňany. We collected 30 samples, their X – Ray diffraction analyses realised in the Brown Coal Research Institute laboratory gave lots of interesting findings. We identified ankerite, dolomite, aragonite, barite, goethite, opal, calcite, quartz and phillipsite. The discovery of high quality samples of rare mineral melanophlogite was the main result of our research.

Keywords: research, geology, mineralogy, melanophlogite

ORE-BEARING METASOMATIC FORMATIONS IN AREAS OF DEEP-SEATED FAULTS

PhD Yelena Glushkova

Diamond and Precious Metal Geology Institute, Siberian Branch, Russian Academy of Sciences (DPMGI SB RAS), **Russia**

ABSTRACT

Ore metasomatites, which occur widely in the regional fault zones and are genetically unrelated to magmatic formations, seem to have a significant metallogenic potential. One can assume that ore-bearing hydrothermal-metasomatic rocks are common not only within the limits of shields but also in platform areas with a thick sedimentary cover, where regional fault zones confined to intracontinental paleorifts are promising for the discovery of ore metasomatites.

Keywords: metasomatite, deep-seated fault, gold content, Siberian platform

RELATIONSHIP ELEMENTAL COMPOSITION AND FORMATION OF PHASES IN THE ORES OF THE NORILSK TYPE

Assoc. Prof. Dr. Anatoly Mashukov
Assoc. Prof. Dr. Alla Mashukova
Svetlana Ponomareva
Svetlana Bistryakova
Siberian Federal University, **Russia**

ABSTRACT

Using the methods of X-ray and Mössbauer spectroscopy, scanning electron microscopy, there were studied the samples of Norilsk ore types in order to identify compounds containing Cu, Ni, Co. The presence of native elements and intermetallic show a reducing mode of ore formation processes. The magnetic phase has the spectrum composed of two six-linear spectrums. The peaks on the spectrum borders show the oxide presence. Most of the bulk of Cu, Ni is not dissipated in the crystal lattices of the ore, but it is part of the ore sulphides. The presence of the characteristic structures of the solid solutions decomposition shows a wide temperature range of sulphide crystallization.

Keywords: ores of the Norilsk type, X-ray, Mössbauer spectroscopy, scanning electron microscopy.

RESULTS OF STUDY THE RARE METAL ORE MINERALIZATION OF THE SELECTED AREAS IN CENTRAL AFRICA

Dr. Kulyash Dyussembayeva

Dr. Adilkhan Baibatsha

Dr. Aimkhan Kassenova

Master Erkhozha Mamanov

Dr. Saltanat Assubayeva

Kazakh National Technical University named after K.I Satpayev in Almaty, **Kazakhstan**

ABSTRACT

The areas of the rare metal ore mineralization (Burenge, Nyanza, Majuri, Santa Maria, Perimeter Ammg) are located on the territory of the Republic of Burundi in 250 km from the capital city Bijumbura (Central Africa). For a preliminary assessment of these areas on the tantalum-niobium ore mineralization have been selected placer samples and studied. Their prospects on the rare metal ore mineralization are revealed.

Keywords: rare metal ore mineralization, minerals of tantalum and niobium, rare earths

ROLE OF ANCIENT WEATHERING CRUSTS OF THE EAST OF THE RUSSIAN PLATE IN STUDYING OF THE DEEP HORIZONS

PhD Elena U. Sidorova

Assoc. Prof. Dr. Lyalya M. Sitdikova

Kazan Federal University, **Russia**

ABSTRACT

Due to the prospects of hydrocarbons content of the deep horizons of the east of the Russian plate the study of the mineral-geochemical features of the rocks of the basement is actual. The great information is given by carrying out deep drilling and analysis of the core material of the bore holes, which revealed the buried weathering crusts on the border of the sedimentary cover and the basement.

Keywords: weathering crust, crystalline basement, deep horizons**,** minerals

SEDIMENTATION CONDITIONS AND PETROGRAPHIC COMPOSITION OF ORE-BEARING ROCK STRATA OF DEPOSITS ZHESKAZGAN

Prof. Baibatsha A.B.[1]

Prof. Mushinsky A.[2]

Dr. Bekbotayev A.T.[1]

PhD-student Bekbotayeva A.A.[1]

[1]Kazakh National Technical University named after K.I.Satpayev in Almaty, **Kazakhstan**

[2]Adam Mickevich University in Poznan, **Poland**

ABSTRACT

Ore-bearing stratum of Zheskazgan ore district has a cyclic structure. Each cycle begins layers of coarse-grains rocks, sandstones and finely ends dispersed clastic rocks. Detailed petrographic studies of ore-bearing rock strata showed a mixed composition. The main parameters of the sedimentation conditions include physical conditions: the density and viscosity of sediment-environment, pool depth, speed, direction and stability of the flow. By chemically sediment conditions are redox reaction, salinity and temperature of the medium. Tectonic activity area and climate are also important factors of depositional area.

Keywords: Gray and red colored sandstones, Zhezkazgan deposit, underwater delta

SOLAR-TERRESTRIAL RELATIONS IN CENTRAL ASIA PALEOARCHIVES

Dr. Dmitriy Ovchinnikov[1]

Dr. Alexandr Mordvinov[2]

Dr. Ivan Kalugin[3]

Dr. Andrey Darin[3]

Dr. Vladimir Myglan[4]

[1] Institute of Forest SB RAS, Krasnoyarsk, **Russian Federation**
[2] Institute of Solar-Terrestrial Physics SB RAS, Irkutsk, **Russian Federation**
[3] Institute of Geology SB RAS, Novosibirsk, **Russian Federation**
[4] Siberian Federal University, Krasnoyarsk, **Russian Federation**

ABSTRACT

A solar-terrestrial relations were examined using millennium-scale paleoclimatic data from the Central Asia mountain region. The paleoclimatic data were based on non-varved lake sediments of the Teletskoye lake and temperature-sensitive long tree-ring width chronologies from the Altai region (Altai Mountains, South Siberia, Russia) in the late Holocene (2000 years). Also a solar-activity during late Holocene was used to analyze. Core of the bottom sediments from the Teletskoe lake (Altai Mountains) were investigated using scanning X-ray fluorescent analysis method with synchrotron radiation (spatial resolution is 0.1 mm). A method ensemble empirical mode decomposition (EEMD) was used to extract low-frequency variability from all presented paleoarchives. The results obtained for paleodata indicate palaeoclimatic oscillations in the range of the de Vries (Suess) (~200-year) solar cycles through the late Holocene. Evidence of the influence of solar activity on global climatic processes and terrestrial ecosystems is discussed.

Keywords: ensemble empirical mode decomposition (EEMD), lake sediments, tree-ring width chronologies, solar-terrestrial relations

THE INTERNAL STRUCTURE OF THE THIRD TERRACE OF THE RIVER GAUJA AND IMPLICATIONS OF ITS INTERPRETATION ON PALEOHYDROLOGICAL RECONSTRUCTIONS

Māris Krievāns

University of Latvia, **Latvia**

ABSTRACT

The main outlines of the drainage network in Latvia results from the retreat of the last Scandinavian Ice Sheet. Studies in evolution of the largest river valleys and their comprehensive geomorphological analysis started in sixties and early seventies of the previous century. Some later major focus was directed on modern alluvial processes. Geological and geomorphological research in smaller valley forms was not systematic and was paid less attention. Only in the last decade an analyses of smaller river terraces, channel profiles and litofacies in the lower reaches, particularly in their junction with a main river are proceed.

This paper presents series of results which were obtained from several outcrops of the River Gauja valley span, known as the Gauja spillway. Field observations were combined with mapping of terrace levels, gullies and tributaries. In order to understand the internal structure of terraces hand-drilled boreholes were made, lithological composition and textures of sediments were studied, and lithofacies analysis of the sediment units was performed in outcrops. The detailed environmental reconstruction was based on all available data combined into lithofacies description and interpretation.

Lithological composition, textures and facies analysis of some outcrops give evidence on accumulation of sediments in basin, supposedly in glaciolacustrine environment but not alluvial origin as it was interpreted in previous studies. Still uncertain is question about genesis of River Gauja terrace III. In previous studies both highest terraces of the lower complex (terrace III and II) were correlated to levels of the stage Bgl II and phase Bgl IIIb of the Baltic Ice Lake. Sediment depositional environment was interpreted as oxbow lake and floodplain members. The latest studies of the outcrop exposing internal structure of the "riser" of terrace III on the right bank of the river north of the farmhouse "Dukuļi" testifies sediment deposition in palaeobasin contacting with dead ice. Such interpretation is also supported by evidence of supraglacial till lenses located in the lower part of the outcropped section. Only upper part of the cross section testifies sediment accumulation environment as alluvial or alluvial-lacustrine which was produced as a result of the water drainage from meltwater basin. After palaeobasin leaking, the River Gauja valley cutting and erosion terrace formation started. According to geological and geomorphologic evidences, then river cut and its bed gradually narrowed.

Keywords: Fluvial architecture, Alluvial deposits, Late-glacial, geomorphology

THE KAPELKA SILVER PROSPECT: GEOCHEMICAL STRUCTURE AND CHARACTERISTICS OF ORE FORMING PROCESS

PhD Ildar Kalko[1]

PhD Evgeny Vlasov[1]

Dr. Vsevolod Prokofiev[1]

Dr. Yury Nikolaev[1]

PhD stud. Yulia Sidorina[1]

PhD stud. Ilya Bugaev[1]

Chief Geol. Viktor Usenko[2]

[1] Lomonosov Moscow State University, **Russia**
[2] LLC Regional Mining Company, **Russia**

ABSTRACT

The Kapelka Ag-Au prospect is located in the Western Chukchi Peninsula, Russia. The mineralization is hosted by Upper Cretaceous volcanic rocks of the Okhotsk-Chukchi Volcanic Belt (OChVB). Wallrock alteration and ore bodies are associated with NE and NNE trending faults.

The LS and base metal types of mineralization are predominant at the Kapelka prospect. Ore bodies occur as stockwork and veinlet systems. Major alteration types are propylitic, argillic and secondary quartzite. High grades of main components were determined in ore samples: 1.5% Ag, 12% Pb, 2.2% Cu, 0.8% Zn and 27 ppm Au; gold silver ratio is from 1:100 to 1:3500. The anomalous geochemical field is widespread. The composition of secondary halos is corresponding to the one of primary ore.

Propylites are composed of epidote, chlorite, K-feldspar, quartz. The main minerals of argillic rocks are tosudite, montmorillonite, dickite and quartz. Propylitic and argillic rocks were formed at the temperature of 330-365 and 110-300°C respectively (the Cathelineau thermometer [1]). Gangue minerals include quartz, adularia, sericite and others. Ore minerals are pyrite, arsenopyrite, galena, sphalerite, chalcopyrite, bornite, electrum, polybasite-pearceite, acanthite and tetrahedrite-tennantite. Native silver, acanthite, anilite, brochantite, anglesite, cerussite, malachite, azurite and wulfenite represent supergeneous assemblage. Homogenization temperatures of fluid inclusions vary from 167 to 353ºC, salinity is within the range of 0.2-1.4 wt. % NaCl equiv. Pressure estimated for fluid boiling at the temperature of 353ºC is 16MPa corresponding to the ore formation depth of 0.6 km.

According to geology, wallrock alteration and composition of geochemical anomalies, the closest analogue of Kapelka is the Zhilny prospect nearby the large Au-Ag epithermal Valunistoye deposit, the Eastern Chukchi Peninsula. Future exploration will clarify the parameters of the ore bodies and economic prospects of Kapelka.

Keywords: silver, gold, Chukchi Peninsula, ore forming process, geochemical prospecting

THE PERMIAN-TRIASSIC GOLD MINERALISATION OF THE NORTH-WESTERN ALTAI-SAYANY FOLDED REGION

Dr. Alexandr I. Chernykh

Siberian Research Institute of Geology, Geophysics and Mineral Resources, **Russia**

ABSTRACT

The Altai-Sayany folded region is characterized by a long history of exploration and mining of gold. Here several metallogenic zones and clusters of gold mineralization are distinguished, varying in formation conditions and age. Based on analysis of the isotope-geochronological, geological and metallogenic data one can distinguish five metallogenic epochs in the formation of gold ore potential within the Altai-Sayany folded region. The gold mineralization of Permian-Triassic age is the least studied within the Altai-Sayany region. The Permian-Triassic age of gold mineralization is determined in those areas, where the gold mineralization is superimposed on a relatively young rocks of Late Paleozoic and Early Mesozoic ages. There are several sites (Kundel, Konyukhta, Legostaevo) with established Permian-Triassic gold mineralization. The article presents the characteristics of the such sites containing the Permian-Triassic gold mineralization. The conclusion is made about the widespread gold mineralization in the Altai-Sayany folded region. This type of mineralization takes its regular position in a number of different mineralization types of this metallogenic epoch. The formation of such mineralization probably is concerned with plume mantle-crustal basic and granitoid magmatism.

Keywords: gold, metallogeny, Permian, Triassic, Altai-Sayany folded region

THE RESULTS OF ANALYTICAL METHODS APPLIED IN THE STUDY OF ORGANIC MATTER CONTAINED IN THE CARBONIFEROUS CLASTIC SEDIMENTS

Ing. Miloš Duraj, Ph.D. [1],

Ing. Silvie Heviánková, Ph.D [2],

prof. Dr.Ing. Miroslav Kyncl [2],

Assoc. Prof. Ing. Marian Marschalko, Ph.D [1],

Prof. Dr. Isik Yilmaz [3]

[1] VŠB-Technical University of Ostrava, Faculty of Mining and Geology, Institute of Geological Engineering, Ostrava, **Czech Republic**
[2] VŠB-Technical University of Ostrava, Faculty of Mining and Geology, Institute of Environmental Engineering, Ostrava, **Czech Republic**
[3] Cumhuriyet University, Faculty of Engineering, Department of Geological Engineering, Sivas, **Turkey**

ABSTRACT

The objective of the work is to determine the total percentage of organic matter in the coal deposit sediments. Such obtained data provides important information, for example, about the conditions under which the deposit originated. In practice, the information may be used in the decision-making about particular uses of the surrounding rocks as well as about the use of the raw materials. Using a variety of methods, measurements were carried out with different representatives of clastic sediments. Samples were drawn from the Saddle Member of the Karviná Formation within the Czech part of the Upper Silesian Basin.

Keywords: coal substance, coal, Carboniferous, Saddle Member, Upper Silesian Basin, Czech Republic

THE STRATIGRAPHY OF THE CRETACEOUS DEPOSITS IN THE REGION OF RAHOVEC

Suka Q
Kelmendi Rr
Raci XH
ICMM (Independent Commission for Mines and Minerals), Prishtina, **Kosova**

ABSTRACT

After Neogene, Cretaceous covers the most part of the surface of Rahovec Region. It includes part of the Internal Dinarides and External parts of the Vardar zone. Cretaceous formation has a wider spread with diverse representation facies formed in different bathymetric environmental settings. Based on the presence of members of the Cretaceous, their unequal position in relation to older depositions and their different facial characteristics we have separated the two tectonic-stratigraphic belts of the Cretaceous deposits developments in the study area. Stratigraphy of Cretaceous deposits consists from:

1. Cretaceous carbonates of western belt (bauxite bearing): Spreading around of mountains Gremnik-Llapçeva -Shkoza-Pagarushë and Zatriq country. The Cretaceous period in this area is presented in two series: The Lower/Early Cretaceous and the Upper/Later Cretaceous. By the point of facial view, depositions of the Cretaceous series consist of: carbonate sediments of shallow waters, reef, Sub-reef sediments (Carbonate Turbidity), littoral and pelagic limestone. The higher spreads have the deposits of the Upper/Later Cretaceous than the Lower/Early Cretaceous: Based on the studies of the biostratigraphy and the features of the lithofacies of some outcrops of selected cross sections we have distinguished these divisions of facial disposal.
2. Cretaceous carbonate-clastic of the eastern belt (non-bauxite bearing): Are spread widely from Pograde in the North, towards Southeast in Panorc village, finishing in Rahovec city. The Sferka transfers tectonic detachment separates Eastern Belt in the two sectors: southern sector, where they meet the older facies of the Lower Cretaceous Barrem-Apt and Alb - Senomanian and Turonian-Senonian facies of the Upper Cretaceous. (Lonqareviq 1978, [4] Elezaj, Kodra 2008) [1] Noted the presence of the break among the turon neritic limestone and pelagic sediments of the senonian /marly/.

   In the North and East sector, there were missing the Lower Cretaceous facies and it is noticed the transgressive placement of the senonian pelagic limestone directly above the ultrabasic rocks.

Keywords: Stratigraphy, deposits, cross section, belts and fossil.

THE VISEAN - SERPUKHOVIAN BOUNDARY DEPOSITS AND FORAMINIFERA'S SECTION AKTOBE IN BIG KARATAU (SOUTH KAZAKHSTAN)

Prof. Adilkhan Baybatsha[1]
PhD-student Sezim Mustapayeva[1]
Dr Valentina Zhaimina[2]
Prof. Zdislaw Belka[3]

[1]Kazakh National Technical University named after K.I Satpayev in Almaty, **Kazakhstan**
[2]Institute of Geological Sciences named after K.I Satpayev in Almaty, **Kazakhstan**
[3]Adam Mickiewicz University in Poznan, **Poland**

ABSTRACT

M. Marfenkova was the first scientist who recognizes foraminiferal zones in the Big Karatau Mountains in 1991. Paleontologist V. Zhaimina recognized foraminiferal zones in the same region in 2006. Those researches were continued by S.N. Mustapaeva, V. Zhaimina, A. Baybatsha and J. Belka in 2012.

In the Aktobe section, the lower part of the Upper Viséan interval composed of alternating wackestone, packstone and grainstone beds (Baktysay Formation) contain debris flow breccia with corals and brachiopods. Wackestones contain conodonts. The middle part of this interval contains an algal buildup with brachiopods (boundstone). This is part of the Akuyuk reef complex. The Upper Serpukhovian interval is composed of packstone-grainstone alternating with wackestones and containing a breccia bed. The section is capped by the Akuyuk reef complex composed of algal-bryozoan boundstone with foraminifers, brachiopods and corals.

Both shallow and deep-water facies contain assemblages of Upper Viséan and Lower Serpukhovian foraminifers. The base of the Serpukhovian is currently drawn at the level of the first appearance of *Janischewskina delicate*. The research group found new results on foraminifers *Janischewskina delicata* in Aktobe section in the Big Karatau Mountains. Local correlation of deep and shallow carbonate facies is based on species of *Neoarchaediscus* and *Janischewskina*.

Keywords: *Janischewskina delicata*, serpukhovian, visean, Big Karatau, Aktobe section.

TRACE METALS IN STREAM SEDIMENT OF KOSOVA BASED ON STATISTICAL ANALYSIS OF LEAD, ZINC, COPPER, NICKEL, CHROMIUM AND COBALT

Prof. Asoc. Dr. Naser Peci[1], Prof. Dr. Zenun Elezaj[1],
MSc. Ramiz Krasniqi[2], MSc Berat Sinani[2], MSc. Selim Berisha[3]

[1] Faculty of Geosciences - University of Mitrovica, **Kosovo**

[2] Independent Commission for Mines and Minerals (ICMM), **Kosovo**

[3] Exploration geologist, **Kosovo**

ABSTRACT

The studies presented in this paper dealing with trace metals in stream sediments and are intended to selecting promising areas in which to prospect for metalliferous ore bodies. Geochemical exploration for ore deposits and metalliferous regions is based on the concept that the products of weathering and erosion of rocks are mainly distributed in local soils, plants and stream sediments.

Results of stream sediment geochemical analysis were taken by the Independent Commission for Mines and Minerals (ICMM) and comprise entire territory of Kosovo. Within the surveyed area a total of 3240 samples of stream sediment were collected and analyzed. In this paper are taken in consideration results for the trace metals lead, zinc, copper, nickel, chromium and cobalt.

The concept of a geochemical anomaly as a concentration level above some arbitrarily chosen background or "threshold" value for a particular element cannot be applied rigorously to regional variations over a large area encompassing different geologic regions with widely different rock types. Consequently, we adopted the procedure of determining the frequency distribution for each trace metal and of defining anomalies in terms of the statistics.

The geochemical results were explored using a range of common statistical techniques including descriptive summary statistics, statistical distribution and correlation analysis for selected trace metals.

Statistical analysis and interpretation the geochemical results from stream sediment sampling for trace metals lead (Pb), zinc (Zn), copper (Cu), chromium (Cr), nickel (Ni) and Cobalt (Co) indicates that there are potential areas for increased exploration on these metals. It is recommended to continue the presented investigations by verification activities including mapping, litho-geochemistry, trenching, drilling.

Keywords: geochemical exploration, stream sediments, trace metals, geochemical anomaly, statistical analysis

WHISKERS AND SPHEROCRYSTALS, AS RARE FORMS OF NATIVE GOLD FROM OCCURRENCE NIYAKHOYSKOE-2 IN THE POLAR URALS, RUSSIA

Assoc. Prof. Dr. Tatyana Mayorova[1,2]

Senior geologist Tatyana Arteyeva[3]

Senior researcher Vasily Philippov[1]

[1]Institute of geology Komi SC, Ural branch of RAS, **Russia**
[2]Syktyvkar State University, **Russia**
[3]ZAO "Gold Minerals", **Russia**

ABSTRACT

The study is devoted to the problem of mineralogy gold-bearing weathering crusts and oxidation zones on the Niyakhoyskoe-2 ore occurrence in the Polar Urals. Along with the typical gold crystals and anhedral particles electron-microscopic analysis showed rare and unique forms of gold – whiskers and spherocrystals in oxidized ore. The structure of whiskers and their aggregates is described in the paper. Electron-microscopic and X-ray analysis' data allowed to determine "spherical" gold particles as spherocrystals formed as a result of continuous splitting of whiskers. Gold whiskers and spherocrystals are new growth in conditions of oxidized ores.

Keywords: gold, whiskers, spherocrystals, the Polar Urals.