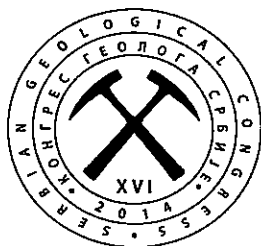


**Српско геолошко друштво  
Serbian Geological Society**

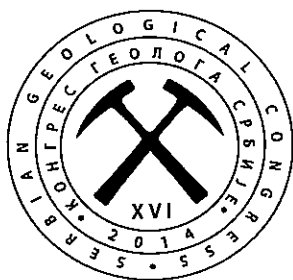
**Програм  
XVI Конгреса геолога Србије**



**Programme  
of the XVI Serbian Geological Congress**

**ОПТИМАЛНО ИСТРАЖИВАЊЕ И ОДРЖИВО  
КОРИШЋЕЊЕ ГЕОЛОШКИХ РЕСУРСА**

**OPTIMAL RESEARCH AND SUSTAINABLE USAGE OF THE  
GEOLOGICAL RESOURCES**



## XVI КОНГРЕС ГЕОЛОГА СРБИЈЕ

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Nemanja Krstekanić, Bojan Kostić, Marija Zečević, Nikola Vojvodić

**22. Maj / 22. May 2014**

Регистрација / Registration	09.00-11.00
Свечано отварање и поздравни говори / Opening ceremony – welcome addresses Председавајући / Chairs: Aleksandar Grubić, Marko Komac, Vladica Cvetković, Aleksey A. Vashkevich, Zoran Stevanović Uvodni referat / Introductory speech: Zoran Stevanović	11.00-12.00
Коктел добродошлице, ручак / Cocktail, Lunch	12.00-14.00
<b>Plenarni referati – Sala I (do recepcije)</b> <b>Plenary reports – Hall I (next to reception desk)</b>	
SKETCH OF THE ĐERDAP'S AREA GEOLOGY Aleksandar Grubić	14.00-14.30
ONEGEOLOGY – GEOSCIENCE DATA AT THE TOUCH OF A BUTTON Marko Komac, Francois Robida, Tim Duffy	14.30-15.00
STANJE I POTENCIJALI MINERALNIH RESURSA ISTOČNE SRBIJE STATUS AND POTENTIAL OF MINERAL RESOURCES OF EASTERN SERBIA Rade Jelenković	15.00-15.30
O KENOZOJSKOM MAGMATIZMU SRBIJE – REČIMA KOJE RAZUME SVAKI GEOLOG ABOUT CENOZOIC MAGMATISM IN SERBIA – BY WORDS UNDERSTANDABLE TO EVERY GEOLOGIST Vladica Cvetković	15.30-16.00
СТРАТИГРАФИЈА, ПАЛЕОНТОЛОГИЈА И ТЕКТОНИКА STRATIGRAPHY, PALAEOLOGY AND TECTONICS – Sala I (do recepcije) Hall I (next to reception desk)	
Председавајући / Chairs: Tudor Berza, Nenad Banjac	
RHODOPE EVOLUTION IN THE HEART OF BALKAN GEOLOGY Ivan S. Zagorchev	16.30-17.00
THE LAKE PANNON – SERBIAN SIDE OF THE STORY Dejan Radivojević, Imre Magyar, Marten ter Borgh, Ljupko Rundić	17.00-17.15
STABLE ADRIA AND THE EXTERNAL DINARIDES: TECTONIC MODELS IN THE CONTEXT OF JURASSIC-CRETACEOUS PALEOMAGNETIC RESULTS Emő Márton, Vlasta Čosović, Alan Moro	17.15-17.30
MAJOR PHASES OF NEOGENE-QUATERNARY TECTONIC EVOLUTION OF THE SOUTH-EASTERN PART OF PANNONIAN BASIN Ivan Dulić, Snežana Marjanović, Vladislav Gajić, Goran Bogicević	17.30-17.45
ПРЕЛИМИНАРНИ РЕЗУЛТАТИ О РЕЦЕНТНОЈ ТЕКТОНСКОЈ АКТИВНОСТИ ИНТЕРНИХ ДИНАРИДА НА ОСНОВУ ФОКАЛНИХ МЕХАНИЗАМА ЗЕМЉОТРЕСА PRELIMINARY RESULTS ON RECENT TECTONIC ACTIVITY OF THE INTERNAL DINARIDES BASED ON FOCAL MECHANISMS OF EARTHQUAKES Ana Mladenović, Branislav Trivić, Vladica Cvetković, Radmila Pavlović	17.45-18.00
RAZVOJ ASIMETRIČNIH BASENA: JARANDOLSKI BASEN ARCHITECTURE OF ASYMMETRICAL SEDIMENTARY BASINS: JARANDO BASIN Nevena Andrić, Vladimir Simić, Dragana Životić	18.00-18.15
ПАЛЕОМАГНЕТСКИ РЕЗУЛТАТИ И РЕЗУЛТАТИ МЕРЕЊА АНИЗОТРОПИЈЕ МАГНЕТСКЕ СУСЦЕПТИБИЛНОСТИ МИОЦЕНСКИХ СЕДИМЕНАТА ЦЕНТРАЛНЕ И ЗАПАДНЕ СРБИЈЕ PALEOMAGNETIC AND MAGNETIC ANISOTROPY RESULTS FROM MIOCENE SEDIMENTS OF CENTRAL AND WESTERN SERBIA Vesna Lesić, Emő Márton, Vesna Cvetkov, Slobodan Knežević, Dragana Tomić	18.15-18.30
RETSKI KAT GORNJE JABLANICE NA ZLATIBORU (JZ SRBIJA) THE RETIAN OF GORNJA JABLANICA (ZLATIBOR Mt., SW SERBIA) Darivojka Ljubović-Obradović, Divna Jovanović, Rodoljub Gajić	18.30-18.45

<b>ХИДРОГЕОЛОГИЈА HYDROGEOLOGY</b>	
<b>Sala II – sprat iznad recepcije Hall II – floor above reception</b>	
Председавајући / Chairs: Petar Milanović, János Szanyi	
О ПОТРЕБИ ФОРМИРАЊА НОВЕ НАЦИОНАЛНЕ МРЕЖЕ ЗА МОНИТОРИНГ ПОДЗЕМНИХ ВОДА У СРБИЈИ ON THE NEED TO SET UP A NEW NATIONAL GROUNDWATER MONITORING NETWORK IN SERBIA Zoran Stevanović, Vesna Ristić Vakanjac, Saša Milanović	16.20-16.45
HIDROGEOLOŠKE SPECIFIČNOSTI KARSTA I NJIHOVE POSLEDICE CONSEQUENCES OF HYDROGEOLOGICAL PARTICULARITIES IN KARST Petar Milanović	16.45-17.00
THE SUSTAINABLE USE OF GEOTHERMAL ENERGY AT UNIVERSITY OF SZEGED János Szanyi, Balázs Kóbor, Tamás Medgyes	17.00-17.15
ODREĐIVANJE GARANTOVANOG PROTICAJA NA KARSTNIM VRELIMA SA VELIKIM SEZONSKIM OSCILACIJAMA / DETERMINATION OF GUARANTEED DISCHARGE (FLOW) AT KARST SPRINGS WITH LARGE SEASONAL FLUCTUATIONS Saša Milanović, Ljiljana Vasić, Tina Dašić	17.15-17.30
KARAKTERIZACIJA KARSTNE IZDANI NA OSNOVU REZULTATA VREMENSKIH SERIJA – NA PRIMERU IZVORIŠTA NEMANJA I SVETA PETKA KARST AQUIFERS CHARACTERISATION ON THE RESULTS OF TIME SERIES – CASE EXAMPLES OF NEMANJA AND SVETA PETKA SOURCES Igor Jemcov	17.30-17.45
INTEGRISANO KORIŠĆENJE HIDROGEOTERMALNIH RESURSA U OBJEKTIMA INDUSTRIJSKE NAMENE-PRIMER OBJEKAT KOMPANIJE „DOKA SERB“ U ŠIMANOVcima INTEGRATED USE OF HYDROGEOTHERMAL RESOURCES IN THE INDUSTRIAL FACILITIES- CASE STUDY “DOKA SERB” COMPANY IN SIMANOVCI Dejan Milenić, Đuro Milanković, Ana Vranješ	17.45-18.00
ХИДРОГЕОЛОШКИ ИСТРАЖУВАЊА ЗА ОБЕЗБЕДУВАЊЕ НА ПОДЗЕМНА ВОДА ЗА ПОТРЕБИТЕ НА „СКИ ЦЕНТАР ВОДНО“ HYDROGEOLOGICAL INVESTIGATIONS FOR THE PROVISION OF GROUNDWATER AT THE SKI RESORT OF MAVROVO Nikola Dimov, Marko Markov, Elizabeta Raleva, Stojan Mihailovski, Vladimir Kostovski	18.00-18.15
МЕЛИОРАТИВНА ХИДРОГЕОЛОШКА ИСТРАЖИВАЊА ЈУЖНЕ ВАРДАРСКЕ ДОЛИНЕ MELIORATIVE HYDROGEOLOGIC INVESTIGATIONS OF THE SOUTH VARDAR VALLEY Zlatko Iljovski, Stojan Mihailovski, Marko Markov, Nikola Dimov	18.15-18.30
SANACIJA I ZATVARANJE HAVARISANE BUŠOTINE D-7 LOKALITET KREMENICA-MEDŽITLIJA (BITOLJ – MAKEDONIJA) REMEDYING AND PLUGGING OF BLOWN-OUT WELL D-7 IN THE KREMENICA-MEDŽITLIJA AREA (BITOLA, MACEDONIA) Dimitar Petrov, Silvana Pesovska, Marinko Eftimov	18.30-18.45
HIDROGEOLOŠKE KARAKTERISTIKE, REŽIM ISTICANJA I BILANS VODA BELOG VRELA (VRELO TOLIŠNICE, SRBIJA) / HYDROGEOLOGICAL CHARACTERISTICS AND DISCHARGE REGIME OF WHITE SPRING (SOURCE OF THE TOLISNICA RIVER, SERBIA) Marina Čokorilo Ilić, Vesna Ristić Vakanjac, Sibela Oudech, Dušan Polomčić, Dragoljub Bajić	18.45-19.00
OSNOVNE KARAKTERISTIKE IZDANSKOG TOKA KARSTNIH VODA SVRLJIŠKIH PLANINA I SUVE PLANINE / GENERAL CHARACTERISTICS OF KARST GROUNDWATER FLOW OF SVRLJIŠKE PLANINE MT. AND SUVA PLANINA MT. Branislav Petrović	19.00-19.15
HIDROGEOLOŠKE STRUKTURE KOSTOLACKOG UGLJONOSNOG BASENA HYDROGEOLOGICAL STRUCTURE OF COAL BASIN IN KOSTOLAC Željko Kljajić, Branimir Lazić, Miloško Lazić, Olivera Krunić	19.15-19.30
POTENCIJAL ZA EKSPLOATACIJU PODZEMNIH VODA DIJELA KAPINA POLJA-NIKŠIĆ POTENTIALITY FOR GROUNDWATER EXPLOITATION OF THE KAPINA POLJA PART- NIKŠIĆ Slavko Hrvačević	19.30-19.45

<b>23 Maj / 23 May</b>	
<b>НАФТНА ГЕОЛОГИЈА И ГЕОФИЗИКА PETROLEUM GEOLOGY AND GEOPHYSICS</b>	
<b>- Sala I (do recepcije) Hall I (next to reception desk)</b>	
Председавајући / Chairs: Ivan Dulić, V.A. Kosmynin	
KOLGAN TERRIGENOUS FORMATION OF RUSSIAN PLATFORM: SEDIMENTATION PRECONDITIONS OF HYDROCARBON POTENTIAL Kosmynin V.A., Kuzmin D.A	9.00-9.30
SPECIAL ASPECTS OF SEISMIC FACIES ANALYSIS IN CLINIFORM'S COMPLEX Yr.Filippovich, O.Zaharova, V. Ananiev, T.Olneva	9.30-9.45
PRIMENA TEHNOLOGIJE BUŠENJA MALIM PREČNIKOM (SLIM HOLE) ZA ISTRAŽIVANJE KOMPLEKSNIH LEŽIŠTA UGLJOVODONIKA APPLICATION SLIM HOLE DRILING TEHNOLOGY (SLIM HOL) RESEARCH COMPLEX LOCKS OF HYDROCARBONS Milan Lončarević, Zoran Rakić	9.45-10.00
EXPERIENCE IN APPLICATION OF THE CONCEPTUAL MODELS OF THE FIELDS DEVELOPED BY THE COMPANY GAZPROM NEFT Redina S.A., Kurmanov P.U	10.00-10.15
UNCONVENTIONAL OIL AND GAS – EFFICIENT WORKFLOWS FOR EXPLORATION RISK AND RESOURCE ASSESSMENTS, AN EXAMPLE FROM ALASKA (USA) Darko Spahić, Bjorn Wygrala	10.15-10.30
RESERVOIR CHARACTERIZATION USING STOCHASTIC AND DETERMINISTIC SEISMIC INVERSION Shestakova G.M., Zakharova O.A., Timoshenko A.A	10.30-10.45
PROSPECTIVE RESOURCES AS A CENTRAL IMPORTANCE REPLACEMENT OF RESOURCE POTENTIAL РЕСУРСЫ СЗ – ПЕРВООЧЕРЕДНАЯ ВОЗМОЖНОСТЬ ВОСПОЛНЕНИЯ РЕСУРСНОЙ БАЗЫ Ekaterina Egorova	10.45-11.00
СЕЙСМОРАЗВЕДКА И ЭЛЕКТРОРАЗВЕДКА В 3D: КОМПЛЕКСИРОВАНИЕ ГЕОФИЗИЧЕСКИХ МЕТОДОВ ДЛЯ ПОВЫШЕНИЯ ЭФФЕКТИВНОСТИ ПРОГНОЗА КОЛЛЕКТОРОВ Kubishta I.I. Pavlovskiy J.V	11.00-11.15
ANALIZA I OBRADA KAROTAŽNIH MERENJA ZA POTREBE IZRADE SEIZMIČKE INVERZIJE I PROGNOZE PETROFIZIČKIH PARAMETARA NA OSNOVU 3D SEIZMIČKIH PODATAKA WELL LOG PROCESSING AND ANALYSIS FOR SEISMIC INVERSION AND PREDICTING OF PETROPHYSICAL PARAMETERS DISTRIBUTION Stevan Doroškov, Aleksandar Ristović	11.15-11.30
Председавајући / Chairs: Miroslav Starčević, Aleksandar Ristović	pauza
GEOMAGNETIC INVESTIGATIONS OF THE ORE DEPOSITS AT LOCATION PRIJEPOLJE, SERBIA Spomenko J. Mihajlović, Miroslav Starčević	12.00-12.15
PRIMENA GEOELEKTRIČNIH ATRIBUTA I PSEUDO 3D INTERPRETACIJA PODATAKA DOBIJENIH UKRŠTENIM KVADRATNIM RASPOREDOM U KLASTIČNOM DEPOZICIONOM SISTEMU THE APPLICATION OF GEOELECTRICAL ATTRIBUTES AND PSEUDO 3D INTERPRETATIONS OF DATA OBTAINED BY CROSS-SQUARE DISTRIBUTION IN A CLASTIC DEPOSITIONAL SYSTEM Branislav Sretenović, Ivana Vasiljević, Vesna Cvetkov, Bojan Brodić	12.15-12.30
СТАНДАРДИЗАЦИЈА ПОПРАВКИ ПРИ РАЧУНАЊУ ГРАВИМЕТРИЈСКИХ АНОМАЛИЈА У СРБИЈИ STANDARDIZATION IN REDUCTION FOR CALCULATION OF GRAVITY ANOMALIES IN SERBIA Ivana Vasiljević, Snežana Ignjatović, Branislav Sretenović, Oleg Odalović	12.30-12.45
ГЕОМАГНЕТСКИ ПРЕМЕР НА ТАЧКАМА ДРУГОГ РЕДА РЕПУБЛИКЕ СРБИЈЕ GEOMAGNETIC SECOND ORDER SURVEYS AT SERBIA D.Andrejić, D. Popeskov, M. Mihajlić	12.45-13.00
ПРАЋЕЊЕ ПРОМЕНА ГЕОМАГНЕТСКОГ ПОЛЈА, ПАРАМЕТАРА АТМОСФЕРЕ И ЗЕМЛЈОТРЕСА У ПРОЈЕКТУ FP7 BLACKSEAHAZNET	

MONITORING OF EARTHQUAKES, GEOMAGNETIC FIELD AND ATMOSPHERE PARAMETER IN FP7 BLACKSEAHAZNET PROJECT Milena Cukavac, Strachimir Cht. Mavrodiev, Lazo Pekevski, Spomenko J. Mihajlovic	13.00-13.15
PRIMENA SEIZMIČKE INVERZIJE I MULTIATRIBUTIVNE ANALIZE PRI INTERPRETACIJI 3D SEIZMIČKIH PODATAKA KIKINDE 2013 THE APPLICATION OF SEISMIC INVERSION AND MULTIATTRIBUTE ANALYSIS FOR INTERPRETATION OF 3D SEISMIC DATA KIKINDA 2013 Janko Sovilj	13.15-13.30
<b>ЕКОНОМСКА ГЕОЛОГИЈА И РУДНА ЛЕЖИШТА ECONOMIC GEOLOGY AND ORE DEPOSITS</b>	
<b>- Sala I (do recepcije) Hall I (next to reception desk)</b>	
Председавајући / Chairs: Rade Jelenković, Vladimir Simić	
GEOLOGY AND MINERALIZATION OF THE NEW COOPER AND GOLD DISCOVERY SOUTH OF BOR – TIMOK MAGMATIC COMPLEX Miodrag Banješević, Duncan Large	16.30-17.00
GENERALNI OSVRT NA MINERALNU EKONOMIJU U SAVREMENIM USLOVIMA ODRŽIVOG RAZVOJA GENERAL REVIEW OF MINERAL ECONOMY IN MODERN CONDITIONS OF SUSTAINABLE DEVELOPMENT Radule Tošović	17.00-17.15
ZNAČAJ PRIMENE MODERNOG I EFIKASNOG MENADŽMENTA LJUDSKIH RESURSA U MINERALNOM SEKTORU THE IMPORTANCE OF MODERN AND EFFECTIVE HUMAN RESOURCE MANAGEMENT IN THE MINERAL SECTOR Radule Tošović	17.15-17.30
ОДРЖИВО ПЛАНИРАЊЕ АГРЕГАТА У ЈУГОИСТОЧНОЈ ЕВРОПИ - ЗАШТО И КАКО SUSTAINABLE AGGREGATES PLANNING IN SOUTHEAST EUROPE – WHY AND HOW? Vladimir Simić, Dragana Životić, Nevena Andrić, Zoran Miladinović	17.30-17.45
GEOLOŠKE KARTE KAO PODLOGE ZA ODRŽIVO PLANIRANJE SNABDEVANJA AGREGATIMA (NA PRIMERU REPUBLIKE HRVATSKE) GEOLOGICAL MAPS AS BACKGROUND FOR SUSTAINABLE AGGREGATE SUPPLY PLANNING (EXAMPLE OF THE REPUBLIC OF CROATIA) Vladimir Simić, Slobodan Miko, Boris Kruk, Željko Dedić, Dragana Životić, Nevena Andrić, Zoran Miladinović	17.45-18.00
<b>МИНЕРАЛОГИЈА, КРИСТАЛОГРАФИЈА, ПЕТРОЛОГИЈА И ГЕОХЕМИЈА MINERALOGY, CRYSTALLOGRAPHY, PETROLOGY AND GEOCHEMISTRY</b>	
<b>Sala II – sprat iznad recepcije Hall II – floor above reception</b>	
Председавајући / Chairs: Vesna Matović, Suzana Erić	
THE ORIGIN OF VOLCANIC SECTION OF THE VARDAR OPHIOLITIC ZONE: A COMPARATIVE PETROLOGICAL AND GEOCHEMICAL STUDY OF LATE-CRETACEOUS VOLCANICS FROM MACEDONIA WITH THEIR JURASSIC COUNTERPARTS FROM BALKANS Prelević Dejan, Simon Wehrheim, Božović Milica, Rolf Romer, Blažo Boev	9.00-9.30
СТАРОСТ ВАРИСЦИЈСКИХ ГРАНИТОИДА ИСТОЧНЕ СРБИЈЕ ОДРЕЂЕНА LA ICP-MS U-Pb МЕТОДОМ НА ЦИРКОНИМА LA ICP-MS U-Pb ZIRCON DATING OF VARISCAN GRANITOIDES IN EASTERN SERBIA Kristina Šarić, Suzana Erić, Vladica Cvetković, Irena Peytcheva, Dragan Jovanović, Aleksandar Pačevski	9.30-9.45
MINERAL BEJKERIT KAO CEMENT U RASEDNOJ BREČI U DIJABAZIMA (MRČIĆI, DIVČIBARE) MINERAL BAKERITE AS A CEMENT IN FAULT BRECCIA IN DIABASE (MRČIĆI, DIVČIBARE) Nebojša Vasić, Đorđe Simić, Vladimir Simić, Predrag Dabić, Suzana Erić, Ilija Brčeski, Violeta Gajić, Predrag Vulić	9.45-10.00
KARAKTERISTIKE SUBKONTINENTALNOG OMOTAČA ISPOD JUGOISTOČNOG DELA LIBIJE CHARACTERISTICS OF THE SUBCONTINENTAL MANTLE BENEATH SOUTHEASTERN LIBYA Maša Radivojević, Suzana Erić, Salah M. Turki, Marinko Toljić, Vladica Cvetković	10.00-10.15
GEOHEMIЈА SAVREMENIH SEDIMENATA TISE I ĐERDAPSKOG JEZERA GEOCHEMICAL CHARACTERISTICS OF SURFACE SEDIMENTS FROM TISZA RIVER AND DJERDAP LAKE Milica Kašanin-Grubin, Nebojša Vasić, Snežana Štrbac, Dragoman Rabrenović, Vidojko Jović, Ilija Brčeski	10.15-10.30

PALEOZOIC OPHIOLITES OF THE DELI JOVAN MTS. (EASTERN SERBIA) Dragan Milovanović, Dušan Bjelotomić, Emin Memović	10.30-10.45
COMPOSITION OF ZONAL GARNETS FROM THE GARNETITE EXOSKARN OF THE ORE FIELD ROGOZNA (ROGOZNA MTS, SOUTHERN SERBIA) Danica Srećković-Batočanin, Nada Vasković, Stanoje Milutinović, Veroljub Ilić, Zoran Nikić	10.45-11.00
МИНЕРАЛОШКЕ, ПЕТРОЛОШКЕ И ГЕОХЕМИЈСКЕ КАРАКТЕРИСТИКЕ ЛИГНИТА ПОЉА РАДЉЕВО У КОЛУБАРСКОМ БАСЕИ MINERALOGY, PETROLOGY AND GEOCHEMISTRY OF LIGNITE IN THE RADLJEVO FIELD, THE KOLUBARA BASIN (SERBIA) Adam Dangić, Branislav Simonović, Dimitrije Dimitrijević, Spasenka Gajinov, Marko Babović, Jelena Milošević	11.00-11.15
CRNI KREČNJACI SA CRNIM ROŽNACIMA DONJE KREDE U SEVERNOM DELU KARPATO-BALKANIDA ISTOČNE SRBIJE (IZMEĐU ŽAGUBICE I MALOG KRŠA) BLACK LIMESTONE WITH BLACK CHERTS OF LOWER CRETACEOUS AGE IN NORTHERN CARPATHO-BALKANIDES (EAST SERBIA, BETWEEN ŽAGUBICA AND MALI KRŠ) Nebojša Vasić, Darivojka Ljubović-Obradović, Jastin Van der Torn, Danica Srećković-Batočanin, Dragana Davidović, Branislav Avramović	11.15-11.30
<b>ХИДРОГЕОЛОГИЈА</b> <b>HYDROGEOLOGY</b> <b>Sala II – sprat iznad recepcije</b> <b>Hall II – floor above reception</b>	pauza
Председавајући / Chairs: Veselin Dragišić, Ferid Skopljak	
GEOLOŠKO-HIDROGEOLOŠKE KARAKTERISTIKE LAJTOVAČKIH KREČNJAKA NA LOKALITETIMA "KREČANSKE JAME" I "PUARIŠTE" KOD LEŽIMIR GEOLOGICAL-HYDROGEOLOGICAL CHARACTERISTICS OF THE LEITHA LIMESTONE ON THE "KREČANSKE JAME" AND "PUARIŠTE" SITES, NEAR LEŽIMIR Milovan Rakijaš, Ljupko Rundić, Slobodan Knežević, Marija Kukavica	12.00-12.15
ПРИМЕНА ГЕОГРАФСКОГ ИНФОРМАЦИОНОГ СИСТЕМА У ИЗРАДИ КАРТЕ РИЗИКА ОД ЗАГАЂИВАЊА ПОДЗЕМНИХ ВОДА НА ПРИМЕРУ НАЦИОНАЛНОГ ПАРКА ЂЕРДАП USE OF GIS IN ASSESSMENT OF GROUNDWATER CONTAMINATION RISK MAP- CASE EXAMPLE OF NATIONAL PARK DJERDAP Vladimir Živanović, Veselin, Dragišić, Nebojša, Atanacković, Sunčica Ninković, Dejan Nešković	12.15-12.30
ANALIZA PROMENE KVALITETA PODZEMNIH VODA U PROCESU PRIHRANJIVANJA ALUVIJALNOG IZVORIŠTA "MORAVA-BRZAN" ANALYSIS OF CHANGES OF QUALITY OF GROUNDWATER DURING RECHARGE PROCESS OF ALLUVIAL SOURCE "MORAVA-BRZAN" Branislav Petrović, Vladimir Živanović	12.30-12.45
УТИЦАЈ КЛИМАТСКИХ ФАКТОРА И ПОВРШИНСКИХ ВОДА НА ПРВУ ИЗДАН СЕВЕРНЕ БАЧКЕ INFLUENCE OF CLIMATE FACTORS AND SURFACE WATER ON NORTHERN BACKA FIRST AQUIFER Milan Tomić	12.45-13.00
PRORAČUN IZDAŠNOSTI BUNARA SA MEĐUSOBNIM UTICAJEM NA IZVORIŠTU „SARAJEVSKA PIVARA“, SARAJEVO, BOSNA I HERCEGOVINA CALCULATING THE CAPACITY OF WELLS WITH MUTUAL DEPENDENCY AT "SARAJEVO BREWERY", SARAJEVO, BOSNIA AND HERZEGOVINA Ferid Skopljak	13.00-13.15
SMISAO FUZZY LOGIKE U HIDROGEOLOŠKOJ PRAKSI / THE PURPOSE OF FUZZY LOGIC IN HYDROGEOLOGICAL PRACTICE Dragoljub Bajić, Dušan Polomčić, Igor Jemcov	13.15-13.30
РУДНИЧКЕ ВОДЕ НАПУШТЕНИХ РУДАРСКИХ РАДОВА НА ПРОСТОРУ КАРПАТО-БАЛКАНИДА ИСТОЧНЕ СРБИЈЕ / MINE WATERS FROM ABANDONED MINING SITES IN CARPATHIAN-BALKAN AREA OF EASTERN SERBIA Nebojša Atanacković, Veselin Dragišić, Vladimir Živanović, Sava Magazinović, Sunčica Ninković	13.30-13.45
OVODNENOST LEŽIŠTA OLOVA I CINKA „KULA“ RUDNIK „GROT“ A.D. KRIVA FEJA DRAINAGE OF LEAD AND ZINC DEPOSIT „KULA“ MINE „GROT“ A.D. KRIVA FEJA Milojko Lazić, Marijela Petrović, Željko Kljajić, Nestor Miković	13.45-14.00
USLOVI OVODNENOSTI „CENTRALNOG POLJA“ LEŽIŠTA UGLJA „ŠTAVALJ“ KOD SJENICE (JUGOZAPADNA SRBIJA) / GROUNDWATER INFLOW CONDITIONS AT THE CENTRAL FIELD OF THE	14.00-14.15

ŠTAVALJ COAL MINE IN SJENICA (SOUTHWESTERN SERBIA) Branko Miladinović, Vesna Ristić Vakanjac, Dragomir Bukumirović, Boris Vakanjac	
ИЗГРАДЊА БУНАРА ВЕЛИКОГ ПРЕЧНИКА (БУНАР – РЕЗЕРВОАРА) НА ПОВРШИНСКИМ КОПОВИМА КОЛУБАРСКОГ БАСЕНА CONSTRUCTION OF LARGE DIAMETER WELLS (WELL-RESERVOIR) ON SURFACE MINES OF KOLUBARA BASIN Nikola Đukanović, Boris Vakanjac, Jasmina Madžgalj, Radoslav Penezić	14.15-14.30
Председавајући / Chairs: Vesna Ristić Vakanjac, Petar Dokmanović	
GEOTERMALNI POTENCIJAL I ISKORISTIVOST PODZEMNIH VODA U BANJAMA SRBIJE GEOTHERMAL POTENTIAL AND USABILITY OF GROUNDWATERS IN SERBIAN SPA RESORTS Petar Dokmanović, Olivera Krunić, Sava Magazinović	16.30-16.45
HEMOMETRIJSKI PRISTUP OBRADI PODATAKA U HIDROGEOLOŠKIM ISTRAŽIVANJIMA CHEMOMETRIC APPROACH TO DATA PROCESSING IN HYDROGEOLOGICAL RESEARCH Jana Štrbački, Marina Čuk, Maja Todorović, Jovana Milosavljević, Jakov Andrijašević	16.45-17.00
PRIMENA GEOHEMIJSKIH METODA PRI PROUČAVANJU HIDROGEOTERMALNIH RESURSA SRPSKOG KRISTALASTOG JEZGRA APPLICATION OF GEOCHEMICAL METHODS FOR STUDYING HYDROGEOOTHERMAL RESOURCES OF SERBIAN CRYSTALLIZATION CORE Tanja Petrović Pantić	17.00-17.15
HIDROHEMIJSKI REŽIM PODZEMNIH VODA IZVORIŠTA "KLJUČ" (JKP Vodovod i kanalizacija - Požarevac) QUALITATIVE CHARACTERISTICS OF WATER FROM "KLJUČ" SOURCE Branimir Lazić, Vladimir Lazić, Jovan Nikolić	17.15-17.30
NEPOGODNI TERENI ZA IZGRADNJU SANITARNIH KOMUNALNIH DEPONIJA SA HIDROGEOLOŠKOG ASPEKTA UNSUITABLE TERRAIN FOR CONSTRUCTING A SANITARY COMMUNAL LANDFILL FROM HYDROGEOLOGICAL POINT OF VIEW Milovan Rakijaš	17.30-17.45
HIDROGEOLOŠKO SAGLEDAVANJE TERENA U CILJU IZBORA POGODNIH LOKACIJA ZA IZGRADNJU SANITARNIH DEPONIJA U SRBIJI HYDROGEOLOGICAL FIELD OBSERVATIONS IN ORDER TO SELECT SUITABLE LOCATIONS FOR THE CONSTRUCTION OF SANITARY LANDFILLS IN SERBIA Milovan Rakijaš	17.45-18.00
<b>СТРАТИГРАФИЈА, ПАЛЕОНТОЛОГИЈА И ТЕКТОНИКА</b> <b>STRATIGRAPHY, PALAEOONTOLOGY AND TECTONICS</b> <b>Mala sala do recepcije</b> <b>Small hall next to reception desk</b>	
Председавајући / Chairs: Milan Sudar, Liubov Bragina	
ЛИТОСТРАТИГРАФСКИ ПРИНЦИПИ ИСТРАЖИВАЊА КВАРТАРА ПРИ ИЗРАДИ ГЕОЛОШКЕ КАРТЕ СРБИЈЕ У ПОСЛЕДЊИХ 50 ГОДИНА LITHOSTRATIGRAPHIC PRINCIPLES OF INVESTIGATION OF QUATERNARY DURING GEOLOGICAL MAPPING IN SERBIA IN THE LAST 50 YEARS Petar Stejić	9.00-9.15
ПЛЕИСТОЦЕНСКА ГЛАЦИЈАЦИЈА ЈУГО-ИСТОЧНЕ ЕВРОПЕ – ТЕОРИЈСКО МЕТОДОЛОШКИ ПРОБЛЕМИ / PLEISTOCENE GLACIATION IN THE SOUTHEASTERN EUROPE - THEORETICAL AND METHODOLOGICAL PROBLEMS Predrag Djurović, Mirela Djurović	9.15-9.30
ГРАНИЦЕ СРЕДЊЕГ ПЛЕИСТОЦЕНА У ЛЕСУ ВОЈВОДИНЕ BOUNDARIES OF MIDDLE PLEISTOCENE IN LOESS OF VOJVODINA Mladen Jovanović, Slobodan B. Marković, Ulrich Hambach, Tivadar Gaudenyi	9.30-9.45
CONODONTS AS AN INSTRUMENT OF GLOBAL CORRELATION BY THE EXAMPLE OF SOUTHERN SIBERIA (RUSSIA) AND EASTERN SERBIA S.A. Rodygin	9.45-10.00
MESOZOIC RADIOLARIA FROM CHERTS OF OPHIOLITE MÉLANGE OF AVALA MOUNTAIN (SERBIA) Nikita Bragin, Liubov Bragina, Nevenka Djerić, Marinko Toljić	10.00-10.15



<p>КВАНТИТАТИВНА АНАЛИЗА ПАЛЕОФАУНЕ БАТУРСКОГ РЗАВА – ЗАПАДНА СРБИЈА  QUANTITATIVE ANALYSIS OF THE FOSSIL FAUNA FROM THE BATURSKI RZAV RIVER – WESTERN SERBIA  Nenad Banjac</p>	10.15-10.30
<p>LATE CRETACEOUS RADIOLARIA FROM LIMESTONE SUCCESSION OF STRUGANIK QUARRIES, WESTERN SERBIA  Liubov Bragina, Nikita Bragin, Nevenka Djerić, Violeta Gajić</p>	10.30-10.45
<p>SIGNIFICANCE OF RADIOLARIAN BIOSTRATIGRAPHIC AGE CONSTRAINTS ON BASALTS AND RADIOLARITES FROM WESTERN SERBIA - GEODYNAMIC IMPLICATIONS  Nataša Gerzina, Nevenka Đerić</p>	10.45-11.00
<p>JURASSIC – EARLY CRETACEOUS RADIOLARIANS OF THE DANUBIAN NAPPES (EASTERN SERBIA)  Nevenka Đerić, Špela Goričan, Duje Kukoč, Nataša Gerzina, Dragoman Rabrenović</p>	11.00-11.15
<p>ПРЕЛИМИНАРНИ ПАЛЕОМАГНЕТСКИ И СЕДИМЕНТОЛОШКИ РЕЗУЛТАТИ КАМПАНСКИХ КРЕЧЪАКА БОСУТЕ, СРБИЈА  PRELIMINARY PALEOMAGNETIC AND SEDIMENTOLOGICAL RESULTS FROM CAMPANIAN LIMESTONE FROM BOSUTA, SERBIA  Vesna Lesić, Emő Márton, Vesna Cvetkov, Violeta Gajić, Dragana Tomić</p>	11.15-11.30
<p>Председавајући / Chairs: Nevenka Đerić, Karmen Fio</p>	pauza
<p>ПРВИ НАЛАЗАК ФОСИЛНИХ ИНСЕКТА У СРБИЈИ  THE FIRST FINDING OF FOSSIL INSECTS IN SERBIA  Zorica Lazarević, Jelena Milivojević</p>	12.00-12.15
<p>SREDNJOMIOCENSKI BRYOZOA S LOKALITETA PIVNICE (DILJ GORA, HRVATSKA)  MIDDLE MIOCENE BRYOZOA FROM THE LOCALITY PIVNICE (DILJ GORA, CROATIA)  Nives Posedi, Marija Bošnjak, Jasenka Sremac, Davor Vrsaljko</p>	12.15-12.30
<p>FOSSILNA HERPETOFAUNA I ZNAČAJ NJENOG PROUČAVANJA U SRBIJI  FOSSIL HERPETOFAUNA STUDIES IN SERBIA AND ITS SIGNIFICANCE  Dragana Đurić, Dragoslav Radosavljević</p>	12.30-12.45
<p>LARGE DEEP BURROWING BIVALVES IN MIDDLE MIOCENE (BADENIAN) OF CENTRAL PARATETHYS; EXAMPLES FROM NORTHERN CROATIA  Karmen Fio, Jasenka Sremac, Nikola Šoić</p>	12.45-13.00
<p>PLEISTOCENSKЕ GASTROPODE JUGOZAPADNE BAČKE IZ ZBIRKE PRIRODNJAČKOG MUZEJA  PLEISTOCENE GASTROPODS OF SOUTHWESTERN BAČKA IN COLLECTIONS OF NATURAL HISTORY MUSEUM  Biljana Mitrović</p>	13.00-13.15
<p><b>ИНЖЕЊЕРСКА ГЕОЛОГИЈА</b>  <b>ENGINEERING GEOLOGY</b>  <b>Мала сала до рецепције</b>  <b>Small hall next to reception desk</b></p>	
<p>Председавајући / Chairs: Kiril Angelov, Zoran Radić</p>	
<p>ZNAČAJ GEOTEHNIČКИХ ИСТРАЖИВАЊА ЗА POSTROJENJE ODSUMPORAVANJA DIMNIH GASOVA TERMOELEKTRANE UGLJEVIK I  SIGNIFICANCE OF GEOTECHNICAL INVESTIGATIONS FOR THE FLUE GAS DESULPHURIZATION PLANT OF THE THERMAL POWER PLANT "UGLJEVIK I"  Nedo Đurić</p>	13.15-13.30
<p>ИНЖЕНЕРСКОГЕОЛОШКИ КАРАКТЕРИСТИКИ НА КАРПЕСТИТЕ МАСИ НА ПРЕГРАДНОТО МЕСТО НА БРАНА "СЛУПЧАНСКА"  Ljupče Kulakov, Laste Ivanovski</p>	13.30-13.45
<p>ГЕОТЕХНИЧКА ИСТРАЖИВАЊА КЛИЗИШТА И МЕРЕ ЗАШТИТЕ МОСТА НА РЕЦИ ПЕК  GEOTECHNICAL INVESTIGATION OF LANDSLIDE AND PROTECTION MEASURES FOR THE BRIDGE OVER THE RIVER PEK  Branko Jelisavac, Petar Mitrović</p>	13.45-14.00

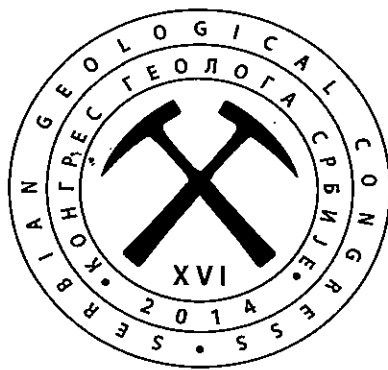
<b>ЕКОНОМСКА ГЕОЛОГИЈА И РУДНА ЛЕЖИШТА / МИНЕРАЛОГИЈА</b> <b>ECONOMIC GEOLOGY AND ORE DEPOSITS / MINERALOGY</b>	
<b>Mala sala do recepcije</b> <b>Small hall next to reception desk</b>	
Председавајући / Chairs: Mile Bugarin, Novica Stolić	
OCCURRENCE OF PEPERITE IN THE SOUTHEASTERN PART OF MONTENEGRO Novo Radulović, Dragan Milovanović, Damjan Čadenović, Martin Đaković	16.15-16.30
МИКРОХРАПАВОСТ ПУТНОГ АГРЕГАТА (ОД СТЕНА ОФИОЛИТА) У ХАБАЈУЋЕМ СЛОЈУ КОЛОВОЗНЕ КОНСТРУКЦИЈЕ MICRO ROUGHNESS OF ROAD AGGREGATES (FROM OPHIOLITE ROCKS) IN WEARING COURSE PAVEMENT STRUCTURE Olivera Đokić	16.30-16.45
VEROVATNO POREKLO JADARITA PROBABLE ORIGIN OF JADARITE Nadežda Krstić, Tatjana Milić-Babić	16.45-17.00
ТЕХНОГЕНО ЛЕЖИШТЕ НА ПРОСТОРУ СТАРОГ ФЛОТАЦИЈСКОГ ЈАЛОВИШТА У БОРУ (ПОЉЕ 1 И ПОЉЕ 2) TECHNOGENIC DEPOSIT IN THE AREA OF THE OLD FLOTATION TAILING DUMP IN BOR (FIELD 1 AND FIELD 2) Miroslava Maksimovic, Mile Bugarin, Vladan Marinković, Zoran Stevanović	17.00-17.15
QUALITATIVE-QUANTITATIVE FEATURES OF CLAY FROM THE SITE BAZERNIK (WESTERN MACEDONIA) Orce Spasovski, Daniel Spasovski	17.15-17.30
КВАРЦНИ ПЕСАКИ И ПЕСКОВИТА ГЛИНА ЛЕЖИШТА БОШЊАНЕ КАО СИРОВИНА ЗА ЦЕМЕНТНУ ИНДУСТРИЈУ QUARTZ SAND AND SANDY CLAY FROM THE BOŠNJANE DEPOSIT AS RAW MATERIAL FOR CEMENT INDUSTRY Miroslava Maksimović, Milenko Jovanović, Sladana Krstić, Goran Pačkovski, Marinko Pavlović	17.30-17.45
PROCEDURE FOR MARBLE CLASSIFICATION FROM BOREHOLES WITH PARTICULAR REFERENCES TO THE SIVEC MINE Mice Trkaleski, Blazo Bovev, Ilias Rigopoulos	17.45-18.00
<b>ГЕОЕДУКАЦИЈА, ЗАШТИТА ГЕОНАСЛЕЂА И ГЕОЕКОЛОГИЈА</b> <b>GEOEDUCATION, GEOHERITAGE AND GEOECOLOGY</b>	
<b>Sala Nacionalnog parka Đerdap</b> <b>Hall of the Đerdap National Park</b>	
Председавајући / Chairs: Aleksandra Maran Stevanović, Ljupko Rundić	
GEOZAŠTITA U SRBIJI: PROŠLOST, SADAŠNJOST, BUDUCNOST GEOCONSERVATION IN SERBIA: PAST, PRESENT, FUTURE Aleksandra Maran Stevanović	9.00-9.30
УЛОГА И ЗНАЧАЈ ГЕОЕДУКАЦИЈЕ У САВРЕМЕНОМ ДРУШТВУ ROLE AND IMPORTANCE OF GEOEDUCATION IN THE MODERN SOCIETY Ljupko M. Rundić, Marina M. Ilić	9.30-9.45
МЕТОДОЛОШКЕ ОСНОВЕ ЗА ПРОЦЕНУ ОБЈЕКТА ГЕОНАСЛЕЂА METHODOLOGICAL GUIDELINES FOR ASSESSMENT OF GEOHERITAGE SITES Aleksandra Maran Stevanović	9.45-10.00
„UPOZNAJ ZEMLJU - ZAVIRI U MIKROSKOP!“ - PROMICANJE GEOLOGIJE I GEOLOŠKE BAŠTINE „MEET THE EARTH-PEEK UNDER THE MICROSCOPE!„ - PROMOTION OF GEOLOGY AND GEOHERITAGE PROTECTION Lidija Galović, Marija Bošnjak	10.00-10.15
ЗАШТИТА И ПРЕЗЕНТАЦИЈА ГЕОЛОШКИХ ОБЈЕКТА У УРБАНИМ УСЛОВИМА THE PROTECTION AND PRESENTATION OF GEOLOGICAL SITES IN THE URBAN ENVIRONMENT Erna Šehovac, Milan Popović, Srećko Stefanović, Branka Lazović, Ljupko Rundić, Slobodan Knežević	10.15-10.30
ОСНОВНЕ ВРЕДНОСТИ ПОДРУЧЈА ЂЕРДАПА, ПОТЕНЦИЈАЛНОГ ГЕОПАРКА MAIN VALUES OF THE DJERDAP AREA, POTENTIAL GEOPARK Dragoman Rabrenović, Srdjan Belij, Ivana Mojsić, Mališa Mladenović	10.30-10.45

НЕОГЕН ИСТОЧНЕ СРБИЈЕ: ПОТЕНЦИЈАЛНИ ОБЈЕКТИ ГЕОНАСЛЕЂА THE NEOGENE OF THE EASTERN SERBIA: POTENTIAL GEOHERITAGE SITES Meri Ganić, Slobodan Knežević and Ljupko Rundić	10.45-11.00
A CONTRIBUTION TO THE INSIGHT INTO ĐERDAP GEOHERITAGE Dobriša Lukić, Dragan Milovanović	11.00-11.15
НАУЧНО-ИСТРАЖИВАЧКИ И ОБРАЗОВНИ РАД НА ЗАШТИЋЕНОМ ЛОКАЛИТЕТУ СПОМЕНИК ПРИРОДЕ „ПРЕБРЕЗА“ 3 SCIENTIFIC RESEARCH AND EDUCATIONAL ACTIVITIES AT THE PROTECTED SITE NATURE MONUMENT "PREBREZA" Zoran Marković, Miloš Milivojević, Sanja Alaburić, Ana Lović, Aleksandra Maran Stevanović	11.15-11.30 pauza
POTENCIJALNO TOKSIČNI MIKROELEMENTI U MRKIM UGLJEVIMA SRBIJE POTENTIALLY TOXIC TRACE ELEMENTS IN SERBIAN BROWN COALS Dragana Životić, Vladimir Simić, Ivan Gržetić	12.00-12.15
GEOCHEMICAL PROPERTIES OF SOIL AND ATTIC DUST AROUND THE BOR OPET PIT AND Cu SMELTER (SERBIA) Robert Šajn, Trajče Stafilov, Suzana Erić	12.15-12.30
GEONASLEĐE LEŽIŠTA MAJDANPEK (ISTOČNA SRBIJA) GEOHERITAGE OF THE MAJDANPEK ORE DEPOSITS (EASTERN SERBIA) Periša Živković, Dragan Milovanović, Aleksandra Maran Stevanović	12.30-12.45
ГЕОМИТОЛОГИЈА И ОБЈЕКТИ ГЕОНАСЛЕЂА У СРБИЈИ GEOMITOLOGY AND GEOHERITAGE OBJECTS IN SERBIA Mališa Mladenović, Srdjan Belij	12.45-13.00
PROJEKAT KARTA GEONASLEĐA PARKA PRIRODE „ŠARGAN-MOKRA GORA“ PROJECT GEOHERITAGE MAP OF THE NATURE PARK "ŠARGAN-MOKRA GORA" Milorad Kličković, Dragan Milovanović, Lidija Amidžić	13.00-13.15
МЕТЕОРИТИ МАРКИЗА ДЕ МОРОА У ЗБИРЦИ МИНЕРАЛА И СТЕНА РУДАРСКО-ГЕОЛОШКОГ ФАКУЛТЕТА MARQUISE DE MAUROY'S METEORITES IN THE COLLECTION OF ROCKS AND MINERALS AT THE FACULTY OF MINING AND GEOLOGY / Alena Zdravković	13.15-13.30
ПОТЕНЦИЈАЛ САМОНИКЛИХ БИЉНИХ ВРСТА У РЕМЕДИЈАЦИЈИ ОТКРИВКЕ РУДНИКА БАКРА У БОРУ, СРБИЈА POTENTIAL OF NATURALLY GROWING PLANT SPECIES FOR REMEDIATION OF MINE WASTES IN BOR, SERBIA Dragana Ranđelović, Slobodan Jovanović, Robert Šajn, Nevena Mihailović, Vladica Cvetković	13.30-13.45
РУДНИК ВЕЛИКИ МАЈДАН - ЈАЛОВИШТА И ОКОЛИНА MINE VELIKI MAJDAN - TAILINGS AND ENVIRONMENT Božidar V. Đokić	13.45-14.00
Председавајући / Chairs: Dragan Milovanović, Dragana Životić	
ГЕОТУРИСТИЧКИ ПОТЕНЦИЈАЛ ЈУВЕЛИРСКИХ МИНЕРАЛНИХ РЕСУРСА НАЦИОНАЛНОГ ПАРКА ФРУШКА ГОРА GEO TOURISM POTENTIAL OF GEMSTONE MINERAL RESOURCES OF NATIONAL PARK FRUŠKA GORA Zoran Miladinović	16.30-16.45
ГЕОНАСЛЕЂЕ ФРУШКЕ ГОРЕ - ВОДИЧ ЗА БИЦИКЛИСТЕ GEOHERITAGE OF FRUŠKA GORA - A GUIDE FOR CYCLISTS Ivan Rvović, Mladen Jovanović, Rada Šorak, Stefan Kotrla	16.45-17.00
SO <sub>2</sub> I UTICAJ NA ŽIVOTNU SREDINU – KOMPARACIJA ODABRANIH PRIRODNIH I VEŠTAČKIH IZVORA EMISIJE SO <sub>2</sub> ENVIRONMENTAL IMPACT – NATURAL AND ARTIFICIAL EMISSION SOURCES COMPARISON Bogoljub Vučković, Vesna Bogdanović, Biljana Radovanović	17.00-17.15
LINEAR AND NONLINEAR MODELLING IN THE STAVNJA VALLEY, BOSNIA AND HERZEGOVINA Jasminka Alijagić, Robert Šajn	17.15-17.30
РАНИЈИ СТРАТИГРАФСКИ МОДЕЛИ КВАРТАРА СРБИЈЕ – ОБЈАВЉЕНИ НА СТРАНИМ ЈЕЗИЦИМА THE PAST QUATERNARY STRATIGRAPHICAL MODELS FOR SERBIA – PUBLISHED IN FOREIGN LANGUAGES Tivadar Gaudenyi, Mladjen Jovanović	17.30-17.45

<p>ПАНИЈИ СТРАТИГРАФСКИ МОДЕЛИ КВАРТАРА СРБИЈЕ – ОБЈАВЉЕНИ НА СРПСКОМ ЈЕЗИКУ  THE PAST QUATERNARY STRATIGRAPHICAL MODELS FOR SERBIA – PUBLISHED IN SERBIAN LANGUAGE  Tivadar Gaudenyi, Mladjen Jovanović</p>	17.45-18.00
<b>POSTER SESIJA / POSTER SESSION</b>	
<p><b>Ulazni deo / Entrance hall</b>  Moderator: Tivadar Gaudenyi</p>	15.30-16.30
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<p><b>OKRUGLI STO: Zakonska regulativa i licenciranje geologa</b>  <b>ROUND TABLE: Legislation and licencing of geologists</b>  <b>Sala I (do recepcije) / Hall I (next to reception desk)</b></p>	18.00-19.30



## THE ORIGIN OF VOLCANIC SECTION OF THE VARDAR OPHIOLITIC ZONE: A COMPARATIVE PETROLOGICAL AND GEOCHEMICAL STUDY OF LATE-CRETACEOUS VOLCANICS FROM MACEDONIA WITH THEIR JURASIC COUNTERPARTS FROM BALKANS

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**Key words:** Ar-Ar dating, Zircon dating, ophiolitic basalts, Sr-Nd-Pb isotopes

Since the first appearance of the term “ophiolite” in 1813, its definition and interpretation was under consistent debate. First interpretation of ophiolites as being serpentinized peridotites associated with a suite of magmatic rocks evolved exclusively at the ocean floor extruded at mid ocean ridges (MOR) (e.g. Gass, 1968; Moores and Vine, 1971), was later doubted by Miyashiro (1973). Based on geochemical studies of the Troodos ophiolite (Cyprus), it was recognized close spatial and temporal occurrence of MOR-basalts with magmatic rocks typically showing subduction related calc-alkaline trend. Since then the evidence for an arc related origin of many Mediterranean ophiolites has hardened over decades, but the contrasting volcanic association of arc-lavas like boninites, arc tholeiites or adakites with MORBs was representing a long lasting conundrum. It was only recently recognized that this perplexing issue may be solved if the ophiolites formed during initiation of subduction within or near a ridge (Barth *et al.*, 2008, Barth and Gluhak, 2009; Reagan *et al.*, 2010; Pearce & Robinson, 2011, Božović *et al.*, 2013). In the recent decades worldwide studies of ancient and recent ophiolites and improvement of geochemical measurement techniques led to the idea of a broad geotectonic range of ophiolite generation (Dilek and Furnes, 2011). Although the magmatic origin of ophiolites in an ocean extension environment is unquestioned, Dilek and Furnes (2011) further subdivided ophiolites in supra-subduction zone, continental margin, mid-ocean-ridge, plume-type, volcanic arc and accretionary-type ophiolites.

Tethyan ophiolites crop out in the five major belts: Jurassic Alpine-Apennine belt of the Western Mediterranean, Jurassic Dinaride-Hellenide bodies of the Balkan Peninsula, Jurassic-Cretaceous ophiolites of Eastern Greece and Turkey, Late Cretaceous bodies of Southern Turkey, Cyprus to Oman and the Neogene Himalayan ophiolites (Moores *et al.*, 2000). A distinct feature of the Tethyan ophiolites is the geochemical variability between enriched MORB to highly depleted, commonly interpreted to be of suprasubduction zone signature (Moores *et al.*, 2000; Dilek and Furnes, 2011).

In the Balkan Peninsula, two ophiolitic belts are distinguished, that can be followed axially along its middle part: they are the Dinaride–Hellenide ophiolite belt in the southwest, and the Vardar belt to the northeast. They represent remnants of the Neotethys branch closed during Mesozoic subduction and collision (Robertson and Karamata, 1994; Karamata *et al.*, 2000; Dimitrijević, 2001; Karamata, 2006). The two ophiolite belts are either relics of two separate major branches of the Neotethys ocean with intervening continental blocks (Drina–Ivanjica and Pelagonian zone) that represent terranes separating these oceanic branches (Karamata, 2006), or they may represent a single thrust from the Triassic–Jurassic Vardar oceanic sequence (from the north) onto the Adria passive margin within a huge nappe system (Rampnoux, 1970; Aubouin, 1974; Schmid *et al.*, 2008). In this case the continental blocks represent tectonic windows. Together, the belts constitute one of the largest exposures of mantle rocks on Earth, with the several thousands of km<sup>2</sup> of olistostrome mélanges composed of large ultramafic bodies, cherts, gabbroic bodies, basaltic sheeted dyke complexes and volcanic sequences. Harzburgites and lherzolites occur as up to kilometre-sized bodies included in the mélange, and as large massifs (100–1000 km<sup>2</sup>) representing thrust sheets overlying the mélange.



The bulk of Balkan ophiolites are of Jurassic age, and only recently, the Sava-zone ophiolite of late Cretaceous age was differentiated, but only in its northernmost part (Kozara ophiolite; Karamata *et al.*, 2000, Karamata *et al.*, 2005, Robertson & Karamata, 1994, Ustaszewski, *et al.*, 2009). In this study we focus on the newly discovered ophiolitic outcrops in Macedonia, called Klepa block, for which our new age data reveal late Cretaceous age meaning that it represents a piece of an oceanic lithosphere within the Sava Zone. Our aim is to compare this ophiolite occurrence with its counterparts in Macedonia and further north in Serbia and Bosnia. The Klepa block is a 5 – 6 km NNW – SSE and 1 – 2 km WSW – ENE extending inselberg comprising dominantly of volcanic rocks. It is represented by an incomplete ophiolitic sequence on Klepa Mt with an age around 80 Ma. It is bordered towards east by a 10-m sized tectonic melange comprising of schistose serpentinite-bearing matrix. The Klepa Mountain has a height of 1150 m and is visible landmark. The top of Klepa is characterized by a dome-like structure. The volcanic rocks of the Klepa ophiolite sequence include pillows, sheet flows, columns, hyaloclastites, dikes and cumulates. The rocks are porphyritic, comprising of phenocrystic subhedral olivine pseudomorphs, augite, plagioclase and in some samples amphibole. The groundmass consists of tabular and acicular plagioclase and amphibole. Secondary minerals include chlorite, calcite, epidote, sericite and clay minerals. Dikes are crosscutting pillows sub-vertically, have variable thicknesses of 0.5 – 1.5 m and an overall E – W strike. The contact with the neighbouring rock is marked by a cm-thick chilled margin. On the top of Klepa Mountain, pyroxene-rich cumulates crop out forming a dome-like structure.

Based on mineralogy and geochemistry of the rocks, four rock types were identified: subalkaline transitional basalts, alkaline basalts, Ti-amphibole-bearing microgabbros and trachyandesites/trachytes. Alkaline and subalkaline transitional basalts have a porphyritic-aphanitic to aphanitic texture. They can form a sub-ophitic or intergranular diabase-like texture with a crystal-rich, coarser-grained, glass-poor matrix or a glass-rich porphyritic-aphanitic texture with varioles of plagioclase typical for rapid crystallization. Phenocrysts of plagioclase, clinopyroxene and relictic olivine are abundant in various combinations and amounts. Amphibole-bearing microgabbros show a microophitic texture of relictic hypidiomorphic plagioclase pseudomorphs and green hornblende. Trachyandesite and trachyte are leucocratic rocks with a typical porphyritic-aphanitic trachytic texture. These rocks contain phenocrysts of sanidine and rare amphibole. In spite of certain petrographic differences, the lavas show relatively uniform Sr and Nd and Pb isotopic compositions with a limited range of  $^{87}\text{Sr}/^{86}\text{Sr}_i$  and  $^{143}\text{Nd}/^{144}\text{Nd}_i$  plotting out of MORB array towards OIB field. The Pb isotope compositions of Klepa lavas are also invariable falling within the OIB field. Trace element patterns show small but regular variations of HFSE, indicating variable degrees of partial melting of a relatively homogeneously enriched mantle source. Comparison of Klepa data with limited geochemical data from Kozara Mt- late Cretaceous volcanics, reveals important resemblance. These geochemical features indicate that the Klepa and Kozara volcanic rocks were generated from an enriched, OIB-type (plume-type?) mantle source by different percent of partial melting. Our working tectono-magmatic model that can explain the geochemical variation observed in the Sava-zone volcanics either involve either plume-related seamounts or a type of fully rifted continental margin that is intermediate between the amagmatic Iberia/Ligurian Tethys type and the magmatic, plume-influenced East Greenland type.

When we compare Sava zone volcanics with the rocks from the volcanic sequence from Jurassic Balkans ophiolites, important differences arise. The petrological and geochemical composition of the Dinaric Ophiolite Unit rocks suggests mid-ocean ridge or back-arc origin. These rocks have depleted LREEs when compared to HREEs and radiogenic  $^{143}\text{Nd}/^{144}\text{Nd}$  isotopic composition similar to MORB source. The Western Vardar Ophiolite Unit rocks also show back-arc affinity based on the flat chondrite normalised REE patterns, HFSE negative anomalies and moderately radiogenic  $^{143}\text{Nd}/^{144}\text{Nd}$  composition. The Serbian Eastern Vardar Ophiolite Unit rocks show more pronounced subduction related geochemical characteristics. In this unit boninites (Serbia-Grcak) and, adakites and keratofires (Macedonia-Demir Kapija) are found which originate in a fore-arc region on the intraoceanic subduction system. The Macedonian Eastern Vardar Ophiolite Unit hosts rocks of both back-arc and island arc origin. In this unit mafic crust is characterised by rocks of back-arc origin. The rocks with adakitic affinity are found in this ophiolitic unit. The whole rock and mineral geochemistry record evidence for slab-derived melt

contribution to the source of these lavas. The melting of the slab is only possible during subduction of a young, hot oceanic crust initiated due to a ridge collapse. The Demir Kapija ophiolites is therefore interpreted as being generated due to subduction initiation at a back-arc basin (Božović et al., 2013).

In Summary, in none of Balkan ophiolitic provinces of Jurassic age geochemical and petrological association similar to one from late-Cretaceous Sava zone volcanics are observed. Our data suggest that Balkan ophiolites of different age demonstrate genetic differences in terms of volcanism that probably have triggered substantially different emplacement mechanisms.

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